Nursing Older People - Competence Evaluation Tool

Development and psychometric evaluation of an instrument measuring community-based nursing staff competence

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Menon asks Socrates:

"*How will you look for it, Socrates, when you do not know at all what it is? How will you aim to search for something you do not know at all? If you should meet with it, how will you know that this is the thing that you did not know?*" [1]

Abstract

This study aims to contribute to the assessment of quality of municipal elderly care by developing an instrument for measuring nursing staff competence. Competence measurements are well known and frequently used within nursing education and practice but less common in municipal elderly care, and they have not been conducted in Norwegian municipal elderly care. Improving the competence of employed staff is at the essence of quality improvement processes, and quality of care requires that all staff members have sufficient competence to provide safe care to patients. Competence is understood as a contextual, multi-faceted concept consisting of knowledge, skills and personal attributes. The individual competence of a practitioner is seen as inherently bound to the competence of other practitioners.

The purpose of this study was to develop and evaluate a competence measurement instrument for nursing staff working in nursing homes and home care services. The aims were achieved through three sub-studies: (1) A systematic literature review and evaluation of instruments measuring the competence of nursing staff in community health care, (2) Identification of the competence necessary to provide safe services to older people in Norwegian municipal elderly care, and (3) Questionnaire development, testing, and comprehensive evaluation.

The finding in Sub-study 1 was All instruments reviewed employed self-assessment as the main source of information. Self-assessment is found to be less valid in groups with low competence compared to groups with higher competence, and should therefore be supplemented with other methods for assessing competence, like testing. Although some instruments were evaluated for reliability and validity, all instruments reviewed fell short in terms of comprehensive instrument evaluation.

In Sub-study 2, the most relevant content of the new competence measurement instrument was found to be covered in 62 items within ten categories: health promotion and disease prevention, treatment, palliative care, ethics and regulation, assessment and taking action, covering basic needs, communication and documentation, responsibility and activeness, cooperation, and attitudes toward older people. Some competence items concerning advanced practices among nurses did not reach consensus, which conflicts with competence expected in government policy documents. The Nursing Older People - Competence Evaluation Tool (NOP-CET) was developed based on the items that reached consensus in Sub-study 2, and consists of a total of 346 questionnaire items. The NOP-CET measures the competence of registered nurses, assistant nurses, and assistants working with older patients in nursing homes and/or home care services. The questionnaire contains items of self-assessment and test-items, and employs seven different response formats.

In Sub-study 3, the NOP-CET was tested on 1016 nursing staff in ten municipalities. The NOP-CET was evaluated and found appropriate for its purpose of measuring community-based nursing staff competence. The NOP-CET was found to have good content validity and reliability, and acceptable construct validity. Precision was acceptable considering the wide

range of competence – from registered nurses to assistants – that the NOP-CET measures. The scores of the NOP-CET are easily interpretable when reported either item-by-item or in sum-scores. The instrument, which was considered acceptable for RNs and ANs, can be improved for assistants. Filling out the NOP-CET was found feasible for the municipalities taking part in the first survey.

This study contributes three aspects to the field of nursing practice, education and research. The first is a framework outlining what competence in municipal elderly care should consist of. Municipalities can use this framework to evaluate available competence and plan the competence to acquire in the future. The framework can be used when evaluating current education of nurses, and as a basis for international studies examining competence in community elderly care. The second contribution of this study is the new competence measurement instrument. The NOP-CET can be used to explore the competence of nursing staff employed in nursing homes, home care services, or entire municipalities. Finally, to decrease measurement error, this study advocates comprehensive instrument development procedures and instrument evaluation within nursing as a science.

Forord

En PhD-student utvikler seg ikke i et vakuum og en avhandling skrives ikke uavhengig av en kontekst. Selv om det i de siste årene har blitt lite tid til baking, vil jeg gi et bilde av konteksten for at denne avhandlingen nå er skrevet og trykt gjennom en kakeoppskrift. Ingrediensene i min PhD-kake har blant annet vært fire flotte veiledere, dyktige og støttende medstudenter, gode, interesserte venner, og en familie som har tatt alle forhold ved det at jeg har gjennomført en doktorgrad på en lett og selvfølgelig måte.

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Article 2

Bing-Jonsson, P. C., Bjørk, I. T., Hofoss, D., Kirkevold, M., & Foss, C. (2014). Competence in advanced older people nursing: development of ˈNursing older people - Competence evaluation toolʾ. *International Journal of Older People Nursing*. doi: 10.1111/opn.12057

Article 3

Bing-Jonsson, P. C., Hofoss, D., Kirkevold, M., Bjørk, I. T., & Foss, C. (In press). ˈNursing older people - Competence evaluation toolʾ: Development and Psychometric Evaluation. *Journal of Nursing Measurement*.

Abbreviations

ADL	Activities of Daily Living
AN	Assistant Nurse
CVC	Central Venous Catheter
EBP	Evidenced Based Practice
EKG	Electrocardiogram
ESAS	Edmonton Symptom Assessment System
IADL	Instrumental Activities of Daily Living
ICT	Information Communication Technology
IPLOS	Individuell Pleie- og Omsorgsstatistikk
KMO	Kaiser-Meyer-Olkin
KOSTRA	Kommune-Stat-Rapportering
LCP	Liverpool Care Pathway
MeSH	Medical Subject Headings
NOP-CET	Nursing Older People - Competence Evaluation Tool
OECD	Organization for Economic Co-operation and Development
PhD	Philosophiae Doctor
PRISMA	Preferred Reporting Items for Systematic reviews and Meta-Analyses
SPSS	Statistical Package for the Social Sciences
RN	Registered Nurse
SD	Standard Deviation
URL	Uniform Resource Locator
VAP	Venous Access Port
WHO	World Health Organization

1 INTRODUCTION

The Norwegian municipalities are responsible for providing necessary health care to their inhabitants, and for providing health care that holds good quality [2]. There are, however, reasons to doubt whether the municipalities are fulfilling the health care needs of their inhabitants and providing sufficient quality of care. Political developments in Norway have pushed more health care responsibilities onto the municipalities, including responsibility for greater parts of patients' trajectories [3]. The largest patient group in municipal health care is older patients of which many are frail with complex needs [4]. Still, relatively low qualified nursing staff is employed to take care of the conglomerate of patients and complex needs [5]. There are many reports of inadequate health care in municipal elderly care in terms of unmet needs, adverse events, and other threats to quality of care [6-11]. A general political worry, expressed through governmental white papers, is that there will be an increase in unmet patient needs in the near future due to the growing numbers and proportions of elderly people, the declining workforces in relation to the retired population, and the frequent use of low-qualified workers in municipal health care [3, 12-14]. A challenge facing Norwegian municipal health care is thus to meet the increasingly complex individual needs of patients with sufficient quality, particularly the elderly patients [15].

Quality of care requires that nursing staff possess the competence needed to meet complex health care demands [16]. Studies indicate that better quality of care, improved patient outcomes, and fewer adverse events are associated with higher levels of registered nurse staffing in health care [17-22]. Still, we know that approximately 30 % of the nursing staff in Norwegian municipal elderly care are assistants without any formal health care training [5], approximately 60 % of the staff – the assistant nurses – are qualified through a degree from upper secondary school [23], and that most of the staff have not had the opportunity to develop their competence in accordance with the increasing job demands [24]. Reports of adverse events indicate the need to investigate whether the competence available in Norwegian municipal elderly care is sufficient to meet complex patient needs. Studies examining nursing staff skills and expertise are called for [25, 26]. Indeed, evaluating nursing staff competence is of great importance [6, 27] because such assessment is vital for the development of strategies to enhance competence, thereby improving the quality of care [28, 29].

This study aims to contribute to the assessment of quality of municipal elderly care by developing an instrument to measure nursing staff competence. Competence measurements are well known and frequently used within nursing education and practice [30, 31], but less common in municipal elderly care, and they have not been conducted in Norwegian municipal elderly care. Furthermore, previous competence measurements have scored registered nurses alone, leaving the majority of nursing staff in municipal elderly care unassessed. In this study, the competence of registered nurses, assistant nurses, and assistants is considered important to deliver high-quality health care to patients; consequently, the competence of all groups of nursing staff is measured and assessed with the new instrument. The purpose of this study was

to develop and evaluate a competence measurement instrument for nursing staff working in nursing homes and home care services.

The study consists of three sub-studies: (1) A systematic literature review and evaluation of instruments that measure the competence of nursing staff in community health care, (2) Identification of the competence necessary to provide safe services to older people in Norwegian municipal elderly care, and (3) Questionnaire development, testing and comprehensive evaluation.

This thesis has nine chapters. Chapters 1 and 2 introduce the reader to the background of and the rationale for the study. Chapter 3 reviews the literature in terms of what is already known about required competence and available competence among nursing staff in community elderly care, and Chapter 4 states the aims of the study. In Chapter 5, a conceptual framework for the concept "competence" is elaborated. Chapter 6 describes the methods applied in this study by taking the reader through the methodological steps involved in the three sub-studies. Chapter 7 presents the results of the sub-studies, which are discussed in Chapter 8. Finally, Chapter 9 concludes the study by discussing implications for practice, education and further research.

2   BACKGROUND

2.1 Community health care

Community health care is the linchpin of effective health care. The World Health Organization (WHO) [32] defines community health care as an integration of health and social care services[1] which promote self-care, independence and family support networks. The term "community health care" covers a range of prevention and primary care services within the community, including health promotion and disease prevention; diagnostics, treatment and management of chronic and episodic illness; rehabilitation; and end of life care. Accordingly, community health care involves a range of health providers, including nurses, social workers, pharmacists, dieticians, public health practitioners and physicians. The ideal, as expressed by the WHO, is that community health care is based on the principles of universal accessibility, coverage on the basis of need, comprehensive care, emphasis on health promotion, and community involvement [33]. The WHO urges all countries to strengthen their health care systems through these democratic values and principles [34].

Community health care is, however, in constant evolvement. In Europe, new organisational developments in the care sector have been a common characteristic of contemporary health care politics [12]. During the past decades European health care systems have been subjected to reforms which include a move away from institutional care towards home care, a move away from public provisions towards private and mixed services, and a move towards services that complement rather than replace informal care provided by family, friends or neighbours [35]. These changes are, in part, results of an increasing older patient population in need of community health care and the economic burden this involves. The share of the population aged 80 years and over in member countries of the Organisation for Economic Co-operation and Development (OECD) is expected to more than double in the coming decade [36]. These demographic changes are expected to increase the demand for community health care, especially long-term care services [37]. Other demographic developments that increase the need for professional care are declining family size, the rise of female participation in paid labour, and increased mobility which all contribute to a decline of family carers [36]. Consequently, there will be high demands for labour and competence in community health care, especially long-term care, in the future.

In Norway, the municipalities (approximately 430 with populations ranging from 250 to 635,000) are responsible for providing community health care, which includes facilitating health promoting and preventive initiatives, curative treatment, as well as long- and short-term care in nursing homes and home care services. As most community health care services are run and financed by the municipalities, the term municipal health care will be used when referring to the Norwegian/Nordic setting. Norway has a health care system that is similar to

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[1] The degree of integration varies from country to country. In Norway health care and social care are organised under separate municipal units.

that of other Nordic countries and the United Kingdom; it is tax-based, most services are free-of-charge and the main actors are public [38]. Opposed to health care systems in most other European countries, Norwegian community health care is staff intensive; Norway relies more heavily on formal, as opposed to informal care than most other countries [6, 39]. The Act on Health and Long-term care [2] asserts the municipalities' responsibility for providing necessary health care to their inhabitants, including nursing homes and home care services. All municipal health care services have to abide by government quality demands, which involve meeting patients' basic physical and psycho-social needs [40, 41]. These quality demands have, however, been criticised for being too vague and lacking normativity. There is uncertainty about the minimum standard for necessary health care, particularly for home care services where there seems to be a large gap between patients' needs for services and the services they actually receive [42].

Older people form the largest population group receiving municipal health care in Norway. In 2011, 62 % of those receiving municipal health care were over the age of 67, while 45 % were above 80 years old [43]. The number of recipients of long-term care increased by 8 % during the period 2007-2012, of which the recipients of long-term care in nursing homes had the highest needs for extensive assistance. Meanwhile, there has also been a 9 % increase in recipients of home nursing, as well as an increase in amount of services for recipients of home nursing [44]. As home care services and nursing homes deliver the main bulk of care to older people in municipal health care, these two settings are investigated in this study. In order to distinguish services in municipal health care that are provided to people over the age of 67 (the general retirement age in Norway), the term "municipal elderly care" is used when referring to home care services and nursing homes in this thesis.

Home care is today an important arena for Norwegian municipal elderly care as most patients stay in their homes when they are in need of health care [45]. The official goal is that all citizens, regardless of their health status, shall live in their own homes for as long as possible, and, if needed, receive health care at home [46]. Home care is defined as the combination of long- and short-term care provided in people's homes [12]. Home care is provided to all age groups, but in this study, the patients of interest are the elderly patients (over 67). Nursing care in the home care setting consists mainly of assistance with personal hygiene, getting dressed, preparing meals, administering medication and performing treatment. Norwegian home care may be divided into three levels: (1) nursing care and practical help (highest level of care), (2) nursing care, and (3) practical help (lowest level of care) [47]. A study aimed at distinguishing formal from informal care (performed by relatives, friends and neighbours), showed that instrumental activities of daily living (IADL) such as laundry, house cleaning, shopping and snow shovelling, were mainly performed by informal care givers, and that nursing staff were allocated away from IADL and channelled towards patients requiring the highest level of care [48]. Despite complex health care needs, many people seem to possess a strong desire to remain at home [49], which demands tailoring "complex health care packages" for patients receiving home care [50]. Overall, the use of home nursing is increasing, whereas traditional domestic help in people's homes is declining [51], meaning

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that the nursing role is expanding towards the highest level of care and advanced nursing in Norwegian home care services.

Nursing home services are offered to the elderly who can no longer live at home because of sickness, disability, cognitive impairment and/or need for rehabilitation. Nursing homes have evolved from being solely long-term institutions to include short-term stays in the form of rehabilitation, terminal care and specialised medical units. Nursing homes are the most common institution-based health service in Norway. In 2012, 9898 patients were in short-term care and 34,013 patients were in long-term care. Most of the patients (77 %) were over 80 years old [44]. Within long-term care in nursing homes, four out of five patients received extensive assistance, i.e. a high level of care [44]. Alongside increasingly complex health care in nursing homes, there has been a development of turning nursing homes into more domestic settings by, for example, building smaller residential units and providing single rooms. This policy is founded in the ideal that nursing home is not only a place to receive nursing, but it is also a home [52], again indicating the breadth and complexity of competence expected of nursing staff in municipal elderly care.

As a result of developments in municipal elderly care, there has been a need for hospitals and municipalities to team up to ensure that patients receive the correct treatment at the right place, at the right time. Following the example of several other European countries [5], the Norwegian government proposed dramatic changes in the structure of Norwegian health care in 2008. These changes were formulated in the "The Coordination Reform", implemented in 2012, which emphasised increased collaboration between different sectors, levels and professions, as well as increased focus on health promotion and disease prevention [2, 3]. An important consequence of the Coordination Reform was that people in need of health care are now mainly meant to be treated in the municipalities where they live, i.e. outside hospitals. As the largest population group in need of health care is the elderly, the Coordination Reform affects this group the most. Fewer hospital beds and shorter hospitalisations mean that municipal elderly care, across home care and nursing homes, currently encompass follow-up of medical treatment from hospital stays and rehabilitation in addition to traditional elderly care [53, 54]. "The Care Plan 2015" emphasises this shift in attention towards municipal elderly care [46], i.e. more patients are allocated to municipal elderly care, especially home care services, which are meant to perform quite advanced nursing care and medical treatment, thus reducing the need for hospitalisation [51].

2.2 The patient population in municipal elderly care

In Norway, people are not entitled to a specified list of health care services; rather their rights to health care are defined by their needs. Norwegian law asserts that everybody has the right to necessary health care [2]; however, what is perceived as necessary in municipal elderly care is decided by the municipality. Many older persons suffer from complex medical, social and physical problems, such as unidentified geriatric problems (delirium, dementia, depression and malnutrition), unmet needs and missed diagnoses that require assessment and

problem solving [55]. In Norway, as in Europe at large, the patient population in receipt of municipal elderly care is characterised by multi-morbidity, poly-pharmacy and/or cognitive impairment [4, 6, 56, 57]. These characteristics cut across all municipal elderly care services, including home care and nursing homes [6, 12].

Old age is not characterised by single diseases or disabilities, but rather by multi-morbidity [58]. Multi-morbidity refers to the coexistence of two or more conditions in a patient [59], e.g. an older person might have diabetes, heart disease and cognitive impairment at the same time. Different combinations of cardiovascular and cerebrovascular diseases, vision and hearing impairments, arthritis, incontinence, dementia and depression are the major causes of disabilities in later life [60]. Multi-morbidity negatively influences quality of life and the ability of self-care [61], and is associated with significant increases in adverse events, hospitalisations and cost of care [7, 62].

Poly-pharmacy is defined as the consumption of multiple medications or administration of more medications than clinically indicated [63], and it is increasing among elderly people [64, 65]. In Norway, 20 % of people over the age of 70 are prescribed more than ten different drugs annually [66]. Several studies indicate that inappropriate drug use is a major reason for impaired health and function in the elderly [67] and potentially avoidable hospital admissions [68], and it could be lethal [69].

A large proportion of patients in receipt of municipal elderly care suffer from cognitive impairment in terms of declining memory and other cognitive abilities. Almost 83 % of all patients admitted to nursing homes suffer from dementia [70]. Clinically significant neuropsychiatric symptoms are common in these nursing home patients (66 %) [71] such as agitation, irritability, disinhibition, psychosis and apathy [72]. In home care cognitive impairment is also highly prevalent in the elderly (41.5 %), but only a minority of home-dwelling patients with cognitive impairment has received a dementia diagnosis (19.5 %), and a substantial part of these patients have neuropsychiatric symptoms (72.1 %) [73].

In sum, multi-morbidity, poly-pharmacy and cognitive impairment leave many old patients in a frail condition. This increasingly frail older patient population is now meant to receive most of their health care in the municipalities. Because of their frail condition, these impaired elderly patients face a high risk of hospitalisation and being "left in limbo" if proper health care is not assigned [74]. The worst scenario is that older people in need of health care do not receive adequate and sufficient health care in accordance with their needs. Adequate and sufficient nursing staff competence that meets the older patients' needs is therefore imperative.

2.3 Nursing staff in municipal elderly care

Nursing care at home and in nursing homes is labour-intensive, and all over Europe, nursing staff have a central position in elderly care [6, 27]. In a comparative study of home care across

Europe, Norway was found to be among the countries with the widest range of home-care professionals [12], and Norway was also among the countries with the highest use of formal carers [39, 75]. Typically, Norwegian municipal elderly care is staffed by registered nurses (RN), assistant nurses (AN), and assistants [76, 77]. An RN is responsible for the nursing care provided on his/her shift, and has supervisory responsibility for ANs and assistants.

RNs have a Bachelor's degree from college or university, and may add specialised training in geriatrics, gerontology, or elderly care at various colleges or universities. In 2011, the first national Master's in Advanced Geriatric Nursing was initiated at the University of Oslo. Still, few RNs possess postgraduate qualifications within municipal elderly care [78], and few have had the opportunity to increase their competence in accordance with demands at work [24]. Unlike the Netherlands, Switzerland and England, recertification for nurses in municipal elderly care is not required in Norway [12].

ANs have three years of upper secondary school education with practice placements in health care institutions, and they may take further education or relevant courses for working in elderly care. Assistants have no formal health care qualifications, and they typically receive employer initiated training for a few days up to a few weeks before they are expected to work on their own. Internationally, support workers have many different titles: ANs, care assistant, residential care assistant, health care assistant, nurse aide and nursing auxiliary [79]. In this study, the terms ANs and assistants are used, while the term nursing staff is meant to include RNs, ANs and assistants.

The period 2007-2010 saw an increase of 8000 full-time-equivalent employees in Norwegian municipal care [80], but the increase in staffing has foremost been allocated to younger patients in municipal health care [13]. ANs constitute the largest professional group within municipal elderly care in Norway, as they make up 58 % of the employed staff [23]. The remaining staff consists mainly of RNs and assistants, but the proportions of these groups vary greatly across municipalities. RNs are reported to make up 34 % of nursing staff in municipal elderly care [23], whereas the proportions of assistants is estimated to be up to 28% in the municipalities [5]. Some municipalities employ more RNs and fewer assistants, while others struggle to afford, recruit or retain RNs to work in municipal elderly care. The proportion of assistants is nevertheless meant to be reduced, as government policy is to increase the amount of trained staff working in municipal elderly care [46].

Education and training influence the care that is provided. Kringos et al. [81] found that enhancement of community health services depends on the education and training of the staff; more education and training enhances access, continuity, comprehensiveness and efficiency of services. Still, a third of the nursing staff in Norwegian municipal elderly care is untrained personnel [5]. This estimate is comparable to countries like Sweden and England, which, like Norway, have no specific staffing standards for municipal health care and use untrained personnel to a large extent [25]. The municipalities decide which staff to recruit, and there are no official recommendations of which staff groups to employ [2, 75].

Yet, the roles and responsibilities of the three groups of nursing staff are not clearly defined [79, 82]. The tasks of RNs and ANs overlap [12]. Role differentiation is weak and role descriptions are lacking [12]. Nursing staff in Norwegian nursing homes and home care services do similar tasks; they are all expected to care for most patients, regardless of the severity of the patient's condition [83], although the law asserts that health personnel shall perform their work in accordance with sound professional standards and considerate care, based on their professional qualifications (Health Personnel Act, Paragraph 4)[84]. A typical work shift in municipal elderly care is characterised by a majority of ANs and assistants, and a few RNs, who are responsible for large groups of old, sick persons without the close professional contact with physicians that is common for RNs in hospitals [85]. Haukelien [83] found that the relatively low competence available in municipal elderly care is reinforced by an attitude of "pulling together", which entails everybody to do all tasks, and that RNs with the highest competence, therefore, do not put all their competence to use. Working in municipal elderly care has been, and to some degree still is, perceived as relatively low status, which does not ease recruitment and retaining of competent staff in the sector. In sum, nursing staff in municipal elderly care is a conglomerate of skilled and untrained staff doing more or less the same tasks in an effort to fulfil the complex needs of the current patient population.

2.4 Ensuring quality of care

Complexity in municipal elderly care is growing; more patients are being assigned to the health care setting, the older patient population is frail and has complex needs, and relatively low qualified nursing staff is employed. Despite efforts to enhance the quality of municipal elderly care, many reports exist of inadequate health care in terms of unmet needs, adverse events, and other threats to quality of care [6-11]. Worldwide unsafe health care results in millions of patient-sufferings in the form of injuries or deaths [86, 87]. A recent study found inadequate care in Norwegian nursing homes to be frequent, as 87 % of the nursing staff admitted to have committed inadequate care in the form of neglect or abuse [88]. A Canadian study found an incidence rate of 13.2 % in adverse events in home care services, of which one-third were considered preventable [89]. Errors in health care are either acts of commission (doing something wrong) or omission (failing to do the right thing), which have led to undesirable outcomes [90]; they are therefore closely linked to the staff performing health care. Safety in health care has, during the last two decades, emerged as a distinct discipline supported by an expanding scientific knowledge base [91]. In Norway, patient safety is now recognised as an integral component of high-quality health care, as evidenced by increased political attention and initiatives on quality of care and patient safety issues [75, 92-95]. Still, as adverse events and threats to quality of care occur on a regular basis, there is a need to assure that adequate measures are in place for the older patient population to receive safe care and treatment. Assessment of quality of care is therefore imperative.

In this study, quality of care is defined as: "whether individuals can access the health structures and processes of care which they need and whether the care received is effective"

[96, p. 1614]. One way of investigating the quality of care is to study the performance of municipal elderly care through measurement of various aspects of the services provided. Measuring performance is not new to health care, however, increased focus on accountability has led to extensive use of performance measurements over the past two decades [97]. This so-called "performance paradigm" [97] is described as crucial in the attempt to manage public services, control professional autonomy, contain costs, and meet rising public expectations. The above described sets of approaches to managing public services are distinguished by their focus on outcomes as opposed to input [98]. Key aspects in the performance paradigm are quantitative metrics, consisting of performance indicators, targets, benchmarks and comparisons, whereas qualitative measures have been less evident [99]. An implication of the focus on measurement has been that measured aspects are given priority, whereas aspects of health care that are not usually measured are more likely to be neglected [98], e.g. nursing staff competence.

The performance paradigm in Norwegian municipal care is evidenced by the introduction of "Individual Care and Treatment Statistics" (Individuell Pleie- og Omsorgsstatistikk: IPLOS) and the Municipal-State-Reporting (Kommune-Stat-Rapportering: KOSTRA). As of 2007, nursing staff are required to register detailed information concerning patients in municipal care (IPLOS): personal information, housing conditions, health assessment, functional level, diagnosis, and information about admission to hospital or treatment outside municipal care [100]. KOSTRA indicators are the ratio of physicians to nursing home residents, the ratio of nursing home residents residing in single rooms, the ratio of nursing home rooms with connected bath room/WC, and the ratio of full-time-equivalent qualified employees [101]. The IPLOS and KOSTRA data have become the official metrics on municipal care, as they are published by a governmental agency [75], and such data are generally perceived as precise and objective [98]. The data have, however, been disputed as they are time consuming to complete (especially IPLOS) and it is uncertain to what extent the data is used to improve quality of care.

Data from registers like IPLOS and KOSTRA do not cover all of the areas that would allow comprehensive judgements to be made about the quality of municipal elderly care, i.e. judgements that entail outcomes as well as inputs. Slagsvold [102] critiques standard indicators of quality in general for lacking evidence of validity, and finds that irrelevant indicators are often included, while more important aspects of quality are often omitted. Measures as IPLOS and KOSTRA tell us about the physical surroundings of the elderly, and the type of health service they receive, but these measures give no insight into the quality of care that takes place in the interaction between patient and nursing staff on a daily basis. Ensuring quality of care should entail more than measuring standard indicators of performance. The Tallinn Declaration of 2008, endorsed by the WHO [103], establishes that quality of care is a key component in judging a health system. Alongside the more traditional information on structure and outcome, the WHO calls for a judgement of quality of care by providing additional information on input and care processes; so-called comprehensive judgement [104].

Internationally, studies indicate that better quality of care, improved patient outcomes and fewer adverse events are associated with higher levels of RN-staffing in general health care [17-20]. For nursing homes in particular, higher staffing levels, especially among RNs, has been associated with improved care processes and patient outcomes for functional ability, pressure ulcers and weight loss [21]. Positive relationships has also been found between staffing levels and number of deficiencies, and avoidable hospitalisation [22]. Although much debated, a Norwegian study found that higher staffing levels did not necessarily lead to higher quality in nursing homes [105]. Nonetheless, measuring the relationship between nurse staffing levels and quality of care by focusing on numbers of staff provides only a limited explanation of the relationship between nursing staff and quality of care, and none of the care processes per se. Such research reduces quality of care to indicators that are easier to measure, and excludes some factors that are important to the patients and their families [22]. One issue is the number of staff and the distribution of staff groups; another is the competence the staff has to provide the care that is needed. Thus, studies should examine the skills and expertise of the nursing staff needed to provide safe care [25]. Professional competence is a key issue when providing quality health care services [106]. Quality of care requires that nursing staff groups possess the competence needed to meet complex health care demands [16]. Evaluating nursing staff competence is thus of great importance [6, 27], because such assessment would provide an understanding that is vital for the development of strategies to enhance competence, thereby improving the quality of care [28, 29].

Improving the competence of employed staff is at the essence of quality improvement processes, as described by Donabedian and Bashshur [28], and is thus linked to a comprehensive assessment of quality of care as emphasised by the WHO (information on input and care processes) [103]. Inherent in quality improvement are three key elements; the specification of desired competence, competence development, and measurement to determine whether improvement has occurred, so that further strategies to improve competence, and thereby quality of care, may be appropriately targeted [28, 29]. Measurement of nursing staff competence is thus inherently linked to a systematic evaluation and improvement of quality of care.

With an aim of contributing to comprehensive assessment of quality of care, this study uses competence measurement of nursing staff in municipal elderly care as a point of departure. Competence measurement is frequently used within nursing education and practice, mainly with focus on nursing competence in hospitals [30, 31], but has been less common in municipal elderly care. Furthermore, competence measurements are mainly performed on RNs alone, thus leaving the majority of nursing staff in municipal elderly care unassessed. In this study, the competence of RNs, ANs and assistants is considered important to deliver safe health care to patients; consequently, the competence of all groups of nursing staff should be measured. To date, no Norwegian studies have examined whether nursing staff have the competence required to meet the needs of elderly patients receiving health care in the municipalities.

3 COMPETENCE IN ELDERLY CARE: LITERATURE REVIEW

A municipal elderly care characterised by a frail older patient population with complex needs and a relatively low qualified nursing staff to meet the needs of these patients leaves us with at least two pressing questions: which nursing staff competence is required to meet the needs of older patients, and does the nursing staff have the required competence? To assess what was already known about these two questions, a review of policy documents and research literature was performed. The review reflects the status of knowledge at the commencement of this study. More recent literature is discussed in Chapter 8: Discussion.

3.1 Government policy documents

Norwegian municipal elderly care is regulated by laws, guidelines and other regulations through the Norwegian Ministry of Health and Care Services and the Norwegian Health Directorate. Such documents have an influence on the care that is provided to recipients of municipal elderly care. Review of government policy documents, i.e. the main documents and statements from government agencies and professional bodies that have a bearing on the nature of practice [107], was therefore considered relevant as part of the literature review. A search for relevant government policy documents was undertaken at the following Norwegian websites: www.regjeringen.no (Norwegian government), www.lovdata.no (Norwegian laws and regulations), www.ks.no (Norwegian municipalities' organisation), www.fhi.no (Norwegian Institute of Public Health), www.helsedirektoratet.no (the Health Directorate), www.ssb.no (Statistics Norway), www.helsetilsynet.no (Norwegian Board of Health Supervision), www.helfo.no (The Norwegian Health Economics Administration), and by asking for expert opinions on which documents could be relevant for this study. The search was performed in May, June and October 2011.

Of the 14 identified government policy documents, only eight included specific text about expected nursing staff competence in municipal elderly care. These eight government policy documents stated that nursing staff is expected to have competence in the following areas:

- Public health, health promotion, disease prevention and early intervention [3, 108]
- Treatment, care, acute care and rehabilitation [2]
- Medical management, including observation and reporting of effect and side effects [109]
- Self-management and empowerment of patients [2]
- Cooperation, inter-professionalism and patient trajectory [2, 110]
- Facilitation of research and application of evidence-based practice [110]
- Knowledge of local health challenges and epidemiology [108]

- Patient safety and quality assurance [110]
- Multicultural understanding [111]
- Health related technology [112]
- Sound professional practice and considerate care [84]

The government, through these government policy documents, is thus expecting a wide range of nursing staff competence, ranging from specific tasks in medical management to adhering to overarching principles such as providing safe practice and considerate care. Overall, the list of competence that the Norwegian government expects points at an advanced level of competence, e.g. facilitation of research and application of evidence-based practice (EBP), and it cannot be expected to be a part of the repertoire of ANs or assistants. Much of the expected competence is also new to RNs that have an older degree. Health promotion, empowerment of patients, patient trajectory, patient safety and health related technology are all concepts that have been given renewed content and meaning in community health care. Considering the fact that few RNs have had the opportunity to enhance their competence in relation to new demands at work [24], this list of expected competence can be seen as ambitious.

3.2 Research literature

In addition to statutory documents it was necessary to review literature that investigates the nature of practice in municipal elderly care in a scientific manner. Therefore, relevant research articles were searched for in the following electronic health research databases (international, Scandinavian and Norwegian): Medline, Embase, Science Direct, CINAHL, British Nursing Index, Ovid Nursing, Google Scholar, Svemed, and Idunn. Single and combined search terms included professional/clinical competence, community/primary/public/municipal health nursing/services, geriatric nursing, assessment, questionnaire, health survey, health personnel/manpower, nurses' role, nurses' aides and nursing. The search was performed in August and September 2011.

At the commencement of this study the literature search revealed only ten studies relevant to review. Eight were studies of competence in municipal elderly care in Nordic countries (Norway, Sweden and Finland) [76, 78, 113-118]. Two were non-Nordic studies concerning competence in municipal elderly care [79], of which one was included despite being over ten years old, as it entailed a theoretical framework deemed relevant for this study [119].

The competence of RNs was explored in four studies. Tunedal and Fagerberg's [113] was the earliest study found. It explored the work role of RNs in (Swedish) municipal elderly care. Using the Delphi approach, Tunedal and Fagerberg found that broad experience as a nurse, as well as mental strength and confidence to make decisions on their own, is required to work in municipal elderly care. This is interesting as many newly educated RNs go directly to work in municipal elderly care after graduating [120], leaving them without the possibility of acquiring enough broad experience before they take on the responsibilities of working in municipal elderly care. Tunedal and Fagerberg [113] also defined medical knowledge,

knowledge about the specifics of municipal elderly care and skills in educating other staff groups as core competence of RNs in municipal elderly care.

Josefsson, Sonde and Wahlin [121] described RNs' needs and possibilities for competence development in (Swedish) municipal elderly care through a questionnaire survey. The majority of the RNs reported that they did not lack knowledge relevant to their current positions, but some RNs did report lacking knowledge about dementia and fall injuries. Substantial differences in possibilities for competence development were identified; many employers did not offer any competence development opportunities or financial support in the form of paid leave, and coverage of expenses in relation to competence development was rare.

In a questionnaire survey of nursing leadership in (Swedish) municipal elderly care, Josefsson and Hansson [117] reported that approximately one third of RNs felt they had no leadership responsibility (despite the fact that RNs have a formal responsibility for nursing), and that most RNs felt their leadership competence was not fully exploited. The RNs experienced ambiguity in the organisational prerequisites for their role as leaders, which is in line with what Josefsson [122] described as unclear mission and work descriptions for RNs in municipal elderly care. The RN is considered part of both the care staff and the consulting, leadership staff, which may lead to mixed expectations and ambiguity.

Johansen and Fagerström [78] reviewed the role RNs play in (Norwegian) home care, but found only 11 articles that met their study's inclusion criteria. None of these studies described the generic competence required in home care, indicating that RN competence in municipal care is an unexplored field in Norway.

The competence of RNs and other groups of nursing staff was explored in two studies. In a questionnaire survey, Hansson and Arnetz [116] compared RNs', ANs' and assistants' competence in (Swedish) nursing home and home care. Nursing home staff were found to be more competent than home care staff. Assistants and ANs performed delegated medication tasks on a daily basis, all staff groups expressed similar needs for competence development and rated their opportunities for competence development as limited.

In a cross-sectional survey, Grönroos and Perälä (2008) assessed the competence of RNs, public health nurses and ANs in (Finnish) home care. To my knowledge, this study is the only published study of generic competence in municipal elderly care for several groups of nursing staff in the Nordic countries. The staff perceived their competence most positively in relation to helping older people cope with ADL, in meeting their patients' physical needs and in cooperating with patients and their next of kin. The staff perceived themselves as lacking in not only the knowledge of services and benefits available to patients, but also the abilities to use ICT and apply evidence-based information in their work. There was little difference between the three groups of staff in relation to self-perceived competence.

The research literature is extremely scarce concerning research on the competence of ANs and assistants in municipal elderly care; only two relevant studies were found. In a qualitative study, Furåker and Nilsson [118] explored the competence of ANs in (Swedish) municipal

elderly care. Twenty-two ANs kept diaries of the time spent on different tasks and which competence they lacked. Twelve were subsequently interviewed. The diaries suggested that the ANs based their competence on standard routines, personal abilities, experience, trial-and-error and situated knowledge. Furåker and Nilsson found ANs to lack competence in essential theoretical knowledge (symptoms and expressions of dementia) and skills related to dementia (interpreting signals, validating patients' feelings), and that the ANs were not particularly interested in developing their competence. The ANs regarded cleaning activities too time-consuming, taking up time that could rather be spent with the patients, even though they already spent more time with the patients than any other staff group.

Eriksen's cross-sectional study [76], the second study of ANs, is a study of the practice area and work demands of ANs in Norway. The majority of the respondents were working in municipal elderly care. Demands and control at work varied strongly with the practice area in which the ANs were working. The main problem for ANs in home nursing seemed to be too much to do and frequent exposure to role conflicts. The situation was even more problematic in nursing homes. The ANs in municipal elderly care reported more demands, exposure to role conflicts, threats, violence, fewer positive challenges and less control over their work compared to ANs in hospitals [76].

In addition to the eight studies from the Nordic countries, two international studies regarding competence in community elderly care were deemed relevant. Baldwin et al. [79] reviewed the role support workers play in nursing homes, most of the studies included were British or American. In their review, it proved problematic to define the exact role of the support worker, as there was much overlap between the role of the RN and that of the support worker. The RNs regarded the support workers' role to be mainly concerned with basic and direct patient care, whereas the support workers saw their role as similar to and inter-changeable with that of the RNs. Baldwin et al. [79] called for greater clarity of the different staff roles as this could ease the delegation of tasks from the RNs to the support workers and maximise the potential of the competence in both positions.

Although it is American and more than ten years old, Neal's [119] grounded theory study was included, as it adds valuable theoretical reflections for home nursing practice. Narratives of 30 home health nurses revealed that they defined their practice as "autonomous", and that the most important requisite for a nurse was "adaption". Neal developed a model of three stages by which nurses attain autonomy: (1) dependence on others for assistance in learning and development, (2) moderate dependence (notable increase in comfort, decreased need to ask questions), and (3) autonomy (make expert clinical and logistical decisions independently): "Over time, nurses develop confidence and experience, and these combined with an ability to make adaption account for movement through the stages" [119, p. 251]. Neal's study is based on the American home health care system that is different from the Norwegian in that it is primarily run by private organisations and financed through reimbursement. However, the nature of the job consisting of visiting patients in their homes is the same; thus, transferability of the findings can be assumed. As opposed to most established nursing models based on

institutional care, Neal's model incorporates the distinct qualities of home nursing of which unstructured settings and working alone are among the most important.

The research literature draws a fragmented picture of existing nursing staff competence in municipal elderly care. The role and competence of the RN in municipal elderly care is better explored than that of ANs and assistants, which are more or less un-explored, despite their importance for the care delivered to patients. In sum, the literature shows that all nursing staff in municipal elderly care need, but do not have, clear job descriptions, opportunities to develop their competence and a balance between work demands and control of the work situation. The required competence of RNs working in municipal elderly care seemed to be broad experience as a nurse, mental strength and confidence to make one's own decisions (autonomy and adaptation), medical knowledge, knowledge about the specifics of municipal elderly care, pedagogical competence, skills in assistance of ADL, collaboration with next of kin, application of evidence-based practice and leadership of other nursing staff. Nursing staff as a group, have been shown to require competence in assistance with ADL, cooperation with patients and next of kin, medical and nursing theoretical knowledge (e.g. dementia and fall injuries), and use of ICT.

When comparing the competence described in the research literature to the competence expected through government policy documents, there are major differences. The advanced and "new" competence expected through policy documents does not reflect the competence as described through the research literature, which is mainly concerned with assistance with ADL, medical knowledge, collaborative skills and personal abilities as mental strength and confidence. An updated literature review of government policy documents as well as research literature in June 2014 supports this view. More recent government policy documents [13, 14, 93, 123] emphasise the same competence expectations as the policy documents reviewed [2, 3, 84, 108-112] while research emphasise that general development of nursing staff competence is a pressing need in municipal elderly care [50, 82]. As only two Norwegian studies concerning competence in municipal elderly care were found, of which one is more a study of poor working conditions and the other revealed that community-based nursing staff competence is unexplored [76, 78], we do not know if the competence expected through policy documents can be found in Norwegian municipal elderly care. Although Sweden and Finland are similar to Norway in how they organise municipal elderly care, and results can be assumed as transferable to Norway, research of community-based nursing staff competence in Norway is lacking. The actuality of the research literature can be questioned, as none of the studies account for the collective competence required by all staff groups to meet older patients' needs in current municipal elderly care. Recent reorganisation of the health care services as a consequence of the "Coordination Reform" implies that the competence requirements are different from a few years ago, which also calls for a new look at which competence is required in present municipal elderly care and at which competence nursing staff actually possess. No studies have assessed the competence of all groups of nursing staff providing care and treatment to older patients in Norwegian municipal elderly care, and a call for an instrument for this endeavour seems appropriate. As a certain level of competence is

required of all nursing staff, regardless of group belonging, it seems appropriate to assess the overall competence available in municipal elderly care with one instrument.

4 AIMS

To contribute to assessment of quality in municipal elderly care, the overall purpose of this study was to develop and evaluate a competence measurement instrument for nursing staff working in nursing homes and home care services. On the basis of this purpose the aims of this PhD study were threefold; investigated in three sub-studies which correspond with the three articles on which this thesis is built.

First, to identify and evaluate existing competence measurement instruments for community-based nursing staffs, the aims were to:

a) identify and review competence measurement instruments developed for nursing staff in municipal elderly care, and

b) explore conceptual and methodological issues concerning these competence measurement instruments.

Second, to establish the content of a new competence measurement instrument, the aim was to identify the competence necessary to provide safe services to older people in need of health care in their homes or in institutions.

The third aim was to develop and evaluate a new competence measurement instrument for nursing staff that provide care and treatment to older people in municipal elderly care.

5 CONCEPTUAL FRAMEWORK

Competence is the main concept in this study, as I aim to describe and measure competence of nursing staff. It is therefore essential to describe how competence is conceptualised in this study, and which assertions lay the ground for an attempt to measure competence. In this section, I will give an historical account of the use and understanding of competence as a concept, followed by a description of the conceptual framework within which I place my understanding of competence. Finally, theories on measurement are described.

5.1 Evolving conceptualisation of competence

The current usage of "competence" is multi-faceted, and it is a concept that is discussed at length in the literature [31, 124]. The term competence is usually applied in reference to professionals; referring to the execution of tasks and duties expected of the professional. One common understanding is to link competence to performance and to treat competence as a characteristic of a person rather than a statement about the range of someone's competence [125]. In this understanding, a professional is either competent or incompetent [31]. Another understanding of competence in the literature is that being competent entails meeting the minimum standard expected of a professional, that a person is "good enough" [125]. Contrary to where competent is understood on a binary scale (either you are competent or you are not), this understanding is on a graduated scale [125]. In nursing science, we know this understanding from Benner's [126] theoretical framework "novice to expert". In Benner's conceptual framework, a nurse begins practice as a novice and primarily focuses on basic rules and routines of the work place. The nurse gradually becomes more experienced and confident, finally relying more on own experience and intuition. This traditional understanding of a relationship between levels of competence and length of experience has been questioned. Contrary to the idea that experience develops competence, Bjørk [127] found that experience made nurses' interventions more efficient, but not more advanced or correct. Rischel et al. [128] found that contrary to Benner's theory, both novice and expert nurses had competence patterns that relate to several levels in Benner's competence model. Thus, research indicates that length of experience does not necessarily imply advancement in competence level.

In addition to the two described ways of understanding competence, the concept has been used in several other ways within nursing. Cowan et al. [129] reviewed the nursing research literature in order to discuss the definition and utilisation of the concept of competence in nursing. Concurring with how competence has been conceptualised and used in other research fields in the post-World War II period [130, 131], Cowan et al. [129] found competence to be defined and used in three ways within nursing practice and research.

The first research tradition was concerned with behaviour. Competence was understood as the ability to perform tasks, and the aim of research into competence was transparent specification of competence to reach agreement on what constituted satisfactory performance.

The terms "competency" and its plural form "competencies" belong to this tradition. Competence is a generic concept that refers to a person's overall capacity, whereas competency refers to specific capabilities [125]. Competency-based training and education is thus a behaviourist tradition, focused more on training than on qualifications, i.e. what a nurse has been taught as opposed to what a nurse is able to do. Typical techniques within this tradition were job and skills analysis. Gonzi [131], however, believed that the behaviourist model was conservative, reductionist and atheoretical in that it ignored the complexity of nursing practice, as well as professional and intelligent judgement. Another critique of this tradition was that it has neglected social and political dimensions of competence, and that it treated the process as a purely technical matter. Nurses may use many strategies to achieve a goal, and these are not necessarily task-oriented or subject to a checklist [129].

The second conceptualisation of competence was a psychological construct consisting of cognitive, affective and psychomotor skills [129]. This was a more complex way of assessing competence, and research into so-called psychological approaches to competence presented a complete contrast to competency-based training. Whereas competency-based training was designed to ensure that all nurses are sufficiently competent to do what is required of them, the second conceptualisation was concerned with what enables them to do it, and this included personal qualities. A critique of this tradition was that psychological approaches to competence were too abstract, and that they ignored qualities necessary for application in the actual situation and context.

The third conceptualisation of competence has been an generic approach, incorporating attitudes, knowledge and skills, and taking the context of the nursing practice into consideration [129]. This notion of competence includes professional and intelligent judgement, and recognises the need for reflexive practice and the importance of context [129]. Research into competency-based training (first conceptualisation) and psychological approaches to competence (second conceptualisation) sought to validate competence in terms of performance, the first at a highly specific level and the latter at a more abstract level. Research in cognitive psychology, however, has frequently sought to distinguish competence from performance. Messick [132] made the point that there is a competence-performance gap and this has implications for assessment methodology, i.e. one is more likely to measure performance than competence. By specifying the context, i.e. a particular nursing situation, and how a nurse handles a situation in several aspects (third conceptualisation), one might be more inclined to measure competence than performance.

Cowan et al. [129] found that the main distinction between definitions of nursing competence remains between that of a behavioural objective, which is also perceived as performance, and that of a psychological construct including cognitive, affective and behavioural skills. More recent research into competence can be characterised as socio-cultural conceptualisations of the concept (fourth conceptualisation). Within studies on organisational learning and knowledge management, there has been a shift from understanding knowledge as an object to being interested in "knowing", i.e. knowledge as a process and a collective activity [133]. The

conceptualisation has changed from competence being understood as a possession of individuals to a collective, social, contextualised activity.

5.2 Conceptual framework

The many conceptualisations of competence seem to be confusing and can therefore limit the validity of clinical assessment [124]. Doubts have been raised as to whether research on competence is appropriate to nursing practice, as it may have the potential to be reductionist and focused on outcome oriented technical procedures [134]. The conceptual framework adopted in this study is an attempt to move beyond task orientation and include other aspects of competence that are equally important for safe practice in municipal elderly care. This account of the conceptual framework draws on several understandings of competence and ends with the definition of competence that is used in this study.

Gonzi, Hager and Athanasou [135] define competence in this way:

"Performance is what is directly observable, whereas competence is not directly observable, rather it is inferred from performance. The competence of professionals derives from their possessing of a set of relevant attributes such as knowledge, skills and attitudes.... Attributes of individuals do not in themselves constitute competence.... Rather, the notion of competence integrates attributes with performance." (p.6)

With this definition, Gonzi et al. described the attributes that make up competence as knowledge, skills and attitudes, and distinguished competence from performance in that competence is not merely the completion of tasks but includes "knowing how". Hand [136] went further by saying that merely having skills without the underpinning rationale makes the practice unsafe, and having only knowledge without the skills to put the knowledge into practice is unsafe. It is therefore essential for professionals to know how to conduct the processes that contribute to safe practice [125].

Eraut [125] is an educational scientist commonly cited in literature concerning the conceptualisation of competence. He developed the conceptualisation of professional competence by discussing the concept under two headings: performance and capability. Eraut [125] defines capability as carrying two meanings. The first is that capability is necessary for performance and enables the performance, but, secondly, capability provides a basis for developing future competence, meaning the possession of the knowledge and skills necessary for future professional work, i.e. knowledge base [125]. The main purpose of dividing competence into performance and capability is that capability concerns what is not directly observable through performance: cognitive processes, knowledge base, knowledge in use, the role played as a professional, ability to learn from experience, creativity, and critical and evaluative attitude. Thus, seeking to describe capability may extend the range of what may be inferred from competence investigations, as it may demonstrate that a professional has the necessary knowledge and skills to perform in a wider range of situations than those observed

[125]. Thus, capability can be seen as an inference to professional work rather than something that is directly demonstrated [125, 135].

It is also interesting to draw on studies of workplace learning, on how people learn from the expertise of others. Nardi, Whittaker and Schwarz [137] argue that in new, more fluid, organisational systems "It's not what you know, it's who you know", referring to the importance of knowing key employees who are gate keepers to knowledge at one's work place. Through several different studies, Edwards [138] recognised that inter-professional collaboration was mediated by the capacity to "know how to know who", which is not an instrumental skill to be acquired on a training programme, but rather, to arise in discussion on activities. Foray and Lundvall [139] also recognised the importance of "knowing who", and argued that "knowing who" in terms of who to ask questions or for assistance, is an important aspect of competence alongside "knowing what, how and why". He further argued that "knowing who" is embedded and learnt in social practice, and cannot simply be codified into a register of names. Edwards [138] emphasised that "knowing how to know who" needs to be connected with other core competence. One attempt to make that connection is Boreham's [140] notion of "collective competence", as a whole team has to be seen as collectively competent if they are to be responsible for a whole product or service. At the centre of this collective competence is the common knowledge base of the team, which includes both specialist knowledge and knowledge of work processes. The goal should be that within a workplace, nursing staff are able to reciprocally strengthen each other's competence so that the amount of collective competence is larger than the sum of individual competence [141].

Collaboration is an important aspect of competence in municipal elderly care. Although municipalities differ in the way they organise work and the amount of co-operation between staff, nursing staff need to work as a team to solve their tasks and problems that arise at work. Edwards [138] reflected on what it means to be a decision-making practitioner that works responsively with patients and other practitioners. Today, nursing staff work increasingly across professional boundaries on complex problems. Nursing staff have to rely on their specialist competence in working with others, while they simultaneously negotiate the accomplishment of complex tasks. This kind of relational practice means that nursing staff needs to be able to label own expertise while recognising, drawing on and contributing to the totality of expertise available [138]. Edwards claims that relational work can strengthen practitioners' actions on complex problems by making accessible a wide range of resources in these actions, and she calls this "relational agency". Edwards' central argument is that offering one's professional resources to collaborating practitioners and to patients, involves an expertise which includes recognising and responding to the standpoints of others and which comes in addition to the specialist competence at the core of each distinct professional practice. Edwards' argument is thus based on the importance of core expertise for the professions, and that relational agency builds on this.

In this study, competence is understood as a contextual, multi-faceted, complex concept, which consists of both actual performance and capability. Competence is, for analytical purposes, divided into knowledge, skills and personal attributes. These attributes do not in

themselves or alone constitute competence; rather, competence can be inferred from them. Hence, competence is larger than the sum of the attributes (knowledge, skills and personal attributes). Finally, the individual competence of a practitioner in the context of municipal elderly care is seen as relational; as inherently bound to the competence of other practitioners.

5.3 Measurement of competence

Conceptualisation and measurement of competence is built on ontological and epistemological assertions. The conceptualisation that I make use of in this study is built on three assertions. The first assertion is that competence is something real, something that can be manifested in the real world through performance or inferred from performance. The second assertion is that competence is something that can be investigated, something that can be analysed and taken apart. The third assertion is that competence can be measured, although not fully and completely; it is possible to grasp competence through measurement. The position adopted implies that competence is an entity that can be measured. The measurement of nursing staff competence is built on theories of what measurement is and how measures should be evaluated. In the following, philosophical and technical elements of measurement are described. The actual methods applied in this study will be elaborated in Chapter 6: Method.

The early definitions of measurement suggested that measurement is the assignment of numbers to objects or events according to rules. This definition is limited as it is only concerned with the task of assigning numbers to something, as opposed to a broader conception that better captures measurement; namely, that it is a process of building models that represent the phenomena of interest, typically in quantitative form [142]. Like most models, measurement models have to be simplifications to be useful, although they should represent the best possible approximation of a phenomenon.

Measuring competence can be fraught with difficulties. Waddell [143] points at the many decisions that must be made, of which conceptualising competence, selecting measurement paradigm and selecting instruments are the most crucial. There has been much controversy in the literature about the type of instrument needed to assess competence, for example trait-based, behaviour-based, qualitative or quantitative instruments [144]. An instrument can be defined as a technique for relating something we observe in the real world (manifest, observed) to something we are measuring that only exists as part of a theory (latent)[145]. I have adopted a quantitative approach to measure the concept competence. Quantitatively, nurse competence can be measured through self-assessment, patient evaluation, observation and/or evaluation by a supervisor, preceptor or manager [30]. Self-assessment, which is adopted in this study, is the most common method for competence measurement of nurses; it allows nurses to consider their practice within their own environments and may, if used for that purpose, assist them to improve their practice [146-149].

Psychometrics is concerned with the theory and technique of psychological measurement, which includes measurement of knowledge and abilities [145]. When we are measuring

nursing staff competence, we are measuring a human attribute, a construct, and we are thus concerned with psychometrics. The human attribute is a latent variable, as it cannot be observed directly and error free. The main concern in psychometrics has to do with measurement error, which is a mismatch between what we are measuring and the recorded value. Measurement error is likely to be more dramatic in psychological measurement than in physical science, for example, as physical science is largely concerned with measuring the observable. Concern about measurement error is related to the validity and reliability of the measure.

Validity is an important, if not the most important, quality of a measurement. A common definition of validity is that a measure is valid if it measures what it claims to measure. According to Borsboom, Mellenbergh and van Heerden (2004), a measurement is valid if the attribute exists and variations in the attribute causally produce variation in the measurement outcome. According to Shadish, Cook and Campbell [150], the term validity refers to the degree of approximation of the truth of an inference. Validity may be threatened by construct underrepresentation, i.e. we are only measuring parts of the concept (called systematic measurement error) or other factors which are influencing our observation (called construct irrelevant variance, or random measurement error)[132]. Literature concerning psychometric evaluations often operates with different types of validity, such as content, face, construct, criterion and concurrent validity. Table 1 shows the different types of validity referred to in this study [142]. The common conception today is that construct validity is the main concern of a measurement, and that we need to provide evidence of different kinds of validity to argue for the generalizability of a measurement [142]. Messick [132] argued that "validity is an integrative evaluative judgement of the degree to which evidence and theoretical rationales support the adequacy and appropriateness of the theoretical specification of the construct". In this view, content validity and reliability are only pieces of evidence for the more important property, which is construct validity.

Table 1. Types of evidence for instrument evaluation, their meaning and evidence needed.

Type	Meaning and type of evidence needed
Content validity	Representativeness of items. Established by demonstrating that items are representative of the construct.
Face validity	Appropriateness of items. Establish whether items seem reasonable and sensible as indicators of construct.
Construct validity	Accurate reflection of construct. Establish whether the correlational (or factor) structure of the measure is consistent with the conceptualised construct.
Reliability	Consistency of measurement procedure. Establish whether the scores are reproducible.

In order to work systematically to deal with measurement error and argue for construct validity, a specific research design should be applied to the development of a new measurement instrument. The research design for instrument development called "The four building blocks" [145] was adopted as a guide on how to develop an instrument. The research design consists of four phases: construct mapping, item design, creating response categories, and measurement modelling.

1. Construct mapping

First and foremost, a latent variable has to be conceptualised and defined. Second, when aiming to develop a measure of a human attribute like competence, it is useful to think of the variable as a continuous variable, ranging from low to high on a continuum. It is thus assumed that the latent variable is continuous, and that there are distinguishable qualitative levels between the extremes. The phase "construct mapping" is built on an underlying idea that a concept such as competence can be graded, and that there is increasing excellence or sophistication.

2. Items design

After conceptualising a construct map, the second step is to think of ways in which the theoretical construct can be manifested in the real world. This step involves operationalisation of competence, which includes deciding on what exactly community-based nursing staff competence consists of (elaborated in Chapter 6: Method). Second, there is the development of items, i.e. questions in a questionnaire. Choosing items is like sampling items from a potential infinite population of possible items related to competence in municipal elderly care. With regard to validity and reliability of the instrument, it is preferable to have more items than less, because "the instrument can then sample more of the content of the construct, and it can then generate more information about how a respondent stands with respect to the

construct, which gives greater accuracy" [145]. In addition, when a subject matter is complex like competence, using several items can better produce an adequate representation [151].

3.   Creating response categories

Inherently bound to questionnaire items are the response categories, which are concerned with categorising observations and scoring them as indicators of the construct. According to Wilson (2005), the response categories must be well defined, finite, exhaustive, ordered, context-specific and research-based.

4.   Measurement modelling

The fourth and final building block consists in providing evidence of construct validity. Measurement modelling is empirical assessment to evaluate whether the empirical construct behaves as we expect the theoretical construct to behave. Such measurement modelling is typically explanatory factor analysis or Structural Equation Modelling [142]. Providing evidence of validity is, however, never proof that a measurement is valid once and for all. Demonstration of validity is a process of information collection for different purposes and different settings to document the likelihood that the measurement is appropriate for the populations under investigation.

6 METHOD

The aims of this PhD study were achieved through three sub-studies. The first Sub-study reviewed the research literature regarding the existence and quality of competence measurement instruments for community health care. The second Sub-study explored what nursing staff competence is relevant for meeting the current needs of older people in nursing homes or home care, and the most relevant competence items to include in a competence measurement instrument. The third Sub-study entailed the development of a new competence measurement instrument and evaluation of validity and reliability of the instrument.

6.1 Research questions Sub-study 1

To identify and evaluate existing competence measurement instruments for community-based nursing staff, the aims of Sub-study 1 were to:

a) identify and review competence measurement instruments developed for nursing staff in municipal elderly care, and

b) explore conceptual and methodological issues concerning these competence measurement instruments.

Based on these aims, the following research questions were developed:

1. What was the target population for the competence measurement instruments used in municipal elderly care from 2000 to 2012?

2. What were the conceptualisation properties of competence measurement instruments used in municipal elderly care from 2000 to 2012?

   2.1. How was competence defined?
   2.2. Which indicators of competence were measured?

3. What were the methodological properties of competence measurement instruments used in municipal elderly care from 2000 to 2012?

   3.1 What were the response categories of the instruments?
   3.2 What evidence was given for evaluation of the instruments (i.e. instrument content, response processes and internal structure)?

6.2 Design

To answer these research questions, we performed a systematic literature review. Systematic reviews are made and read in order to keep up to date on an issue, to make sure that the planned research has not already been done and to use as a starting point for clinical

guidelines [152]. Systematic literature reviews are characterised by their transparency, stringency, use of established criteria for reviewing research, inclusion of all available and relevant literature, systematic assessment of included literature and accounting for bias [153]. We adopted the definition of a systematic review used by the Cochrane Collaboration [154]: a systematic review is a review of a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant research, and to collect and analyse data from the studies that are included in the review.

As with all research, the value of a systematic review depends on what was done, what was found and the clarity of what is reported so that the reader can assess the strengths and weaknesses of a particular review [153]. In response to the great variety in quality of published systematic literature reviews, the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA statement) was developed [153]. The PRISMA statement is now a well-established guide for performing systematic literature reviews consisting of a 27-item checklist and a four-phase flow diagram (see Figure 1). The 27-item checklist gives detailed information on how to perform a systematic literature review and what to report. The four-phase flow diagram is an illustration of how to perform literature inclusion and exclusion. The PRISMA statement was used as a guide for performing and presenting our review.

A literature search strategy was adapted from another review of measurement instruments [155]. This review of measures used a three-stage literature search strategy, of which stage 1 consisted of identifying relevant instruments through a systematic literature search. An important point about the first stage is that several articles might identify the same instrument. Although all articles concerning the same instrument can be included, it is the measurement instrument that is of interest, and not the research articles per se. Stage 2 of the adapted search strategy identifies eligible instruments from the literature search for inclusion in the review. This stage is identical to the stage in the PRISMA flow diagram concerning eligibility. Eligibility criteria for inclusion and exclusion were established. It is, however, hard to imagine all possibilities to expect in a literature search before one starts. Moher et al. [153] recognises that a review process, even a systematic one, is an iterative process. Although we had established eligibility criteria before the literature search, these criteria were amended during the review process to enable inclusion of all instruments relevant to review for our study. The final list of eligibility criteria are listed in Table 2. The eligibility criteria were phrased to include all instruments measuring competence in any kind of nursing activity related to community health care, all nursing staff rendering care and treatment, and articles published in the last decade. We excluded instruments measuring competence in arenas outside of community health care and staff labelled as leaders or administrative personnel.

Table 2. Eligibility criteria for Sub-study 1.

Inclusion criteria	Exclusion criteria
• Questionnaire surveying nursing staff competence in community health care • Study reporting the development/testing of instruments aimed at measuring nursing staff competence in community health care • Instrument relating to one or several groups of nursing staff in community health care • Study published between 2000 and 2012	• Competence measurement/assessment involving methodology other than quantitative competence measurement • Instrument relating to nurse management, regardless of setting • Instrument developed for hospital settings. • Instrument relating to nursing students and staff in training • Instrument measuring performance, expertise, skill, capability (as defined in article) • Non-research • Articles in languages other than English or a Scandinavian language

Stage 3 in the adapted search strategy consists of applying established review criteria to the included instruments, bringing us to the core of the review, which are the standards by which we evaluated the included measurement instruments. We used the Fitzpatrick criteria for evaluating respondent-based outcome measures [156] to assess the quality of the included instruments. Based on varying quality of measures in use, Fitzpatrick et al. [156] developed a guide on how to assess and select a respondent-based outcome measure. Respondent-based outcome measures refer to questionnaires and other methods of assessing quality of life or health status from the patient's perspective. Although competence measures differ from respondent-based outcome measures in at least two aspects – who they measure and what they measure – the two types of measures still have to fulfil the same quality criteria to be appropriate for a purpose. Fitzpatrick et al. [156] found that investigators should apply the following eight criteria to evaluate respondent-based outcome measures: reliability, validity, responsiveness, precision, interpretability, acceptability, feasibility and appropriateness. The same criteria can be found in literature on psychometrics [142, 157] and is thus a well-established set of criteria on which to base an assessment of an instrument (see Chapter 5.3).

Fitzpatrick et al.'s [156] list and explanation of criteria was found to be both comprehensive and close to exhaustive and was therefore chosen to evaluate competence measurement instruments. The criteria "responsiveness" was excluded, however, as it refers to whether an instrument is sensitive to changes of importance to patients/respondents and whether it reflects a therapeutic effect. Responsiveness requires that a difference in response can be correlated to an objective change in the respondent's health (or in our case competence), and such a criterion is not available for competence measurement instruments. It is hard to imagine how to create such a criterion, as the competence of nursing staff will have effect on

a range of patients and not on a criterion within the patients (at least one that we are interested in because the patient's treatment and wellbeing is the ultimate goal). Fitzpatrick et al.'s [156] criteria for assessing instruments are summarised in Table 3.

Table 3. The Fitzpatrick criteria for evaluating measurement instruments.

Reliability	requires that an instrument is reproducible and internally consistent. Internal consistency is measured by e.g. Cronbach's alpha (α). Reproducibility is assessed by test-retest reliability
Validity	is assessed in relation to a specific purpose and setting. Face, content and construct validity are the most relevant. Face and content validity can be evaluated by examining the content of the questionnaire and how it was developed. Construct validity is evaluated through statistical criteria called psychometric evaluation
Precision	refers to the ability of the measurement to reflect true changes or differences in competence. One of the main influences on the precision of an instrument is the format of response categories
Interpretability	is concerned with how meaningful the scores from an instrument are. How can the scores be interpreted or what can the results be compared with?
Acceptability	addresses how acceptable an instrument is for respondents to complete by eliciting views of respondents about the instrument and evaluating the response rate
Feasibility	is concerned with how easy the instrument is to administer and process
Appropriateness	concerns whether the instrument is appropriate to the questions, which the instrument is intended to address. Instruments need to be clearly focused and psychometrically sound to be considered appropriate. Ultimately, appropriateness involves considering all the criteria as a whole

6.3 Literature search

The literature search is crucial in a systematic literature view, as it is here that one can identify one's study material. A literature search should be so broad that it includes all relevant literature, but not so broad that it overloads the researcher by identifying an unsurmountable amount of literature of which a large part is irrelevant. A search of the term "nursing competence" in Pubmed, for example, gave 27,846 hits, but when the term "measuring" was added to the search terms, the hit was reduced to 295. It is therefore

important to search in all relevant databases, but also to limit the search with relevant keywords, years and languages.

We referred to a Norwegian guide on how to perform systematic literature reviews when seeking relevant databases for our literature search [158]. The following international, Scandinavian and Norwegian electronic health research databases were deemed as exhaustive for our purpose: *Medline, Embase, Science Direct, Academic Search Premier, CINAHL, Eric, PsychInfo, Cochrane Library (including DARE, HTA, CDSR, CENTRAL, EED and CMR), Joanna Briggs Institute, British Nursing Index, Ovid Nursing, Web of Knowledge, Google Scholar, Svemed, Norart, Cristin, BIBSYS* and *Idunn.* According to the Norwegian Knowledge Centre for the Health Services [158], Medline, Embase, Science Direct, Academic Search Premier, CINAHL, Eric, PsychInfo, British Nursing Index, Ovid Nursing, Web of Knowledge, Google Scholar, Svemed, Norart, Cristin, BIBSYS and Idunn are general databases not restricted by study design. Cochrane Library and Joanna Briggs Institute are databases for systematic reviews.

The search terms we used varied from database to database, as the databases we chose to search do not use the same keywords or the same language. Search terms included both thesaurus/medical subject headings (MeSH) and keywords, and the MeSH headings were "exploded" wherever possible. We used Boolean operators (OR, AND) to expand and narrow searches. In databases where the option was possible, the truncated search terms nurs* and competen* were used to search for all possible usages of these words. We limited our searches to peer-reviewed articles in English or a Scandinavian language and to the years 2000-2012, because research prior to this was deemed unlikely to reflect current trends. The literature search was first performed in October and November 2011 and reiterated in June 2012. Search terms are listed in Table 4. Table 5 is an example of a search strategy. The example is taken from the search in Medline, as this proved to be the database that yielded most relevant hits.

Table 4. Search terms Sub-study 1.

• professional/clinical competence	• self-report
• psychomotor performance	• nursing evaluation research
• community health/primary/public/ municipal health nursing/services	• educational measurement
	• program evaluation
• geriatric nursing	• validation studies
• home nursing/home care services	• health personnel/manpower
• nursing homes	• nurses
• assessment/self-assessment	• nurses' role
• questionnaire	• nurses' aides
• health survey	• nursing

Table 5. Search strategy example from search in Medline.

	# ▲	Searches	Results	Search Type	Actions
☐	1	professional competence.mp. [mp=abstract, title, heading word, identifiers]	401	Advanced	Display / More ≫
☐	2	exp competence/	24303	Advanced	Display / More ≫
☐	3	exp occupational tests/	1084	Advanced	Display / More ≫
☐	4	educational testing/ or achievement tests/ or performance based assessment/	14217	Advanced	Display / More ≫
☐	5	job skills/ or job performance/ or minimum competencies/ or occupational tests/ or personnel evaluation/ or skilled workers/	19060	Advanced	Display / More ≫
☐	6	3 or 4 or 5	32987	Advanced	Display / More ≫
☐	7	1 or 2	24593	Advanced	Display / More ≫
☐	8	6 and 7	3449	Advanced	Display / More ≫
☐	9	exp nurses/ or exp nursing/	4781	Advanced	Display / More ≫
☐	10	8 and 9	54	Advanced	Display / More ≫
☐	11	primary health care/	1059	Advanced	Display / More ≫
☐	12	exp Community Health Services/	1343	Advanced	Display / More ≫
☐	13	11 or 12	2326	Advanced	Display / More ≫
☐	**14**	**7 and 13**	**26**	**Advanced**	Display / More ≫

Remove Selected | Save Selected | Combine selections with: And | Or | RSS

Save Search History

6.4 Data selection

The literature search gave 4491 hits. All hits were screened, meaning that the titles' of the journal articles were read through carefully. If there was any doubt about what the article discussed, the abstract was read. Articles that clearly did not meet the inclusion criteria were then discarded. Articles that seemed to meet the inclusion criteria were printed. After all databases had been searched, we were left with 154 downloaded and/or printed articles/papers. These articles were re-checked for relevance by reading all abstracts carefully. Another 15 papers were discarded as duplicates after this screening. The full texts of the remaining 139 articles were then read systematically. The aim, methods and main results of all 139 articles were summarised in a spreadsheet. During this process, the eligibility criteria were amended several times to include all relevant instruments and exclude all irrelevant instruments. The final, systematic reading of all articles identified 11 instruments, which were described in 14 articles. Figure 1, which is an adaption of the PRISMA flow chart, is an illustration of the data selection process.

Figure 1. PRISMA 2009 Flow diagram of selection process.
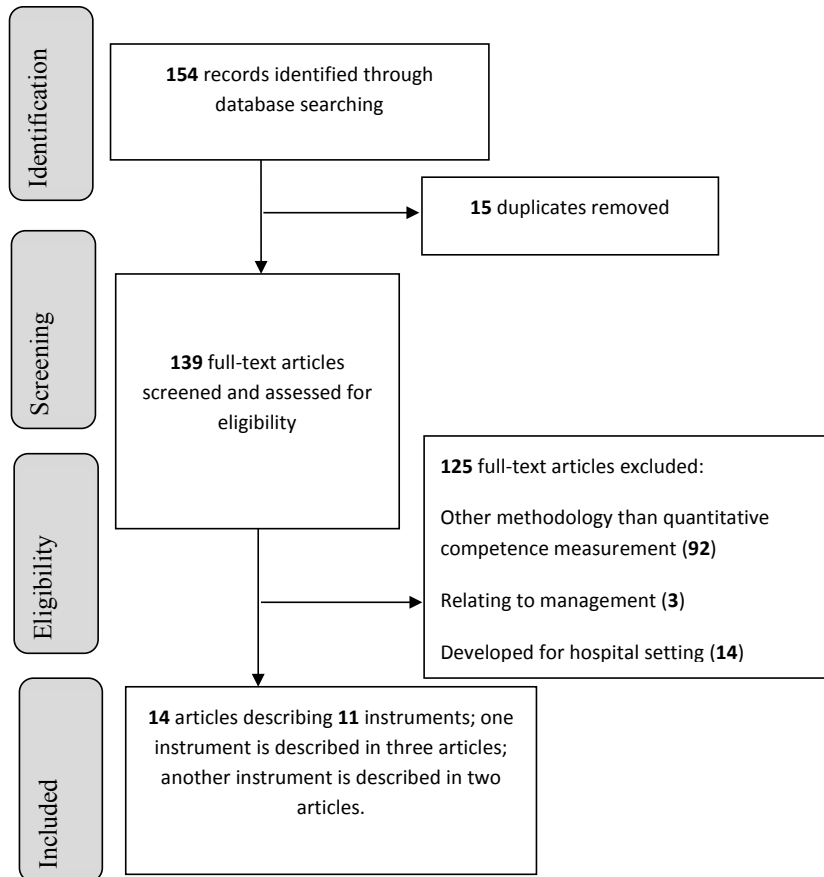
6.5 Analysis

By definition, a systematic literature review uses systematic and explicit methods to critically appraise relevant research [154]. We used seven evaluation criteria put forward by Fitzpatrick et al. [156] to evaluate the identified competence measurement instruments. Again, the included studies were read carefully for findings concerning the research questions.

First, the target populations for the competence measurements were identified. This could be found explicitly in all articles. Second, we operationalised our research question about conceptualisation properties of the instruments as "which indicators of competence are measured" and "how is competence defined". The first question was relatively straightforward to answer, as most articles described in text or tables which indicators were used. How competence was defined was, however, a more difficult question to answer, as few

articles defined competence explicitly. Answering this question therefore entailed reading the articles several times for clues on the author's understanding of competence. Clues were found in indicators used, in phrasing about necessary competence, in introductions concerning the rationale for developing the instrument or in the discussion on what competence is needed. This analysis can therefore be labelled as a form of content analysis [159], as it entailed establishing common categories of conceptualisation. Content analysis will be described further in Sub-study 2.

The third step in the analysis was concerned with finding the methodological properties of the competence measurement instruments. This research question was operationalised into response categories and evidence for instrument evaluation. All articles reported the type of response categories used. How and how much the articles reported on instrument evaluation, however, varied greatly. Instrumentation evaluation was not necessarily found in Methods and Results sections, but often in the introduction and background sub-chapters. For those instruments that were described in several articles, information on instrument evaluation differed in the amount and phrasing between articles. The analysis of instrument evaluation, thus, consisted of reading the articles several times to ensure we had found everything related to evaluating the instruments. All first authors of the articles were contacted by e-mail to ask for supplementary information and to ask for permission to see the instrument itself. Only two authors replied, both refusing to send their instruments. We were therefore left to evaluate the instruments based on information in the published articles.

6.6 Research question Sub-study 2

To establish the content of a new competence measurement instrument, the aim of Sub-study 2 was to identify the competence necessary to provide safe services to older people in need of home-based or institution-based health care. Based on this aim, the following research question was developed:

- Which competence do community-based nursing staff need to provide safe health care services that meet the current needs of older patients?

6.7 Design

To answer the research question of Sub-study 2, a Delphi study was conducted. The Delphi technique is a survey method designed to structure group opinion, generate group consensus, assess priorities and develop measurement instruments [160]. It is a way of obtaining expert opinion on a specific matter in a systematic manner [161, 162]. The technique offers an alternative to direct debate by systematic collection of informed judgements by an expert panel [161]. The Delphi technique is thus a group decision-making process that differs from other group processes by its emphasis on anonymity of the participants, interaction with feedback, statistical group responses and expert input. A Delphi study is a multi-stage approach with the aim of achieving a consensus among the participating experts. This Delphi

study consisted of three stages, called "rounds". An expert panel was asked to take part in three consecutive investigations (Rounds 1, 2 and 3), which will be described in detail below.

6.8 Participants and sampling

The participants in a Delphi-study are, by definition of the study design, experts in the field of investigation. However, whether someone is identified as an expert or not depends on the researcher's judgement. Expertise is an extensive research field in itself, but one way of defining someone as an expert is to distinguish expert knowledge from other forms of knowledge, such as everyday knowledge and common-sense knowledge [163]. Experts appear to embody methods of problem solving combined with an understanding of how knowledge necessary to solve the problem should be organised. Thus, they embody knowledge of "what" as well as knowledge of "how" in an organised manner [164]. In this study, an individual was addressed as an expert because we assumed he or she had knowledge not everybody in the field possesses. Their expertise is highly potential because it is linked with the power of defining the situation and constructing the reality of present municipal elderly care [163, 165]. Hence, by interviewing experts, we hoped to get the opportunity to expand our access to the field, which would not have been possible by interviewing lay-people or novices. Experts can be expected to be engaged and interested in their field of expertise, so another argument for including experts in a study that demands commitment over time, is that their expertise may serve as motivation for participation [166]. In this study, experts are defined as "informed individuals", "specialists in their field" and "people who are knowledgeable in older people nursing " [162]. Our expert panel consisted of 42 experts, of whom 14 were clinicians in elderly care (RNs and ANs), 11 were community care leaders or administrative, 7 were teachers in geriatric nursing, 6 were researchers within the field, and 4 represented relevant patient organisations.

The experts were sampled individually through purposeful sampling, which is concerned with selecting information-rich cases that can illuminate the question under study [167]. Several strategies for purposefully selecting information-rich cases exist, and the sampling strategy applied was a three-stage approach. The first stage was "intensity sampling", in which excellent or rich examples of the phenomenon of interest were sought, i.e. experts. This sampling method involved prior information and considerable judgment, and for this purpose we made use of the "snowball" technique [167] to find the experts. The research group, consisting of the author and her four supervisors, met and discussed who could be identified as "informed individuals", "specialists in their field" and "people who are knowledgeable in older people nursing". A list of ten names was drawn, and each of these ten experts were contacted by telephone or e-mail to invite them to take part in the study. These ten experts were asked to recommend other experts fitting our definition of experts, starting the "snowball" rolling.

The second stage of our sampling strategy was "stratified, purposeful sampling" [167], meaning that we created samples within the sample to make comparisons between groups

possible. For a conventional or classic Delphi study, like this one, a heterogeneous sample is used to ensure that the entire spectrum of opinion is determined [162]. The following groups were found to cover the spectrum of opinion in current municipal elderly care: clinicians/nursing staff with long clinical experience, leaders/administrators with extensive experience working at different administrative levels in municipal elderly care, teachers in colleges or universities with long experience in teaching older people nursing, researchers in the field municipal elderly care, and finally people who could speak on the patients' behalf who were found to be best represented in the largest patient organisations for municipal elderly care.

In the third sampling stage, experts with a variety of work places, interests, perceptions and demographics were selected to avoid biases because of panel membership. This stage called "maximum variation" (heterogeneity) was aimed at capturing and describing the central themes that cut across a great deal of variation [167]. The following criteria were selected on which the participants were meant to vary: gender, years of experience, years working in municipal elderly care, and regional belonging. Finally, 42 people consented to take part in the study. All participants were, because of the snowball technique, recommended as experts by other experts. The characteristics of the sample are shown in Table 6.

Table 6. Characteristics of participants in the expert panel.

| | | From clinical practice N=14 | | Nursing staff leaders and administrators N=11 | Nurse lecturers N=7 | Nursing researchers N=6 | From patient organisations N=4 |
		8 Registered nurses	6 Assistant nurses				
Years of experience in older people nursing	Range	6-25	24-32	6-38	15-29	12-40	16-38
	Mean	16.3	27.8	20.5	20.4	23.5	28.0
Age	Range	23-51		38-59	51-65	52-65	36-79
	Mean	43.6		50.6	56.7	55.2	62.0
Gender	Women	12		9	7	4	4
	Men	2		2		2	
Geographical part of Norway	South	3		1			
	East	6		6	4	3	4
	West	2			2	1	
	Middle	3		2	1		
	North			2		2	

6.9 Data collection and analysis

Three Delphi rounds were conducted. Round 1 was performed from September through November 2012, Round 2 in December 2012 and January 2013, and Round 3 in February and March 2013. Table 7 was developed to summarise data collection methods, types of analyses used and ways of presenting results for Sub-study 2 (the Delphi study).

Table 7. The Delphi study process

	Data collection methods	Analysis	Presentation of results
Round 1	Semi-structured telephone interviews; tape recordings, notes, and transcriptions	Qualitative: meaning coding and categorisation; three stages of abstraction from item to category to theme	Table of themes, categories, and questionnaire items
Rounds 2 and 3	Electronic questionnaire with 110 items in Round 2 and 48 items in Round 3; five-point Likert scale; four open questions regarding comments on the process and questionnaire	Quantitative analysis using SPSS: descriptive statistics, and non-parametric tests for comparisons between groups. The text generated from open questions was sorted by theme	The percentage of scores between 4 and 5 on the Likert scale as measured by consensus; the mean of each item as a measure of agreement. Standard deviation was used as a measure of disagreement. Scatterplots illustrated strength of agreement

6.9.1 Round 1

Round 1 was a qualitative exploration of which competence community nursing staff need in order to provide safe health care services. As the aim was to explore, qualitative interviews were considered appropriate to gather a large and in-depth material. The term "explore" involves striving for breadth and variation to achieve dense descriptions of a phenomenon [159]. All 42 participating experts were interviewed individually via telephone. The experts were sent a semi-structured interview guide by e-mail before the scheduled interview, and had been asked to think through the questions and make notes in preparation for the interview. The interview guide is attached in Appendix 1 (in Norwegian). The questions e-mailed to the experts were:

"Please give your opinion on the following questions:

- What knowledge do nursing staff need to meet present demands in municipal elderly care services?

- Which skills do nursing staff need to meet present demands in municipal elderly care services?

- Which personal attributes do nursing staff need to meet present demands in municipal elderly care services?"

The interviews were scheduled to take approximately 30 minutes. The interviews were voice-recorded while I took notes during the interviews. After each interview, I recapitulated what the interviewee and I had just talked about, and made additional notes where necessary. What I found to be the main points of the interview were written down on a large poster, as a first preliminary analysis.

When all 42 interviews had been conducted, I listened to all interview recordings to confirm my notes and impressions. At this point, I made a decision not to transcribe all of the interviews (which is probably the most common thing to do in qualitative research). This decision was based on the experience that after approximately ten interviews the data material reached saturation, meaning that after the first ten interviews the interviewees did not elicit a great deal of new angles and themes concerning competence in older people nursing, but more or less repeated what the first ten interviewees had said. Thus, for my analysis I decided to transcribe what I called key interviews and rely on my rich notes and the recordings for the remaining interviews. Key interviews were those interviews that introduced new angles and themes about competence in older people nursing. These were the interviews that I found especially informative, enlightening or innovative, that went beyond what is common knowledge and challenged the present conception of what municipal elderly care consists of. I found ten interviews to be key interviews, and these were transcribed verbatim.

The interpretation process began with the first interview and was an ongoing process throughout and for a period of approximately three months after the interviews. The texts (notes and transcriptions) were analysed using meaning coding and categorisation [159], and the recordings were referred to when in doubt about a statement. The analysis was reiterative in the sense that I went back and forth between the texts (notes and transcriptions) and my coding and categorisation several times. A process like this can appear chaotic. It can, however, in hindsight be recognised as a three-stage analytical process.

In the first stage of the analysis, I concentrated the meaning of the text into short sentences, from now on referred to as items; the common term used in questionnaire surveys/psychometrics. This stage of the analysis did not involve searching for hidden, subtle meaning, but sought to establish the manifest meaning of an interviewee's statement. During the interviews, I had asked the interviewees to be concise and explain what they meant by a statement if it seemed unclear. This stage, therefore, consisted of sorting items so that similar or overlapping items could be merged.

Second, the analysis was concerned with categorisation. I had now established a range of items, but these had to be sorted into categories to make the material coherent and comprehensive. This was a deductive process in the sense that I used my knowledge of how

things are usually grouped in geriatric nursing to categorise the items. An example is that the items "Common conditions that older people have; geriatrics and mental health", "Loss of function; both acute and chronic" and "How to connect a symptom to a disease" describe aspects relevant for treatment of older people, and were thus placed in the category "Treatment".

Finally, in the third analytical stage, categories were grouped into central themes. Although the central themes in the end were defined as "knowledge", "skills" and "personal attributes", this was not the first or only solution. It was in the last two stages, and especially the third stage, where the analysis was reiterated several times. Knowledge, skills and personal attributes emerged as the most suitable and appropriate themes. An example of the analytical process can be seen in Table 8.

Table 8. Example of the analytical process; meaning coding and categorisation.

Excerpt interview no. 5	Meaning condensation	Meaning coding (reduced to items)	Category	Established themes
"We need knowledge about the diseases that older people have, like how they gradually or more acutely lose their functional level and how diseases appear differently in older people; and [we need] to understand what is happening in certain situations, especially changes in health status and with regard to early intervention. [These situations are] not as evident in older people compared with younger people, and there are several things that influence these situations, like aging, diseases, and medication."	Knowledge about diseases, disease development, and functional decline particular for older people. Knowledge about the interactions of age, disease and medication. Early recognition of what is happening, how health status changes and how to intervene promptly	Common conditions that affect older people	Treatment	Knowledge
		Loss of function; both acute and chronic	Treatment	Knowledge
		Polypharmacy	Treatment	Knowledge
		Early recognition of changes in patient health status	Assessment and taking action	Skills
		Observation of effects, side effects and medication interactions	Assessment and taking action	Skills
		Early intervention and quick action	Assessment and taking action	Skills
		Being proactive and dynamic	Responsibility and activeness	Personal attribute

6.9.2 Round 2

Round 2 began when the interpretation process of Round 1 was considered complete. In Round 2, the expert panel responded to an electronic questionnaire sent out by e-mail. The questionnaire consisted of the 110 items developed from the qualitative analysis in Round 1. The respondents were provided with information on how to respond to this round as seen in Appendix 2 (In Norwegian). The questionnaire began with the following instructions: "On a scale from 1 to 5, please score how relevant you find each single item for the provision of

good health care to older people in home care and nursing homes". The respondents thus scored the items in terms of their relevance to older people nursing on a five point Likert-type scale (1= of very little relevance, 2 = of little relevance, 3 = relevant, 4 = very relevant and 5 = decisive). The respondents were also encouraged to add additional comments. Four open questions were spread evenly throughout the questionnaire with the following phrasing: "Do you have comments about the questionnaire so far?" (three times), and "Please give comments on our conceptualisation and operationalisation of competence if you desire here" (one time). The respondents were given two weeks to complete the questionnaire, and reminders were sent to those who had not responded (maximum three reminders). Round 2 thus resulted in one data file that was analysed quantitatively in SPSS Statistics Version 20, and text comments, which were sorted according to themes.

As the aim of a Delphi study is to achieve a consensus among the participating experts, the key question is what to accept as synonymous with consensus. In our study, we considered the score range of 4 (very relevant) and 5 (decisive) to represent the panel's agreement with each item, as seen in other similar Delphi-studies [162]. Thus, for us, consensus meant a certain percentage of the respondents had graded the relevance of an item as 4 or 5. The literature provides few clear guidelines on what consensus level to set [162], but several use 75 % as a cut-off [168-170]. This cut-off proved to be too low for our study, as it meant that 80 % of the items were agreed upon after Round 2. A cut-off at 90 %, however, would leave 44 % of the items for re-evaluation in Round 3. As re-evaluation in light of results from previous rounds is an important characteristic of Delphi studies, we set the cut-off for consensus as $\geq$ 90 % agreement on score 4 or 5 on a particular item. Although not seen in other Delphi studies, we found it necessary to establish a cut-off for exclusion of items as well. Round 2 identified some items as clearly irrelevant, and it was deemed unfruitful to include these items in another round. Therefore, a <50 % consensus was set to be the cut-off for exclusion of items, leaving items with consensus of >50 % but <90 % for re-evaluation.

Another decision to be made in relation to Round 2 was how to run Round 3. Some Delphi studies leave all items for evaluation in all rounds [162], but we wanted to exclude some items from Round 3 to reduce the amount of items the experts had to consider. Feedback from Round 2 had been that our list of items was long and that the questionnaire was time-consuming. As our strict cut-off for consensus ensured that the items that reached consensus in Round 2 were those considered relevant for older people nursing, we chose to exclude these items from re-evaluation in Round 3.

As we were interested in seeing whether the sub-samples in the expert panel rated items differently, testing for group differences was necessary, i.e. clinicians versus teachers or researchers. Non-parametric tests were used because group sizes were small, and normally distributed data could not be assumed. "Fountain graphs" were used to depict group agreement between rounds. As a reaction to the fact that few Delphi studies report what happens between the rounds in a study, Greatorex and Dexter [171] recommended using fountain graphs to illustrate agreement and disagreement amongst the expert panel across rounds. Fountain graphs are scatter plots where the mean of each item is displayed as a

measure of agreement or group opinion, and standard deviation (SD) is displayed as a measure of panel disagreement. Statistical analyses were performed in SPSS, and analyses used were frequencies, descriptive statistics such as mean and SD, scatter plot and non-parametric tests for group differences (Kruskal-Wallis test)[172].

6.9.3 Round 3

Round 3 took place when the results from Round 2 were analysed and was quite similar to the second round; it was an electronic questionnaire with the same score range as in Round 2. In Round 3, the expert members were shown the Round 2 results, in both numbers and text, and were asked to reconsider the 48 items that had not reached consensus in Round 2. The introductory letter to Round 3 is shown in Appendix 3 (in Norwegian). For referral when filling out the questionnaire, the panel was provided with a text explaining what was meant by consensus, and why some items had been excluded and some retained for Round 3. The panel received a table of all items containing the mean score, SD and percentage that had answered 4 or 5 on an item in Round 2, and a table summarising the comments given in the open questions in Round 2.

As it is most common to use the same cut-off throughout a Delphi study [162], the cut-off level ≥ 90 % was used for Round 3 as well. The same analyses were used for Round 2 and 3.

6.10 Research question Sub-study 3

The aim of Sub-study 3 was to develop and evaluate a new competence measurement instrument for community-based nursing staff that provide care and treatment to older people. The instrument was named "Nursing Older People - Competence Evaluation Tool" (NOP-CET). Based on the evaluative criteria of Fitzpatrick et al. [156], the research question for Sub-study 3 was:

- What evidence does the trial of the NOP-CET provide in relation to reliability, validity, precision, interpretability, acceptability, feasibility and appropriateness?

6.11 Design

Sub-study 3 had three phases. The first phase entailed developing the NOP-CET based on results from the Delphi study. In the second stage, the questionnaire was pre-tested on typical respondents, and in the third and final stage, a survey was conducted to try out the NOP-CET for the first time.

6.11.1   Phase 1

The NOP-CET was developed when the Delphi-study results were clear, in the spring of 2013. Its questions were developed based on the 62 items that reached consensus in the Delphi study. Questions concerning advanced nursing competence, expressed as required competence in government policy documents, were also added, to ensure the actuality and relevancy of the NOP-CET. To create a measurement instrument substantially and methodologically different from those already available, item development was a crucial part of this doctoral project. The items from the Delphi study varied greatly in terms of specificity and abstraction level, which meant that some items were more strenuous to operationalise than others. The systematic literature review in Sub-study 1 discussed the advantages and disadvantages of self-report and Likert-scales, and proposed the inclusion of patient cases and test items to avoid the sole reliance on self-evaluation. The NOP-CET therefore included several types of questions and response formats, including Likert-scales, patient cases with multiple choice format and test items. I developed items by constructing items/questions, asking some of the Delphi-experts for help and by reading research articles relevant for particular items. I asked students from two different advanced geriatric nursing master classes to write down real, but anonymous, patient cases, for inclusion in the questionnaire. The NOP-CET is attached in Appendix 4 (translated from Norwegian to English).

After the first draft of the NOP-CET, the questionnaire was reviewed by four professors/supervisors, who gave feedback on content, syntax and response-formats. I revised the draft, which the same professors/supervisors reviewed. This process was reiterated until we had a questionnaire that the professors and I felt comfortable covered the content of all 62 items from the Delphi-study and had an acceptable format. Table 9 shows which NOP-CET-items cover which category from the Delphi-study. Several NOP-CET-items cover more than one category.

Table 9. Delphi-categories with corresponding NOP-CET-items.

Category	NOP-CET item no.
Health promotion and disease prevention	Q1-7
Treatment	Q8-14, Q16-17, Q20, Q31, Q33
Palliative care	Q20
Ethics and regulations	Q1-3, Q31-33, Q37-42
Assessment and taking action	Q1-3, Q8-12, Q15-18, Q20-21, Q33, Q37-42
Cover basic needs	Q16-17, Q21, Q23-30
Communication and documentation	Q20, Q31-32, Q34, Q44, Q47
Responsibility and activeness	Q16-17, Q37-42
Cooperation	Q16-17, Q37-42, Q44, Q50
Attitudes toward older people	Q1-3, Q31-32, Q34, Q43

6.11.2   Phase 2

After the drafting, the NOP-CET was transferred to Questback (questback.com), an online electronic tool for questionnaire development and surveying. Phase 2 consisted of pilot-testing the first versions of the NOP-CET on typical respondents, i.e. RNs familiar with municipal elderly care. Invited pilot-testers were RNs working clinically or RNs teaching nursing science. The NOP-CET was pilot-tested in the way it was meant to be used in the actual survey; an invitation with a link to the questionnaire was sent by e-mail to a sample of pilot-testers. The pilot-testers completed the questionnaire electronically. In addition, the pilot-testers were asked to say how long it took and to review the questionnaire based on the following question: "Please consider if the questionnaire is acceptable, comprehensible, relevant to the setting, easy to understand and free of ambiguity?" The NOP-CET was pilot-tested in two rounds; the first pilot involved nine RNs, while the second pilot was answered by five RNs. After both rounds, I sat down with the pilot-testers, went through the NOP-CET item by item and discussed the testers' thoughts on the items, the response-formats, syntax, phrasing and other relevant issues. Careful amendments were made according to the feedback. The NOP-CET improved considerably between pilot-tests 1 and 2, and it was considered satisfactory after the second round, as few substantial changes were required.

6.11.3   Phase 3

In Phase 3, the NOP-CET was used to survey community-based nursing staff competence. The NOP-CET was developed to be a comprehensive questionnaire measuring competence in older people nursing. The questionnaire (Appendix 4) contains 65 items. As most items contain sub-items, the actual amount of questions the respondent is asked to consider is 346. There are two main types of items, items with Likert-type scales and items with dichotomous scores (correct/wrong).

Nine municipalities were invited to participate in the first trial of the NOP-CET and agreed to take part. The invitational letter is found in Appendix 5 (in Norwegian). Six municipalities agreed to invite all nursing staff employed in municipal elderly care, meaning nursing homes and home care units. One municipality included four home care units, one municipality included a representative sample of the nursing staff, randomly selected, in all nursing homes and home care units, and one municipality agreed to include all nursing staff in two nursing homes, as this municipality is a big city so including all nursing staff would require tremendous effort by the municipality. The questionnaire was sent to 2822 nursing staff. Eight of the participating municipalities are located in the south-eastern part of Norway, while one municipality is in northern Norway. The municipalities were selected to represent different types of areas; three can be classified as urban areas, five as suburban and two municipalities are in rural parts of the country. The sample on which the questionnaire was tested (N=1016, response rate 36 %) consisted of RNs, ANs and assistants working in nine municipalities. The properties of the sample are displayed in Table 10.

Table 10. Sample properties in Sub-study 3

Municipality	1	2	3	4	5	6	7	8	9
Participating part of municipal elderly care	All units	All units	All units	All units	All units	All units	4 home care units	Representative sample of units	Two nursing homes
Geographical region of Norway	South east	South east	South east	South east	South east	Northern	South east	South east	South east
Inhabitants in municipality	15,500	21,000	20,000	51,000	45,000	9,500	118,500	35,000	635,000
N	175	99	100	143	233	128	37	55	46
Response rate (%)	48	22	26	20	31	62	41	49	16
Response RNs (%)	32	40	30	40	31	34	52	31	38
Response ANs (%)	54	36	53	46	57	54	44	66	56
Response assist. (%)	9	12	7	5	7	9	4	3	6

6.12 Data collection

The NOP-CET trial was carried out from September to December 2013. Administrators working in the participating municipalities provided lists of e-mail addresses of nursing staff employed in nursing homes and home care units. The same administrators were asked to make sure all nursing staff were informed of their employers' commitment to take part in the survey and to encourage all staff to take part. E-mails with an internet link to the questionnaire were sent to the nursing staff on the provided lists. One municipality could not provide e-mail addresses, so this municipality sent letters by mail that included the URL address required to fill in the questionnaire.

The nursing staff were given two weeks to complete the NOP-CET. Two reminders were sent during the last week that the questionnaire was open. The NOP-CET was kept open for one additional week for those municipalities that requested this. Respondents were asked to fill in the electronic questionnaire during work time using the online tool "Questback" on a computer at the workplace; they were given up to one hour of "free" time during work to complete the questionnaire. Once a respondent had completed the questionnaire and pressed "send", their response was visible to me in Questback. All responses were exported electronically to SPSS.

6.13 Analysis

To answer the research question of Sub-study 3, the properties of the following concepts need to be specified and operationalised: reliability, validity, precision, interpretability, acceptability, feasibility and appropriateness.

Validity was assessed as face, content and construct validity. The content validity of the NOP-CET was evaluated in Sub-study 2. In Sub-study 3, face validity was evaluated by pilot-

testing on typical respondents and is further discussed under the heading "acceptability". Construct validity was explored and assessed by factor analysis, a technique to identify clusters of variables [172]. Explanatory factor analysis describes the interrelationships of a set of variables by deriving new variables (factors) that are fewer in number than the original set of variables [173], and is useful to evaluate whether the new clusters of variables (factors) reflect theoretically meaningful properties. Explanatory factor analysis is relevant to find which dimensions underlie the responses to items and which items are good indicators of a certain factor [173]. Construct validity was also assessed by correlating items to own factor (should correlate with own factor) and items to other factors (should correlate higher with own factor than other factors) (Pearson's r). A choice to be made when conducting explanatory factor analysis is the number of factors to retain in the final factor solution. Important measures in a factor analysis are:

- *Factor loadings*, which depend on the sample size, and in sample sizes greater than 600, a factor loading should be at least .21 [174]. In large samples, even small loadings can be considered statistically meaningful.
- *Communality* is the proportion of variance explained by the extracted factors.
- *Eigenvalue* indicates the importance of a factor. Kaiser [175] recommends retaining all factors with eigenvalues >1.
- *Factor rotation* was used to discriminate between factors since a variable can load on many factors. We chose direct oblimin rotation, as we expected our factors to correlate [172].
- Kaiser-Meyer-Olkin (*KMO*) is a measure of sampling adequacy with a minimum value of > .5 [176, 177].
- *Bartlett's test* tells us whether the correlations in the data material are high enough for the variables to be suitable for factor analysis. It should be statistically significant ($p <$ .05).

Reliability was evaluated by internal consistency, i.e. Cronbach's alpha (α). Cronbach's α is a measure of whether individual items produce results consistent with the overall questionnaire and the factor to which the item belongs. Alphas above .7 are considered a sign of reliability [178]. The reproducibility (i.e. test-retest reliability) could not be assessed, as the questionnaire was only administered once.

Precision is concerned with the preciseness of the scores of an instrument, i.e. the distinctions an instrument makes. One of the main influences on the precision of an instrument is the format of its response categories, i.e. the form in which respondents give their answers [156]. Investigators may also inspect items to consider whether they discriminate sufficiently between respondents. Such item analysis included investigating the distribution/variance of the items (preferably all, or most, response categories should be used), floor- or ceiling effect, and degree of difficulty on dichotomous scores – the majority of correct answers to such items should lie between 30 % and 70 % [179].

The main question when it comes to **interpretability** is how interpretable the scores of the instrument are. We have used two methods for interpreting the results, results for each single item and sum-scores, which are reported and discussed.

Acceptability refers to how acceptable an instrument is to respondents, which is essential to obtain high response rates [156], and is closely linked to face validity. Acceptability is judged on the item response rates and rates of missing responses. Acceptability is also assessed by asking for the respondents' evaluation of the questionnaire.

Feasibility is concerned with whether the instrument is easy to administer and process. Time and resources required to collect, process and analyse results influence the answers to these questions, which are closely linked to acceptability.

Appropriateness addresses whether an instrument is appropriate to the questions it is intended to address. Appropriateness is evaluated by considering how content was determined, inspection of the content, reliability, construct validity, responsiveness, precision, interpretability, acceptability and feasibility of the instrument. Appropriateness is thus seen as summative of all the other criteria mentioned.

Data was analysed using SPSS version 20. The following analyses were performed: principal axis factoring (exploratory factor analysis), bivariate correlations, reliability analysis, descriptive statistics (mean and SD) and missing value analysis.

6.14 Ethical considerations

In Sub-study 2, participants were initially contacted by e-mail with an invitational letter that explained the purpose and requirements for taking part in the study. All participants confirmed their consent to participate via e-mail. Participants were assured anonymity of their participation and confidentiality of the information they provided. Participation was voluntary throughout the whole study. In Sub-study 3, it was made clear that participation was voluntary and confidential. The participants were informed that filling out the questionnaire was synonymous with informed consent.

Research approval from Norwegian Social Science Data Services was required for Sub-studies 2 and 3 as they involved data collection of personal information on an individual level. Research approval for Sub-study 2 was received on August 29, 2012 (Appendix 6) and for Sub-study 3 on June 3, 2013 (Appendix 7). The sub-studies were found to fulfil the requirements of informed and written consent, safe keeping of personal identifiable information and confidentiality by the Norwegian Social Science Data Services. All sub-studies were conducted in accordance with the ethical requirements of the Helsinki Declaration (www.wma.net).

7 RESULTS

7.1 Sub-study 1

The systematic literature search and selection produced 4491 hits, 154 articles were screened for eligibility, 139 articles were systematically read and, finally, 14 articles were eligible for the systematic review. Among the 14 eligible articles, 11 competence measurement instruments were identified. Table 3 in Article 1 presents the instrument evaluation based on the criteria developed by Fitzpatrick et al. [156]; the results are presented for each instrument. The following is a synopsis of the results from Sub-study 1, presented according to the research questions.

The target population for the competence measurement instruments identified were (a) specified sub-groups of nursing staff and (b) RNs exclusively. Only three instruments measured generic competence in municipal elderly care, whereas the remaining instruments concerned urinary incontinence (1), competence development (1), palliative care (1) and community health nursing of all age groups (5).

Five instruments were built on clear definitions of competence, whereas six instruments were not built on explicitly stated definitions of competence. However, as the instrument developers focused on skills, abilities, tasks, performances and behaviours, I interpreted most of the definitions and understandings of competence in the instruments reviewed to be related to a behaviouristic understanding of competence. When competence is undefined, we do not know what would be a reasonable operationalisation and generalisation of the results, and in this light, attempts to evaluate validity are difficult.

All instruments employ Likert-type response categories. The degree of instrument evaluation varied greatly. All instruments provided some evidence of content validity. Evidence of internal structure, i.e. reliability and construct validity of the instrument, was poor overall. Four instruments were thoroughly evaluated with psychometric tests for validity and reliability, but none of these concerned generic competence in municipal elderly care.

The conclusions I drew from Sub-study 1 were that in development and utilisation of competence measurement instruments, researchers need to be explicit about their conceptualisation of the construct they are measuring, evaluate the appropriateness of competence measurement instruments, and embrace psychometrics as a methodology for evaluating validity. Judged by these criteria, no appropriate competence measurement instrument exists to measure generic competence of community-based nursing staff in Norwegian nursing homes and home care services. The development of an instrument has to take into consideration all the evaluation criteria of Fitzpatrick et al. [156] in order for the appropriateness of the instrument to be judged.

7.2 Sub-study 2

The Delphi study resulted in agreement on 62 items of competence relevant for municipal elderly care. Consensus was easily reached in the expert panel. Interest in and commitment to the study was high, as evidenced by the response rates of 100 % in Rounds 1 and 2, and 93 % in Round 3.

The interviews in Round 1 were characterised by interviewee engagement and preparation. The data material reached a saturation of categories and items after approximately 10 interviews, meaning that at this point, few new items and categories of competence emerged, and those that were put forward were already mentioned by other experts. The content analysis resulted in 110 items of relevant competence for nursing staff in municipal elderly care. These 110 items were spread across 14 categories within three themes: knowledge, skills and personal attributes. The themes, categories and items produced in Round 1 are shown in Table 4 in Article 2.

In Round 2 consensus was reached on 56 items, 6 items were considered irrelevant, and 48 items were forwarded to Round 3 for re-evaluation. The 56 items that reached consensus had consensus levels varying from 90 % to 100 %. Items from all 14 categories developed in Round 1 reached consensus, but only in the category "covering basic needs" did all items reach consensus in Round 2. The results from Round 2 are displayed in Table 11. Items that reached consensus are highlighted in grey.

Table 11. Consensus levels on items in Round 2.

Category	Item	Consensus
Health promotion and disease prevention	General knowledge of aging	97.6
	Normal age-related changes; deficiencies in sight and hearing	100
	The personal development of older people	69.1
	The life story of individual patients	81.0
	The vulnerability that many older people experience because of the loss of family, friends and function	78.6
	Facilitating housing based on the functional level of older people	78.6
	How to include and focus on next-of-kin/relatives	76.2
	The situation of next-of-kin and their health risks	52.4
	Person-centred care	88.1
	Facilitate environment and activity based on a functional level	83.3
	How to involve a patient's resources and support ability to cope	100
	Patient and relative involvement and empowerment	92.9
	Local/national traditions, culture and identity (e.g. food, clothes, songs and activities)	42.9
	What is meaningful to the individual (e.g. preferences in music and activities)	68.7
	How to prevent loneliness	80.9
	How to prevent falls and wounds	97.6
Treatment	Common conditions affecting older people; geriatrics and mental health	95.2
	Loss of function; both acute and chronic	100
	Common diagnoses (e.g. infections, diabetes, heart diseases, COPD, cancer, Parkinson's disease, multiple sclerosis and rheumatoid arthritis)	95.3
	Pathology, prevalence and the treatment of dementia, depression and delirium	97.6
	Psychosocial dimensions related to the mental health of older people	83.3
	How to connect a symptom to a disease	95.2
	Pharmacology and medication calculations	90.5
	Poly-pharmacy	88.1
Palliative care	Treatment of pain	97.6
	Treatment of palliative symptoms	97.7
	End-of-life care	95.2

	Assure patient wishes and customs surrounding death	85.7
	Use of the Liverpool Care Pathway (LCP) and Edmonton Symptom Assessment System (ESAS) tools	66.6
Systemic knowledge	Health system organisation	54.8
	Health politics and governance	26.2
	Resources in own municipality/organisation (e.g. assistive tools)	69.0
	How to make use of voluntary work	38.1
	Routines at own workplace (e.g. those regarding patient referrals)	88.1
	What and to whom to report	90.5
	New assistive care technologies; how these can secure and improve the lives of patients	73.8
Ethics and regulations	Ethical principals	88.1
	Ethical decision-making processes	64.3
	Relevant laws concerning community care	76.2
	Trust-promoting initiatives to reduce the use of force	88.1
	Patient rights	95.2
	Patient safety	95.2
Assessment and taking action	Early recognition of changes in the patient health status	97.6
	Use of routines/checklists regarding objectives and systematic observations	92.9
	Basic observations of pulse, blood pressure, respiration, skin, temperature, consciousness and functional decline	97.6
	Observe effects, side effects and medication interactions	97.6
	Awareness of the complexity of polypharmacy	92.8
	Analyse, interpret and assess/understand patient needs	100
	Early intervention and quick action	95.3
	Support professional arguments with sufficient clinical evidence	83.4
	Understand the totality of a patient's situation	92.8
	Resuscitation	90.5
	How to contact nurses or physicians in emergencies	97.6
Covering basic needs	Cover basic needs based on a patient's primary functions	97.6
	Hand hygiene	95.2
	Satisfactory assistance with patient oral hygiene	97.6
	Ergonomic positioning of sitting and lying patients	95.2
	Mobilise and activate patients	95.2
	Body mechanics and use of assistive tools	92.9
Perform procedures	Simple procedures (e.g. monitoring blood glucose, injecting insulin, inserting intermittent female urinary catheters, applying transdermal analgesic patches, dispensing medication, wound and ostomy care, tube feeding and administering nebulizer treatment)	100
	Postmortem care	73.8
	More advanced procedures (e.g. handling of intravenous pumps, intramuscular injections, EKG, various drains, permanent urinary catheters, VAP, CVC and blood sampling)	73.8
	Terminal care	95.3
Communication and documentation	Oral and written understanding of Norwegian	95.3
	Communication with older people, especially those with dementia: talk slowly, say one thing at a time in a calm voice, wait for a response, initiate physical contact, reduce stimuli, listen, let the patient be active	100
	Have the "difficult talk" regarding death	90.5
	Keep confidentiality	97.6
	Develop a nursing plan	92.9
	Coordinate individual plans for patients	57.1
	Evidence-based competence; up-to-date information for practice	88.1
	Make use of tools for project management	28.6
	Make use of electronic tools for nursing procedures	66.6
	Register patient in a national community care register	64.3
	Electronically document: write assessments of patients, document in a sufficiently understandable language; provide correct patient reports; follow the national guidelines concerning patient documentation	95.2
	Communicate with multicultural patients	90.5
Responsibility and activeness	Recognise one's own responsibility and contribution to the health care system	90.5
	Take responsibility	90.5
	Advocate for the patient	81.0
	Provide clear instructions or authorisation when necessary	73.8
	Set clear limits; do not do everything for the patient	76.2
	Prioritise	92.8
	Be proactive and dynamic	95.2

	Do not necessarily accept that a patient is undemanding and content	85.7
	Be innovative, creative and find solutions	76.2
Cooperation	Cooperate across professions	97.7
	Participate in team work	92.9
	Cooperate with next-of-kin	95.2
	Provide and receive guidance from colleagues	88.1
	Systematically teach and guide patients and next-of-kin/relatives	85.7
	Work independently	97.6
Self-awareness and personal development	Insight regarding how one affects other people	78.6
	Constantly self-develop; be open to change	88.1
	Be adjustable	85.7
	Tolerate stress and tackle one's own responsibilities	85.7
	Be aware of own limitations regarding competence	97.6
	Have high self-esteem	38.1
	Feel assured with regard to one's own competence	88.1
Attitudes toward older people	Interpersonal skills	81.0
	Being fond of/appreciate older people	66.6
	Show respect/moral behaviour	97.6
	Care	90.5
	Empathise	88.1
	Show humility	78.5
	Be inclusive	76.1
	Meet a patient at his or her level	85.7
	Treat all patients equally	45.3
Professional behaviour	Aesthetics, including wearing modest clothing	69.1
	Have good manners (e.g. greet politely and ring doorbell)	95.2
	Show respect when entering someone's home	95.2
	Keep appointments and be predictable	97.6
110 items in total		

To display the experts' view of the relevance of the 110 items in Round 2, the mean and SD of each item are displayed in a fountain graph in Figure 1 in Article 2. This graph illustrates that many items in Round 2 were considered highly relevant (mean ≥ 4) and that the six excluded items differed from the rest of the items; five items had low averages (< 3.5), and one item showed very high disagreement (SD = 1.38).

The feedback from the open questions in the Round 2-questionnaire were grouped into the following themes: (1) suggestions for item changes or improvement, (2) comments concerning the measurement of community care staff as a single entity (i.e., answering for professions other than oneself), and (3) comments on our conceptualisation of competence. Based on these comments, I made simple clarifications of the items from Round 2 to 3, while ensuring that the original meaning of the items was retained to allow for comparison between rounds. The remaining comments were considered relevant feedback for the remaining development of the NOP-CET.

In Round 3, the respondents re-evaluated the remaining 48 items in light of the results from Round 2, resulting in six more items reaching consensus. These six items were: "Assure patient wishes and customs surrounding death", "Trust-promoting initiatives to reduce the use of force", "Provide and receive guidance from colleagues", "Empathise", "Be inclusive" and "Meet a patient at his or her level". The remaining 42 items in Round 3 did not reach consensus. To display the experts' view on the 48 items that were continued from Round 2 to Round 3, the mean and SD of these items are displayed in Figures 2 and 3 in Article 2. These

fountain graphs show how group agreement decreased and the amount of disagreement increased for the study as a whole across Rounds 2 and 3 for these items.

The total number of items that reached consensus in our Delphi study was thus 62; 56 items from Round 2 and six items from Round 3. All 14 categories from Round 1 were represented by these 62 items; however, as four categories remained with only one or a few items each, these were collapsed, leaving a total of 10 categories: health promotion and disease prevention, treatment, palliative care, ethics and regulation, assessment and taking action, covering basic needs, communication and documentation, responsibility and activeness, cooperation, and attitudes toward older people. The categories and items that reached consensus are displayed in Table 5 in Article 2.

Particularly notable was the finding that several items that concerned advanced practices among nurses did not reach consensus. These items were: "Use of the Liverpool Care Pathway (LCP)/Edmonton Symptom Assessment System (ESAS) tools" (63.9 % consensus in Round 3); " New assistive care technologies; how these can secure and improve the lives of patients" (66.6 % consensus in Round 3); "More advanced procedures (e.g. handling of intravenous pumps, intramuscular injections, EKG, various drains, permanent urinary catheters, VAP, CVC and blood sampling)" (80.6 % consensus in Round 3); and "Evidence-based competence: up-to-date information for practice" (83.3 % consensus in Round 3). The non-parametric analysis did not reveal significant between-groups differences with regard to how relevant the experts rated the items: no p-values were below .05.

Conclusions drawn from Sub-study 2 were that the most relevant content of the new competence measurement instrument was found to be covered in 62 items within ten categories; health promotion and disease prevention, treatment, palliative care, ethics and regulation, assessment and taking action, covering basic needs, communication and documentation, responsibility and activeness, cooperation, and attitudes toward older people. Advanced nursing competence did not reach consensus in this expert panel. The implication of Sub-study 2 was to develop questionnaire items based on the 62 Delphi-items.

7.3 Sub-study 3

The NOP-CET was developed based on the 62 Delphi-items identified in Sub-study 2. The three-phase development procedure is described in Chapter 6: Method. The NOP-CET is attached in a translated English version (original language is Norwegian) in Appendix 4. The results from the evaluation of the NOP-CET is presented according to six criteria put forward by Fitzpatrick et al. [156].

Validity

Arguments for content validity of the NOP-CET are based on the thorough development procedure, i.e. review of the literature, the Delphi study and the questionnaire development phase. Content validity refers to the representativeness of items. The expertise and the heterogeneity represented in the expert panel assured that relevant nursing staff competence for municipal elderly care was covered in the findings from the Delphi study. Round 2 and 3 of the Delphi study had a form similar to what Polit and Beck [180] called the Content Validity Index, which is commonly used for evaluating content validity. The strict consensus level ensures that ≥ 90 % of the experts found each single included item to be highly relevant, which can be interpreted as the items being representative of the field of interest.

The NOP-CET showed acceptable construct validity. Factor analysis of knowledge-items, skills-items and personal attributes-items gave theoretically meaningful factors. Factor analysis of knowledge items returned 11 factors (total variance explained 54.98 %). Skills items produced nine factors (total variance explained 65.03 %), and items concerning personal attributes were grouped into eight factors (total variance explained 52.83 %). Tables 1-3 in Article 3 show the factor loadings after rotations, eigenvalues, total variance and Cronbach's α. These results were supported by item to own factor and item to other factor correlations, as Kline [178] argues that validity is obtained when items correlate higher with own factor than with all other factors. The factor analysis and correlations supported our conceptualised division of competence into knowledge, skills and personal attributes, and the idea that these themes have different facets that are recognisable from a clinical perspective. Ten items did not load on any factors.

Reliability

The NOP-CET showed good internal consistency with high Cronbach's α values for all three themes (knowledge: $\alpha = .883$, skills: $\alpha = .930$ and personal attributes: $\alpha = .774$). Of the total 28 factors, 18 factors had a Cronbach's $\alpha > .7$, and the remaining 10 factors had a Cronbach's $\alpha < .7$ (range: .684 - .516). Considering that these factors were composed of few items, and the diversity of sub-constructs included in the concept measured, these α-values can be considered acceptable.

Precision

Seven types of response formats were used in the questionnaire, but there were two main types of items; items with Likert-type scales and items with dichotomous scores. Reported problems with Likert-scales such as multi-dimensionality (respondents have to consider the content of the item and the intensity of their agreement), negative wording (can confuse the respondents), and mid-point bias (respondents tend to choose the middle category) were avoided by an adaption of "phrase completion" (respondents only have to consider intensity of agreement), positive wording (no confusion regarding item content) and use of four response categories. Dichotomous scores and multiple choice were chosen to supplement

Likert-type scales in order to counteract the problems of "faking good" and self-report. Item analysis indicated that no response category was deemed inappropriate or insufficient. Although 29 % of the Likert-type items showed a floor-effect (mean values between 1.10 and 1.93), these items were retained, as it was deemed more relevant to detect differences at the top end of the scale. Similarly, despite 49 % of the dichotomous items were considered too easy (minimum 70 % were able to answer the questions correctly), these items were retained, as they are useful to identify respondents at the low end of the scale.

Interpretability

The scores of the NOP-CET can be interpreted easily item by item, but sum-scores are also useful, as these scores reduce the amount of information to process. Scores from the NOP-CET can also be used in an evaluative manner by establishing the lowest clinically acceptable score or by giving demerit points to respondents that give answers that are clinically harmful. However, this requires further research, as it is important to make rational and defensible cut-offs between competent and incompetent, and the goal is to have as few misclassifications, either false positives or false negatives, as possible [181].

Acceptability

The response rate varied widely across the participating municipalities from 15 % to 62 %. However, the largest sub-groups in the sample (RNs and ANs) were found to be similar to the actual proportions of these staff groups in the participating municipalities. The municipalities in the sample were chosen to represent different socio-demographical parts of the country. Generalisability of the results may therefore be assumed, at least to the municipalities included. Missing responses across items varied from 1.2 % to 18.3 % as seen in Table 12, which was considered tolerable. The NOP-CET was administered electronically, which seems to have been acceptable to most participants. Despite the estimated completion time of one hour, 1016 respondents filled out the questionnaire from beginning to end. Only 39 respondents gave feedback concerning the questionnaire being too long or time-consuming. The respondents' evaluation mainly revolved around technical issues like re-phrasing of items and adding an extra response category to the Likert-type items. The face validity, i.e. whether items seem reasonable and sensible indicators of competence, can be evaluated according to the acceptability. The main issue concerning acceptability seemed to be that relatively few assistants had filled out the questionnaire, which is problematic, as this group makes up almost a third of the staff in many municipalities.

Table 12. Missing responses in percentage per NOP-CET item.

Item no.	Missing (%)	Item no.	Missing (%)	Item no.	Missing (%)	Item no.	Missing (%)	Item no.	Missing (%)
Q1	1.6	Q14	.0	Q21.24	3.3	Q31B	1.6	Q40.5	9.4
Q2	2.3	Q15	.0	Q21.25	3.5	Q31C	1.6	Q40.6	11.1
Q3	1.6	Q20.1	3.2	Q21.26	4.4	Q31D	1.6	Q41.1	3.2
Q5.1	1.7	Q20.2	4.1	Q21.27	4.1	Q31E	1.6	Q41.2	5.5
Q5.2	2.6	Q20.3	4.5	Q21.28	3.3	Q31F	1.6	Q41.3	9.7
Q5.3	2.8	Q20.4	4.8	Q21.29	3.7	Q32A	2.1	Q41.4	10.7
Q5.4	3.6	Q20.5	4.7	Q23.1	1.8	Q32B	2.1	Q41.5	7.9
Q6.1	12.7	Q20.6	10.0	Q23.2	2.4	Q32C	2.1	Q41.6	10.2
Q6.2	15.8	Q20.7	7.1	Q23.3	2.9	Q32D	2.1	Q42.1	3.1
Q6.3	13.3	Q20.8	8.7	Q23.4	2.8	Q32E	2.1	Q42.2	5.8
Q6.4	16.2	Q20.9	6.2	Q23.5	2.8	Q33A	4.2	Q42.3	6.3
Q6.5	8.8	Q20.10	4.7	Q24A	1.2	Q33B	4.2	Q43.1	2.7
Q7.1	5.4	Q20.11	4.7	Q24B	1.2	Q33C	4.2	Q43.2	2.9
Q7.2	2.7	Q21.1	2.7	Q24C	1.2	Q33D	4.2	Q43.3	3.4
Q7.3	2.9	Q21.2	4.1	Q24D	1.2	Q37.1	3.6	Q43.4	3.6
Q7.4	4.7	Q21.3	4.0	Q24E	1.2	Q37.2	7.9	Q44.1	3.4
Q7.5	2.5	Q21.4	4.2	Q24F	1.2	Q37.3	18.3	Q44.2	3.7
Q7.6	3.0	Q21.5	3.2	Q25	.0	Q37.4	18.3	Q44.3	4.8
Q7.7	3.5	Q21.6	2.3	Q26	.0	Q37.5	12.2	Q44.4	6.6
Q7.8	4.2	Q21.7	2.2	Q27.1	.0	Q37.6	12.1	Q44.5	6.1
Q8A	2.0	Q21.8	3.2	Q27.2	.0	Q38.1	6.1	Q44.6	6.0
Q8B	2.0	Q21.9	3.2	Q27.3	.0	Q38.2	10.8	Q44.7	6.8
Q8C	2.0	Q21.10	3.8	Q28	.0	Q38.3	15.6	Q44.8	6.4
Q8D	2.0	Q21.11	3.9	Q29.1	.0	Q38.4	16.8	Q44.9	6.5
Q8E	2.0	Q21.12	3.5	Q29.2	.0	Q38.5	12.2	Q44.10	6.4
Q8F	2.0	Q21.13	3.1	Q29.3	.0	Q38.6	15.5	Q48.1	1.9
Q8G	2.0	Q21.14	3.1	Q29.4	.0	Q39.1	3.6	Q48.2	4.2
Q8H	2.0	Q21.15	3.5	Q29.5	.0	Q39.2	7.7	Q49.1	4.8
Q9	.0	Q21.16	3.5	Q29.6	.0	Q39.3	13.0	Q49.2	4.6
Q10	.0	Q21.17	3.8	Q29.7	.0	Q39.4	12.9	Q49.3	4.8
Q11	.0	Q21.18	3.3	Q29.8	.0	Q39.5	11.0	Q49.4	4.9
Q12	.0	Q21.19	3.5	Q29.9	.0	Q39.6	12.5	Q49.5	4.9
Q13	.0	Q21.20	4.0	Q30.1	.0	Q40.1	3.5	Q49.6	5.2
		Q21.21	3.6	Q30.2	.0	Q40.2	5.8	Q49.7	5.3
		Q21.22	3.4	Q30.3	.0	Q40.3	10.8	Q49.8	5.8
		Q21.23	2.5	Q31A	1.6	Q40.4	11.1	Q50	3.8

Feasibility

An electronic, self-completion survey such as the NOP-CET requires few resources compared to surveys that demand raters. However, the time spent filling out the questionnaire; estimated to one hour, is time that could potentially have been spent on direct patient work. Reducing the length of the questionnaire to reduce burden on the workplace is therefore an option.

Appropriateness

According to Fitzpatrick et al. [156], appropriateness is the ultimate criteria by which to evaluate an instrument and can be seen as the sum of the evidence provided above. The first trial showed acceptable validity (content, face and construct validity) and reliability. Evaluation of precision gave positive results, considering the range of competence that the NOP-CET aims to measure (from assistants to RNs). Interpretability was good and can be improved by developing a cut-off for the lowest clinically acceptable score or by giving

demerit points to respondents that give answers that are clinically harmful. Acceptability seems to be good for RNs and ANs, but may need to be improved for assistants. Finally, the length of the questionnaire may be reduced to increase feasibility. Yet, based on this evidence, it seems rational to conclude that the NOP-CET is appropriate as a measure of competence in community-based nursing staff. Nevertheless, validation is a never-ending process of collecting more and more information, for different purposes and different settings, and the questionnaire should be further developed and tested on other samples of nursing staff to make further conclusions about appropriateness.

8 DISCUSSION

With an overall purpose of developing and evaluating a competence measurement instrument for nursing staff working in nursing homes and home care services, the aims of this PhD study were threefold. The first aim was to identify and evaluate existing competence measurement instruments for community-based nursing staff. The second aim was to establish the content of a new competence measurement instrument, and the third and final aim was to develop and evaluate the new competence measurement instrument. The finding in Sub-study 1 was that existing competence measurement instruments were not appropriate for measuring the competence of current community-based nursing staff, as the content measured did not cover the current challenges in municipal elderly care, and their conceptual and methodological properties were generally too weak. In Sub-study 2, the most relevant content of the new competence measurement instrument was found to be covered within ten categories; (1) health promotion and disease prevention, (2) treatment, (3) palliative care, (4) ethics and regulation, (5) assessment and taking action, (6) covering basic needs, (7) communication and documentation, (8) responsibility and activeness, (9) cooperation, and (10) attitudes toward older people. In Sub-study 3, a new competence measurement instrument – the Nursing Older People - Competence Evaluation Tool (NOP-CET) – was developed and found appropriate for its purpose of measuring community-based nursing staff competence.

From these findings arise at least three important topics to discuss. The first regards methodological challenges concerning instrument development, the second issue involves epistemological and conceptual concerns when attempting to measure an abstract phenomenon such as competence, while the third topic is concerned with quantitative competence measurement as a means of quality improvement. This chapter will be organised according to these three topics.

8.1 Methodological choices

The aim of this study was to develop a competence measurement instrument and evaluate the appropriateness of the new instrument. This endeavour is concerned with measurement as methodology, and part of the evaluation is concerned with psychometrics in particular. Although there are strong traditions of conduct within measurement and psychometrics as disciplines, this does not imply that there is only one correct way of developing and evaluating an instrument. Contrarily, the process from the idea of developing a measurement instrument to having an evaluated version of a questionnaire is long and complex, and a number of decisions must be made. In the following, I will discuss important decisions we have taken in the instrument development process and examine how this may have influenced the findings and the validity of the inferences that can be drawn from a measurement with the NOP-CET. The decisions involve the use of the Fitzpatrick's criteria, applying a research

design and choice of response formats. Finally, ethical issues concerning methodology are discussed.

A decision which has influenced the methods used and findings in this study was the decision to use the criteria of Fitzpatrick et al. [156] to evaluate measurement instruments. The Fitzpatrick criteria were used as the benchmark against which the 11 competence measurement instruments in Sub-study 1 were evaluated, and against which the NOP-CET was evaluated in Sub-study 3. The Fitzpatrick criteria can be characterised as comprehensive, as they include more than analyses commonly used in measurement, particularly in nursing [30, 182], which is primarily Cronbach's α and explanatory factor analysis in terms of psychometric evaluation. Although the Fitzpatrick criteria are not new, they may not be well known within nursing measurement environments; none of the instruments reviewed have referenced Fitzpatrick et al. Most of the 11 instruments evaluated in Sub-study 1 fall short of the Fitzpatrick criteria because of poor conceptual frameworks, unarticulated development processes and/or relying solely on reliability as a measure of evaluation.

In the review of competence measurement instruments (Sub-study 1), we found that only four of 11 instruments were found to have sufficient evidence of the psychometric properties reliability and validity. These findings are in line with two other literature reviews of instruments measuring nursing competence that have previously been performed for hospital settings [30] and the educational setting [182]. Meretoja and Leino-Kilpi concluded that "competence assessment cannot be undertaken adequately until the measurement instruments are known to have these properties" (i.e. psychometric properties) (p. 351), while Yanhua and Watson stated ten years later that "the psychometrics of measures of competence in nursing require further investigation with the application of more sophisticated methods of analysis and scaling that are becoming available" (p. 835). Still, these two reviews do not apply other assessment criteria than reliability and validity. The common conception today is that construct validity is the main concern of a measurement, and that we need to provide evidence of different kinds of validity such as content, face, construct, concurrent and convergent validity to argue for a measure's generalizability [142]. Fitzpatrick et al. [156] argued that the ultimate criteria by which to evaluate an instrument is it's appropriateness, i.e. whether the instrument is fit to be used for the purpose in mind. In this sense, generalizability is not the only issue, appropriateness is also important, which is a property that encompasses other properties to judge in addition to construct validity.

In addition to reliability and validity, the Fitzpatrick criteria include the properties of precision, interpretability, acceptability, feasibility and appropriateness. The advantages of evaluating an instrument by these criteria is that one captures other important properties of an instrument in addition to reliability and validity, like the ability of a measurement to reflect true changes, how to interpret scores, how filling out the instrument is experienced and what administering the instrument involves. These are important properties as they concern how one should prepare for a competence measurement and how the results from the measurement can be used and interpreted. Consequently, the Fitzpatrick criteria are benchmarks for evaluation that should be the recommended when evaluating measurement instruments within

nursing. There has been an evolvement from the time when Meretoja and Leino-Kilpi [30] found that few competence measurement instruments in nursing were evaluated properly for reliability and validity, to what we found in our review of competence measurement instruments 12 years later. There are, however, to my best knowledge, no other competence measurement instruments in nursing besides the NOP-CET that have been evaluated comprehensively by the Fitzpatrick criteria. Two newly evaluated instruments concerning competence in dementia care do, however, deserve credit for advanced psychometric evaluations [183, 184], but they do not use the Fitzpatrick criteria. The NOP-CET shows satisfactory evidence of reliability and construct validity, as well as precision, interpretability, acceptability and feasibility, indicating that it is an appropriate instrument for nursing staff competence measurement in Norwegian home care services and nursing homes.

Another decision we made in relation to methodology was to use a research design that allowed the instrument development process to be systematic and transparent. The research design adopted was that put forward by Wilson [145] called "The four building blocks", which involves working systematically with (1) construct mapping, (2) item design, (3) creating response categories, and (4) measurement modelling. The idea is that when working systematically and checking each step of the process, one more appropriately deals with measurement error. Thorough development procedures are required to ensure that competence is truly being measured, with the exclusion of irrelevant parts. We sought to deal with systematic measurement error in all phases of the development process, but the most important phase was the Delphi study, which established which competence elements to measure. To minimise random measurement error, the pilot-testing of the NOP-CET was important, as respondents could give feedback on whether the items in the questionnaire were acceptable, comprehensible, relevant to the setting, easy to understand and free of ambiguity. Through measurement modelling, described as step 4 in "The four building blocks", we evaluated the degree of systematic (factor analysis) and random (Cronbach's α) measurement error, which was found acceptable.

The research design adopted is similar to what Meretoja, Isoaho and Leino-Kilpi [144] employed to develop the Nurse Competence Scale (NCS) for RNs in hospitals. Their instrument development design involved reviewing other instruments to find which instruments existed and what needed to be improved, establishing the content of the NCS through the Delphi technique, and finally testing the instrument for psychometric properties. The 11 instruments reviewed in Sub-study 1 did not report to have applied a research design when developing the measurement instruments. Not applying a research design could be a reason why many of the instruments fell short when evaluated according to the Fitzpatrick criteria. Instrument developers work with the methodology "measurement" and should therefore be familiar with the threat of measurement error and how best to deal with it. Applying a systematic approach to instrument development could be one way forward to improve measurement methodology in nursing.

The final methodological choice to be discussed is the use of seven different response formats in one instrument. Seven response formats can easily be perceived as too many because it

might confuse the respondents and the different measurement levels complicate statistical analysis. The choice to include several response formats was made in an attempt to alleviate two problems that I identified when reviewing other competence measurement instruments (Sub-study 1): the problem of self-assessment and the problem with Likert scales.

The task of developing a quantitative competence measurement instrument is linked to the aim of simultaneously assessing the competence of many people in several workplaces in order to compare competence levels. Self-assessment is the most common and cost-effective way of performing a quantitative measurement and has been shown to have advantages in the form of encouraging continued education and increasing work satisfaction [147-149]. There are, however, problems concerned with self-assessment, and these are reinforced in this study as we measure the competence of staff groups that have different educational and/or preparation levels. In a review of the effectiveness of self-assessment, Colthart et al. [185] found that competence appears to have impact on self-assessment in the sense that competent practitioners are reasonably accurate in their self-assessment, while people who lack competence are less likely to be aware of their deficiencies. The reason for this is not clear, although some suggest a kind of psychological 'defence' mechanism [185]. It is nonetheless a methodological problem that groups with little or no training might score themselves higher than what is accurate, and higher than a RN.

To deal with this problem of self-assessment, we chose to include test items in addition to traditional Likert-type items (which involved self-assessment). Test items have response categories that are either correct or wrong; they involve factual knowledge, as for example, "which is the correct procedure for resuscitation?", or "what is the desired level of blood glucose in patients with diabetes?" The test items can be correlated with items that concern the self-assessment on the same subject (e.g. diabetes). Hence, the respondents were tested to assess whether their self-assessment was accurate.

The second rationale for choosing several types of response formats is concerned with the problem of Likert scales. The Likert scale is commonly used in social research because of its ease of construction, intuitive appeal, adaptability and generally good reliability [186]. The main problem with Likert scales, however, is multidimensionality; Likert scales ask respondents to think about two dimensions at the same time, the content of the item and the intensity of their agreement [186]. In order to reduce the problem of multidimensionality, I used a type of response format called "phrase completion" [186] in which the content is clear and respondents only have to determine the intensity of their agreement. "Phrase completion" must be adjusted to the corresponding questions, which meant that the choice to use "phrase completion" increased the number of response categories. Overall, the combination of several types of response formats can be seen as a way to decrease measurement error and increase validity. The combination of different types of response formats in competence measurements of municipal elderly care is to our knowledge only found in the instrument developed by Saxer et al. [187] (reviewed in Article 1).

Finally, the methodological choices made have ethical implications. An important aspect concerns examining the consequences the measure has for the respondents. Results from a competence measurement can have serious consequences if the measure is developed to rank individuals or classify someone as competent or incompetent. First, participation in the trial of the NOP-CET was voluntary and confidential, and second, the instrument was not developed to rank individuals. The purpose of the NOP-CET was to evaluate the competence of the nursing staff in general. In order to translate the NOP-CET scores into clinically meaningful units, however, it is necessary to decide on cut-off points for what is clinically sound competence. In this light, Azzarello (2003) emphasises the importance of making a rational and defensible cut-off point between competent and incompetent. The goal is to have as few misclassifications, either false positives or false negatives, as possible. Azzarello describes different techniques to set valid cut-off points, which all rely on expert judgment on what should be the reference point. Future research on the NOP-CET will need to establish rational and defensible cut-offs to make meaningful comparisons between groups.

8.2 Epistemological and conceptual concerns

This study aimed to describe and measure the competence of community-based nursing staff. How I have conceptualised competence has consequences for how the concept is measured. Competence was conceptualised as a contextual, multi-faceted, complex concept, consisting of actual performance and capability. Competence was for analytical purposes divided into knowledge, skills and personal attributes. The most relevant competence for nursing staff in municipal elderly care was found to consist of four categories of knowledge, three categories of skills, and three categories of personal attributes. Factor analysis of knowledge, skills and personal attribute items gave factors that were clinically meaningful, and construct validity was thus assumed. These results give one solution to measurement of nursing staff competence. The results could, however, have been different if someone else conducted the study. What is it then that makes this piece of research valid and relevant? In addition to methodology issues already discussed, the answer to this question relates to epistemological and conceptual concerns when attempting to measure an abstract phenomenon such as competence.

Theories or models are not exhaustive descriptions of a phenomenon, but rather the best possible approximation of a phenomenon [188]. When we aim to describe a phenomenon such as competence, we have to choose some criteria, which implies that other criteria are left out. Like most models, measurement models have to be simplified to be useful, so the simplification is not a problem per se. Model development becomes problematic when there is vagueness concerning how criteria were chosen, included and excluded from a model. As discussed above, the process of developing a competence measurement instrument is based on methodological choices. These choices are embedded in epistemological assumptions.

Empirical research can be seen as an activity of distinguishing representation from object, in which answers to a questionnaire are "representations" and the competence of the respondents

is the "object" [189]. We can never be sure that the first is a true reflection of the latter, but we may provide evidence that we are within approximation of the true representation, and thus legitimise our representation. Research is a human activity involving human intellect, interests, resources and intentions [190]. Data is collected by someone and criteria are chosen by someone. The researchers have a central position in the becoming of the results and interpretations thereof. I have had a central position in this study in the sense that I chose the conceptual framework and the interview questions to pose, and I constructed the questionnaire items. Further, analysis is never objective. Another person with the intention of developing an instrument to measure nursing staff competence could, and probably would, end up with different results. It is here that construct validity comes in as some of the most important evidence in my research. I have argued for construct validity by making explicit the choices that I have made, and by following a systematic procedure. I have followed standards of conduct from research communities in measurement and psychometrics. Yet, Kuhn [191] stated that there are no higher standards than the consensus in a research community, meaning that there are no criteria to decide which representation of an object (e.g. competence) is The Best. In this light, science should be understood as an ongoing process in which researchers improve the concepts they use, e.g. "Competence", to understand the mechanisms that they study, e.g. competence measurement [189]. Validation of the NOP-CET will therefore continue in further use of the instrument, as demonstration of validity is a process of collecting information for different purposes and different settings, and to document the likelihood that the measurement is appropriate for the populations being investigated.

Another important issue to consider when attempting to measure an abstract phenomenon such as competence is the conceptual framework. The choice of conceptual framework is highly influential on the results of this study. The framework adopted gave directions for which questions I posed, and therefore the answers I got. My conceptual framework is inspired by Eraut [125] and his discussion of competence under the two headings performance and capability. Contrary to a behaviouristic understanding of competence, Eraut sees competence as something more than performance. Capability can demonstrate other processes important to competence, such as cognitive processes, knowledge base, knowledge in use, the role played as a professional, ability to learn from experience, creativity, and critical and evaluative attitude. Can such subtle processes be made explicit and measurable, or are they subtle exactly because they are impossible to articulate, make explicit and measure? I believe these cognitive processes are hard to measure, but not impossible.

Grimen [192] points at two ways of testing tacit knowledge: testing actions or testing results. Testing results is related to testing performance; it is what was achieved that is of interest. To grasp the subtle differences in capability between groups of nursing staff, however, I believe testing actions could be a solution. What a nurse actually does is more demonstrative of cognitive processes and the logic of these, than what the results end up as. The latter may be influenced by many other factors of which the nurse has no influence, e.g. the progression of a disease. Thus, Eraut's discussion of performance versus capability inspired me to pose a range of questions and use different types of response formats in an attempt to capture the subtle aspects of competence (capability), and not only those which are more easily measured

(performance). The use of patient cases, which present a problem to solve (multiple choice response format), was one method applied to capture cognitive process, role played, creativity, and critical and evaluative attitude, as well as incorporating the context of nursing in municipal elderly care. Some of these patient case-items did not form factors in the factor analysis and came across as too easy in the item analysis (Questions 31, 32, and 34), and may therefore be altered before a new survey with the NOP-CET. Other patient-case-items proved useful. Questions nos. 16 and 17 (see Appendix 4) proved to be good measures of knowledge, clinical decision making and perception of own role in critical situations. Question no. 43 (see Appendix 4) also proved to be a relatively good measure of attitudes towards elderly and critical attitude.

The conceptual framework divided competence into knowledge, skills and personal attributes. I have emphasised that these attributes do not in themselves constitute competence, and that competence is more than the sum of these three scores (knowledge, skills and personal attributes). Still, as an analytical tool, competence was studied as three separate entities in this study. I asked the experts in the Delphi study about relevant knowledge, skills, and personal attributes, and used this division when presenting the results from Sub-study 2. Questionnaire items were created based on this division, and factor analysis was performed on the three separate attributes of competence. In this sense, I did not study competence, but rather attributes of competence. A measurement model is, however, not a true reflection of the real world, but rather a tool for thought, a simplification. A model requires criteria, and to be comprehensible it must include some criteria and exclude others. In this sense, the analytical exercise of dividing competence into three attributes can be justified. I cannot claim that the NOP-CET captures all aspects of relevant competence for community-based nursing staff, but based on previous argumentation for construct validity, I can claim that the competence measured is relevant.

Another issue concerning the conceptual framework is the issue of "collective competence". When competence is understood to be context specific, it can also be understood as bound to colleagues. As opposed to seeing competence as a capacity of the individual, one can draw on a notion that competence is distributed among staff members and artefacts [133]. Competence is not seen as a mental activity residing exclusively in the individual mind, but as inherently practical and domain-specific. Referring to the seminal statement of Polanyi [193] that we know more than we can say, the nursing staff might know more than we can measure. In this perspective, measuring competence individually will reduce a complex professional life to something less. It was therefore important to capture collective aspects of competence in the NOP-CET by measuring collaboration and relational practice. Collaboration and relational practice is based on factors related to frequent, high-quality communication (which is timely, accurate and problem solving), as well as high-quality relationships (in which shared goals, shared knowledge and mutual respect are present) [194-196]. These aspects of collective competence were measured in Questions nos. 35-42 in the NOP-CET. Edwards [138] claims that relational work can strengthen practitioners' actions on complex problems, and that this relational agency comes in addition to the specialist, individual competence at the core of each distinct professional practice. In this light, the contribution of this study is a tool that

enables the individual competence of nursing staff to be made explicit in addition to measuring collaboration and relational practice.

Interviews with municipal leaders and politicians revealed that general development of nursing staff competence, including assistants, is a pressing need in municipal elderly care [50]. This study adopted a different approach than most other studies measuring competence in municipal elderly care; it measures all groups of nursing staff in one instrument. The rationale for studying nursing staff as one group, and not discriminate between RNs, ANs and assistants, is an attempt to get beyond analyses of competence bound to roles. It is rather a study of the competence needed to meet the current needs of the older patient population in municipal elderly care. Work environments differ and are changing, especially in municipal elderly care [83, 138]. Work roles are dynamic; their components are renegotiated in the flow of the activity, and over time old roles disappear and new one's emerge [197]. The Coordination Reform opens up for new and expanded roles for health personnel (e.g. Advance Practice Nurses), as well as changes in allocation of responsibilities between physicians, RNs and other health personnel [3]. The rationale for measuring all nursing staff in one instrument is thus founded in an attempt to assess the competence needed, and not staff roles per se.

Finally, as competence has been discussed as a concept, it is appropriate to discuss the usefulness of concepts themselves. Rodgers found that "concept development must be an ongoing process, with no realistic end point, except that work on a particular concept may decrease as the concept loses significance. As phenomena, needs, and goals change, concepts must be continually refined and variations introduced to achieve a clearer and more useful repertoire [198]". This statement contrasts with what other nursing scholars have said about the need to reach a consensus on competence as a concept [31, 129]. Building consensus on what constitutes competence, or other concepts for that matter, may be unfruitful, as this could lead to closing the debate on competence as a concept. The debate on competence as a concept, seen through Rodgers eyes, is useful, as it continually contributes to refine the concept and introduces new angles that are useful to current practice. Risjord [188] found that concept development is crucial for nursing as a science. As described earlier, there has been much evolvement in the conceptualisation of competence in the last 50 years. Thus, the lack of consensus on competence as a concept within nursing is not a problem, but rather a fruitful discussion on the usefulness of the concept. Although others have built their conceptual understanding of nursing competence on Eraut's framework [124], I believe that this study contributes to a continued refinement of competence as a concept in nursing. The understanding and measurement of competence is taken beyond behaviouristic foci on performance to include subtle process of capability as well as collective competence that are important aspects of a complex concept as nursing competence.

8.3 Competence measurement as quality improvement

Apart from developing an instrument that is valid and built on a sound conceptual framework, a rationale for this study was to develop a tool that could contribute to quality improvement processes in municipal elderly care. The WHO [103] has called for more comprehensive judgements of quality of care and asks for information on care processes in addition to measures of standard indicators of health care performance [104]. Initially I linked competence measurements to systematic evaluation and improvement of quality of care, and as possible supplements to quality indicators available in the national registers IPLOS and KOSTRA. In this section, I will discuss how the NOP-CET can be of use to evaluate quality in municipal elderly care.

An increasing number of developed countries are moving towards a culture of measuring quality in municipal elderly care, but they all face challenges in public availability of data, homogeneity of measurement and choice of indicators to measure quality of care [199]. Mor [200] emphasised that selecting the aspects of quality to be measured and incorporated into quality measurement metrics is perhaps the most important issue. When no agreement exists on what quality of care should entail, the term "quality" can assume different meanings in different settings [199]. Donabedian's [28] approach to the evaluation of quality of care, which entails evaluating structure, processes and outcomes, is perhaps the few points of consensus there is in the field of quality of care [201]. Competence measurement is one of three key elements in a quality improvement process; it is necessary to evaluate the present competence in order to appropriately target competence improvement strategies [28, 29].

There are many aspects of quality in municipal elderly care, such as clinical, functional, treatment-related, psycho-social and quality of life-related aspects of quality, some of which are more readily measured than others [200]. These aspects can be viewed as process data, as they concern what is done in giving and receiving care [28]. Competence can be related to all the mentioned aspects, as the care that nursing staff provide will have clinical, functional, treatment-related, psycho-social and quality of life-related consequences. Measuring competence can therefore be seen as a process oriented way of evaluation quality of care. There are strong arguments for a process approach as opposed to an outcome-oriented way of evaluating quality of care. Outcomes can be poor measures of quality of care, as they are only partially attributable to health services and may be strongly influenced by other factors such as lifestyle, environment or socioeconomic circumstances [201]. Outcomes do not capture all elements of the performance of a health service, but only permit inferences to be made about the quality of the process and structures of care [202]. Finally, poor outcomes, e.g. death or increased hospital admissions, do not always imply poor quality of care [203]. Municipal elderly care involves taking care of people who are chronically ill, in a palliative or terminal phase. In such cases, measuring outcome does not give meaning, at least if the outcome is measured in terms of recovery or survival. It would be more relevant to measure whether appropriate, individually targeted treatment that alleviates unpleasant symptoms is provided,

and whether the care is provided in a respectful and empathic manner. The NOP-CET is largely concerned with the process of care, and measures in detail how treatment and care is provided to patients in an acute, chronic or palliative state. The NOP-CET can therefore be said to measure process in addition to outcome. In this sense, the process-oriented approach of the NOP-CET can be seen as a valuable addition to the measurement of outcomes to assess quality of municipal elderly care.

An important issue to consider when discussing assessment of quality of care is the patient's role and say in the assessment. It is often the case that those aspects of quality that are most valued are most difficult to measure, either because we do not trust the patients' voice or because we do not know how to capture the aspects of care that are harder to measure [200]. Many of the patients in municipal elderly care suffer from cognitive impairment or dementia; therefore, their families should be able to act as their advocates. A feature of current municipal elderly care in many countries, also in parts of Norway, is that patients in collaboration with their families can choose between nursing homes or home care providers when assigned to municipal elderly care. A study of influences on the decision of choosing a nursing home found that although information on the quality of clinical care was available to the patients and their families (i.e. pressure ulcers, malnutrition, incontinence, decline in ADL, pain and falls), these dimensions did not play important roles in the choice of nursing home [204]. The patients and their families chose a nursing home on the basis of the quality dimensions that were easy for them to observe, evaluate and apply to their situation, such as safety, privacy, freedom and mobility; referred to as "hotel services". Does this mean that patients and their families do not care as much about the clinical care as the hotel aspects of care? No, not necessarily, but the clinical aspects of care may be harder for them to assess. Just as it may be hard for patients and their families to judge the quality of clinical care, and thus rather refer to hotel quality dimensions, it may be hard for patients to judge the clinical competence of nursing staff. Patients can more easily relate to whether tasks are performed, or whether staff is "nice", but may not be in the best position to judge the quality of clinical competence [205]. As the older patient population is frail, dependent on a good relationship with the nursing staff, and often refrain from making complaints about the staff on which they depend [206], the NOP-CET can be a valuable tool to judge whether the competence of the nursing staff is sufficient from a clinical perspective.

Another issue concerning the NOP-CET was that it was developed as context-specific. Competence does not exist in a vacuum and should not be considered separately from its surrounding structures. The NOP-CET measures competence in nursing homes as well as home care services. The rational for creating such an instrument was that the competence necessary to provide safe care to frail elderly patients was considered to be similar for both settings because the patient groups have the same characteristics (multi-morbidity, poly-pharmacy and cognitive impairment). There are, however, important differences between nursing homes and home care services that influence how the nursing staff "orchestrates" their work. The most obvious difference is that nursing home patients reside in the same physical building and the nursing staff therefore work at the same place at the same time. Staff in nursing homes can at any time consult other staff, alternate tasks between themselves,

and survey what others are doing – their competence is relational. Staff in home care services usually work alone or in pairs, constantly travelling from one patient's home to another, and deal with problems alone without more competent staff present to "correct" them – their competence is more individual. Consequently, the nursing staff in nursing homes and home care services do not have equal opportunities to display and develop their competence [116]. Such structural differences have to be considered when competence measured through the NOP-CET is compared across settings.

In order to link a competence measurement to quality improvement initiatives, clear conceptual models of competence, specification of relevant indicators of competence, as well as a system that aids in using information on competence for decision making and quality improvement processes is needed [104]. Meretoja and Koponen [207] identified a lack of methods for identifying optimal competence profiles for systematic competence development, and therefore developed a model to compare nurses' optimal and actual competence. The model includes three systematic steps: the first is to establish group consensus on the optimal competence required in the practice setting. The second step is assessment of actual competence, and the third is an evaluation of how the actual competence differs from optimal competence. Lai's [208] competence analysis which consists of (1) defining competence demands, (2) evaluating competence, and (3) identifying competence needs, seems to be similar to the model of Meretoja and Koponen. The models of Meretoja and Koponen (2012) and Lai [208] can be seen as answers to Klazinga's [104] call for a systematic quality improvement approach, as they depict the process required to clarify educational challenges in a practice setting. This PhD-study is conducted in accordance with the described models, as optimal competence for nursing staff in municipal elderly care has been established and a measurement instrument has been developed to measure the actual competence profile of nursing staff. The next step to complete the process is to evaluate how actual competence differs from optimal competence and thereby identify specific educational challenges in the nursing staff. This step involves establishing cut-offs for safe competence levels, which means translating competence scores into clinically meaningful units.

Overall, competence is a key issue when providing quality health care services [106]. Quality of care requires all people who deliver patient care and treatment to possess the competence needed to meet complex health care demands [16]. In contrast to most other competence measurement instruments reviewed in Sub-study 1, the NOP-CET measures relevant competence required by all nursing staff in municipal elderly care. Measuring the competence of all nursing staff is of importance because such assessment can provide a detailed understanding of available competence and competence that is lacking [6, 27], which is necessary to work systematically and targeted when developing strategies to enhance competence, thereby improving the quality of care [28, 29]. Ongoing measurement of nursing staff competence can therefore provide evidence that can be used as a starting point to improve quality of care, and thus help reduce the number of adverse events in municipal elderly care.

9   CONCLUSION

To contribute to assessment of quality in municipal elderly care, the aims of this study were to evaluate existing instruments and establish the content of, develop and evaluate a new competence measurement instrument for nursing staff working in nursing homes and home care services. The study was divided into three sub-studies to answer the research questions. Based on the findings and discussion thereof, the following conclusions are drawn.

With regard to identifying and evaluating existing competence measurement instruments for community-based nursing staff:

- Several instruments for measuring community-based nursing staff competence exist, of which some measure the competence of RNs alone, while others measure several groups of nursing staff in the same instrument.

- The available competence measurement instruments measure competence in community elderly care (nursing homes and/or home care services), palliative care exclusively, public/community health nursing or general practice nursing.

- The indicators of competence used in instruments measuring competence in community elderly care were not found to reflect the competence that is currently expected of nursing staff as expressed through government policy documents.

- The conceptualisation of competence in the existing instruments belongs to a behaviouristic understanding of nursing competence, which is limited in that it does not incorporate important aspects of competence such as cognitive processes, evaluative attitudes or the collective aspects of competence.

- All instruments employ self-assessment as the main source of information. Self-assessment is found to be less valid in groups with low competence than in groups with higher competence and should therefore be supplemented with other methods for assessing competence, such as testing.

- All instruments rely on Likert scales as response categories, which have limitations.

- Although some instruments had been evaluated for reliability and validity, all instruments fell short in terms of comprehensive instrument evaluation (i.e. the Fitzpatrick criteria).

- No instrument was found appropriate to measure nursing staff competence in Norwegian municipal elderly care: a new instrument is needed.

With regard to establishing the content of a new competence measurement instrument:

- Clear expert consensus was reached in terms of what competence is necessary to provide safe services to older people in need of health care in their homes or in institutions.

- Consensus was reached on 62 items of competence within ten categories: health promotion and disease prevention, treatment, palliative care, ethics and regulation, assessment and taking action, covering basic needs, communication and documentation, responsibility and activeness, cooperation, and attitudes toward older people.

- Some competence items concerning advanced practices among nurses did not reach consensus, which conflicts with competence expected as expressed through government policy documents.

- The strict cut-off for consensus, the heterogeneity of the expert participants, the high response rate and the commitment of the participants are signs of content validity of the items that reached consensus.

- The Nursing Older People - Competence Evaluation Tool (NOP-CET) was developed based on the 62 items that reached consensus, and consists of 346 questionnaire items. The NOP-CET measures the competence of RNs, ANs and assistants working with older patients in nursing homes and/or home care services. The questionnaire contains items of self-assessment as well as test-items, and employs seven different response formats. The NOP-CET was tested on 1016 nursing staff in ten municipalities.

With regard to evaluation, the NOP-CET was found appropriate to measure nursing staff competence in municipal elderly care based on the following:

- The NOP-CET was found to have good content validity based on a thorough development procedure; review of the literature and methods previously applied, the Delphi-consensus-process, and the systematic questionnaire development.

- Construct validity was found acceptable as factor analysis divided the items into theoretically meaningful factors, supported by item-to-own-factor and item-to-other-factors correlations.

- The NOP-CET showed good internal consistency with high reliability for all three themes: knowledge, skills and personal attributes.

- Precision was acceptable considering the wide range of competence from RNs to assistants that the NOP-CET measures. Use of other response formats in addition to Likert scales should counteract problems with self-assessment, multi-dimensionality and mid-point bias.

- The scores of the NOP-CET are well interpretable reported item-by-item and as sum scores.

- The NOP-CET was considered acceptable as a measure for RNs and ANs.

- Using the NOP-CET was found feasible for the municipalities taking part in the first survey.

9.1 Implications for nursing practice, education, and research

Measurement does not enhance quality of care in itself; it is a tool that has to be used strategically as part of a larger process with the aim of improving quality of care. This study contributes with three aspects to the field of nursing practice, education and research. The first is a framework for competence in municipal elderly care, the second is the new competence measurement instrument, and the third is recommendations for instrument development procedures and instrument evaluation.

Several government policy documents require high competence levels of nursing staff and mention particularly competence in health promotion, empowerment of patients, patient trajectory, patient safety and health related technology [3, 14, 46]. These expectations do not reflect what the research literature has found to be the core competence of nursing staff in municipal elderly care: assistance with ADL, medical knowledge, collaborative skills and personal abilities such as mental strength and confidence. An exploration of what is currently expected of nursing staff competence was needed and was conducted in Sub-study 2. The results of the Delphi-study – the ten categories and 62 items of competence – are an updated framework for what competence in municipal elderly care should include. This framework can be used by municipal administrations to evaluate available competence and plan for what competence to acquire, by for example, hiring personnel with higher competence levels in advanced nursing practice. The framework can be used in undergraduate education, colleges and universities when evaluating the current education of nurses (ANs and RNs) and planning new courses/education programs. As the socio-demographic and political developments in Norway follow international trends, the framework of competence is likely to be generalizable to other developed countries with a similar health care system. Assuming that older people in need of health care have the same needs across borders, the framework could be used as a basis for international studies examining competence in community elderly care. Bearing in mind, however, that the framework is founded on a contextual understanding of competence, meaning that the environment in which the framework is applied should be considered.

There are to date no instruments that measure Norwegian community-based nursing staff competence other than the NOP-CET. The development and employment of the NOP-CET

can therefore be a contribution to assessing competence in Norwegian municipal elderly care. The first trial of the NOP-CET showed that the instrument can be used to evaluate whether the staff employed in a nursing home, a home care service, or an entire municipality are sufficiently competent to deliver safe care to older patients. Measuring competence is of interest to practice (the municipalities) and to follow developments in municipal elderly care with scientific investigations. However, in order to work at a detailed, strategic and systematic level in terms of competence assessment and enhancement, some steps remain. These are: (1) establish cut-offs for safe competence levels, (2) evaluate how actual competence differs from optimal competence, thereby identifying specific educational challenges in the nursing staff, (3) alleviate competence gaps through evidence-based competence development interventions, and (4) evaluate the effectiveness of the competence development interventions. Recommendations for further research are therefore:

- To translate the NOP-CET scores into clinically meaningful units. It is necessary to draw cut-off points for what is clinically safe competence, and it is important to make rational and defensible cut-offs between competent and incompetent. The goal is to have as few misclassifications, either false positives or false negatives, as possible [181]. Methodologically, this could involve a group consensus process like the Delphi technique [162], in which experts participate with the aim of reaching consensus on defensible cut-offs.

- Evaluate how existing competence differs from optimal competence and thereby identify specific educational challenges in the nursing staff. Such evaluation is done statistically, but also involves professional judgement, and should be done in collaboration with the municipalities and professionals involved.

- Identified competence gaps should be met by evidence-based competence development interventions. These should take place in close collaboration with the municipalities involved or the well-established "Utviklingssenter for sykehjem og hjemmetjenester" in the included areas (in English: Development centres for nursing homes/home care services), which have competence development as their main activity.

- The effectiveness of the initiated competence development interventions should be evaluated using new competence measurements with the NOP-CET.

Finally, this PhD study contributes two methodological recommendations to nursing research: (1) using a research design when developing a measurement instrument, and (2) using the Fitzpatrick criteria as a benchmark for evaluating measurement instruments. The main concern in measurement is "error", both systematic and random measurement error. Error is a mismatch between the item being measured and the recorded value, and reduces validity and reliability. The research design adopted was developed to reduce the risk of systematic and

random measurement error. None of the instruments reviewed in Sub-study 1 were found to have been developed by a psychometric research design, and their psychometric properties were generally poorly evaluated. Thus, in order to deal with measurement error and argue for construct validity, a research design is recommended in the development of new measurement instruments in nursing.

Further, the Fitzpatrick criteria are recommended as a benchmark for evaluating measurement instruments in nursing. The Fitzpatrick criteria are comprehensive and include more than what is commonly used in evaluation of measurement in nursing [30, 182]. Most of the 11 instruments evaluated in Sub-study 1 fell short of the Fitzpatrick criteria because of poor conceptual frameworks, unarticulated development processes, and/or relying solely on reliability as a measure of evaluation. The comprehensiveness of the Fitzpatrick criteria is that in addition to reliability and validity, they include the properties precision, interpretability, acceptability, feasibility and appropriateness. The advantages of evaluating an instrument by these criteria is that one captures other important instrument properties, like the ability of a measurement to reflect true changes, how to interpret scores, how filling out the instrument is experienced and what administering the instrument involves.

Still, the common conception today is that construct validity is the main concern of a measurement, which involves providing evidence of different kinds of validity, such as content, face, concurrent and convergent validity [142]. This study has evaluated content, face and construct validity, in addition to reliability. Providing evidence of validity is, however, never proof that a measurement is valid once and for all. Demonstration of validity is a process of collection information for a specific purpose and a specific setting, to document that it is likely that the measurement is appropriate for the population being investigated. Further evaluation of construct validity of the NOP-CET could include exploration of reliability and item-response.

Reliability is commonly evaluated by Cronbach's α, as is done in this study, and for the 11 instruments reviewed in Sub-study 1. Test-retest reliability can be conducted when the same instrument is given to the same sample twice, with some time interval, but is problematic when the aim of using the instrument is to detect a difference in competence because of competence development interventions. This is the intended use of the NOP-CET, and is therefore not the best option of testing its reliability [179]. Another way of testing reliability is by Generalizability theory [209]. The set of items in a questionnaire is assumed a representative sample of all possible items measuring a construct, e.g. competence. The question of reliability is resolved into a question of accuracy of generalisation. Generalizability theory opens up for the possibility of estimating differentiated variances as opposed to individual variances, as expressed in Chronbach's α [210].

Further exploration of item-response can be done by construct modelling, a model developed by Rasch [211] and expanded by Wilson [145]. Construct modelling, also referred to as item-response theory, expresses the probabilistic relationship between respondent ability and item difficulty, and is built on the assumption that the measurement error is not consistent all along the scale of an item. Construct modelling identifies discriminative points along a scale, i.e.

thresholds that help us to tell the respondents apart. As the NOP-CET measures a wide range of competence from RNs to assistants, it is of interest whether it discriminates equally along the entire scale range, and evaluation should therefore consider whether there are sufficient numbers of items with different levels of difficulty (both easy and difficult items).

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Appendices

Appendix 1. Interview guide for Delphi study Round 1 (in Norwegian)

Intervju i Delphi-studien "Kompetanse i kommunale pleie- og omsorgstjenester til eldre"

Takk for at du vil delta i Delphi-studien; "Kompetanse i kommunale pleie- og omsorgstjenester til eldre". Denne e-posten har til hensikt å klargjøre praktiske forhold og beskrive tema for det første intervjuet. Telefonintervjuet beregnes å vare i 30 minutter og gjennomføres i ukene 37-40.

Det er fint om du vil svare på følgende innen en uke:

- To mulige tidspunkt for intervju i nevnte tidsrom.

- Telefonnummer du ønsker benyttet.

- Bekrefte eller avkrefte at intervjuet kan tas opp på bånd. I henhold til personopplysningsloven vil lydopptakene/transkripsjonene bli lagret på et sikkert sted og slettet straks studien er avsluttet (01.09.2014).

I intervjuet vil vi ha fokus på hvilken kompetanse som er relevant for helsepersonell i kommunale pleie- og omsorgstjenester til eldre. Vi forstår kompetanse som en sammensetning av kunnskaper, ferdigheter og personlige egenskaper. Med helsepersonell mener vi assistenter/ufaglærte, helsefagarbeider/hjelpepleier/omsorgsarbeider og sykepleiere. I de siste årene har det bl.a. gjennom Samhandlingsreformen vært en bevegelse mot økte og til dels endrede krav til hvilke oppgaver helsepersonell har i forhold til eldre i kommunale pleie- og omsorgstjenester. Spørsmål vi vil diskutere er:

- Hvilke kunnskaper mener du at helsepersonell trenger for å imøtekomme krav i kommunale pleie- og omsorgstjenester til eldre?

- Hvilke ferdigheter mener du at helsepersonell trenger for å imøtekomme krav i kommunale pleie- og omsorgstjenester til eldre?

- Hvilke personlige egenskaper mener du at helsepersonell trenger for å imøtekomme krav i kommunale pleie- og omsorgstjenester til eldre?

Som en forberedelse til intervjuet er det fint om du noterer ned stikkord om kompetanse som du mener er aktuelle. Eksempler kan være: "Sykepleiere trenger ferdigheter i å legge perifert venekateter og administrere intravenøs væskebehandling", "Helsefagarbeidere trenger tilstrekkelige kunnskaper til å dele ut medisiner", eller "Alt helsepersonell bør vise toleranse overfor pasienter fra andre kulturer". Vær gjerne ambisiøs i forhold til å sette en god standard for kvalitet i kommunehelsetjenesten.

Jeg ser frem til å snakke med deg!

Vennlig hilsen Pia Bing-Jonsson

Doktorgradsstipendiat, Avd. for sykepleievitenskap

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Appendix 2. Information letter for Delphi study Round 2 (in Norwegian)

Informasjon om runde 2 i forskningsstudien "Kompetanse i kommunale pleie- og omsorgstjenester til eldre"

Hjertelig takk for din deltagelse i runde 1 (telefonintervjuet) i Delphi-studien "Kompetanse i kommunale pleie- og omsorgstjenester til eldre". Vi fikk svært nyttige svar og et rikt materiale som vi nå har jobbet med en god stund. Svarene deres har blitt sammenfattet og kategorisert i 14 kompetanseområder. Under hvert kompetanseområde er det ulikt antall "kompetanseaspekter". Resultatene kommer nå tilbake til dere i form av et spørreskjema (runde 2).

Målet med studien er å utvikle et spørreskjema som måler kompetansen til helsepersonell i kommunale pleie- og omsorgstjenester til eldre i Norge. Vi ønsker at spørreskjemaet skal være spesifikt i forhold til de ulike områder av kompetanse dere mener er relevante, i tillegg til at det endelige spørreskjemaet oppleves aktuelt for både de som skal svare på det og de som skal bruke resultatene i etterkant.

I runde 2 ønsker vi at du som ekspert skal rangere hvor sentrale de identifiserte kompetanseaspektene er for utøvelsen av helsehjelp for helsepersonell i kommunale pleie- og omsorgstjenester til eldre. Helsepersonell som er inkludert i studien er sykepleiere, helsefagarbeidere (eller de med liknende utdanning) og ufaglærte. For ikke å komplisere dette spørreskjemaet har vi valgt å ikke skille på yrkesgruppene i dette skjemaet. Det betyr at vi ber deg om å rangere kompetanseaspektene med tanke på hva som kreves samlet sett for å oppnå god og forsvarlig helsehjelp. I denne runden fokuserer vi altså hva innholdet i kompetansen bør være og ikke hvilken yrkesgruppe som har kompetansen. Også denne gang ber vi deg tenke på hva som kreves av kompetanse i dag og i fremtiden, så vær gjerne ambisiøs i forhold til å sette en god standard for kvalitet i kommunehelsetjenesten.

Vi ber deg vurdere hvert enkelt kompetanseaspekt ved å rangere det på en skala fra 1 til 5 (1=Svært lite relevant, 2=Lite relevant, 3=Relevant, 4=Svært relevant og 5=Helt avgjørende). Flere steder i spørreskjemaet vil det være åpne svarmuligheter der vi ønsker at du kommenterer på ting du reagerer på i skjemaet. Hvis du mener at noe er unyansert, galt, upassende, uriktig formulert, mangelfullt eller totalt fraværende så hadde det vært verdifullt for studien om du kunne skrive ned dette her. Det finnes ingen riktige eller gale svar. Vi er ute etter din oppfatning ut ifra den kompetanse og erfaring du besitter.

Du vil motta en egen e-post med lenke til spørreundersøkelsen. Der vil du få oppgitt et brukernavn. Passord for å logge deg inn på spørreundersøkelsen genereres i en egen e-post. Hvis du har problemer med pålogging, utfylling eller annet ikke nøl med å ta kontakt på p.c.bing-jonsson@medisin.uio.no

Tusen takk for at du tar deg tid til å svare på spørreskjemaet i runde 2. Vi håper du har anledning til å svare på spørreskjemaet innen 15. januar. Runde 3, som også er et lignende spørreskjema, vil komme en til to måneder etter dette.

Med hilsen

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Professor Christina Foss
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Appendix 3. Information letter for Delphi study Round 3 (in Norwegian)

Kjære ekspertdeltager i Delphi-studien "Kompetanse i kommunale pleie- og omsorgstjenester til eldre"

Hjertelig takk for din besvarelse i runde 2. Alle 42 deltagere leverte en besvarelse. Dette er kjempe bra! Det er veldig viktig for påliteligheten av resultatene i denne studien at alle deltar i alle runder. Nå er det kun en runde igjen, og den tar mye mindre tid! Runde 3 er et elektronisk spørreskjema som ligner på det forrige, bare at det er under halvparten så langt. Vi har beregnet at det tar ca. 15 minutter å fylle ut.

I vedlagte dokument finner du resultatene fra runde 2 som danner grunnlag for runde 3. I tredje og siste runde ber vi deg om igjen å rangere kompetanseområder på samme måte som i runde 2, men nå er det kun 48 punkter å ta stilling til (110 i forrige runde).

Erfaringer fra forrige runde viste at det elektroniske verktøyet for utfylling, nettskjema, har en feil. Det går ikke an å åpne besvarelsen, eller begynne å fylle den ut, for så å komme tilbake til den senere. Vi oppfordrer deg derfor til å sette av 20 minutter til pålogging, utfylling og innsendelse av skjemaet, og å sende det inn med en gang det er utfylt.

Hvis du opplever problemer med spørreundersøkelsen så er det fint om du tar kontakt på: p.c.bing-jonsson@medisin.uio.no

Vi setter veldig pris på din deltagelse. Du bidrar til utvikling av et spørreskjema som vil være den første av sin sort og som vil kunne påvirke sammensetning og utvikling av kompetansen i kommunehelsetjenesten i fremtiden. Vi håper du kan besvare denne siste undersøkelsen innen 8. mars.

Vennlig hilsen

Pia Bing-Jonsson

Prof. Christina Foss

Prof. Marit Kirkevold

Prof. Ida Torunn Bjørk

Prof. Dag Hofoss

Appendix 4. Nursing Older People - Competence Evaluation Tool

Thank you for participating in this competence evaluation of municipal elderly care. We ask you to answer all of the questions to the best of your ability, and if you do not know the correct answer to a question, please answer with your best guess. This questionnaire covers the most relevant areas within municipal elderly care, and is therefore quite long. Please set aside one hour for filling in your answers. There will be two types of questions: knowledge based questions and questions about your own experience. You may give comments on the questionnaire itself, at the end. Thank you again!

Imagine that Mr. Green, who is 85 years old, is a new patient to you and your workplace.

Q1. When I am asked to facilitate activities which Mr. Green finds meaningful I experience that: 1) I don't know what to do, 2) I am often uncertain what to do, 3) I usually handle it well, or 4) I am certain I handle it well.

Q2. When I need to find out what the preferences and resources are for Mr. Green: 1) I don't know what to do, 2) I am often uncertain what to do, 3) I usually handle it well, or 4) I am certain I handle it well.

Q3. When I am asked which rights Mr. Green has in patient involvement: 1) I don't know what to say, 2) I am often uncertain what to say, 3) I am usually able to answer, or 4) I am certain I am able to answer.

Q4. How often do you have patients with:

	Never	Every month	Every week	Daily/on every shift
Sight deficiencies?	●	●	●	●
Sight deficiencies and you suspect they have poor glasses?	●	●	●	●
Hearing deficiencies?	●	●	●	●
Hearing deficiencies and you suspect they have poor hearing aids?	●	●	●	●

Q5. Please complete the following sentences. When I must..

	I don't know what to do	I am often uncertain what to do	I usually handle it well	I am certain I handle it well
..help an older person with changing batteries and cleaning hearing aids I experience that:	●	●	●	●
..speak with patients with hearing deficiencies I experience that:	●	●	●	●
..facilitate lighting for patients with sight deficiencies I experience that:	●	●	●	●

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..schedule an appointment for a patient for sight or hearing check-ups, I experience that:

    ●   ●   ●   ●

Ms. Gran is 93 years old, has heart failure, type 2 diabetes and an ulcerating leg wound. Wound healing is difficult. Ms. Gran feels dizzy and has fallen several times.

Q6. Please consider the following statements. Ms. Gran is disposed to falling because..

	Correct	Wrong	I don't know
..she has fallen several times during the last month:	●	●	●
..she seems agitated/restless lately:	●	●	●
..her sight is so poor that she cannot do all of her chores herself:	●	●	●
..she needs to go to the toilet at least once an hour:	●	●	●
..her gait is unstable:	●	●	●

Q7. When you perform wound care on patients like Ms. Gran, how often do you do the following?

	Never	Every month	Every week	On every shift	Not possible where I work
Give pain relief ½-1 hour before wound care:	●	●	●	●	●
Perform hand hygiene before wound care:	●	●	●	●	●
Perform hand hygiene after wound care:	●	●	●	●	●
Have the wound assessed by a physician:	●	●	●	●	●
Follow the wound care procedure:	●	●	●	●	●
Assess if the wound has changed:	●	●	●	●	●
Assess the skin surrounding the wound:	●	●	●	●	●
Draw or take a picture of the wound to document:	●	●	●	●	●

Ms. Andersen is 85, has type 2 diabetes and a moderate degree of dementia. She is physically active and eats irregularly. She gets Insulatard in the morning and evening, and NovoRapid when her blood glucose is above 15 mmol/l.

Q8. What affects Ms. Andersen's blood glucose? You may give up to three answers.

Her level of physical activity	●
Her mood	●
How much insulin she gets	●
How much she eats	●
What kind of insulin she gets	●
If she gets insulin	●

Degree of cognitive impairment ●
I don't know ●

Q9. What does hypoglycaemia mean?

Too high blood glucose ●
Too low blood pressure ●
Low glycaemic index ●
Too low blood glucose ●
I don't know ●

Q10. What are the desired blood glucose values of a diabetes patient?

1-10 mmol/l ●
4-10 mmol/l ●
2-4 mmol/l ●
20-30 mmol/l ●
I don't know ●

Q11. What kind of insulin is Insulatard?

Fast working ●
Works at medium speed ●
Slow working ●
I don't know ●

Q12. What can happen if Ms. Andersen has a blood glucose of 3 mmol/l and you inject 8 IE of NovoRapid?

She may get confused •
She may get hypoglycaemia •
She may get high blood pressure •
She may get hyperglycaemia •
Nothing •
I don't know •

The following two questions are for those of you who handle medications.

Q13. Morphine injection fluid has a strength of 10 mg/ml. Your patient needs 5 mg of Morphine as a subcutaneous injection. How many ml does this dose make?

Q14. A patient has been requisitioned 320 mg Albyl E per day in tablet form. The strength is 160 mg. Treatment has ended after 5 days. How many tablets has the patient received?

You find Mr. Bratmo lifeless on the floor.

Q15. What is the correct procedure for the resuscitation of Mr. Bratmo?

15 heart compressions, 2 insufflations	●
30 heart compressions, 2 insufflations	●
5 heart compressions, 1 insufflation	●
I don't know	●

Ms. Olsen is 90 years old and generally weakened by age. Imagine that she develops the following symptoms.

Q16. Please choose how you would respond when Ms. Olsen, your patient, develops the following symptoms. You may choose up to two options on each line.

	No action required	Observe again the following day	Consult with an RN	Nursing related measure required immediately	Have patient assessed by physician	Requires acute help in hospital or by physician
Has dyspnoea during rest within last two days:	●	●	●	●	●	●
Choughs, has increased saliva and respiration frequency above 20/min:	●	●	●	●	●	●
Has irregular pulse increased more than 20/min within last two days:	●	●	●	●	●	●
Has temperature above 38.5:	●	●	●	●	●	●
Is substantially dehydrated:	●	●	●	●	●	●
Skin has rash, wounds, is red or itchy:	●	●	●	●	●	●
Has reduced appetite and food intake:	●	●	●	●	●	●
Is not able to eat:	●	●	●	●	●	●
Has pain and discomfort in mouth:	●	●	●	●	●	●
Is incontinent for urine, stings when urinates:	●	●	●	●	●	●
Has fresh blood in stool:	●	●	●	●	●	●

Q17. Please choose how you would respond when Ms. Olsen, your patient, develops the following symptoms. You may choose up to two options on each line.

	No action required	Observe again the following day	Consult with an RN	Nursing related measure required immediately	Have patient assessed by physician	Requires acute help in hospital or by physician
Has increased needs to full care within last two days:	●	●	●	●	●	●

Has fallen two times during previous week:	•	•	•	•	•	•
Has symptoms of partial paralysis:	•	•	•	•	•	•
Is more tired during the day:	•	•	•	•	•	•
Has changes in sight, hearing, speech and comprehension:	•	•	•	•	•	•
Has newly occurring chest pain:	•	•	•	•	•	•
Has lost interest in keeping home in order, sleeps in chair instead of bed:	•	•	•	•	•	•
Has short attention span and delusions:	•	•	•	•	•	•

Q18. Do you use check lists/measurement tools like the MMS assessment of cognitive function, MNA assessment of nutritional status, or risk for falling assessment in your work? 1) yes 2) no.

Q19. For those who answered "yes" on Q18: Please write down which check lists/tools you use:

Q20. Please finish the sentences regarding palliative care and treatment. When I must..

	I don't know what to do	I am often uncertain what to do	I usually handle it well	I am certain I handle it well	Not applicable
..assess a patient's pain:	•	•	•	•	•
..assess the effectiveness of pain relieving medication:	•	•	•	•	•
..assess the need for alternative medical pain relief methods:	•	•	•	•	•
..use non-medical pain relief methods:	•	•	•	•	•
..assess measures against dyspnoea, nausea and obstipation:	•	•	•	•	•
..use the ESAS tool:	•	•	•	•	•
..transfer a palliative patient to another treatment level:	•	•	•	•	•
..use the LCP tool:	•	•	•	•	•
..assure a patient's own wishes surrounding death:	•	•	•	•	•
..perform end of life care:	•	•	•	•	•
..communicate about death with the patient and family:	•	•	•	•	•

Q21. How often do you do the following procedures in your work?

	Never	Every month	Every week	On every shift

Monitor blood glucose:	•	•	•	•
Inject insulin:	•	•	•	•
Insert intermittent urinary catheter on woman:	•	•	•	•
Insert intermittent urinary catheter on man:	•	•	•	•
Insert permanent urinary catheters:	•	•	•	•
Apply/change transdermal analgesic patch:	•	•	•	•
Dispense medication:	•	•	•	•
Wound care:	•	•	•	•
Tube feeding:	•	•	•	•
Administer nebulizer treatment:	•	•	•	•
Perform ostomy care:	•	•	•	•
Subcutaneous injection (e.g. Fragmin):	•	•	•	•
Intramuscular injection:	•	•	•	•
Blood sampling:	•	•	•	•
Handle intravenous pumps:	•	•	•	•
Use of central venous catheter:	•	•	•	•
Puncture via Venous Access Port:	•	•	•	•
Administer intravenous medication:	•	•	•	•
Handle a drain:	•	•	•	•
Handle EKG:	•	•	•	•
Assess whether a patient has oedema:	•	•	•	•
Assess skin of patient:	•	•	•	•
Take blood pressure:	•	•	•	•
Take pulse:	•	•	•	•
Weigh a patient:	•	•	•	•
Count respiration frequency:	•	•	•	•
Take temperature:	•	•	•	•
Assess patient's urine:	•	•	•	•
Assess patient's stool:	•	•	•	•

Q22.Have you been trained in the following procedures, and if yes, by whom?

	No	Yes, during my education	Yes, by a colleague	Yes, by external sources (e.g. hospital)	I don't remember
Monitor blood glucose:	•	•	•	•	•
Inject insulin:	•	•	•	•	•
Insert intermittent urinary catheter on woman:	•	•	•	•	•
Insert intermittent urinary catheter on man:	•	•	•	•	•
Insert permanent urinary catheters:	•	•	•	•	•
Apply/change transdermal analgesic patch:	•	•	•	•	•
Dispense medication:	•	•	•	•	•
Wound care:	•	•	•	•	•
Tube feeding:	•	•	•	•	•

	Never	Every month	Every week	On every shift	Not possible where I work
Administer nebulizer treatment:	•	•	•	•	•
Perform ostomy care:	•	•	•	•	•
Subcutaneous injection (e.g. Fragmin):	•	•	•	•	•
Intramuscular injection:	•	•	•	•	•
Blood sampling:	•	•	•	•	•
Handle intravenous pumps:	•	•	•	•	•
Use of central venous catheter:	•	•	•	•	•
Puncture via Venous Access Port:	•	•	•	•	•
Administer intravenous medication:	•	•	•	•	•
Handle a drain:	•	•	•	•	•
Handle EKG:	•	•	•	•	•
Assess whether a patient has oedema:	•	•	•	•	•
Assess skin of patient:	•	•	•	•	•
Take blood pressure:	•	•	•	•	•
Take pulse:	•	•	•	•	•
Weigh a patient:	•	•	•	•	•
Count respiration frequency:	•	•	•	•	•
Take temperature:	•	•	•	•	•
Assess patient's urine:	•	•	•	•	•
Assess patient's stool:	•	•	•	•	•

Q23. How often do you make use of the following techniques/tools for body mechanics?

	Never	Every month	Every week	On every shift	Not possible where I work
Exploit patient bed's mechanical function to flip, raise and lower bed:	•	•	•	•	•
Use sliding mat for moving patient upwards in bed:	•	•	•	•	•
Adjust patient bed to own elbows' height when moving patient in flat bed:	•	•	•	•	•
Use appropriate tools for body mechanics when moving patient from bed to chair:	•	•	•	•	•
Use patient lift when patient's weight exceeds what is an acceptable load for you:	•	•	•	•	•

Q24. What prevents pressure ulcers in bed-bound patients? You may choose up to three answers.

Distribute the pressure of the patient's body (e.g. using pillows)   •

Lie as much as possible on the same side   •

Apply lotion to dry skin   •

Relieve by changing sitting and lying positions   •

Do not disturb and move the patient too much ●

I don't know ●

Q25. How often should a bed-bound patient change position?

Every 15 minutes ●
Every second hour ●
At least twice a day ●
I don't know ●

Q26. Which position is appropriate when your patient has heart/lung deficiencies?

High supine ●
Prone position ●
Flat supine ●
I don't know ●

Q27. Are the following three statements correct or wrong?

	Correct	Wrong	I don't know
Physical activity in old age can prevent bone mass loss:	●	●	●
Physical activity in old age can prevent pneumonia:	●	●	●
Physical activity in old age can prevent blood clots:	●	●	●

Q28. What is the recommended first choice for hand hygiene for you, as health personnel?

Wash hands for a minimum of 60 seconds ●
Disinfect hands for a minimum of 15 seconds ●

Q29. In which situations is disinfecting hands and in which situations is washing hands recommended?

	Disinfecting hands	Washing hands	I don't know
Between each patient, without soiling:	●	●	●
Between unclean and clean contact with the same patient, without soiling:	●	●	●
Before handling sterile, disinfected and clean equipment:	●	●	●
After using rubber glove:	●	●	●

After handling medication:	•	•	•
Before serving food:	•	•	•
After contact with body fluids, excrement, mucosal tissue or broken skin:	•	•	•
After going to the toilet:	•	•	•
Visible soiling of hands:	•	•	•

Q30. Please choose which patient group requires which oral care procedures.

	Have their own teeth and dentures, cannot perform oral care	Have their own teeth, can perform oral care	Very sick or unconscious patients	Have dentures, cannot perform oral care
Patient should lie laterally. Remove dentures. Use lockable pliers with moist tupfers to clean the mouth cavity. Clean tongue and palate. Apply lubricant to lips:	•	•	•	•
Help with oral care twice a day. Clean in-between teeth and on tongue. Help clean dentures with mild soap solution:	•	•	•	•
Facilitate oral care twice a day. Encourage cleaning in-between teeth and on tongue:	•	•	•	•

Your patient, Ms. Roms, has Alzheimer's dementia. You've received a report that for several days now she has refused to take off her clothes. You must now help Ms. Roms with personal hygiene and changing clothes.

Q31. Which way of communicating do you find appropriate to use when helping Ms. Roms? You may choose up to three answers.

Tell her what is about to happen	•
Say at little as possible	•
Use few and simple words	•
Speak with normal sentences	•
Use physical contact	•
Avoid physical contact	•

During report you've been assigned to be responsible for a dying patient you haven't met before. You go to see him together with a colleague. Mr. Ahmed is 80 years old, a Muslim, and is originally from the Middle East. Before you enter Mr. Ahmed's house you hear audio playback of the Koran. You find the patient diseased in his bed. The women in his family sit by his bed, while the men in the family are seated in the living room. The atmosphere is tense,

and the women are wailing and some are praying. Only the daughter of Mr. Ahmed can speak some Norwegian. Your colleague whispers to you: "What are we going to do now?"

Q32. What would you do in this situation? You may choose up to two answers.

You know only Norwegian customs surrounding death and choose to follow these •

You are familiar with Muslim customs surrounding death and choose to follow these •

You listen to the family's wishes and respect these •

You leave the room as you are uncertain what to do •

You ask the women to leave the room so you can perform post-mortem care •

Mr. Henriksen is 90 years old, has problems sleeping, and needs wound care on a wound on his sacrum. He is preoccupied with his sleeping problems and feels tired all day long. He slumbers in his chair several times a day. Mr. Henriksen receives the following medication: Fentanyl transdermal analgesic patch, Paralgin Forte, Imovane, Mogadon, Sobril, Vallergan and OxyNorm.

Q33. Which measure is appropriate to initiate with regards to Mr. Henriksen's situation? You may choose up to two answers.

He cannot rest properly due to his wound; he needs more relaxants. •

His sleeping disorder can be caused by pain from the wound; the wound must be relieved from pressure. •

Organise a medication assessment by a physician, as the patient is on a combination of pain killers, relaxants and sleeping medication. •

His sleeping disorder can be caused by pain from the wound; he needs more pain killers. •

Have the wound assessed for further treatment and prevention of worsening. •

Let him sleep during the day; he is old and needs his rest. •

Ms. Lassen lives in a nursing home together with seven other patients. Her husband, Mr. Lassen, is committed and visits his wife twice a day. He helps with practical tasks in the nursing home, like bringing other patients to arrangements, and he knows the other patients well. Mr. Lassen often asks you how the other patients are doing, and likes to discuss the other patients in the common room.

Q34. How would you relate to this situation? You may choose up to two answers.

As Mr. Lassen is a kind and helpful relative; it is OK that he can learn something from you about the other patients. •

You let Mr. Lassen stay committed and discuss other patients like before. •

You tell Mr. Lassen that you cannot give information to him about patients other than his wife. •

You encourage Mr. Lassen not to talk about the other patients in the common room. •

You praise Mr. Lassen for his commitment and interest. •

Q35. From whom do you seek advice to be able to perform the work that is expected of you? You may choose up to two persons from the list below.

RN at my workplace	●
AN at my workplace	●
Assistant at my workplace	●
Your leader	●
Another leader in the municipality	●
Physician	●
Patient relative	●
Nobody, I handle my work well alone	●

Q36. If you could not find the person from whom you seek advice on the list above, please describe them here using your own words:

Q37. How often do you communicate with the following groups about your patients?

	Never	Every month	Every week	On every shift
RNs:	●	●	●	●
ANs:	●	●	●	●
Assistants:	●	●	●	●
Physician:	●	●	●	●
Leader:	●	●	●	●
Patient relatives:	●	●	●	●

Q38. How often do you need to talk to the following groups about your patients, but it is not feasible (because you cannot get a hold of a person, or he/she does not have time to talk to you)?

	Never	Every month	Every week	On every shift
RNs:	●	●	●	●
ANs:	●	●	●	●
Assistants:	●	●	●	●
Physician:	●	●	●	●
Leader:	●	●	●	●
Patient relatives:	●	●	●	●

Q39. To what degree do the following groups tell you what you need to know about your patients when you ask them (meaning that you get the necessary and sufficient information)?

	To little	To some degree	To a strong	Does not apply

	degree		degree	
RNs:	●	●	●	●
ANs:	●	●	●	●
Assistants:	●	●	●	●
Physician:	●	●	●	●
Leader:	●	●	●	●
Patient relatives:	●	●	●	●

Q40. When a patient problem occurs, to what degree do the following groups work with you to solve the problem?

	To little degree	To some degree	To a strong degree	Does not apply
RNs:	●	●	●	●
ANs:	●	●	●	●
Assistants:	●	●	●	●
Physician:	●	●	●	●
Leader:	●	●	●	●
Patient relatives:	●	●	●	●

Q41. To what degree do the following groups know the content of your patient related work?

	To little degree	To some degree	To a strong degree	Does not apply
RNs:	●	●	●	●
ANs:	●	●	●	●
Assistants:	●	●	●	●
Physician:	●	●	●	●
Leader:	●	●	●	●
Patient relatives:	●	●	●	●

Q42. When you need to read documentation about a patient you do not know, to which degree is the following documentation sufficient to get a comprehensive understanding of the patient?

	To little degree	To some degree	To a strong degree	Does not apply/do not read documentation
Documentation from own workplace:	●	●	●	●
Documentation from physician:	●	●	●	●
Documentation from hospital:	●	●	●	●
Documentation from other municipal services:	●	●	●	●

Q43. Please rate what you think of the following situations?

	Unproblematic	Can be tolerated	Quite improper	Completely intolerable
Home care is scheduled to help Ms. Nilsen with showering between 10 am and 12 pm. When nobody has arrived by 1 pm, Ms. Nilsen calls and asks if home care has forgotten her. The response she gets is that due to sickness few people are at work, and that they cannot come after all.	●	●	●	●
Kristin observes that a colleague helping a patient with dementia to the toilet pulls down the patient's pants from behind without informing him.	●	●	●	●
After Trine has finished helping Mr. Kristiansen she is annoyed. She tells the others in the hall that Mr. Kristiansen was angry and tried to hit her.	●	●	●	●
Truls works in home care and visits a patient for the first time. The first thing he does is unlock the door and go to the kitchen cabinet to find the patient's medication.	●	●	●	●

Q44. When you document nursing, how often do you do the following?

	Never	Every month	Every week	Daily/On every shift	Not possible in my workplace
Use electronic documentation system:	●	●	●	●	●
Report about all my patients on a shift:	●	●	●	●	●
Develop nursing plan:	●	●	●	●	●
Update nursing plan:	●	●	●	●	●
Write nursing report for dismissal/referral:	●	●	●	●	●
Register patient in national register:	●	●	●	●	●
Send electronic message to physician:	●	●	●	●	●
Send electronic message to hospital:	●	●	●	●	●
Search in procedural system to find out something you do not know:	●	●	●	●	●
Search in acknowledged health related database to find out something you do not know:	●	●	●	●	

Q45. What is your mother tongue? 1) Norwegian, 2) Samisk (native language), 3) Swedish, 4) Danish, 5) English, 6) Spanish, 7) Other

Q46. For those who answered "7" on Q45. Please write down your mother tongue here:

Q47. How would you rate your language abilities to..

	I don't know what to do	I am often uncertain what to do	I usually handle it well	I am certain I handle it well
..speak Norwegian:	●	●	●	●
..understand Norwegian:	●	●	●	●
..read Norwegian:	●	●	●	●
..write Norwegian:	●	●	●	●

Q48. How often do you experience that..

	Never	Every month	Every week	Daily/On every shift
..patients have trouble understanding you:	●	●	●	●
..colleagues have trouble understanding you:	●	●	●	●

Q49. To what degree can the following assistive care technologies enhance the care you give to patients?

	To little degree	To some degree	To a strong degree	Don't know
A sensor that registers that a patient has fallen and cannot get up:	●	●	●	●
Medicine dispenser that alerts if medication is not taken:	●	●	●	●
GPS that can track a patient that is lost:	●	●	●	●
Door sensor which alerts if patient goes out at night time or in cold:	●	●	●	●
Sensors that measures critical clinical markers, like blood pressure or blood glucose:	●	●	●	●
Devise facilitating communication between patient and health service:	●	●	●	●
Social media that can reduce loneliness, and keep in touch with friends and family:	●	●	●	●
Technology that stimulates, entertains, activates and structures the day:	●	●	●	●

Q50. In general, to which degree are you competent to give safe health care to older people?
1) To very little degree, 2) To little degree, 3) To some degree, 4) To a strong degree, 5) To a very strong degree

Now, only a few more important questions remain before you finish the questionnaire.

Q51. How old are you?

Q52. What is your gender? 1) Male, 2) Female

Q53. Which professional group do you belong to? 1) RN, 2) AN, 3) Assistant, 4) Other

Q54. This question is for those who answered "4" on Q54: Please specify your professional group:

Q55. Where do you work? 1) Home care 2) Nursing home, 3) Other municipal health service for the elderly, 4) Municipal health service for patients other than the elderly

Q56. In which municipality do you work?

Q57. What is the name of your department?

Q58. What kind of position do you hold? 1) Permanent position, 2) Temporary position

Q59. This question is for those who answered "1" on Q58: What percent is your position?

Q60. This question is for those who answered "2" on Q58: What percent do you usually work in a month?

Q61. How long have you worked at your current workplace?

Q62. How many years have you worked with municipal elderly care?

Q63. Please fill in relevant education/training/courses you have taken in relation to municipal elderly care?

Q64. How satisfied are you with the questions in this questionnaire? 1) Very dissatisfied, 2) Dissatisfied, 3) Moderately satisfied, 4) Satisfied, 5) Very satisfied

Q65. Please write down any comments about the questionnaire, your experiences in filling it out, or other things you want to communicate to those who made the survey.

Appendix 5. Invitation letter to NOP-CET survey (in Norwegian)

Invitasjon til å delta i kompetansemåling av ansatte i kommunale pleie- og omsorgstjenester til eldre

Fra 1. september i år gjennomføres en stor spørreundersøkelse som har til hensikt å måle kompetansen til sykepleiere, helsefagarbeidere og assistenter som jobber i kommunale pleie- og omsorgstjenester til eldre. Dette er en invitasjon til X kommune til å delta i undersøkelsen.

Kompetansemålingsinstrumentet er utviklet i samarbeid med eksperter på kommunale pleie- og omsorgstjenester til eldre fra hele landet, og måler kompetansen til de tre nevnte gruppene av helsepersonell, med fokus på kunnskaper, ferdigheter og personlige egenskaper. Vi er opptatt av at alt helsepersonell som jobber i direkte pasientarbeid skal få målt og få innsikt i sin kompetanse, og at instrumentet skal bli et redskap som kan brukes til kartlegging og utvikling av kompetanse for ledelsen i alle Norges kommuner. Vi vet det finnes mye kompetanse i kommunale pleie- og omsorgstjenester til eldre, men vi vet ikke like mye om hvordan kompetansen fordeles blant yrkesgruppene og om den er tilstrekkelig i forhold til dagens krav. Deltagelse i denne spørreundersøkelsen vil gi dere svar på det.

Kompetansemålingen som din kommune inviteres til vil måle følgende områder av kompetanse:

Helsefremming og forebygging	Behandling	Palliasjon	Etikk og lovverk	Vurdering og handling
Hvordan dekkes grunnleggende behov	Kommunikasjon og dokumentasjon	Ansvar og handlekraft	Samarbeid	Holdninger overfor eldre

Kompetansemålingen vil foregå ved hjelp av et elektronisk spørreskjema (Questback). Deltagelse i kompetansemålingen bør innebære at:

- Øverste myndighet i kommunen er inneforstått med og støtter kompetansemålingen.

- Kommunen inviterer og oppfordrer alle eller en andel av de ansatte i kommunes pleie- og omsorgstjenester til eldre til å delta.

- Deltagelse er frivillig.

- Vi får tilgang til e-postadresser for utsendelse av spørreskjema til de som skal delta.

- Det tar 45-60 minutter å fylle ut spørreskjemaet.

- De som vil delta har tilgang til internett for å fylle ut spørreskjemaet.

- Umiddelbart etter utfylling vil den enkelte deltager få en rapport av sine svar.

- Kommunen får tilsendt en rapport med resultat fra kompetansemålingen. Denne rapporten vil tilkjennegi type tjeneste, arbeidssted/avdeling, men være anonymisert i forhold til enkeltansatte.

- Kommunen får tilbud om muntlig presentasjon av resultater og tolkninger av disse fra undertegnede.

Vi håper at din kommune er interessert i inngående opplysninger om deres ansattes kompetanse i eldreomsorg og ønsker å delta i kompetansemålingen. Ved interesse vennligst ta kontakt med undertegnede før utgangen av juni 2013. Gjennomføringen vil avsluttes ved utgangen av året og vil for deltagende kommuner pågå i en måned.

Med vennlig hilsen

Pia C. Bing-Jonsson
PhD stipendiat
p.c.bing-jonsson@medisin.uio.no
tel: 97 97 79 20

På vegne av:
Prof. Christina Foss
Prof. Ida Torunn Bjørk
Prof. Marit Kirkevold
Prof. Dag Hofoss

Appendix 6. Research approval from Norwegian Social Science Data Services for Sub-study 2

Pia Cecilie Bing-Jonsson
Avdeling for sykepleievitenskap
Institutt for helse og samfunn
Universitetet i Oslo
Postboks 1130 Blindern
0318 OSLO

Vår dato: 29.08.2012   Vår ref:31212 / 3 / MSI   Deres dato: Deres ref:

TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 23.08.2012. Meldingen gjelder prosjektet:

31212	*Kompetanse i kommunehelsetjenesten: Utvikling og psykometrisk testing av et kompetansemålingsinstrument*
Behandlingsansvarlig	*Universitetet i Oslo, ved institusjonens øverste leder*
Daglig ansvarlig	*Pia Cecilie Bing-Jonsson*

Personvernombudet har vurdert prosjektet og finner at behandlingen av personopplysninger er meldepliktig i henhold til personopplysningsloven § 31. Behandlingen tilfredsstiller kravene i personopplysningsloven.

Personvernombudets vurdering forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, eventuelle kommentarer samt personopplysningsloven og helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema, http://www.nsd.uib.no/personvern/forsk_stud/skjema.html. Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, http://www.nsd.uib.no/personvern/prosjektoversikt.jsp.

Personvernombudet vil ved prosjektets avslutning, 01.09.2014, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Vigdis Namtvedt Kvalheim

Marte Sivertsen

Marte Sivertsen tlf: 55 58 33 48

Personvernombudet for forskning

Prosjektvurdering - Kommentar

Formålet er å måle kompetansen til helsepersonell (sykepleier, hjelpepleier/helsefagarbeider og assistenter/ufaglærte) som jobber i hjemmesykepleie og sykehjem. Målet er å utvikle et reliabelt og valid kompetansemålingsinstrument. Utvalget består av fageksperter i eldreomsorg og/eller kommunehelsetjeneste, helsepersonell i kommunehelsetjenesten, høgskolelektorer, forskere, eldreombud og representanter fra pårørendeforeninger, ca. 50 totalt.

Innmeldt prosjektdel gjennomføres som en Delphi-studie, og behandlingsgrunnlag gis for denne delen. Personvernombudet legger til grunn at prosjektets øvrige deler, jf. prosjektskisse, ikke medfører behandling av personopplysninger. Dersom det blir aktuelt ber vi om at forsker sender en endringsmelding i god tid.

Ifølge prosjektmeldingen skal det innhentes skriftlig samtykke basert på muntlig og skriftlig informasjon om prosjektet og behandling av personopplysninger. Personvernombudet finner informasjonsskrivet tilfredsstillende utformet i henhold til personopplysningslovens vilkår, forutsatt at dato for prosjektslutt/anonymisering tilføyes. Delsetningen "Din anonymitet vil bli ivaretatt både under og etter gjennomført studie" er noe uklar og vi anbefaler å omformulere, f.eks. slik: "Opplysningene vil bli behandlet konfidensielt, og ingen enkeltpersoner vil kunne gjenkjennes i publikasjoner. Opplysningene anonymiseres og opptakene slettes når prosjektet er ferdig, innen 01.09.2014." Det bør også tilføyes at det er ønskelig å gjøre lydopptak av telefonintervjuet.

Vi ber om å få tilsendt revidert informasjonsskriv som vedlegg på epost til personvernombudet@nsd.uib.no.

Data innsamles ved hjelp av spørreskjema i flere runder som sendes pr. epost og telefonintervju som registreres på lydopptak. Datamaterialet vil være knyttet til informantens navn gjennom kode som viser til en koblingsnøkkel.

Personvernombudet legger til grunn at behandlingen av personopplysninger er i samsvar med Universitetet i Oslo sine rutiner for informasjonssikkerhet.

Prosjektet skal avsluttes 01.09.2014 og innsamlede opplysninger skal da anonymiseres og lydopptak slettes. Anonymisering innebærer at direkte personidentifiserende opplysninger som navn/koblingsnøkkel slettes, og at indirekte personidentifiserende opplysninger (sammenstilling av bakgrunnsopplysninger som f.eks. yrke, arbeidsplass, alder, kjønn) fjernes eller grovkategoriseres slik at ingen enkeltpersoner kan gjenkjennes i materialet.

Appendix 7. Research approval from Norwegian Social Science Data Services for Sub-study 3

Pia Cecilie Bing-Jonsson
Institutt for helse og samfunn
Universitetet i Oslo
Postboks 1130 Blindern
0318 OSLO

Vår dato: 03.06.2013	Vår ref:34625 / 3 / LT	Deres dato:	Deres ref:

TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 27.05.2013. Meldingen gjelder prosjektet:

34625	*Kartlegging av kompetanse i eldreomsorgen*
Behandlingsansvarlig	*Universitetet i Oslo, ved institusjonens øverste leder*
Daglig ansvarlig	*Pia Cecilie Bing-Jonsson*

Personvernombudet har vurdert prosjektet og finner at behandlingen av personopplysninger er meldepliktig i henhold til personopplysningsloven § 31. Behandlingen tilfredsstiller kravene i personopplysningsloven.
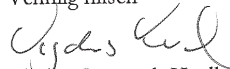
Personvernombudets vurdering forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, ombudets kommentarer samt personopplysningsloven og helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema http://www.nsd.uib.no/personvern/meldeplikt/skjema.html. Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, http://pvo.nsd.no/prosjekt.

Personvernombudet vil ved prosjektets avslutning, 15.09.2014, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Vigdis Namtvedt Kvalheim

Lis Tenold

Lis Tenold tlf: 55 58 33 77
Vedlegg: Prosjektvurdering

Personvernombudet for forskning

Prosjektvurdering - Kommentar

Det gis skriftlig informasjon og innhentes skriftlig samtykke. Personvernombudet finner informasjonsskrivet tilfredsstillende utformet i henhold til personopplysningslovens vilkår.

Prosjektet skal avsluttes 15.09.2014 og innsamlede opplysninger skal da anonymiseres. Anonymisering innebærer at direkte personidentifiserende opplysninger som navn/koblingsnøkkel slettes, og at indirekte personidentifiserende opplysninger (sammenstilling av bakgrunnsopplysninger som f.eks. yrke, alder, kjønn) fjernes eller grovkategoriseres slik at ingen enkeltpersoner kan gjenkjennes i materialet.

Personvernombudet legger til grunn at det ikke samles inn og registreres opplysninger om tredjepersoner, her ment pasienter, arbeidskollegaer, eller overordnede.

II