

# E-leadership in nursing – a systematic review

Vanesa Numanovic<sup>1</sup>, Harri Jalonen<sup>1</sup>, Juha Lindell<sup>1</sup>, Julia Jacobsson<sup>2</sup>

<sup>1</sup> School of Management, Social and Health Management, University of Vaasa, Finland; <sup>2</sup> Department of Nursing Science, University of Eastern Finland, Finland

**Vanessa Numanovic, PhD-student, MHSc, School of Management, Social and Health Management, University of Vaasa, Wolffintie 32, FI-65200 Vaasa, FINLAND, Email: [vanesa.numanovic@student.uvasa.fi](mailto:vanesa.numanovic@student.uvasa.fi).**

## Abstract

Nurses and nurse leaders play a key role in healthcare digitalisation. While the volume of nursing leadership research has increased dramatically, empirical research on e-leadership in nursing remains limited. We believe this is the first systematic review of e-leadership among nurse leaders. Our purpose is to synthesise and describe existing research knowledge on e-leadership in nursing and to identify gaps in research knowledge.

We conducted a systematic literature review guided by the framework suggested by Holly et al. (2017). We searched the CINAHL, Scopus, Web of Science, PubMed, Business Source Premier and Medic databases. The search yielded 1,968 records. We excluded 656 duplicates and 1,125 records by reference to the title and read 187 abstracts. We read 51 full texts, resulting in 12 records; we screened the reference lists of each of those and detected one more relevant record.

The review includes 13 studies. Qualitative content analysis was utilised to analyse the data, leading to three main themes being identified: i) interpersonal relationships, ii) e-leadership and coping and iii) readiness for e-leadership and remote work. The main themes incorporated 12 sub-themes.

The paper concludes by presenting several practical implications for nurse leaders and their organisations. The findings indicate a readiness for e-leadership among nurse leaders and for remote work among employees. There are several advantages but also many disadvantages regarding e-leadership in nursing. Nurse leaders need sufficient training in e-leadership as digitalisation is progressing in healthcare.

**Keywords:** leadership, nurses, remote work, health care, systematic literature review

## Introduction

There are many definitions of leadership and no single umbrella theory. Leadership evolves, as do many phenomena. [1] Research in nursing leadership has increased significantly, especially over the past decade [2–5]. Nursing leadership has been

studied from many perspectives, including those of job satisfaction [3], nurse engagement [6] and patient outcomes [2]. Despite this increase in nursing leadership research, there is limited empirical research available on e-leadership in nursing. The healthcare sector has rapidly become digitalised. Some health services can be provided using digital

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communication tools without in-person appointments [7].

E-leadership has most commonly been studied in the fields of economics, business and management and also information and communication sciences [8]. The COVID-19 pandemic accelerated the adoption of remote work, which appears to be here to stay [9]. Although research and knowledge of e-leadership is developing [10], e-leadership ought not to be understood as an extension of traditional leadership [11]. Hence, traditional theories of leadership fail to describe e-leadership [8]. In a recent concept analysis, e-leadership was identified as a closely related/surrogate term for the concept of leadership in the context of digital health services [12]. We consider e-leadership to manifest in two major ways in nursing leadership, that is, the leader is either leading virtually or from a distance, or the employee is working remotely.

Two recent reviews have emphasised the need for comprehensive research on e-leadership in healthcare [13,14]. We believe this paper is the first systematic review of e-leadership among nurse leaders. By nurse leaders, we mean frontline nurse leaders. We could also use the concept of nurse manager; however, e-leadership encompasses more than managerial duties and incorporates building trust with team members and establishing a virtual presence [15]. Nurse leaders have broad responsibilities, and the demands upon them are growing [16]. Nurses and nurse leaders play a key role in healthcare digitalisation [15]. Our purpose is to synthesise and describe existing research knowledge on e-leadership in nursing and to identify gaps in research knowledge.

### ***Definition of e-leadership***

A widely used definition of e-leadership is a “social influence process mediated by Advanced

Information Technology (AIT) to produce a change in attitudes, feelings, thinking, behaviour, and/or performance with individuals, groups, and/or organisations” [17]. Later, Avolio et al. [10] updated that definition to incorporate the context of leadership: “e-leadership is defined as a social influence process embedded in both proximal and distal contexts mediated by AITs that can produce a change in attitudes, feelings, thinking, behaviour, and performance”.

Liu et al. [18] summarised the different scopes of the definitions of e-leadership. The narrow definition is limited to the use and combination of technology and traditional methods of communication. The next level considers the use of technology on an organisational level to support knowledge management and decision-making. The final level goes even further and describes e-leadership as a leadership system where leadership and technology are mutually influential.

Van Wart et al. [19] have defined e-leadership as “[an] effective way and blending of electronic and traditional methods of communication. It implies awareness of current [information and communication technology] ICTs, selective adoption of new ICTs for oneself, and the organisation and technical competence in using those ICTs selected”. That definition emphasises the usability of technology and blending methods to suit the situation.

While definitions of e-leadership vary, their common features include a geographical distance between the leader and employees and communication via technological solutions [8]. Leading a dispersed team brings specific challenges, commonly including communication [20], trust [11,21], lack of interpersonal contact [9], isolation [22] and availability [23]. Organisational support is crucial, and standardised practices could promote successful collaboration between leaders and teams [13].

The healthcare sector is characterised by constant human interactions and hierarchies; accordingly, e-leadership and remote working bring challenges [13]. Interactions in e-leadership have been widely addressed, and leaders and employees seem to have similar assessments of communication in the e-leadership context [14]. E-leaders must leverage technology to foster information flow and trust [12] and effectively combine digital and traditional communication methods [19].

## Material and methods

Systematic reviews are used to combine previous research results or to identify gaps in research knowledge [24] and are suitable to tackle an emerging topic [25]. We chose the systematic review as a research method to identify knowledge gaps to integrate existing findings and applied the framework for conducting systematic reviews provided by Holly et al. [26]. That approach comprises a) formulating a question, b) establishing the inclusion criteria, c) developing a search strategy/performing the search, d) selection of articles to be included in the systematic review, e) data extraction, f) data synthesis and g) recommendation for practice and future research and writing the review.

### *Establishing the inclusion and exclusion criteria*

We included all original empirical study reports that focused on e-leadership in nursing and whose target population was frontline nursing managers or their staff. We included qualitative and quantitative studies and excluded studies not related to e-leadership or remote work, those not set in a nursing context, or with a focus on telemedicine or aspects other than e-leadership styles, healthcare reforms, or executive management. We also excluded studies whose abstract or full text were not readily

available or that were written in languages other than English or Finnish.

### *Developing a search strategy and performing the search*

We identified several concepts referring to e-leadership during a preliminary search of the Scopus and Web of Science databases in September and October 2022 in different fields on e-leadership that enabled us to identify search terms relevant to the concept of e-leadership. Next, we consulted an information specialist about the search terms and search strategy. The search terms remote, virtual, distance, indirect and distributed were combined with the terms management and leadership. We used the terms telemanagement and teleleadership and also e-leadership to capture different writing styles. All the search terms describing e-leadership were combined with the Boolean operator OR. The final search phrase was combined with the terms nurse and healthcare with the Boolean operator AND. We searched the CINAHL, Scopus, Web of Science, PubMed, Business Source Premier, Medic, and Cochrane Library databases in November and December 2022.

### *Selection of studies to be included in the systematic review*

The search yielded 1,968 records, which were uploaded into the EndNote 20 reference management programme. After removing duplicates (n=656), the remaining records (n=1,312) were screened by title, after which we read 187 abstracts. This screening of abstracts resulted in the exclusion of a further 136 records. We read 51 full texts, which resulted in selecting 12 records. We consulted the reference lists of those studies and detected one more relevant record, meaning we identified 13 records in total. (Figure 1.) Most of the screened records focused on

aspects of digitalisation in healthcare more than they did on e-leadership.

We assessed the quality of the 13 studies utilising the Quality Assessment for Diverse Studies (QuADS) tool [27]. Two researchers assessed four studies independently to distinguish the extent of agreement in their respective judgements. Next, the researchers met to discuss their scoring procedure, after which the remaining nine studies were assessed. We assessed the studies independently and then again discussed scoring, especially any discrepancies in scoring. None of the studies were rejected as the QuADS tool does not provide a cut-off score for

a study to be considered of high or low quality; instead, the intention is to discuss any quality findings narratively.

According to the quality appraisal, the studies were generally of high quality. The total scores per study reached around 70% and above, apart from one study, which scored below 50%. Generally, the studies' aims, setting and population descriptions, and research methodology received high scores. The scores were lowest for the item concerning stakeholders' involvement in research design or conduct. (Appendix 1.)

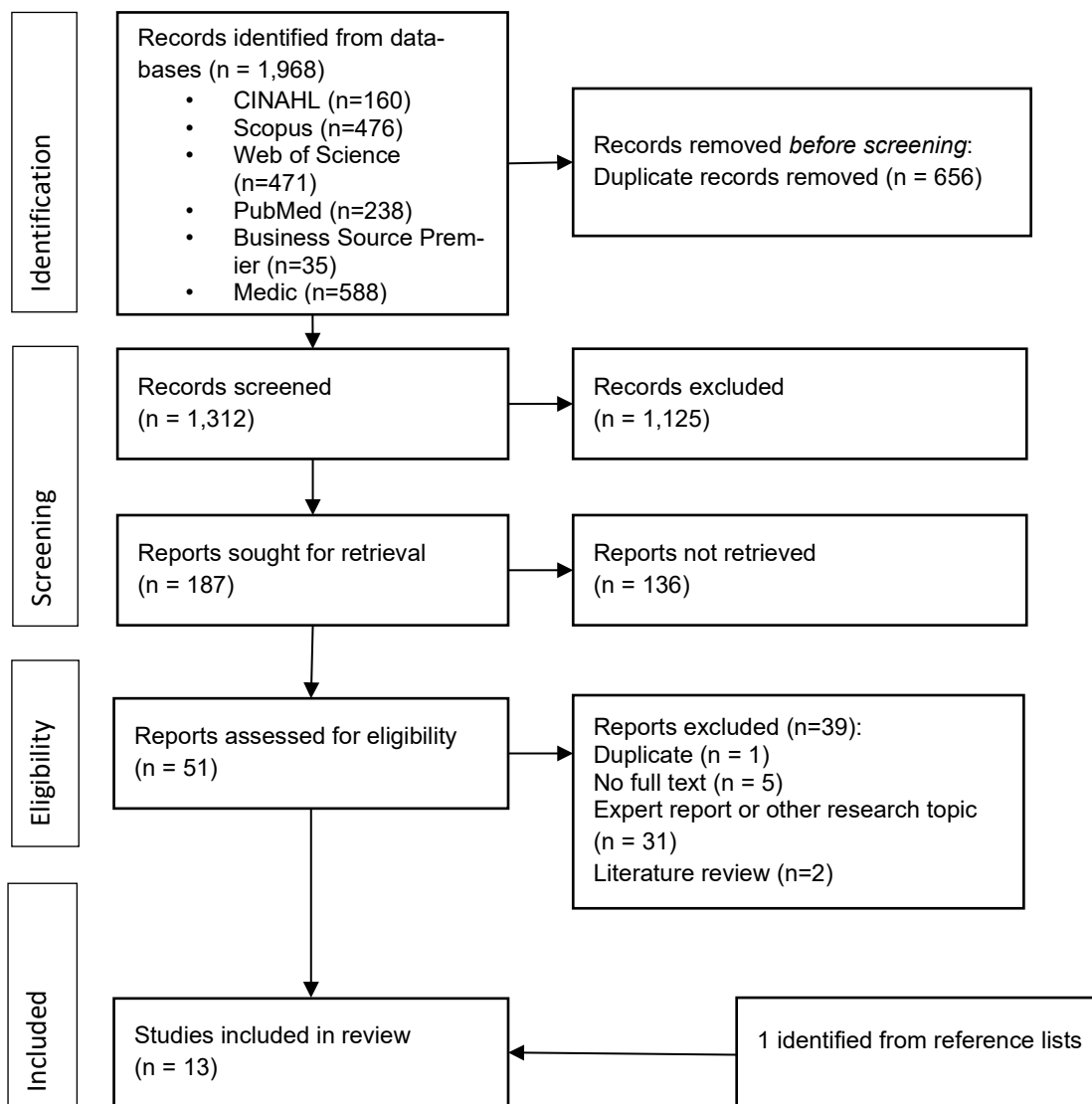


Figure 1. Prisma flow diagram [28].

### Data extraction and data synthesis

Appendix 2 records the matrix used to summarise the studies' main characteristics. The matrix was developed by following the suggestions of Holly et al. [26]. After acquiring an overall impression from reading the included studies, we then built upon that impression by reading the studies repeatedly to form a deeper picture of the content.

As the studies included in this systematic review were heterogeneous and mainly qualitative, we

present our findings in a narrative synthesis [26]. Content analysis was utilised to analyse the data [29,30]. First, we identified meaning units that were to be reduced to codes [29]. The codes were combined based on their meaning to form groups under the same theme. The themes were grouped to form sub-themes according to their content and, further, main themes [30]. We identified three main themes and then divided them into 12 sub-themes. Table 1 presents an example of the synthesis process.

**Table 1.** Example of data synthesis.

Codes	Sub-theme	Main theme
work efficiency increased	work efficiency	e-leadership and coping
online meetings are efficient		
the workload of managers has increased		
work pace has increased		
technology increases work efficacy		
remote work makes work easier		
digitalisation affects work (more flexibility, peaceful work environment and agility)		
an enormous amount of emails		
the amount of technology in use		

## Results

### *Characteristics of the studies included*

This review addressed 13 studies published between 2007 and 2022. More than half of the publications were from the Nordic countries (Finland  $n=6$ , Sweden  $n=1$ , Norway  $n=1$ ); others were from Australia ( $n=2$ ), the USA ( $n=1$ ), the Philippines ( $n=1$ ) and Israel ( $n=1$ ). Most of the publications ( $n=10$ ) were written in English, and three were in Finnish. Most studies ( $n=7$ ) applied a qualitative research design, and their data were collected mostly via focus group interviews. Four of the studies used a mixed-method research design and collected data by surveys and/or interviews. There were two quantitative studies. The concepts describing e-leadership were not consistent in that, in addition to e-leadership concepts, we identified concepts including remote management or leadership, distance or distant leadership, indirect leadership, hybrid leadership, and concepts describing e-leadership through various combinations of technology and digital terms.

Most of the studies reviewed concentrated on the leaders' perspective ( $n=7$ ), two addressed the

employee perspective, and three the perspectives of both leaders and employees. One study concentrated on the perspectives of employees and care recipients. In total, the studies involved 3,262 participants, but one study did not clearly disclose its number of participants. Of the 3,262 participants, 204 were leaders, of whom 142 were expressly referred to as frontline nurse leaders; 1,523 were employees. The number of participants per study ranged from eight to 2,667. Some studies did not unequivocally state whether the leaders were nurse leaders or other healthcare leaders; where there was ambiguity, we designated the people in question as leaders. Other leaders were medical doctors, social work managers, and managers in primary care. The 142 expressly described as frontline nurse leaders were mostly referred to as nurse managers or frontline nurse leaders in the original studies. The studies were conducted in various healthcare environments: hospitals, primary healthcare sites, psychiatric healthcare sites, home care settings, nursing homes, and rural areas.

### *Identified themes*

Three main themes and 12 sub-themes were identified: i) interpersonal relationships, including four



sub-themes, namely team spirit, attitudes, communication, and need for physical presence; ii) e-leadership and coping including three sub-themes namely work efficiency, accessibility, work well-being, and iii) readiness for e-leadership and remote work including five sub-themes namely IT equipment, IT systems, competence, organisational structures, influence of COVID-19.

Many of the studies addressed interpersonal relationships, aspects of which included team spirit [31–40], attitudes [32,38,41], communication [31,36–38,40,42] and a need for physical presence [32,37–40]. Interaction in remote work environments differs [36–38] from leaders' and employees' perspectives [37]. Maintaining team spirit is challenging for e-leaders, and social distancing is noticeable [36–38] and there is also a fear that the leader might lose their grasp on the clinical work environment [37,39]. Building trust is important [40]. The preferred leadership style in e-leadership is transformative [35]. Although leaders strive to be exemplary leaders [32], employees experience a lack of leadership in remote settings [31,33]. Remotely led workplaces can succeed when facilitating change [33], but patient satisfaction must not suffer [34].

Attitudes to digitalisation and e-leadership may have positive or negative effects on e-leadership. Positive attitudes to digitalisation and positive experiences with digitalisation, as well as openness, have a positive effect [41]. In general, nurse leaders have a positive attitude to digitalisation [32]. Meanwhile, negative attitudes relate to employee and patient reluctance to use digital solutions [41] and employee resistance to change related to adopting digital tools [38].

Communication in e-leadership and remote work was assessed similarly by leaders and employees [37]. Traditional methods such as phone calls, virtual meetings, email [37], and WhatsApp messages

[42] are the most used forms of communication. Although nurse leaders strive to communicate and utilise versatile communication technologies [36,38], actual usage seems limited [31]. Employees feel that communication lacks reciprocity and perceive it as formal in practice [37]. There are no commonly agreed principles regarding communication between leaders and employees [38,40]. There is also an overload of information, and essential information can be lost as a result [36,37]. Furthermore, leaders could do more to clarify their role to employees [31] by exploiting technology that is constantly developing [42].

Employees have a clear need for physical presence [32,37–39]. Virtual interactions are perceived differently, and constant remote work has an impact on social interactions [38]. It is difficult to communicate emotions virtually, and physical presence has been deemed necessary to get to know clinical staff [39].

The e-leadership and coping theme comprised three sub-themes: work efficiency, accessibility, and well-being at work. Work efficiency increased [32,39] as, for example, virtual meetings proved very effective [38,39]. Leaders described how working remotely makes their work easier [40], enabling more flexibility, peacefulness, and agility [38]. Nevertheless, leaders' workload [32,39] and work pace [38] increased. Leaders receive a huge number of emails [36,40], and the amount of technology used is increasing [32,36].

Accessibility was perceived differently by employees and leaders. Although employees felt it was easy to approach their leaders remotely [37], they felt that their leaders were not sufficiently available [31,37]. Meanwhile, leaders found it easy to approach employees remotely [37] and wished to be available for employees, occasionally even outside working hours [40].

Working remotely has both advantages and disadvantages in terms of well-being at work. Employees found working remotely convenient [38,43] but felt that they received less support from e-leaders [34] than they would in a conventional employment situation. In addition, failures of e-leadership cause stress and can lead to staff resignations [31]. Leaders' experiences of well-being at work were mixed. While virtual meetings are convenient, breaks are barely taken during remote days [38–40], leaders' stress and loneliness increased [40], principles of ergonomics were ignored, and leaders worried about remote employees' well-being at work [39]. Support for remote employees in crises is sub-optimal [31], and the need to constantly learn new things is burdensome for leaders [32].

Finally, readiness for e-leadership and remote work was a theme addressed from several perspectives. This main theme included the sub-themes IT equipment, IT systems, competencies, organisational structures, and the effects of COVID-19. Available, well-functioning IT equipment [32,37,41] and adequate guidance [38] and support for their use are important [32]. IT systems were also a common sub-theme. Leaders use versatile platforms when communicating with staff [40] and when fulfilling their managerial tasks [32,36]. Leaders perceive IT systems as useful [32] but do not seem to identify their needs regarding IT systems and thus underutilise them [32,42]. Leaders use IT solutions to identify problem areas and promote rapid information flows [36]. Leaders are often overwhelmed by the number of devices and systems in use [32,36]. New systems are occasionally introduced while still under development [32]. IT solutions do not always work properly [32,41] but promote digital services when they function well [41].

E-leadership and remote work require competencies encompassing skills [32,37–40,43], training

[31,36,37,39,40] and guidance [31,39]. Leaders' and employees' skills are at different levels [34,40,42]. Leaders emphasise the need for training and time to become familiar with further new technological solutions [31,36–38,40] but lack guidance and adequate support [31,39].

It appears that the organisational structures in healthcare are not yet adequate to facilitate remote work and e-leadership. Organisations lack policies on remote work and structures regarding e-leadership [31,32,36,37,39]. Although digitalisation may be implemented in an organisation's strategy [32], there is no policy for practical aspects, such as no consistency in technological solutions [32,36], communication systems [37], or no clear procedures for setting goals for remote work [39]. The result is a lack of support for employees or even retention problems [31]. There are also no agreed protocols between different organisations [41].

The COVID-19 pandemic accelerated the shift to remote work and e-leadership [40,41], and studies published subsequently identified some effects of COVID-19 on remote work and e-leadership. Resistance to change decreased and had a positive effect on attitudes [38]. Leaders learned how to build relationships with employees virtually [40]. The downside was that events occurred very quickly, leaving no time for training [38]. Remote work and e-leadership seem to be here to stay, and Ameen et al. [39] proposed a future hybrid leadership style involving alternating e-leadership and face-to-face leadership.

## Discussion

This systematic review aimed to synthesise previous research knowledge and identify gaps in research knowledge on e-leadership in nursing. We identified three main themes: interpersonal relationships, e-leadership and coping, and readiness



for e-leadership and remote work, as well as 12 sub-themes. The results confirm previous findings and add new information on the effects of COVID-19 on remote work and e-leadership in the context of nursing.

Avolio et al. [10,17] emphasised the social aspects of leadership mediated by AITs. Most of the studies in this review addressed the social aspects of leadership. The findings indicate a readiness for e-leadership among nurse leaders and for remote work among employees. There are several advantages but also many disadvantages to e-leadership in nursing but overall, leaders have a positive attitude to digitalisation. To some extent, they seem to benefit from e-leadership in terms of managerial responsibilities, but interpersonal responsibilities can suffer, employees might perceive a lack of leadership, and leaders' work well-being might suffer. Regular face-to-face meetings are considered necessary. The findings of this review were similar to previous research findings on e-leadership in different settings [8,9].

Studies regarding nurse leaders' educational interventions influencing nursing leadership have identified several factors related to leadership practice, but these factors remain weakly specified [5]. It would be useful to know which factors are related to good e-leadership in nursing from the perspectives of leaders and employees, as some positive aspects of e-leadership have already been identified, such as versatile means of communication utilising several communication systems, regular face-to-face meetings [44], and one-on-one meetings with employees to promote good relations [13,23].

It is notable that, over time, the need to ensure competence in e-leadership has not changed greatly. Our findings indicate that nurse leaders need sufficient training in e-leadership [31,36–40] as digitalisation in healthcare progresses. Nurse

leaders have not only identified the need for training but also a lack of time to familiarise themselves with new technological solutions [31,36–38,40]. Organisations appear to assume that leaders can learn virtual practices alongside their routine work, while e-leadership should not be viewed as an extension of traditional leadership [11]. Although technology has developed, it seems that leaders are struggling with challenges similar to those of 20 years ago, especially regarding versatile communication options. Technological feasibility and usability merit more attention. Van Wart et al. [19] emphasise the usability of technology and stress the importance of choosing solutions appropriate to the situation. The issue of appropriate solutions should also be addressed at the organisational level to ensure competence is in place prior to the implementation of new technology.

The COVID-19 pandemic has accelerated the shift towards e-leadership and remote work in general and in the healthcare sector [9] and nursing. The pandemic had a positive influence on attitudes [40], and leaders learned to build relationships with employees virtually [42], although versatile communication options are currently used to a limited extent [40,44]. Trust in virtual settings is consistently emphasised in previous literature [8,17,23]. We also detected some findings regarding trust and its importance [40,42], but this was not addressed as frequently as one might assume. It may be concluded that trust is an important part of leadership in general, and, in time, leaders may have been able to build trust in virtual settings more sufficiently than before. Ameel et al. [39] have also suggested a hybrid leadership model to be more suitable in the healthcare context. Future research on the development of e-leadership in nursing in the period following the worst of the COVID-19 pandemic would be welcome.

Extant literature offers no uniform definition of e-leadership as a concept, which has led to multiple definitions co-existing. Studies in this review utilised versatile concepts describing e-leadership. Kiljunen et al. [14] noted in their scoping review that concept analysis is necessary.

Liu et al. [18] point out that e-leadership can differ in scope. The results of this study indicate that in

the context of nursing, e-leadership currently seems to be largely limited to the use and combination of electronic and traditional communication methods. Leaders appear to be unsupported and left to their own devices in the realm of e-leadership in nursing. There is a need to clarify the opportunities presented by e-leadership in nursing.

**Table 2:** Summary of results.

Theme	Sub-theme	Practical implications
Interpersonal relationships	Team spirit	It is necessary to be aware of the differences between face-to-face and virtual interaction. Maintaining close relationships promotes team spirit. Building mutual trust is important.
	Attitudes	Positive attitudes and experiences promote e-leadership. Identifying negative attitudes and experiences may help to promote e-leadership in the future.
	Communication	We recommend establishing common principles regarding communication between leaders and employees. Versatile technology should be utilised in communication to promote reciprocity.
	Need for physical presence	A clear need for physical presence remains. It is necessary to meet employees regularly despite a virtual presence.
E-leadership and coping	Work efficiency	Utilising technology in leadership is essential. Email volume management is a development topic.
	Accessibility	We recommend leaders clearly state to employees how to be reached.
	Work well-being	Work well-being can suffer if not addressed adequately: ergonomics, preventing isolation, and maintaining work rhythm.
Readiness for e-leadership and remote work	IT equipment	Well-functioning IT equipment and adequate guidance and support are pivotal.
	IT systems	IT systems in use must work properly, and the number of systems should be limited to an appropriate amount.
	Competence	Ensuring leaders' and employees' skills training and guidance needs.
	Organisational structures	Establishing organisational policies on e-leadership and remote work. Develop organisational structures to promote e-leadership and remote work.
	Influence of COVID-19	Exploring hybrid leadership opportunities.

### **Limitations and future research**

E-leadership has become increasingly commonplace in many fields, including nursing. However, the existing data on e-leadership among nursing leaders remains limited. Most research is qualitative and descriptive. We chose to use the concept of nurse leaders to refer to the participants. We acknowledge the dataset also included other healthcare leaders. The included studies were chosen on the grounds that they focused on e-leadership in nursing. In some studies, the participants' professional backgrounds were not stated unequivocally. However, the study results indicate that nurse leaders were included, at least to some extent.

An additional constraint arises from the literature search being conducted by a single researcher; however, any negative effects were mitigated by our collaborative approach throughout the research process as a whole. Two researchers conducted the quality appraisal.

In the future, it would be beneficial to conduct more extensive research on this topic. Nurse leaders have identified a clear need for training and guidance in e-leadership, and the phenomenon might benefit from intervention research. We also

suggest in-depth research on organisational support for nurse leaders, as e-leadership may compromise well-being at work. A potential future research topic is the acceptance and usability of IT solutions, as this has not been addressed sufficiently in previous research. As most of the research has been conducted in public healthcare settings, future research, including a comparative study on e-leadership practices in public and private healthcare, could be productive.

### **Conclusion**

Nurse leaders generally have a positive attitude to digitalisation despite e-leadership in nursing having disadvantages alongside its advantages. Organisations could benefit from training enthusiastic leaders to become e-leaders as digitalisation progresses in the healthcare context. Organisations often lack a mutually agreed policy on remote work and structures governing e-leadership. More research attention directed to e-leadership at the organisational level in nursing could deliver greater insight into the phenomenon.

### **Conflict of interest statement**

No conflicts declared.

### **References**

- [1] Benmira S, Agboola M. Evolution of leadership theory. *BMJ Leader* 2021;5:3–5. <https://doi.org/10.1136/leader-2020-000296>
- [2] Lee SE, Hyunje L, Sang S. Nurse Managers' Leadership, Patient Safety, and Quality of Care: A Systematic Review. *West J Nurs Res*. 2023 Feb;45(2):176–185. <https://doi.org/10.1177/01939459221114079>

- [3] Perkins RT, Bamgbade S, Bourdeanu L. Nursing Leadership Roles and Its Influence on the Millennial Psychiatric Nurses' Job Satisfaction and Intent to Leave. *J Am Psychiatr Nurses Assoc*. 2023 Jan-Feb;29(1):15–24. <https://doi.org/10.1177/1078390320979615>
- [4] Kantek F, Yesilbas H, Aytur Ozen T. Leadership and care in nursing research: A bibliometric analysis. *J Adv Nurs*. 2023 Mar;79(3):1119–1128. <https://doi.org/10.1111/jan.15527>

- [5] Cummings GG, Lee S, Tate K, Penconek T, Micaroni SPM, Paananen T, Chatterjee GE. The essentials of nursing leadership: A systematic review of factors and educational interventions influencing nursing leadership. *Int J Nurs Stud.* 2021 Mar;115:103842. <https://doi.org/10.1016/j.ijnurstu.2020.103842>
- [6] Junttila K, Heikkilä A, Heikkilä A, Koivunen M, Lehtikunnas T, Mattila E, Meriläinen M, Peltokoski J, Sneek S, Tervo-Heikkinen T. The Impact of Leadership in the Autonomy and Engagement of Nurses: A Cross-sectional Multicenter Study Among Nurses Outside the United States. *J Nurs Adm.* 2023 Jan 1;53(1):19–26. <https://doi.org/10.1097/NNA.0000000000001237>
- [7] European Commission. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on enabling the digital transformation of health and care in the Digital Single Market; empowering citizens and building a healthier society. Brussels: European Commission; 2018 [cited 2024 Jan 25]. Available from: <https://digital-strategy.ec.europa.eu/en/library/communication-enabling-digital-transformation-health-and-care-digital-single-market-empowering>
- [8] Cortellazzo L, Bruni E, Zampieri R. The Role of Leadership in a Digitalized World: A Review. *Front Psychol.* 2019 Aug 27;10:1938. <https://doi.org/10.3389/fpsyg.2019.01938>
- [9] Contreras F, Baykal E, Abid G. E-Leadership and Teleworking in Times of COVID-19 and Beyond: What We Know and Where Do We Go. *Front Psychol.* 2020 Dec 11;11:590271. <https://doi.org/10.3389/fpsyg.2020.590271>
- [10] Avolio BJ, Sosik JJ, Kahai SS, Baker B. E-leadership: Re-examining transformations in leadership source and transmission. *The Leadership Quarterly.* 2014;25(1):105–131. <https://doi.org/10.1016/j.leaqua.2013.11.003>
- [11] Avolio B, Kahai SS. Adding the “E” to E-Leadership: How it May Impact Your Leadership. *Organizational Dynamics.* 2003;31(4):325–338. [https://doi.org/10.1016/S0090-2616\(02\)00133-X](https://doi.org/10.1016/S0090-2616(02)00133-X)
- [12] Laukka E, Pölkki T, Kanste O. Leadership in the context of digital health services: A concept analysis. *J Nurs Manag.* 2022 Oct;30(7):2763–2780. <https://doi.org/10.1111/jonm.13763>
- [13] Terkamo-Moisio A, Karki S, Kangasniemi M, Lammintakanen J, Häggman-Laitila A. Towards remote leadership in health care: Lessons learned from an integrative review. *J Adv Nurs.* 2022 Mar;78(3):595–608. <https://doi.org/10.1111/jan.15028>
- [14] Kiljunen M, Laukka E, Koskela TK, Kanste OI. Remote leadership in health care: a scoping review. *Leadership in Health Services* 2022 Jan;35(1):98–115. <https://doi.org/10.1108/LHS-06-2021-0059>
- [15] Cowan LD. e-Leadership: Leading in a Virtual Environment--Guiding Principles for Nurse Leaders. *Nurs Econ.* 2014 Dec;32(6):312–319,322.
- [16] Nurmeksela A, Kinnunen J, Kvist T. Nurse managers' work content: development of the questionnaire and results of the pilot study. *Scand J Caring Sci.* 2020 Dec;34(4):839–851. <https://doi.org/10.1111/scs.12796>
- [17] Avolio BJ, Kahai S, Dodge GE. E-leadership: Implications for theory, research, and practice. *The Leadership Quarterly.* 2000;11(4):615–668. [https://doi.org/10.1016/S1048-9843\(00\)00062-X](https://doi.org/10.1016/S1048-9843(00)00062-X)
- [18] Liu C, Van Wart M, Kim S, Wang X, McCarthy A, Ready D. The effects of national cultures on two technologically advanced countries: The case of e-leadership in South Korea and the United States. *Aust J Public Adm.* 2020 Sep;79(3):298–329. <https://doi.org/10.1111/1467-8500.12433>

- [19] Van Wart M, Roman A, Wang X, Liu C. Operationalizing the definition of e-leadership: identifying the elements of e-leadership. *Int Rev Adm Sci.* 2019 Mar;85(1):80–97. <https://doi.org/10.1177/0020852316681446>
- [20] Holland JB, Malvey D, Fottler MD. Health care globalization: a need for virtual leadership. *Health Care Manag (Frederick).* 2009 Apr-Jun;28(2):117–23. <https://doi.org/10.1097/HCM.0b013e3181a2cb63>
- [21] Neufeld DJ, Wan Z, Fang Y. Remote leadership, communication effectiveness and leader performance. *Group Decision and Negotiation.* 2010;19(3):227–246. <https://doi.org/10.1007/s10726-008-9142-x>
- [22] Savolainen T. Trust-Building in e-Leadership: A Case Study of Leaders' Challenges and Skills in Technology-Mediated Interaction. *Journal of Global Business Issues* 2014;8(2):45–56.
- [23] Galanti T, Guidetti G, Mazzei E, Zappalà S, Toscano F. Work From Home During the COVID-19 Outbreak: The Impact on Employees' Remote Work Productivity, Engagement, and Stress. *J Occup Environ Med.* 2021 Jul 1;63(7):e426–e432. <https://doi.org/10.1097/JOM.0000000000002236>
- [24] Aromataris E, Pearson A. The systematic review: an overview. *Am J Nurs.* 2014 Mar;114(3):53–58. <https://doi.org/10.1097/01.NAJ.0000444496.24228.2c>
- [25] Webster J, Watson RT. Analyzing the past to prepare for the future: Writing a literature review. *MIS Q.* 2002 Jun;26(2):XIII–XXIII. <http://www.jstor.org/stable/4132319>
- [26] Holly C, Salmond S, Saimbert M. Comprehensive Systematic Review for Advanced Practice Nursing [ebook]. 2nd ed. New York (NY): Springer Publishing Company; 2017. <https://doi.org/10.1891/9780826131867>
- [27] Harrison R, Jones B, Gardner P, Lawton R. Quality assessment with diverse studies (QuADS): an appraisal tool for methodological and reporting quality in systematic reviews of mixed- or multi-method studies. *BMC Health Serv Res.* 2021 Feb 15;21(1):144. <https://doi.org/10.1186/s12913-021-06122-y>
- [28] Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ.* 2021 Mar 29;372:n71. <https://doi.org/10.1136/bmj.n71>
- [29] Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Educ Today.* 2004 Feb;24(2):105–112. <https://doi.org/10.1016/j.nedt.2003.10.001>
- [30] Lindgren BM, Lundman B, Graneheim UH. Abstraction and interpretation during the qualitative content analysis process. *Int J Nurs Stud.* 2020 Aug;108:103632. <https://doi.org/10.1016/j.ijnurstu.2020.103632>
- [31] Weymouth S, Davey C, Wright JI, Nieuwoudt LA, Barclay L, Belton S, Svenson S, Howell L. What are the effects of distance management on the retention of remote area nurses in Australia? *Rural Remote Health.* 2007 Jul-Sep;7(3):652. <https://doi.org/10.22605/RRH652>
- [32] Lammintakanen J, Saranto K, Kivinen T. Use of electronic information systems in nursing management. *Int J Med Inform.* 2010 May;79(5):324–31. <https://doi.org/10.1016/j.ijmedinf.2010.01.015>
- [33] Øye C, Mekki TE, Jacobsen FF, Førlund O. Facilitating change from a distance - a story of success? A discussion on leaders' styles in facilitating change in four nursing homes in Norway. *J Nurs Manag.*



- 2016 Sep;24(6):745–54.  
<https://doi.org/10.1111/jonm.12378>
- [34] Lundgren D, Ernsth Bravell M, Börjesson U, Kåreholt I. The Impact of Leadership and Psychosocial Work Environment on Recipient Satisfaction in Nursing Homes and Home Care. *Gerontol Geriatr Med.* 2019 Apr 18;5:2333721419841245.  
<https://doi.org/10.1177/2333721419841245>
- [35] Orte CJS, Diño MJ. Eliciting e-leadership style and trait preference among nurses via conjoint analysis. *Enfermería Clínica.* 2019 Mar;29(Suppl 1):78–80.  
<https://doi.org/10.1016/j.enfcli.2018.11.025>
- [36] Sharpp TJ, Lovelace K, Cowan LD, Baker D. Perspectives of nurse managers on information communication technology and e-Leadership. *J Nurs Manag.* 2019 Oct;27(7):1554–1562.  
<https://doi.org/10.1111/jonm.12845>
- [37] Ristolainen M, Maijala R, Eloranta S. Viestintä osana etäjohtamista terveydenhuollossa. *FinJeHeW.* 2020 Oct 13;12(3):179–186.  
<https://doi.org/10.23996/fjhw.95051>
- [38] Ravelin A, Laukka E, Heponiemi T, Kaihlanen A, Kanste O. Perusterveydenhuollon johtajien kokemuksia koronaviruspandemian vaikutuksista digitaaliseen työkuultuuriin ja sen johtamiseen. *Sosiaalilääketieteellinen Aikauslehti.* 2021 Oct 5;58(3):220–235.  
<https://doi.org/10.23990/sa.103248>
- [39] Ameel M, Myllynen M, Kallakorpi S. Exploring Hybrid Leadership: Experiences of Remote Leadership in Healthcare. *J Nurs Adm.* 2022 Dec 1;52(12):653–658.  
<https://doi.org/10.1097/NNA.0000000000001227>
- [40] Laukka E, Hammarén M, Pölkki T, Kanste O. Hospital nurse leaders' experiences with digital technologies: A qualitative descriptive study. *J Adv Nurs.* 2023 Jan;79(1):297–308.  
<https://doi.org/10.1111/jan.15481>
- [41] Laukka E, Gluschkoff K, Kaihlanen AM, Suvisaari J, Kärkkäinen J, Vormaa H, Heponiemi T. Muutos psykiatrien avohoitokäyntien toteutuksessa ja johtajien kokemukset etäasiointia estävistä ja edistävästä tekijöistä COVID-19 aikakaudella. *FinJeHeW.* 2021 Feb 27;13(1):49–62.  
<https://doi.org/10.23996/fjhw.98228>
- [42] Kagan I, Shor R, Ben Aharon I, Yerushalmi S, Kigli-Shemesh R, Gelman S, Itzhaki M. A Mixed-Methods Study of Nurse Managers' Managerial and Clinical Challenges in Mental Health Centers During the COVID-19 Pandemic. *J Nurs Scholarsh.* 2021 Nov;53(6):663–670.  
<https://doi.org/10.1111/jnu.12685>
- [43] Hafermalz E, Riemer K. Interpersonal Connectivity Work: Being there with and for geographically distant others. *Organization Studies.* 2020 Dec;41(12):1627–48.  
<https://doi.org/10.1177/0170840620973664>
- [44] McKinney VR, Whiteside MM. Maintaining distributed relationships. *Commun ACM.* 2006 Mar;49(3):82–86.  
<https://doi.org/10.1145/1118178.1118180>



## Appendix 1.

Summary of quality appraisal.

Criteria, scale 0-3	Ameel et al. 2022	Hafermalz & Riemer 2020	Kagan et al. 2021	Lammintakannen et al. 2010	Laukka et al. 2021	Laukka et al. 2023
1. Theoretical or conceptual underpinning to the research	2	3	2	2	2	3
2. Statement of re-search aim/s	3	3	3	3	3	3
3. Clear description of research setting and target population	3	3	3	3	3	3
4. The study design is appropriate to address the stated re-search aim/s	2	2	3	3	2	3
5. Appropriate sampling to address the research aim/s	2	2	2	2	2	2
6. Rationale for choice of data collection tool/s	2	2	3	2	2	3
7. The format and content of data collection tool is appropriate to address the stated research aim/s	3	2	3	3	2	3
8. Description of data collection procedure	3	2	3	3	3	3
9. Recruitment data provided	3	1	3	1	2	3
10. Justification for analytic method selected	2	3	3	3	2	3
11. The method of analysis was appropriate to answer the re-search aim/s	3	2	3	3	2	3
12. Evidence that the research stakeholders have been considered in research design or conduct.	1	0	2	0	0	0
13. Strengths and limitations critically discussed	3	1	2	2	2	3
Total of max. 39	32	26	35	30	27	35

Criteria, scale 0-3	Lundgren et al. 2019	Orte & Dino 2019	Oye et al. 2016	Ravelin et al. 2021	Ristolainen et al. 2020	Sharpp et al. 2019	Weymouth et al. 2007
1. Theoretical or conceptual underpinning to the research	3	1	3	2	2	2	2
2. Statement of re-search aim/s	3	2	3	3	3	3	3
3. Clear description of research setting and target population	3	1	3	3	3	3	3
4. The study design is appropriate to address the stated re-search aim/s	3	2	3	3	2	3	3
5. Appropriate sampling to address the research aim/s	3	2	3	2	2	2	2
6. Rationale for choice of data collection tool/s	2	1	3	3	3	2	3
7. The format and content of data collection tool is appropriate to address the stated research aim/s	3	1	3	3	2	3	3
8. Description of data collection procedure	3	1	3	3	3	2	2
9. Recruitment data provided	3	1	2	3	3	3	3
10. Justification for analytic method selected	3	2	3	3	2	3	3
11. The method of analysis was appropriate to answer the re-search aim/s	3	1	2	3	2	3	3
12. Evidence that the research stakeholders have been considered in research design or conduct.	0	0	0	1	1	1	2
13. Strengths and limitations critically discussed	3	0	2	1	3	3	3
Total of max. 39	35	15	33	33	31	33	35

## Appendix 2.

Summary of included studies.

Author(s), (year), title, journal	Aim	Study design, methods, participants, and context	Main findings
Ameel et al., (2022), <i>Exploring Hybrid Leadership. Experiences of Remote Leadership in Healthcare</i> . JONA 52(12): 653–658.	To describe leaders' experiences of remote leadership during the 1st year of the COVID-19 pandemic.	Qualitative study using focus group interviews. 8 leaders, including 6 nurse managers, 1 medical doctor, and 1 social work manager. psychiatric inpatient units in Finland	Managers experienced fewer disturbances during the remote workday, less time spent on traveling, and the efficiency of online meetings. Remote work had positive and negative effects on leaders' well-being at work. Leaders reported a lack of organizational support. Leaders recognized the need for a hybrid leadership model for the future.
Hafermalz & Riemer, (2020), <i>Interpersonal Connectivity Work: Being there with and for geographically distant others</i> , Organization Studies 41(12): 1627–1648.	To describe how interpersonal connectivity can be achieved at a geographic distance. To develop a conceptual model of interpersonal connectivity work	Abductive research approach. 13 interviews (10 telenurses and 3 managers of telenurses) who worked in a major city in Australia that provides a telenursing service to the public.	Nurses were able to connect with geographically distant callers on a personal level. Solid clinical work experience was helpful in telenursing. Several nurses reported that physical distance was part of what attracted them to the job.
Kagan et al., (2021), <i>A Mixed-Methods Study of Nurse Managers' Managerial and Clinical Challenges in Mental Health Centers During the COVID-19 Pandemic</i> . Journal of Nursing Scholarship 53(6): 663–670.	To examine the managerial and clinical challenges of nurse managers in mental health centers during the ongoing COVID-19 pandemic.	A mixed-methods study using a structured self-administered questionnaire and focus group interviews. 25 nurse managers from two mental health centers in Israel.	The most important challenges were related to clinical responsibilities such as protecting patients from infection. Managerial challenges were related to communication with staff.
Lammintakanen et al., (2010), <i>Use of electronic information systems in nursing management</i> . International journal of medical informatics 79: 324–331.	To describe nurse managers' perceptions of the use of electronic information systems in their daily work.	Qualitative study using focus group interviews. 48 nurse managers from both primary and specialized healthcare organizations in Finland.	Nurse managers accepted the use of information technology. The usability of management information systems was assessed critically: all opportunities have not yet been identified. Nurse managers have a central role in the implementation of information systems. The development of personnel competencies and work processes is crucial.
Laukka et al., (2021), <i>Muutos psykiatristen avo- hoitokäyntien toteutuksessa ja johtajien koke- mukset etäasiointia estävistä ja edistävistä tekijöistä COVID-19 aika- kaudella</i> . Finnish Journal of eHealth and Welfare 13(1): 49–62	To examine whether COVID-19 has affected the form of psychiatric outpatient services and describe psychiatric healthcare leaders' experiences of digital and remote services.	A mixed-method survey study utilizing an online questionnaire containing structured and open-ended questions. 39 leaders from 19 different healthcare districts in Finland. The participants were medical leaders, nurse managers and service supervisors.	Digital and remote services increased after the COVID-19 outbreak. The challenges for using remote services were related to the lack of and problems with IT solutions and equipment, negative attitude towards digital services, insufficient IT knowledge, and organizational problems. Positive aspects were related to the necessity for remote services due to COVID-19, positive attitude towards digital services and well-functioning networks and technology.

Laukka et al., (2023), <i>Hospital nurse leaders' experiences with digital technologies: A qualitative descriptive study</i> . Journal of Advanced Nursing.	To describe hospital nurse leaders' experiences with digital technologies.	A qualitative descriptive study. Semi-structured focus group interviews in one university-affiliated hospital in Finland. 20 frontline nurse leaders and middle managers.	Leaders experienced they needed to be open-minded towards digitalization, which made their work easier by making it more efficient. They also got frustrated with digitalization, which caused them stress. Leaders' own digital skills are important, although some leaders felt that their digital ability was low.
Lundgren et al., (2019), <i>The Impact of Leadership and Psychosocial Work Environment on Recipient Satisfaction in Nursing Homes and Home Care</i> , Gerontology & Geriatric Medicine 5: 1–9.	To examine the association between nursing assistants' assessment of leadership, their psychosocial work environment, and satisfaction among older people receiving care in nursing homes and home care.	Quantitative Study, cross-sectional surveys with 1,132 nursing assistants and 1,535 people receiving care in 45 nursing homes and 21 home care units in Sweden.	Direct leadership was associated with the psychosocial work environment in nursing homes and home care. Indirect leadership did not affect recipients' satisfaction in either nursing homes or home care. Better leadership was related to higher satisfaction among nursing assistants and older people in nursing homes.
Orte & Dino, (2019), <i>Eliciting e-leadership style and trait preference among nurses via conjoint analysis</i> , Enfermeria Clinica 29(S1): 78–80.	To identify e-leader preferences among nurses based on several attributes namely: style, trait, and characteristics.	A quantitative approach, conjoint analysis via a card sort (create the orthogonal cards regarding the leadership style) was employed. 174 purposively selected nurses in the Philippines with prior experience with a virtual nursing leader.	Most of the respondents choose the leadership style as the most important factor in executing e-leadership. The transformational leadership style yielded a higher score than the transactional leadership style.
Ravelin et al., (2021), <i>Pe-rusterveydenhuollon johtajien kokemuksia koronaviruspandemian vaikutuksista digitaaliseen työkuultuuriin ja sen johtamiseen</i> , Sosiaalilääketieteellinen aikakauslehti 58: 220–234 .	To describe the experiences of primary care leaders on the effects of the COVID-19 pandemic on the digital work culture and its management.	A qualitative descriptive study utilizing a semi-structured individual interview. 21 primary care leaders from three municipals and one health care district from Finland.	The COVID-19 pandemic's effects on the digital work culture were related to the progress of digital work culture, change in the nature of work and the work community's readiness for change. The COVID-19 pandemic's effects on leading digital work culture were considered to change leadership, leaders' nature of work and leaders' readiness for change.
Ristolainen et al., (2020), <i>Viestintä osana etäjohtamista terveydenhuollossa</i> , Finnish Journal of eHealth and Welfare 12(3): 179–186.	To describe the current state of communication in remote management and its development needs in healthcare.	A mixed-method survey study utilizing an online questionnaire which contained structured and open-ended questions. 15 nurse managers and 120 employees from one university-affiliated hospital in Finland.	There were no shared organizational approaches created for remote management communication. Traditional methods such as phone calls and e-mail were mostly used. Familiarity and trust between the staff were related to a natural remote communication and regular face-to-face meetings were still considered important.
Sharpp et al., (2019), <i>Perspectives of nurse managers on information communication technology and e-Leadership</i> , Journal of Nursing Management 27: 1554–1562.	To clarify nurse managers' perspectives on challenges and opportunities with technology and how it may influence communication and leadership.	Descriptive qualitative study design utilizing open-ended interviews and focus groups. 16 nurse managers from individual hospitals in the US healthcare system.	Four themes were identified: cannot live without it, too much, too many, poor onboarding training and difficulty maintaining virtual relationships. Establishing and maintaining relationships virtually was considered challenging but it may improve virtual relationships. Nurse managers utilize technology quite widely in their daily work.

Weymouth et al. (2007), What are the effects of distance management on the retention of remote area nurses in Australia? The International Electric Journal of Rural and Remote Health Research, Education, Practice and Policy 7(3):652–667.	To identify the effects of distance management on registered nurses in remote areas.	A mixed-method study utilizing surveys and interviews. Participants were: 61 registered nurses, 26 former registered nurses and 9 nursing executives from three different Australian states.	Nurses felt managers were inaccessible and there was a lack of support and flexibility from management. Management also changed frequently which caused even more challenges. Executives emphasized a need for clear communication, interpersonal skills, and support as well as clarifying the management's roles to employees.
Oye et al., (2016), <i>Facilitating change from a distance – a story of success? A discussion on leaders' styles in facilitating change in four nursing homes in Norway</i> , Journal of Nursing Management 24: 745–754.	To examine the influence of leadership when facilitating change in nursing homes.	A multi-site comparative ethnography in four nursing homes after an intervention in Norway. Two ethnographic fieldworkers performed an in-depth ethnographic investigation on how the teams act or do not act. Empirical data comprised interviews and observations. The number of participants was not clearly disclosed.	Different leadership styles to facilitate change were identified. Surprisingly, a remote leadership style involving almost no cooperation with staff proved successful in another setting.