



## An integrative review of nurse-led virtual clinics He arotakenga hanumi i ngā tari hauora mariko nā te tapuhi i ārahi

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### Abstract

Nurse-led virtual clinics are planned contact by a nurse to a patient for the purposes of clinical consultation, advice and treatment planning. It is a promising innovation yet to be fully utilised within models of health service delivery. Despite the increasing popularity of virtual clinics, there is still a very limited understanding of how this platform could be fully integrated as part of day-to-day nursing practice in the future. This integrative review aimed to examine nurse-led virtual clinic follow-up within chronic care services, particularly on clinical utility and clinical outcomes. An extensive literature search was undertaken from online databases: Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, PubMed, Science Direct, Ovid, Scopus and Google Scholar. Publications written in English on nurse-led virtual clinics for chronic or long-term conditions were included. A total of 43 articles published from 2000 to 2015 were initially found. Twelve articles satisfied the inclusion criteria and were selected for review. Three main themes were identified: technical aspects of nurse-led virtual clinics, outcomes of nurse-led virtual clinics, and the future application of nurse-led virtual clinics within the health industry. Results from studies indicate that nurse-led virtual clinics are patient-centred, cost effective and provide efficient delivery of care. Nurse-

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### Ngā Ariā Matua

Ko tēnei mea te tari hauora mariko nā te tapuhi i ārahi he tūtakinga ka āta whakaritea e tētahi tapuhi me tana tūrora mō ngā take āwhina tūrora, tohutohu, me te whakamahere mahi whakaora. He tikanga hou tino pai tēnei ki te titiro atu, ā, kāore anō kia tino whakamahia i roto i ngā momo huarahi whakarato taurimatanga hauora. Ahakoa e piki whakarunga ana te pīrangi o te ao whānui ki ngā tari hauora mariko, he iti noa te māramatanga o te tini o te tangata ki ngā huarahi e taea ai tēnei huarahi te haumi mai ki ngā ritenga mahi tapuhi o ia rā, ā ngā rā e tū mai nei. Te whāinga ia o tēnei arotake haumi he tiroiro i te whāinga i te tūrora i ngā rā o muri mai e te tapuhi i roto i ngā ratonga taurimatanga māuiui ngau-roa, me te aronui anō ki te whāinga tikanga, me te whāinga hua mō te tūrora. I mahia tētahi rangahau whānui tonu i ngā pātengi raraunga tuihono nei: Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, PubMed, Science Direct, Ovid, Scopus me Google Scholar. I uru ki roto ētahi tuhinga reo Ingarihi mō ngā tari hauora mariko nā te tapuhi i ārahi mō ngā māuiui ngau-roa, wā roa rānei. E 43 ngā tuhinga i kitea mai i te tau 2000 ki 2015, i te tuatahi. Tekau mā rua ngā tuhinga i whakaetia i raro i nga paearu whakauru, ā, i kōwhiria hei arotake. E toru ngā ia matua i tautohutia: ngā āhuetanga hangarau o ngā tari hauora mariko nā te tapuhi i ārahi, ngā putanga o ngā tari hauora, me te wāhi ki ngā tari hauora mariko nā te tapuhi i ārahi i roto i te ahumahi hauora mō ngā rā kei te tū mai. I kitea ko ngā hua mai i ngā tirohanga ko tēnei mea te tari hauora mariko nā te tapuhi i ārahi,



led virtual clinics have potential to effectively respond to increasing demands and pressures within New Zealand health care services.

he arotahi tika atu ki te tūroro, he ngāwari te utu, he kamakama ki te hora taurimatanga. He nui tonu ngā painga o ngā tari hauora nā te tapuhi i ārahi hei huarahi whakatutuki i ngā hiahia me ngā tāpokopokotanga o ngā ratonga hauora o Aotearoa.

## Keywords / Ngā kupu matua

nurse-led virtual clinics / ngā tari hauora nā te tapuhi i ārahi; integrative review / te arotake hanumi; nurse-led follow-up / te whāinga i te tūroro i ngā rā o muri mai e te tapuhi; New Zealand/ Aotearoa

## Introduction

Telehealth is a form of technology communication used to provide information regarding a client's health care to health care providers regardless of geographical distance (Nurse Executives of New Zealand, 2015; New Zealand Telehealth Forum, n.d). Wade and Stock (2017) recently classified telehealth as a platform that involves various forms of technology and is not only limited to telephone technology but also computer-generated processors and applications such as mobile health applications, video communications, wearable devices and sensor devices. The New Zealand Nurses Organisation (2016) definition of telehealth is "health care delivery, or closely related processes, when participants are separated by distance, and information and communications technologies and infrastructures are used to overcome that distance" (p.1). Health professionals, particularly nurses, are starting to take active roles contributing to the advancement of telehealth and telemedicine. However, the increasing popularity of virtual clinics presents challenges for nurses and future nursing practice.

Nurse-led virtual clinics operate according to the virtual proximity created between nurses and clients. These are promising innovations yet to be fully utilised within models of health service delivery. While the increasing popularity of nurse-led virtual clinics is evident in the

literature, there is still a very limited understanding of how this platform could be fully integrated as part of day-to-day nursing practice. A systematic review on nurse-led telephone follow-up specifically for clients with colorectal cancer revealed positive clinical outcomes and satisfying patient experiences (Cusack & Taylor, 2010). However, these authors suggested that structure and guidelines for nurse-led telephone follow-up were not clearly articulated in the majority of available literature. Furthermore, their review focused on clients with a specific type of malignancy and did not explore other utility and outcomes of nurse-led virtual clinics.

## New Zealand context

The New Zealand Health Strategy (2016) recognises the need for an innovative approach to health by effectively using new and emerging technology such as mobile devices, smartphones and wearable devices to achieve sustainable health outcomes. There is rising pressure on the healthcare industry to provide cost-effective and high-quality care for patients. "SMART" systems are proposed in the Strategy which include utilising the telehealth approach which poses advantages to rural New Zealand populations. SMART systems are about discovering, developing and sharing effective innovations across the system, including new technologies. Telehealth



could reduce organisational costs by decreasing hospital admission rates as well as improving management of chronic conditions at a distance (Minister of Health, 2016).

New Zealand health organisations are slowly embracing nurse-led virtual clinics. Experienced New Zealand nurses, Sayer, Almeida, and Baird utilised different modes of telehealth to run their nurse-led virtual clinics (Nursing Review, 2017). These nurses utilised virtual clinics via Zoom conferences and mobile/telephone follow-up, which were evaluated to be successful for following up cystic fibrosis patients and were appreciated by patients within the vascular service unit. Wright and Honey's (2016) study of nurses' experience using teleconsultation reported that it was more convenient, timely and resulted in positive experiences for patients. These are just some of the existing and documented forms of nurse-led clinics in New Zealand and they offer the potential to support targets and strategic goals.

## **Aim**

To undertake an integrative review on nurse-led virtual clinic practices and trends. The review was guided by the following questions:

- a. What are the clinical utilities of nurse-led virtual clinics?
- b. What are identified clinical outcomes resulting from nurse-led virtual follow-up?

## **Methodology**

Integrative reviews evaluate what is already known about a specific subject with the purpose of finding a solution to a specific problem or proposing recommendations for future research (Whittemore & Knalf, 2005). This review approach combines analysis of research from diverse methodologies (for example experimental and theoretical sources) and outlines a systematic framework (Whittemore & Knalf, 2005) for analysing and integrating evidence.

## **Search strategy**

An extensive systematic literature search was undertaken using the online databases Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, PubMed, Science Direct, Ovid, Scopus and Google Scholar. Only peer-reviewed journals were selected. The search strategy included a manual search through the reference lists of retrieved articles to identify relevant literature and ensure comprehensive coverage. Case reports and clinical descriptions were used as resources for supporting the results and were not included in the review and data analysis as they did not include measurable clinical outcomes. In order to create a focused collection of studies to be reviewed, inclusion and exclusion criteria were applied to provide a framework for the selection process (see Table 1). The search terms used were guidelines, nursing, nurse-led clinics, outcomes, policy, standards, virtual clinics, telehealth and chronic /long-term care conditions.

## **PRISMA screening and quality appraisal**

A total of 43 articles were found using the combination of search terms with limiters applied. Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework (Moher et al., 2009) (Figure 1), twelve studies satisfied the screening process with specific reference to the outlined inclusion/exclusion criteria. The twelve studies were evaluated using the Mixed Method Appraisal Tool (MMAT) described by Pluye et al. (2011). The MMAT evaluates the quality of articles using a consistent, single-format quality appraisal scale suitable for methodologically diverse studies in a systematic or integrated review. The twelve articles selected met all the criteria in the quality appraisal tool.

## **Data analysis and synthesis**

The identified articles were read thoroughly and independently by each reviewer in relation to aim, methodology, and findings. Results from the articles



**Table 1: Inclusion and Exclusion Criteria**

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none"> <li>• Primary research using diverse methodologies</li> <li>• Search was limited to primary research</li> <li>• Publications written in English language</li> <li>• Full texts articles published between 2000 to 2016 to reflect current research</li> <li>• Published in peer reviewed academic journals</li> <li>• Nurse-led virtual clinics conducted on adults with long term/chronic conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Non nurse-led virtual clinics</li> <li>• Studies published before the year 2000</li> <li>• Non peer reviewed journals</li> <li>• Review articles, clinical reports, editorial articles and discussion papers</li> <li>• Nurse-led virtual clinics working in paediatric, maternal, mental health and acute care settings</li> </ul>

were then integrated and analysed to categorise the data. The information derived was then entered into a table displaying descriptors such as authors, year and place of publication, research aim, sample size, methodology, and results (see Table 2). The result of this process enabled groupings of similar data and identifying reoccurring themes in a data display. Critical examination of this data resulted in the identification of subgroups. The interrelated conceptual data were then compared and contrasted in an iterative process (data comparison) and then regrouping to similar concepts or themes. A pattern was then identified for similarities and differences and conclusions drawn (Whittemore & Knalf, 2005).

### Results

Three themes were identified from this integrative review. These are technical aspects, outcomes and future applications of nurse-led virtual clinics. The first theme, 'technical or procedural', highlights the findings

pertaining to the set-up of virtual clinics, carrying out the actual operation of running a virtual clinic and documentation process involved. The second theme refers to 'outcomes of nurse-led virtual clinics' observed between patients and the hosting organisations. The third theme is about the feasibility of nurse-led virtual clinics in the future as well the need for education for effective implementation.

### Technical/procedural aspects

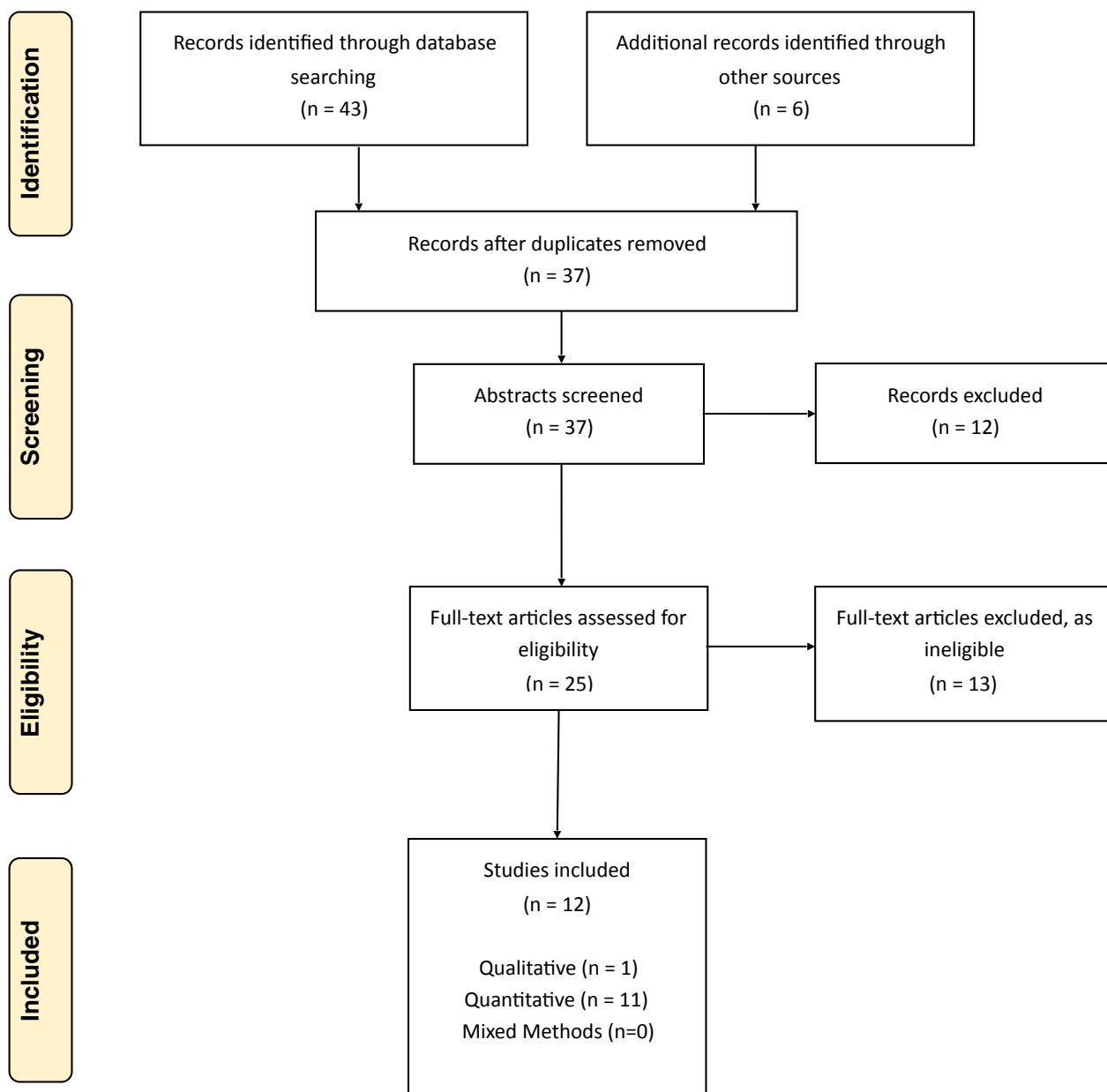
Technical/procedural aspects explain the similarities in steps taken to develop and run the nurse-led virtual clinic starting from the setting up, recruitment of staff and to a post-virtual clinic appointment.

### Set up

Set-up describes the processes of recruiting staff to run virtual clinics. A majority of studies indicated that nurse specialists and nurse practitioners tended to run the virtual clinics (Beaver et al., 2012; Koinberg



Figure 1: Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart (Moher et al., 2009)



et al., 2004; Sardell et al., 2000; Smits et al., 2015). Some studies utilised highly experienced nurses with specified skills and training (Hennell et al., 2005; Leach et al., 2014; Nesari et al., 2010; Overend et al., 2008; Kimman et al., 2010). Kimman et al. (2010) and Sardell et al. (2000) noted that nurses carrying out virtual clinics

attended a specific training programme to update their knowledge and skills and recent advances in practice and management. A multidisciplinary approach was observed in studies, which confirms that this approach provides patients with transparent, safe, robust and high-quality care and follow-up (Beaver et al., 2012;



Leahy et al., 2013; Nesari et al., 2010; Smits et al., 2015; Robertson et al., 2013). These authors reported that at any given time during the nurse-led virtual clinic follow-up, patients had the right to revert to a face to face consultant clinic follow-up (Kimman et al., 2010; Leahy et al., 2013; Smits et al., 2015).

## **Procedure**

All studies used telephone communication or mobile phone technology as their means of virtual media for follow-up. These devices were widely accessible to a majority of the patients and were readily available to clinical specialists. Mobile phone technology permitted flexibility as consultations with patients could be at any location, making the process more patient-centric and convenient (Sardell et al., 2008). Leach et al. (2014) was the only study that conducted the nurse-led virtual follow-up using both telephone and electronic mails. All studies, with the exception of Leach et al. (2013), utilised a structured format of questions and ways of questioning at every telephone follow-up. The standard format included health education and psychosocial support and guidance to patients. Beaver et al. (2010), Leahy et al. (2013) and Overend et al. (2008) recognised the importance and need for a structured and organised form of consultation. Leahy et al. (2013) and Robertson et al. (2013) agreed that a structured form of consultation allowed standardisation of care. Beaver et al. (2010; 2012) suggested that a pre-arranged date and appointment time with the patient was convenient for nurses in terms of flexibility with time and travel. Smits et al. (2015) noted a high compliance rate with the virtual follow-up model.

## **Documentation**

Leahy et al. (2013) and Robertson et al. (2013) believed documentation post nurse-led virtual consultation was essential to complete the assessment as it provided patient progress and/or identified complications and need for intervention. Hennell et al. (2005) and Robertson et al. (2013) used specific templates for documentation of

the virtual clinic consisting of the symptoms reviewed, blood test results and follow-up plans. Overend et al. (2008) and Sardell et al. (2000) agreed that documentation was a necessary element for nurse-led clinics as a communication document to the general practitioner (GP) and other medical personnel involved. Moreover, Hennell et al. (2005) claimed that documentation should also be sent to the patient as it summarises and confirms the telephone consultation.

## **Outcomes**

Outcomes as a theme were derived from the main recipients of care (patients) and the care providers (organisation).

## **Patient**

All twelve studies reported that patients found nurse-led virtual clinic consultations convenient as they take place in a comfortable environment within flexible times, no waiting time, or time lost in travelling or making travel arrangements for clients from rural areas (Beaver et al., 2010; 2012; Hennell et al., 2005; Kimman et al., 2010; Leach et al., 2014; Overend et al., 2008; Robertson et al., 2013; Sardell et al., 2000; Smits et al., 2015). Beaver et al. (2012) noted that patients participating in the telephone-led nurse follow-up raised their concerns more openly. Patients felt they were given enough time to express any other concerns and appreciated the psychosocial support and advice given. These findings resonate with those of Smits et al. (2015) that nurse-led telephone follow-up fostered a close and trusting relationship between patients and their specialist nurse.

Planning the virtual follow-up at a specified date and time gave flexibility to patients and allows organisation of their schedules (Beaver et al., 2010; Hennell et al., 2005; Smits et al., 2015). In terms of patient satisfaction, Koinberg et al. (2004) and Leahy et al. (2013) reported no significant statistical difference in patient satisfaction in their comparison of nurse-led virtual follow-up to medical follow-up. However, there was a trend that favoured

**Table 2: Studies Selected for Review**

Authors, Year and Place	Research Aim	Nurse-led virtual clinic type	Sample size	Methodology	Main Results
Sardell et al. (2000) UK	To assess nurse-led telephone follow-up for patients with high grade glioma instead of the usual face to face follow-up and determine patient satisfaction with this care delivery.	Telephone follow-up and email contact	45	Quantitative; descriptive survey using patient satisfaction questionnaire	<ul style="list-style-type: none"> <li>Majority of patients thought the nurse was accessible and was experienced and knowledgeable to deal with their concerns.</li> <li>The nurse-led telephone follow-up recorded a high patient satisfaction score and patient compliance was high.</li> </ul>
Koinberg et al. (2004) Sweden	To evaluate nurse-led follow-up on demand versus physician follow-up after breast cancer treatment with regards to patients' well-being, satisfaction, access to medical care and medical safety.	Telephone follow-up	264	Quantitative; descriptive survey using Hospital Anxiety and Depression scale (HAD) and Satisfaction and Accessibility (SaaC) Scale	<ul style="list-style-type: none"> <li>Nil significant differences in results in both groups.</li> </ul>
Hennell et al. (2005) UK	To determine patient satisfaction with regards to nurse-led rheumatology telephone clinics and its effect on waiting times.	Telephone clinics	68	Quantitative; descriptive/evaluation using survey	<ul style="list-style-type: none"> <li>Reduced follow-up waiting times by 2 months (otherwise waiting times 5 months) 82% had adequate time allocated to the telephone led consultation and felt satisfied and not rushed; 64% found it convenient; 16% stated it was as convenient as conventional clinics; 64% understood the consultation very well along with letter post consultation confirmed their understanding; 72% content with the new service delivery positive and would use it again.</li> </ul>
Overend et al. (2008) UK	To explore effectiveness and safety of follow-up of patients with indolent and chronic haematological malignancies by means of a nurse-led telephone clinic as well as patients' satisfaction with this service delivery.	Telephone follow-up	53	Quantitative; descriptive using a Subject Satisfaction Questionnaire (SSQ).	<ul style="list-style-type: none"> <li>Results achieved was positive and encouraging as follow-up via this method could be carried out in the rural areas.</li> <li>It decreased waiting times and travel time; was seen as convenient and cost effective.</li> </ul>
Kimman et al. (2010) Netherlands	Exploring the cost-effectiveness of nurse-led telephone follow-up after breast cancer and to compare patient satisfaction between nurse-led telephone and conventional follow-up in outpatient settings.	Telephone follow-up	320	Quantitative; randomised controlled trial; evaluation using Dutch version of Ware's Patient Satisfaction Questionnaire III (PSQ III).	<ul style="list-style-type: none"> <li>High patient satisfaction scores were achieved in all areas for both groups, however a high inclination was noted towards acceptability and practicability for telephone follow-up.</li> </ul>
Nesari, et al. (2010) Iran and Japan	To evaluate any improvement in the level of adherence to a diabetes therapeutic regimen for type 2 diabetic patients via a nurse telephone follow-up service.	Telephone follow-up	61	Quantitative; descriptive; evaluation using a questionnaire	<ul style="list-style-type: none"> <li>Study yielded positive results in all fields, was highly cost- effective and efficient.</li> </ul>
Beaver et al. (2010) UK	To discuss and understand telephone follow-up after breast cancer treatment from patients and breast care nurses' points of view.	Telephone follow-up	28	A qualitative design; semi-structured interviews	<ul style="list-style-type: none"> <li>Patients found telephone follow-up provided convenient and good continuity of care.</li> <li>Fitted patient's daily routine.</li> </ul>
Beaver et al. (2012) UK	To identify possible benefits of nurse-led telephone follow-up for colorectal cancer patients.	Telephone follow-up	65	Quantitative; exploratory randomised trial	<ul style="list-style-type: none"> <li>Telephone intervention was highly accepted by both patients and health professionals. Satisfaction levels were noted to be high in both study groups.</li> <li>Patients more likely to discuss concerns in telephone group as more comfortable in own surroundings and not pressured for time in a busy clinic; reduced burden on outpatient clinic; and convenient to patient, saving time and travelling costs in telephone group.</li> </ul>
Robertson et al. (2013) Scotland	To evaluate the feasibility of nurse-led virtual prostate-specific antigen (PSA) follow-up for prostate cancer patients regarding patient satisfaction and cost effectiveness.	Telephone follow-up	191	Quantitative; descriptive survey using satisfaction questionnaire	<ul style="list-style-type: none"> <li>98% were very happy with the new service; 98-8% of patients reported being well supported by this new service.</li> <li>It relieved 50 consultant out patient's appointment slots per month and decreased waiting times. It was patient centred, safe and efficient as well as had a positive impact for patients and the service.</li> </ul>
Leahy et al. (2013) Australia	To determine if patients with low to intermediate risk of prostate cancer were satisfied with nurse-led follow-up in comparison to traditional medical follow-up; and to compare patient self-reported symptoms with nurse-led telephone follow-up or traditional methods of follow-up.	Telephone follow-up	100	Quantitative; comparative study	<ul style="list-style-type: none"> <li>83 men were recruited to cohort 1 (51 low to intermediate risk; 32 high risk) and 86 to cohort 2 (intervention) (51 low to intermediate risk; 35 high risk)</li> <li>There was minimal evidence of high distress in the men who participated in this study. Only 11% and 10% of low-moderate risk men in cohorts 1 and 2 respectively, reported high levels of distress.</li> <li>Results revealed that there was no difference in the level of care between a nurse-led telephone follow-up and regular medical outpatient follow-up.</li> <li>There was a significant trend favouring nurse-led telephone follow-up.</li> <li>Results showed that nurse-led telephone follow-up was a feasible option for follow-up.</li> </ul>



Leach et al. (2014) Australia	To determine the effect on IBD (irritable bowel disease) patient outcomes in a tertiary hospital via the intervention of a nurse-led virtual clinic.	Telephone follow-up	566	Quantitative; correlational study	<ul style="list-style-type: none"> <li>Facilitated a more flexible and patient focused approach cost-effective</li> <li>Total IBD clinic reviews performed in 2011 = 824, and 163 avoided clinic reviews = 16.5% reduction.</li> <li>Total estimated cost saving of \$136,535.</li> </ul>
Smits et al. (2015) England	To assess feasibility of nurse-led telephone follow-up in comparison to traditional/conventional hospital follow-up methods to assess for quality of life and patient satisfaction of women treated for endometrial cancer. In addition, feasibility of nurse-led telephone follow-up in terms of acceptance, referral to consultant clinic, and compliance with nurse-led telephone follow-up was also assessed.	Telephone follow-up	78 and 112	Quantitative; descriptive using patient satisfaction survey	<ul style="list-style-type: none"> <li>Study revealed equal results for both nurse-led telephone and conventional follow-up with regards to quality of life and patient satisfaction.</li> <li>Decreasing burden on outpatient clinics and health expenditures.</li> <li>Nurse-led telephone follow-up is a promising alternative in follow-up care of women treated for endometrial cancer and should be assessed further to offer these women the best possible care.</li> <li>118 women in nurse-led telephone follow-up group (98%) stated that they would like to continue their follow-up care in this clinic.</li> <li>The nurse-led telephone follow-up is a viable, feasible and cost-effective option available and improves follow-up services for this group of patients which can be applied to other services.</li> </ul>

the nurse-led virtual follow-up model of care. Kimman et al. (2010) and Smits et al. (2015) noted that patient satisfaction results had similar trends and preference patterns, which suggests that the nurse-led virtual model is an acceptable method of delivering follow-up care. Moreover, patients found nurse-led virtual clinics safe and effective. Nesari (2010) identified significant positive client outcomes for nurse-led telephone follow-up on patients with diabetes. These outcomes were noted with the improvement of their HbA1c levels and adherence to a diabetic diet, blood glucose monitoring, exercise, foot care and medications. The study proposed that this mode of service delivery could reduce diabetes-related complications resulting in health care benefits. Furthermore, this review revealed that nurse-led virtual follow-ups were mainly utilised for clients with different types of cancer; however, it has potential to be utilised in other non-cancer conditions such as diabetes, irritable bowel syndrome, and auto-immune conditions (for example, rheumatology).

### Organisation

Leach et al. (2014) discussed the cost implications of nurse-led virtual clinics and showed a reduction of 987 clinic visits with an approximate saving of \$136,535 compared to the previous year within the study setting. These authors identified a decrease of 27 hospital admissions, 163 outpatient reviews, and 32 emergency

presentations. Similarly, Robertson et al. (2013) found a reduction of 50 outpatient clinic appointments per month during the three-year study period. Nurse-led virtual follow-up was also noted to impact on organisational efficiency by cutting numbers in outpatient waiting lists (Overend et al., 2008) and increasing access to care services despite geographical distances (Hennell et al., 2005; Sardell et al., 2000).

### Future utility and challenges

The majority of studies reported that nurse-led virtual clinics were feasible and widely accepted. In addition, Beaver et al. (2010) and Koinberg et al. (2004) recommended that this form of nurse-led telephone consultation for follow-up purposes could be applied to other disease conditions with appropriate limits. Overend et al. (2008) predicted that this mode of follow-up will become increasingly pertinent as outpatient clinics become more overcrowded. All studies showed that nurses who embraced the nurse-led virtual clinic roles recommended advanced communication and technology skills training. These skills are necessary along with expert clinical nursing knowledge in order to practice autonomously. Communication and technology skills are central to the quality of delivering high quality, safe and efficient nurse-led telephone consultations. Studies also emphasised the importance of having comprehensive knowledge of the specific disease condition (Beaver et





al., 2010; Kimman et al., 2010; Leahy et al., 2013). These studies recommended ongoing training and support to deliver this specialised method of care.

### Discussion

The findings from this review indicated patient appreciation and satisfaction with nurse-led virtual clinics. This model of care was widely accepted and brought positive experiences to patients. Experienced nurses, as the main drivers of this innovation, were able to influence client outcomes. These integrated findings concurred with a previous literature review about reduced travel and waiting times which helped patients with bowel cancer feel at ease as they discussed their concerns with nurses (Cusack & Taylor, 2010). The “open door” policy in the nurse-led virtual clinic model permits flexible consultation times as well as promoting self-care and autonomy. Sooby and Kirkland (2015) reported the importance of patients having the freedom to organise their preferred schedule. This sense of self-determination decreased appointment cancellations for post nasal surgery follow-up. Wong and Chan (2005) also showed a reduction in the number of emergency presentations for patients with chronic conditions, such as chronic obstructive pulmonary disease, through nurse initiated telephone follow-ups. These results were further supported by Leach et al. (2014), who demonstrated a major impact by reducing clinic reviews and hospital and emergency presentations with nurse-led virtual clinics in operation for patients with irritable bowel disease.

From this review, there was a strong preference towards nurse-led virtual clinics as patients appreciated the opportunity of being assessed and cared for remotely instead of a busy and rushed clinic environment. Day and Kerr (2012) suggested that nurse-led virtual clinics can be efficiently used for various conditions. These included management of chronic conditions, health

education and preventive care management of acute conditions and care coordination (Court & Austin, 2015). In terms of cost-effectiveness, a nurse-led care initiative that used a similar approach to nurse-led virtual clinics showed significant cost reduction in the management of chronic conditions such as rheumatoid arthritis (Ndosi et al., 2014). Nurse-led virtual clinics for the growing ageing population with chronic conditions could be the solution to meet the high pressures and fiscal demands on health care organisations to provide high quality, safe, timely and equitable care.

One of the significant findings in this review is the lack of standardised guidelines in running a nurse-led virtual clinic. Part of the reason is the contextual need for having a nurse-led virtual clinic and the focus on a particular condition (the majority were for malignancies) or the type of nurse-led services provided (follow-up or actual consultations). Evidence integrated and synthesised from this review is that each study has utilised a structured approach and required experienced nurses to manage the nurse-led virtual approach. Interestingly, apart from the study recommendations, there was limited discussion on nurses’ information technology (IT) skills. Nurse-led virtual clinics are dependent on technology. However, based on the findings of the current review, it was assumed that nurses running the virtual clinics have the required skills and are keeping up with current trends. Historically, evidence suggested that nurses are resistant to using information technology (Timmons, 2003). However, this perception is gradually changing with the advent of recent nursing initiatives driven by nurses who engage in technologies (Ferguson, Davidson, Scott, Jackson, & Hickman, 2015). The findings of this review reveal the importance of mobilising the nursing workforce to take an active role in the development of an innovative approach using technology. Understanding nurse-led approaches informs the future direction of healthcare organisations and the populations they serve.



## Limitations

This review was limited to nurse-led virtual clinics for adults with long-term conditions. It excluded nurse-led virtual clinics working in paediatric, maternal, mental health and acute care settings. A variety of questionnaire measurement tools were used in the reviewed articles, making it difficult to integrate and analyse some of the results. Additionally, the literature search did not retrieve empirical data from New Zealand that fitted the review inclusion and exclusion criteria. With increasing research and interests in telehealth, it is likely newer manuscripts were in the process of publication and therefore were not identified.

## Conclusion

An ageing population with increasing complexity and comorbidity place significant demands on health care services. It is time to think boldly about modifying the way health care services are delivered and embracing

the advancements made in technology. Telehealth maximises the utilisation of expert resources to address the burden on health care services and redesign care pathways. Proposing an alternative follow-up method such as a nurse-led virtual clinic approach will benefit health consumers in terms of accessibility to health care services. The approach also empowers the public about their own health care and wellbeing. Studies have demonstrated this mode of follow-up is ideal for older adults, or those who live far from the hospital and are dependent on families or significant others for transport. Patients have welcomed and are appreciative of this change. Results from studies identify that the nurse-led virtual clinic care model is patient centred and cost-effective whilst delivering safe, efficient, equitable and quality care. This model of care is likely to contribute to a sustainable health care delivery system for New Zealanders living in rural areas and those population groups with high prevalence of chronic conditions.

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