Protocol

Development and Implementation of a Nurse-Led Model of Care Coordination to Provide Health-Sector Continuity of Care for People With Multimorbidity: Protocol for a Mixed Methods Study

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Abstract

Background: Innovative strategies are required to reduce care fragmentation for people with multimorbidity. Coordinated models of health care delivery need to be adopted to deliver consumer-centered continuity of care. Nurse-led services have emerged over the past 20 years as evidence-based structured models of care delivery, providing a range of positive and coordinated health care outcomes. Although nurse-led services are effective in a range of clinical settings, strategies to improve continuity of care across the secondary and primary health care sectors for people with multimorbidity have not been examined.

Objective: To implement a nurse-led model of care coordination from a multidisciplinary outpatient setting and provide continuity of care between the secondary and primary health care sectors for people with multimorbidity.

Methods: This action research mixed methods study will have two phases. Phase 1 includes a systematic review, stakeholder forums, and validation workshop to collaboratively develop a model of care for a nurse-led care coordination service. Phase 2, through a series of iterative action research cycles, will implement a nurse-led model of care coordination in a multidisciplinary outpatient setting. Three to five iterative action research cycles will allow the model to be refined and further developed with multiple data collection points throughout.

Results: Pilot implementation of the model of care coordination commenced in October 2018. Formal study recruitment commenced in May 2019 and the intervention and follow-up phases are ongoing. The results of the data analysis are expected to be available by March 2020.

Conclusions: Nursing, clinician, and patient outcomes and experiences with the nurse-led model of care coordination will provide a template to improve continuity of care between the secondary and primary health care systems. The model template may provide a future pathway for implementation of nurse-led services both nationally and internationally.

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continuity of patient care; multimorbidity; nurse led; integrated health; transitional; chronic disease

Introduction

Background
Increasing prevalence and complexity of multimorbidity across populations is a global phenomenon [1-3]. This constitutes one of the most significant challenges for health care in the 21st century [4]. In general, care for patients with multimorbidity is fragmented and not coordinated, especially between health care settings, such as primary and secondary care [5,6]. Current models of care delivery focus on single-disease-specific management, resulting in attendance at multiple specialist medical clinics, and do not support continuity of care, placing a significant burden on both patients and hospitals [3,7].

In an attempt to improve efficiencies within health care, nurse-led clinics and services have emerged over the past two decades [8,9]. Their effectiveness has been demonstrated on a number of levels, responding to the complexity of care coordination required by patients [10,11]. This includes the use of a person-centered approach [9], positive patient experience and satisfaction [9,12], and counseling and interventions to support chronic medication adherence [8,13].

In Australia, providing continuity in health care for people with chronic and complex disease is problematic, partly due to differences between federal and state government policies as well as structures and funding systems for the primary and secondary health care sectors [14]. This issue poses a challenge for nurse-led services to provide integrated models of care and lead continuity of care strategies between the health sectors at local service levels. Nurse-led models of care can provide a solution, in part, to the barriers associated with developing nonfragmented care in order to provide effective management for people with multimorbidity. It is, therefore, timely that a model of care trialing cross-sector collaboration is implemented. In Australia, the primary and secondary health care sectors will have congruent access to patients’ health care information through national strategies, such as My Health Record [15] and Health Care Homes [16]. These strategies, although in their infancy, if supported at local service and health network levels, can be used to leverage communication and collaboration by nurses to improve continuity of care. However, there remain few studies examining nurse-led models of care to improve continuity of care [17,18]. Despite the success of nurse-led services in a range of other contexts, their effectiveness in supporting continuity of care between the secondary and primary health sectors for people living with multimorbidity is yet to be determined.

Multimorbidity and Nurse-Led Models of Care
Chronic diseases, including cardiovascular disease, diabetes, chronic lung disease, and cancer, are collectively responsible for almost 70% of all deaths worldwide. In the United Kingdom, the United States, and Australia, between 22% and 25% of the population live with multimorbidity, defined as having two or more chronic conditions concurrently; the prevalence of multimorbidity is even higher in the older population [2].

Multimorbidity is associated with poorer health outcomes, increased care fragmentation [1,19], higher health service utilization, and higher health care costs [20,21]. Existing models of care are based on a medical model of health service delivery and are designed to manage a single disease; therefore, they are not suitable for the complexity of health care associated with the presence of multiple chronic conditions [3,22,23]. Additionally, clinical guidelines predominantly focus on a single disease, potentially contributing to conflicting medication and care management for people with multimorbidity [24]. The traditional single-disease focus of current health care models and practices is also unsuitable for people with multimorbidity due to a lack of holistic care management and coordination [3,22,23].

Continuity of care is acknowledged as an essential component of high-quality care [25]. However, it is evident that chronic and complex health care management poses a challenge for health care systems to provide and promote continuity of care for people with multimorbidity [1]. A person-centered approach rather than a single-disease management program will provide more effective, high-quality care [4]. A coordinated comprehensive patient-centered model that focuses on continuity of care across the health system is especially needed for people with multimorbidity [6,26,27].

The relationship between aspects of continuity of care and patient satisfaction, improved health outcomes, a reduction in hospital admissions, and a reduction in health care utilization has been established [17,25,28,29]. In a recent scoping study [6] it was identified that in relation to multimorbidity management, models and elements of care were focused on general integrated care, as previously applied to single-disease management; therefore, they were unsuitable to the specific care required for the complexity associated with multimorbidity. The details of models of care require further study, specifically the role of nursing and nurse-led services to improve continuity of care and care coordination for people with multimorbidity.

Methods

Ethics and Registration
Ethical approval was obtained by the Human Research Ethics Committee (HREC) (reference number: HREC/17/RAH/552) at the University of South Australia (application ID: 200958) and the Central Adelaide Local Health Network (CALHN) (reference number: R20171204).

Aims
The overall aim of this study is to determine the feasibility of implementing a nurse-led care coordination service from the outpatient setting to provide continuity of care across the secondary and primary health care settings for people with multimorbidity. The specific aims are as follows:
1. Develop and implement a model of care for a nurse-led service to provide continuity of health care for people with multimorbidity.

2. Identify nursing interventions associated with implementation of a nurse-led service model of care.

3. Identify barriers and enablers to implementing a nurse-led service.

4. Identify structures, processes, and outcomes required to implement a nurse-led service and achieve continuity of care.

**Design**

**Overview**

The study design comprises action research with the application of the research spiral: “plan, act, observe, reflect, and re-plan” [30]. A Donabedian model [31] of evaluating structure, process, and outcome in health care will guide data collection during the action research cycles. There is precedence in the application of this model, not only in health care evaluation [32] but also in defining and evaluating nurse-led services [10,33]. The categories of structure, process, and outcome will include the measurement of stakeholder views and clinical staff and patient experience related to continuity of care across secondary and primary health care settings over time. The research will be conducted in two phases.

**Phase 1: Initial Action Research Cycle**

The goals of Phase 1 are as follows:

1. Consult with the Multidisciplinary Ambulatory Consulting Service (MACS) staff and associated stakeholders regarding the components and development of a nurse-led service model of care; for specific stakeholders, see Participants section and Table 1 below.

2. Review evidence in relation to nurse-led services, nursing interventions, and associations with continuity of care for people with chronic disease.

3. Review evidence in relation to best practice management of people with multimorbidity.

4. Collaboratively develop a nurse-led service model of care.

5. Develop operational roles, guidelines, and protocols to implement the nurse-led service model of care.

Phase 1, the initial action research cycle, will focus on two interventions. First, we will complete a systematic review to identify the effectiveness of nurse-led services to improve continuity of care for people with chronic disease (international prospective register of systematic reviews [PROSPERO] registration number: CRD42018095780). The second focus will be on stakeholder engagement; a series of forums, workshops, and meetings will engage stakeholders and collaboratively develop a model of nurse-led care coordination.

This action research cycle will inform the development of an evidence-based model of care for a nurse-led service and prepare the clinical team for nurse-led service implementation. Figure 1 depicts the Multimorbidity Nursing Model of Care action research study design; included is the systematic review and stakeholder forum informing development and planning of the nurse-led care coordination service and subsequent iterative implementation of the nurse-led service.

**Table 1.** Study participants and eligibility criteria.

| Eligibility criteria | Stakeholders | Health care staff | Patients |
|----------------------|--------------|-------------------|----------|
| **Inclusion criteria** | Attendees at the stakeholder forums and workshop; stakeholders include health care professionals, primary and secondary health care executives, relevant academic and clinical participants, and consumer representatives (n=40) | Health care staff from the tertiary referral center and outpatient service associated with implementing and/or working in, or in collaboration with, the nurse-led care coordination service or outpatient services (n=30) | All patients receiving care from registered nurses within the MACS, the nurse-led care coordination service, attending a general practitioner service or the PHC sector associated with the MACS (n=30 in clinic) |
| **Exclusion criteria** | Nil | Nil | Patients with cognitive impairment |

aMACS: Multidisciplinary Ambulatory Consulting Service.

bPHC: primary health care.
Phase 2: Subsequent Action Research Cycles

The goals of Phase 2 are as follows:

1. Trial implementation of the nurse-led service model of care over a series of iterative action research cycles.
2. Implement nurse-led service care coordinator role.
3. Implement associated protocols and guidelines to operationalize the nurse-led service model of care.
4. Evaluate action research cycles in terms of changes to nursing interventions, service structures, processes, and outcomes.

Phase 2, the subsequent action research cycles, will employ a mixed-methods approach with multiple data collection points.

During implementation of the nurse-led model of care coordination, nursing roles and interventions, service structures, processes, and outcomes will be observed, refined, and reimplemented. Patient, nurse, and health care staff experience as well as organizational culture impacts will be measured. The structures and processes within the nurse-led service will be evaluated by recognized data collection instruments that examine patient and health care staff experiences of continuity of care, patient-related quality of life, and staff experience of organizational culture (see Table 2 for data collection instruments and characteristics). Nursing roles, tasks, skills, and knowledge will also be evaluated (see Table 2).
Table 2. Data collection instruments and characteristics.

| Author (publication year); instrument | Instrument primary purpose and adaptation; Continuity of care domain | Validation, reliability, and context for use | Number of items; Response options |
|----------------------------------------|---------------------------------------------------------------------|---------------------------------------------|----------------------------------|
| Glasgow et al. (2005) [34]: Patient Assessment of Chronic Illness Care (PACIC) survey | A validated patient self-report instrument to assess the extent to which patients with chronic illness receive care that aligns with the Chronic Care Model. Measures care that is patient-centered, proactive, and planned and includes collaborative goal setting; Problem-solving and follow-up support | A practical instrument that is reliable and has face, construct, and concurrent validity | The PACIC consists of five scales and an overall summary score |
| MacColl Center for Health Care Innovation (2000) [35]: Assessment of Chronic Illness Care (ACIC V3.5) survey | The ACIC addresses the basic elements for improving chronic illness care at the community, organization, practice, and patient level—adapted for use in the MACS setting; Relational, management, and informational continuity | Preliminary data indicate that the ACIC is responsive to changes that teams make in their systems and correlates well with other measures of productivity and system change | Seven dimensions—each dimension includes a number of items; Point value is attributed to a choice of four levels across each item |
| The EuroQol Group (1990) [36] and Herdman et al (2011) [37]: Patient EQ-5Dc | The EQ-5D is a standardized measure of health status, applicable to a wide range of health conditions and treatments. Developed by the EuroQol Group, it provides a simple, generic measure of health for clinical and economic appraisal. | Widely validated and contextualized; translated into over 170 language versions | Five dimensions (each with three or five levels), 15 items, and crosswalk value sets available to convert three-item survey to meaningful value equivalent to five-item survey; Tick box and visual analog |
| Berglund CB et al. (2015) [38]: Patient satisfaction and continuity of care | The survey was originally developed for the patient-physician outpatient encounter [39]. It proved to capture changes in patient satisfaction over time. It has since been adapted to capture the patient-nurse outpatient encounter; Relational, management, and informational continuity | No formal validity and reliability testing, however, item generation including the testing procedure provides sufficient content validity | 12 multiple-choice items, including items concerning waiting time, continuity of care, length of visit, information, interpersonal manner, and fulfillment of expectations; 4-point scale from 1 (Not at all) to 4 (Very much) |
| Uijen AA et al. (2011 [40] and 2012 [41]): Nijmegen Continuity Questionnaire (NCQ) | To measure continuity of care from the patients’ perspectives across primary and secondary care settings; Personal continuity, team continuity, and cross-boundary continuity | Internal consistency, content validity, structural validity, and construct validity | 28 items in three subdomains; 5-point scale from 1 to 5 |
| Stokes T et al. (2005) [42]: General Practitioners’ Views on Continuity of Care survey | Measures the perceived importance of the types of continuity of care and doctor or practice characteristics that may influence attitudes toward personal continuity of care—adapted for nurse-patient context; Relational, management, and informational continuity | High internal consistency (alpha=.78). The scale score correlated highly with the overall rating of the importance of personal continuity (P<.001) | 25 items over four domains; 5-point scale from 1 to 5 |
| Cameron KS et al. (2011) [43]; Organizational Culture Assessment Instrument | Assesses six key dimensions of organizational culture: dominant characteristics of an organization, organizational leadership, management of employees, organizational glue, strategic emphasis, and criteria of success | Widely tested | Six dimensions with four alternatives (24 items); 4-point scale from A to D |
| Gardner G et al. (2017) [44]: The Advanced Practice Nursing Role Delineation Questionnaire (APRD) | A self-assessment tool that provides a standardized understanding of advanced practice. It is designed to support health service planning, cross-discipline team development, and demonstration of achievement of practice at this level. | Evidence based | Five items: clinical care, optimizing health systems, education, research, and leadership; 5-point scale from 0 to 4 |

*MACS: Multidisciplinary Ambulatory Consulting Service.

**EuroQol: European Quality-of-Life Scale.

***EQ-5D: European Quality-of-Life Five-Dimension Scale.

**Participants**

1. Stakeholders. These will consist of attendees at the forums and workshop.
2. Health care staff. There will be two health care staff groups:
   a. Health care staff within the MACS or from the outpatient service (n=130).
   b. Health care staff from the primary health network or the private sector. For example, clinical staff working in general or community settings (ie, primary health care sector) and have patients who attend or could attend the MACS clinic (n=10).

3. Patients. There will be two patient groups:
   a. Patients who have previously attended the MACS clinic prior to implementation of the nurse-led care coordination service (n=100).
   b. Patients who would usually attend the MACS clinic following implementation of the nurse-led care coordination service (n=30).

**Data Collection and Analysis**

This action research study is largely qualitative but includes a quantitative descriptive element. There will be an initial stakeholder forum to develop the domains for a model of nurse-led care coordination. When the model is developed, it will be validated through current literature and a follow-up-focused workshop of stakeholders (see Table 3). Stakeholders at the forum and workshop will include health care staff and executives from both the primary and secondary heath care sectors, as well as other relevant academic and clinical participants (see Table 1). The nurse-led model for care coordination will then be implemented and refined through a series of iterative action research cycles. Data will be collected throughout the action research cycles (see Table 3).
Table 3. Data collection and analysis: survey and interview schedule.

| Event and survey tool | Data collection point | Participants | Analysis |
|-----------------------|-----------------------|--------------|----------|
| Stakeholder forums and validation workshop: activities guided by the Australian Primary Health Care Nurses Association, Building Blocks [45], and Donabedian’s categories of structure, process, and outcome [31] | At stakeholder forums and validation workshop events | Key stakeholders: registered nurses (level one), nursing middle management, general practitioners, pharmacists, allied health, and executives across both primary and secondary health care sectors, along with consumer, academic, and professional association representation (n=60) | Thematic analysis |
| Patient Assessment of Chronic Illness Care (PACIC) survey [34] | Prior to nurse-led service implementation, January-April 2019 | MACS® outpatients who attended clinic prior to model of nurse-led care coordination implementation (n=100) | Descriptive statistics and thematic analysis |
| Assessment of Chronic Illness Care (ACIC V3.5) survey [35] | Prior to nurse-led service implementation, January-April 2019 | MACS outpatients who attended clinic prior to model of nurse-led care coordination implementation (n=100) | Descriptive statistics and thematic analysis |
| Patient experience and continuity of care in clinics survey [38] | First appointment | MACS outpatients who attended clinic after model of nurse-led care coordination implementation (n=30-40) | Descriptive statistics and thematic analysis |
| Patient EQ-5D-3L, health questionnaire [36,37] | At first and second appointments | MACS outpatients who attended clinic after model of nurse-led care coordination implementation (n=30-40) | Descriptive statistics |
| Patient experience and continuity of care in clinics, Nijmegen Continuity Questionnaire (NCQ) [40,41] | At second appointment or at 3-6 months | MACS outpatients who attended clinic after model of nurse-led care coordination implementation (n=30-40) | Descriptive statistics and thematic analysis |
| General Practitioners’ Views on Continuity of Care survey [42,46] | At commencement, then at 3-6 months | Nurses working in the MACS outpatient clinic (n=2) | Descriptive statistics and thematic analysis |
| Doctor and allied health staff experience and continuity of care survey [42,46] | At commencement, then at 3-6 months | Doctors and allied health staff working in the MACS outpatient clinic (n=3-10) | Descriptive statistics and thematic analysis |
| Primary health care staff experience and continuity of care survey [42,46] | At commencement, then at 3-6 months | Health care staff managing MACS patients in the primary health care sector; general practitioner rooms or community services (n=10) | Descriptive statistics and thematic analysis |
| Nurse experience and continuity of care survey, other than MACS [42,46] | At commencement | Nurses, other than the MACS nurses, working in outpatient clinics (n=80) | Descriptive statistics and thematic analysis |
| The Advanced Practice Nursing Role Delineation Questionnaire (APRD) [44] | At commencement and at 6 months | Nurses working in the MACS clinic and outpatient clinic nurses (n=2) | Descriptive statistics and thematic analysis |
| Staff workplace culture survey [43] | Commencement and at 6 months | All health care staff working in the MACS outpatient clinic (n=5-10) | Descriptive statistics and thematic analysis |
| Survey: question bank | At 6 months via email | Director of nursing and nursing director (n=2) | Thematic analysis |
| Interview, with questions from bank, and ongoing reflective meetings | At 6 months and ongoing | Head of unit (n=1) | Thematic analysis |
| Interview and ongoing reflective meetings | At 6 months and ongoing | MACS nurses (n=2) | Thematic analysis |
| Interview and ongoing reflective meetings | At 6 months and ongoing | MACS team (n=5-10) | Thematic analysis |
| Focus group questions from bank | At 6 months | Consulting clinics nurses (n=10-20) | Thematic analysis |
| Patient medical record | Following patient recruitment | MACS outpatients who attended clinic after model of nurse-led care coordination implementation (n=30-40) | Descriptive statistics |

aMACS: Multidisciplinary Ambulatory Consulting Service.
bEQ-5D-3L: European Quality-of-Life Five-Dimension Three-Level Scale.
Qualitative Data

Thematic analysis based on the phases of Braun and Clarke [47] will be used as outlined in Table 4. The process of thematic analysis will identify categories of information and develop model domains for developing a model of nurse-led care coordination. It is anticipated that the model will be pragmatic and consider specific continuity of care strategies to be implemented as part of the nurse-led care coordination service. Thematic analysis will also be used to analyze survey and interview data to reveal patients’, nurses’, and health care staff’s experiences of continuity of care, before and after implementation of the nurse-led model of care coordination. Through the process of thematic analysis, an account of what is happening in the situation (ie, nurse-led service within the multidisciplinary MACS clinic) and how it is happening will be identified [47]. Braun and Clarke’s practical approach is useful for comparing multiple data sources (ie, from patients, nurses, and health care staff) [47,48].

Table 4. Process of thematic analysis, adapted from Braun and Clarke [47].

| Phase                        | Activity                                                                 |
|------------------------------|--------------------------------------------------------------------------|
| **Analysis**                 |                                                                          |
| Familiarization with data    | Transcribe data and formulate ideas; analysis starts here and continues throughout the process |
| Generation of initial codes  | Systematically code and collate entire dataset                           |
| Search for themes            | Sort different codes into possible candidate themes                      |
| Review of themes             | Refine and finalize candidate themes                                      |
| Naming and defining of themes| Develop thematic map of data, further refine themes, and perform final analysis |
| Production of the report     | Perform inductive thematic analysis, which will emphasize understanding the patients’ and nurses’ experience of the nurse-led service |

Quantitative Data

Quantitative data from questionnaires and/or medical records related to patients’, nurses’, and health care staff’s experiences of continuity of care and the nurse-led model of care coordination and demographic data, as well as data relating to the nurse-led model of care coordination, continuity of care, and patient progress or outcomes will be analyzed (see Table 3). Analysis will use descriptive statistical methods including means, medians, and interquartile ranges where appropriate. Differences between variables will be analyzed using either two-tailed t tests or the Wilcoxon ranked-sum test where appropriate. A P value of less than .05 will be considered statistically significant. All statistical analyses will be conducted using NVivo 10 (QSR International) and SPSS, version 25 (IBM Corp).

Validity and Reliability

The nurse-led model will be collaboratively developed at a series of stakeholder—secondary and primary health sectors—forums. The forums will also be developed with reference to the Australian Primary Health Care Nurses Association Building Blocks for nurse-led clinics [45]. A follow-up validation workshop and literature search will further refine the model. Implementation of the model through iterative research cycles will continue the validation process as elements change in response to user experiences. Interventions aligned with the model will be based on real-world experience in the nurse-led service, a consensus approach, and systematic findings from the literature.

Recognized and validated instruments will be used to collect data in relation to continuity of care, patient centeredness, workplace culture, and the practice role and level of the nurses (see Table 2). A concurrent approach to data collection and analysis will allow the separate use of quantitative and qualitative methods within a single cycle of data collection and analysis. This will allow both sets of data to be interpreted together, providing a richer and more comprehensive response to research questions [49].

Results

Pilot implementation of the model of care coordination commenced in October 2018. Formal study recruitment commenced in May 2019 and the intervention and follow-up phases are ongoing. The results of the data analysis are expected to be available by March 2020.

Discussion

Expected Results

Nurse-led services and clinics have been widely implemented in primary health care settings and, increasingly, in outpatient departments but not with the purpose of improving continuity of care between the two sectors. The evidence for nurse-led services to improve continuity of care for people living with multiple chronic diseases and complex care needs has not been established. This proposed study is significant because it aims to develop a model of care for nurse-led services, based on both research and stakeholder experience. This model, focusing on patient-centered care and the nursing role to coordinate care to achieve continuity across the health care sector, has not been previously trialed for people with multimorbidity.

It is anticipated that the model of care for a nurse-led care coordination service will support the implementation of continuity of care strategies. These strategies may include assessment of risk of hospital readmission; patient readiness for change; well-coordinated, individualized, multidisciplinary health care plans; patient self-management strategies; and coordinated communication between the secondary and primary
health care sectors. Ideally, these will result in improved patient and staff experiences and health outcomes. Development of the model followed by a series of action research cycles of testing and refining the model will ensure that the research incorporates both theory and practical experience related to continuity of care across the health sector. This action research approach will, therefore, focus on what works within a real-world clinical setting. It will produce a patient-centered model of care for nurse-led services that provides a template for continuity of care, articulating the nursing role and service for adaptation throughout diverse health care systems within Australia and potentially worldwide.

Limitations

As this is an action research design, there are no a priori design of the nurse-led model of care coordination or nursing interventions required. However, as both the model and the interventions will be developed in collaboration with real-world clinical practice and the health care literature, it will be important to ensure concordance between both. No control or comparator will be included within the model assessment, but survey participants who attended the outpatient department prior to commencement of the nurse-led service will be examined. The service setting is geographically limited since it is located at only one site; however, it is anticipated that the setting will be adaptable and applicable to geographically diverse locations. Electronic record and patient data systems vary across health sectors and can pose access and consistency issues. These will be addressed through the highly pragmatic nature of the study, which will focus on relationship building [47] and regular and consistent communication across health sectors as part of the nursing interventions.

Acknowledgments

This protocol is part of KMD’s PhD studies.

Authors’ Contributions

KMD was responsible for the literature review and study design, along with drafting the initial manuscript and its revised versions. GEC contributed significantly to the drafting and preparation of the manuscript and contributed to the study design. MCE, SS, ADH, JH, and GS contributed to the drafting and preparation of the manuscript and to the study design.

Conflicts of Interest

None declared.

References

1. Barnett K, Mercer SW, Norbury M, Watt G, Wyke S, Guthrie B. Epidemiology of multimorbidity and implications for health care, research, and medical education: A cross-sectional study. Lancet 2012 Jul 07;380(9836):37-43 [FREE Full text] [doi: 10.1016/S0140-6736(12)60240-2] [Medline: 22579043]
2. Global Status Report on Noncommunicable Diseases 2014. Geneva, Switzerland: World Health Organization; 2014. URL: https://apps.who.int/iris/bitstream/handle/10665/148114/9789241564854_eng.pdf [accessed 2019-10-08]
3. Harrison C, Henderson J, Miller G, Britt H. The prevalence of complex multimorbidity in Australia. Aust N Z J Public Health 2016 Jun;40(3):239-244. [doi: 10.1111/1753-6405.12509] [Medline: 27027989]
4. Pefoyo AJ, Bronskill SE, Gruneir A, Calzavara A, Thavorn K, Petrosyan Y, et al. The increasing burden and complexity of multimorbidity. BMC Public Health 2015 Apr 23;15:415 [FREE Full text] [doi: 10.1186/s12889-014-0133-9] [Medline: 25903064]
5. Wallace E, Salisbury C, Guthrie B, Lewis C, Fahey T, Smith SM. Managing patients with multimorbidity in primary care. BMJ 2015 Jan 20;350:h176. [doi: 10.1136/bmj.h176] [Medline: 25646760]
6. Struckmann V, Leijten FR, van Ginneken E, Kraus M, Reiss M, Spranger A, SELFIE Consortium. Relevant models and elements of integrated care for multi-morbidity: Results of a scoping review. Health Policy 2018 Jan;122(1):23-35 [FREE Full text] [doi: 10.1016/j.healthpol.2017.08.008] [Medline: 29031933]
7. Sinnott C, Mc Hugh S, Browne J, Bradley C. GPs’ perspectives on the management of patients with multimorbidity: Systematic review and synthesis of qualitative research. BMJ Open 2013 Sep 13;3(9):e003610 [FREE Full text] [doi: 10.1136/bmjopen-2013-003610] [Medline: 23048011]
8. Al-Mallah MH, Farah I, Al-Madani W, Bdeir B, Al Habib S, Bigelow ML, et al. The impact of nurse-led clinics on the mortality and morbidity of patients with cardiovascular diseases: A systematic review and meta-analysis. J Cardiovasc Nurs 2016;31(1):89-95. [doi: 10.1097/JCN.0000000000000022] [Medline: 25658181]
9. Jakimowicz S, Surling C, Duddle M. An investigation of factors that impact patients' subjective experience of nurse-led clinics: A qualitative systematic review. J Clin Nurs 2015 Jan;24(1-2):19-33. [doi: 10.1111/jocn.12676] [Medline: 25236376]
10. Wong FK, Chung LC. Establishing a definition for a nurse-led clinic: Structure, process, and outcome. J Adv Nurs 2006 Feb;53(3):358-369. [doi: 10.1111/j.1365-2648.2006.03730.x] [Medline: 16641541]
11. Randall S, Crawford T, Currie J, River J, Bethavas V. Impact of community based nurse-led clinics on patient outcomes, patient satisfaction, patient access and cost effectiveness: A systematic review. Int J Nurs Stud 2017 Aug;73:24-33. [doi: 10.1016/j.ijnurstu.2017.05.008] [Medline: 28531549]
12. Coleman S, Havas K, Ersham S, Stone C, Taylor B, Graham A, et al. Patient satisfaction with nurse-led chronic kidney disease clinics: A multicentre evaluation. J Ren Care 2017 Mar;43(1):11-20. [doi: 10.1111/jorc.12189] [Medline: 28156054]

13. Van Camp VP, Van Rompaey B, Elseviers M. Nurse-led interventions to enhance adherence to chronic medication: Systematic review and meta-analysis of randomised controlled trials. Eur J Clin Pharmacol 2013 Apr;69(4):761-770. [doi: 10.1007/s00228-012-1419-y] [Medline: 23052418]

14. Primary Health Care Advisory Group. Better Outcomes for People With Chronic and Complex Health Conditions. Canberra, Australia: Commonwealth of Australia as represented by the Department of Health; 2016. URL: https://www1.health.gov.au/internet/main/publishing.nsf/Content/76B2BDC12AE54540CA257F72001102B9/$File/Primary-Health-Care-Advisory-Group_Final_Report.pdf [accessed 2019-10-08]

15. My Health Record. Canberra, Australia: Australian Digital Health Agency URL: https://www.myhealthrecord.gov.au/ [accessed 2019-05-07]

16. Australian Government, Department of Health. 2019. Health Care Homes URL: https://www1.health.gov.au/internet/main/publishing.nsf/Content/health-care-homes [accessed 2019-05-07]

17. Barker I, Steventon A, Deeny SR. Association between continuity of care in general practice and hospital admissions for ambulatory care sensitive conditions: Cross sectional study of routinely collected, person level data. BMJ 2017 Feb 01;356:j848 [FREE Full text] [doi: 10.1136/bmj.i84] [Medline: 28148478]

18. Pereira Gray DJ, Sidaway-Lee K, White E, Thorne A, Evans PH. Continuity of care with doctors–A matter of life and death? A systematic review of continuity of care and mortality. BMJ Open 2018 Jun 28;8(6):e021161 [FREE Full text] [doi: 10.1136/bmjopen-2017-021161] [Medline: 29959146]

19. Morgan M, Coates M, Dunbar J. Using care plans to better manage multimorbidity. Australas Med J 2015;8(6):208-215 [FREE Full text] [doi: 10.4066/AML.2015.2377] [Medline: 26213584]

20. Steiner CA, Friedman B. Hospital utilization, costs, and mortality for adults with multiple chronic conditions, Nationwide Inpatient Sample, 2009. Prev Chronic Dis 2013 Apr 25;10:E62 [FREE Full text] [doi: 10.5888/pcd10.120292] [Medline: 23618542]

21. van den Bussche H, Schön G, Kolonko T, Hansen H, Wegscheider K, Glaeske G, et al. Patterns of ambulatory medical care utilization in elderly patients with special reference to chronic diseases and multimorbidity: Results from a claims data based observational study in Germany. BMC Geriatr 2011 Sep 13;11:54 [FREE Full text] [doi: 10.1186/1471-2318-11-54] [Medline: 21914191]

22. Smith SM, Soubhi H, Fortin M, Hudon C, O'Dowd T. Managing patients with multimorbidity: Systematic review of interventions in primary care and community settings. BMJ 2012 Sep 03;345:e5205 [FREE Full text] [doi: 10.1136/bmj.e5205] [Medline: 22945950]

23. Caughey G. Multiple Chronic Health Conditions in Older People: Implications for Health Policy Planning, Practitioners and Patients. Adelaide, Australia: University of South Australia; 2013 May. URL: https://www.unisa.edu.au/siteassets/episerver-6/files/global/health/sansom/documents/qumprc/multiple-chronic-health-conditions.pdf [accessed 2019-10-08]

24. Vitry A, Zhang Y. Quality of Australian clinical guidelines and relevance to the care of older people with multiple comorbid conditions. Med J Aust 2008 Oct 06;189(7):360-365. [Medline: 18837677]

25. van Walraven C, Oake N, Jennings A, Forster A. The association between continuity of care and outcomes: A systematic and critical review. J Eval Clin Pract 2010 Oct;16(5):947-956. [doi: 10.1111/j.1365-2753.2009.01235.x] [Medline: 20553366]

26. Roland M, Paddison C. Better management of patients with multimorbidity. BMJ 2013 May 02;346:f2510. [doi: 10.1136/bmj.f2510] [Medline: 23641032]

27. Shakib S, Dundon BK, Maddison J, Thomas J, Stanners M, Caughey GE, et al. Effect of a multidisciplinary outpatient model of care on health outcomes in older patients with multimorbidity: A retrospective case control study. PLoS One 2016;11(8):e0161382 [FREE Full text] [doi: 10.1371/journal.pone.0161382] [Medline: 27537395]

28. Saultz J, Albedawi W. Interpersonal continuity of care and patient satisfaction: A critical review. Ann Fam Med 2004;2(5):445-451 [FREE Full text] [doi: 10.1370/afm.285] [Medline: 15506579]

29. Saultz J, Lochner J. Interpersonal continuity of care and care outcomes: A critical review. Ann Fam Med 2005;3(2):159-166 [FREE Full text] [doi: 10.1370/afm.285] [Medline: 15798043]

30. Kemmis S, McTaggart R, Nixon R. The Action Research Planner: Doing Critical Participatory Action Research. Singapore: Springer Science+Business Media; 2014.

31. Donabedian A. The quality of care. How can it be assessed? JAMA 1988;260(12):1743-1748. [doi: 10.1001/jama.260.12.1743] [Medline: 3045356]

32. Pillay M, Dennis SF, Harris MF. Quality of care measures in multimorbidity. Aust Fam Physician 2014 Mar;43(3):132-136 [FREE Full text] [doi: 24600676]

33. Irvine D, Sidani S, Hall L. Finding value in nursing care: A framework for quality improvement and clinical evaluation. Nurs Econ 1998;16(3):110-116, 131. [Medline: 9748972]

34. Glasgow RE, Wagner EH, Schaefer J, Mahoney LD, Reid RJ, Greene SM. Development and validation of the Patient Assessment of Chronic Illness Care (PACIC). Med Care 2005;43(5):436-444. [doi: 10.1097/01.mlr.0000160375.47920.8c] [Medline: 15838407]
35. MacColl Institute for Health Care Innovation, Group Health Cooperative. Improving Chronic Illness Care. Seattle, WA: MacColl Institute for Health Care Innovation; 2000. Assessment of Chronic Illness Care URL: http://www.improvingchroniccare.org/index.php?p=Assessment&s=240 [accessed 2019-10-08]

36. EuroQol Group. EuroQol: A new facility for the measurement of health-related quality of life. Health Policy 1990 Dec;16(3):199-208. [Medline: 10109801]

37. Herdman M, Gudex C, Lloyd A, Janssen M, Kind P, Parkin D, et al. Development and preliminary testing of the new five-level version of EQ-5D (EQ-5D-5L), Qual Life Res 2011 Dec;20(10):1727-1736 [FREE Full text] [doi: 10.1007/s11136-011-9903-x] [Medline: 21479777]

38. Berglund CB, Gustafsson E, Johansson H, Bergenmar M. Nurse-led outpatient clinics in oncology care: Patient satisfaction, information and continuity of care. Eur J Oncol Nurs 2015 Dec;19(6):724-730. [doi: 10.1016/j.ejon.2015.05.007] [Medline: 26071199]

39. Bergenmar M, Nylen U, Lidbrink E, Bergh J, Brandberg Y. Improvements in patient satisfaction at an outpatient clinic for patients with breast cancer. Acta Oncol 2006;45(5):550-558. [doi: 10.1080/02841860500511239] [Medline: 16864168]

40. Uijen AA, Schellevis FG, van den Bosch WJ, Mokkink HG, van Weel C, Schers HJ. Nijmegen Continuity Questionnaire: Development and testing of a questionnaire that measures continuity of care. J Clin Epidemiol 2011 Dec;64(12):1391-1399. [doi: 10.1016/j.jclinepi.2011.03.006] [Medline: 21479777]

41. Uijen AA, Schers HJ, Schellevis FG, Mokkink HG, van Weel C, van den Bosch WJ. Measuring continuity of care: Psychometric properties of the Nijmegen Continuity Questionnaire. Br J Gen Pract 2012 Jul;62(600):e949-e957 [FREE Full text] [doi: 10.3399/bjgp12X652364] [Medline: 22782001]

42. Stokes T, Tarrant C, Mainous AG, Schers H, Freeman G, Baker R. Continuity of care: Is the personal doctor still important? A survey of general practitioners and family physicians in England and Wales, the United States, and The Netherlands. Ann Fam Med 2005;3(4):353-359 [FREE Full text] [doi: 10.1370/afm.351] [Medline: 16046569]

43. Cameron KS, Quinn RE. Diagnosing and Changing Organizational Culture: Based on the Competing Values Framework. 3rd edition. San Francisco, CA: Jossey-Bass; 2011.

44. Gardner G, Duffield C, Gardener A, Doubrovsky A. The Australian Nursing Workforce Survey Toolkit. Brisbane, Australia: Queensland University of Technology, 2017. URL: https://eprints.qut.edu.au/108232/1/The%20Australian%20Nursing%20Workforce%20Survey%20Toolkit%20June%202017%20F.pdf [accessed 2019-10-08]

45. APNA. 2018. Building blocks, explaining the essential elements of a nurse clinic. (Online) URL: https://www.apna.asn.au/nursing-tools/nurse-clinics/Buildingblocks [accessed 2018-02-13]

46. Freeman G. Priority given by doctors to continuity of care. J R Coll Gen Pract 1985 Sep;35(278):423-426 [FREE Full text] [Medline: 4057175]

47. Braun V, Clarke V. Using thematic analysis in psychology. Qualitative Research in Psychology 2006 Jan;3(2):77-101. [doi: 10.1191/1478088706qp063oa]

48. Stringer ET. Action Research. Thousand Oaks, CA: Sage publications; 2013.

49. Saunders M, Lewis P, Thornhill A. Research Methods For Business Students (7th Edition). Harlow, UK: Pearson; 2019.

Abbreviations

ACIC: Assessment of Chronic Illness Care
APRD: The Advanced Practice Nursing Role Delineation Questionnaire
CALHN: Central Adelaide Local Health Network
EQ-5D: European Quality-of-Life Five-Dimension Scale
EQ-5D-3L: European Quality-of-Life Five-Dimension Three-Level Scale
EuroQol: European Quality-of-Life Scale
HREC: Human Research Ethics Committee
MACS: Multidisciplinary Ambulatory Consulting Service
NCQ: Nijmegen Continuity Questionnaire
PHC: primary health care
PROSPERO: international prospective register of systematic reviews
