Rapid Synthesis

Examining the Effects of Nurse Practitioners on the Quadruple Aim

1 November 2019

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Rapid Synthesis:
Examining the Effects of Nurse Practitioners on the Quadruple Aim
30-day response

1 November 2019

McMaster Health Forum

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Timeline

Rapid syntheses can be requested in a three-, 10-, 30-, 60- or 90-business-day timeframe. This synthesis was prepared over a 30-business-day timeframe. An overview of what can be provided and what cannot be provided in each of the different timelines is provided on McMaster Health Forum's Rapid Response program webpage (www.mcmasterforum.org/find-evidence/rapid-response).

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Conflict of interest

The authors declare that they have no professional or commercial interests relevant to the rapid synthesis. The funder played no role in the identification, selection, assessment, synthesis or presentation of the research evidence profiled in the rapid synthesis.

Merit review

The rapid synthesis was reviewed by a small number of policymakers, stakeholders and researchers in order to ensure its scientific rigour and system relevance.

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KEY MESSAGES

Questions

- What are the effects of nurse practitioners (NPs) working in primary care on the goals of the quadruple aim (improving care experiences and health at manageable per capita costs and with positive provider experiences)?
- What features of primary-care models have supported the successful integration of NPs in Canada and internationally?

Why the issue is important

- NPs are registered nurses with an additional graduate education and an expanded scope of practice that gives them independent authority to order/interpret diagnostic tests, perform certain procedures, diagnose, prescribe medications and other treatments, and admit/discharge patients from hospital.
- NPs have a long history in Canada and evidence has demonstrated that NPs provide equivalent or better patient satisfaction and care than physicians, as well as no difference in quality of care or quality of life. However, the profession has not been fully integrated into provincial and territorial health systems, particularly across health sectors.
- In British Columbia, it was announced that 200 new nurse practitioner (NP) positions will be funded in the province between 2018 and 2021 as part of the Ministry of Health's priority to promote team-based primary care though the Primary Care Networks.
- This rapid synthesis was requested to provide updated synthesized evidence about the effects of NPs working in primary care and to identify how to support their integration into primary-care models.

What we found

- We included nine systematic reviews and 17 primary studies, and all of the reviews cited limitations as a result of the quality and amount of evidence available.
- For the first question, seven systematic reviews and six primary studies provided relevant findings.
- In general, we found that:
  - patient experience was similar or higher with NP-led care (i.e., where NPs work collaboratively with an interprofessional team that includes a consulting physician) than with physician-led care;
  - patient outcomes for NP-led models were as good as or better than physician-led models, co-management (i.e., between NPs and physicians) models in primary care achieved better clinical outcomes than physician-led care, substitution of physicians with NPs showed a slight decrease in mortality rates for primary-care patients receiving care from NPs, and NPs are as accurate as physicians in identifying abnormalities or interpreting diagnostic procedures results;
  - substitution of physicians with NPs showed no difference in cost of physician-led versus NP-led care; and
  - collaboration between providers can enhance the provider experience for NPs and physicians, provider experiences can be negatively affected by unclear expectations and a lack of role definition, and NPs practising in rural and remote practices may experience role isolation.
- For the second question we found one recent (which has been published since the first rapid synthesis we produced) and two older systematic reviews (both of which were included in the original synthesis), as well as 15 primary studies.
- We identified several features of primary-care models that were found to be important for supporting integration of NPs, as well as two conceptual frameworks which provide helpful insights for how to support successful integration of nurse practitioners in primary care.
- The factors that support effective integration of NPs include: 1) ensuring a clearly articulated vision that prioritizes the leadership of NPs; 2) using a patient-centred approach; 3) using team-based approaches with shared responsibility for care that builds a collaborative model between NPs and physicians; 4) ensuring role definition and clarification within teams; 5) building support from family physicians to integrate NPs in primary care to avoid turf wars, as well as building relationships with patients, colleagues and healthcare leaders; 6) enabling NPs to work to their full scope of practice, including through educational programs that prepare NPs for the roles they need to play; 7) enabling flexibility (e.g., by adapting models to local contexts and by ensuring modification throughout integration, which could be supported using a rapid-learning health system approach; 8) building and incorporating strong leadership at the system level and from nursing; and 9) enabling real-time collaboration in teams.

QUESTIONS

- What are the effects of nurse practitioners (NPs) working in primary care on the goals of the quadruple aim (improving care experiences and health at manageable per capita costs and with positive provider experiences)?
- What features of primary-care models have supported the successful integration of NPs in Canada?

WHY THE ISSUE IS IMPORTANT

Nurse practitioners are registered nurses with additional graduate education and experience.(1; 2) As regulated health professionals, nurse practitioners have a legislated expanded scope of practice that gives them independent authority to assess, diagnose and provide treatment.(3) This broader scope of practice includes: diagnosing and treating illness, ordering and interpreting diagnostic tests, prescribing certain drugs, and performing specific medical procedures.(1-4) In this role, evidence has demonstrated that NPs provide equivalent or better patient satisfaction and care than physicians, as well as no difference in quality of care or quality of life.(5)

Nurses have a long tradition of informally working in these types of expanded roles in rural and remote communities in Canada (e.g., outpost nurses).(6; 7) The formalization of the nurse practitioner role in Canada began in the mid-1960s. This was in response to four interrelated factors:

1) introduction of publicly funded healthcare;
2) perceived physician shortage;
3) increased attention on primary care; and
4) increased medical specialization.(6)

In the 1970s provincial nursing groups led several initiatives to legitimize expanded nursing roles, which sparked the development of educational programs.(6) However, there is variability across provinces and territories in the scope of practice (e.g., prescribing and referrals to specialists), remuneration and employment settings.(7; 8)

In British Columbia (where this rapid synthesis was requested from), legislation to allow NPs to practise was passed in 2005, and within five years the province had 129 practising NPs.(6) At present, British Columbia has approximately 500 practising NPs who are represented by the Nurses and Nurse Practitioners of British Columbia.(9) Recently, it was announced that 200 new nurse practitioner (NP) positions will be funded in the province between 2018 and 2021 as part of the Ministry of Health's priority to promote team-based primary care though the Primary Care Networks. To inform this initiative, this rapid synthesis was requested to provide updated synthesized evidence about the effects of NPs and to identify how to support their integration into primary-care models.

Box 1: Background to the rapid synthesis

This rapid synthesis mobilizes both global and local research evidence about a question submitted to the McMaster Health Forum's Rapid Response program. Whenever possible, the rapid synthesis summarizes research evidence drawn from systematic reviews of the research literature and occasionally from single research studies. A systematic review is a summary of studies addressing a clearly formulated question that uses systematic and explicit methods to identify, select and appraise research studies, and to synthesize data from the included studies. The rapid synthesis does not contain recommendations, which would have required the authors to make judgments based on their personal values and preferences.

Rapid syntheses can be requested in a three-, 10-, 30-, 60- or 90-business-day timeframe. An overview of what can be provided and what cannot be provided in each of these timelines is provided on the McMaster Health Forum's Rapid Response program webpage (www.mcmasterforum.org/find-evidence/rapid-response)

This rapid synthesis was prepared over a 30-business-day timeframe and involved four steps:

1) submission of a question from a policymaker or stakeholder (in this case, the Government of British Columbia);
2) identifying, selecting, appraising and synthesizing relevant research evidence about the question;
3) drafting the rapid synthesis in such a way as to present concisely and in accessible language the research evidence; and
4) finalizing the rapid synthesis based on the input of merit reviewers.

WHAT WE FOUND

In 2018 we conducted a rapid synthesis about nurse practitioners in Ontario that addressed the following questions:

- What does evidence indicate about whether the use of nurse practitioners in different sectors of the health system is: 1) effective; 2) cost-effective; and 3) acceptable to patients and families?
- What are the barriers and facilitators to implementation and integration of nurse practitioners in the Ontario health system?(5)

The main differences between the questions posed for that synthesis and this one are that: 1) the first question for this rapid synthesis is narrower in the sense that it only focuses on primary care, but is broader in terms of outcomes, given that it includes provider experiences; and 2) the second question for this rapid synthesis is focused on features of models that support integration of NPs, rather than barriers and facilitators to implementation in one specific jurisdiction (Ontario).

Given this, for the first question, we updated the searches that we conducted in the original rapid synthesis to identify any additional systematic reviews that had been published about the effects of nurse practitioners, but we focus on identifying only those relevant to primary care. In addition, we re-reviewed all of the systematic reviews included in the original rapid synthesis to identify those that included information relevant to NPs working in primary care, and extracted any additional information from them about provider experiences. To supplement this, we conducted targeted searches for primary studies from Canada using the combination of search terms included in Box 2. From this, we included nine systematic reviews that used a range of synthesis methods (e.g., integrative reviews) and 17 primary studies. We provide more details about each systematic review in Appendix 1 and primary studies in Appendix 2.

While the results from question 1 in the original rapid synthesis that we published in 2018 are broader than the question posed here, we include below a summary of the key findings from it before providing findings in relation to the two specific questions posed for this synthesis. That review included a total of 34 relevant documents (21 systematic reviews, 10 primary studies and three organizational reports), as well as insights from 14 key informant interviews to identify the barriers, facilitators and potential windows of opportunity to the integration of nurse practitioners in the Ontario health system.

Box 2: Identification, selection and synthesis of research evidence

As this rapid synthesis builds on a previous synthesis addressing similar questions, we identified relevant research evidence that was included in the earlier rapid response. In addition, we updated the search for systematic reviews by searching (in October 2019) Health Systems Evidence (www.healthsystemsevidence.org) and PubMed. In Health Systems Evidence we applied the following filters: under domain 'any delivery arrangement' and 'nurses'; and under document type 'systematic reviews of effects', 'systematic reviews addressing other questions' and 'economic evaluations and costing studies.' In PubMed, we searched for 'nurse practitioner' using two health services research 'hedges' - appropriateness and costs - and applied filters for systematic reviews, limiting publication dates to the last five years. In addition, we searched PubMed for primary studies using the following search strategy: (nurse practitioner) AND (safe* OR effective* OR cost OR patient*experience OR satisfaction) and limited publication dates to the last five years. We then searched for primary studies from Canada that could provide additional insights for the second question by searching PubMed using this combination of search terms: (nurse[Title/Abstract] AND practitioner*[Title/Abstract]) AND primary[Title/Abstract] AND (care[Title/Abstract] OR healthcare[Title/Abstract])) AND Canada.

The results from the searches were assessed by one reviewer for inclusion. A document was included if it fit within the scope of the questions posed for the rapid synthesis.

For each systematic review we included in the synthesis, we documented the focus of the review, key findings, last year the literature was searched (as an indicator of how recently it was conducted), methodological quality using the AMSTAR quality appraisal tool (see the Appendix for more detail), and the proportion of the included studies that were conducted in Canada. For primary research (if included), we documented the focus of the study, methods used, a description of the sample, the jurisdiction(s) studied, key features of the intervention, and key findings. We then used this extracted information to develop a synthesis of the key findings from the included reviews and primary studies.

Key findings from the original rapid synthesis produced about enhancing health-system integration of nurse practitioners

We have directly extracted the key findings from the original rapid synthesis below.(5) The full-text of the report is publicly available on the McMaster Health Forum's website for those who are interested in more detail.

A range of benefits was found in relation to the effectiveness of nurse practitioners working in different roles, including: 1) increased adherence to guidelines in primary care; 2) improved overall quality of care in emergency departments; 3) improved health outcomes (including a reduction in pain) in long-term care; 4) improved communication and collaboration within health teams; and 5) improved medication adherence.

Supportive evidence was found for cost savings to the health system with regards to engaging nurse practitioners in primary care (including rural and remote communities), specialty care (emergency departments and inpatient roles) and long-term care, while other findings suggested that nurse practitioners have longer consultations and patients request more follow-up visits, but all of the reviews cited limitations as a result of the quality and amount of evidence available.

Improved patient satisfaction for care provided by nurse practitioners was found in emergency departments, long-term care, as well as in care provided in rural and remote communities, and no significant differences were found for oncology care provided by nurse practitioners, and in a comparison of nurse-practitioner-led, physician-led and multidisciplinary teams for care provided to people with rheumatoid arthritis.

Key informants described seven main challenges to engaging nurse practitioners: 1) legislative/regulatory; 2) scope of practice; 3) participation in policy decisions; 4) remuneration-related challenges; 5) supply and distribution of nurse practitioners; 6) role clarity; and 7) data-monitoring systems. The following facilitators to engaging nurse practitioners were identified by key informants: 1) expansions to scope of practice; 2) use of an implementation/evaluation framework; and 3) increasing awareness and demand.

Three main windows of opportunity were identified by key informants: 1) leveraging the role of Provincial Chief Nursing Officer in workforce planning and health-system decision-making; 2) recent political change and the focus on cost-saving measures from the new government present opportunities to enhance integration of nurse practitioners; and 3) ongoing workforce planning and nurse practitioners' suitability to improving care delivery and addressing equity gaps.

Key findings for question 1 - What are the effects of nurse practitioners (NPs) working in primary care on the goals of the quadruple aim (improving care experiences and health at manageable per capita costs and with positive provider experiences)?

We found seven systematic reviews (10-16) and six primary studies (17-22) relevant to this question. Of the seven reviews, five were included in the previous synthesis and two were newly identified.(11; 16) We outline the key findings from these documents below according to the quadruple aim outcomes.

Effects of NPs at improving patient experience

We found two systematic reviews (10; 11) and four primary studies (17; 18; 20; 21) that addressed the patient experience dimension of the quadruple aim. Generally, the patient experience was found to be similar between NP-led care (i.e., where NPs work collaboratively with an interprofessional team that includes a consulting physician) and physician-led care.

Both of the systematic reviews (10; 11) and two primary studies (18; 20) specifically examined patient satisfaction outcomes. Ultimately, patient satisfaction was as high or higher with NP-led care as opposed to

physician-led care. One review suggested that patient satisfaction was equal to or marginally higher for nurse-led primary care,(11) while the other review suggested there was no significant difference in the same outcome.(10) The two primary studies echoed this finding, with patients ranking their satisfaction with NP-led care quality highly.(18; 20)

In addition, both systematic reviews (10; 11) and two studies (17; 21) suggested that care led by NPs was more patient centred. One review suggested that communication between patients and NPs was stronger than physician-patient communication,(10) and a primary study similarly found that patient-provider relationships were stronger with nurse practitioners.(17) In this same study, patients expressed feeling more power, authority and self-confidence when NPs provided care.(17) In addition, the reviews (10; 11) and one primary study (21) specifically noted that NPs spent more time with patients than doctors did. One review stated with moderate certainty that consultation length was significantly longer with NPs than doctor.(11)

Finally, one review (10) suggested that there was little difference in the services provided to patients by NPs as opposed to doctors. Using meta-analysis, the review found that the same number of prescriptions and tests were provided to patients by NPs as by doctors.(10) The same review also found that there was no difference in the number of scheduled return visits, but more returns were attended in nurse-led primary care.(10) Finally, it was found that patients utilized the same number of referrals, specialty visits and hospital admissions in nurse-led and doctor-led care.(10)

Effects of NPs at improving health outcomes

We found evaluations of co-management models (i.e., between NPs and physicians) and substitution of physicians by NPs. One systematic review included six studies that found that co-management models in primary care achieved better clinical outcomes than physician-led care. It was found that co-management increased adherence to guidelines, but findings were inconsistent about the effect on medication compliance. Finally, one study included in this review found that diabetic patients in a co-management team were monitored more closely than patients in a standard model.(13) In addition, one primary study used a comparative case study design where NP care for patients with chronic conditions was contrasted with when they had group medical visits or not. The results show that confidence of patients to manage their conditions increased in the group medical visits, and they felt more prepared to self-manage their conditions.(17)

Four systematic reviews assessed substitution of physicians with NPs.(10-12; 15) One review included 18 randomized controlled trials, showing a slight decrease in mortality for primary-care patients receiving care from NPs.(11) Similarly, health outcomes related to cardiovascular diseases and diabetes for NP-led models were as good as or better than physician-led models. Also, the analysis from 10 studies showed inconclusive results for process-of-care outcomes.(11)

The second review assessed substitution of physicians with NPs from the perspective of regulation of the scope of practice.(15) This review considered 15 studies, showing that an expanded scope of practice could increase primary-care capacity and healthcare utilization, although no association was found in relation to enhanced patient access to care.(15)

Another review found two randomized controlled trials that demonstrated that process-of-care outcomes and clinical outcomes was as good as or better with NP-led care then with physician-led care.(12)

Findings from a separate review using 11 randomized controlled trials and 23 observational studies showed that NPs undertook more investigations and had longer consultations with patients, compared to doctors.(10) In terms of diagnosis, findings show that NPs are as accurate as physicians for identifying abnormalities or interpreting diagnostic results.(10)

Finally, a mixed-methods study conducted in Alberta evaluated the inclusion of NPs in primary-care models, which found a positive trend in diabetes and dyslipidemia management, as well as cancer screening.(18)

Effects of NPs at keeping costs manageable for health systems

We identified four systematic reviews that assessed the substitution of physicians with NPs, two of which showed no difference in cost of physician-led versus NP-led care,(11; 12; 15; 16) as well as a primary study (a cost-effectiveness study conducted in Canada).(19) One of the reviews assessed nine randomized controlled trials and concluded that there was no difference in cost, but the certainty of the evidence was low.(11) The other review reported that costs of non-scheduled or emergency visits could increase costs in NP models.(12) The third systematic review included 11 randomized controlled trials and found that NPs providing primary or specialized ambulatory care are potentially cost-saving. For primary care, the review found that "there is high-quality evidence that nurse practitioners in alternative provider ambulatory primary care roles are cost-effective with patient outcomes that are equivalent to or better than usual care and with lower costs."(16) The fourth systematic review assessed the impact of NP scope-of-practice regulation. This review examined four studies, which reported inconclusive and contradictory findings in terms of costs, mainly due to mixed results from the different studies included.(15)

Finally, a cost-effectiveness analysis compared a model of an NP being supported by three in-house physicians, with a family-physician model in a Canadian nursing home.(19) The results showed that the NP-led model had better outcomes with less costs. The effectiveness was mainly studied through emergency-department transfers.(19)

Effects of NPs on supporting positive provider experiences

We identified one systematic review (12) and three primary studies (17; 18; 21) that included findings relevant to provider experiences in the context of NPs playing a leading role in primary-care teams. The systematic review identified unclear expectations for NPs' role as a potential barrier to their implementation in primary care.(12) The review also suggested that a lack of role definition can contribute to misunderstandings and resistance from physicians for integrating them in primary care.(12) These concerns were echoed in one primary study which suggested that in some practices there is a limited understanding of the NP role.(18) The same primary study also suggested that in rural practices, NPs leading primary care may feel isolation in their role.(18) A recent study conducted in Quebec indicated that experiences of unnecessarily restricted scope of practice coupled with limited collaboration with physicians resulted in frustrations with respect to professional autonomy.(23) The same study found that large workloads that result in overtime hours and the lack of flexibility in schedules were two key factors leading to feeling inadequate value of their role.

The systematic review and studies also emphasized that collaboration between providers can enhance the provider experience for NPs and physicians. The systematic review emphasized the importance of collaboration between NPs, physicians and other team members (e.g., physician assistants) for the NP role to be accepted.(12) A primary study reiterated this finding, suggesting that collaborating with and receiving support from family physicians was important for enhancing provider experience and defining the NP role.(21) Another primary study suggested that NP-led care in collaborative settings can facilitate a process of building better relationships between physicians and NPs, and that NPs felt more agency in their role and physicians recognized them as holding these leaderships roles.(17)

Key findings for question 2 - What features of primary-care models have supported the successful integration of NPs in Canada?

We found one recent (which has been published since the first rapid synthesis we produced) (24) and two older systematic reviews (both of which were included in the original synthesis),(14; 25) as well as 14 primary studies that provided relevant findings to the second question.(17; 18; 21; 26-36) Five of the included studies were conducted as part of a larger connected initiative and therefore are included in one row in Appendix 2.(26-30)

Key findings from systematic reviews

The most recent review was a scoping review that examined the use of the Nursing Role Effectiveness Model (NREM), which is an approach that can be used for the evaluation of the effects of nursing on outcomes in a multi-dimensional healthcare space within primary healthcare.(24) Given that it is a scoping review, we did not assess its methodological quality as the AMSTAR tool is meant for use only with systematic reviews. Moreover, an important limitation to note in context of this rapid synthesis is that the scoping review did not separate registered nurses (RNs) from NPs, and therefore there are limitations in what can be assumed to apply to NPs since findings from both groups are mixed. We decided to include the review given that evaluation is an important component of supporting successful integration over time (e.g., by assessing whether or not integration has been successful and making continuous adjustments over time to achieve desired outcomes). The NREM has three components (structure, process and outcomes), which focus on patient, nurse and organizational variables that have an effect on different outcomes and processes. The process component looks specifically at nursing processes (treatments, procedures, actions) that affect patient outcomes. The outcome component investigates patient outcomes that are directly affected by nursing practice and include things like knowledge of conditions, patient satisfaction and cost. Based on the 22 documents included in the review, the applicability of the NREM criteria were assessed. Broader or more general outcomes such as patient education and patient functional status were found to be reasonable criteria for primary care, while other more specific outcomes such as immobility management, elimination management, and patient pressure ulcers were not found to be appropriate criteria for primary-care settings. Since primary care often takes an interprofessional approach as it involves allied healthcare professionals, NREM was found to be a valuable evaluative approach given that it also takes into account variables related to working in teams, while also being able to separately evaluate nursing roles. However, the review noted that as it stands, the NREM needs to be further evaluated in primary-care settings before it can be used with confidence in that sector.(24)

The two older reviews both focused on factors that influence the implementation and integration of nurse practitioners in Canadian healthcare settings (with both including extensive content relevant to primary-care settings).(14; 25) The first is a scoping review which reviewed 349 papers and included insights from interviews and focus groups with key informants, and the second is a medium-quality review (an integrative review) that included 12 studies (all of which were conducted in Canada).(14) The integrative review identified involvement, acceptance and intention as the three main concepts influencing the process of implementation.(14) In particular, involvement that promotes collaboration across professionals was found to be central to successful implementation and integration. Moreover, the review noted that all team members working together is important for developing a shared understanding, which is essential for integrated approaches to care. Acceptance of the nurse-practitioner role was also found to be important as it allows the worker to enact the responsibilities of the role. Finally, defining the intentions of the nurse-practitioner role was found to be important to guide implementation and foster collaboration.(14) Similarly, the scoping review found that thoughtful role development in consultation with various stakeholders and the community(ies) in which the nurse practitioner provides care was a key facilitator for integration.(14) However, the same review also noted that role development was often carried out under a time constraint (often when funding became available), which could be a barrier to effective integration given that it is carried out with incomplete planning to assess the gap a nurse practitioner could fill.

Both reviews also identified several barriers to successfully integrating nurse practitioners in primary care. At the system or structural level, barriers included inadequate regulation or legislation which can limit the successful implementation of the nurse practitioner role,(14) as well as educational programs (including continuing education and professional development) being broad and not always fully preparing nurse practitioners to fulfil their roles (e.g., building advanced skills in specialty areas).(25) For education, the scoping review detailed that key informants emphasized:

- the educational system not fully preparing nurse practitioners to fulfil their role (e.g., the lack of specialty education and certification available), which was seen as being partly due to curricula not sufficiently addressing interprofessional education and research, as well as because some trained in primary care end up working in acute care given the availability of jobs;
- educational programs were too broad, which limited the ability to build advanced skills and confidence in their area of specialty;
- nurse-practitioner and clinical-nurse-specialist educational programs need to be separate and distinct so that there can be clear distinctions between the roles;
- educational standardization across the country was viewed as important for allowing for greater mobility (but the level of education required for nurse practitioners to be proficient was not widely agreed upon); and
- the cost and low return on investment for nurse-practitioner education may limit the number of interested students.(25)

At the organizational level, the integrative review found that factors such as inadequate support, unclear expectations and poor organizational culture contributed to difficulty integrating nurse-practitioner roles.(14)

Several barriers at the professional level were also identified. For example, as noted above, implementing NPs in primary care is often carried out under a time constraint (e.g., when funding becomes available), which may lead to incomplete planning for the role.(25) In addition, role clarity and interprofessional tensions related to expectations of health professionals and administrators for nurse practitioners (e.g., scope of practice and time spent on direct patient care) was identified as a barrier.(25) For example, the integrative review found that at the individual level, physician resistance and staff misunderstanding limited integration, and a lack of role clarity also negatively contributed to the implementation of nurse-practitioner roles.(14) Related to this was the issue of liability, with physicians noting concerns about practising collaboratively with NPs because they could be financially responsible in certain malpractice cases.(25) To address these concerns, the Canadian Nurses Protective Society enhanced the liability coverage of nurse practitioners in 2004. This involved extending protection from the date of an incident irrespective of when a claim is made, and increasing the amount of coverage for professional liability for NPs to $5 million per incidence and an annual aggregate of $5 million.(25) Furthermore, most research has found that malpractice claims against nurse practitioners are rare. Nonetheless, physicians and pharmacists still noted concerns about liability, and given that most nurse practitioners are employees, concerns regarding vicarious liability also exist.(25) These concerns regarding liability are, in part, due to gaps in information, and further emphasize the need for attention to role clarity and building a collaborative team environment to support effective integration. Lastly, widely varying scopes and models of practice were also frequently cited as barriers to role integration,(25) which again further emphasizes the importance of role clarification and collaborative team-based approaches to overcome this barrier.

Key findings from primary studies

Among the 15 included studies, we identified several factors that were found to be important for supporting effective integration of NPs, as well as two conceptual frameworks which provide helpful insights for how to support successful integration of nurse practitioners in primary care. Many of the factors for supporting integration echo the findings from the reviews above. Those identified as being important for supporting integration include:

- articulating a clear vision that prioritizes the leadership and integration of NPs early in the reform process, sharing the vision through stakeholder engagement, and protecting the core elements of the vision during the policy development and implementation process;(32)
- using a patient-centred approach (e.g., through a consistent approach to engaging and monitoring patients, using a collaborative approach to care and positioning patients as partners in care);(26-30; 36)

- using team-based approaches with shared responsibility for care which builds a collaborative model between NPs and physicians to avoid working in silos,(17; 22; 31; 33; 35; 36), with one survey of NPs in Ontario public health units noting that most NPs worked as the only NPs in their unit, which resulted in a lack of coverage when away and a lack of integration within the team;(33)
- ensuring role definition and clarification within teams, which has been highlighted as "both an organizational process to be developed and a competency that each member of the primary care team must mobilize to ensure effective interprofessional collaboration";(21; 23; 28; 36)
- building support from family physicians to integrate NPs in primary care to avoid turf wars (but formal collaboration agreements were found to limit NPs' ability to improve access in some instances),(21; 35) as well as building relationships with patients, colleagues and healthcare leaders have been found to be central to integrating the nurse-practitioner role;(36)
- enabling NPs to work to their full scope of practice (this was the most important area needing improvement in a survey of Ontario NPs, and NPs in Nova Scotia expressed in a study that they could take on a greater role in diagnostics, prescribing pharmaceuticals and consultation and referral for performing minor procedures such as suturing minor wounds, inserting catheters and removing casts);(21; 23; 34)
- enabling flexibility (e.g., by adapting models to local contexts and by ensuring modification throughout integration, which could be supported using a rapid-learning health system approach);(23; 26-30; 37)
- building and incorporating strong leadership at the system level (e.g., from regional health authorities),(35) and from nursing (e.g., through nursing departments and/or nurse managers which support role definition and clarification within teams),(30; 35) which can also include making NPs responsible for community outreach activities and having them play a linking role between the community, family physicians and other sectors such as public health (as has been done in Nova Scotia);(21) and
- enabling real-time collaboration within teams.(22)

Three of the studies cited in the above list were conducted in British Columbia (where this synthesis was requested from). The first convened two deliberative dialogues about facilitating integration of NPs in primary-healthcare settings in British Columbia. Key findings emphasized the need for shared responsibility/care to build a collaborative model between NP and physician to avoid working in silos, and real-time collaboration was highlighted as being a key part of integrating nurse practitioners.(22)

The second study described NP fee-for-service models in British Columbia as one approach to integrate NPs in primary care.(35) This study indicated that fee-for-service remuneration has been documented as a barrier to implementing collaborative team-based practice. However, it describes that the integration of NPs who are paid through salary with fee-for-service primary-care practices enabled the creation of interprofessional teams. Moreover, the study states that early evaluation of the model has found an increase in patient access to care as well as increased satisfaction among patients and providers. In the model, the NP works in the delivery of care, supporting the development of patient self-management goals, supporting community activities, and providing prevention and promotion activities. NPs also provide case management and referrals to complex care and specialists. The model was also noted as providing opportunities for student-nurse learning. The main facilitator for the model that was identified was the Regional Health Authority of British Columbia, as it supported the introduction of NPs in the health system, the evaluation, as well the clarification of roles. One of the main challenges identified was the historical role of physicians at the top of the hierarchy.

The third study focused on identifying nurse practitioners' perspectives on how collaboration can advance the profession.(36) Participants identified collaboration as central to advancing role integration and participants viewed collaboration as a core competency. Given this, study participants described building relationships (with patients, colleagues and healthcare leaders) as a key element of the NP role. In addition, collaboration was also seen to facilitate role autonomy (e.g., by ensuring that everyone understands the NP role, which allows for NPs to have the autonomy required to respond to the needs of the community). Participants also identified role clarity as another benefit derived from collaboration (e.g., working with clients and colleagues

was seen as allowing NPs to gain recognition for their contributions, which was used to take on more tasks). Collaboration with clients was also seen to enhance holistic client-centred care, especially for underserved and marginalized communities. The study also described well-functioning teams as supportive, having a common vision, and full of energy. Collaboration within teams, and with other professionals, was identified as essential and as leading to better quality of care, but continuous education of team members about the NP role was cited as being needed to prevent underutilization. Lastly, the study identified that collaboration between NPs and health authority leaders was seen as mutually beneficial with NPs benefitting by using leaders to gain access to more resources and to advance the NP agenda, and health authority leaders benefitting given that NPs were catalysts for primary-care renewal efforts (e.g., for advancing interprofessional teams and rural primary care).

In addition, one study that sought to determine benefits and challenges of a community initiative to introduce the NP role in rural primary care in Alberta found that NPs have largely been used to relieve strain on the rural primary-care system.(18) The study noted that 817 unattached patients had been added to one NP's case load, and that NPs filled gaps in chronic and mental healthcare that would typically be provided in primary care by family physicians. This finding was echoed in a survey of how NPs perceive their role and its implementation within public-health units in Ontario, where it was found that nearly all the respondents (89.3%) reported working in areas under-serviced by physician.(33) Similarly, the introduction of NPs as primary-care providers in Nova Scotia was viewed as a solution to accessibility challenges for primary care in the province, where wait times to see a family physician had significantly increased in light of demographic changes. In general, local communities have now accepted NPs as a healthcare provider either independently or in collaboration with family physicians.(21) However, the Alberta study also noted that NPs identified some challenges in accessing ongoing education and role isolation as a result of their placement in rural communities.(18) It further noted that barriers to their continued employment included a lack of sustainable funding, limited understanding of the nurse practitioner role from the public and other providers, and the potential for role isolation. In addition, a study conducted with NPs from Quebec, found that NPs perceived their role as in between a caring paradigm (close to promotion and preventive approaches), and a biomedical paradigm (being treated as medical residents).(23)

The first of the two conceptual models that we identified was derived as part of a multi-component project based in Quebec, Canada, that included a synthesis of the current evidence and implementation support tools that were found to be useful for integrating nurse practitioners in primary care, as well as findings from qualitative case studies in six primary healthcare teams in rural and urban areas of Quebec.(26-30) The study found that the best-performing primary-care teams used an array of organizational and individual strategies as part of role-clarification processes, and concluded that "role clarification is both an organizational process to be developed and a competency that each member of the primary care team must mobilize to ensure effective interprofessional collaboration."(28) Findings also revealed six key factors to support the integration of nurse practitioners in primary care: preparing their integration; defining their role within the team; adopting a consistent approach to monitor patients; nurturing a collaborative dynamic; supporting the entire team; and identifying other factors, barriers and facilitators to integration. The six key factors are in depicted in Figure 1, which is reproduced with permission from Contandriopoulos et al. 2019.(27) Each of the six factors outlined in Figure 1 also has a detailed description of how and why they are important for integrating NPs in primary care, which are included in fact sheets that are linked to in the figure on the project website (www.phcnp.info/preambule.html).

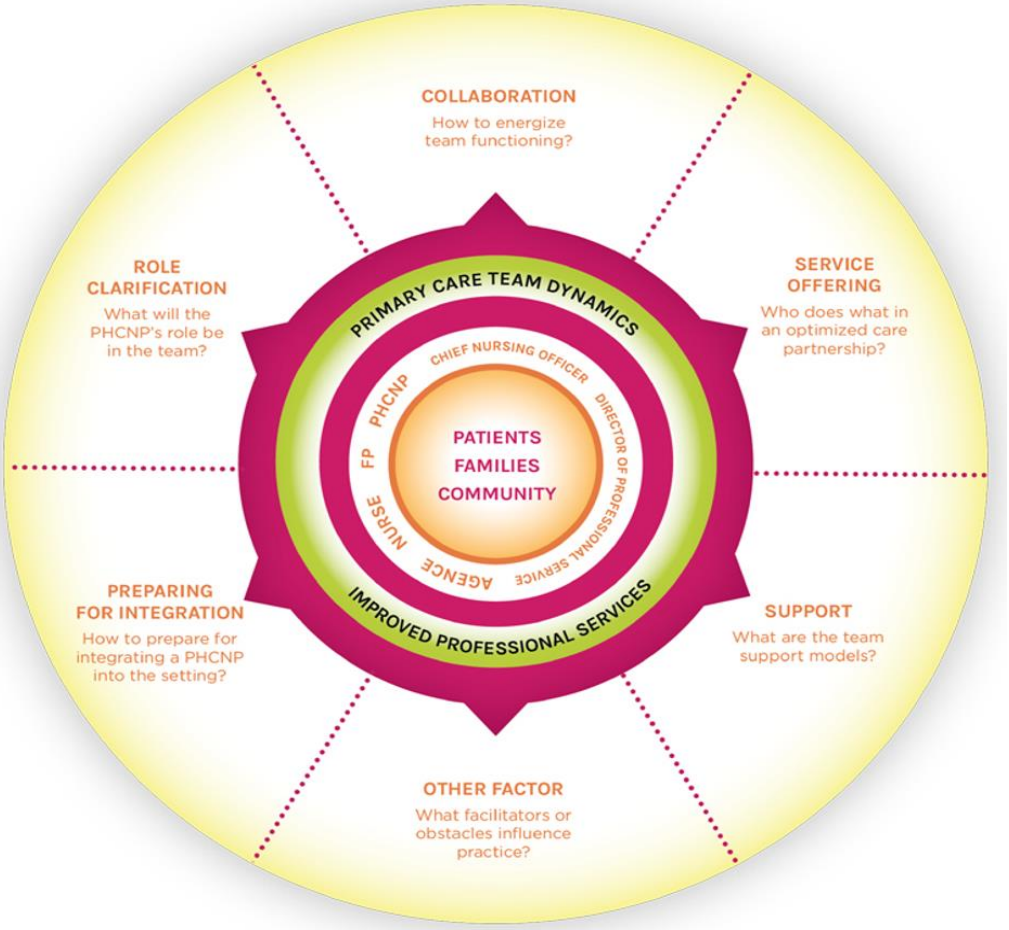
Overall, the findings from the studies emphasize the need for flexibility and a strong role for senior nursing managers for successful integration. For flexibility, ensuring that implementation approaches be adapted to the specific context of each organization in terms of its environment and experience was identified as critical. Moreover, the need to ensure modification throughout integration was emphasized as important.(26-30) For leadership, the importance of a strong coordination mechanism was identified as being best done through the involvement of managers with an in-depth understanding of the professional roles and scope of practice for nurses and nurse practitioners.

Several specific factors also emerged from the project as being central to supporting the integration of nurse practitioners in primary care.(26-30) First, findings emphasize that the process of integrating primary-care NPs needs to be team-based and done at multiple levels. In addition, clinical support facilitates the clinical work of NPs and was found to be key to integration, and nursing departments were found to play an essential role in supporting integration at the clinical, team and system level.(30) Specifically, direct supervision by the nursing department contributed to higher levels of support and facilitated communication between workers. Horizontal support between NPs was also found to be an important aspect of clinical support. This was described as consisting of "sharing clinical experiences, documentation, and advice on day-to-day work arrangements in the clinic."(30) It was also found that a successful form of horizonal support was through dyadic interaction of nurses which "gave them the opportunity to create alliances, develop and share a vision of their role, validate ideas related to their clinical practice or their integration into the setting, and suggest, when needed, changes to make the most of advanced nursing practices."(30) Next, team support was found to assist with the integration of roles, task distribution, and interpersonal relations. It was found that nursing managers were key players, as they helped with role definition and development. Further, systemic support focuses on the broader environment within which nurse practitioners must integrate and work. The directors of nursing were found to be key players for this form of support, as they represented the interests of nurse practitioners at many levels. Lastly, it was found that the integration of nurse practitioners in primary care relies on support at a number of levels, and maximizing nurse practitioner effectiveness requires clear role responsibilities which must be considered in specific contexts.

The second conceptual model was developed through a stakeholder-engagement process that led to the introduction of the first Nurse Practitioner-Led clinic in Ontario.(32) The model consists of six themes which are used to explain what is needed to support implementation of the nurse practitioner-led model. The first theme focused on 'felt need', which related to the need to focus on priorities within the system, which, in the case of Ontario at the time, included increased access to primary-care services and improved human resource capacity. The second theme related to the vision for change. Two visions for addressing system needs were a nurse practitioner-led model and a family-health-team model which had the same goals (enhance access with multidisciplinary teams), but with a different structure (one with nurse practitioners playing a key role in decisions with the other led by physicians). The next three themes related to the vision process for nurse practitioner-led clinics, which focus on shaping the visions, sharing the vision and protecting the vision. For shaping the vision, participants emphasized the need to determine the defining features of the nurse practitioner-led model early to avoid it being shaped by other stakeholders. To share the vision, study participants emphasized engagement of external stakeholders to garner support for the vision that was taking shape. Lastly, protecting the vision focused on identifying opposition to the model and developing strategies to address changes to the original vision or suggested alternative visions. The last theme related to strategies to be used during the process of change to the system to introduce NP-led clinics. These strategies included:

1) strategic silence (e.g., to avoid responding to negative public communication to prevent delaying progress towards the vision);
2) leading the way (e.g., ensuring strong leadership to support actions from others to foster broad support for the vision);
3) networking (e.g., leveraging relationships to influence other stakeholders in the system and effective communication of the vision across system levels and sectors);
4) storytelling (e.g., using personal stories to emphasize the need for change);
5) building synergy (e.g., building on other policy initiatives that lend support to the change, such as the change to scope of practice for nurse practitioners that was occurring simultaneously); and
6) revealing benefits of the model (e.g., using evidence to support and protect the vision).

Figure 1: Overview of best-practice recommendations for integrating nurse practitioners in primary care (figure reproduced with permission from Contandriopoulos et al. 2019)(27)



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APPENDICES

The following tables provide detailed information about the systematic reviews and primary studies identified in the rapid synthesis. The ensuing information was extracted from the following sources:

- systematic reviews - the focus of the review, key findings, last year the literature was searched, and the proportion of studies conducted in Canada; and
- primary studies - the focus of the study, methods used, study sample, jurisdiction studied, key features of the intervention and the study findings (based on the outcomes reported in the study).

For the appendix table providing details about the systematic reviews, the fourth column presents a rating of the overall quality of each review. The quality of each review has been assessed using AMSTAR (A MeaSurement Tool to Assess Reviews), which rates overall quality on a scale of 0 to 11, where 11/11 represents a review of the highest quality. It is important to note that the AMSTAR tool was developed to assess reviews focused on clinical interventions, so not all criteria apply to systematic reviews pertaining to delivery, financial or governance arrangements within health systems. Where the denominator is not 11, an aspect of the tool was considered not relevant by the raters. In comparing ratings, it is therefore important to keep both parts of the score (i.e., the numerator and denominator) in mind. For example, a review that scores 8/8 is generally of comparable quality to a review scoring 11/11; both ratings are considered "high scores." A high score signals that readers of the review can have a high level of confidence in its findings. A low score, on the other hand, does not mean that the review should be discarded, merely that less confidence can be placed in its findings and that the review needs to be examined closely to identify its limitations. (Lewin S, Oxman AD, Lavis JN, Fretheim A. SUPPORT Tools for evidence-informed health Policymaking (STP): 8. Deciding how much confidence to place in a systematic review. *Health Research Policy and Systems* 2009; 7 (Suppl1):S8).

All of the information provided in the appendix tables was taken into account by the authors in describing the findings in the rapid synthesis.

Appendix 1: Summary of findings from systematic reviews about nurse practitioners working in primary care

Question	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
What are the effects of nurse practitioners working in primary care on the goals of the quadruple aim?	Comparing nurse practitioner-physician co-management of primary care to solely physician-led primary care (13)	There is increasing interest in examining the effectiveness of nurse practitioner-physician co-management of primary-care patients given the current primary-care physician shortage in the U.S. The review examined six studies to compare nurse practitioner-physician co-management of primary care to solely physician-led primary care. The studies compared how these primary-care arrangements influenced three outcomes: adherence to recommended care guidelines; changes in clinical outcomes for patients; and quality of life for patients and their caregivers. Four studies compared co-management of primary care to solely physician-led primary care for the impact they have on recommended care guideline adherence. Co-managed primary-care arrangements were found to increase adherence to guidelines for several conditions including dementia, incontinence and diabetes. One of the studies found that co-managed teams provided better patient education, but no difference in ensuring there are discussions surrounding medication compliance, when compared to physician-led primary care. Another study found that for diabetic patients, measures of disease control and hyperlipidemia were monitored more closely in co-managed teams, but there was no difference found in blood pressure monitoring. Four studies compared the primary-care arrangements for their impact on clinical outcomes. These studies investigated the outcomes for patients with either diabetes or Alzheimer's disease. Overall, for nurse practitioner-physician co-managed primary-care arrangements, clinical outcomes were better or the same as the outcomes for solely physician-led care. Three studies compared patient and caregiver quality of life using two different tools to measure quality of life. Overall, there were few differences found in quality-of-life measures between co-managed and physician-led patients and caregivers. One difference that arose was a higher self-reported quality of life for patients with diabetes who received co-managed care. Furthermore, one study found that after 18 months of tracking, those receiving co-managed primary care reported improvements in their quality of life. The study cited a lack of a measure for primary-care practitioner interaction as a potential reason why the included studies showed variability in results. Furthermore, the low number of studies (six) highlights that co-management arrangements are still emerging, and further research is needed.	2017	6/9	0/6

Question	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
	Examining the impact of replacing primary-care doctors with nurses on patient outcomes, service delivery and cost (11)	As the population ages and the nature of primary care changes, it is important for healthcare services to make reforms that make care more efficient, effective and affordable. The substitution of nurses for doctors is a reform that may improve the efficiency and capacity of primary-care services. This review examined only randomized controlled trials and identified 18 as satisfying the inclusion criteria. Importantly, the review only included studies where the nurse replaced primary-care doctors as opposed to acting as supplements to doctors. The review found that the examined interventions produced numerous different effects on primary-care patient outcomes. Eight studies examined mortality and meta-analysis indicated that primary care by nurses as opposed to doctors may slightly reduce mortality; however, the certainty of this conclusion is low. In looking at health outcomes related to diseases like cardiovascular disease and diabetes, nurse-led primary care is shown to produce very similar outcomes to doctor-led care. Similar results were found when looking at patient satisfaction, where it was equal or slightly greater, for nurse-led primary care. The study suggested that when looking at quality of life for patients engaging with primary-care services, there was no difference between doctor and nurse-led care. In addition to patient outcomes, the review examined process-of-care outcomes. Though 10 studies addressed this topic, data was fairly inconclusive. Some individual trials showed gaps in care measures between nurse and doctor-led care; however, this data was all of low certainty. The review also consulted 16 trials to examine a number of utilization outcomes. The length of consultations was found – with moderate certainty – to be longer with nurses as opposed to doctors. In examining consultation rates, there was no evidence to suggest a difference in scheduled return visits, but there was a higher number of attended return visits in nurse-led primary care. In terms of the number of prescriptions, tests and investigations, meta-analyses suggested that there was little or no difference between doctor and nurse-led care. Another outcome investigated was people's use of other services like referrals, specialty visits and hospital admissions. Finally, nine trials examined the cost of care. This intervention showed no difference in cost of doctor-led versus nurse-led care. However, the certainty of this conclusion was very low as the evidence was not suitable for meta-analysis.	2017	3/18	Unavailable

Question	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
		Speaking specifically about nurse practitioners, the authors suggest that they likely provide the same – or even greater – quality of care as primary-care doctors.			
	Assessing the effectiveness of greater scope-of-practice regulations for nurse practitioners (15)	The work of nurse practitioners is moderated by state scope-of-practice regulations. It has been suggested that expanding the scope of practice of nurse practitioners could help reduce the impact of the shortage of primary-care physicians in the future. The review examined 15 studies to assess the effect of greater scope-of-practice regulations for nurse practitioners. Three outcomes of interest were the nurse practitioner workforce, healthcare access and utilization, and healthcare costs. This review found a positive association between an expanded scope of practice and the per capita number of working nurse practitioners in a state. In addition, a greater number of nurse practitioners in combination with prescription authority for select medications could increase primary care and overall number of office-based visits. However, no association was found between increased scope of practice of nurse practitioners and access to care by the public. Four studies examined the impact of state nurse practitioner scope-of-practice regulations on healthcare costs. Two separate studies had contradictory results regarding the effect of expanded scope of practice on determining the income of nurse practitioners. In a different study, it was found that less restrictive scope-of-practice regulations for nurse practitioners did not have an impact on office-based visit costs. The non-competitive primary-care market may explain this. In retail clinics where nurse practitioners provided primary-care services, one study found that there were higher costs associated with granting nurse practitioners both independent practice and prescriptive authority compared to independent practice authority alone. The 15 studies examined in this review provide evidence that reducing restrictions on scope-of-practice regulations for nurse practitioners could lead to increases in primary-care capacity and healthcare utilization. There was inconclusive evidence regarding the impact on healthcare costs. Further research is needed and the clinical specialities of nurse practitioners taken into consideration to help understand the role of nurse practitioners in healthcare delivery.	2015	6/10	0/15
	Evaluating the outcomes of substituting nurse practitioners,	Evolving population needs must be met by the health system. As the population ages, the workload on physicians increases. Alternative models of	2015	8/10	1/12

Question	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
	physician assistants or nurses for physicians in long-term and primary-care settings for the aging population (12)	care, including those provided by nurse practitioners, nurses and physician assistants, must be explored to address this issue. The review examined 16 articles describing 12 studies in order to evaluate the outcomes of substituting nurse practitioners, physician assistants or nurses for physicians. Outcomes were examined across five domains: patient outcomes; process-of-care outcomes; care-provider outcomes; resource-use outcomes; and cost-effectiveness. Two randomized controlled trials demonstrated positive effects for the substitution of allied health professionals for physicians in the context of primary care. Patient outcomes and process-of-care outcomes for substituted models of care were as good as or better than physician-care outcomes. This was supported by other studies included in the review, although two studies found that costs increased as patients engaged in "unplanned" visits for acute reasons. The overall results of this review were mixed, as some studies found positive effects while others did not. The authors theorize that these mixed results may be partially attributed to the lack of clarity on the roles of nurse practitioners, physician assistants and nurses. A number of social, organizational and individual factors affect the substitution process. As such, a number of factors must be considered in introducing allied health professionals to new roles. Appropriate funding must be secured, the organizational climate must be supportive, and there should be collaboration and shared responsibility. Taken together, the results of the randomized controlled trials suggest that care provided by nurse practitioners, physician assistants and nurses was equal to or better than physician care in terms of patient and process-of-care outcomes. While the other studies included in this review support this finding, concrete conclusions were not made. Future research should emphasize cost-effectiveness of care, with focus on the social, organizational and individual factors that have an impact on physician substitution.			
	Cost-effectiveness of primary care and specialized ambulatory care provided by nurse practitioners (16)	This systematic review examined 11 randomized controlled trials to evaluate the cost-effectiveness of primary and specialized ambulatory care when provided by nurse practitioners. To determine cost-effectiveness, the review identified health system utilization as its primary outcome, and looked at three measures: costs of healthcare (e.g. personnel costs, medications), use of services (e.g. referrals, hospitalisations, emergency department visits), and health resource use (e.g. diagnostic tests).	2013	8/10	0/11

Question	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
		All 11 trials focused on nurse practitioners working in ambulatory care. Six trials focused on alternative nurse practitioner roles in either primary or specialized care. The other five trials examined complementary nurse practitioner roles in specialized care. Though the study did not exclusively examine primary care, the evidence in primary care was strongest and allowed for meta-analysis from two studies which included over 2500 patients. This meta-analysis ultimately demonstrated that the costs per consultation were lower for nurse practitioners in the alternative provider role than for general practitioners. The review also suggested that there may be higher resource use for nurse practitioners in the alternative role than for general practitioners. Instances of higher resource use could be attributed to the length of consultation, patient return visits, and/or nurse practitioners needing to get general practitioners to sign prescriptions. The study suggests that this resource discrepancy may be related to structural factors, such as nurse practitioners having different productivity policies than general practitioners. In examining the nurse practitioners in complementary roles, there were additional costs and resource use. The authors suggest that this is expected as the nurse practitioner position is a personnel addition made in order to improve different outcomes. The authors further state that determining if this extra cost is justified is difficult because of low uncertainty. That being said, half of the patient/provider outcomes suggested that the addition of nurse practitioners in these complementary roles is advantageous. Ultimately, the review demonstrates that nurse practitioners in alternative provider ambulatory primary-care roles may be cost-saving and will provide patients with the same – or better – outcomes. Nurse practitioners in complementary provider specialized ambulatory care roles do improve patient outcomes. However, the cost-effectiveness of the addition of the nurse practitioner must be studied more.			
	Evaluating factors influencing the implementation of nurse practitioners in Canadian primary, acute and long-term care settings (14)	Nurse practitioners have been an important component of the health system for more than 40 years. In primary care, especially, evidence has indicated that nurse practitioners are important in increasing access to care and providing safe and effective care. Despite this, their integration into the care setting remains a challenge that merits investigation.	2011	6/11	12/12

Question	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
		The review examined 10 studies and two provincial reports in order to evaluate factors influencing the implementation of nurse practitioners in Canadian healthcare settings. A number of factors were found to influence nurse-practitioner role implementation. At a system level, inadequate regulation or legislation limits the successful implementation of the nurse-practitioner role. At the organizational level, factors such as inadequate support, unclear expectations and poor organizational culture contributed to difficulty implementing the nurse-practitioner role. At the individual level, physician resistance and staff misunderstanding limited implementation. Lack of role clarity negatively contributes to the implementation of nurse-practitioner roles. This review also identified three main concepts influencing the process of implementation: involvement, acceptance and intention. Collaboration and involvement across professionals was found to be central to successful implementation, as all team members must work together to develop a shared understanding. Acceptance of the nurse-practitioner role is important so that the worker can enact the responsibilities of the role. Finally, defining the intentions of the nurse-practitioner role is important to guide implementation and foster collaboration. Taken together, a number of factors influence the implementation of the nurse-practitioner role. Addressing these factors will contribute positively to this process. Future studies should build on these findings and extend beyond the Canadian context.			
	Evaluating whether nurse practitioners can act as substitutes for doctors in a primary-care setting (10)	Both doctors and nurse practitioners can provide primary care for patients, therefore, it is important to consider if nurse practitioners can act as substitutes for doctors. The review examined 11 randomized controlled trials and 23 observational studies in order to evaluate whether nurse practitioners can act as substitutes for doctors in primary care. The review focused on the four outcomes of patient satisfaction, health status, process measures and quality of care. The comparison of the care provided by the two health professionals was assessed through examination of their processes. Patient-related outcomes were assessed by examining patient satisfaction, health status and quality of care of patients.	2001	7/11	3/35

Question	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
		With regards to process measures, results showed that nurse practitioners undertook more investigations and had longer consultations with patients when compared to doctors. With regards to patient-related outcomes, there were many differences when comparing the quality of care provided by the two health professionals. Nurse practitioners were able to identify physical abnormalities more often, gave more information, and had better communication with their patients. Nurse practitioners were also just as accurate as doctors when ordering and interpreting X-ray films. While there were no significant differences between nurse practitioners and doctors in health outcomes, nurse practitioners provided better quality of care in many ways. It is important to note that despite this, there was also no significant difference in patient satisfaction. Overall, nurse practitioners provided care that is at least as good as doctors. This review examined studies mainly focused on minor illnesses and single consultations. A long-term study should be conducted to compare the ability of nurse practitioners and doctors to detect potentially serious illnesses early on, which is an important aspect of primary care.			
What features of primary-care models have supported the successful integration of nurse practitioners in Canada and internationally?	Examining the use of the Nursing Role Effectiveness Model (NREM) within primary healthcare (24)	This scoping review examines the Nursing Role Effectiveness Model (NREM) which provides a framework for the evaluation of the effect of nursing on outcomes in a multi-dimensional healthcare space. Assessing the impact of nurse roles on care is important in informing stakeholders and decision-makers. The review aimed to synthesize the literature that evaluated nursing in primary care by utilizing the NREM, while also providing insight on how to optimize the role of nurses in primary healthcare. The NREM is a model with three components of structure, process and outcome. The structure component looks at patient, nurse and organizational variables that have an effect on different outcomes and processes. The process component looks specifically at nursing processes (treatments, procedures, actions) that affect patient outcomes. The outcome component investigates patient outcomes that are directly affected by nursing practice and include things like knowledge of conditions, patient satisfaction and cost. The scoping review ultimately included 22 articles that were set in acute care, long-term care, home care, ambulatory care, and primary healthcare studies. To achieve the aim of evaluating the use of NREM within primary care, the study assessed the applicability of the NREM criterion. Some outcomes – like patient education and patient functional status – were reasonable criteria for primary	2018	12/22	Unavailable

Question	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
		healthcare, while other outcomes – like immobility management, elimination management, patient pressure ulcers, etc. – were not appropriate criteria for primary-care settings. Since primary care often takes an interprofessional approach as it involves allied healthcare professionals, NREM can be valuable as it also takes into account interprofessionalism. The model succeeds in effectively evaluating independent nursing roles while acknowledging that the primary-care contexts they work within are often interprofessional. As it stands, the NREM is not adequate to evaluate nursing outcomes in primary healthcare. To ensure the NREM is adequate for primary care, though, the review suggests numerous modifications. Importantly, a comprehensive literature review of the NREM variables as they are relevant to primary-care settings is necessary. Furthermore, a systematic review of outcome measures related to nurses in primary care is needed.			
	Integrating advanced practice nurses into health systems in Canada and identifying the factors that promote or impede further integration (25)	This scoping review was conducted to help reveal why advanced practice nurses are not fully integrated in the health system, and what can be done to achieve greater integration. The authors reviewed 349 papers and conducted interviews and focus groups with key informants in the field. This scoping review addressed clinical nurse specialists, primary-healthcare nurse practitioners, and acute-care nurse practitioners. One noted barrier in the Canadian advanced practitioner nurse educational path is the lack of specialty education and certification. Key informant nurses noted that their educational program was too broad, and they were not able to build advanced skills and confidence in their area of specialty. Key informants also emphasized that nurse practitioner and clinical nurse specialist educational programs need to be separate and distinct so that there can be clear distinctions between the roles. Furthermore, educational standardization across the country was suggested to allow for greater mobility. However, the level of education required for nurse practitioners to be proficient was not widely agreed upon. The educational system was also seen as a barrier because it did not fully prepare nurse practitioners to fulfil their roles. This is partly because the educational curriculum does not sufficiently address interprofessional collaboration and research. Other issues include that nurse practitioners trained in primary care may end up working in acute care, and the lack of faculty and preceptors involved in nurse-practitioner education. Furthermore, the cost and low return on investment for nurse-practitioner education may be limiting the number of students.	2013	0/11	Unavailable

Question	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
		Liability was another issue noted by the referenced papers and key informants. Physicians noted concerns about practising collaboratively with nurse practitioners because they could be financially responsible in certain malpractice cases. To address these concerns, the Canadian Nurses Protective Society enhanced the liability coverage of nurse practitioners. Furthermore, most research has found that malpractice claims against nurse practitioners are rare. Nonetheless, physicians and pharmacists still noted concerns about liability, and given that most nurse practitioners are employees, concerns regarding vicarious liability also exist. These concerns regarding liability are, in part, due to gaps in information. Role development was discussed as an important determinant of nurse-practitioner role integration. Thoughtful role development in consultation with various stakeholders and the community where the nurse practitioner is to work was cited as a facilitator. However, a noted barrier was that role development was often carried out under a time constraint (often when funding became available), and thus there was incomplete planning to assess the gap a nurse practitioner could fill. Expansion of the nurse-practitioner workforce was found to frequently follow physician shortages; this is facilitated by the overlapping scopes of practices of physicians and nurse practitioners. Widely varying scopes and models of practice were also frequently cited as barriers to role integration.			
	Evaluating factors influencing the implementation of nurse practitioners in Canadian healthcare settings (14)	Nurse practitioners have been an important component of the health system for more than 40 years. However, their integration into the care setting remains a challenge that merits investigation. The review examined 10 studies and two provincial reports in order to evaluate factors influencing the implementation of nurse practitioners in Canadian healthcare settings. A number of factors were found to influence nurse-practitioner role implementation. At a system level, inadequate regulation or legislation limits the successful implementation of the nurse-practitioner role. At the organizational level, factors such as inadequate support, unclear expectations and poor organizational culture contributed to difficulty implementing the nurse-practitioner role. At the individual level, physician resistance and staff misunderstanding limited implementation. Lack of role clarity negatively contributes to the implementation of nurse-practitioner roles. This review also identified three main concepts influencing the process of implementation: involvement, acceptance and intention. Collaboration and	2011	6/11	12/12

Question	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
		involvement across professionals was found to be central to successful implementation, as all team members must work together to develop a shared understanding. Acceptance of the nurse-practitioner role is important so that the worker can enact the responsibilities of the role. Finally, defining the intentions of the nurse-practitioner role is important to guide implementation and foster collaboration. Taken together, a number of factors influence the implementation of the nurse-practitioner role. Addressing these factors will contribute positively to this process. Future studies should build on these findings and extend beyond the Canadian context.			

Appendix 2: Summary of findings from primary studies about nurse practitioners working in primary care

Question addressed	Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
What are the effects of nurse practitioners working in primary care on the goals of the quadruple aim?	How nurse practitioner-led group medical visits can influence the management of chronic conditions (17)	*Publication date:* 2017 *Jurisdiction studied:* Canada *Methods used:* Qualitative case study. Data was analyzed using interpretive descriptive methods.	In-depth interviews were conducted with patients and providers (n=24) in each case, which was combined with 10 hours of direct observation.	The study included two cases that used nurse practitioner-led group medical visits (GMV) and one case where nurse practitioners did not use GMVs. The two GMV cases consisted of: 1) a nurse practitioner organized and administered GMV that focused on supporting healthy nutrition for patients with chronic conditions; and 2) a nurse practitioner that was supported by an interdisciplinary health-care team that provided GMVs about diabetes management.	Overall, the study found that GMVs led by nurse practitioners were able to better harness nurse practitioners' professional agency by increasing their leadership and by enhancing interprofessional collaboration. It was also found that GMVs support patient-centred and interprofessional environments. This was found to increase patient confidence to manage their chronic conditions. In addition, patients in GMVs indicated that they were able to support each other, as well as be better equipped to self-manage their own chronic conditions. Two main themes were identified in the analysis, which related to: 1) acquisition of knowledge; and 2) relationship shifting between providers and patients. For the acquisition of knowledge, patients and providers noted that a key benefit of GMVs was that it allowed for the acquisition of health and interpersonal knowledge, with patients in the GMVs indicating that they had more personal power and authority. Moreover, GMVs were found to have provided a space where patients and providers expressed feeling more connected, which resulted in an increase in the sharing of information among team members, and strong relationships between providers and patients as well as among the providers. Second, the main way in which GMVs supported a change in relationships between providers and patients was by transforming the clinical encounter into a more patient-centred approach. In particular, it was found that the GMV approach increased the opportunities for patients and providers to engage (e.g., to share successes, challenges and goals as part of their care), as well as for patients to take more control of their primary care. It was also found that GMVs shifted relationships between types of providers within the team. In particular, nurse practitioners in the non-GMV case expressed concern that their role was not valued or visible, and indicated that more recognition for their work was needed. In addition, the

Question addressed	Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
					historical power dynamics between physicians and nurses were viewed as barriers to innovation in the non-GMV model. In contrast, the interviews with providers in the GMV cases revealed a shift in relationships between physicians and nurse practitioners where the former recognized that NPs were in the leadership role. In addition, in situations in the GMVs where nurse practitioners were the only provider present, recognition of the skills and contributions of nurse practitioners were enhanced in the broader medical community.
	To facilitate integration of nurse practitioners in primary-healthcare settings in British Columbia (22)	*Publication date:* 2016 *Jurisdiction studied:* British Columbia, Canada *Methods used: Two deliberative dialogues*	The deliberative dialogues were convened with stakeholders involved in supporting nurse-practitioner integration in a health authority in southern interior British Columbia.	Nurse-practitioner integration in a health authority in southern interior British Columbia.	The first deliberative dialogue that was convened identified 10 actions to use for promoting integration of nurse practitioners in primary-healthcare settings, which through the second dialogue were later refined and monitored for progress. While the results of the deliberations were not able to be found (the only paper identified about it reported on the process of convening the dialogues, but not the outcomes of the dialogues), the YouTube video that was produced as part of the project emphasized the need for shared responsibility/care to build a collaborative model between NPs and physicians to avoid working in silos. Moreover, real-time collaboration was highlighted as being a key part of integrating nurse practitioners.
	To determine benefits and challenges of a community initiative to introduce the nurse-practitioner role in rural primary care (18)	*Publication date:* 2016 *Jurisdiction studied:* Alberta, Canada *Methods used:* Mixed methods participatory research design that used surveys, interviews, patient record data and shadow billing data	Surveys and interview invitations were sent to 200 patients receiving care from a nurse practitioner, six physicians and three private-practice healthcare professionals, while patient record data focused on chronic disease management, women's health and mental health as well as five target conditions.	Combined methods aim to get a picture of the patient population that receives care from nurse practitioners, their perceptions of them as a care provider, and the role of the nurse practitioner within an interprofessional team in rural communities in Alberta.	The findings revealed that nurse practitioners in Alberta provided services to predominantly female patients, three-quarters of which were for previously identified or chronic health concerns. They have largely been used to relieve strain on the rural primary-care system through 817 unattached patients being added to one nurse practitioner's case load. Nurse practitioners have generally been used to fill gaps in chronic and mental healthcare that would typically be provided in primary care by family physicians. Patient record data showed positive trends in diabetes and dyslipidemia management as well as in cancer screening, where nurse practitioners had been employed. In general, patients had high satisfaction ratings with 94% noting that the nurse practitioner spent a significant amount of time with them. However, nurse practitioners identified some challenges in accessing ongoing education and role isolation as a result of their placement in rural communities. Further, barriers to their continued employment include a lack of sustainable funding, limited understanding of the

Question addressed	Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
					nurse-practitioner role among the public and other providers, and the potential for role isolation.
	Evaluating the cost-effectiveness of a nurse practitioner and family physician model of care in a Canadian nursing home (19)	*Publication date:* 2016 *Jurisdiction studied:* Canadian nursing home *Methods used:* Cost-effectiveness analysis using a controlled before-after design	518 nursing home residents, 121 in the intervention group, 186 in the internal control group (residents from the same nursing home as intervention group), and 211 in the external control group (residents at a similar nearby nursing home)	There is a shortage of family physicians to meet the primary healthcare demand in nursing-home settings. The nurse practitioner-family physician model of care involved one nurse working with three in-house physicians. The nurse provided day-to-day primary healthcare and consulted with physicians on an as-needed basis. The nurse operated within the legislative scope of practice and participated in medication review as well as in the interdisciplinary care team for patients.	As the global population ages, health needs evolve. Effective health systems must meet these needs, with alternative-care models being a key focus of research. The study performed a cost-effectiveness analysis in order to examine a nurse practitioner and family physician model of care in a Canadian nursing home. This cost-effectiveness analysis compared a nurse practitioner-family physician model of care to a family physician-only model of care in a nursing home. The researchers hypothesized that the blended model of care would result in similar or reduced costs and improved patient outcomes. Taken together, the combined family physician and nurse practitioner model resulted in fewer emergency-department transfers and reduced costs. Despite a wealth of evidence supporting the implementation of nurse practitioners in a number of settings, there are very limited cost-effectiveness analyses to support these findings. Future research should focus on rigorous economic evaluation, in addition to broadening study samples and developing design.
	Defining the role of primary-healthcare nurse practitioners in rural Nova Scotia (21)	*Publication date:* 2010 *Jurisdiction studied:* Nova Scotia, Canada *Methods used*: Mixed methods study that collected data through telephone interviews and a survey of nurses	Qualitative telephone interviews were conducted with chairs of health boards, and a quantitative survey was completed by nurse practitioners, family physicians, public-health nurses, and family practices	Questionnaire was developed to gain descriptive information about the primary-healthcare responsibilities of nurse practitioners in Nova Scotia, including their role in: direct clinical care; community activities; research; education; and practice administration.	The introduction of nurse practitioners as primary-care providers was seen as being a solution to accessibility challenges for primary care in the province, where wait times to see a family physician had significantly increased in light of demographic changes. In general, local communities have accepted nurse practitioners as a healthcare provider either independently or in collaboration with family physicians. The study examined the existing and preferred role of nurse practitioners. The role currently has partial overlap with family physicians, focusing on providing wellness and health promotion services, counselling and education for patients to become more self-reliant. Generally, nurse practitioners reportedly have more time to spend with patients than family physicians and are responsible for most of the community outreach activities in primary care. Importantly, they also tend to play a linking role between the community and family

Question addressed	Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
					physicians, as well as among other community services such as local public health. When asked about nurse practitioners' preferred role, both survey and interview respondents expressed that it would be helpful for more overlap between the roles of NPs and family physicians. Approximately 80% of respondents thought that nurse practitioners could take a greater role in diagnostics while 75% thought they should have an enhanced role in prescribing pharmaceuticals, though slightly less (60%) believed they should be allowed to prescribe opioids. Similar perspectives were expressed for an increased role in consultation and referral, as well as for performing minor procedures (e.g., suturing minor wounds, inserting catheters, and applying and removing casts). With regards to factors influencing implementation of nurse practitioners in rural communities, it was found that the support of family physicians was critical to avoid turf wars, as was the need to carefully identify the right primary-care provider for each service. While collaboration between nurse practitioners and family physicians is essential, formal collaboration agreements were found, in some instances, to limit nurse practitioners' ability to improve access to health services. Finally, clearly defining the role of nurse practitioners is essential both for the effective practice of the team as well as to inform patients on each professional's role.
	Evaluating an innovative care model involving collaboration between a nurse practitioner, paramedics and family physicians in Long and Brier Islands (20)	*Publication date:* 2009 *Jurisdiction studied:* Canada, the Long and Brier islands in Nova Scotia *Methods used:* Structured questionnaires, individual and group interviews	Adult English-speaking residents of the islands, 40 years or older with at least one chronic illness diagnosis; 86 Caucasian participants at year one, 85 at year two, and 50 at year three	The intervention was developed in response to the lack of primary health services for the predominantly older adult population on the remote islands. The intervention model consists of an on-site nurse practitioner and paramedic working in collaboration with an off-site family physician to provide rural primary healthcare.	There is increasing commitment in Canada to meet the health needs of rural communities. The current longitudinal study conducted interviews with patients, care providers and community members in Long and Brier Islands in order to evaluate an innovative care model which involved collaboration between a nurse practitioner, paramedics and family physicians. Four main areas of interest were addressed: impact on health promotion and illness prevention; impact on resident satisfaction with health services; organizational structures that can enable collaborative teams; and nature of collaboration. Both accessibility and acceptability of health services improved over the three years of intervention. Health-promotion services that were initiated in the early years of the study continued to be available, and residents cited the

Question addressed	Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
					support of the nurse practitioner and paramedics as key to success. While residents initially voiced hesitancy at the new model of care, it was embraced over time. Residents were satisfied with the quality and type of care provided. The nurse practitioner-paramedic-physician model of care was embraced over the course of the study, with organizational structure supporting positive change. Leadership, strong political support and community involvement played important roles in coordination and success. Collaboration among the health team and other health professionals was key to the success of this intervention. Collaboration improved over time, and challenges were resolved as the nurse practitioner, paramedic and family physician worked together. Taken together, this longitudinal study found a positive impact on the health of rural communities. Costs were reduced, largely attributable to reduced travel and medication costs. Organizational structure was central to the success of this intervention, and future interventions must take this into consideration.
What features of primary-care models have supported the successful integration of nurse practitioners in Canada?	Work experiences of primary healthcare nurse practitioners to explore the factors influencing their role optimization (23)	*Publication date:* 2019 *Jurisdiction studied:* Quebec *Methods used:* In-depth semi structured interviews and focus groups	Twenty-seven primary healthcare nurse practitioners in three health care regions in Quebec	No intervention, but nurse practitioners described their experiences regarding their role, and their engagement in their work	Nurse practitioners reported two elements related with work conditions that is related to inadequate value of their role: Large workload that bring overtime hours, and the lack of flexibility for the schedule given the nature of their work. Also, they identified two main elements generating frustration in terms of their professional autonomy: the limits experienced to collaborate with physicians, and the perception of an unnecessarily restricted scope of practice. They also perceived being pulled from the caring paradigm associated with nursing, and the biomedical paradigm associated with medicine. This creates pressure on them, since they are perceived as familiar with preventive approaches in one side but are also perceived as medical residents for a group of health professionals.

Question addressed	Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
					The nurse practitioners' sense of engagement in their work is conflicted by the variety of experiences (and roles) over which they need to practice, limiting their capacity to fully engage in their work. They are also concerned about their fragility over health systems transformations. Finally, some participants question their future in the profession, showing frustration and concerns about their own health.
	To understand the factors and mediating variables that influence the effectiveness of integration of nurse practitioners into primary-care teams (based on a series of publications and web-based resources) (26-30)	*Publication date:* 2014-2018 *Jurisdiction studied:* Quebec, Canada *Methods used:* Realist review and qualitative case studies in six primary-healthcare teams in rural and urban areas of Quebec	In addition to the realist review, a total of 34 interviews were conducted with 11 nurse managers or nursing directors, 15 nursing team members, seven physician partners, and one team member from outside of nursing	The cases included in the study were defined as the primary-healthcare setting where the primary-healthcare nurse practitioner practised. The six cases were from four geographic regions in Quebec. Of these, half were in primarily rural areas and all served patients in all age groups and were diverse in relation to patient-management models, size of interprofessional teams, number of professional staff, and number of patients seen by the nurse practitioner.	The study found that the best-performing primary-care teams used an array of organizational and individual strategies as part of role clarification processes. The study concluded that "role clarification is both an organizational process to be developed and a competency that each member of the primary care team must mobilize to ensure effective interprofessional collaboration." Findings also revealed six key factors to support the integration of nurse practitioners in primary care: preparing their integration; defining their role within the team; adopting a consistent approach to monitor patients; nurturing a collaborative dynamic; supporting the entire team; and identifying other factors, barriers and facilitators to integration. Details about the six key factors are summarized in a figure and in a fact sheet about each. These are available through the main project website - http://www.phcnp.info/preambule.html. An overview of key findings from the main study (the case study) is provided below. Clinical support facilitates the clinical work of nurse practitioners and was found to be key to integration. Direct supervision by the nursing department contributed to higher levels of support and facilitated communication between workers. Team support assists with the integration of roles, task distribution, and interpersonal relations. This study found that nursing managers were key players, as they helped with

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					role definition and development, thereby enhancing effectiveness. Physicians also played an integral role to evaluation and feedback. This study found little communication between professionals, which limited the effectiveness of nurse practitioners in the clinical context. Systemic support focuses on the broader environment within which nurse practitioners must integrate and work. The directors of nursing were key players in this form of support, as they represented the interests of nurse practitioners at numerous levels. The current study found that the integration of nurse practitioners in a primary-healthcare context relies on support at a number of levels. The maximization of nurse-practitioner effectiveness relies on clear role responsibilities which must be considered in specific contexts. Findings emphasize that the process of integrating primary-healthcare nurse practitioners needs to be team-based and done at multiple levels. A provincial implementation plan was in place to support nurse practitioner implementation, but each case that was studied adopted distinct implementation structures and practices that engaged different actors at the clinical, team and system level, with nursing departments playing an essential role in supporting integration at all three levels. Overall, the findings from the study emphasize the need for flexibility and a strong role for senior nursing managers for successful integration. For flexibility, ensuring that implementation approaches be adapted to the specific context of each organization in terms of its environment and experience was identified as critical. Moreover, the need to ensure modification throughout the integration was emphasized as important. For leadership, the study pointed to the importance of a strong coordination mechanism which was identified as being best done through the involvement of managers with an in-depth understanding of the professional roles and scope of practice for nurses and nurse practitioners.

Question addressed	Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
	To characterize and describe provider experiences with a primary-care system in southwestern Ontario, Canada (31)	*Publication date:* 2018 *Jurisdiction studied:* South West LHIN (Ontario) *Methods used:* This article presents the results of a providers' online survey, which was part of a study including focus groups as well	The survey was delivered to 617 primary-care providers, and 100 responded (16.2%).	The survey included questions related to practice, confidence, views about health system, and quality of care.	Most providers worked in team-based practices. Some of the respondents recognize a need of more providers to meet patient needs, whereas most of them agreed that a team-based approach in primary care has a positive impact on patient care. In terms of access, 15.2% of providers were not accepting new patients, which is higher among providers with team-based approaches. A total 43.4% of providers would continue to practise in the next five years, and some of them experience a lack of support in providing culturally appropriate care, or care for trauma and violence. Two main challenges were identified by respondents: the difficulty to refer a patient to a specialist, and the dissatisfaction with the time spent on each patient.
	To determine benefits and challenges of a community initiative to introduce the nurse-practitioner role in rural primary care (18)	*Publication date:* 2016 *Jurisdiction studied:* Alberta, Canada *Methods used:* Mixed methods participatory research design that used surveys, interviews, patient record data and shadow billing data	Surveys and interview invitations were sent to 200 patients receiving care from a nurse practitioner, six physicians and three private-practice healthcare professionals, while patient record data focused on chronic disease management, women's health and mental health as well as five target conditions.	Combined methods aim to get a picture of the patient population that receives care from nurse practitioners, their perceptions of them as a care provider, and the role of the nurse practitioner within an interprofessional team in rural communities in Alberta.	The findings revealed that nurse practitioners in Alberta provided services to predominantly female patients, three-quarters of which were for previously identified or chronic health concerns. They have largely been used to relieve strain on the rural primary-care system through 817 unattached patients being added to one nurse practitioner's case load. Nurse practitioners have generally been used to fill gaps in chronic and mental healthcare that would typically be provided in primary care by family physicians. Patient record data showed positive trends in diabetes and dyslipidemia management as well as in cancer screening, where nurse practitioners had been employed. In general, patients had high satisfaction ratings with 94% noting that the nurse practitioner spent a significant amount of time with them. However, nurse practitioners identified some challenges in accessing ongoing education and role isolation as a result of their placement in rural communities. Further, barriers to their continued employment include a lack of sustainable funding, limited understanding of the nurse practitioner role among the public and other providers, and the potential for role isolation.
	Stakeholder participation in the system-change	*Publication date:* 2016	Interviews were conducted with 16 participants who were	The focus of the study was on the introduction of nurse practitioner-led	A conceptual model consisting of six themes was developed to explain what is needed to support implementation of the nurse practitioner-led model.

Question addressed	Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
	process that led to the introduction of the first Nurse Practitioner-Led clinic in Ontario (32)	*Jurisdiction studied:* Ontario, Canada *Methods used:* A single case study design was used. Data collection consisted of two site visits, semi-structured interviews, and relevant public documents. Qualitative content analysis was used to analyze the data.	providers (nurses and physicians), healthcare managers and policymakers. In addition, 20 documents were analyzed.	clinics in Ontario where nurse practitioners are the most responsible care provider for a roster of patients, the clinic director is a nurse practitioner, and the board is comprised of at least 50% nurse practitioners.	The first theme focused on 'felt need', which related to the need to focus on priorities within the system, which, in the case of Ontario at the time, included increased access to primary-care services and improved human resource capacity. The second theme related to the vision for change. Two visions for addressing system needs were a nurse practitioner-led model and a family-health-team model which had the same goals (enhance access with multidisciplinary teams), but with a different structure (one with nurse practitioners playing a key role in decisions with the other led by physicians). The next three themes related to the vision process for nurse practitioner-led clinics, which focus on shaping the visions, sharing the vision and protecting the vision. For shaping the vision, participants emphasized the need to determine the defining features of the nurse practitioner-led model early to avoid it being shaped by other stakeholders. To share the vision, study participants emphasized engagement of external stakeholders to garner support for the vision that was taking shape. Lastly, protecting the vision focused on identifying opposition to the model and developing strategies to address changes to the original vision or suggested alternative visions (e.g., a request from a government-funded body to include six physicians and two nurse practitioners with a physician in a leadership position). The last theme related to stakeholder activities that needed to be used during the process of change to the system to introduce nurse practitioner-led clinics. These strategies included: 1) strategic silence (e.g., to avoid responding to negative public communication to prevent delaying progress towards the vision); 2) leading the way (e.g., ensuring strong leadership to support actions from others to foster broad support for the vision); 3) networking (e.g., leveraging relationships to influence other stakeholders in the system and effective communication of the vision across system levels and sectors); 4) storytelling (e.g., using personal stories to emphasize the need for change);

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					5) building synergy (e.g., building on other policy initiatives that lend support to the change, such as the change to scope of practice for nurse practitioners that was occurring simultaneously); and 6) revealing benefits of the model (e.g., using evidence to support and protect the vision).
	How nurse practitioner-led group medical visits can influence the management of chronic conditions (17)	*Publication date:* 2017 *Jurisdiction studied:* Canada *Methods used:* Qualitative case study. Data was analyzed using interpretive descriptive methods.	In-depth interviews were conducted with patients and providers (n=24) in each case, which was combined with 10 hours of direct observation.	The study included two cases that used nurse practitioner-led group medical visits (GMV) and one case where nurse practitioners did not use GMVs. The two GMV cases consisted of: 1) n nurse practitioner organized and administered GMV that focused on supporting healthy nutrition for patients with chronic conditions; and 2) a nurse practitioner who was supported by an interdisciplinary healthcare team that provided GMVs about diabetes management.	Overall, the study found that GMVs led by nurse practitioners were able to better harness nurse practitioners' professional agency by increasing their leadership and by enhancing interprofessional collaboration. It was also found that GMVs support a patient-centred and interprofessional environment. This was found to increase patient confidence to manage their chronic conditions. In addition, patients in GMVs indicated that they were able to support each other, as well as be better equipped to self-manage their own chronic conditions. Two main themes were identified in the analysis, which related to: 1) acquisition of knowledge; and 2) relationship shifting between providers and patients. For the acquisition of knowledge, patients and providers noted that a key benefit of GMVs was that it allowed for the acquisition of health and interpersonal knowledge, with patients in the GMVs indicating that they had more personal power and authority. Moreover, GMVs were found to have provided a space where patients and providers expressed feeling more connected, which resulted in an increase in the sharing of information among team members, and strong relationships between providers and patients as well as among the providers. Second, the main way in which GMVs supported a change in relationships between providers and patients was by transforming the clinical encounter into a more patient-centred approach. In particular, it was found that the GMV approach increased the opportunities for patients and providers to engage (e.g., to share successes, challenges and goals as part of their care), as well as for patients to take more control of their primary care.

Question addressed	Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
					It was also found that GMVs shifted relationships between types of providers within the team. In particular, nurse practitioners in the non-GMV case expressed concern that their role was not valued or visible and indicated that more recognition for their work was needed. In addition, the historical power dynamics between physicians and nurses were viewed as barriers to innovation in the non-GMV model. In contrast, the interviews with providers in the GMV cases revealed a shift in relationships between physicians and nurse practitioners where the former recognized that NPs were in the leadership role. In addition, in situations in the GMVs where nurse practitioners were the only provider present, recognition of the skills and contributions of nurse practitioners was enhanced in the broader medical community.
	To survey how nurse practitioners perceive their role and its implementation within public-health units in Ontario (33)	*Publication date:* 2010 *Jurisdiction studied:* Ontario *Methods used:* Postal survey	The survey was distributed to all nurse practitioners working in public-health units in Ontario (29 total), and 28 responded	No intervention.	This study aimed to understand how nurse practitioners perceived the implementation of the nurse-practitioner role within public-health units. All the respondents were female, mostly between 36 and 45 years old. Most possessed a bachelor's degree in nursing with a post-baccalaureate certificate. Most nurse practitioners worked in sexual health programs. Almost 70% of the nurse practitioners' time was spent on clinical care. Nearly all the respondents (89.3%) reported working in areas under-serviced by physicians. Nineteen public-health units in the province hired at least one nurse practitioner. Eleven hired just one, six units employed two nurse practitioners, and two units had three nurse practitioners on staff. Part of the survey asked for respondents' perspectives on barriers preventing the implementation of nurse practitioners in public-health units. The most commonly cited answers centred on the isolation and lack of nurse practitioners working in public-health units. Given that most nurse practitioners worked as the only nurse practitioner in their unit, a lack of coverage when away and a lack of integration within the team were cited as barriers. A low salary was another commonly cited barrier. Approximately half of the respondents reported that specialists being unwilling to accept referrals from a nurse practitioner and a lack of respect from physicians were barriers to the implementation of their role.

Question addressed	Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
					Facilitators to role implementation were also reported. Support from the public-health unit managers, shared decision-making in defining the nurse-practitioner role, and the health-promotion focus of the nurse-practitioner role were three commonly cited facilitators. With respect to collaboration with physicians, being entrusted to participate in decision-making and being shown respect were facilitators commonly cited by the respondents. Union membership was a dividing point, with 28.6% of respondents citing it as a barrier and 46.4% citing it as a facilitator. There was also disagreement as to whether the personality and philosophy of physicians was a barrier (35.7%) or a facilitator (46.4%). Nurse practitioners were also divided regarding their ability to fulfil their full scope of practice with 53.6% responding that they were able to practice to their full scope of practice. In general, nurse practitioners in public-health units reported being satisfied with their jobs. Roughly a third (35.7%) of respondents reported intentions to remain with their public-health unit for five or more years. Respondents were generally satisfied with the collaboration they had with physicians, and they were minimally satisfied with their salaries. Job satisfaction was positively correlated with having a good relationship with a collaborating physician and being satisfied with their salary. Job satisfaction was inversely correlated with a greater number of orientation events nurse practitioners had to attend, more time spent on clinical practice, and the number of barriers hindering collaboration with physicians.
	To survey nurse practitioners' settings of practice in primary care, and examine what impacts different settings have on working conditions (34)	*Publication date:* 2010 *Jurisdiction studied:* Ontario *Methods used:* 70-question survey	The survey was sent to 733 primary-healthcare nurse practitioners, with responses from 378 of them analyzed	No intervention	The demographic and educational background of the survey respondents was similar to the average for Ontario. The average age of respondents was 45.6 years and 96.6% were female. Most respondents had a post-baccalaureate certificate or master's degree. The respondents came from all 14 LHINs in the province, with the North East LHIN having the largest percentage of respondents (14%). Nurse practitioners from small cities, towns, and rural and remote areas accounted for 40% of respondents. The main practice locations included community health centres, physician offices, family health teams, hospitals and nurse practitioner-led clinics.

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					Nurse practitioners were mostly employed full-time (82%), and 20% were unionized (mostly those working in hospitals). Eighty-four per cent of nurse practitioners' salaries were funded by the Ministry of Health and Long-Term Care. Positions in community health centres and family health teams were more likely to be salaried, while hospital-based nurse practitioners were more likely paid an hourly rate. Ninety per cent of nurse practitioners were paid between $80,001 and $100,000. Those earning more than $100,000 were more likely to be working in hospitals. Satisfaction with salary was highest among hospital-based nurse practitioners (80%). Nurse practitioners working in hospitals and family health teams worked the most hours per week, while those in community health centres worked the fewest. The average respondent had 13 face-to-face appointments and five phone consultations a day. Approximately a third of nurse practitioners worked at multiple sites, and 43% made home visits. The clientele of nurse practitioners varied significantly by practice setting. Almost all nurse practitioners in physician offices and family health teams saw 'typical family practice clientele', while nurse practitioners working in community health centres were more likely to have clients who were low-income, homeless and cultural minorities. Nurse practitioners working in family health teams spent more of their time on direct patient care than other nurse practitioners, and those in nurse practitioner-led clinics spent more time on administration than others. Nurse practitioners in community health centres, family health teams, and nurse practitioner-led clinics spent more time on health promotion than those working in hospitals. Overall, nurse practitioners estimated they could not order 30% of the drugs and tests their clients needed due to regulations. The average respondent collaborated with four physicians in their practice, and 87% spent fewer than two hours per week collaborating with their main consulting physician. Eighty-five per cent of respondents found they had adequate consulting time, and the vast majority found their consulting physician to have a good understanding of the nurse-practitioner role and scope and practice. Ninety-two per cent found their relationship with collaborating physicians to have improved

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					over time, and 75% were satisfied with the collaboration. Relationships with physicians outside of their practice were less satisfactory. Eighty per cent of clients were cared for autonomously or with minimal supervision. Forty-two per cent of nurse practitioners in hospitals and nurse practitioner-led clinics, and 20% in family health teams, indicated that a greater enabling of nurse practitioners to work to their full scope of practice was the most important area needing improvement. These findings are limited because they are all self-reported, and nurse practitioners working in nurse practitioner-led clinics were not well represented in this survey. Furthermore, several practice settings, such as long-term care homes and public-health units, had too few respondents to allow for reporting.
	Defining the role of primary-healthcare nurse practitioners in rural Nova Scotia (21)	*Publication date:* 2010 *Jurisdiction studied:* Nova Scotia, Canada *Methods used*: Mixed methods study that collected data through telephone interviews and a survey of nurses	Qualitative telephone interviews were conducted with chairs of health boards, and a quantitative survey was completed by nurse practitioners, family physicians, public-health nurses, and family practices	A questionnaire was developed to gain descriptive information about the primary-healthcare responsibilities of nurse practitioners in Nova Scotia, including their role in: direct clinical care; community activities; research; education; and practice administration.	The introduction of nurse practitioners as primary-care providers was viewed as a solution to accessibility challenges for primary care in the province, where wait times to see a family physician had significantly increased in light of demographic changes. In general, local communities have accepted nurse practitioners as a healthcare provider either independently or in collaboration with family physicians. The study examined the existing and preferred role of nurse practitioners. The role currently has partial overlap with family physicians, focusing on providing wellness and health-promotion services, counselling and education for patients to become more self-reliant. Generally, nurse practitioners reportedly have more time to spend with patients than family physicians and are responsible for most of the community outreach activities in primary care. Importantly, they also tend to play a linking role between the community and family physicians as well as among other community services such as local public health. When asked about nurse practitioners' preferred role, both survey and interview respondents expressed that it would be helpful for more overlap between the roles of NPs and family physicians. Approximately 80% of respondents thought that nurse practitioners could take a greater role in diagnostics while 75% thought they should have an enhanced role in prescribing pharmaceuticals, though slightly less (60%)

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					believed they should be allowed to prescribe opioids. Similar perspectives were expressed for an increased role in consultation and referral as well as for performing minor procedures (e.g., suturing minor wounds, inserting catheters, and applying and removing casts). With regards to factors influencing implementation of nurse practitioners in rural communities, it was found that the support of family physicians was critical to avoid turf wars, as was the need to carefully identify the right primary-care provider for each service. While collaboration between nurse practitioners and family physicians is essential, formal collaboration agreements were found, in some instances, to limit nurse practitioners' ability to improve access to health services. Finally, clearly defining the role of nurse practitioners is essential both for the effective practice of the team as well as to inform patients on each professional's role.
	To describe two approaches to integrate nurse practitioners in primary care (35)	*Publication date:* 2010 *Jurisdiction studied:* British Columbia and Ontario *Methods used:* Key-informant interviews, focus groups and a scoping review published before	Eighty-one health professionals (including nurse practitioners) plus a follow-up of seven nurse practitioners, physician clinicians, and patients.	The study presents a descriptive analysis of the use of fee-for-service in British Columbia and the creation of nurse practitioner-led clinics in Ontario, as two strategies to integrate nurse practitioners in primary care.	The article generally describes each model, identifies the main facilitators and challenges of establishing and sustaining them, and states the strengths and limitations of each model. <u>Fee-for-service Practices in British Columbia</u> Nurse practitioners in fee-for-service physician practices work in collaboration with physicians. The nurse practitioner works in the delivery of care, patient self-management goals, community activities, and prevention and promotion activities. It also conducts case management and refers to complex care and specialists, as required. Also, it provides opportunities for student-nurse learning. The main facilitator identified was the Regional Health Authority of British Columbia, which supported the introduction of nurse practitioners in the health system, the evaluation, and the clarification of roles. One main challenge identified is the historical role of physicians being at the top of the hierarchy. The strengths identified are that nurse-practitioner integration facilitates the creation of interprofessional teams and collaboration between its members, increase of patient access to care, and patients feel better informed about care. Limitations identified are mainly economic, related to possible physicians' loss of income, or additional expenses if more than one professional is seeing one patient at the same time.

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					Nurse practitioner-led clinics in Ontario The clinics work to provide comprehensive care for patients working in collaboration with physicians and other health professionals in areas not having regular access to primary care. They also help patients to navigate the health system, and mainly conduct prevention and promotion strategies for the population. A number of facilitators were indicated such as shortage of physicians, patients without primary-care services, media coverage about nurse practitioners' role, good relationship with physicians, high patient satisfaction, and congruent governance structure. Challenges faced by nurse practitioner-led clinics are not having the capacity to receive all the patients, and the opposition of medical associations. Main strengths of this model are the increase of patient access (especially in areas with physician shortages), better use of physicians' time, enhancing interprofessional work, ensuring that patients remain engaged in the clinic rather than individual practice, and better patient satisfaction. The limitations are also mainly economic. There are not enough funds for extended hours, and the physicians require more time to see each patient, since they are more complex, limiting their billings.
	Collecting nurse practitioners' perspectives on how collaboration can advance the profession (36)	*Publication date:* 2010 *Jurisdiction studied:* British Columbia *Methods used:* Participatory action research involving group dialogues	Seventeen nurse practitioners from two health authorities in British Columbia	No intervention, but the participants were engaged shortly after the introduction of the nurse practitioner role in British Columbia.	The discussions with nurse practitioners led to the theme of collaboration advancing role integration. Nurse practitioners viewed collaboration as a core competency and valued all team members for their contributions. In practice, nurse practitioners drew on a range of people for their expertise, and they incorporated this input into client care. Participants described building relationships (with patients, colleagues and healthcare leaders) as a key element of the nurse-practitioner role. Collaboration was also seen to facilitate role autonomy. Collaboration with leaders was described as important in ensuring that everyone understands the nurse-practitioner role, and this allowed for nurse practitioners to have the autonomy required to respond to the needs of the community. Collaboration and autonomy were understood to be complementary, with collaboration that fosters autonomy

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					allowing for nurse practitioners to try new approaches and develop new collaborations to advance primary care. Role clarity was another benefit derived from collaboration. Various strategies allowed for nurse practitioners to build a professional identity and clarify the role. Working with clients and colleagues allowed for nurse practitioners to gain recognition for their contributions, and they used this to take on more tasks with the goal of improving population health. Given the nurse practitioners' alignment with clients, collaboration with clients and effective service of clients was important in developing role clarity. Collaboration with clients was also seen to enhance holistic client-centred care. By positioning clients as partners in care, nurse practitioners were able to bring their expertise and combine it with clients' personal experiences to enable holistic care. This collaboration with clients also allowed nurse practitioners to share power and advance health access for underserved and marginalized communities. Given that all the nurse practitioners who participated in dialogues worked in teams, collaboration was important in generating team capacity. Well-functioning teams were described as supportive, having a common vision, and full of energy. Collaboration within teams, and with other professionals, was essential and led to better quality of care. However, nurse practitioners had to repeatedly educate team members about their role and reported being underutilized at times. Finally, collaboration between nurse practitioners and health authority leaders was seen as mutually beneficial. Nurse practitioners benefitted by using leaders to gain access to more resources, and collaborated with leaders to advance the nurse practitioners' agenda. Health authority leaders benefitted as nurse practitioners were catalysts for primary-care renewal efforts such as advancing interprofessional teams and rural primary care.

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