

Rapid Synthesis

Enhancing Health System Integration of
Nurse Practitioners in Ontario

17 October 2018



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Rapid Synthesis:
Enhancing Health System Integration of Nurse Practitioners in Ontario
60-day response

17 October 2018

McMaster Health Forum

The McMaster Health Forum's goal is to generate action on the pressing health-system issues of our time, based on the best available research evidence and systematically elicited citizen values and stakeholder insights. We aim to strengthen health systems – locally, nationally, and internationally – and get the right programs, services and drugs to the people who need them.

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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 60-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

- The objective of this rapid synthesis is to answer the following two questions using the best-available research evidence and insights from key informant interviews:
 - 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?

Why the issue is important

- Nurse practitioners are a regulated health profession across Canada. They 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.
- While nurse practitioners in Ontario began working within the primary-care sector, they are increasingly working in other sectors (e.g., in home and community care, specialty care and long-term care) and providing care for a range of conditions and populations.
- Although the nurse practitioner role has a long history in Canada, the profession has not been fully integrated into the health systems, particularly across health sectors.
- This rapid synthesis was requested to support efforts towards strengthening the integration of nurse practitioners within the Ontario health system.

What we found

- We identified a total of 34 relevant documents (21 systematic reviews, 10 primary studies and three organizational reports) and conducted 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.
- A range of benefits were 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 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.

QUESTIONS

- 1) 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?
- 2) What are the barriers and facilitators to implementation and integration of nurse practitioners in the Ontario health system?

WHY THE ISSUE IS IMPORTANT

Nurses have a long tradition of informally working in expanded roles in rural and remote communities in Canada (e.g., outpost nurses).(1; 2) The formalization of the nurse practitioner role in Canada began in the mid-1960s as a 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.(1) In the 1970s there were a number of initiatives led by provincial nursing groups to legitimize expanded nursing roles, which led to the development of educational programs.(1) The ways in which the nurse practitioner role has been formally introduced to health systems has varied across provinces and territories in Canada, and has resulted in jurisdictional variability in terms of the scope of practice (e.g., prescribing and referrals to specialists), remuneration and employment settings.(2; 3)

Nurse practitioners are registered nurses with additional graduate education and experience.(4; 5) As a regulated health professional, nurse practitioners have a legislated expanded scope of practice that gives them independent authority to assess, diagnose and treat.(6) This broader scope of practice includes: diagnosing and treating illness, ordering and interpreting diagnostic tests, prescribing certain drugs; and performing specific medical procedures.(4-7)

Nurse practitioners were first legally recognized in Ontario in 1998 within primary care.(1; 2) As of 2017, there were 104,923 registered nurses in Ontario, of which 3,011 were nurse practitioners.(8) The College of Nurses of Ontario reports a slightly higher figure of 119,200 registered nurses and 3,444 nurse practitioners in 2017.(9) Using data from the Canadian Institute for Health Information, the nurse practitioner workforce in Ontario accounts for 57% of the total nurse practitioner workforce in Canada.(8) Looking internationally, there are approximately 248,000 (75 per 100,000 population) nurse practitioners in the U.S., compared to 5,274 (14 per 100,000 population) in Canada.(8; 10) The profession has grown substantially in Ontario and between 2008 and 2017, with the nurse practitioner workforce having increased by 70% during this time.(8) Although the workforce has increased over time, it is important to note that the nurse practitioner workforce density is still relatively small in Ontario (26 per 100,000 population).(8; 11)

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 60-business-day timeframe and involved five steps:

- 1) submission of a question from a policymaker or stakeholder (in this case, the Nurse Practitioner Association of Ontario);
- 2) identifying, selecting, appraising and synthesizing relevant research evidence about the question;
- 3) conducting key informant interviews;
- 4) drafting the rapid synthesis in such a way as to present concisely and in accessible language the research evidence; and
- 5) finalizing the rapid synthesis based on the input of at least two merit reviewers.

While nurse practitioners in Ontario began working in the primary care sector, they are increasingly working in other sectors, with a range of conditions and populations. There are three specialty certificates for nurse practitioners in the province: 1) primary healthcare; 2) pediatrics; and 3) adult.(7; 12) A nurse practitioner can hold more than one speciality certificate and they refer to the client population and not the health sector or clinical area.(7) The number of nurse practitioners by specialty certificate in 2018 was 2,603 (75%) in primary healthcare, 250 (7%) in pediatrics and 625 (18%) in adult care.(13; 14)

The top five areas of practice reported for nurse practitioners by the College of Nurses of Ontario in 2017 were:

- 51% (1,527) in primary care;
- 8% (227) geriatrics;
- 5% (157) acute care;
- 4% (106) cardiac care;
- 3% (98) emergency; and
- 29% (858) other areas of practice.(13)

Nurse practitioners are also engaged in the delivery of healthcare in other systems, such as corrections services.(15)

The top five employers of nurse practitioners reported by the College of Nurses of Ontario in 2017 were:

- 30% (888) acute care hospital;
- 19% (653) family health team;
- 16% (462) community health centre;
- 6% (165) physician's office;
- 4% (127) nurse practitioner-led clinic; and
- 26% (768) other employers.(13)

In 2005, the Ministry of Health and Long-Term Care released a report on the integration of primary healthcare nurse practitioners, which generated 29 recommendations for the full integration of nurse practitioners.(16) Since the release of the report, there have been a variety of initiatives to better integrate nurse practitioner into the health system, including the relatively recent expansion of nurse-practitioner led clinics. However, a number of system-level issues continue to challenge the full integration and expansion of the profession, including those related to scope of practice, remuneration and role clarity, among others.

Ontario is undergoing significant changes to its health system, including a redesign of primary care through the passing of the *Patients' First Act, 2017* and expected reforms following the election of a new provincial government. These, combined with changes in population health, models and settings of care, have the potential to significantly shift the structure of the health workforce in Ontario and may provide opportunities for the further expansion and integration of the profession. Given this potential for change, this rapid synthesis was requested by the Nurse Practitioner Association of Ontario to determine in what sectors the use of nurse practitioners has been effective, cost-effective and acceptable to patients and families, and the barriers and facilitators to implementation and full integration of nurse practitioners in the Ontario health system.

Box 2: Identification, selection and synthesis of research evidence

We identified research evidence (systematic reviews and primary studies) by searching in May 2018 two databases: 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.

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. Primary studies were included from our search when they directly answered the question at hand. For these studies, 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.

WHAT WE FOUND

We identified a total of 34 relevant documents by searching two databases (Health Systems Evidence and PubMed), and we supplemented these searches with literature sent to us by experts in the area of research. The search strategy for these databases is detailed in Box 2. Literature was included when it directly addressed the questions posed for this rapid synthesis. Based on this criterion, we included 21 systematic reviews, 10 primary studies and three organizational reports. The methodological quality of reviews varied with one low-quality,(17) 14 medium-quality (18-30) and six high-quality (26; 31-36) systematic reviews. Findings from these reviews and primary studies have been summarized in each of the relevant sections related to the questions and in Table 1 and 2. Further details on the included documents are provided in Appendix 1 and 2.

In addition, we conducted 14 key informant interviews with policymakers involved in nurse practitioner workforce planning (n=5), heads of organizations/managers in hospital-or community-based settings (n=5) and other prominent stakeholders and/or researchers with expertise in engaging nurse practitioners in the workforce (n=4). We asked the key informants to identify: 1) barriers to the integration of nurse practitioners in the Ontario health system; 2) facilitators to the integration of nurse practitioners in the Ontario health system; and 3) the potential windows of opportunity that could be harnessed to support changes towards enhanced integration of nurse practitioners in the Ontario health system. Findings from the key informant interviews are summarized according to these three themes below and presented in greater detail in Table 3.

As described above, the majority of the nurse practitioner workforce (51%) in Ontario works within the primary-care sector.(13) We provide a synthesis of the relevant evidence based on the health sector within which nurse practitioners are working, as well as the care for select conditions (e.g., the health condition that nurse practitioners are treating).

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?

We present the evidence under three headings, which correspond to the three parts of the question underpinning the rapid response: 1) effectiveness of nurse practitioners; 2) cost-effectiveness of nurse practitioners; and 3) acceptability of nurse practitioners to patients and families. For each of the sections, we break down the evidence according to sector (home and community care, primary care, specialty care, long-term care and public health) and the policies, programs, places and people involved.(37) We also identify evidence as it relates to nurse practitioners providing care for specific health conditions identified in the literature we included. We summarize the key findings in Table 1.

Effectiveness of nurse practitioners

We identified eight systematic reviews (four recent high quality, three recent medium quality and one older medium quality) (18; 22; 23; 26; 27; 32-34), two primary studies (38; 39) and one organizational report (40) that addressed the safety and effectiveness of nurse practitioners.

Three of the reviews and one primary study included findings related to the safety and effectiveness of nurse practitioners working in different health sectors. Within specialty care, one recent high-quality review examined the impact of nurse practitioner services in the emergency department, finding that patients engaging with this model of care experienced improved overall quality of care compared to other medical care groups.(33) Limitations were noted in the review that quality of care among nurse-practitioner services was poorly defined among the selected studies. Another recent medium-quality review found that care provided by nurse practitioners reduced waiting times in emergency departments while being comparable to other emergency-department care and services.(22) Within long-term care, one recent high-quality review found a positive impact of nurse practitioners on health outcomes, including improvements or slowed decline in physical and cognitive function.(32) One primary study evaluated the impact of a nurse practitioner-led pain-

management team in long-term care facilities, finding an improvement in clinical behaviour (e.g., use of standardized pain-assessment tools, identification of pain characteristics, use of proper forms, identification of pain causes, identification of goals, development of care plans, documentation of intervention effectiveness, and goal modification) and reduction in resident pain.(39)

In relation to providing care for specific conditions, one recent high-quality review compared the effectiveness of nurse practitioner-led asthma care to physicians.(34) The review found no significant differences between nurse-led and physician-led models of care for patients with asthma in terms of primary outcome measures, including frequency of exacerbations, severity and symptoms.(34)

The remaining four reviews and primary study compared the effectiveness of nurse practitioners to other health professionals. One recent medium-quality review compared nurse practitioner-physician co-management to solely physician-led primary care on adherence to recommended care guidelines, changes in clinical outcomes for patients and quality of life for patients and their caregivers.(27) Co-managed primary-care arrangements were found to increase adherence to guidelines for several conditions including dementia, incontinence and diabetes.(27) There were a few differences found in quality-of-life measures between co-managed and physician-led care for patients and caregivers, but higher self-reported quality of life was found in patients with diabetes who received co-managed care.(27) The review noted the low number of studies (n=6) as a potential limitation to consider when interpreting the results, and highlights that co-management arrangements are still emerging within primary care.(27)

One older medium-quality review compared nurse practitioner- to physician-led care finding that there were no significant differences in health outcomes between the two.(23) With regards to patient-related outcomes, nurse practitioners were noted as identifying physical abnormalities more often, giving more information, and having better communication with their patients.(23) Similarly, one recent high-quality review found that care provided by nurse practitioners, physician assistants and nurses was equal to or better than physician-provided care in terms of patient and process of care outcomes.(26)

In terms of team collaboration after the introduction of a nurse practitioner, one recent medium-quality review identified four themes: 1) threat to professional boundaries; 2) resource for the team; 3) autonomy and control; and 4) necessities in the process of interprofessional collaboration.(18) The acceptance of nurse practitioners as key resources to a healthcare team was found to improve communication and collaboration, and nurse practitioners contributed to continuity in the workplace and were often more available than physicians.(18) A primary study examined the effect of a multidisciplinary care team, including nurse practitioners, on medication use among at-risk patients using the medication appropriateness index.(38) The study found that a large proportion of patients were using medication inappropriately, but by the end of the study this had been significantly reduced.(38)

We found one recent organizational report by the Organisation for Economic Cooperation and Development (OECD) which provides an analysis of advanced nursing roles in primary care in 37 OECD countries.(40) The evidence synthesis found that task-shifting from physicians to nurse practitioners resulted in equivalent or improved quality of care.(40) The supportive evidence was found in a number of countries (Australia, Canada, the Netherlands, Sweden, Switzerland, the United Kingdom and the United States) and was applicable to nurse practitioners working in a range of roles and in acute and chronic conditions.(40)

Cost-effectiveness of nurse practitioners

We found nine systematic reviews (five recent high-quality, three recent medium-quality and one older medium quality) (24-26; 29-31; 33-35), three primary studies (41-43) and one organizational report (40) that addressed the cost-effectiveness of nurse practitioners. It is important to note that all of the reviews highlighted limitations with the lack of evidence on nurse-practitioner roles on cost-effectiveness specifically. The reviews cited limitations with both the quality and paucity of evidence on cost-effectiveness, and there were often only one or two studies included in the review that examined costs directly. As a result of this lack

of true economic analyses, the findings for this section are framed more generally in terms of the cost savings to the health system of nurse practitioners rather than cost-effectiveness.

Five of the reviews and one primary study included findings related to the cost savings of nurse practitioners working in different sectors. Four recent high-quality reviews and one recent medium-quality review focused on nurse practitioners working within speciality care.(24; 26; 31; 33; 35) The first review found no significant differences in cost between the delivery of nurse-practitioner services in the emergency department and their comparator (e.g., physician or extended scope of practice physiotherapist).(33) The second review on transitional care (transition from hospital care) found that the quality of evidence was low among studies examining cost-effectiveness, making it impossible to conclude whether nurse practitioners in transition roles were cost-effective.(31) The third review found supportive evidence for cost savings of nurse practitioners in ambulatory care, noting that it is important to recognize that savings often rely on the lower salaries of the profession.(35) The fourth review found supportive evidence for nurse practitioners in inpatient roles and that they were equally effective to physicians in this role, while using equal or more resources and accruing equal costs.(24) Within long-term and primary care, one recent high-quality review found no effect for substituting nurse practitioners, physician assistants or nurses for physicians, meaning that care provided by allied health professionals was equal to physician-provided care.(26) The review suggests that substituting physicians with nurse practitioners, physician assistants or nurses maintained quality of care at no increased cost, however, concrete conclusions were not made because the review only included two randomized-controlled trials.(26) A primary study on the nurse practitioner and family physician model of care in a Canadian nursing home found that the model resulted in fewer emergency department transfers and a reduction in costs.(41)

With respect to the cost savings of nurse practitioner-led care compared to physician-led care for select conditions, we identified one recent high-quality review, one older medium-quality review and one primary study.(29; 34; 43) Within nurse practitioner-led asthma care, the recent high-quality review found no significant differences between nurse practitioner- and physician-led models of care for persons with asthma, suggesting that nurse practitioner-led care may lead to savings on healthcare costs.(34) The older medium-quality review compared nurse practitioner-led care with dermatologist care in the treatment of childhood eczema, finding that care by nurse practitioners contributed to a reduction in healthcare and family costs, while maintaining effectiveness.(29) The review found that lower healthcare costs resulted from lower salaries and a reduced number of patient visits, and that families who were cared for by nurse practitioners spent half the amount compared to families who saw dermatologists (accounted for by time costs and out-of-pocket expenditures).(29) The primary study compared outcomes for patients with rheumatoid arthritis who were cared for by a team that included a nurse practitioner to those that did not include a nurse practitioner.(43) The longitudinal study found supportive evidence for the team that involved a nurse practitioner in treatment, finding that the intervention group incurred fewer costs than the control group in terms of total cost of medical tasks.(43) While there were costs associated with adding a nurse practitioner to the team, some of these costs were offset by the nurse practitioner taking over some medical tasks.(43)

Two recent medium-quality reviews and one primary study focused on expanding scope of practice or the nurse practitioner role more broadly.(25; 30; 42) The first review found that reducing restrictions on scope-of-practice regulations for nurse practitioners could lead to increases in primary-care capacity and healthcare utilization, however, the evidence was inconclusive regarding the impact on healthcare costs.(30) Similarly, the second review found challenges in economic evaluations, including the varying implementation of advanced practice nursing roles, the dependence on roles on individual attributes, and the difficulty in quantifying patient outcomes.(25) One primary study evaluated a care model which involved collaboration between a nurse practitioner, paramedics and family physicians in a rural area of Canada.(42) The longitudinal study found a positive impact on the health of rural communities and costs were reduced, which was largely attributable to reduced travel and medication costs.(42)

We found one recent OECD organizational report that found the evidence was inconclusive on the cost-effectiveness of nurse practitioners.(40) The evidence was mixed, with some studies suggesting cost savings

resulting from lower salaries and reimbursement levels (the Netherlands and the United States), while others suggest that nurse practitioners have longer consultations and patients request more follow-up visits.(40) The authors highlight that there is a need for higher-quality economic evaluations and cost-effectiveness analyses.

Acceptability of nurse practitioners to patients and families

We identified seven systematic reviews (two recent high quality, one recent medium quality, two older medium quality, one recent low quality and one older low quality) (17; 20; 23; 29; 32; 33; 44), two primary studies (42; 43) and one organizational report (40) that addressed the acceptability of nurse practitioners to patients and families. In order to access the relevant literature on the acceptability of nurse practitioners to patients and families, we focused our search of the research evidence on ‘patient experience’ and ‘satisfaction’ with nurse practitioners.

Four of the reviews and two primary studies included findings related to patient and families’ satisfaction with care provided by nurse practitioners in different health sectors. Within primary care, one primary study found that patients were satisfied with care provided through an innovative care model involving collaboration between a nurse practitioner, paramedics and family physicians in Long and Brier Islands, Canada.(42) Another primary study evaluating the impact of multidisciplinary treatment teams (including nurse practitioners) for patients with rheumatoid arthritis found no significant difference in patient satisfaction scores.(43) One recent high-quality review found ratings of patient satisfaction were enhanced in emergency departments that used a nurse practitioner model of care.(33) Within long-term care, one recent high-quality review found improved outcomes with nurse practitioners in this setting, suggesting increased satisfaction for both patients and providers.(32) No significant differences in patient satisfaction were found in an older medium-quality review comparing nurse practitioner-led to physician-led care.(23) Within oncology care, no significant differences in provider and patient satisfaction were found in a recent medium-quality review for care provided by nurse practitioners, but the review noted that this was most likely due to methodological limitations of the included studies (e.g., problems in data collection, use of self-reported data, and small sample sizes).(20)

Within select conditions, one older medium-quality review found improved patient satisfaction in childhood eczema care that was provided by a nurse practitioner.(29)

Two of the reviews focused on continuity of care in models of care that include nurse practitioners. One recent low-quality review examined urgent-care clinics and whether they improved access to care while maintaining continuity of care in primary care.(44) While urgent-care clinics improve access to care, they may undermine continuity of care particularly in the delivery of preventive services and management of chronic conditions. Nurse practitioners work in both primary care and urgent-care settings, and the review suggested that they are well suited to patient education and system navigation.(44) Another older low-quality review assessed the impact of nurse practitioners and physician assistants in the provision of care in the intensive-care unit.(17) Both professions were found to provide greater continuity of care to patients, ensuring consistent adherence to protocols and guidelines, mostly likely due to not rotating off service.(17)

One recent OECD organizational report found that when appropriately trained, nurse practitioner-led care led to high patient satisfaction.(40) These findings are most likely attributed to greater information provision and counselling in nurse practitioner-led care compared to physician-led care.(40)

Table 1. Key findings from the evidence on the effectiveness, cost-effectiveness and acceptability for patients and families of nurse practitioner-led care

Area of findings related to the nurse practitioner health workforce	Key findings
Effectiveness	<p><i>Benefits</i></p> <ul style="list-style-type: none"> • Two reviews (recent high quality and medium quality) found improved overall quality of care in patients engaging with nurse-practitioner services in the emergency department compared to other medical care groups,(33) and a reduction in emergency department wait times.(22) • One recent high-quality review found improved health outcomes (e.g., improvements or slowed decline in physical and cognitive function) for nurse practitioners in long-term care.(32) • One primary study on nurse practitioner-led pain management in long-term care facilities found an improvement in clinical behaviour and a reduction in resident pain.(39) • One older medium-quality review identified three factors that influenced the successful implementation of nurse practitioners in Canadian healthcare settings: 1) collaboration and involvement across health professionals; 2) acceptance of the nurse practitioner role; and 3) defining the intentions of the nurse practitioner role.(28) • One recent high-quality review found no significant differences between nurse-led and physician-led models of care for patients with asthma in terms of primary outcome measures (e.g., frequency of exacerbations, severity and symptoms).(34) • One recent medium-quality review found an increase in adherence to guidelines (dementia, incontinence and diabetes) in co-managed care (nurse practitioner-physician) compared to physician-led primary care.(27) • Two reviews (recent high quality and older medium quality) compared nurse practitioner-led to physician-led care and found no significant differences in health outcomes between the two,(23) and no effect for substituting nurse practitioners, physician assistants or nurses for physicians, meaning that care provided by allied health professionals was equal to physician-provided care.(26) • One recent medium-quality review found the acceptance of nurse practitioners as key resources to a healthcare team improved communication and collaboration, and nurse practitioners contributed to continuity in the workplace and were often more available than physicians.(18) • One primary study found that a large proportion of patients were using medication inappropriately, however, by the end of the study this had been significantly reduced through the use of a multidisciplinary care team, which included nurse practitioners.(38) • One recent organizational report provided an evidence synthesis, finding that task-shifting from physicians to nurse practitioners resulted in equivalent or improved quality of care. (40)
Cost-effectiveness	<p><i>Benefits</i></p> <ul style="list-style-type: none"> • One recent high-quality review found supportive evidence for cost savings of nurse practitioners in ambulatory care, noting that it is important to recognize that savings often rely on the lower salaries of the profession.(35) • One recent medium-quality review found that nurse practitioners in inpatient roles were equally effective to physicians in this role, while using equal or more resources and accruing equal costs.(24) • One recent high-quality review suggests that substituting physicians with nurse practitioners, physician assistants or nurses maintained quality of care at no increased cost.(26) • One primary study on the cost savings of a nurse practitioner and family physician model of care in a Canadian nursing home found that the model resulted in fewer emergency department transfers and a reduction in costs.(41)

	<ul style="list-style-type: none"> • One recent high-quality review found no significant differences between nurse practitioner-led and physician-led models of care for persons with asthma, suggesting that nurse practitioner-led care may lead to savings on healthcare costs.(34) • One older medium-quality review that compared nurse practitioner-led care with dermatologist care in the treatment of childhood eczema found that care by nurse practitioners reduced healthcare and family costs, while maintaining effectiveness.(29) • One primary study on team-based care for rheumatoid arthritis that included nurse practitioners found that the intervention group incurred fewer costs than the control group in terms of total cost of medical tasks.(43) • One primary study found a positive impact on the health of rural communities and a reduction in costs for a care model that included collaboration between a nurse practitioner, paramedics and family physicians.(42) <p><i>Uncertainty regarding benefits and potential harms</i></p> <ul style="list-style-type: none"> • No significant differences in cost were found in one recent high-quality review between the delivery of nurse practitioner services in the emergency department and their comparator (e.g., physician or extended scope-of-practice physiotherapist).(33) • No clear message was derived from one recent high-quality review on transitional care (transition from hospital care) as the quality of evidence was low among studies examining cost-effectiveness, and authors were not able to conclude whether nurse practitioners were cost-effective.(31) • No clear message was derived from two recent medium-quality reviews on cost-effectiveness of the nurse practitioner role and on expanding scope-of-practice regulations for nurse practitioners.(25; 30) • No clear message was derived from one recent OECD organizational report, as some studies suggested cost-effectiveness resulting from lower salaries and reimbursement levels of nurse practitioners (the Netherlands and the United States), while others found that nurse practitioners have longer consultations and patients request more follow-up visits.(40)
<p>Acceptability for patients and families</p>	<p><i>Benefits</i></p> <ul style="list-style-type: none"> • One recent high-quality review found ratings of patient satisfaction were enhanced in emergency departments that used a nurse practitioner model of care.(33) • One recent high-quality review found improved outcomes with nurse practitioners in long-term care, suggesting increased satisfaction for both patients and providers.(32) • One older medium-quality review found improved patient satisfaction in childhood eczema care that was provided by a nurse practitioner.(29) • One primary study found that patients were satisfied with care provided through an innovative care model involving collaboration between a nurse practitioner, paramedics and family physicians in Long and Brier Islands, Canada.(42) • Two reviews (recent low quality and older low quality) found improved continuity of care in models of care that include nurse practitioners.(17; 44) • One recent OECD organizational report found that when appropriately trained, nurse practitioner-led care led to higher patient satisfaction compared to physician-led care.(40) <p><i>Uncertainty regarding benefits and potential harms</i></p> <ul style="list-style-type: none"> • No significant differences in patient satisfaction scores were found in a primary study evaluating the impact of multidisciplinary treatment teams (including nurse practitioners) for patients with rheumatoid arthritis.(43) • No significant differences in patient satisfaction were found in an older medium-quality review comparing nurse practitioner-led to physician-led care.(23) • No significant differences in provider and patient satisfaction were found within oncology care provided by nurse practitioners, most likely due to methodological limitations of the included studies (e.g., problems in data collection, use of self-reported data, and small sample sizes).(20)

What are the barriers and facilitators to implementation and integration of nurse practitioners in health systems?

Insights from the literature about barriers and facilitators to implementation and integration of nurse practitioners in health systems

We identified four systematic reviews (one recent high quality and three older medium quality),(19; 21; 28; 36) four primary studies (45-49) and two organizational reports (3; 50) that addressed implementation considerations related to engaging nurse practitioners in the health workforce. We identified one framework that addresses both barriers and facilitators to optimizing scopes of practice within collaborative care models of care.(50) The conceptual framework considers three layers of inputs. We summarize these layers, examples of barriers and facilitators from the framework, and findings about specific barriers and facilitators identified from the literature in Table 2.

Key findings from key informants related to the barriers and facilitators to implementation and integration of nurse practitioners in health systems

To compliment the findings from the research evidence, we present relevant findings from the 14 key informant interviews under three headings that follow Tables 2 and 3: 1) insights from key informants about the barriers to the integration of nurse practitioners in the Ontario health system; 2) insights from key informants about the facilitators to the integration of nurse practitioners in the Ontario health system; and 3) insights from key informants about potential windows of opportunity to further integrating nurse practitioners in Ontario's health system. The findings from the key informant interviews are organized by health system arrangements, which include governance arrangements (e.g., policy authority, organizational authority and professional authority), financial arrangements (e.g., how systems are financed and providers remunerated) and delivery arrangements (e.g., how care meets consumers' needs, who provides the care and where it's provided).(51) Table 3 presents a high-level summary of the key themes to emerge from the interviews.

The insights from the research evidence overlap with the concepts that emerged from key informant interviews. The research evidence focused more broadly on the overarching barriers and facilitators to the integration and implementation of nurse practitioners in health systems. The key informant interviews provided a more nuanced understanding of the issue by exploring the specific barriers and facilitators within the Ontario health system. In particular, the key informant interviews yielded important insights into workforce planning for nurse practitioners in Ontario, and the types of policy levers associated with governance, financial and delivery arrangements that could be harnessed to enhance integration of the profession.

Table 2: Key findings from the evidence on the barriers and facilitators to implementation and integration of nurse practitioners in health systems

Inputs for optimizing scope of practice (50)	Types of inputs (50)	Barriers		Facilitators	
		Examples from the framework (50)	Identified from the literature	Examples from the framework (50)	Identified from the literature
Marco (structural level)	Education and training	<ul style="list-style-type: none"> Education programs that limit professionals from working to full scope 	<ul style="list-style-type: none"> Educational programs, including continuing education and professional development, are broad and may not fully prepare nurse practitioners to fulfil their roles (e.g., building advanced skills in specialty areas) (3; 21) Capacity and confidence in nurse practitioner role, most likely stemming from limitations in training, experience, and mentorship in leadership (36) 	<ul style="list-style-type: none"> Practicums and continuing education that facilitate interprofessional collaboration 	<ul style="list-style-type: none"> None identified
	Economic (funding, financing and remuneration)	<ul style="list-style-type: none"> Funding models that do not allow for changes in scope of practice 	<ul style="list-style-type: none"> Funding and compensation models do not align with comprehensive team-based care (3) 	<ul style="list-style-type: none"> Alternative funding models that are aligned with interprofessional care 	<ul style="list-style-type: none"> Sustainable funding, adequate infrastructure and resources to support the nurse-practitioner role (19)
	Legislation and regulation	<ul style="list-style-type: none"> Inflexible legislation and regulation 	<ul style="list-style-type: none"> Provincial/territorial variability in terms of legislative and regulatory differences in nurse practitioner scope of practice (21) Liability concerns by other health professionals (e.g., physicians and pharmacists) with respect to practising collaboratively, although the Canadian Nurses Protective Society enhanced the liability coverage of nurse practitioners (21) 	<ul style="list-style-type: none"> Creating responsive legislative frameworks that are locally applicable 	<ul style="list-style-type: none"> None identified
Meso (institutional level)	Institutions (e.g., institution-based accreditation and	<ul style="list-style-type: none"> Opposition between professional associations 	<ul style="list-style-type: none"> Remuneration creates competition within and between sectors and salary differences in unionized versus non-unionized nurse practitioners (3) 	<ul style="list-style-type: none"> Interprofessional representation in health-system decision-making 	<ul style="list-style-type: none"> Accreditation standards that demand evidence of participation in leadership activities in order to enhance leadership skills in nurse practitioners (36)

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	performance management and unions)				<ul style="list-style-type: none"> • Networking opportunities for nurse practitioners both within and outside organizations (36)
	Technological infrastructure	<ul style="list-style-type: none"> • Lack of communication across multiple care settings 	<ul style="list-style-type: none"> • None identified 	<ul style="list-style-type: none"> • Implementation and maintenance of electronic medical records across health professions and sectors 	<ul style="list-style-type: none"> • None identified
	Community/population needs (e.g., recruitment and retention and geographic distribution)	<ul style="list-style-type: none"> • Limited evidence on community needs 	<ul style="list-style-type: none"> • None identified 	<ul style="list-style-type: none"> • Routine monitoring and evaluation systems 	<ul style="list-style-type: none"> • None identified
Micro (health professions level)	Team environment	<ul style="list-style-type: none"> • Professional hierarchies, culture and lack of interprofessional communication 	<ul style="list-style-type: none"> • Heavy clinical caseload as well as a lack of clerical and administrative support limits opportunities to take on leadership roles (e.g., participating in committees, budget-holding and management positions) (36) • Nurse-practitioner role development is often carried out under a time constraint (e.g., when funding becomes available), which may lead to incomplete planning for the role (21) • 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) (3; 21) 	<ul style="list-style-type: none"> • Change management, continuing professional development and team environments 	<ul style="list-style-type: none"> • Participation of nurse practitioners on committees and research, as well as clear reporting structures and administrative support (36) • Clinical supports facilitated clinical work (28) • Collaboration and involvement across health professionals to develop a shared understanding (28) • Acceptance of the nurse-practitioner role to implement the full responsibilities associated with the role (28) • Direct supervision can contribute to higher levels of support and facilitate communication between health professionals (49) • Defining the intentions of the nurse-practitioner role to help guide implementation and foster collaboration (28) • Collaboration supports role autonomy, role clarity and the provision of

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					<p>holistic client-centred care by nurse practitioners (45)</p> <ul style="list-style-type: none">• Support and mentorship for nurse practitioners (19)• Nursing managers can support the integration of nurse practitioners by helping with role definition and development (49)
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Table 3. Summary of key informant insights on the implementation considerations related to engaging nurse practitioners in the health workforce

Health system arrangement	Barriers	Facilitators	Windows of opportunity
Governance	<ul style="list-style-type: none"> • Legislative/regulatory <ul style="list-style-type: none"> ○ Term ‘physician’ in legislation limits who can sign forms • Scope of practice <ul style="list-style-type: none"> ○ Limitations in point-of-care testing and ordering certain diagnostic tests (e.g., magnetic resonance imaging and CT scans) • Participation in policy and organizational decisions <ul style="list-style-type: none"> ○ Limited voice in decision-making ○ Competing interests between the Ontario Nurses Association and Registered Nurses’ Association of Ontario 	<ul style="list-style-type: none"> • Scope of practice <ul style="list-style-type: none"> ○ Expansions to scope of practice (e.g., nurse practitioners prescribing controlled substances) have allowed nurse practitioners to better address the needs of their patients ○ Implementation of the participatory, evidence-based, patient-focused process for advanced practice nursing role development, implementation, and evaluation (PEPPA framework) to optimize the nurse-practitioner role and long-term integration 	<ul style="list-style-type: none"> • Stakeholder participation in policy and organizational decisions <ul style="list-style-type: none"> ○ The position of Provincial Chief Nursing Officer within the Ministry of Health and Long-Term Care, currently filled by a nurse practitioner (Michelle Acorn), is a key opportunity to leverage her expertise and knowledge of the profession in workforce planning and health-system decision-making
Financial	<ul style="list-style-type: none"> • Remuneration <ul style="list-style-type: none"> ○ Compensation and pay structures do not reflect expanded scope of practice ○ Certain funding mechanisms in primary care restrict nurse-practitioner remuneration and engagement in the sector <ul style="list-style-type: none"> ▪ e.g., incentive bonuses for physicians providing well baby visits or smoking cessation in Family Health Teams limit nurse practitioner involvement ○ Lack of consistency in who can bill for services <ul style="list-style-type: none"> ▪ e.g., physicians bill OHIP for medical assistance in dying services, whereas services are included as part of salaried contracts for nurse practitioners 	<ul style="list-style-type: none"> • None identified 	<ul style="list-style-type: none"> • Recent political change in Ontario from a Liberal to Conservative government and the focus on cost-saving measures from the new government present opportunities to enhance integration of nurse practitioners because of their proven alignment with the health system ‘triple aim’: <ul style="list-style-type: none"> ○ improved patient experience and satisfaction; ○ meeting population health needs; and ○ keeping per capita costs manageable

<p>Delivery</p>	<ul style="list-style-type: none"> • Need, demand and supply <ul style="list-style-type: none"> ○ Lack of access to nurse practitioners due to the overall small size of the workforce and geographic distribution • Role clarity <ul style="list-style-type: none"> ○ Lack of awareness of nurse practitioner role creates interprofessional tensions (e.g., between registered nurses and nurse practitioners, between physician assistants and nurse practitioners, and between physicians and nurse practitioners in primary care) • Data monitoring systems <ul style="list-style-type: none"> ○ The Nurse Practitioner Access Reporting system does not collect the same level of data on nurse practitioners as the OHIP billing data on physicians, which limits monitoring capabilities 	<ul style="list-style-type: none"> • Availability of care and culturally appropriate care <ul style="list-style-type: none"> ○ Increasing awareness and demand for nurse-practitioner services are a key facilitator to greater integration of the profession <ul style="list-style-type: none"> ▪ Interprofessional and nurse practitioner-led approaches within primary care (e.g., Aboriginal Health Access Centres, Community Family Health Teams, Community Health Centres, Nurse Practitioner-Led Clinics and Nursing Stations) • Where care is provided <ul style="list-style-type: none"> ○ Recognition of nurse practitioners as autonomous health professionals ○ Provision of culturally sensitive care by nurse practitioners in Aboriginal Health Access Centres, Community Family Health Teams, Community Health Centres, Nurse Practitioner-Led Clinics and Nursing Stations 	<ul style="list-style-type: none"> • Ongoing workforce planning is a window of opportunity to enhance the role of nurse practitioners given the profession's suitability to improving care delivery and addressing equity gaps <ul style="list-style-type: none"> ○ Nurse practitioners are uniquely poised to provide care to hard-to-reach populations and to people living in rural or remote areas who often experience difficulties accessing services
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Insights from key informants about the barriers to the integration of nurse practitioners in the Ontario health system

Key informants described seven main challenges to engaging nurse practitioners within the Ontario health system. Within governance arrangements, three main barriers were cited by participants: 1) legislative/regulatory; 2) scope of practice; and 3) participation in policy and organizational decisions. While all participants recognized significant gains over the past decade with respect to expanded scope of practice for nurse practitioners, there remain some interrelated legislative/regulatory barriers at both federal and provincial levels. These challenges primarily centred on the use of the term ‘physician’ in legislation, which limits who can complete forms. Examples include physician signatures required for death certificates (*Vital Statistics Act, 1990*), out-of-country forms and referral forms for coverage under extended health benefits. More inclusive language of ‘prescriber’ or ‘primary-care provider’ was suggested by a number of key informants. Related to legislative/regulatory barriers are limitations to scope of practice. The *Regulated Health Professions Statute Law Amendment Act, Bill 179, 2009* was cited as a barrier to point-of-care testing (e.g., urinalysis dip or pregnancy test) and ordering certain diagnostic tests (e.g., magnetic resonance imaging and CT scans).^(52; 53) Lastly, a number of participants expressed frustration with the lack of participation of nurse practitioners in policy and organizational decisions. The Ontario Medical Association was listed as a robust advocacy body for physicians, however, competing interests between the Ontario Nurses Association and Registered Nurses’ Association of Ontario were viewed as a challenge to giving nurse practitioners a voice in policy decisions.

The most significant barriers related to financial arrangements that were identified by key informants included three remuneration-related challenges. First, compensation and pay structures have not increased in response to an expanded scope of practice, which is an important factor in job retention and satisfaction.⁽³⁾ Second, although there is an array of funding mechanisms within primary care, some were identified as restricting nurse-practitioner remuneration and engagement in the sector more generally. For example, while Family Health Teams offer team-based interprofessional primary care, some key informants identified incentive bonuses for physicians as a barrier to providing collaborative care with nurse practitioners (e.g., by limiting the types of services provided such as well baby visits or smoking cessation). Third, participants also discussed challenges with the scope of the Ontario Health Insurance Plan (OHIP), particularly with physician billing. For example, one participant gave the example of medical assistance in dying services where both physicians and nurse practitioners can provide these services, but physicians are able to bill for services through OHIP whereas these services are included as part of salaried contracts for nurse practitioners.⁽⁵⁴⁾

Within delivery arrangements, the supply and distribution of nurse practitioners, role clarity and data monitoring systems were the main challenges identified by key informant interviews. For the supply and distribution of nurse practitioners, there is a growing demand for nurse-practitioner services in the province, but key informants indicated that many Ontarians do not have access to them due to limitations in the supply (e.g., overall size of the workforce) and geographic distribution of the workforce. In relation to role clarity for nurse practitioners, key informants emphasized the lack of awareness and a clear understanding of the nurse-practitioner role and scope of practice, and indicated that this can lead to tensions between professions. Examples of this identified during the interviews related to perceived ‘scope creeping’ or scope crossover: 1) within nursing (between registered nurses and nurse practitioners); 2) between physician assistants and nurse practitioners; and 3) between physicians and nurse practitioners in primary care. One participant indicated that “physicians have little to no understanding about what a nurse practitioner can do, which leads to tensions, but once we educate them and they work together, there is a shift. It’s all been very positive.” Lastly, in relation to data monitoring systems, issues with collecting comprehensive data on nurse practitioners was identified as a key barrier. In particular, while key informants noted that the Ministry of Health and Long-Term Care has robust systems to track physicians (e.g., OHIP billing), the Nurse Practitioner Access Reporting system does not collect the same level of data on nurse practitioners, which significantly limits the monitoring capabilities. Similarly, within hospital data systems there is not a common database to capture data specific to care delivered by nurse practitioners.

Insights from key informants about facilitators to the integration of nurse practitioners in the Ontario health system

Key informants indicated that the main facilitators for enhancing the integration of nurse practitioners in the Ontario health system related to governance and delivery arrangements, but not financial arrangements. In relation to governance arrangements, expansion of the scope of practice for nurse practitioners and implementation of a quality framework were identified as significant enablers to better engaging nurse practitioners in the system. First, participants noted that while challenges to practising to full scope remain (as identified above), many barriers have been overcome, which has cleared the way for significant improvements in their ability to provide care to their patients. The Government of Ontario has been responsive to approving regulations for scope of practice expansions. For example, some participants identified the 2017 inclusion of controlled substances in the scope of practice expansion as having allowed nurse practitioners to better address mental health and addictions for their patients. Second, participants noted that incorporating the use of a core framework for the implementation of the nurse-practitioner role, such as the participatory, evidence-based, patient-focused process for advanced practice nursing role development, implementation, and evaluation (PEPPA framework), as essential to role success.⁽⁵⁵⁾ The PEPPA framework was identified by participants as key to optimizing the nurse practitioner role and the long-term integration of the profession within the health system.⁽⁵⁵⁾

With respect to delivery arrangements, participants discussed the increasing awareness and demand for nurse-practitioner services as the key facilitator to greater integration. In particular, the advantages of a nursing holistic approach to care and the longer time spent in direct patient care compared to the medical model was cited as an important component to meeting the needs of underserved populations. The creation of models that either include nurse practitioners as part of an interprofessional team or are nurse practitioner-led are important enablers to the integration of nurse practitioners in the health workforce and system. For example, Nursing Stations are created in communities with a small population but with high health needs, in which a nurse practitioner is well suited based on education and training and because the approach does not rely on volume. Other examples of models that play an important role in increasing exposure to and recognition of nurse practitioners as autonomous health professionals include the provision of culturally sensitive care by nurse practitioners in Aboriginal Health Access Centres, Community Family Health Teams, Community Health Centres, and Nurse Practitioner-Led Clinics.

Insights from key informants about potential windows of opportunity to further integrating nurse practitioners in Ontario's health system

Key informants identified three potential windows of opportunity that could be harnessed to support changes towards enhanced integration of nurse practitioners in the Ontario health system. Within governance arrangements, the main window of opportunity to emerge was associated with the role of Provincial Chief Nursing Officer within the Ministry of Health and Long-Term Care. This position was viewed by participants as being central to increasing the visibility of nurse practitioners within the Ontario health system. The role is currently filled by a nurse practitioner (Michelle Acorn), and participants identified this as a key opportunity to leverage her expertise and knowledge of the profession in workforce planning and health-system decision-making.

For financial arrangements, key informants focused on the window of opportunity created by the recent political change in Ontario from a Liberal to Conservative government. Given the new government's focus on cost-saving measures, participants flagged this as an opening for enhanced integration of nurse practitioners because of their proven alignment with the health system 'triple aim'. Specifically, supportive research evidence for nurse practitioners on improving patients' satisfaction with care, health-system cost-

savings, and meeting population health needs was viewed as an opportunity to further integrate the profession.

Lastly, within delivery arrangements, participants identified ongoing workforce planning in the province as a window of opportunity to enhance the role of nurse practitioners given the profession's suitability to addressing equity gaps. Specifically, key informants indicated that while there are a number of areas where nurse practitioners could be instrumental in improving care delivery for underserved populations and addressing equity gaps, they are not currently being used to their full potential. In particular, key informants noted that there is an opportunity for nurse practitioners, as they are uniquely poised to provide care to hard-to-reach populations and to people living in rural or remote areas who often experience difficulties accessing services (e.g., expansions of current models such as Nursing Stations).(56; 57)

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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 (includes, economic evaluations and costing 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 engaging nurse practitioners in the health workforce

Type of review	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating by McMaster Health Forum	Proportion of studies that were conducted in Canada
Systematic review	Examining the effectiveness of nurse-led asthma care compared to physician-led care (34)	<p>The management of asthma is essential to reduce morbidity of the disease, and effective management requires engagement with health professionals. While care has historically been provided by physicians, this work has been shifting given the potential benefits for workload and financial savings.</p> <p>The current review examined five randomized controlled trials (RCTs) in order to examine the quality and effectiveness of nurse-led asthma care, compared to care provided by a physician. The effects of interventions were assessed across primary outcome measures, including frequency of exacerbations, asthma severity and symptoms, and healthcare costs. Secondary outcomes were assessed across patient-related, health economic, and objective measures pertaining to lung function.</p> <p>In terms of primary outcomes, no significant differences in the frequency of exacerbations or asthma severity was found between nurse-led and physician-led care groups. One trial found the cost of outpatient visits to a nurse-led care group to be significantly lower than visits to a physician-led group</p> <p>In terms of patient-related outcomes, there was no significant difference in quality of life between patients in the nurse-led or physician-led model of care. No major differences between groups were found relating to measures of health economics, including absence from school/work and hospital readmissions. Objective measures of lung function, airway reactivity, and airway inflammation found no significant differences between groups.</p> <p>This review found no significant differences between nurse-led and physician-led models of care for persons with asthma. However, nurse-led care may lead to savings on healthcare costs.</p>	2012	10/11	0/5
Systematic review	Examining the cost-effectiveness of nurse practitioners delivering transitional care (31)	<p>The transition from hospital care poses a potential challenge for patients and families, and the management of care in this period is essential.</p> <p>The review assessed five RCTs in order to examine the cost-effectiveness of nurse practitioners delivering transitional care. Outcomes of interest centred around objective measures of health-system utilization, including length of stay, costs of care, and resource use. Patient and provider outcomes were also examined.</p> <p>Across patient outcomes, the quality of evidence was low in the selected studies. Of 13 patient outcomes, complementary nurse-practitioner care was found to be equivalent to usual care among the majority. Measures of anxiety reduction and patient satisfaction were improved in models of nurse-practitioner care. Quality of evidence was also low across 11</p>	2012	9/11	1/5

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Type of review	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating by McMaster Health Forum	Proportion of studies that were conducted in Canada
		<p>health systems outcomes, but nurse-practitioner care was superior to usual care in terms of reduction of re-hospitalization. Quality of evidence was low among studies examining cost-effectiveness, thus making it impossible to conclude whether nurse practitioners in transition roles are cost-effective. No studies linked costs to outcomes.</p> <p>While challenges were posed by the quality of evidence examined by the current review, the results suggest that nurse practitioners may play a promising role in transitional care. Future research on the topic is needed.</p>			
Systematic review	Examining the impact of nurse practitioner services in the emergency department (33)	<p>The emergency department is a crucial point of quality care. In light of increased demand, there has been an uptake of nurse-practitioner services in this context.</p> <p>The review assessed 15 papers in order to examine the impact of nurse-practitioner services in the emergency department. Four outcomes of interest were studied: cost, waiting times, patient satisfaction and quality of care.</p> <p>Only one study directly examined the impact of emergency nurse-practitioner services on cost. This study found no significant differences in cost between services. Quality of care among nurse practitioner services was also poorly defined among the selected studies. However, the evidence suggests that patients engaging with this model of care experienced improved overall quality of care compared to other medical care groups. Ratings of patient satisfaction with emergency nurse-practitioner care found that this model of care enhanced satisfaction, in addition to reducing wait times and increasing quality of care. Among the current studies, waiting time analysis was well reported. Taken together, these studies generally suggest that the nurse practitioner model of care reduces waiting times in the emergency department.</p> <p>While positive outcomes were reported by the studies under examination in the review, greater evidence on the outcomes of interest is needed. Patient satisfaction, quality of care and waiting times were generally found to have positive impacts, but further robust research is needed to have an impact on policy and service developments.</p>	2013	8/10	0/15
Systematic review	Evaluating nurse practitioners working in primary or specialized ambulatory care (35)	<p>Ambulatory care describes a broad range of services that do not require a patient to stay in the hospital overnight. Given the extensive services encompassed by this form of care, enhancing the quality of provision within a cost-effective framework is a global challenge. The role of nurse practitioners in providing primary and specialized ambulatory care has been explored.</p> <p>The review examined 11 randomized controlled trials in order to evaluate nurse practitioners working in primary or specialized ambulatory care. Complementary and alternative nurse-practitioner roles were examined. Primary outcomes of interest centred on</p>	2013	8/10	0/11

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Type of review	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating by McMaster Health Forum	Proportion of studies that were conducted in Canada
		<p>objective measures of health-system utilization, including use of services, costs of care, and resource use. Patient and provider outcomes were also examined.</p> <p>This review found a paucity of evidence on health-system outcomes, indicating a need for further research. However, the evidence suggests that nurse practitioners are a cost-effective source of ambulatory care. This is particularly true in the primary-care setting, where nurse practitioners yield lower mean health-service costs compared to general practitioners. Nurse practitioners in an alternative role need to seek out general practitioners for select services, resulting in a higher use of resources in some instances. The evidence suggests that nurse practitioners in the complementary role are favoured by patient and provider outcomes, indicating the effectiveness of this role. While additional costs and resource use are expected given the added nurse-practitioner position in the complementary role, the goal of improved patient and provider outcomes explains this increase.</p> <p>When considering the cost-effectiveness of nurse practitioners in the ambulatory setting, it is important to recognize that savings often rely on the lower salaries of these professionals. Pay equity is a salient issue. Further research is needed to examine the cost-effectiveness of nurse practitioners in the ambulatory setting, given the growing burden of chronic disease and social inequity. Future research should be guided by a health economist.</p>			
Systematic review	Evaluating the effectiveness of advanced practice nurses in long-term care (32)	<p>As populations age, the need for effective and high quality long-term care becomes more prominent. The role of nurse practitioners in this setting is of growing interest, and the effectiveness of this role merits study.</p> <p>The review examined 15 papers describing four studies, in order to evaluate the effectiveness of advanced practice nurses in long-term care. The four studies did not test similar outcome measures and were described narratively in the review.</p> <p>Advanced practice nurse is a collective term referring to both clinical nurse specialists and nurse practitioners. Nurse practitioners are registered nurses with licensure to autonomously diagnose, order and interpret tests. Clinical nurse specialists are graduate-prepared nurses providing expert care, encompassing the role of clinician, consultant, educator, researcher and leader.</p> <p>Two studies examined the role of clinical nurse specialists in the long-term care setting. These studies indicated a positive impact of this role on health outcomes, such as an improvement or slowed decline in physical and cognitive function. The education and consultation dimensions of the clinical nurse specialist role contributed positively to health outcomes.</p>	2010	8/10	0/4

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Type of review	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating by McMaster Health Forum	Proportion of studies that were conducted in Canada
		<p>Two studies examined the role of nurse practitioners in the long-term care setting. This role largely focuses on direct patient care, and outcomes suggest patient and provider satisfaction in this setting. Under the care of nurse practitioners, nursing home residents are supported in achieving their own healthcare goals without added cost.</p> <p>While there was limited evidence to evaluate on the role of advanced practice nurses in long-term care, the four studies under review suggest positive outcomes among families and residents. Positive health outcomes and increased satisfaction support the idea that these health providers play a crucial role in this setting. Further research is needed to develop this field of research, and considerations on the scope of practice based on jurisdiction must be kept in mind.</p>			
Systematic review	Evaluating whether nurse practitioners can act as substitutes for doctors (23)	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>	2001	7/11	3/35

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Type of review	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating by McMaster Health Forum	Proportion of studies that were conducted in Canada
Systematic review	Assessing the effectiveness of greater scope-of-practice regulations for nurse practitioners (30)	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>	2015	6/10	0/15
Systematic review	Comparing nurse practitioner-physician co-management of primary care to solely physician-led primary care (27)	<p>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.</p> <p>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.</p>	2017	6/9	0/6

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Type of review	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating by McMaster Health Forum	Proportion of studies that were conducted in Canada
		<p>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.</p> <p>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.</p> <p>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-managements arrangements are still emerging, and further research is needed.</p>			
Systematic review	Evaluating the cost-effectiveness of clinical nurse specialists and nurse practitioners in inpatient roles (24)	<p>Advanced practice nurses, including clinical nurse specialists and nurse practitioners, play a critical role in addressing patient and family health needs. These professionals integrate a number of clinical and non-clinical roles and function in alternative or complementary provider roles. The cost-effectiveness of these advanced practice nursing roles merits further research.</p> <p>The study examined 43 RCTs in order to evaluate the cost-effectiveness of clinical nurse specialists and nurse practitioners in inpatient roles. Outcomes of interest to the present study focused on objective measures of health system utilization, including length of stay, costs and resource use. Additionally, patient and provider outcomes were considered, including patient/job satisfaction and quality of care/life.</p> <p>Only one study examined the role of clinical nurse specialists in inpatient settings. While this study found that the role of these professionals as complementary providers was equally</p>	2012	5/9	1/3

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Type of review	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating by McMaster Health Forum	Proportion of studies that were conducted in Canada
		<p>effective to usual care, the quality of evidence was weak. Given the importance of these workers in the inpatient setting, rigorous evaluations of their role must be conducted. Two studies examined the role of nurse practitioners in the inpatient setting. Across both studies, nurse practitioners were found to be equally effective as physicians in this role, while using equal or more resources and accruing equal costs. From these studies, it was not possible to determine the cost-effectiveness of these professional roles.</p> <p>This review identified a lack of research on the cost-effectiveness of advance practice nurses in the inpatient setting. Research should focus on developing metrics that may be used in the monitoring of quality and outcomes of care.</p>			
Systematic review	Determining the quantity of oncology care that is provided by nurse practitioners (20)	<p>Workforce issues may negatively impact the quality of cancer care in the future. Nurse practitioners can be used to fill the gap in the workforce within oncology care.</p> <p>The scoping review examined 10 studies in order to determine the quantity of oncology care that is provided by nurse practitioners. The review included six cross-sectional studies, two randomized controlled trials, one quasi-experimental study and one retrospective cohort study. The outcome variables were diverse throughout the review, and included the assessment of provider and patient satisfaction, the function of nurse practitioners, recommendations for enhancing the role of nurse practitioners, the identification of practice and physician characteristics that employ nurse practitioners, and the assessment of nurse practitioners in palliative-care interventions.</p> <p>The included studies were limited by methodological problems in data collection, including the use of self-reported data, and small sample sizes. None of the included studies specifically evaluated the quantity of care provided by nurse practitioners. Thus, there were several factors which limited the quantification of nurse practitioners, and because of this, an accurate estimation of the amount of care provided by nurse practitioners in oncology does not currently exist.</p>	2015	4/9	0/10
Systematic review	Evaluating strategies promoting patient throughput in the emergency department (22)	<p>The overcrowding of emergency departments is a primary concern in the healthcare system. Various models of care have been explored to promote patient care in this setting, including increased nursing scope of practice.</p> <p>The current review examined 21 studies in order to evaluate strategies promoting patient throughput in the emergency department. One of these strategies, expanded nursing scope of practice, is relevant to the current project. Outcomes of interest included a range of health and service variables such as emergency department length of stay and waiting time, quality of care, and patient satisfaction.</p> <p>Nursing roles, such as clinical initiative nurses and nurse practitioners, are an important component of the emergency department. One study in the current review found that the</p>	2014	4/10	3/21

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Type of review	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating by McMaster Health Forum	Proportion of studies that were conducted in Canada
		<p>introduction of the clinical initiative nursing role, which was introduced to support triage nurses, resulted in a reduced “did not wait” rate among patients in the department. Another study found a reduction in time from diagnosis to treatment when nurse-initiated diagnostic tests were ordered. Further, multiple studies indicated that nurse involvement reduced time to analgesia. Multiple studies reported that care provided by nurse practitioners reduced waiting times while being comparable to other care and services. Impact on cost, efficiency and re-presentation rates were not identified in the current review.</p> <p>The current review found evidence that the expansion of nursing roles in the emergency department has contributed to increased patient throughput to some extent. Future research should explore the effectiveness and impact of these expanded roles, using rigorous study methods.</p>			
Systematic review	Examining whether urgent-care clinics undermine or improve continuity of care (44)	<p>Urgent-care clinics are an important centre for care. However, given the nature of these clinics, there is concern that they may undermine the continuity of care provided by primary healthcare.</p> <p>The review examined 12 studies in order to examine whether urgent-care clinics undermine the continuity of primary care, or whether these clinics improve access to care. Three common themes emerged from the review of the literature: perceived barriers to primary care/benefits of alternate care; deflection of a patient and lack of collaboration between sites of alternate care and primary-care providers; and insufficient knowledge of the healthcare system or the presenting medical conditions.</p> <p>Patients reported a number of perceived barriers and benefits to alternate sources of care, such as that provided by an urgent-care clinic. Convenience was a major factor cited by patients, as the hours of primary-care providers are often inconvenient. The inability to make primary-care appointments with ease, particularly when facing an urgent medical issue, posed a barrier to patients. Lower socio-economic status and lack of insurance were barriers to care that often resulted in patients seeking alternate care sources. While presenting complaints in urgent-care clinics, emergency departments, and retail clinics were common complaints in the primary-care setting as well, the evidence suggested that alternate care sites provide to underserved patient populations.</p> <p>A patient can be deflected from a primary-care setting when they cannot be seen that day, have an acute medical need, or need same-day tests. Evidence suggests that this process often results in miscommunication and patient frustration. This process can disrupt continuity of care and lead to unmet medical needs.</p> <p>Three studies examined by this review observed that insufficient knowledge of the healthcare system was a driving force for patients to seek care at alternate sites. Lack of</p>	2014	3/9	0/12

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Type of review	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating by McMaster Health Forum	Proportion of studies that were conducted in Canada
		<p>knowledge relating to medical acuity, primary-care options, and proper use of services contributed to this pattern of use.</p> <p>While urgent-care clinics provide an important service to communities, inappropriate usage may undermine continuity in patient care. The deflection of patients from primary care settings, in addition to limited hours and appointments, may be contributing to this trend. Future research should explore the role of nurse practitioners in providing essential health services and education, in order to maximize the efficiency of the healthcare system.</p>			
Systematic review	Assessing the impact of nurse practitioners and physician assistants in the provision of care in the intensive-care unit (17)	<p>The involvement of advanced practitioners, such as nurse practitioners and physician assistants, in intensive-care units is expanding. As workforce demands increase, the impact of this practice is of interest.</p> <p>The current review examined 31 studies in order to assess the impact of nurse practitioners and physician assistants in the provision of care in the intensive-care unit.</p> <p>While there were limited studies reporting on the impact of nurse practitioners and physician assistants in the intensive-care unit, evidence suggests that these roles have positive outcomes. Studies found that patient care was improved, through the enhancement of flow, reduced resident work hours, and improved clinical and financial outcomes. Further, nurse practitioners were found to have a positive impact on care through the education and interaction of other nursing staff. Both nurse practitioners and physician assistants do not rotate off service, thereby providing greater continuity of care to patients and ensuring consistent adherence to protocols and guidelines.</p> <p>Future research should build on the findings of this review in four main areas. First, practice models should be explored to promote optimal practice. Second, additional research should be conducted on the varied roles that nurse practitioners and physician assistants may take in the intensive-care setting. Third, the supply and demand of staff must be considered such that proper training opportunities can be developed. Last, the billing and reimbursement practices for these workers must be explored.</p>	2007	3/10	Not reported in detail
Systematic review	Conducting an economic evaluation of nurse practitioner and clinical nurse specialist roles (25)	<p>The role of advanced practice nurses has been expanded to meet the developing health needs of the population. As the role of professionals such as nurse practitioners and clinical nurse specialists expands, economic evaluation of these roles is necessary to evaluate cost-effectiveness.</p> <p>The review conducted an economic evaluation of nurse practitioners and clinical nurse specialists by analyzing four key inputs. A narrative review of the literature was conducted, followed by a quality assessment of 43 randomized controlled trials. A narrative review of economic-evaluation guidelines was conducted in order to identify commonalities and</p>	2017	4/9	Not reported in detail

McMaster Health Forum

Type of review	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating by McMaster Health Forum	Proportion of studies that were conducted in Canada
		<p>discrepancies. Finally, experts were consulted to identify the strengths and limitations of economic evaluation. Findings from all of these sources were synthesized and analyzed.</p> <p>Results from the narrative review found challenges in economic evaluations, including the varying implementation of advanced practice nursing roles, the dependence on roles on individual attributes, and the difficulty in quantifying patient outcomes.</p> <p>The current review conducted a quality assessment of 43 randomized controlled trials and found that average quality was 39/100.</p> <p>The narrative review of economic-evaluation guidelines found relative consistency across guidelines.</p> <p>Consultations with experts resulted in a list of considerations that have been inconsistently followed. These considerations included comparators, perspective, time horizon, discounting, modelling, effectiveness, measurement and valuation of health, resource use and costs, analysis, uncertainty and reporting.</p> <p>The expanding roles of nurses in the health workforce necessitates an established economic-evaluation guideline. The current review proposed considerations for these guidelines based on an extensive review of the literature and consultations with experts. Some of these considerations are role-specific and must take the unique role of nurse practitioners and clinical nurse specialists into consideration. Future research is required to further develop economic evaluation in this field as roles evolve and the workforce grows.</p>			
Systematic review	Evaluating the outcomes of substituting nurse practitioners, physician assistants or nurses for physicians in long-term care and other care settings (26)	<p>Evolving population needs must be met by the health system. As the population ages, the workload on physicians increase. Alternative models of care, including those provided by nurse practitioners, nurses, and physician assistants, must be explored to address this issue.</p> <p>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.</p> <p>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 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</p>	2015	8/10	1/12

Type of review	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating by McMaster Health Forum	Proportion of studies that were conducted in Canada
		<p>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.</p> <p>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.</p>			
Systematic review	Exploring team collaboration after the introduction of a nurse practitioner (18)	<p>The scope of practice for nurses has expanded globally, with these professionals taking on greater responsibility for patients. Obstacles and opportunities for interprofessional collaboration must be examined as nursing roles develop.</p> <p>The review examined 26 studies in order to explore team collaboration after the introduction of a nurse practitioner. Four themes about the addition of a nurse practitioner emerged from the findings: threat to professional boundaries; resource for the team; autonomy and control; and necessities in the process of interprofessional collaboration.</p> <p>The addition of nurse practitioners to a healthcare team was found to be a process of adaptation and adjustment. Conflicting ideas about the role of nurse practitioners were found to affect the early stages of the role, but this eventually developed into an integrated role that strengthened care. Clear expectations from the entire team were necessary for collaboration, and trust developed over time.</p> <p>The acceptance of nurse practitioners as key resources to a healthcare team was found to improve communication and collaboration. Nurse practitioners contributed to continuity in the workplace and were often more available than physicians. While this review found evidence that some physicians felt responsible for nurse practitioners, some reported relief and satisfaction with the role.</p> <p>Autonomy was found to be central to the nurse practitioner experience, with many professionals looking for further learning opportunities from physicians. Physicians reported the nurse practitioner role as dependent, while nurses themselves described their role as independent.</p> <p>The development of interprofessional collaboration hinges on appropriate job description and role models. This review found that nurse practitioners initially felt alone and alienated in their new roles, and that it took time before scope of practice became clear.</p>	2012	5/9	Not reported in detail

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Type of review	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating by McMaster Health Forum	Proportion of studies that were conducted in Canada
		<p>The review highlighted the challenges and opportunities that emerge with the introduction of the nurse practitioner role to an interprofessional team. Clear expectations for nurse practitioners, as well as structural support, were found to be key factors for the successful implementation of this role. Future research should assess patient outcomes and further explore the ways in which healthcare organizations can support transitions.</p>			
Systematic review	Evaluating the cost effectiveness of nurse-practitioner care of childhood eczema (29)	<p>Past research has indicated that the substitution of nurse practitioners for dermatologists in the treatment of childhood eczema leads to similar patient outcomes. However, further research is needed into the economic impacts of this approach to care.</p> <p>The review evaluated six studies in order to compare nurse-practitioner care with dermatologist care. In addition, a randomized controlled trial was conducted, in which patients were assigned to conventional care by a dermatologist or to care by a nurse practitioner.</p> <p>The results of the randomized controlled trial indicate that the provision of childhood eczema care by nurse practitioners contributed to a reduction in healthcare and family costs, while maintaining effectiveness. Lower healthcare costs resulted from lower salaries and a reduced number of patient visits. Families who were cared for by nurse practitioners spent half the amount spent by families who saw dermatologists, mainly accounted for by time costs and out-of-pocket expenditures. In addition, this study found that patient satisfaction was improved when care was provided by a nurse practitioner. Greater satisfaction and improved cost-effectiveness suggest that nurse practitioners may be the preferred caregivers in this context.</p> <p>The review of costs indicated that costs varied between studies, making comparison difficult. This may have been due to the different settings under examination, as hospital-based care usually tends to more severe cases of eczema. More severe cases were found to be positively associated with higher costs. Different types of costs were included in this review, including eczema-specific and eczema-related costs.</p> <p>While international comparison of costs was limited in the review, the economic evaluation indicated that the provision of eczema care by nurse practitioners was cost-effective and resulted in patient satisfaction.</p>	2011	7/11	0/6
Systematic review	Evaluating factors influencing the implementation of nurse practitioners in Canadian health-care settings (28)	<p>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.</p> <p>The review examined 10 studies and two provincial reports in order to evaluate factors influencing the implementation of nurse practitioners in Canadian healthcare settings.</p>	2011	6/11	12/12

Enhancing Health System Integration of Nurse Practitioners in Ontario

Type of review	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating by McMaster Health Forum	Proportion of studies that were conducted in Canada
		<p>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.</p> <p>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.</p> <p>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.</p>			
Systematic review	Exploring organizational leadership in the implementation and development of advanced practice nursing roles (19)	<p>The review examined 10 papers and conducted qualitative interviews in order to explore the role of nursing leaders in the integration of advanced practice nurses into healthcare systems. A number of key themes emerged.</p> <p>The importance of nursing leaders was frequently cited across studies and interviews, as organizational priorities are set by senior team members to optimize effectiveness of nursing practice. Certain leadership challenges existed within nurse-practitioner teams, which involved the reallocation of tasks, changing relationships and team management. In response to these challenges, a number of strategies, including effective task reallocation, attention to relationships, team development and lesson-sharing, were proposed. Effective leadership was cited as crucial for streamlining the practice of advanced practice nurses, as role administrators can ensure that expectations are clear.</p> <p>Poor planning posed a barrier to effective role implementation of advanced practice nurses. The review and interviews identified a number of important components which must be considered when developing expectations and roles for advanced practice nurses. First, participants identified the utility of implementation toolkits which facilitate role implementation by acknowledging barriers and providing structure. Engaging stakeholders was cited as crucial, as the involvement of a range of healthcare providers contributed to effective planning.</p>	2008	5/9	Not reported in detail

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		<p>The implementation of the advanced practice nursing role was found to hinge largely on sustainable funding, adequate infrastructure and resources, the use of all role dimensions, the awareness of roles, and support and mentorship. Taken together, these factors contribute to a more sustainable approach to integration and protect professionals from the often-changing tides of economic conditions in the healthcare system.</p>			
Systematic review	Exploring factors promoting and inhibiting advanced practitioners from fulfilling their leadership role (36)	<p>Providing leadership is an essential but understudied aspect of the advanced practitioner's role. Understanding the factors impacting whether advanced practitioners, including nurse practitioners, fulfil their leadership roles is essential to ensuring the sustainability of their roles.</p> <p>The review included 34 studies. Barriers and enablers to leadership were categorised into four groups: healthcare-system level; organisational level; team level; and advanced-practitioner level.</p> <p>Barriers were most commonly cited at the organisational level, with 14 studies finding that a large clinical caseload limited advanced practitioners' ability to provide leadership. According to 11 studies, a lack of clerical and administrative support also limited the time advanced practitioners had to provide leadership. Limited resources, such as funds and IT resources, were also cited as barriers. Finally, relationships and organisational structures were found to be barriers because advanced practitioners were often not supported by key stakeholders and had limited connections to directors and management.</p> <p>At the healthcare-system level, a lack of opportunity to take on leadership roles was cited as a barrier in seven studies. Advanced practitioners were found to be restricted to their organizations' objectives, excluded from committees, and excluded from budget-holding and management positions.</p> <p>At the advanced-practitioner level, six studies reported that a lack of capacity and confidence to carry out leadership roles was a barrier. A lack of capacity came out of a lack of training, experience and mentorship in leadership.</p> <p>Six studies reported that having a lone advanced practitioner on a team was a barrier to enact leadership. Similarly, three studies reported that having multiple advanced practitioners on a team enabled practitioners to enact leadership.</p> <p>Organizational-level factors were also the most commonly cited enablers. Opportunities for networking within and outside the organization was the most commonly cited enabler as it allowed for sharing experiences and building alliances. Seven papers reported that mentorship was effective at building leadership capacity, especially for those just entering advanced-practice roles. Five papers found that having a clear leadership role description</p>	2015	7/9	4/34

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		<p>with an appropriate scope was an enabler of leadership. Furthermore, participation in internal committees, external committees and in research were all found to be enablers of leadership. Finally, having clear reporting structures and administrative support were reported as enablers in two papers.</p> <p>At the healthcare-system level, accreditation standards that demand evidence of participation in leadership activities were found to be enablers of leadership enactment in two papers.</p> <p>At the level of advanced practitioners, seven papers found that possessing certain personal attributes, such as the ability to lead teams and high levels of self-confidence, were conducive to enacting leadership. Four papers found that requiring advanced practitioners to have a master's degree also improved their leadership engagement.</p> <p>This review revealed that most barriers and enablers exist at the organizational level. The complexity of building leadership capacity was highlighted, but several promising developments have also been provided.</p>			

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<p>Systematic review</p>	<p>Integrating advanced practice nurses into health systems in Canada and identifying the factors that promote or impede further integration (21)</p>	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>Other tensions involved the expectations that physicians and administrators have of nurse practitioners. In acute-care settings, physicians expected nurse practitioners to be spending more time on direct patient care, while administrators preferred having some protected time for research, teaching and other activities. In primary-care settings, a tension exists between</p>	<p>2009</p>	<p>4/10</p>	<p>228/238</p>
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	<p>physicians and nurse practitioners with respect to nurse practitioners' independence to practice. Physicians largely oppose nurse practitioner-led clinics and working as consultants for nurse practitioners, and they favour having nurse practitioners act as assistants. Another potential area of role confusion lies between nurse practitioners and physician assistants. There was a perceived competition between physician assistants and nurse practitioners, and this was seen as a barrier to nurse practitioner role integration. Thus, key informants recommended clarifying the differences between the roles. Another potential competition exists between nurse practitioners and physicians. Given that nurse practitioners are frequently called upon to fill in during times of physician shortage, there is concern that they could be displaced when physician numbers increase.</p> <p>Another barrier is the difficulty in fulfilling the non-clinical aspects of the nurse practitioner role. Despite the value that nurse practitioners place on their research, teaching and leadership activities, time constraints and heavy patient workloads make it difficult to partake in these activities. Furthermore, nurse practitioners' ability to engage in research may be limited due to a lack of resources, knowledge and experience.</p> <p>The recruitment and retention of nurse practitioners is another challenge. A limited supply of and high demand for nurse practitioners was found to be a barrier in recruiting nurse practitioners. Retention issues were attributed to widely varying salaries for nurse practitioners, poor work environments, and the Agreement for Internal Trade. Recruiting nurse practitioners to rural and remote areas was another challenge mentioned by informants. Furthermore, the expanded role of registered nurses in these areas created some competition. However, informants noted that small and remote communities were more receptive of nurse practitioners.</p> <p>Role clarity was another area that was cited as needing improvement. The lack of clarity makes the role more vulnerable during times of budgetary constraint and when other roles come around. This is because there is limited clarity regarding how nurse practitioners can help achieve patient and health-system goals. Increasing awareness of nurse practitioners' education, scope of practice, and liability risks amongst physicians, administrators, health-system leaders, and the public was suggested. Healthcare team members who had worked closely with nurse practitioners in the past were found to be more likely to have a clear understanding of the role. Similarly, public support was also noted to be tied to awareness, so communication campaigns were suggested. Improving role clarity on interprofessional teams was suggested as a facilitator for role implementation.</p> <p>With respect to scope of practice, the legislative and regulatory differences between provinces, and the lack of a national framework, were seen as barriers. Specific examples of areas where scope of practice differences act as barriers include prescribing privileges, referral to specialists, and the level of consultation needed with physicians. Furthermore, limited admission and discharge privileges, and pharmacists' resistance to filling nurse practitioners' prescriptions were cited as barriers.</p> <p>The literature and key informants highlighted that leadership on the part of multiple stakeholders is needed to facilitate role implementation. Informants also mentioned that</p>			
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		<p>having an increased nursing presence in policymaking discussions could facilitate role implementation. Facilitating role implementation by improving resources for nurse practitioners and improving their integration within healthcare teams was also suggested. Furthermore, helping nurse practitioners connect with one another and engage in professional development was suggested to improve role implementation. Current union membership was not seen to represent nurse practitioners adequately, and there were mixed attitudes regarding whether union membership could help with role implementation.</p> <p>With respect to nurse practitioner-physician collaboration, numerous barriers were highlighted. Firstly, acute-care nurse practitioners were perceived as competing with residents for patient care opportunities and time with physicians. Furthermore, primary-care nurse practitioners and physicians experience barriers to collaboration due to funding mechanisms and the nature of the employer-employee relationship. However, there is evidence suggesting that primary-care physicians would be more receptive of nurse practitioners if their concerns regarding liability and reimbursement were addressed. Furthermore, interactions with nurse practitioners, a positive view of nurse practitioners, and a recent residency were found to be linked to greater acceptance of nurse practitioners amongst physicians.</p> <p>A frequently cited barrier to nurse practitioner role implementation is funding. The literature and informants highlighted that a lack of long-term funding for nurse-practitioner positions is a significant barrier. Furthermore, methods for obtaining funding are varied and some methods, such as the request-for-proposal process, leave areas with the greatest need for nurse practitioners at a disadvantage when competing for funding. Drawing from global budgets to fund nurse-practitioner positions was also seen as unsustainable because of the reallocation that must occur and the potential for budgets to shrink during times of economic downturn. Remuneration is another area of interest. Although most nurse practitioners supported being paid by salary, the magnitude of their salaries was noted to be inadequate given their skills and scope of practice. However, one informant posited that salaries need not be higher, rather, they need to be consistent across settings and regions to prevent issues with retention. A further issue revolves around how to best provide compensation for team-based care. Given that physicians may lose income by working with and shifting tasks to nurse practitioners, there is a disincentive to team-based care and nurse practitioner role integration. Finally, incentives provided to physicians to hire nurse practitioners may result in nurse practitioners being placed as employees rather than partners in providing care.</p> <p>Finally, evaluating the implementation of nurse practitioners in the health system has produced some evidence regarding the financial productivity outcomes of nurse practitioner care, but there are gaps in the evidence base regarding models of professional collaboration, the non-clinical aspects of the role, and patient-based quality-of-care indicators. Furthermore, new ways of measuring nurse practitioners' impact in primary-care settings are needed given that medical records cannot capture all that nurse practitioners do.</p>			
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Appendix 2: Summary of findings from primary studies about engaging nurse practitioners in the health workforce

Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
<p>Evaluating the cost-effectiveness of a nurse practitioner and family physician model of care in a Canadian nursing home (41)</p>	<p><i>Publication date:</i> 2016</p> <p><i>Jurisdiction studied:</i> Canadian nursing home</p> <p><i>Methods used:</i> Cost-effectiveness analysis using a controlled before-after design</p>	<p>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)</p>	<p>There is a shortage of family physicians to meet the primary health care demand in nursing home settings. The nurse practitioner-family physician model of care involved one nurse working with three 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.</p>	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>
<p>Evaluating the impact of multidisciplinary treatment teams involving nurse practitioners (43)</p>	<p><i>Publication date:</i> 2009</p> <p><i>Jurisdiction studied:</i> large university hospital in a European country</p> <p><i>Methods used:</i> two successive group time-series</p>	<p>Adult patients suffering from arthritis, 69 control participants and 78 in the intervention group</p>	<p>The intervention consists of adding a nurse practitioner to a multidisciplinary consultation care team with a rheumatologist, rehabilitation physician, plastic surgeon and an occupational therapist. The nurse practitioner was responsible for scheduling of consultations, pre-consultation assessment and information gathering, telephone follow-up post-consultation and referral logistics.</p>	<p>Multidisciplinary treatment teams may be useful in the treatment of patients, including those with chronic conditions such as rheumatoid arthritis.</p> <p>The study compared patients with rheumatoid arthritis who were cared for by a team including a nurse practitioner, with patients who did not see a nurse practitioner. Outcomes of interest included office-hours capacity, patient satisfaction, quality of life and costs.</p> <p>When a nurse practitioner was involved on the treatment team, office-hour capacity increased. While patient satisfaction scores were not significantly different, there was evidence that patients were somewhat more satisfied with care involving a nurse practitioner. Quality of life was not significantly different between groups. There was evidence that the intervention group incurred fewer costs than the control group in terms of total cost of medical tasks. While there are costs associated with adding a nurse practitioner to a team, some of these costs were offset by the nurse practitioner taking over some medical tasks.</p> <p>Taken together, this study indicated that the addition of a nurse practitioner to a multidisciplinary care team did not have significant impact on the</p>

Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
<p>Evaluating an innovative care model involving collaboration between a nurse practitioner, paramedics and family physicians in Long and Brier Islands (42)</p>	<p><i>Publication date:</i> 2009</p> <p><i>Jurisdiction studied:</i> Canada, the Long and Brier islands in Nova Scotia</p> <p><i>Methods used:</i> Structured questionnaires, individual and group interviews</p>	<p>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</p>	<p>The intervention was developed in response to the lack of primary health services for the predominantly older adult population on the remote islands.</p> <p>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.</p>	<p>outcomes of interest. Future research should further investigate cost-savings and take clinician satisfaction into account.</p> <p>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 team; and nature of collaboration.</p> <p>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 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.</p> <p>Residents were satisfied with the quality and type of care provided.</p> <p>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.</p> <p>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.</p> <p>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.</p>
<p>Examining the effect of a multidisciplinary care team on medication use (38)</p>	<p><i>Publication date:</i> 2012</p> <p><i>Jurisdiction studied:</i> Pharmacist and nurse practitioner teams near Ottawa</p>	<p>120 patients aged 50 or older at risk of adverse health outcomes</p>	<p>In response to the demands of evolving population and health system needs, a multidisciplinary healthcare team was developed involving three nurse practitioners and one pharmacist. In addition to</p>	<p>The study examined the effect of a multidisciplinary care team on medication use among at-risk patients. Medication use was assessed using the medication appropriateness index.</p> <p>According to the medication appropriateness measures taken at the outset of the study, a large proportion of patients were using medication inappropriately. However, by the end of the study this had been</p>

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	<p><i>Methods used:</i> Intervention arm of randomized controlled trial</p>		<p>usual care, home visits and telephone support featured in the intervention arm of this study.</p>	<p>significantly reduced. Factors such as age, number of medications, and education were all found to have an impact on risk of inappropriate usage. Given the prevalence of inappropriate medication use, such as the use of non-prescribed or unneeded medication, the involvement of a pharmacist in the study was of significant importance.</p> <p>The study only examined the intervention arm of a randomized controlled trial, thus conclusions are limited. However, these results suggest that the involvement of nurse practitioners and a pharmacist can lead to changes in appropriate medication use, reducing negative health outcomes.</p>
<p>Evaluating the impact of a nurse practitioner-led pain management-team in long-term care facilities (39)</p>	<p><i>Publication date:</i> 2016</p> <p><i>Jurisdiction studied:</i> Nurse practitioner teams in Canada</p> <p><i>Methods used:</i> Mixed methods</p>	<p>345 long-term care residents in Canada, with 139 assigned to the full intervention group, 108 assigned to the partial intervention group, and 98 assigned to the control group</p>	<p>The management of pain in long-term care facilities is a growing challenge. In this study, the full intervention had four main components: two “train-the-trainer” educational sessions; the development of an inter-professional pain-management team at each of the two intervention sites; an educational workshop; and reminders of the study. The partial intervention sites involved a nurse practitioner working as usual, with added support from an inter-professional pain-management team.</p>	<p>The study examined the impact of a nurse practitioner-led pain-management team on pain-related resident outcomes, clinical practice behaviours and quality of pain medication prescribing practices.</p> <p>Residents involved in the intervention demonstrated significantly reduced pain levels during activity over time. This decrease in pain was observed for both the full intervention and partial intervention groups. Significant improvements were also experienced in functional status in both of these groups.</p> <p>In terms of clinical practice behaviours, nurse practitioners in the full intervention group demonstrated significant improvements in the use of standardized pain assessment tools, identification of pain characteristics, use of proper forms, identification of pain causes, identification of goals, development of care plans, documentation of intervention effectiveness, and goal modification.</p> <p>Nurse practitioners were valued as important members of the team at both intervention sites. The personal attributes of these staff, as well as the positive resident and staff outcomes, contributed to this success. The Pain Team was regarded as important at intervention sites, due to contributions to staff education, best practice, communication and autonomy. While citing success, staff at the intervention sites acknowledged that barriers remained in the implementation of this model. These barriers included staff knowledge, communication, limited nurse practitioner availability and conflicting priorities.</p> <p>This study reported positive outcomes after the implementation of nurse practitioner-led pain-management teams at two intervention sites. The involvement of nurse practitioners improved clinical behaviour and reduced resident pain. Future research should build on these findings to develop the involvement of interdisciplinary teams within the context of long-term care.</p>

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<p>Examining the development of nurse practitioner practice in different healthcare settings (49)</p>	<p><i>Publication date:</i> 2017</p> <p><i>Jurisdiction studied:</i> Primary healthcare nurse practitioners in Quebec, Canada</p> <p><i>Methods used:</i> Case studies and semi-structured interviews</p>	<p>Three primary healthcare nurse-practitioner teams were examined, with interviews being conducted with key actors in each team</p>	<p>This study examined three case studies as part of a larger multi-centre study which focused on the integration of nurse practitioners in Quebec, Canada. Case studies were selected to demonstrate the integration of nurse practitioners across a variety of context and teams.</p>	<p>As health systems evolve, reliance on allied health professionals in primary-healthcare settings increases. In light of these changes, the structures and mechanisms that support the integration and development of nurse practitioners is of key interest.</p> <p>The study was part of a larger study examining primary-healthcare nurse practitioners in Quebec which examined six case studies. The article examined three of these studies and conducted 18 semi-structured interviews with key clinical actors. Three types of support practices that support the integration of nurse practitioners were identified by this study: clinical, team and systemic.</p> <p>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. Horizontal support between nurse practitioners was also found to be an important aspect of support. This support enhanced the effectiveness of workers by developing roles and responsibilities.</p> <p>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 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.</p> <p>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.</p> <p>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.</p>
<p>Collecting nurse practitioners' perspectives on how collaboration can advance the profession (45)</p>	<p><i>Publication date:</i> 2010</p> <p><i>Jurisdiction studied:</i> British Columbia</p>	<p>17 nurse practitioners from two health authorities in British Columbia</p>	<p>No intervention, but the participants were engaged shortly after the introduction of the nurse practitioner role in British Columbia.</p>	<p>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.</p>

Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
	<p><i>Methods used:</i> Participatory action research involving group dialogues</p>			<p>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 allowing for nurse practitioners to try new approaches and develop new collaborations to advance primary care.</p> <p>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.</p> <p>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.</p> <p>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 a better quality of care. However, nurse practitioners had to repeatedly educate team members about their role and reported being underutilized at times.</p> <p>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.</p>
<p>Surveying models of governance for the regulation of nurse practitioners and advanced practice nurses, with an</p>	<p><i>Publication date:</i> 2015</p> <p><i>Jurisdiction studied:</i> England; Wales; Northern Ireland; Scotland; Ireland; Finland;</p>	<p>The scoping review searched Medline, CINAHL, Web of Science, the Cochrane library, Google Scholar, and the websites of the</p>	<p>No intervention.</p>	<p>The study focused on governance models and regulation in 11 countries with established practice at the nurse practitioner/advanced practice nursing level.</p> <p>Of the 11 countries, six (Canada, Australia, Ireland, the Netherlands, New Zealand, and the United States) were found to have a highly regulated</p>

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<p>analysis of their impacts on practice (48)</p>	<p>Netherlands; Australia; Canada; New Zealand; United States</p> <p><i>Methods used:</i> Scoping review and data from the TASK-SHIFT2Nurses survey 2015</p>	<p>WHO, OECD, International Council of Nurses, and European Federation of Nurses. The TASK-SHIFT2Nurses survey involved 93 country experts from 39 countries, most of which were in the EU.</p>		<p>approach to task shifting to nurses. Three governance models were found to exist in these countries: national, decentralized, or regulation at the level of settings or employers. All the countries regulated nurses' prescribing practices to some extent. The locus of regulation varied as well, but it largely followed general patterns of governance within the health system of a country. In Canada, most of the regulatory authority defining nurse practitioners' scope of practice is decentralized.</p> <p>With respect to advanced practitioners' scope of practice, governance models can act as either enablers or barriers, depending on whether regulation is up-to-date with the educational preparation of practitioners. In the Netherlands, an experimental law was enacted in 2011 to expand the scope of practice for nurse practitioners and nurse specialists. This task shifting was to be evaluated before the law came for review again in 2016. In the United States, states determine scope of practice, and thus there are variations in the extent of task shifting across the country. In Australia, variations between states restricted professionals' mobility and practice; this is one reason why the locus of governance was transferred to the national level. The U.K.'s approach (leaving regulation to employers) has resulted in significant variations in scope of practice across settings.</p> <p>Evidence regarding governance models and role clarity comes from the U.K. and Finland, where there is minimal government regulation. Besides regulations on prescriptive authority, the role of nurse practitioners and advanced practice nurses has evolved opportunistically, and there may be less role clarity due to variations across settings and employers.</p> <p>There is minimal evidence examining the impact of governance models on patient safety and malpractice. One study from the U.S. found that 4.4% of a non-representative sample of 25,000 nurse practitioners had a liability claim brought against them in a 10-year period. There is some evidence suggesting nurse practitioners are less likely to have a malpractice case brought against them when compared to physicians. Although, this may be because collaborating physicians were more likely to be sued when they practised collaboratively with nurse practitioners.</p> <p>The availability of nurse practitioner and advanced practice nursing workforce statistics was found to be greater in countries with national or decentralized regulation. For the U.K. countries and Finland, workforce statistics were old and not very robust.</p>
<p>To survey nurse practitioners' settings of practice in primary</p>	<p><i>Publication date:</i> 2010</p>	<p>The survey was sent to 733 PHC nurse practitioners, with</p>	<p>No intervention.</p>	<p>The demographic and educational background of the survey respondents was similar to the average for Ontario. The average age of respondents was</p>

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<p>care, and examine what impacts different settings have on working conditions (47)</p>	<p><i>Jurisdiction studied:</i> Ontario</p> <p><i>Methods used:</i> 70-question survey</p>	<p>responses from 378 PHC nurse practitioners analyzed</p>		<p>45.6 years and 96.6% were female. Most respondents had a post-baccalaureate certificate or master's degree.</p> <p>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, physicians' offices, family health teams, hospitals and nurse practitioner-led clinics.</p> <p>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 MOHLTC. Positions in community health centres and family health teams were more likely to be salaried, while hospital-based nurse practitioners were more likely paid on 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.</p> <p>The clientele of nurse practitioners varied significantly by practice setting. Almost all nurse practitioners in physicians' 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.</p> <p>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</p>

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				<p>collaborating physicians to have improved 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.</p> <p>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.</p>
<p>To survey how nurse practitioners perceive their role and its implementation within public-health units in Ontario (46)</p>	<p><i>Publication date:</i> 2010</p> <p><i>Jurisdiction studied:</i> Ontario</p> <p><i>Methods used:</i> Postal survey</p>	<p>The survey was distributed to all nurse practitioners working in public-health units in Ontario (29 total), and 28 responded</p>	<p>No intervention.</p>	<p>Nurse practitioners are a relatively new addition to public-health units in Ontario. This study aimed to understand how nurse practitioners perceived the implementation of the nurse-practitioner role within public-health units.</p> <p>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.</p> <p>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 around 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.</p> <p>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</p>

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				<p>with physicians, being entrusted to participate in decision-making and being shown respect were commonly cited facilitators by the respondents.</p> <p>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.</p> <p>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.</p>



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