Collaborative Emergency Centres:
Rapid Knowledge Synthesis

February 2012

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How to cite this project:

Disclaimer:
This report is a summary of available literature and is intended to provide a starting point in considering current research evidence. Our research team took care when conducting this project and preparing this report, however the possibility exists that not all of the best evidence was found during our searches. Thus, the team shall not bear responsibility or liability for any missing data, incomplete information, or other errors that may be covered in this report. Please consult other sources to ensure that you have as complete a picture as possible related to any topics of interest covered within this report.
Contents

Executive Summary ............................................................................................................................ i
Short Report ...................................................................................................................................... iii-xi

Full Report:
Background ......................................................................................................................................... 1
Relevance and Potential Impact ........................................................................................................... 1
Collaborative Emergency Centres in Nova Scotia .............................................................................. 1
Using Evidence in Decision Making ................................................................................................... 2
Rapid Knowledge Synthesis Plan and Objectives .............................................................................. 3
Part 1: Scan of CEC-type Models ....................................................................................................... 4
Objectives .......................................................................................................................................... 4
Methods ............................................................................................................................................ 4
Results ............................................................................................................................................. 6
CEC-type Centres Across Canada ....................................................................................................... 6
Structures and Processes .................................................................................................................. 8
Part 2: Summarizing the Scientific Evidence for CEC-type Models ....................................................... 9
Objectives .......................................................................................................................................... 9
Methods ............................................................................................................................................ 9
Results ............................................................................................................................................. 15
Prioritized Searches ........................................................................................................................ 15
Non-Prioritized Searches ................................................................................................................ 27
Knowledge Translation ...................................................................................................................... 36
Acknowledgments ............................................................................................................................ 37
Contributions of Authors .................................................................................................................. 37
Declarations of Conflict of Interest .................................................................................................... 37
How to Cite Full Report Document: ................................................................................................ 37
Sources of Support ............................................................................................................................. 37
Appendices ......................................................................................................................................... 38
Appendix 1: Jurisdictional Review Scoping Searches – Resource List ................................................. 38
Appendix 2: Data Extraction Form for Scan of Jurisdictions Outside of Nova Scotia ....................... 40
Appendix 3: Original CEC Evidence Synthesis Review Questions ................................................... 44
Appendix 4: Jurisdiction Review Centre Selection Flowchart ............................................................ 46
Appendix 5: CEC-type Centre Summaries ......................................................................................... 47
Appendix 6: Final CEC Evidence Synthesis Review Questions
Appendix 7: Search Strategies
Appendix 8: Flow Charts of Database Search Results
Appendix 9: Data Extraction Questions from Distiller Form
Appendix 10: Evidence Tables for Included Reviews
Glossary of Selected Terms from the Report
References
Collaborative Emergency Centres: Rapid Knowledge Synthesis

Executive Summary

The Nova Scotia Department of Health and Wellness originally defined a Collaborative Emergency Centre (CEC) as “a model that brings together rural community emergency departments and local family practices to work together to provide seamless access to primary and emergency care to the community”. CECs have three formally linked components: a primary health care team, the capacity to provide urgent care, and protocols in place for emergency care.

Report objectives:
To inform decision making regarding the development and implementation of effective CECs across Nova Scotia by:

1. Defining CECs through the identification of potential structures, process and implementation strategies of CEC-type models in other jurisdictions.
2. Identifying scientific evidence that investigates the effectiveness of CEC-type models and their structures and processes for improving health outcomes.

Results:
Twenty-four potential structures and processes for CECs were identified, including components related to staffing, services, protocols, collaborative practices, governance/funding, research and evaluation.

A total of 55 systematic reviews were included in the evidence summary, and 11 records were included in additional scoping searches. These studies provided evidence on the effectiveness of CEC-type models and relevant components.

Overall messages:
- There is some scientific literature on various components of CEC-type models.
- There is good evidence from systematic reviews to support Nurse Practitioners working in primary care and in the ED with regard to patient satisfaction and compliance, with care at least equivalent to a physician-in-training.
- This review captured limited evidence from systematic reviews on the role of paramedics in the ED or primary care.
- There is limited but promising evidence from systematic reviews on the benefit of tele-consultation.
- Cost-effectiveness of these novel approaches is unknown.
- A growing number of collaborative models are in operation across Canada and the world; Nova Scotia has the opportunity to share and to lead.
- There is limited scientific literature on the concept of CEC-type models; there is room in this area for future research studies.

Who is this report for?
This evidence synthesis is intended for use by local health system stakeholders, policy and decision-makers within the Nova Scotia Department of Health and Wellness.

Information about this evidence synthesis:
This report has been developed into three sub-reports: an executive summary, a short report, and a full report. The executive and short reports are summaries, while additional and more comprehensive information is available in the full report.

Included in this report:
Information from a broad collection of literature and evidence sources. Searches were often restricted to systematic reviews. This is supported by information from published reports from other jurisdictions and stakeholder workshops.

Not included in this report:
- Primary research studies or detailed descriptions of individual study interventions within systematic reviews.
- Information not presented in the peer-reviewed literature except that provided through integrated knowledge translation process.
- We do not make recommendations for practice.

This knowledge synthesis project was undertaken by the Nova Scotia Cochrane Resource Centre with support from the Nova Scotia Health Research Foundation.
The Nova Scotia Department of Health and Wellness originally defined a CEC as “a model that brings together rural community emergency departments and local family practices to work together to provide seamless access to primary and emergency care to the community”. CECs have three formally linked components: a primary health care team, the capacity to provide urgent care, and protocols in place for emergency care.

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To inform decision making regarding the development and implementation of effective CECs across Nova Scotia by:

1. Defining CECs through the identification of potential structures, process and implementation strategies of CEC-type models in other jurisdictions.
2. Identifying scientific evidence that investigates the effectiveness of CEC-type models and their structures and processes for improving health outcomes.

**Research Methods:**
Our approach included two major parts: 1. Scanning of CEC-type models, 2. Summarizing the scientific evidence for CEC-type models.

We collected information on CEC-type models relevant to the Nova Scotia context through a scan of other jurisdictions. We summarized information on the structures and processes included in other models and iteratively refined an operational definition of a CEC.

We summarized the scientific evidence for CEC-type models. Comprehensive literature searches of the peer-reviewed and grey literature studies that provide evidence on the effectiveness of CEC-type models and their structures and processes were executed.

The project included an integrated knowledge translation process, including interactions with important Nova Scotia clinical and policy decision-makers, such as the Department of Health and Wellness, primary health care practitioners (family physicians, nurses), emergency care practitioners (members of Emergency Health Services, emergency physicians), and members of the Cumberland County Health authority involved in the development and/or functioning of the first implemented CEC, located in Parrsboro, Nova Scotia.

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- Information not presented in the peer-reviewed literature except that provided through integrated knowledge translation process.
- We do not make recommendations for practice.
Defining CECs:
Our operational definition of a CEC-type centre, which was finalized at a stakeholder workshop, is:

A CEC-type centre focuses on the delivery of health care services including both primary care and access to emergency care through a seamless collaborative team approach.

- Primary care encompasses access to health promotion, wellness, chronic disease management, illness and injury prevention, and diagnosis and treatment of illness and injury.
- Access to emergency care includes initial emergency stabilization of life-threatening conditions, response to (including treatment or referral) the majority of urgent conditions and those conditions of lesser urgency.

A health care provider must be available on-site, and has a formal supportive relationship with other professional(s) or institution(s) elsewhere through telephone or technological means.

Jurisdictional scan:
We selected 12 locations that represented CEC-type centres across selected Canadian jurisdictions (see Table 1).

Selected centres were from locations across Canada. Two centres were located in Alberta, two in British Columbia, two in Newfoundland and Labrador, two in the North West Territories, one in Nunavut, two in Saskatchewan, and one in the Yukon.

Three centres had a health care model with features and demographics similar to those of the CEC model in Nova Scotia, labeled “CEC-type centres with Nova Scotia context”. The remainder of centres are categorized generally as meeting the final operationalized “CEC-type centres” model definition.

Table 1: CEC-type centres identified from selected Canadian jurisdictions

<table>
<thead>
<tr>
<th>CEC-type centres with Nova Scotia context:</th>
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<tbody>
<tr>
<td>- Rainbow Lake Health Centre, Rainbow Lake, Alberta</td>
</tr>
<tr>
<td>- Ladysmith Community Health Centre, Ladysmith, British Columbia</td>
</tr>
<tr>
<td>- Dr. W. H. Newhook Community Health Centre, Whitbourne, Newfoundland</td>
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</tbody>
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<table>
<thead>
<tr>
<th>CEC-type centres:</th>
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<tbody>
<tr>
<td>- Northeast Community Health Centre, Edmonton, Alberta</td>
</tr>
<tr>
<td>- Oceanside Primary &amp; Urgent Centre, Parksville, British Columbia</td>
</tr>
<tr>
<td>- Hopedale Community Clinic, Hopedale, Newfoundland</td>
</tr>
<tr>
<td>- Fort Simpson Health Centre, Fort Simpson, North West Territories</td>
</tr>
<tr>
<td>- Wrigley Health Centre, Wrigley, North West Territories</td>
</tr>
<tr>
<td>- Igloolik Community Health Centre, Igloolik, Nunavut</td>
</tr>
<tr>
<td>- Black Lake Health Centre, Black Lake, Saskatchewan</td>
</tr>
<tr>
<td>- Cumberland House Health Centre, Northern Village of Cumberland House, Saskatchewan</td>
</tr>
<tr>
<td>- Health Centres (case: Dawson City Community Health Centre), Yukon</td>
</tr>
</tbody>
</table>

Introduction to Structures and Processes:
Twenty-four potential structures and processes relevant to CECs were identified. These included components related to health professional staffing, available services, use of treatment protocols, collaborative practices, funding and governance, research and evaluation. These define important considerations for CEC-type centres and directed our topics for evidence synthesis.

Seven structures and processes were prioritized through discussion amongst the research and investigator team and stakeholder workshop participants as of critical importance to the functioning and implementation of a CEC. There were 16 other important structures and processes relevant to CECs, but were not prioritized by Nova Scotia stakeholders.
Prioritized Structures and Processes:
1. **CEC-type models of health care delivery** considered the effects of CEC-type models according to our operationalized definition.
2. **Hours of access to health care services** were defined as the operational hours that emergency or primary care services are accessible to members of a community (for example, extended hours, access to on-call physician only, or daytime only).
3. **Health care professional staff available (emergency care)** included personnel who provide, or assist and support the provision of, care to patients in an organized emergency care facility. This included traditional and allied health professionals and support staff involved in care.
4. **Health professional staff available (primary care)** included personnel who provide, or assist and support the provision of, care to patients in an organized primary care facility. This included traditional and allied health professionals and support staff involved in care.
5. **Collaborative practices (primary or emergency care)** were described as multiple health professionals working together to provide care. This was defined broadly according to primary studies as ≥2 professionals involved in care.
6. **Telehealth/Tele-consultation** included off-site consultation and delivery of health services via remote telecommunication. Off-site consultation meant consultation via remote telecommunications (using various tools) of a health provider on-site to one at a distance to enhance local scope of practice. This is generally for the purpose of diagnosis or treatment of a patient. Delivery of health services via remote telecommunications included interactive consultative and diagnostic services for a patient communicating with a health care provider at a distance.
7. **Comprehensive set of diagnostic services available (primary or emergency care)** described having diagnostic services available, organized for the purpose of providing diagnosis to promote and maintain health (for example, x-ray and other forms of diagnostic imaging, blood work, electrocardiograms, and blood pressure monitoring).

Non-prioritized Structures and Processes:
8. **Structure of emergency services** represented the different methods of scheduling or prioritizing patient visits or waiting time in emergency departments (e.g., prioritizing care by triage).
9. **Structure or primary care services** represented the different methods of scheduling or prioritizing patient visits, appointment systems, individual or group appointments, or waiting times (for example, walk-in appointments).
10. **Emergency protocols or use of standing orders in emergency care delivery** provide a planned course of medical treatment from providers in the assessment and treatment of patients with acute illness or injuries. The use of standing orders signifies the use of written documents containing rules, policies, procedures, regulations, and orders for the conduct of patient care in various stipulated clinical situations.
11. **Destination and transfer plan in emergency health care delivery to manage patients** represented the inter-facility transfer and transportation methods of patients to obtain specific, definitive or specialist care not available on site. Options for destination plans may include transfer to community hospital, regional hospital, or tertiary care centre, emergency stabilization and transfer to increased care, referral to specialist care, or maximum patient observation time. Transfer mechanism options may include ground ambulance, air ambulance, or Medevac.
12. **Levels of service infrastructure in emergency and primary health care delivery** referred to the medical or health related services provided in one facility, compared to these services being offered through neighbouring facilities.
13. **Ambulatory clinic services available in primary health care delivery** are health services provided to patients on an ambulatory basis, rather than by admission to a hospital or other health care facility. Examples of ambulatory services include chemotherapy, intravenous medications, and orthopaedic follow-up.
14. **In-patient beds available within a community health centre** are set up and staffed for use in caring for patients who are deemed to require admission to a hospital.
15. **Formal community health needs assessment** for organizing health care services in a community represented the systematic identification of a population's needs to determine the proper level of services needed. Formal community health needs assessments could be in the form of an evaluation developed by a strategic planning team linked with representatives of a community advisory committee.
16. **Specific health promotion and prevention services available in primary health care delivery** encourages individuals’ behaviour to most likely optimize health potentials (physical and psychosocial) through health information, preventive programs, and access to medical care.

17. **Specific governance structure for a community health centre** considered the form that a governing body takes. A governing body oversees daily and administrative activities.

18. **Formal program evaluations for a community health centre** are designed to assess the efficacy of a program. They may include the evaluation of cost-effectiveness, the extent to which objectives are met, or impact of a program.

19. **Program funding structure for a community health centre** were the source and means by which programs and services are financed.

20. **Funding structure for health professionals at a community health centre** were the remuneration paid or benefits granted to an employee.

21. **Community awareness campaigns for a community health centre and availability of services** represented the use of communications media to interchange, transmit and receive information to increase awareness of services in a community.

22. **Recruitment and retention programs for rural health centres** were programs and/or plans (financial or otherwise) designed to incentivise and motivate physicians and employees to work in and remain in rural areas to provide health services.

23. **Affiliation with an education institution** represented a formal relationship with an academic institution to partner with in research and teaching initiatives.

24. **Conducting research at a community health centre** included basic or applied collaborative research efforts between centre staff and researchers from academic settings.

**Overall summary of research evidence:**

A total of 55 systematic reviews were included in the evidence summary of prioritized structures and processes (see Table 2 for overall screening results for prioritized searches). Eleven records were included from additional scoping searches for non-prioritized structures and processes (see full report for more information).

<table>
<thead>
<tr>
<th>Table 2: Flow chart of overall screening results for prioritized searches</th>
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<tbody>
<tr>
<td>Records identified through database searching (n=6545)</td>
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<tr>
<td>Records screened after duplicates removed (n=6277)</td>
</tr>
<tr>
<td>Records excluded at title/abstract stage (n=5931)</td>
</tr>
<tr>
<td>Full text assessed for eligibility (n=259)</td>
</tr>
<tr>
<td>Full text identified as primary studies (n=203)</td>
</tr>
<tr>
<td>Reviews identified and data extracted (n=56)</td>
</tr>
<tr>
<td>Articles included in synthesis (n=55)</td>
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</table>
Summary of the research evidence on CEC-type models of health care delivery:

**CEC-type models**

We identified 1723 unique records potentially relevant to the effectiveness of CEC-type models of health care delivery. We selected 45 that we reviewed in full text (32 primary studies and 12 grey literature documents). None of the identified studies met our CEC-type model definition selection criteria.

**Key Messages**

- There is limited scientific literature on the concept of CEC-type models as a health care delivery model.
- This is an area for future research studies.

Summary of research evidence on the effectiveness of specific structures and processes relevant to CEC-type models of healthcare delivery:

**Hours of access to health care services**

We identified and screened 835 unique results. We identified two well-conducted systematic reviews related to the impact of hours of health care service delivery on individual or community health outcomes (1, 2).

**Key Messages**

- Lack of evidence is available on the impact of alternative models of after-hours care.
- Telephone triage and advice lines appear to reduce medical workload, have potential to reduce costs, but need to be balanced against reduced patient satisfaction.
- While ED overuse is associated with lack of hours of access to primary care, expanding these services does not appear to have a major impact on reducing inappropriate ED use.

**Health care professional staff available (emergency care)**

We identified and screened 496 unique results and 46 records were reviewed in full text. We identified eight systematic reviews on the topic of the effect of health care professional staff available in an emergency care delivery environment on health outcomes (3-10). They included novel medical and non-medical roles in the emergency care delivery settings. These systematic reviews assessed a small number of RCTs, more frequently including lower levels of study designs. Four systematic reviews investigated the effect of nurse practitioners (NPs) or NPs and other non-medical staff in the ED (4,7,8,10). These systematic reviews investigated studies conducted in combined adult and paediatric populations (4,7), or in adult only populations (10). Hoskins (2011) examined the effect of emergency NPs, expanded-scope physiotherapists and emergency care practitioners in all emergency care settings (7). The other four systematic reviews each investigated one of the following health professional roles/models: triage liaison physicians (9), pharmacists (5), physician assistants (6), and multidisciplinary teams targeted toward frequent ED users (3).

**Key Messages**

- Patients accept and are satisfied with the care provided by NPs and physician assistants in the ED.
- Additional patient contact time afforded by alternative ED staffing is associated with improved communication and increased health promotion.
- Shorter length of stay may be associated with greater patient satisfaction.
- The quality of care provided by NPs and physician assistants vs. residents in the ED is comparable.
- Case management may reduce ED use for specific groups of vulnerable patients and also for all frequent users of EDs.
- Financial implications of staff changes might be significantly different in Canada (current evaluation data is inadequate).
- Data from systematic reviews on other health professionals in these roles is lacking.
Health care professional staff available (primary care)
We identified and screened 1052 unique results, 78 records were reviewed in full text. Twelve systematic reviews evaluated the effect of different primary care staff on health outcomes (11-22). Reviews assessed the effectiveness of including specific staff in the fields of: 1. General primary care, 2. Mental health, and 3. Various other primary care populations.

Key Messages
- NPs in primary care as substitutes in the same role as GPs has been shown to have no difference in care, and to have improvement in patient compliance, knowledge, or satisfaction.
- Evidence is lacking for cost-effectiveness analyses and examination of long-term effects of the addition of health care professional staff in primary care; the few cost studies available suggest similar or increased costs with NP compared to extra salaried GPs.
- Nurse- and pharmacist-led care for hypertension was found to be effective for hypertension and heart failure. Specialist nurse care in treating diabetes resulted in neutral outcomes.
- There is modest evidence to support the addition of pharmacists, paraprofessionals and mental health care workers in primary care settings for mental health.
- Characteristics of health care providers, including training and experience, should be reported more consistently in studies.

Collaborative practices (primary and emergency care)
We identified and screened 1521 unique results, 127 records were reviewed in full text. We identified 18 systematic reviews that assessed the effectiveness of collaborative models of care (23-40). Nine systematic reviews assessed the team-based models of collaborative care in: 1. ED, and 2. Primary care (mental health and other chronic diseases). Systematic review definitions of collaborative care ranged from broad (e.g., multiple professionals involved) to more specific (e.g., multifaceted intervention involving combinations of three distinct professionals working collaboratively within the primary care setting: a case manager, a primary care practitioner, and a mental health specialist [to be included in the review, studies had to involve two of these three components of collaborative care]). Collaborative care was most commonly defined by the number of health professional disciplines involved in patient care.

Key Messages
- Collaborative care (multidisciplinary models) in primary care settings has been shown to consistently improve symptoms and management of chronic disease (depression, hypertension).
- Collaborative care has been consistently found to be more expensive than usual care (other than Community Mental Health Teams), although additional high quality economic evaluations are required.
- The introduction of multidisciplinary teams to the ED may be successful in improving access, however, more research is needed.
- No consistent improvements in health outcomes were observed in many studies examining shared GP-specialist consultation in primary care management of chronic health conditions.
- Generalizability to the Nova Scotia CEC model is limited as these collaborative models focus largely on physician collaboration with either another physician or an allied health professional, and do not examine the idea of two non-physicians working collaboratively.
Tele-Consultation/Telehealth
A good quality review of reviews on the topic of telehealth, published in 2009, was identified (41). We conducted searches to locate reviews published after 2009. We identified 663 unique results. Fifty-one records were reviewed in full text. Fourteen additional systematic reviews published after 2009 were selected (42-55). These systematic reviews assessed the effectiveness of telehealth in: 1. Off-site consultation, 2. Mechanisms for off-site communication, and 3. Off-site health care delivery.

Key Messages
• Studies on telehealth are heterogeneous, making it difficult to draw general conclusions from studies.
• Despite a large number of studies and systematic reviews on the effectiveness of telemedicine, high quality evidence is still lacking (mostly observational studies are available).
• Reviews demonstrate that telehealth services do not appear to harm patients and are both reliable and feasible in this limited assessment of non-emergency conditions.
• The effect of tele-consultation on clinical outcomes is not clearly established (finding are mixed and many studies show no difference from usual care).
• Studies of telehealth for service provision in chronic/mental health conditions report neutral to positive findings.
• Few studies examine the cost effectiveness of tele-consultation.

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We appreciate the assistance and support of Fred Burge, Alana MacLellan, Jenny Cartwright, and Kristy McGill throughout this rapid evidence synthesis project. We also thank all stakeholder workshops attendees for their support.

Declarations of Conflict of Interest:
No conflicts of interest have been declared by the authors.

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2. Leibowitz R, Day S, Dunt D. A systematic review of the effect of different models of after-hours primary medical care services on clinical outcome, medical workload, and patient and GP satisfaction. Family Practice [serial on the Internet]. 2003; (3).


Collaborative Emergency Centres: Rapid Knowledge Synthesis

Full Report

Background

Relevance and Potential Impact

Long wait times, lack of access to primary care resources, and inadequate access to emergency departments (EDs) are noted as the greatest issues plaguing health care in Nova Scotia (67). These issues are not unique to the province; meeting the needs of health care communities across Canada and around the world is recognized as a challenge (68, 69).

Collaborative Emergency Centres (CECs) are a unique potential solution to these access issues in Nova Scotia. CECs are a new model of health care delivery that bring teams of nurses, doctors and other health providers under one roof to provide improved access to timely primary health care, and appropriate access to 24/7 emergency care (69). CECs have three formally linked components: a primary health care team, the capacity to provide urgent care, and a protocol in place for emergency care. This collaborative and integrative care model is different from traditional models of care, in which the delivery of emergency and primary care are typically distinct (70). Potential solutions to alleviate health care access issues through similar collaborative care models have been implemented in other Canadian provinces (71, 72) and countries, including Australia (73, 74), New Zealand (75), and the United Kingdom (73, 76). It is useful to understand the strategies and components that have been implemented in other jurisdictions, and to assess the strength of evidence supporting these potential strategies to promote effective implementation of CECs in Nova Scotia.

This rapid knowledge synthesis project aims to inform decision making regarding the development and implementation of effective CECs across Nova Scotia by:

1. Defining CECs through the identification of potential structures, process and implementation strategies of CEC-type models in other jurisdictions.
2. Identifying scientific evidence that investigates the effectiveness of CEC-type models and their structures and processes for improving health outcomes.

Collaborative Emergency Centres in Nova Scotia

CECs seek to fulfill a key commitment of the Better Care, Sooner report by helping to address issues of ED overcrowding and long wait times to see general practitioners (67). The Nova Scotia Department of Health and Wellness points out that their objective is to “keep EDs open, reduce patient wait times and provide a team-based approach that offers continuity of care” (77-81). The first CEC was announced in April 2011 and opened in Parrsboro in July 2011 (82). In October 2011, CECs were announced for Tatamagouche, Pugwash, and Springhill (77-79). In November 2011, a CEC was announced for Annapolis Royal (80). It is projected that these CECs will be scheduled to open in the coming months. In December 2011, it was publicized that the province of Nova Scotia will invest $6.8 million to establish more CECs across the province (81).
Using Evidence in Decision Making

The implementation and continued quality improvement of CECs in Nova Scotia, like other policy and clinical decisions, is best informed by relevant and comprehensive evidence, when available. Evidence-informed decision making involves the translation of the best available research evidence compiled through a transparent and systematic process. Knowledge translation is a term used to describe the integration of evidence into decision making. The Canadian Institutes of Health Research (CIHI) defines knowledge translation as a “dynamic and iterative process that includes the synthesis, dissemination, exchange and ethically sound application of knowledge to improve health, provide more effective health services and products, and strengthen the health care system” (83).

Using research evidence in policy and clinical decision making can enable a transparent and systematic process to clarify a problem, frame options to address it, and define how an option can be implemented within even the most dynamic decision making processes, thus helping to protect against error or bias (84). The effective use of evidence-informed decision making can also lead to the provision of more successful programs and practices, and subsequently benefit policy and decision making by improving health outcomes (85).

There are many types of evidence syntheses available that may inform decision making (see the Glossary for descriptions of different types of evidence syntheses, including scoping reviews, jurisdictional reviews and rapid reviews).
Rapid Knowledge Synthesis Plan and Objectives

The overall approach in this rapid knowledge synthesis project followed principles important for knowledge syntheses: systematic and transparent methods that minimize potential bias. We considered the required time frame of a rapid knowledge synthesis, the complexity of the topic area and the necessity of producing a summary of value and relevancy to decision makers in Nova Scotia. To accomplish this, we adapted methods for rapid reviews (emphasizing expedited systematic review methods) with the methods of a jurisdictional review (86) and integrated knowledge translation (87).

Our approach included two major parts: 1. Scanning of CEC-type models, and 2. Summarizing the scientific evidence for CEC-type models. Results from an integrated knowledge translation process, including interactions with important Nova Scotia CEC stakeholders, are embedded within these major parts of the report.

We first scanned for existing CEC-type models. This part of our project included clearly defining a ‘CEC-type model’ through scoping the literature and other jurisdictions. Initial scoping searches clarified our review questions. We collected information on CEC-type models relevant to the Nova Scotia context through a scan of other jurisdictions and summarized information on the structures and processes that they included.

Summarizing the scientific evidence for CEC-type models was the second major part of our project. The evidence summary involved searching for relevant peer-reviewed and grey literature. We summarized available evidence to determine the effectiveness of CEC type-models, and their structures and processes.

We used an integrated knowledge translation approach, engaging clinical and policy decision makers to help refine our evidence summary questions and interpret findings relevant for CECs in Nova Scotia. This was executed through two half-day workshops with selected stakeholders, including representatives from groups relevant to CECs in Nova Scotia, such as the Department of Health and Wellness, primary health care practitioners (family physicians, nurses), emergency care practitioners (members of Emergency Health Services, emergency physicians), and members of the Cumberland County Health authority involved in the development and/or functioning of the first implemented CEC, located in Parrsboro, Nova Scotia (82).

The goals of the first stakeholder workshop were to discuss approaches and methods for evidence synthesis, discuss the objectives and approach of our project, and refine definitions and priorities within the project. The goals of the second workshop were to discuss our findings, key messages, and future dissemination plans.
Part 1: Scan of CEC-type Models

Objectives
The objectives in the scanning of CEC-type models were to investigate:

1. What CEC-type models have been applied in jurisdictions outside of Nova Scotia
2. What components are included in these health care delivery models
3. How CEC-type models are assessed (e.g., what outcome measures are used?)

Methods
Prior to beginning the scan of jurisdictions outside of Nova Scotia, we conducted a brief scoping search of the literature. We consulted peer-reviewed literature, grey literature, and documentation on CECs provided by the Nova Scotia Department of Health and Wellness to determine a preliminary list of structures and processes essential to CECs, and establish the extent and range of jurisdictions to be selected for the scoping process. We initially scanned primary government and department of health government websites, and scanned the peer reviewed literature to support the decision making process regarding search strategy and feasibility.

We conducted a scan of Canadian jurisdictional resources to locate relevant centres and determine their structures and processes. The jurisdictional scan process included:

a. Selecting jurisdictions
b. Identifying resources and developing a search strategy
c. Searching for relevant CEC-type centres
d. Selecting relevant CEC-type centres
e. Data extraction of digital information potentially relevant to CECs
f. Suitability of CEC-type centres
g. Telephone follow-up with key CEC-type centres

a. Selecting jurisdictions: We selected Canadian jurisdictions according to their similarities in health care models and demographics to Nova Scotia for the scoping process. The provinces of Ontario and Quebec were not included as Ontario’s e-presence contained far too much information to be manageable in a restricted timeline, and Quebec e-documents were primarily written in French.

b. Identifying resources and developing a search strategy: Relevant digital resources were selected for individual jurisdictions by a librarian researcher for the jurisdictional scan. Selected resources were:

- Government and health department websites
- Individual health authority websites
- Research citation databases (Canadian Business and Current Affairs Complete, PubMed)
- Search engines (Google, Google Scholar, Google news)

We also included any sites related to jurisdictional health care systems discovered through the search process. A full list of websites searched is available in Appendix 1. The search of digital information was comprehensive, however, focusing on digital formats limited our jurisdictional scan, as not all information and news becomes translated to digital format. Furthermore, all documents may not be made publicly available, and thus would not have been retrieved through this process.

One librarian researcher identified relevant search terms to use in the jurisdictional scan by reviewing the terms used in located documents. We consistently searched these terms when a search option was available: “primary and emergency”, “collaborative care”, “collaborative health”, “team model”, “integrated care”, “health centre”, “community health centre”, “community health centres”, “urgent”, and “urgent and primary”. Inconsistency of
language related to CEC-type models across jurisdictions required adding terms to individual search strategies. Additional search terms included jurisdiction-specific nomenclature for potential CEC-type models, and specific locations or names of potential CEC-type centres.

c. Searching for relevant CEC-type centres: Each jurisdictional search began with a scan of primary government and government health websites. In the case of government sites, we scanned reports and publications oriented towards health services (Canadian government websites consistently link to publications and reports on a navigation pane). In addition, we scanned government department of health websites for lists of health centres, lists of services provided, and news releases. All webpages with titles that appeared relevant to alternative models of care, listing models of care, or listing health centres were also scanned. All websites searched are listed in Appendix 1. The search strategy was executed on each website.

A single researcher conducted all of these searches to ensure consistency. A maximum of three business days was used for scoping of each jurisdiction to ensure timely completion of the jurisdiction scoping process. We consulted co-investigators for additional sites or centres we may have missed through our search process.

d. Selecting relevant CEC-type centres: Our original working definition was provided through preliminary documentation on CECs in Nova Scotia produced by the Nova Scotia Department of Health and Wellness, defining CECs as “a model that brings together rural community EDs and local family practices to work together to provide seamless access to primary and emergency care to the community”. We used this preliminary definition to determine which centres should be considered CEC-type centres.

We selected any centres that appeared to have:

- A mix of primary, urgent and/or emergency care services in one location
- Been designed as a primary point of access to care for a community

It was required that these components be present in searched documents for a jurisdiction to be included.

e. Data extraction of digital information potentially relevant to CECs: We developed a data extraction form (Appendix 2) based on our previously established template of structures and processes, and through consultation with the research team. We collected the following information about the CEC-type centres, their structures and processes:

- General information on the selected CEC-type centre
- Hours of service
- Staffing
- Health care provider collaboration
- Triage
- Protocols and standing orders
- Destination and transfer plans
- Capacity
- In-patient beds
- Off-site communication and telehealth
- Health promotion and prevention services
- Governance
- Program funding and practitioner funding

A single reviewer completed data extraction for each of the selected centres and added any relevant new components iteratively. In the event of conflicting information, the most current source of information was considered, or one researcher contacted the centre to clarify.
We used a saturation approach to data collection and extraction: we continued identifying new centres and extracting information on CEC-type model components when available evidence or new centres were found. Not only was this process essential to the scoping of other jurisdictions, it also supported the development of a comprehensive set of 29 structure and process questions and their respective definitions to guide the literature searches. The original list of these 29 questions is available in Appendix 3.

f. Suitability of CEC-type centres: Selected centres were revisited through different levels of the scanning process of CEC-type models. Centres were excluded in later stages of the review process based on narrowing of our definition of CEC-type models, through consultation with investigators and stakeholders. Inclusion and exclusion of centres was based on CEC-type model criteria and were assessed by two researchers with conflicts resolved through consultation among the research team.

In the event of lack of clarity regarding the appropriateness of a centre based on our inclusion criteria, one researcher contacted the centre via telephone (using a telephone number provided on public domain resources) to confirm whether or not they met inclusion criteria.

Included centres were categorized as “CEC-type centres with Nova Scotia context”, and “CEC-type centres”. Centres defined as “CEC-type centres with Nova Scotia context” met the criteria of having a health care model closely related to the CEC model and a similar target population to Nova Scotia. Centres defined as “CEC-type centres” met the criteria of having a health care model closely related to the CEC model.

To determine the suitability of each centre, two researchers considered the final list of CEC-type centres. Each researcher individually selected centres with key similarities to the Nova Scotia model based on population and service models, and centres noted as meeting CEC-type model requirements but having any special conditions. The results of both researchers were compared. Centres were included in selected categories when there was consensus; conflicts were resolved through discussion between the two researchers. Any unresolved conflicts were brought to the attention of the research team for resolution.

g. Telephone follow-up with key CEC-type centres: We contacted selected centres demonstrating particular relevance to the Nova Scotia context to ensure accurate and thorough understanding of individual jurisdictional practices as described through web presences.

One researcher called relevant centres at the telephone number provided on public domain resources. The researcher described the rapid knowledge synthesis project in brief, and requested to speak with a manager or supervisor at the centre. The researcher followed a semi-structured list of questions on staffing models in primary and emergency care, collaborative care in primary and emergency health care delivery environments, off-site consultation and mechanisms for off-site health care delivery, the CEC-type model as a whole, and formal evaluation methods at the centre. Questions were formulated to clarify and give context to content available through centres’ online presences.

Information from telephone contact was integrated into the data extraction and summarizing process of the scan of jurisdictions.

Results

CEC-type Centres Across Canada
We identified 26 CEC-type centres across select Canadian jurisdictions. Twenty-five were identified during the scan of jurisdictions and one additional centre was recommended through consultation with the investigator team. Information about the centres, structures and processes were extracted for all 26 centres. Subsequent reassessment and refining of our selection of centres occurred iteratively after further operationalizing our definition
Collaborative Emergency Centres: Rapid Knowledge Synthesis
Nova Scotia Cochrane Resource Centre

of a CEC-type centre.

Our definition of “CEC-type centres” (supporting the ability to define the scope of the project) was finalized following group discussions at the first stakeholder workshop:

A CEC-type centre focuses on the delivery of health care services including both primary care and access to emergency care through a seamless collaborative team approach.

- Primary care encompasses access to health promotion, wellness, chronic disease management, illness and injury prevention, and diagnosis and treatment of illness and injury.
- Access to emergency care includes initial emergency stabilization of life-threatening conditions, response to (including treatment or referral) the majority of urgent conditions and those conditions of lesser urgency.

A health care provider must be available on-site, and has a formal supportive relationship with other professional(s) or institution(s) elsewhere through telephone or technological means.

This working definition was used to determine relevancy throughout the rapid knowledge synthesis project.

After final operationalization of the definition of CEC-type centres, 14 centres were excluded. Our final list of CEC-type centres in jurisdictions across selected Canadian jurisdictions included 12 specific locations, listed in Table 1. The total number of centres considered, and the level of exclusions can be seen in a flow chart (Appendix 4).

Selected centres were located across Canada. Two centres were located in Alberta, two in British Columbia, two in Newfoundland and Labrador, two in the North West Territories, one in Nunavut, two in Saskatchewan, and one in the Yukon.

Three centres had a health care model with features and demographics similar to those of the CEC model in Nova Scotia, labeled “CEC-type centres with Nova Scotia context”. The remainder of centres are categorized generally as meeting the final operationalized “CEC-type centres” model definition.

<table>
<thead>
<tr>
<th>Table 1: List of CEC-type centres</th>
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<tr>
<td><strong>CEC-type centres with Nova Scotia context:</strong></td>
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<tr>
<td>- Rainbow Lake Health Centre, Rainbow Lake, Alberta</td>
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<td>- Ladysmith Community Health Centre, Ladysmith, British Columbia</td>
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<tr>
<td>- Dr. W. H. Newhook Community Health Centre, Whitbourne, Newfoundland</td>
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<tr>
<td><strong>CEC-type centres:</strong></td>
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<tr>
<td>- Northeast Community Health Centre, Edmonton, Alberta*</td>
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<tr>
<td>- Oceanside Primary &amp; Urgent Centre, Parksville, British Columbia†</td>
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<tr>
<td>- Hopedale Community Clinic, Hopedale, Newfoundland</td>
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<tr>
<td>- Fort Simpson Health Centre, Fort Simpson, North West Territories</td>
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<tr>
<td>- Wrigley Health Centre, Wrigley, North West Territories</td>
</tr>
<tr>
<td>- Igloolik Community Health Centre, Igloolik, Nunavut</td>
</tr>
<tr>
<td>- Black Lake Health Centre, Black Lake, Saskatchewan</td>
</tr>
<tr>
<td>- Cumberland House Health Centre, Northern Village of Cumberland House, Saskatchewan</td>
</tr>
<tr>
<td>- Health Centres (case: Dawson City Community Health Centre), Yukon</td>
</tr>
</tbody>
</table>

*The Northeast Community Health Centre in Edmonton, Alberta is an innovative model of primary health care delivery that combines community-based services with a 24-hour ED (88). This large urban ambulatory site opened in 1999. The region it serves contains vulnerable and high-risk groups with complex medical and social issues who are not well served by traditional health services.

†The Oceanside Primary and Urgent Centre in Parksville, British Columbia although very relevant to the CEC-type model of Nova Scotia, is projected to open in late 2012. The information available on this centre is anticipatory.
Collaborative Emergency Centres: Rapid Knowledge Synthesis
Nova Scotia Cochrane Resource Centre

**CEC-type Centres with Nova Scotia Context**

The Ladysmith Community Health Centre, in Ladysmith, British Columbia was converted from a hospital into a community centre in 2008. The previous inpatient space was renovated to accommodate other health care services that were previously located throughout Ladysmith and in neighbouring communities. The Ladysmith Community Health Centre serves a population of approximately 7500 people.

The Rainbow Lake Health Centre, in Rainbow Lake, Alberta has a relevant alternative staffing model: the health centre, dealing with primary and urgent care, has EMS personnel providing primary care services in the clinic. Rainbow Lake has a population of 1100, and is located 140 kilometers west of High Level, where the regional hospital is located.

The Dr. W. H. Newhook Community Health Centre, in Whitbourne, Newfoundland provides primary care and emergency services. Open 24 hours, there is a nurse on staff with an on call GP at night. The population of Whitbourne, Newfoundland is approximately 855.

**CEC-type Centres**

Centres listed as “CEC-type centres” have populations below 2000 (with the exception of the Oceanside Primary and Urgent Centre and the Northeast Community Health Centre), with many being located in the Canadian territories, or in the more northern regions of Canadian provinces. In the cases from the Yukon, Nunavut and the North West Territories, the health centres reflect the health care service model which is present throughout their jurisdiction.

**Structures and Processes**

The scan of jurisdictions supported the development of a comprehensive list of 29 structures and processes which define the CEC-type model (complete list in Appendix 3). We summarised extracted data for individual centres in a table, outlining the established components for each jurisdictional CEC-type model (see Appendix 5).

We present descriptive narratives from the results of the scan of jurisdictions within the evidence summary results in the following part of the report.

---

**PLEASE NOTE:** The results from the jurisdictional scan are not based on peer-reviewed evidence; results from the scan of jurisdictions only include statements of what is occurring in other jurisdictions, according to publicly available resources.

Throughout the report, comments from the scan of jurisdictions will be noted by the icon 🇨🇦, and highlighted in blue boxes, like this one.

These include:
1. Summaries of all centres, or
2. Anecdotes from specific relevant centres.
Part 2: Summarizing the Scientific Evidence for CEC-type Models

Objectives
The objectives of the evidence summary were to summarize evidence available in the peer-reviewed literature about:

1. The effectiveness of CEC-type models compared to traditional health care delivery models, and
2. The effect of specific CEC-type model structures or processes.

Methods
Summarizing the scientific evidence for CEC-type models included identifying evidence about our overall question, the effectiveness of CEC-type models, and prioritized CEC-type model structures and processes identified as most important by stakeholder workshop participants, as well as scoping literature reviews for additional structures and processes. This entailed a multi-step process including:

- Prioritizing searches
- Search strategy development
- Citation management and selection
- Data extraction

a. Prioritizing searches: A comprehensive set of 29 questions, identified through background scoping and initial consultation with stakeholders and the investigator team, was presented to stakeholder participants during the first workshop. These questions addressed variables such as hours of access, staffing models, available services, and affiliations considered potentially relevant in a CEC-type setting (see Appendix 4). These 29 questions were remodelled into a final list of 24 questions (see Appendix 6). Seven of these structures and processes were prioritized through discussion amongst the research and investigator team as of critical importance to the functioning and implementation of a CEC. At the first stakeholder workshop, stakeholders were asked to also prioritize structures and processes. The research team received confirmation that the selected prioritized structures and processes were of the highest importance to stakeholders, as well. Prioritized structures and processes and their corresponding definitions are listed in Table 2.

b. Search strategy development: We developed comprehensive search strategies for each of the prioritized structures and processes (Table 2) to assist with electronic searches of the peer-reviewed literature. Sources for search terms included background literature, consultation with the investigator team, and the jurisdictional review process. We used Medical Subject Headings (MeSH) for the PubMed database and Emtree terms for the Embase database in conjunction with key word terms (i.e., text words not in the database thesaurus) to capture all terminology that might be used to describe a CEC-type model.

Since a CEC by its nature combines primary care with emergency care, a librarian member of the research team also developed lists of MeSH and key words to describe these settings. Controlled vocabulary is not used consistently across databases so we adjusted each search strategy accordingly.

Prioritized structures and processes: We searched each prioritized structure or process question in PubMed and Embase (two of the largest indexes of biomedical and health literature in the world). When appropriate, we also conducted searches in The Cochrane Library, CINAHL, and the grey literature (see Glossary for definition). We limited searches to research published in the English language due to insufficient time for translations. Each search included terms to describe a CEC-type model (e.g., enhanced primary care, wellness centre, polyclinic) as well as terms to describe a primary care setting (e.g., primary health care, general practice), emergency care setting (e.g., accident and emergency, rural hospital), or both, depending on the focus of the structure or process guiding question. Each search then combined the terms describing the setting with terms describing the structure or process under investigation (e.g., collaborative practices, telehealth).
### Table 2: Prioritized structures and processes and definitions

<table>
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<tr>
<th>#</th>
<th>Structure/Process</th>
<th>Definition</th>
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| 1  | CEC-type models of health care delivery                | A CEC-type model centre focuses on the delivery of health care services including both primary care and access to emergency care through a seamless collaborative team approach.  
- Primary care encompasses access to health promotion, wellness, chronic disease management, illness and injury prevention, and diagnosis and treatment of illness and injury.  
- Access to emergency care includes initial emergency stabilization of life-threatening conditions, response to (including treatment or referral) the majority of urgent conditions and those conditions of lesser urgency.  
A health care provider must be available on-site, and has a formal supportive relationship with other professional(s) or institution(s) elsewhere through telephone or technological means. |
| 2  | Hours of access to health care services                | Hours of access to primary or emergency care services means the operational hours that primary care or emergency services are accessible to members of a community. Hours of access to primary care could be: daytime (regular) hours or extended hours. Examples of hours of access to emergency services could be: 24 hours/day, extended hours, access to on-call physician only, or daytime only hours according to health care provider availability. |
| 3  | Health care professional staff available (emergency care) | Health care professional staff available in emergency care are professional personnel who provide, or assist and support the provision of, care to patients in an organized emergency care facility. Specific options include: physician/specialist(s), nurse practitioner(s), nurse(s) (with or without additional training), physician assistant(s), paramedic(s) with additional training, allied health professional(s) (regulated or other), additional support staff. |
| 4  | Health care professional staff available (primary care)  | Health care professional staff available in primary care are professional personnel who provide, or assist and support the provision of, care to patients in an organized primary care facility. Specific options include: physician/specialist(s), nurse practitioner(s), nurse(s) (with or without additional training), physician assistant(s), allied health professional(s) (regulated or other), additional support staff. |
| 5  | Collaborative practices (primary or emergency care)     | Collaborative practice can be described as multiple health professionals working together to provide care. Systematic review definitions of collaborative care ranged from broad to more specific number and types of professionals. Collaborative care was most commonly defined by the number of health professional disciplines involved in patient care (e.g., ≥2 (39) or ≥3 professionals (29). |
| 6  | Telehealth/Tele-Collaboration                           | **Off-site consultation** means consultation via remote telecommunications (i.e., the transmission of information over distances via electronic means) of a health provider on-site to one at a distance to enhance the local scope of practice. This is generally for the purpose of diagnosis or treatment of a patient.  
**Mechanisms for off-site communication** are the tools by which information is transferred over distances via technological means.  
**Delivery of health services via remote telecommunications** (i.e., the transmission of information over distances via electronic means). This includes interactive consultative and diagnostic services for a patient communicating with a health care provider at a distance. |
| 7  | Comprehensive set of diagnostic services available (primary or emergency care) | Having diagnostic services available means having organized services for the purpose of providing diagnoses to promote and maintain health. Diagnostic procedures can also be routinely performed on all individuals or specified categories of individuals in a specified situation. Examples of diagnostic services are: x-ray and other forms of diagnostic imaging, blood work, ECGs, and blood pressure monitoring. |
The primary goal was to identify recent, high quality systematic reviews relevant to each prioritized structure or process. Therefore we first conducted searches with a filter to specifically identify systematic reviews. If no relevant reviews were identified, the search was repeated without the review filter, and primary studies were identified. We categorized primary studies into experimental (e.g., randomized controlled trials [RCTs]), observational (cohort studies, case control studies, cross-sectional studies), or qualitative. If no primary studies were identified, a grey literature search was conducted.

Search strategies for each prioritized structure or process were developed (full search strategies for prioritized questions are provided in Appendix 7) as follows:

1. **CEC-type models of health care delivery**: In the PubMed and Embase databases, we combined terms describing emergency care settings, terms to describe primary care setting, and terms to describe CEC settings. Searches were not combined with a systematic review subset. We used the CADTH’s Grey Matters tool to identify grey literature sources to conduct grey literature searching (89). We selected 10 sources based on generalizability and their focus on health contexts most likely to be relevant to Canada and Nova Scotia. During the searches, we identified two additional grey literature sources and we added these to the original list. A description of the grey literature search strategy, and list of grey literature sources are included in Appendix 7.

2. **Hours of access to health care services**: In the PubMed and Embase databases, we combined terms to describe emergency care settings with terms to describe hours of access (e.g., “after-hours care”, “out of hours”). Also, in The Cochrane Library, PubMed and Embase databases, we combined terms to describe primary care settings with terms to describe hours of access. All searches were then combined with a systematic review subset to isolate reviews from the overall results.

3. **Health care professional staff available (emergency care)**: In The Cochrane Library, PubMed, and Embase databases, we searched terms describing CEC settings along with terms to describe emergency care settings; either of these settings would have been acceptable. We combined terms for settings with terms to describe specific health care professional staff (e.g., “physicians”, “paramedics”). We then combined the searches with a systematic review subset to isolate reviews from the overall results.

4. **Health care professional staff available (primary care)**: In The Cochrane Library, PubMed, and Embase databases, we searched terms to describe CEC settings along with terms to describe primary health care settings; either of these settings would have been acceptable. We combined setting terms with terms to describe specific health care professional staff (e.g., “physicians”, “paramedics”). We then combined the searches with a systematic review subset to isolate reviews from the overall results.

5. **Collaborative practices (primary or emergency care)**: In The Cochrane Library, PubMed, and Embase databases, we searched terms to describe CEC settings along with terms to describe primary health care settings and terms to describe emergency care settings; any of these settings would have been acceptable. We combined terms for settings with terms to describe specific collaborative practices in health care settings (e.g., “collaborative care”, “patient care team”). We then combined the searches with a systematic review subset to isolate reviews from the overall results.

6. **Telehealth/Tele-consultation**: We did not include terms to describe any specific setting in the searches as the setting for this search was not relevant. In The Cochrane Library, PubMed, and Embase databases, terms to describe telehealth or tele-consultation were searched (e.g., “remote consultation”, “telehealth”). We then combined the searches with a systematic review subset to try to isolate reviews from the overall results.

7. **Comprehensive set of diagnostic services available (primary or emergency care)**: Similar to other prioritized component searches, we conducted scoping searches to identify MeSH and keywords to capture the concept comprehensively. Although this component question was prioritized by stakeholders during the first workshop, we did not conduct a comprehensive search for this component question. In addition, we consulted our investigator team during the scoping process in an attempt to clarify our search process. This approach led to no manageable search strategy. We completed a scoping literature review on this component.
c. Citation management and selection: We imported citations identified in the searches into Endnote reference
management software (90). We removed duplicate citations and uploaded citation lists into Distiller systematic
review software (91). We used three stages of study screening. In the first stage, one reviewer assessed record
titles for potential relevance. Articles relevant (or of unclear relevance) advanced to the next stage of citation
screening.

In the second stage of study screening, we assessed abstracts using an accelerated screening approach. We
advanced articles to full text consideration (third stage) if one reviewer judged the abstract to be relevant to the
specific component question under consideration. Two reviewers were required to reject an abstract, a
mechanism to ensure that potentially relevant abstracts were not rejected. Records were excluded when either
the structure or process being considered or study setting was not relevant to the research question.

Operationalization for structures and processes (“exposures”) are included in Table 2. A restriction on
methodology was also implemented: only reviews were advanced to the data extraction level (with the
exception of the first prioritized question on CEC-type models). The inclusion/exclusion criteria used to screen
abstracts, in brief, is described in Table 3. For example, for a study to be included in our evidence synthesis for
health care staff in emergency care, the study had to be a systematic review evaluating the use of specific health
professional staff (as defined in Table 2) in an emergency care setting.

In the third stage of screening, we retrieved full text articles if available through Dalhousie University Libraries.
Studies flagged as not relevant in full article review were checked by a second reviewer before exclusion. Flow
charts detailing the article selection process are found in Appendix 8.

d. Data extraction: We extracted the
following data from included studies:

- Author objectives
- Descriptions of the participants, interventions, and outcomes (related to health, process,
  and/or costs)
- Author conclusions
- Review quality (type of evidence, potential bias, generalizability)
- Quality of evidence included

The form developed to extract data is shown in Appendix 9. Author conclusions were listed as positive,
negative or neutral. Positive results suggested an intervention leading to improved outcomes. Neutral results
concluded that the intervention had no impact on outcomes or had similar outcomes to the comparison. Negative results concluded that the intervention led to inferior outcomes to the comparison.

One researcher extracted data from full text articles. At least one additional researcher checked data extraction.

We exported collected data from Distiller into Microsoft Excel, to be formatted, condensed and summarized. We
distributed data tables to the content expert members of the investigator team along with worksheets
developed to extract the key messages of review articles for each specific prioritized structure or process search.
As part of extracting key messages from the data extracted for included studies for each prioritized structure or process search, we asked our investigator team to flag any records that they felt were not fully relevant to the specific structure or process, or which were not generalizable to the Nova Scotia context. Of the studies that remained, the investigators extracted key messages and synthesized overall messages. A template of the worksheet is available in Table 4. A minimum of two investigators looked at each data set and extracted messages. The research team compared results and assessed them for consistency. These key messages and the data tables were discussed at the second stakeholder workshop held in December 2011.

Non-prioritized structures and processes: For component questions not prioritized by the research team or stakeholders, we conducted scoping literature searches in PubMed. A list of these non-prioritized components of CEC-type models and their operationalized definitions are available in Table 5. Where available, we selected the most recent, highest quality systematic review as representative of the evidence related to a specific component, and the research team summarized these. This approach is limited in that without a full comprehensive search strategy in multiple major databases, we may have missed relevant systematic reviews on a particular topic. However, the research team felt that conducting these scoping searches would help round out the available evidence on specific components of CECs, and it was therefore worthwhile to provide brief summaries. Key messages were not created based on scoping searches, due to the limitations of this evidence.

<table>
<thead>
<tr>
<th>Table 4: Evaluation of available evidence</th>
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<tbody>
<tr>
<td>What population, exposure, and outcomes does the evidence represent?</td>
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<td>Population(s):</td>
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<td>Exposure(s):</td>
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<td>Outcome(s):</td>
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<tr>
<td>What are the results/key messages (Narrative points)?</td>
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<td>Population(s):</td>
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<td>Exposure(s):</td>
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<td>Outcome(s):</td>
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<td>What are the limitations/caveats in the messages?</td>
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<td>Additional notes:</td>
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<th>Table 5: Non-prioritized structures and processes</th>
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Collaborative Emergency Centres: Rapid Knowledge Synthesis
Nova Scotia Cochrane Resource Centre

<table>
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<th>institution teaching initiatives.</th>
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<tr>
<td>Conducting research at a community health centre Research at a community health centre may include basic or applied collaborative research efforts between staff and researchers from academic settings.</td>
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Results

Prioritized Searches
Overall, 15 databases searches and 12 grey literature searches were conducted for prioritized structures and processes, and we identified 6545 citations. Once we omitted duplicate records, we screened 6277 citations at the title and abstract level, with 5931 of these ultimately excluded. We screened 259 results at the full-text level, and excluded 203 of these records. We report on 55 records. Below we describe the results and key messages for each of the prioritized component searches. Flowcharts for each component search are provided in Appendix 8. Evidence tables for included reviews are listed in Appendix 10.

1. CEC-type models
In the database searches, we retrieved 1758 citations, in addition to 12 citations obtained through the grey literature search. Of these, 1723 were unique records. We excluded 1678 records through title and abstract screening, leaving 45 records to review in full text. Of these, 32 citations were primary studies and 12 were grey literature documents. All results did not meet the criteria of the appropriate exposure (being relevant to CEC-type models). Data were extracted for one review; no records were suitable for inclusion in the data synthesis.

Key Messages
- There is limited scientific literature on the concept of CEC-type models as a health care delivery model.
- This is an area for future research studies.

2. Hours of access to health care services
In the database searches for hours of access to emergency services (full search strategy in Appendix 7), there were 780 unique results, and 779 were excluded through title and abstract screening, leaving one record to review in full text. This final record was excluded at the full text screen as it did not meet inclusion criteria. In the database searches for hours of access to primary care (full search strategy in Appendix 7), there were 55 unique results, and 45 were excluded through title and abstract screening due to not meeting inclusion criteria, leaving 10 records to review in full text.

Summary of reviews identified in the search: We identified two well-conducted systematic reviews related to the impact of hours of health care service delivery on individual or community health outcomes (1, 2). Leibowitz (2003) investigated evidence on the effect of different models of after-hours primary medical services on health related (clinical outcomes, patient satisfaction) and health care process outcomes (medical workload) (2). This systematic review included 19 studies of varying methodology (including four RCTs and two pseudo RCTS, and comparative or case studies representing adult patients seeking care after primary care hours).

Carret and Domingues (2009) assessed factors, including hours of primary care services available, associated with inappropriate ED resource use (1). This systematic review from 2009 included one cohort, two case-control, and 19 cross-sectional studies that addressed this issue.

Summary of the research evidence: Overall these reviews reported neutral findings with respect to the impact of hours of services on health (Leibowitz 2003) and resource (Carret 2009) outcomes. There has been little benefit found from adding alternative models of after-hours care.
Leibowitz (2003) reported that there is very little evidence about the advantages of one service model compared with another in relation to clinical outcomes. The only area where there is some limited evidence is about differences in prescribing habits. The evidence suggests that deputizing doctors (see Glossary) may prescribe less appropriately than doctors from practice-based or co-operative services, and that GPs prescribe more appropriately than junior emergency medical staff. Telephone triage and advice services appear to reduce medical workload through the substitution of telephone consultations for in-person consultations and have the potential to reduce costs. This should be balanced with the finding of reduced patient satisfaction when in-person consultations are replaced by telephone consultations (2).

Carret (2009) reported that two out of 22 studies included in their review found an association between difficult access to primary health care and inappropriate ED use; the remaining studies did not assess this intervention. An included cohort study conducted in the United States found that difficulty in scheduling a primary care appointment, difficult telephone contact for primary care, and longer waiting time for a primary care appointment were associated with inappropriate ED use (1).

**Limitations of the evidence available:** No evidence from systematic reviews was found regarding the impact of (more or less) emergency service hours on health outcomes. Relevant populations not represented in the identified reviews include rural emergency settings and children; Leibowitz (2003) focused on a United Kingdom health delivery model, in addition to considering types of organizational modes of delivery rather than the effect of more or less hours of access to care (2). Limited information is available on hours of service, particularly as relevant to CEC-type model of care delivery, and important clinical, safety, and resource use (e.g., workload/patient volumes, wait times, cost, and impact of ED service variables on primary care) outcomes are not reported.

**Key Messages**
- A lack of evidence is available on the impact of alternative models of after-hours care.
- Telephone triage and advice lines appear to reduce medical workload, and have potential to reduce costs, but need to be balanced against reduced patient satisfaction.
- While ED overuse is associated with lack of hours of access to primary care, expanding these services does not appear to have a major impact on reducing inappropriate ED use.

3. **Health care professional staff available (emergency care)**

In the database searches on health professional staff in emergency care (full search strategy in Appendix 7), there were 495 unique results, and 449 were excluded through title and abstract screening due to inappropriate setting or exposure. Forty-six records were reviewed in full text.

**Summary of reviews identified in the search:** We identified eight systematic reviews related to the topic of the effect of health care professional staff available in an emergency care delivery environment on health outcomes (3-10). They included novel medical and non-medical roles in the emergency care delivery settings. These systematic reviews assessed a small number of RCTs, but mostly including lower levels of study designs. Four systematic reviews investigated the effect of nurse practitioners (NPs) or NPs and other staff in the ED (Hoskins 2011; Wilson 2009; Kleinpell 2008; Carter 2007). These systematic reviews investigated studies conducted in combined adult and paediatric populations (Hoskins 2011; Carter 2007), or in adult only (Wilson 2009) populations (Kleinpell 2008 also included ICU, however we have focused on evidence from ED settings). Hoskins (2011) examined the effect of Emergency Nurse Practitioners (ENPs), expanded-scope physiotherapists, and
emergency care practitioners in all emergency care settings. The other four systematic reviews each investigated one of the following health professional roles/models: triage liaison physicians (Rowe 2011), pharmacists (Cohen 2009), physician assistants (Doan 2011), and multidisciplinary teams targeted toward frequent ED users (Althaus 2011).

Overall these systematic reviews reported (cautiously due to the low quality of included studies) positive effects of alternative health professional staff in emergency settings based on patient satisfaction (Doan 2011; Hoskins 2011; Wilson 2009; Carter 2007) and competency with adequate training (Doan 2011; Kleinpell 2008; Carter 2007). There are, however, few well-conducted controlled studies available. It should be noted that many of the studies compare to house staff and the UK model in which there is no attending physician in the ED; this is not the same as the Canadian (or US) model or standard of care.

Summary of the research evidence:
NPs in the ED: Hoskins (2011) reported that 22 out of 23 studies found high levels of patient satisfaction with non-medical roles in the ED. Patients seen by ENPs were more likely to seek follow up in primary care following their initial visit to the ED (7).

Wilson (2009) reported that reducing the amount of medical officer time spent on specified presentations improves patient access to interventions, reducing issues of ED overcrowding and improving patient satisfaction with health service. Two studies reported that care provided by ENPs was effective in reducing waiting times for treatment and overall length of stay (LOS) in the ED. Nine studies found no significant difference between the effectiveness of ENP and junior doctors (10).

Carter (2007) reported that overall, NPs appear to be more expensive than residents, on a per patient basis. The included studies factored in more than salary, although it is unknown whether training costs of residents were included. The addition of an NP, whether in a minor injury unit in the ED or in a free standing unit, was shown to reduce wait times. The included studies do not compare the addition of an NP with the addition of any other staff (e.g., more residents, another attending physician or a physician assistant) (4).

Other non-medical staff/models: Rowe (2011) included two RCTs that found a significant 37 minute reduction in mean ED LOS when comparing triage liaison physician (TLP) (See Glossary) intervention to nurse-led triage. Most non-RCT studies reported statistically significant reductions in their individual estimates of ED LOS. One RCT showed a significant 30 minute reduction in the mean time to physician initial assessment associated with TLP presence when compared to nurse-led triage. Most non-RCTs also showed a significant reduction in the indicator of patients leaving the ED without being seen; this was not significantly different in the included RCT. Individual study results on 'leaving against medical advice' were inconsistent (9).

Cohen (2009) found one observational study reporting that a pharmacist in the ED reduces medication errors, provides complete medication and immunization histories, and potentially avoids costs. Services provided by pharmacists in the ED in this study included traditional clinical pharmacy services, medical emergency response, and providing consultations on medication issues (5).

Limitations of the evidence available: Many reviews that we identified were based on studies of low level design. Relevant populations not represented in the identified reviews include rural emergency settings and patients with emergency/life-threatening illness. Some important health professional groups, such as paramedics, were not included in the systematic reviews. Provider satisfaction was not measured by included studies and cost/resource use was not adequately assessed. The studies that were included in the reviews were...
heterogeneous because of differing triage scoring systems, diagnostic categories used in EDs, and scope of interventions; most studies focused on minor injuries. When a comparison was provided, care was often compared to that provided by medical trainees (house officers or residents), not to attending staff physicians.

**Key Messages**

- Patients accept and are satisfied with the care provided by NPs and physician assistants in the ED.
- Additional patient contact time afforded by the alternative ED staffing is associated with improved communication and increased health promotion.
- Shorter length of stay may be associated with greater patient satisfaction.
- The quality of care provided by NPs and physician assistants vs. residents in the ED is comparable.
- Case management may reduce ED use for specific groups of vulnerable patients and also for all frequent users of EDs.
- Financial implications of staff changes might be significantly different in Canada (evaluation data is inadequate).
- Data from systematic reviews on other health professionals in these roles is lacking.

4. **Health care professional staff available (primary care)**

In the database searches for health professional staff available in primary care (full search strategy in Appendix 7), there were 1052 unique results, and 974 were excluded through title and abstract screening due to inappropriate setting or exposure, leaving 78 records to review in full text. Of these 78, 48 were systematic reviews.

**Summary of reviews identified in the search:** Twelve systematic reviews evaluated the effect of different primary care staff on health outcomes (11-22). Reviews assessed the effectiveness of including specific staff in the fields of: 1. General primary care, 2. Mental health, and 3. Various other primary care populations (diabetes, midwifery, heart failure patients, hypertension).

Five reviews assessed models of primary care where nurses substituted or led care on health, process, and cost outcomes. These reviews mainly considered the use of NPs in doctor substitute roles in three overlapping reviews (overlapping reviews include some of the same studies, and the more recent review includes previous ones within its synthesis) (Hollinghurst 2006; Horrocks 2002; Brown 1995); while two overlapping reviews (one Cochrane Review [Laurant 2005] and one systematic review [Keleher 2009]) broadened their scope to include nurses in general, considering varying levels of training and experience.

Four reviews considered the addition of mental health care staff to primary care on health, process, and cost outcomes. Two reviews (one Cochrane Review [Harkness 2009] and one systematic review [Bower 2000]) considered the addition of mental health care professional delivery of care on-site in a primary care environment. One Cochrane Review considered the addition of paraprofessionals (den Boer 2005) while one review assessed the evidence on the addition of pharmacists providing prescription information and patient education for the management of depression in a primary care setting (Gilbody 2003).

Finally, three systematic reviews were identified that explored the addition of specific staff to narrower populations. One Cochrane Review looked at the evidence on the effect of diabetes specialist nurses compared with usual care in hospital clinics or primary care for children and adults with diabetes (Loveman 2003). One review considered the addition of pharmacists (Koshman 2008) in the management of heart failure patients on health outcomes. The last systematic review evaluated the effect of nurse- or pharmacist-led care for patients with essential hypertension in a primary care, outpatient, or community care setting (Fahey 2005).
Summary of the research evidence:

NPs as doctor substitute: Two overlapping reviews, Horrocks (2002) and Brown (1995), the former including 11 RCTs and 23 observational studies with a prospective experimental design (22), and the latter with 38 studies (12 RCTs) (13), evaluated NPs as substitutes for physician-led care. Both reviews reported neutral and positive health outcomes. NPs ordered slightly more laboratory tests than did physicians. NPs received higher patient satisfaction scores. There was no difference on quality of care, prescription drugs, functional status, number of visits per patients, or use of emergency departments. NPs made more complete records, scored better on communication than doctors and offered more advice on self-care and management (13, 22). Hollinghurst (2006), in a meta-analysis, considered the addition of an extra salaried GP or NP to deal with excess patient demand in primary care, and included two RCTs (based on the results and an updated search of the systematic review strategy by Horrocks 2002), reporting negative results, concluding that employing NPs to provide first-line care and deal with excess patient demand in UK general practice is likely to cost the same or slightly more than employing GPs (21).

Nurses as doctor substitutes: Keleher (2009) evaluated two systematic reviews (including the Cochrane Review by Laurant [2005]), six RCTs, and one randomized controlled crossover trial. Compared to doctor-led care, nurse-led care resulted in neutral results for patient mortality and quality of life (QOL), but positive outcomes for compliance with medication or care, patient knowledge and patient satisfaction (17).

Mental health care professionals in primary care on-site setting: Harkness (2009), a Cochrane Review, in addition to a previous systematic review (Bower 2000), considered the impact of the addition of on-site mental health workers (MHWs) delivering psychological therapy and psychosocial interventions in primary care on process outcomes. The evidence provides support for MHWs providing psychological therapy and psychosocial interventions on-site in primary care that modestly but significantly reduces consultation rates, psychotropic prescribing, prescribing costs, and rates of mental health referrals. There is evidence that on-site MHWs do not impact prescribing behaviour with regard to the wider practice population. However, evidence does not support the addition of MHWs to primary care teams with the aim of reducing demand on primary care providers (PCPs) or achieving enduring changes in their clinical behaviour which will generalise to the wider practice population (12, 16).

Paraprofessionals in primary care: One Cochrane Review (den Boer 2005) considered the addition of paraprofessionals on health outcomes. This review included five RCTs involving the use of paraprofessionally-performed psychological treatment of anxiety and depressive disorders for adults compared to psychological treatment by professionals, or no treatment. No conclusions about the effect of paraprofessionals compared to professionals could be made. Three studies in female-only populations indicated a significant effect for paraprofessionals compared to no treatment (11).

Pharmacists and depression management: Gilbody (2003) considered 36 studies (29 randomized and non-randomized controlled trials, five controlled before and after studies and two interrupted time series studies) assessing the impact of the addition of pharmacists providing prescribing information and patient education for the management of depression in a primary care setting on health outcomes. Clinician education on medication provided by expert pharmacists resulted in significantly improved prescribing of antidepressants among patients older than 60 years (15).

Diabetes specialist nurses: Loveman (2003) a Cochrane Review, considered evidence from six RCTs and controlled clinical trials, assessing the impact of diabetes specialist nurses compared with usual primary care in hospital clinics or primary care with no specialist nursing input for both children and adults with diabetes. The
Collaborative Emergency Centres: Rapid Knowledge Synthesis
Nova Scotia Cochrane Resource Centre

evidence was neutral, finding no significant results on the effects of a diabetes specialist nurse/nurse case-manager on patient health outcomes (20).

Heart failure care: Koshman (2008) considered four RCTs examining the effect of adding pharmacists in managing heart failure patients on health outcomes. Pharmacist care was shown to reduce the rates of both all-cause hospitalization and heart failure hospitalization by almost one-third. There was no significant reduction in mortality with the addition of pharmacist care (18).

Hypertension care: Fahey (2005) included seven RCTs assessing the impact of nurse- or pharmacist-led care for patients with essential hypertension in a primary care, outpatient or community care setting on health outcomes. These RCTs were significantly heterogeneous and did not allow for a pooled estimate to be calculated; individually most RCTs found favourable results showing improved control of blood pressure through nurse- or pharmacist-led care (14).

Limitations: Reviews did not distinguish between training and roles held by NPs compared to nurses. The characteristics of nurses and doctors (numbers, training, experience) are often not consistently reported in studies.

In general, the current evidence is limited by the quality of the included studies, in particular, poor methodological rigor, heterogeneous findings among studies, and limited generalizability to the Nova Scotia setting. In addition, there is a lack of evidence considering the addition of health care staff other than mental health specialists, pharmacists, nurses, or NPs in alternative primary care staffing models. Evidence is also lacking in cost-effectiveness analyses and examination of long-term effects of these alternative staffing models.

Key Messages
- NPs in primary care as substitutes in the same role as GPs have been shown to have no difference in care and improvement in patient compliance, knowledge, or satisfaction.
- Evidence is lacking for cost-effectiveness analyses and examination of long-term effects of the addition of health care professional staff in primary care; the few cost studies available suggest similar or increased costs with NP compared to extra salaried GPs.
- Nurse- and pharmacist-led care for hypertension was found to be effective for hypertension and heart failure. Specialist nurse care in treating diabetes resulted in neutral outcomes.
- There is modest evidence to support the addition of pharmacists, paraprofessionals and mental health care workers in primary care settings for mental health.
- Characteristics of health care providers, including training and experience, should be reported more consistently in studies.

5. Collaborative practices (primary or emergency care)
In the database searches for collaborative practices (full search strategy in Appendix 7), there were 1521 unique results, and 1394 were excluded through title and abstract screening, leaving 127 records to review in full text. Of these 127, 69 were reviews. Fifty-one of these were excluded due to inappropriate exposure or setting.

Summary of reviews identified in the search: A large amount of literature is available on collaborative practices, although limited in scope. We identified a total of 18 systematic reviews that assessed the effectiveness of collaborative models of care (23-40). Nine systematic reviews assessed the team-based models of collaborative care in: 1. ED, and 2. Primary care (mental health and other chronic diseases). Systematic review definitions of
collaborative care ranged from broad (e.g., multiple professionals involved) to more specific (e.g., multifaceted intervention involving combinations of three distinct professionals working collaboratively within the primary care setting; a case manager, a primary care practitioner, and a mental health specialist [to be included in the review, studies had to involve two of these three components of collaborative care]). Collaborative care was most commonly defined by the number of health professional disciplines involved in patient care (e.g., ≥ 2 [van Steenbergen-Weijenburg 2010] or ≥ 3 professionals [Gilbody 2006]).

One systematic review assessed the evidence of collaborative care in the ED (Kilner 2010). Five systematic reviews assessed the effect of collaborative care in managing mental health conditions in primary care or community settings (e.g., major depressive disorder [van Steenbergen-Weijenburg 2010; Gilbody 2006], or other serious mental health diagnoses [Malone 2007 (Cochrane Review); Simmonds 2001; Tyrer 2000]). Three reviews addressed treatment of other chronic conditions: hypertension (Carter 2009), heart failure (Holland 2005), and the elderly (Johansson 2010) in the primary care or community setting.

An additional six systematic reviews assessed the effect of specialist-GP collaborative consultation on health related outcomes. These reviews focused on the effect of specialist consultation in primary care management of the following chronic health conditions: depression (Cape 2010; Chang-Quan 2009), stroke care (Mitchell 2008), and broad chronic disease management (Foy 2010; Smith 2007/Smith 2008 [a Cochrane Review]; Mitchell 2002). Collaborative care in these systematic reviews included simple (single interaction or intervention with health professionals) or multifaceted (multiple features) interventions.

Three systematic reviews were identified that explored specific components of collaborative care models that were likely to be effective (Butler 2011; Bower 2006), and evidence on intervention strategies to improve collaboration (Zwarenstein 2009 [Cochrane Review]).

**Summary of the research evidence:**

**Collaborative team-based care (ED):** Kilner (2009) included 14 observational studies (five controlled before and after studies, five descriptive case studies, four descriptive cross-sectional studies), focused specifically on physiotherapy practice. There is low quality evidence that the introduction of multidisciplinary teams to the ED may be successful in reducing access block, and physiotherapists may play a role in this; teamwork and communication are paramount but remain difficult to quantify. There is very limited evidence regarding teamwork and communication in the ED. The evidence available is limited by the lack of experimental studies (32).

**Collaborative team-based care (primary care, mental health):** Gilbody (2006) included 37 RCTs that assessed the effect of multifaceted collaborative care on health outcomes for those with depression (29), and van Steenbergen-Weijenburg (2010) assessed the cost-effectiveness for management of depression (39). Study results provide evidence that collaborative care is effective in improving short-term depression outcomes and demonstrate emerging evidence of longer-term benefit (health outcomes maintained at 12 months). Economic information, however, is insufficient for policy decisions. Studies found that the overall cost of collaborative care is often more expensive than usual care but these studies did not conduct cost-effectiveness analyses (29, 39).
Three overlapping reviews, a Cochrane Review by Malone (2007), one by Simmonds (2001) and a Cochrane Review by Tyrer (2000), each including RCTs, assessed Community Mental Health Teams (CMHT) in the management of adults with severe mental illness (most commonly schizophrenia). These reviews found that CMHT management was associated with no significant differences in death from any cause including suicide and suspicious circumstances. CMHT management was significantly associated with treatment acceptance, satisfaction with care, and avoidance of hospital admission. There was suggestion that CMHT management leads to a reduction in direct medical costs but further synthesis was not possible (33, 36, 38).

Collaborative team-based care (primary care, other chronic conditions): Carter (2009) included 37 controlled studies of interventions involving pharmacists or nurses in the management of hypertension. They found that these models were significantly associated with improved blood pressure. The authors note that their analysis could not determine whether there was a preferred level of training or qualification (26). Holland (2005) included 30 RCTs investigating the impact of multidisciplinary teams in the management of heart failure. They found that these teams reduce both hospital admission and all-cause mortality, with the most effective interventions having a home-care delivery component. Johansson (2010) included five RCTs and examined the impact of multidisciplinary teamwork working with elderly persons living in the community. They concluded that the intervention was successful in reducing deterioration of health and functional ability, improving activities in daily living, increasing social activity and general well-being and life satisfaction (30).

GP-specialist consultation models: Seven systematic reviews assessed the effect of shared GP-specialist consultation across a range of chronic health conditions: depression (Cape 2010; Chang-Quan 2009), stroke (Mitchell 2008), and mixed chronic conditions (Foy 2010; Smith 2007/Smith 2008; Mitchell 2002). These systematic reviews present conflicting information with limited evidence of improved depressive symptoms (Foy 2010; Chang-Quan 2009), and improved patient satisfaction (Mitchell 2002). Smith (2007/2008), a Cochrane Review, included 19 RCTs and one controlled before and after study of shared-care health service interventions designed to improve the management of chronic disease; they found no consistent improvements in health outcomes. GP-specialist consultation models were consistently found to cost more than usual care (Chang-Quan 2009; Smith 2007/Smith 2008; Mitchell 2002).

Mechanism(s) of effective collaborative care: Two systematic reviews, Butler (2011), Bower (2006), and a Cochrane Review by Zwarenstein (2009) explored different approaches to improve collaborative practice. Zwarenstein (2009) included results from five RCTs and found inter-professional interventions (e.g., interdisciplinary rounds, multidisciplinary team meetings, video conferencing compared to audio-conferencing, multidisciplinary meetings with an external facilitator) can improve health care processes and outcomes, although generalizable inferences about key elements of inter-professional care are difficult (40). Bower (2006) used meta-regression analysis including data from 37 studies to identify active ingredients in collaborative care models for addressing depression in a primary care setting. They found no significant predictors of the effect of collaborative care on antidepressant use. Key predictors of depressive symptoms included systematic identification of patients, professional background of staff and specialist supervision (23). Butler (2011) reviewed 26 controlled/quasi-experimental studies exploring level of integration of provider roles. They found no correlation between the outcomes and the extent of clinician integration or the implementation of structured processes of care, nor was there evidence that more intensive intervention in both areas produced better results for people with depression (24).

Limitations of evidence available: These reviews do not have broad generalizability to the whole primary care field, as most have a narrow focus on chronic health conditions. Collaborative practice is broadly defined in the literature and results are heterogeneous. Most reviews examined studies of low quality which further limits the
generalizability of our results. Only one review of low quality studies was relevant to collaborative practices in emergency settings. Few studies considered cost and resource use outcomes.

**Key Messages**

- **Collaborative care (multidisciplinary models) in primary care settings has been shown to consistently improve symptoms and management of chronic disease (depression, hypertension).**
- **Collaborative care has been consistently found to be more expensive than usual care (other than Community Mental Health Teams); although additional high quality economic evaluations are required.**
- **The introduction of multidisciplinary teams to the ED may be successful in improving access, however, more research is needed.**
- **No consistent improvements in health outcomes were observed in many studies examining shared GP-specialist consultation in primary care management of chronic health conditions.**
- **Generalizability to the Nova Scotia CEC model is limited as these collaborative models focus on physician collaboration with either another physician or an allied health professional, and do not examine the idea of two non-physicians working collaboratively.**

6. **Tele-Consultation/Telehealth**

We identified a review of reviews of good quality on the topic of telehealth published before 2009 (41). We conducted searches to locate reviews published after 2009 (full search strategy in Appendix 7). There were 663 unique results from the database searches, and 612 were excluded through title and abstract screening because they did not meet inclusion criteria for setting or exposure. Fifty-one records were reviewed in full text. Of these 51, 27 were systematic reviews published after 2009 and of these 14 met inclusion criteria in the data synthesis.

**Summary of reviews identified in the search:** In addition to one review of reviews considering reviews published before 2009, we identified 14 systematic reviews published after 2009 (42-55). These systematic reviews assessed the effectiveness of telehealth in: 1. Off-site consultation, 2. Mechanisms for off-site communication, and 3. Off-site health care delivery. We identified four recent systematic reviews related to the topic of off-site consultation for health care delivery. These studies focus on medical fields, including telehealth consultations for acute stroke management for patients in rural hospitals (Johansson 2010), patients in ICUs (Young 2011), and dermatology (Warshaw 2011; van der Heijden 2010).

Three recent systematic reviews related to the evaluation of different mechanisms for off-site communication (Verhoeven 2010; Wade 2010; Krishna 2009). Verhoeven (2010) evaluated synchronous and asynchronous tele-consultation for diabetes care compared to usual care. Wade (2010) focused on the cost outcomes of using synchronic video technology in dermatology, mental health, paediatric cardiology, home nursing, intensive care, emergency medicine, neurology, infectious diseases, internal medicine, general practice, cardiology, oncology, pain management, and four surgical disciplines (ear nose and throat surgery, orthopaedics, gynaecology, and neurosurgery). Krishna (2009) focused on the use of cell phones and text messaging interventions for the delivery of health information or educational intervention on health and process outcomes.

Nine recent systematic reviews were identified relating to off-site health care delivery, where patients call or connect via web to consult with health care providers directly. Studies focused on a variety of health care fields, including mental health (Garcia-Lizana 2010; Griffiths 2010; Luxton 2010), diabetes and chronic diseases (McLean 2010; Polisena 2009a; Polisena 2009b), hearing loss (Swanepoel 2010), and the review of reviews including a population with various clinical conditions (Ekeland 2010).
**Off-site consultation**

**Summary of the research evidence:**

**Stroke management:** The systematic review conducted by Johansson (2010) included 18 studies: two RCTs, one clinical controlled trial, and 15 studies with an observational design. They reported positive findings on health and process outcomes such as improved quality of care and reduced mortality. Neutral findings with respect to the impact of off-site (telemedicine systems) consultation for health care delivery in acute stroke management were found. The review stated that telemedicine technologies (telephone-based or real-time video consultation system) are safe and feasible in acute stroke management and are useful for support in areas with insufficient neurological services. There are, however, few economic studies on telemedicine so more research is needed on the clinical and economic impact of telemedicine in stroke management (45).

**Intensive Care Units:** The systematic review conducted by Young (2010) included 13 controlled before and after studies involving 35 ICUs. They investigated the impact of telemedicine applied to hospital critical care units, including any telecommunication system installed in the ICU to facilitate real-time access to critical care specialists (e.g., critical care nurses) located elsewhere. The health related outcomes of interest were: ICU mortality, ICU LOS, in-hospital mortality, in-hospital LOS. They reported mixed findings on health outcomes with respect to the application of telehealth for off-site consultation in intensive care units. They found that due to the significant resources required for tele-ICU implementation, further evaluation is needed. Tele-ICU coverage is associated with a significantly lower ICU mortality and LOS but not lower in-hospital mortality or hospital LOS (55).

**Tele-dermatology:** Overall, mixed findings with respect to the impact of off-site consultation for tele-dermatology on health and process outcomes were found, but there were positive results for cost outcomes (Warshaw 2011; van der Heijden 2010).

Van der Heijden (2010) assessed the use of telehealth for tertiary tele-dermatology on health, process, and cost outcomes. The systematic review included 11 studies: five observational/descriptive, six analytic, and one controlled trial. The review concluded that tertiary tele-dermatology research is still in early development. The authors suggest that future research should focus on identifying the scale of tertiary tele-dermatology and on what modality of tele-dermatology is most suited for communication among dermatologists. Rigorous studies evaluating the benefits of tertiary tele-dermatology are lacking (44).

Warshaw (2011) investigated the effect of store and forward (SAF) and live interactive (LI) technology for tele-dermatology on diagnostic and management accuracy and concordance, clinical outcomes and costs. The number of studies included in this review is unclear. They concluded that there was insufficient evidence to determine whether tele-dermatology had an effect on clinical course. Clinic dermatology was superior to tele-dermatology for diagnostic accuracy and equivalent within 10% for management accuracy. It should be noted that both SAF and LI tele-dermatology had acceptable diagnostic accuracy and concordance. Clinic dermatology was superior to both tele-dermatology and tele-dermatoscopy for malignant and premalignant lesion rates, warranting caution in using tele-dermatology in these cases. Cost studies were limited by variations in parameters included and perspectives chosen for the analyses. The majority of studies found SAF and LI tele-
dermatology to be cost-effective if certain critical assumptions about patient travel distance, tele-dermatology volume, and costs of clinic dermatology were met (54).

**Mechanisms for off-site communication**

**Summary of the research evidence:** Three systematic reviews reported mixed findings on health, process and cost outcomes, with respect to the impact of synchronous real time video and asynchronous mechanisms for off-site consultation (Verhoeven 2010; Krishna 2009), and mixed findings regarding cost outcomes (Verhoeven 2010, Wade 2010).

Verhoeven (2010) evaluated 90 studies including 28 RCTs, 48 observational studies, eight quasi-experimental studies, four cohort studies, and two studies based on expert interviews. They concluded that both synchronous and asynchronous tele-consultations for diabetes care are feasible, cost-effective, and reliable. Asynchronous and synchronous applications appeared to differ in the type of contribution they made to diabetes care compared to usual care: asynchronous applications were more successful in improving clinical values and self-care, whereas synchronous applications led to relatively high usability of technology, cost reduction in terms of lower travel costs for both patients and care providers, and reduced unscheduled visits compared to usual care. Future research needs quasi-experimental study designs and a holistic approach that focuses on multilevel determinants (clinical, behavioral, and care coordination) to promote self-care and proactive collaborations between health care professionals and patients to manage diabetes care. Krishna (2009), with 20 RCTs and five CCTs, concluded that information and educational interventions delivered through wireless mobile technology resulted in both clinical and process improvements in the majority of studies included. Health care requiring regular management such as for chronic disease or ongoing advice and support such as smoking cessation benefited the most from cell phone interventions (52).

Wade (2010) assessed the economic value of synchronous or real time video communication for telehealth. This systematic review included 36 articles: 18 RCTs, six diagnostic test accuracy, five controlled before and after studies, two prospective case-controls, two retrospective cohorts, and one each of non-randomized controlled trial, prospective cohort and economic modelling studies. They reported mixed findings with respect to the impact of the mechanism of synchronous communication for telehealth on cost. They concluded that synchronous video delivery is cost-effective for home care, on-call specialists, and potentially cost-effective for regional and rural care depending upon the circumstances of the service. It is not cost-effective, however, from the health services perspective, for local delivery of service between hospital specialists and primary care, particularly due to additional health care staffing. These authors suggest improvement in the quality of economic analyses is needed to provide data for more accurate modelling of the effects of widespread introduction of telehealth into the health care system (53).

**Off-site health care delivery**

**Summary of the research evidence:**

*Mental health:* Three systematic reviews reported mixed findings with respect to the impact of telehealth for patients with mental health conditions and consultation with health care providers on health outcomes (symptom management [Garcia-Lizana 2010, Griffiths 2010]) and process outcomes (safety for clinically unsupervised settings [Luxton 2010]).

The review by Garcia-Lizana (2010) evaluated technology for depression management and included 10 RCTs. A majority of included studies found no significant difference for evaluating depression symptoms, patient satisfaction, or QOL, when compared to control. The review reported insufficient evidence regarding the effectiveness of information and communication technology use in the management of depression and recommended further research (42).

Griffiths’ review (2010) on preventive and treatment Internet interventions for depression and anxiety disorders considered 26 RCTs. The review demonstrates that the Internet can be an effective medium for the delivery of
interventions designed to reduce the symptoms of depression and anxiety conditions (43).

Luxton (2010) provided some evidence that tele-mental health services delivered to clinically unsupervised settings can be safely managed. They considered nine studies: six RCTs, one case-study and two non-randomized controlled trials. The authors reported that the limited data and low count of peer-reviewed studies, however, limit the ability to make generalized conclusions about the safety of these treatments (47).

**Chronic disease management:** Three systematic reviews reported neutral to positive findings with respect to the impact of telehealth for patients with chronic disease consultations with health care providers on health outcomes (McLean 2010; Polisena 2009b) and cost outcomes (Polisena 2009a; Polisena 2009b).

Polisena (2009a) evaluated the cost-effectiveness of home telehealth for chronic diseases and concluded that most of the 22 studies (14 RCTs, four case control studies, four pre-post studies) found home telehealth to be cost saving from both health care system and insurance provider perspectives. Study heterogeneity was observed due to diverse study populations, interventions, and the health care systems in which they were based. Economic evaluations were based on studies of poor quality so authors were unable to make informed decisions on resource allocation (49).

Polisena (2009b) examined home telehealth compared with usual care for patients with diabetes, by considering 21 studies: 12 RCTs and nine observational studies. The review concluded that home telehealth interventions were similar or favourable compared to usual care in terms of QOL, patient satisfaction, adherence to treatment or compliance. In general, home telehealth had a positive impact on the use of numerous health services and glycaemic control. The authors reported that more studies of higher methodological quality are required to give more precise insights into the potential clinical effectiveness of home telehealth interventions (50).

McLean (2010) considered 21 RCTs published across 25 reports studying the use of telehealth interventions for treatment of asthma. They found no evidence of a clinically important impact on patients’ QOL or the number of visits to the ED over 12 months. With that said, telehealth care is no worse than usual care in its ability to improve QOL. There was a significant reduction in the number of patients admitted to hospital once or more over 12 months, especially for patients with severe asthma. It may, therefore, be useful to consider focusing certain telehealth interventions on groups with higher risk of complications from their asthma (48).

**Audiology:** Swanepoel (2010) included 26 articles (mostly case reports), and focused on the impact of synchronous and asynchronous audiological services with a telehealth component on patient-clinician perceptions. They found that several screening applications have demonstrated the feasibility, reliability, and effectiveness of telehealth applications compared to conventional methods. The limited information available on patient perceptions revealed mixed findings. The authors suggest that tele-audiology holds significant promise in extending services to underserved communities but requires considerable empirical research to inform future implementation (51).

Ekeland (2010) produced a review of systematic reviews published prior to 2009. Overall, 21 reviews found telehealth effective, 19 reviews were less confident in the effectiveness of telemedicine, and 22 reviews concluded that the evidence for the effectiveness of telemedicine is still limited and inconsistent. Despite the large number of studies and systematic reviews on the effects of telemedicine, they reported that high quality evidence to inform policy decisions on how best to use telemedicine in health care is still lacking; large studies
with rigorous designs are needed to get better evidence on the effects of telemedicine interventions on health, satisfaction with care, and costs (41).

Limitations: The evidence on telehealth consultation involves a lack of representation of ED or primary care services, with only a few studies considering alternative on-site providers such as nurses or paramedics. Most studies included in the systematic reviews vary in quality; many are considered to be of poor quality due to small sample sizes, lack of study information, and validity issues. Generalizability is a concern as many included studies had heterogeneous results possibly due to diverse study populations, interventions, and the health care systems in which they were based.

Key Messages:
- Studies on telehealth are heterogeneous making it difficult to draw general conclusions from studies.
- Despite a large number of studies and systematic reviews on the effectiveness of telemedicine, high quality evidence is still lacking (mostly observational studies are available).
- Reviews demonstrate that telehealth services do not appear to harm patients and are both reliable and feasible in this limited assessment of non-emergency conditions.
- The effect of tele-consultation on clinical outcomes is not clearly established (findings are mixed and many studies show no difference from usual care).
- Studies of telehealth for service provision in chronic/mental health conditions report neutral to positive findings.
- Few studies examine the cost effectiveness of tele-consultation.

7. Diagnostic services available (primary or emergency care)
No clearly relevant systematic reviews on the topic of the effect of having a comprehensive set of diagnostic services available in emergency health care delivery or primary health care were identified through a further scoping search. There is a large amount of literature available on the subject of the effect of specific diagnostic services in various health care settings, but no review was identified that included studies on a complete set of diagnostic services.

Based on the literature regarding select Canadian CEC-type centres, the most common diagnostic services available in select CEC-like centres were: blood work (stated for seven of the Canadian CEC-type centres consulted) and medical imaging (x-ray was mentioned for eight Canadian CEC-type centres consulted, and ultrasound services were mentioned by two consulted centres). Two consulted centres explicitly mentioned on-site laboratories. Two centres mentioned electrocardiograms (ECGs).

Non-Prioritized Searches

8. Structure of emergency services
A 2011 systematic review by Harding, Taylor, and Leggott (56) assessed the available evidence on the question, ‘Do triage systems across a broad spectrum of health services affect patient flow?’ Three RCTs were included among a total of 25 included studies, the remainder being non-randomized trials or observational studies.

In the review, participants were patients triaged across a broad range of health services. Interventions were systems that ranked patients in order of priority or sorted patients for the most appropriate service, compared to no triage or informal triage, no management of patients at point of basic triage, or systems with options for providing simple treatment or management at the point of triage. Outcomes were related to patient flow (e.g., waiting times, effect on waiting lists, LOS).
This review included studies from around the world, though the language was limited to English. The authors concluded that “Moderate evidence exists from a range of health services that the ability to combine triage and initial treatment in less resource intensive cases can have a positive effect on patient flow. There is conflicting evidence that triage systems that only prioritise patients, without providing any treatment, improve overall patient flow, although tailoring triage criteria more specifically to the patient population or using triage to prioritise treatable cases may be of benefit” (p. 371).

9. Structure of primary care services
A 2011 systematic review by Rose, Ross, and Horwitz (57) assessed the available evidence in order to “describe patient and physician and/or practice outcomes resulting from implementation of advanced access scheduling in the primary care setting” (p. 1150). One RCT was included among a total of 24 eligible studies, the remainder being cross-sectional, controlled or uncontrolled before and after design.

In the review, participants were primary care patients and the intervention was advanced access scheduling compared to no advanced access scheduling. Outcomes included patient satisfaction, wait time for an appointment, no-show rates for appointments, and outcomes related to presenting to the ED.

The studies identified mostly originated from the US, with two from the UK, and only English language studies were included. The authors note that all studies had at least one source of potential bias. The eight studies evaluating time to third-next-available appointment showed reductions (range of decrease: 1.1-32 days), but only two achieved a third-next-available appointment in less than 48 hours (25%). No-show rates improved only in practices with baseline no-show rates higher than 15%. Effects on patient satisfaction were variable. Limited data addressed clinical outcomes and loss to follow-up. The authors concluded that “Studies of advanced access support benefits to wait time and no-show rate. However, effects on patient satisfaction were mixed, and data about clinical outcomes and loss to follow-up were lacking” (p. 1150).

10. Emergency protocols or use of standing orders in emergency health care delivery
A 2009 summary by Agrawal and Kosowsky (58) was identified on the subject of ‘Clinical practice guidelines in the emergency department’ in the absence of any clearly relevant systematic reviews on the topic of the effect of emergency protocols or the use of standing orders in emergency care delivery.

The goals of clinical practice guidelines, the authors note, are as follows:

- Selecting the “best practice” when practice varies unnecessarily.
- Defining standards for the expected length of hospital stay and for the use of tests and therapies.
- Examining interactions between steps in a care algorithm to coordinate steps and decrease delay at the rate-limiting step.
- Providing a common pathway for all staff to view and understand their individual roles in the care process.
- Providing a framework for data collection to troubleshoot and improve efficiency in the pathway.
- Decreasing documentation burdens.
Collaborative Emergency Centres: Rapid Knowledge Synthesis
Nova Scotia Cochrane Resource Centre

- Improving patient satisfaction through education about plan for care.

The summary concludes that “the use and sheer number of clinical practice guidelines are proliferating at a rapid rate and have become an important part of clinical practice in the ED setting. The effective use of guidelines requires the appropriate application of relevant decision trees, a critical understanding of the clinical pathology and research methodology involved, and acknowledgment of the reasons to use the guidelines in the first place. Although these guidelines have the potential for improving the standard of health care, there are limitations in their use, and any clinician should be cognizant of their potential medical, legal, and financial implications. Overall, the need for quick decision making and expeditious interventions make algorithms and pathways invaluable in the ED setting” (p. 564).

11. Destination and transfer plan in emergency health care delivery to manage patients

No clearly relevant systematic reviews on the topic of the effect of using a destination and transfer plan in emergency care delivery were identified.

12. Levels of service infrastructure in emergency and primary health care delivery

A 2011 article by Wakerman and Humphreys (59) was identified on the subject of ‘sustainable primary health care services in rural and remote areas: Innovation and evidence’ in the absence of any clearly relevant systematic reviews on the topic of the effect of levels of service infrastructure in emergency and primary health care delivery.

Incorporating an unspecified number of reviews and studies into what is essentially a scoping synthesis, the authors note a number of infrastructure components that influence a rural health centre’s ability to impact health outcomes. The authors reported “There is a strong history of primary health care innovation in Australia. Successful health service models are ‘contextualised’ to address diverse conditions. They also require systemic solutions, which address a range of interlinked factors such as governance, leadership and management, adequate funding, infrastructure, service linkages and workforce. An effective systemic approach relies on alignment of changes at the health service level with those in the external policy environment. Ideally, every level of government or health authority needs to agree on policy and funding arrangements for optimal service development. A systematic approach in addressing these health system requirements is also important.”
Service providers, funders and consumers need to know what type and level of services they can reasonably expect in different community contexts, but there are gaps in agreed indicators and benchmarks for primary health care services. In order to be able to comprehensively monitor and evaluate services, as well as benchmarks, we need adequate national information systems” (p. 118).

13. **Specific ambulatory clinic services available in primary health care delivery**

No clearly relevant systematic reviews on the topic of the effect of specific ambulatory services available within primary health care were identified. There is a large body of literature available on the subject of the effect of specific ambulatory services (some being explicitly related to primary care) and practices on individual health outcomes, but no review was identified that included studies on ambulatory clinic services in primary health care, specifically.

14. **In-patient beds available within a community health centre**

No clearly relevant systematic reviews on the topic of the effect of having in-patient beds available within a community health centre were identified.

15. **Formal community health needs assessment for organizing health care services in a community**

No clearly relevant systematic reviews on the topic of the effect of a formal community health needs assessment were identified.

16. **Specific health promotion & prevention services available in primary health care delivery**

A well-conducted 2007 systematic review by Wilhelmsson and Lindberg (60) assessed the available evidence on ‘Prevention and health promotion and evidence-based fields of nursing’. The goal of the review was “to summarize evidence-based knowledge regarding prevention and health promotion and education that is applicable to nurses in primary care” (p. 255). Fifteen studies were included along with 16 Cochrane Reviews. Of the 15 original studies, six were RCTs, eight were before-after design, and one was a mixed RCT and before-after design.
In Wilhelmsson and Lindberg (60), included studies used interventions involving nurses conducting promotion or prevention activities compared with no promotion or prevention activities. Outcome areas were related to alcohol consumption, coronary heart disease, myocardial infarction, diabetes, smoking cessation, breast feeding, fall prevention, asthma, and cardiovascular disease. The included studies and reviews published in the English language came from Western countries as specified in the inclusion criteria. The authors report that “The main results from this systematic literature review are that few studies were of high scientific quality, and that only limited areas are scientifically elucidated, relevant and applicable to nurses in primary care with respect to prevention, health promotion and education” (p. 263). “Further, there is also a lack of evaluated methods and methodology. [...] Based on these facts, there is naturally limited evidence regarding interventions in prevention, health promotion and education. A great deal of preventive work by nurses in primary care is presumably ongoing, but both knowledge and tradition are lacking with respect to evaluating and documenting scientifically. If this is the case, the consequence will be that limited new knowledge will be generated in this area” (p. 263).

**17. Specific governance structure for a community health centre**

No clearly relevant systematic reviews on the topic of the effect of a specific governance structure for a community health centre were identified.

Nine of the health centres were governed by their local health authority. One Canadian CEC-type centre consulted was governed by a hospital organization. It was not possible to determine the governance of two other Canadian CEC-type centres consulted.

**18. Formal program evaluation for a community health centre**

No clearly relevant systematic reviews on the topic of the effect of having a formal program evaluation for a community health centre were identified.

Information on program evaluations was unavailable for eight Canadian CEC-type centres consulted.

Two of the Canadian CEC-type centres consulted discussed program evaluations at a centre level during the early stages of program development. A publication by McKim (95), on the Northeast Community Health Centre in Edmonton, Alberta stated that “an early enhancement was the identification of evaluation as a key component for the success of the Centre, and a regional program evaluator was seconded to NECHC’s planning team”.

One of the Canadian CEC-type centres consulted mentioned the role of program evaluations at a health authority level by using the principles of Continuous Quality Improvement (97).

The Health Council of Canada explicitly stated that no formal program evaluations of inter-professional primary health care teams in Nunavut have been performed, and none is currently planned. Informally, however, regional and community health centres have regular meetings to assess how well teams are functioning (98).
19. Program funding structure for a community health centre

No clearly relevant systematic reviews on the topic of the effect of having a specific program funding structure for a community health centre were identified.

Funding model information for programs and centres is not readily available information, beyond press releases regarding donations or government funding put forward to support certain centres (e.g., construction funding for new health care facility put forward by provincial or federal government) (99).

20. Funding structure for health professionals at a community health centre

A well-conducted 2011 Cochrane Review by Scott (61) examined ‘The effect of financial incentives on the quality of health care provided by primary care physicians’. This review subsumed and broadened the scope of two earlier Cochrane Reviews (100, 101). Seven studies were included in the review, including three cluster RCTs, two controlled before and after studies, one controlled interrupted time series study, and one uncontrolled interrupted time series study.

In the Scott (61) review, participants were primary care physicians and primary care teams. The intervention was the impact of different financial interventions on the quality of care delivery. Outcomes were quality of care related to patients' health and well-being.

The authors concluded that: “The use of financial incentives to reward PCPs for improving the quality of primary health care services is growing. However, there is insufficient evidence to support or not support the use of financial incentives to improve the quality of primary health care” (p. 2). Scott note that there is a large body of literature on the subject of how to design and implement financial incentives, and that better use should be made of the existing literature when primary health centres are implementing incentives. The authors continue, “studies should also examine the potential unintended consequences of incentive schemes by having a stronger theoretical basis, including a broader range of outcomes, and conducting more extensive subgroup analyses. Studies should more consistently describe i) the type of payment scheme at baseline or in the control group, ii) how payments to medical groups were used and distributed within the groups, and iii) the size of the new payments as a percentage of total revenue. Further research comparing the relative costs and effects of financial incentives with other behaviour change interventions is also required” (p. 2).

A second systematic review was identified with a broader scope than Scott (61), looking at ‘Financial incentives for return of service in underserved areas’ by Bärnighausen and Bloom (62). This well-conducted review identified 43 observational studies.

Staff funding models were not readily available for Canadian CEC-type centres consulted. Two Canadian CEC-type centres briefly discussed funding models.

One of the Canadian CEC-type centres consulted stated that “Traditionally, doctors have been paid a fee for each patient visit, called fee-for-service. A new payment method blends an annual fee for each registered patient, based on a patient’s age and health care needs. This new system allows physicians at the clinic to involve other health professionals in care, and spend more time helping patients manage complex and chronic conditions” (102).

The Canadian CEC-type centre consulted which has yet to open its doors stated that: physician payments are [to be] covered by agreements between Ministry of Health & BC Medical Association. Non-physician staff will be employees of the centre (103).
care, to remain, and to be satisfied with work and personal life in underserved areas), and program impacts (effectiveness in influencing health systems and health outcomes).

The majority of the included studies were from the US, though authors did not place any geographic or language restrictions on their search. The remaining studies came from Canada, Japan, New Zealand, and South Africa. The authors concluded that: “Financial-incentive programs for return of service are one of the few health policy interventions intended to improve the distribution of human resources for health on which substantial evidence exists. However, the majority of studies are from the US, and only one study reports findings from a developing country, limiting generalizability. The existing studies show that financial-incentive programs have placed substantial numbers of health workers in underserved areas and that program participants are more likely than non-participants to work in underserved areas in the long run, even though they are less likely to remain at the site of original placement. As none of the existing studies can fully rule out that the observed differences between participants and non-participants are due to selection effects, the evidence to date does not allow the inference that the programs have caused increases in the supply of health workers to underserved areas” (p. 1).

21. Community awareness campaigns for a community health centre and availability of services

A 2011 Cochrane Review by Flodgren (63) examined the available evidence assessing the effect of local opinion leaders to improve professional practice and patient outcomes. Eighteen cluster RCTs were included in this well-conducted systematic review.

The authors considered any intervention evaluating the effectiveness of local opinion leaders in improving the behaviour of health care professionals and patient outcomes, compared to no intervention, or any other single intervention. Outcomes were professional performance and/or patient outcomes. In each of the trials the opinion leaders delivered educational initiatives to members of their own health care profession. Physicians were the target in 14 trials, nurses in two trials and two trials targeted physicians, nurses, and midwives.

This review included studies from around the world, and no restrictions were placed on language. The authors concluded, “Opinion leaders alone or in combination with other interventions may successfully promote evidence-based practice, but effectiveness varies both within and between studies. These results are based on heterogeneous studies differing in terms of type of intervention, setting, and outcomes measured. In most of the studies the role of the opinion leader was not clearly described, and it is therefore not possible to say what the best way is to optimise the effectiveness of opinion leaders” (p.2).

22. Recruitment & retention programs for rural health centres

A well-conducted 2011 systematic review by Gagnon (64) aimed to explore the impact of interventions using information and communication technologies (ICTs) on recruitment and retention of health care professionals. Thirteen studies were included, including four of quantitative designs, five qualitative designs, and four using mixed methods. Although detailed search strategies were not provided, considerable detail was given about which databases were searched as well as grey literature sources and additional health websites.
Participants were health care professionals and interventions were various ICTs, mostly telehealth. Outcomes were effects on recruitment and retention. The authors noted that the studies that met inclusion were extremely heterogeneous, given the diversity of health care professionals and many forms of ICTs.

Included studies were limited to those published in French, English, or Spanish. The authors concluded, “despite the conclusions of nine of 13 studies reporting a possible positive influence of ICTs on the recruitment and retention of health care professionals, we believe that these results are only the beginning of a deeper reflection that is needed on this topic. Caution should be exercised when generalizing the results, and other studies are certainly needed to better understand the scale and subtleties of this complex relation” (p. 273).

A brief report from the Health Council of Canada (98) stated that the Department of Health of Nunavut offers support and incentives, including scholarships, bursaries, and subsidized child care, to nursing students in the Nunavut Nursing Program at Nunavut Arctic College.

An additional systematic review from 2009 by Wilson (65) provides “a critical review of interventions to redress the inequitable distribution of health care professionals to rural and remote areas”. There were 110 studies found through a search in PubMed; these include retrospective observational studies and surveys due to a lack of primary intervention studies.

The search was limited to English language studies. The value in this systematic review lies in the classification system Wilson devised to summarize the existing evidence. The 110 articles were sorted into five intervention categories: Selection, Education, Coercion, Incentives, and Support. The authors provide, in table form, an overview of interventions that aim to reduce urban-rural staffing imbalances, viewable here in the open access journal Rural and Remote Health, the International Electronic Journal of Rural and Remote Health Research, Education, Practice and Policy: http://www.rrh.org.au/articles/subviewnew.asp?ArticleID=1060

The authors conclude that universal definitions for the concepts of “rural” and “remote” are needed to help compare the large number of studies available in this area. Wilson (2009) write that there are strategies to meet short term staffing requirements, but little evidence to demonstrate the long term impact of these interventions. The authors write, “current evidence only supports the implementation of well-defined selection and education policies, although incentive and support schemes may have value. There remains an urgent need to evaluate the impact of untested interventions in a scientifically rigorous fashion in order to identify winning strategies for guiding future practice and policy” (p. 2).

23. Affiliation with an educational institution

No clearly relevant systematic reviews on the topic of the effect of affiliation with an educational institution for a community health centre were identified.
Related to educational institutions and their support role in training health professional staff who will work in rural areas that might support a CEC-type setting, Rabinowitz (66) examined the outcomes of comprehensive medical school programs designed to increase the rural physician supply. This 2008 systematic review resulted in the development of a model to estimate the impact of replicating these medical education programs. The authors only looked at English language studies, due to a focus on US medical education. The value in this systematic review lies in its efforts to locate data regarding all US-based allopathic medical school programs designed to increase the rural physician supply and which included recruitment and retention outcomes.

24. Conducting research at a community health centre
No clearly relevant systematic reviews on the topic of the effect of a community health centre being involved in conducting research were identified.

Affiliation with educational educations is unknown for 10 of the Canadian CEC-type centres consulted. Two Canadian CEC-type centres consulted explicitly stated having a presence of medical students and residents through university teaching programs within their health centres.

Whether research was conducted within health centres was unknown for 11 Canadian CEC-type centres consulted. One Canadian CEC-type centre consulted was affiliated with a Centre for Rural Health Studies.
Knowledge Translation

A second integrated knowledge translation workshop was delivered to the same group of stakeholders invited to the first workshop. Our group of attendees brainstormed a list of potential stakeholders to disseminate all or a targeted selection of this project’s findings to. These stakeholders included:

- Professional groups (colleges, associations)
- Health care providers
- Researchers (in part, to identify gaps in the literature, or opportunities to study the CEC model)
- NSHRF
- Department of Health and Wellness
  - Research
  - Policy
  - Operators / District Health Authorities
- Other government entities
- Administrators of CECs and health care providers
- Communities (members of the public and users of health services in communities)

The research team asked the workshop attendees to think about how to reach out to each of the identified stakeholders, and which specific stakeholders might be interested in which messages or groups of messages.
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Contributions of Authors

Research team

Jill Hayden (team lead) – Overseeing planning and conduct of all stages of the evidence synthesis; critical editing of early drafts and the final report.

Jessica Babineau – Drafting proposal, jurisdictional review coordination, team coordination, workshop coordination, literature searches, citation screening, data extraction, data management, drafting of final report.

Lara Killian – Literature searches, citation screening, data extraction, data management, workshop facilitation, drafting and editing of final report.

Austin Zygmunt – Citation screening, data extraction, review of final report.

Investigator team

Ruth Martin-Misener – Defining key terms, search terms, content advising, analysis of extracted data and workshop outcomes, workshop participation, contributing to critical editing of final report and subsequent publications.

Alix Carter – Defining key terms, search terms, content advising, analysis of extracted data and workshop outcomes, contributing to critical editing of final report and subsequent publications.

Jan Jensen – Defining key terms, search terms, content advising, analysis of extracted data and workshop outcomes, workshop participation, contributing to critical editing of final report and subsequent publications.

Declarations of Conflict of Interest

No conflicts of interest have been declared by the authors.

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Appendices

Appendix 1: Jurisdictional Review Scoping Searches – Resource List
Each jurisdictional search began with a scan of major government and health sites: websites were scanned for relevant documents or pages. In the case of government sites, this included reports or publications oriented towards health services. Health sites included a scan for lists of health centres, lists of services provided, and news releases. All pages seeming to be of possible interest were scanned.

Search tools, when available, were also used to search terms such as “primary AND emergency”, “collaborative care”, “team model”, “integrated care”, “health centre”, and “community health centre”. Specific location names, determined through preliminary scanning of sites, were also searched when relevant. Inconsistency of naming structures between jurisdictions required adding additional terms to each search strategy.

Finally, select databases and search engines (CBCA, PubMed, Google, Google Scholar, and Google News) were searched for terms related to potential health centres identified in each jurisdiction.

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<td>Dehcho Health and Social Services Authority</td>
<td><a href="http://www.dhssa.ca">www.dhssa.ca</a></td>
</tr>
<tr>
<td></td>
<td>Department of Health and Social Services</td>
<td><a href="http://www.hss.gov.nu.ca">www.hss.gov.nu.ca</a></td>
</tr>
<tr>
<td>ONTARIO</td>
<td>Government of Ontario</td>
<td><a href="http://www.ontario.ca">www.ontario.ca</a></td>
</tr>
<tr>
<td></td>
<td>Minister of Health and Long Term Care</td>
<td><a href="http://www.health.gov.on.ca/en">www.health.gov.on.ca/en</a></td>
</tr>
<tr>
<td></td>
<td>Ontario’s Local Health Integration Networks</td>
<td><a href="http://www.lhins.on.ca">www.lhins.on.ca</a></td>
</tr>
<tr>
<td>PRINCE EDWARD ISLAND</td>
<td>Government of PEI</td>
<td><a href="http://www.gov.pe.ca">www.gov.pe.ca</a></td>
</tr>
<tr>
<td></td>
<td>Health PEI</td>
<td><a href="http://www.healthpei.ca">www.healthpei.ca</a></td>
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<tr>
<td></td>
<td>PEI Health Sector Council</td>
<td><a href="http://peihsc.ca">peihsc.ca</a></td>
</tr>
<tr>
<td></td>
<td>Nunatsiavut Government</td>
<td><a href="http://www.nunatsiavut.com">www.nunatsiavut.com</a></td>
</tr>
<tr>
<td>QUEBEC</td>
<td>Portail Quebec</td>
<td><a href="http://www.gouv.qc.ca">www.gouv.qc.ca</a></td>
</tr>
<tr>
<td>SASKATCHEWAN</td>
<td>Government of Saskatchewan</td>
<td><a href="http://www.gov.sk.ca">www.gov.sk.ca</a></td>
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<td></td>
<td>Saskatchewan Health</td>
<td><a href="http://www.health.gov.sk.ca">www.health.gov.sk.ca</a></td>
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<td></td>
<td>Saskatoon Health Authority</td>
<td><a href="http://www.saskatoonhealthregion.ca">www.saskatoonhealthregion.ca</a></td>
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<tr>
<td></td>
<td>Athabasca Health Authority</td>
<td><a href="http://www.athabascahealth.ca">www.athabascahealth.ca</a></td>
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<tr>
<td></td>
<td>Keewatin Yatthe</td>
<td><a href="http://www.kyrha.ca">www.kyrha.ca</a></td>
</tr>
<tr>
<td></td>
<td>Mamawetan Churchill River</td>
<td><a href="http://www.mccrrha.sk.ca">www.mccrrha.sk.ca</a></td>
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<tr>
<td></td>
<td>Prairie North Health Authority</td>
<td><a href="http://www.pnrha.ca/bins/index.asp">www.pnrha.ca/bins/index.asp</a></td>
</tr>
<tr>
<td></td>
<td>Prince Albert Parkland Health Authority</td>
<td><a href="http://www.paphr.sk.ca">www.paphr.sk.ca</a></td>
</tr>
<tr>
<td></td>
<td>Kelsey Trail Health Authority</td>
<td><a href="http://www.kelseytrailhealth.ca">www.kelseytrailhealth.ca</a></td>
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<tr>
<td></td>
<td>Heartland Health Authority</td>
<td><a href="http://www.hrha.sk.ca">www.hrha.sk.ca</a></td>
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<tr>
<td></td>
<td>Sunrise Health Authority</td>
<td><a href="http://www.sunrisehealthregion.sk.ca">www.sunrisehealthregion.sk.ca</a></td>
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<tr>
<td></td>
<td>Regina Qu’appelle Health Authority</td>
<td><a href="http://www.rqhealth.ca">www.rqhealth.ca</a></td>
</tr>
<tr>
<td></td>
<td>Five Hills Health Authority</td>
<td><a href="http://www.fhhr.ca">www.fhhr.ca</a></td>
</tr>
<tr>
<td></td>
<td>Cypress Health Authority</td>
<td><a href="http://www.cypresshealth.ca">www.cypresshealth.ca</a></td>
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<tr>
<td></td>
<td>Sun Country Health Authority</td>
<td><a href="http://www.suncountry.sk.ca">www.suncountry.sk.ca</a></td>
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<tr>
<td></td>
<td>Winnipeg Health Authority</td>
<td><a href="http://www.wrha.mb.ca">www.wrha.mb.ca</a></td>
</tr>
<tr>
<td>YUKON</td>
<td>Yukon Health and social services</td>
<td><a href="http://www.hss.gov.yk.ca">www.hss.gov.yk.ca</a></td>
</tr>
<tr>
<td></td>
<td>Yukon Health Guide</td>
<td><a href="http://www.ykhealthguide.org">www.ykhealthguide.org</a></td>
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</tbody>
</table>
## Appendix 2: Data Extraction Form for Scan of Jurisdictions Outside of Nova Scotia

### JURISDICTIONAL DATA EXTRACTION FORM

<table>
<thead>
<tr>
<th>ID</th>
<th></th>
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<tbody>
<tr>
<td>PROV/COUNTRY</td>
<td></td>
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<tr>
<td>CITY/OTHER LOCATION/HEALTH AUTHORITY</td>
<td></td>
</tr>
<tr>
<td>NAME OF CENTRE</td>
<td></td>
</tr>
<tr>
<td>POTENTIAL CONTACT PERSONS</td>
<td></td>
</tr>
<tr>
<td>CONTACT NOTES</td>
<td></td>
</tr>
<tr>
<td>ADDITIONAL INFORMATION</td>
<td></td>
</tr>
<tr>
<td>AREA SERVED [e.g. rural/urban; population; density]</td>
<td></td>
</tr>
<tr>
<td>HEALTH CARE SYSTEM CONTEXT [e.g. established, “fit”]</td>
<td></td>
</tr>
</tbody>
</table>

### CEC ‘Characteristics’

| Hours of Service: Emergent Service | □ 24 hours/day  
□ Daytime only  
□ Not available  
□ Other: |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Source:</td>
<td></td>
</tr>
</tbody>
</table>
| Hours of Service: Urgent Service   | □ 24 hours/day  
□ Daytime only  
□ Not available  
□ Other: |
| Source:                           |                                                  |
| Hours of Service: Walk-in/low acuity Service | □ 24 hours/day  
□ Daytime only  
□ Not available  
□ Other: |
| Source:                           |                                                  |
| Staff Members | Practitioner Type | Qualification |
|               | □ MD               | □ GP  
□ EMERGENCY  
□ RADIOLOGY  
□ SURGERY  
□ PEDIATRICS  
□ Other: |
<table>
<thead>
<tr>
<th>Health Care Provider (HCP) Collaboration</th>
<th>□ No \ □ Yes \ □ Other: \ □ Notes (e.g., Leadership roles, collaborative team structure and composition)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triage (are patients triaged upon arrival)</td>
<td>□ No \ □ Yes \ □ CTAS \ □ Other scale: _______________</td>
</tr>
<tr>
<td>Emergency Protocols/Standing Orders</td>
<td>□ None \ □ Staff other than MD can initiate</td>
</tr>
<tr>
<td>Destination Plan (pre-determined destination based on patient presentation – e.g., STEMI, trauma)</td>
<td>□ No \ □ Yes \ □ Community hospital \ □ Tertiary care centre \ □ Other: \ □ Source:</td>
</tr>
<tr>
<td>Transfer Plan</td>
<td>□ No</td>
</tr>
<tr>
<td><strong>Collaborative Emergency Centres: Rapid Knowledge Synthesis</strong></td>
<td><strong>Nova Scotia Cochrane Resource Centre</strong></td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td><strong>Capacity (equipment, services) to treat various levels of acuity</strong></td>
<td>Describe (e.g., facility size and structure [e.g., square footage, number of rooms]; equipment [e.g., resuscitation equipment, casting equipment])&lt;br&gt;Source: [1]</td>
</tr>
<tr>
<td><strong>Ambulatory care</strong></td>
<td>□ No&lt;br&gt;□ Yes&lt;br&gt;□ XR&lt;br&gt;□ Day surgery&lt;br&gt;□ Blood work&lt;br&gt;□ Diagnostic Imaging (CT, mammo, etc)&lt;br&gt;□ ECGs&lt;br&gt;□ Orthopedics follow-up&lt;br&gt;□ Other:&lt;br&gt;Source:</td>
</tr>
<tr>
<td><strong>In-patient beds</strong></td>
<td>□ No&lt;br&gt;□ Yes&lt;br&gt;□ Notes:</td>
</tr>
<tr>
<td><strong>Consulting/Offsite communication</strong></td>
<td>□ On-call MD&lt;br&gt;□ Consult ED&lt;br&gt;□ Consult specialist&lt;br&gt;□ Other:&lt;br&gt;Source:</td>
</tr>
<tr>
<td><strong>Health promotion &amp; prevention services</strong></td>
<td>□ No&lt;br&gt;□ Yes&lt;br&gt;□ Notes:&lt;br&gt;Source: [1]</td>
</tr>
<tr>
<td><strong>Governance</strong></td>
<td>□ Department of Health&lt;br&gt;□ District Health Authority&lt;br&gt;□ Hospital&lt;br&gt;□ Other:&lt;br&gt;Source:</td>
</tr>
<tr>
<td><strong>Evaluation</strong></td>
<td>□ Formal Program evaluation&lt;br&gt;□ Continuous Quality Improvement (chart audit, advent reporting)&lt;br&gt;□ Other:&lt;br&gt;Source:</td>
</tr>
<tr>
<td></td>
<td>What outcomes were evaluated? [e.g., availability of emergency services, patient/provider satisfaction, patient health outcomes, efficient delivery of emergency and primary care, time to definitive care, safety of care]</td>
</tr>
<tr>
<td>Source:</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td></td>
</tr>
<tr>
<td>What are the results of the evaluation? What was considered successful? What improvement opportunities were identified?</td>
<td></td>
</tr>
</tbody>
</table>

### Program Funding

- Publicly funded
  - Performance-based contracts
  - Lump sum
  - Other:
- Fee
- Private insurance
  - Other:

### Practitioner Funding

- Salary
- Fee-for-service (physicians)
- On-call pay
- Other:

### Notes

### References
Appendix 3: Original CEC Evidence Synthesis Review Questions

OVERALL REVIEW QUESTION
1. What is the effect of CEC-type models of health care delivery (see definition) on outcomes related to individual or community health? (Comparison: traditional health care delivery)

STRUCTURES/PROCESSES QUESTIONS
2. What is the effect of (greater or lesser) hours of access to emergency services in a community?
3. What is the effect of the structure of emergency services (i.e. triage) on individual or community health outcomes?
4. What is the effect of (greater or lesser) hours of primary care services on individual or community health outcomes?
5. What is the effect of the structure of primary care services (i.e. walk-in, same day availability) on individual or community health outcomes?
6. What is the effect of (additional, specific listed) health care professional staff available in an emergency care delivery environment on individual or community health outcomes? (Comparison: traditional health care delivery)
   - Physician/Specialist(s)
   - Nurse Practitioner(s)
   - Nurse(s) with additional training
   - Paramedic with additional training
   - Allied Health Professional(s) (Regulated)
   - Allied Health Professional(s) (Other)
   - Additional Support Staff
7. What is the effect of (additional, specific listed) health care professional staff available in a primary health care delivery environment on individual or community health outcomes? (Comparison: traditional health care delivery)
   - Physician/Specialist(s)
   - Nurse Practitioner(s)
   - Nurse(s) with additional training
   - Allied Health Professional(s) (Regulated)
   - Allied Health Professional(s) (Other)
8. What is the effect of collaborative practices in emergency health care delivery on individual or community health outcomes? (Comparison: traditional health care delivery)
9. What is the effect of collaborative practices in primary health care delivery on individual or community health outcomes? (Comparison: traditional health care delivery)
10. What is the effect of having emergency protocols or use of standing orders in emergency health care delivery on individual or community health outcomes? (Comparison: traditional health care delivery)
11. What is the effect of managing patients using a destination and transfer plan in emergency health care delivery on individual or community health outcomes? (Comparison: traditional emergency care delivery)
12. What is the effect of (levels of) service infrastructure in emergency and primary health care delivery on individual or community health outcomes?
13. What is the effect of having (a comprehensive set of) diagnostic services available in emergency health care delivery on individual or community health outcomes?
14. What is the effect of having (a comprehensive set of) diagnostic services available in primary health care delivery on individual or community health outcomes?
15. What is the effect of having (specific) ambulatory clinic services available in primary health care delivery on individual or community health outcomes?
16. What is the effect of having in-patient beds available within a community health centre on individual or community health outcomes?
17. What is the effect of accessing or having available off-site consultation for health care delivery in a community on individual or community health outcomes?

18. What is the effect of emergency and primary health care centres using (different/specific listed) mechanisms for off-site communication on individual or community health outcomes?

19. What is the effect of emergency and primary health care centres using (different/specific listed) mechanisms for off-site health care delivery on individual or community health outcomes?

20. What is the effect of organizing health care services for a community based on a formal community health needs assessment?

21. What is the effect of having (specific listed) health promotion & prevention services available in primary health care delivery on individual or community health outcomes?
   - Health Education
   - Public Health
   - Nutrition
   - Recreation
   - Specialist Services
   - Chronic Disease
   - Infection Control
   - Mental Health & Addictions
   - Home Care
   - Health Clinics (specific groups)

22. What is the effect of having a specific (listed) governance structure for a community health centre, on individual or community health outcomes?

23. What is the effect of having a formal program evaluation for a community health centre, on individual or community health outcomes?

24. What is the effect of having a specific (listed) program funding structure for a community health centre, on individual or community health outcomes?

25. What is the effect of having a specific (listed) funding structure for health professionals at a community health centre, on individual or community health outcomes?

26. What is the effect of community awareness campaigns for a community health centre and availability of services, on individual or community health outcomes?

27. What is the effect of recruitment & retention programs for rural health centres, on individual or community health outcomes?

28. What is the effect of a community health centre to be affiliated with an educational institution, on individual or community health outcomes?

29. What is the effect on individual or community health outcomes for a community health centre to be involved in conducting research?
Appendix 4: Jurisdiction Review Centre Selection Flowchart

Centres identified through scoping searches (n=25)

Potentially relevant centres screened for eligibility (n=26)

Centres considered for eligibility (n=15)

Centres included in qualitative synthesis (n = 12)
  - CEC-type centres with Nova Scotia context (n=3)
  - CEC-type centres (n=9)

Records excluded through CEC type centre operationalization process (n=11)

Exclusions through contact with health centre (n=3)
## Appendix 5: CEC-type Centre Summaries

### Prioritized Components

<table>
<thead>
<tr>
<th>Centre/Location</th>
<th>Structure</th>
<th>Hours</th>
<th>Staffing</th>
<th>Collaborative Practice</th>
<th>Telehealth</th>
<th>Diagnostic services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ladysmith Community Health Centre, Ladysmith, BC</td>
<td>Primary care centre (family practice) with urgent care. Primary care by appointment, priority given to patients who do not have a local practitioner. (93)</td>
<td>Family practice - open standard day hours (Mon-Fri), with urgent care centre open until 7:30-10:30 (93)</td>
<td>GPs, NP, RNs, Public Health Nurses, Midwife, Long Term Care Case Manager, Home Care Nurse, Home &amp; Community Care Clinician &quot;Support Staff&quot;. Also have OT, Physio, X-ray, Medical lab techs, Nutritionist. (93, 105)</td>
<td>The goal of the Centre is to provide integrated and collaborative team care to patients by the appropriate provider in the appropriate setting in an appropriate time and in an appropriate type and format of intervention for their needs. (93) Online registry ensures continuous and proactive care for patients (102).</td>
<td>Unknown</td>
<td>X-ray, blood work, have lab and collection station</td>
</tr>
<tr>
<td>Rainbow Lake Health Centre, Rainbow Lake Alberta</td>
<td>Has primary care and &quot;emergency&quot; (defined as &quot;rural ambulatory&quot;) (106)</td>
<td>Standard day time hours (107)</td>
<td>Paramedics role: patient assessments, lab draws and suturing. Normally staffed with NP (retired) (92). It is far easier to be proactive rather than reactive in terms of training – should be increased training prior, rather than when needed for paramedic staff working on site. No additional formal training has occurred for paramedic staff (92).</td>
<td>While collaborating, it is important to be aware of the different scope of practice each team member has (e.g. NPs and paramedics) and to work with that – discussed how this strategy failed in other locations, as paramedics would be made to sweep the floors rather than working within their scope of practice. Teleconference with Regional Hospital Hospital Management has an important role at the centre.</td>
<td>Team teleconference with regional hospital on weekly basis While having advanced technology to consult with surgeons and specialists via videoconferencing, it is often challenging to get specialists to leave their busy workdays to go into a separate room to discuss with members at the centre – can be easier to use phone conservation, where you relay the important information to ensure thorough understanding of the situation.</td>
<td>Unknown</td>
</tr>
<tr>
<td>Dr. W. H. Newhook Community Health Centre, Whitbourne, Newfoundland</td>
<td>Primary Care and Emergency services. Rapid access to ambulatory care services.</td>
<td>Primary care (Weekdays, standard hours) and 24 hour emergency care (96).</td>
<td>Value of communication and flexibility of staff is necessary due to ongoing challenges in staffing (only one nurse on site and one utilities person at night – with a second nurse and doctor on call). Nurse on duty at night for emergencies. During the day, physicians have clinics but also one is on duty at the ED (called when necessary) and are on call at night. Staff has standard qualifications.</td>
<td>Value of communication and flexibility of staff is valuable.</td>
<td>Centre does not have technological telehealth systems in place, although being considered. At night, GP and second nurse are on call - available via telephone.</td>
<td>Lab, EKGs, X-ray - after hours referred to Carbonear or St. John’s (96).</td>
</tr>
<tr>
<td>Cumberland House Health Centre, Norther Village of Cumberland House, Saskatchewan</td>
<td>Primary Care centre with emergency (NP on staff)</td>
<td>Outpatient/Prima ry care: M-F, standard daytime hours (North Saskatchewan Health Services, 2009). Nurse on call 24/7 (108).</td>
<td>GP 3 days/week; NP; Pharmacy; First Responder, Community Health Developer/Rep (108).</td>
<td>Unknown</td>
<td>Telehealth as &quot;two-way videoconferencing technology that is used as a tool to provide an optional way for patients to see their referred clinicians without the need to travel to an urban centre&quot; (Hrychuk, 2010). Centre was a &quot;Satellite Initiative site&quot; for telehealth (see additional reading)</td>
<td>Blood work, &quot;laboratory services&quot;(109).</td>
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<tr>
<td>Hopedale Community Clinic, Hopedale, Newfoundland</td>
<td>Primary Care and Emergency care available during daytime hours. Focused on primary care, but has basic trauma and resuscitation equipment, including a defibrillator and 3 holding beds on site (110).</td>
<td>Regional Nurse II, a Regional Nurse I, a Personal Care Attendant, a Mental Health Counsellor, two Maintenance Repairmen and a Domestic Worker. Labrador-Grenfell Health partners with the Nunatsiavut Department of Health and Social Development in the provision of health care. Community health services are provided by the Nunatsiavut Government, through a team consisting of a Public Health Nurse, a Public Health Aide, Community Service Workers, and Child Care Workers (110)</td>
<td>The core values of Labrador-Grenfell Health offer principles and a guiding framework for all employees as they work in their various capacities to deliver health and community services and enhance the health status of the residents of the region, i.e., Collaboration: Each person actively engages others to develop positive partnerships and promote productive teamwork. A visiting psychologist provides additional counseling services as needed. A behavior management Specialist also visits on a regular basis (111)</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Black Lake Health Centre, Black Lake, Saskatchewan</td>
<td>Primary Care - Open weekdays daily. Emergency services - 24/7 (112).</td>
<td>4 RNs and a home care nurse are employed at the centre. Support staff (hired by band). EMS staff operate beyond traditional scope - working in the health facility with doctors and nurses in the ED and labour/delivery, assist in acute care, and long term care in collaboration with an interdisciplinary team (LPN as case manager). Paramedics also do training for AHA and general public (e.g. CPR, First aid, first responder). AHA paramedics have Canadian Aero medical and transportation association Level 1 course (113) Visiting services: Psychiatric, physician, dentist, Mental health and addictions, pharmacist.</td>
<td>Nurses are considered primary caregivers, with telephone access to GPs at Stoney Rapids (25 km away). EMS staff operate beyond traditional scope - working in the health facility with doctors and nurses in the ED and labour/delivery, assist in acute care, and long term care in collaboration with an interdisciplinary team (LPN as assessor/case manager) (112)</td>
<td>Black Lake has the advantage of a full-fledged hospital located in Stoney Rapids, a community 25 km away, so nurses have access to doctors via telephone if they need them.</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Community Health Centre, Region</td>
<td>Health Centre Structure</td>
<td>Primary Care Structure</td>
<td>Registered Nurse Description</td>
<td>Healthcare Team Services</td>
<td>Additional Services</td>
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<tr>
<td>Igloolik, Nunavut</td>
<td>Only health centre in community - primary care and Emergency.</td>
<td>Primary Care - Open weekdays from 9am to 5pm. Nurse on call for emergencies 24/7 (114)</td>
<td>Registered nurse (Community Health Nurse - The Department of Health and Social Services supports training in a number of disciplines, including maternal care, midwifery, and mental health (98). Doctors, dentists, and other specialists visits town on a regular basis (114). Social worker, community health representatives (98).</td>
<td>In Nunavut, interdisciplinary care is seen as the most sustainable model and the best way to deliver primary health care. The community health nurse is the backbone of the team and the first point of contact for patients. The core team in the community health centres consists of at least two community health nurses, plus a social worker, community health representatives, clerk interpreters, and X-ray technician. The nurse in charge provides both clinical and administrative leadership for the team. Teams provide a whole spectrum of regular and special needs care, including care for mental health and addictions (98).</td>
<td>Unknown</td>
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</tr>
<tr>
<td>Wrigley, NWT</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>The CHW and CHR provide health care in the absence of trained medical and/or nursing personnel under the long-distance direction and guidance of the medical/nursing staff of the Fort Simpson Health and Social Services Center. When providing basic and emergency care or assessment, the CHW and CHR will be required to independently perform a basic assessment (vital statistics) and provide the results to medical/nursing personnel in Fort Simpson for diagnosis and treatment (116).</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>Health Centres (case: Dawson City), Yukon</td>
<td>Primary Care: walk-in/ outpatient/ clinic for primary care. Emergency: on-call (after primary care hours) (94).</td>
<td>Primary care: M-F daily. Emergency care: 24/7 on-call NP (Dawson Medical Clinic, n.d.)</td>
<td>GPs (3 during the summer, 2 during the winter); Several medical students and Family Practice Residents choose to do their rural elective experience in Dawson every year; NP; Community Health nurse; Home care nurse; Private pharmacy</td>
<td>The medical clinic is housed in the same building as the nursing station (94). Telehealth appointments with dietitian and Mental Health/ Counselling at the Health Centre (117). Tele- consultation with specialists in Vancouver; often avoiding unnecessary distance travel for patients (94).</td>
<td>X-ray, blood work (Specimen collection Mon, Wed, Fri 8:30-10:30), ECGs (94).</td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Services and Team Details</td>
<td>Notes</td>
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<tr>
<td>Northeast Community Health Centre, Edmonton, Alberta</td>
<td>Emergency services - 24 hours/day Primary Care-Unknown (88).</td>
<td>Shortages of medical generalists and specialists in northeast Edmonton, particularly the latter, were identified through analysis of regional statistics and through the community consultation focus groups held during planning for the Centre. E.g. ED identified a need for follow-up services for minor orthopaedic injuries; in response, the Centre established a regular follow-up clinic for amateur sports injuries and simple fractures. A consultant psychiatrist works with the NECHC Mental Health Service, providing regular mental health rounds for the Centre and other community-based PCPs. This model allows the psychiatrist to support primary care physicians and mental health providers in interventions beyond the range of usual primary care process. (95).</td>
<td>NECHC provides services to ensure client-centred service delivery. Close working relationships were established with community-based services, agencies and resources. Today, NECHC providers continue to work with these partners in case management, healthy living initiatives and client referrals. Maximizing multidisciplinary teams to provide integrated client-centred services is a critical feature of the Centre. The make-up of these teams varies according to specific client needs, but could include GPs, multicultural health brokers, social workers, RNs, dieticians, nutritionist, etc.(95).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oceanside Primary &amp; Urgent Centre, Parksville, BC</td>
<td>Primary Care and Urgent care (including stabilization and transfer)</td>
<td>A collaborative work space is being designed for up to ten health care practitioners, including: family physicians, NPs and associated staff. These professionals will provide the typical health care services associated with family practice, including treating illness, managing chronic disease, prevention and referrals. Pharmacist on site. (119).</td>
<td>Plan is for a multidisciplinary care team – this will be GP led, and NP will be part of the team (118).</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Unknown | X-ray, blood work, diagnostic imaging, audiology services, and ultrasound services (88). | Tele-consultation capacity (120). | Onsite laboratory, medical imaging (e.g. x-ray and ultrasound) (119). |
Non-Prioritized Components (1/2)

<table>
<thead>
<tr>
<th>Centre/Location</th>
<th>Protocols/Standing orders</th>
<th>Destination/Transfer plans</th>
<th>Service Infrastructure</th>
<th>Ambulatory services</th>
<th>Community Health Needs Assessment</th>
<th>Health Promotion and Prevention</th>
<th>Governance Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ladysmith Community Health Centre, Ladysmith, BC</td>
<td>Unknown</td>
<td>Centre is 25 minutes away from a higher level facility. Centre has the capacity to stabilize and transfer, however, for emergency situations have an ambulance by-pass protocol (e.g. for Trauma cases). Originally has the term “emergency” in name, but changed to Community Health centre and changed the name to Urgent once the by-pass protocol was put into place.</td>
<td>A privately run long term residential care facility is located adjacent to the centre. Centre converted from General Hospital. All residential care, palliative care and respite beds were transferred to a brand new purpose build facility. The previous inpatient space was renovated to accommodate other health care services that were previously located throughout Ladysmith and in neighbouring communities. The new service model was part of VIHA’s strategy for enhancing primary health care services and chronic disease management in central Vancouver Island (93).</td>
<td>Yes - clinical day care (eg. casting and IV and blood transfusions) (121).</td>
<td>Planning for this primary health care site began in 2003 and included a review of the health services provided to the Ladysmith community (93).</td>
<td>Yes (93).</td>
<td>District Health Authority governed (121).</td>
</tr>
<tr>
<td>Rainbow Lake Health Centre, Rainbow Lake, Alberta</td>
<td>Currently developing concrete protocols and guidelines based on current practice.</td>
<td>Centre had a very close relationship with Regional hospital (still at a distance) – all calls and consultations were made at this centre. Transfers would be made to the location, but it was possible to “trump” this destination to a higher level medivac when needed.</td>
<td>Unknown</td>
<td>Yes - Bloodwork, suturing (122)</td>
<td>Unknown</td>
<td>Yes</td>
<td>Alberta Health Services governed (88)</td>
</tr>
<tr>
<td>Dr. W. H. Newhook Community Health Centre, Whitbourne, Nfld</td>
<td>Unknown</td>
<td>Centre has holding beds, but patients are normally generally assessed, treated and discharged or are transferred to secondary or tertiary care centres (96)</td>
<td>Unknown.</td>
<td>Yes - Chemotherapy, Holter Monitoring, Blood Pressure [BP] Monitoring, Intravenous Medications (96)</td>
<td>Unknown</td>
<td>Yes - mostly as visiting services (Visiting Services: Dietitian, Respiratory Therapist, Mental Health Counsellor) (96)</td>
<td>Health Authority Governed (123)</td>
</tr>
<tr>
<td>CEC-type models</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Yes (108).</td>
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</tr>
<tr>
<td>Cumberland House Health Centre, Northern Village of Cumberland House, Sask</td>
<td>Unknown</td>
<td>Emergency patients are medevaced to the appropriate referral centre (110).</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Yes</td>
</tr>
<tr>
<td>Hopedale Community Clinic, Hopedale, Nfld</td>
<td>Unknown</td>
<td>A future priority for development of ICP Drug protocols to provide improved quality of emergency care for patients on long flights to the south. (112).</td>
<td>Hospital 25 km away in Stoney Rapid (transfers by ambulance) - aero transfer occurs during emergency situations (104, 113).</td>
<td>Nurse residence and clinic renovations completed in 2005-2006 (112).</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Yes(112).</td>
</tr>
<tr>
<td>Black Lake Health Centre, Black Lake, Sask</td>
<td>Unknown</td>
<td>Serious medical conditions, procedures, or emergencies are flown to Iqaluit or Ottawa (98).</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Yes (e.g. RN’s in Igloolik make home visits and offer structured appointment’s for prenatal well-woman and well-child clinics (124).</td>
</tr>
<tr>
<td>Igloolik Community Health Centre, Igloolik, Nunavut</td>
<td>Unknown</td>
<td>The maximum patient observation is for 6 hours before the patient is transferred (medivac) to Stanton Territorial Hospital, in Yellowknife or to Edmonton, Alberta (115).</td>
<td>Fort Simpson is the largest community in the Dehcho and also serves as the administrative headquarters for the Authority (second level of health centre) (125). Also near the Residential Long Term Care facility renamed the “Elders Care Home” provides quality care to the elderly and disabled, and has 20 beds (115).</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Yes</td>
</tr>
<tr>
<td>Centre has 2 emergency rooms and 5 clinic rooms (115).</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Medical clinic and nursing station are co-located with the addition on a private pharmacy(94). However, construction of a new hospital is planned - replacing the health centre as of 2010 (126).</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Yes</td>
<td>District Health Authority (125).</td>
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<tr>
<td>A 12-bed hospital facility is located in Watson Lake. The Watson Lake Hospital provides 24-hour emergency medical treatment, short term admissions and despite care clients requiring more specialized care may be referred to Whitehorse General Hospital (6 hours via medivac) or hospitals out of the territory (117).</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Specific medication dispersion is provided during daytime hours (127).</td>
<td>Unknown prior to development of current centre. However, complete a functional assessment of the community's acute care needs by the government and the Yukon Hospital Corporation to have occurred in preparation for hospital development. Community meetings to discuss the needs of the community, including health centre staff, other health professionals in the community, the Tr'ondëk Hwëch'in First Nation, community stakeholders to have been invited.(126).</td>
<td>Yes</td>
<td>Dawson City Clinic is under a current change in governance model - a new hospital facility will be constructed under supervision of the Yukon Hospital Corporation (126). Other health centres are governed by the Yukon Department of Health Services (128).</td>
<td></td>
</tr>
<tr>
<td>The City of Edmonton leased Northeast Community Health Centre land. The lease expires in 2048 (122).</td>
<td>Unknown</td>
<td>Unknown</td>
<td>A strategic planning team was developed regarding the planning of the centre which included RNs, a NP, physicians, a program evaluator, a strategic planner and a senior administrator, and was linked with the community advisory committee representatives (95).</td>
<td>Yes</td>
<td>Unknown</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Non-prioritized components (2/2)

<table>
<thead>
<tr>
<th>Centre/Location</th>
<th>Program Evaluation</th>
<th>Program Funding</th>
<th>Staff funding</th>
<th>Community Awareness</th>
<th>Recruitment and Retention</th>
<th>Educational Affiliation</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CEC-type models with Nova Scotia context</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Ladysmith Community Health Centre, Ladysmith, BC</td>
<td>Unknown</td>
<td>Unknown</td>
<td>“Traditionally, doctors have been paid a fee for each patient visit, called fee-for-service. A new payment method blends an annual fee for each registered patient, based on a patient’s age and health care needs. This new system allows physicians at the clinic to involve other health professionals in care, and spend more time helping patients manage complex and chronic conditions.” [102]</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Rainbow Lake Health Centre, Rainbow Lake Alberta</td>
<td>Currently, an evaluation of the standing model is occurring at the centre - in hopes of establishing this model type in other locations across the province.</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Health centre has had positive feedback from the community - Community outreach helped community realize benefits of new HC system.</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Dr. W. H. Newhook Community Health Centre, Whitbourne, Newfoundland</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Quick access to ambulatory services recognized by the community.</td>
<td>Unknown</td>
<td>Memorial University Teaching Program (i.e. Residents, Clinical Clerks, Medical Students, Foreign Medical Graduates) [96]</td>
<td>Affiliation with centre for Rural Health Studies [96]</td>
</tr>
<tr>
<td>CEC-type models</td>
<td>Location</td>
<td>Construction funding:</td>
<td>Current Program funding:</td>
<td>Notes</td>
<td></td>
<td></td>
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<tr>
<td>Cumberland House Health Centre, Norther Village of Cumberland House, Saskatchewan</td>
<td>Unknown</td>
<td>Health Minister $200 000 for planning and design of the new health care facility. Health Canada investing $60 000 to support the planning and design phase of the Cumberland house health centre (99). Current program funding: Unknown</td>
<td>Unknown</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Hopedale Community Clinic, Hopedale, Newfoundland</td>
<td>Labrador-Grenfell Health uses the principles of Continuous Quality Improvement (97).</td>
<td>Unknown</td>
<td>Unknown</td>
<td></td>
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</tr>
<tr>
<td>Black Lake Health Centre, Black Lake, Saskatchewan</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>To entice health professional to move north, the provincial government established the Recruitment Grant Program (104).</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Igloolik Community Health Centre, Igloolik, Nunavut</td>
<td>No formal evaluation of inter-professional primary health care teams in Nunavut has been performed, and none is currently planned. Informally, however, regional and community health centres have regular meetings to assess how well teams are functioning (98)</td>
<td>Unknown</td>
<td>Unknown</td>
<td>The department of Health offers support and incentives—including scholarships, bursaries, and subsidized child care—to nursing students in the Nunavut Nursing Program at Nunavut Arctic College (98).</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Fort Simpson Health Centre, Fort Simpson, NWT</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td></td>
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<tr>
<td>Wrigley, NWT</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
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</tbody>
</table>


<table>
<thead>
<tr>
<th>Health Centres (case: Dawson City), Yukon</th>
<th>Unknown.</th>
<th>Unknown.</th>
<th>Unknown.</th>
<th>Unknown.</th>
<th>Unknown.</th>
<th>Several medical students and Family Practice Residents choose to do their rural elective experience in Dawson every year (94).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northeast Community Health Centre, Edmonton Alberta</td>
<td>Formal program evaluation - As the Centre developed, the conceptual model was refined. An early enhancement was the identification of evaluation as a key component for the success of the Centre, and a regional program evaluator was seconded to NECHC’s planning team (95).</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Community members in north Edmonton had been lobbying for health services in their neighbourhood for almost 20 years before the Centre became a reality. During the planning phase, community consultations were held to gather the community’s input on what services should be provided at the Centre (95).</td>
<td></td>
</tr>
<tr>
<td>Oceanside Primary &amp; Urgent Centre, Parksville, BC</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Physician payments are covered by agreements between Ministry of Health &amp; BC Medical Association. Non-physician staff will be employees of centre (103).</td>
<td>Unknown - However, from a narrative perspective, there have been meetings within the community, in addition to press releases and presentations made available via the VIHA website.</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
</tbody>
</table>
Appendix 6: Final CEC Evidence Synthesis Review Questions

Prioritized Questions

1. What is the effect of **CEC-type models** of health care delivery (see definition) on outcomes related to individual or community health? (Comparison: traditional health care delivery)

2. What is the effect of (greater or lesser) **hours of access to emergency or primary care services** in a community?

3. What is the effect of (additional, specific listed) **health care professional staff available in an emergency care delivery environment** on individual or community health outcomes? (Comparison: traditional health care delivery)

4. What is the effect of (additional, specific listed) **health care professional staff available in a primary health care delivery environment** on individual or community health outcomes? (Comparison: traditional health care delivery)

5. What is the effect of **collaborative practices in emergency or primary health care delivery** on individual or community health outcomes? (Comparison: traditional health care delivery)

6. What is the effect of using telehealth or teleconsultation, in general or through specific mechanisms, on individual or community health outcomes?
   a. What is the effect of accessing or having available **off-site consultation** for health care delivery in a community on individual or community health outcomes?
   b. What is the effect of emergency and primary health care centres using (different/specific listed) **mechanisms for off-site communication** on individual or community health outcomes?
   c. What is the effect of emergency and primary health care centres using (different/specific listed) **mechanisms for off-site health care delivery** on individual or community health outcomes?

7. What is the effect of having (a comprehensive set of) **diagnostic services available in emergency or primary health care delivery** on individual or community health outcomes?

Non-Prioritized Questions

8. What is the effect of the **structure of emergency services** (i.e. triage) on individual or community health outcomes?

9. What is the effect of the **structure of primary care services** (i.e. walk-in, same day availability) on individual or community health outcomes?

10. What is the effect of having **emergency protocols or use of standing orders** in emergency health care delivery on individual or community health outcomes? (Comparison: traditional health care delivery)

11. What is the effect of managing patients using a **destination and transfer plan** in emergency health care delivery on individual or community health outcomes? (Comparison: traditional emergency care delivery)

12. What is the effect of (levels of) **service infrastructure** in emergency and primary health care delivery on individual or community health outcomes?

13. What is the effect of having (specific) **ambulatory clinic services** available in primary health care delivery on individual or community health outcomes?

14. What is the effect of having **in-patient beds available** within a community health centre on individual or community health outcomes?

15. What is the effect of organizing health care services for a community based on a **formal community health needs assessment**?

16. What is the effect of having (specific listed) **health promotion & prevention services** available in primary health care delivery on individual or community health outcomes?

17. What is the effect of having a specific (listed) **governance structure** for a community health centre, on individual or community health outcomes?

18. What is the effect of having a **formal program evaluation** for a community health centre, on individual or community health outcomes?
19. What is the effect of having a specific (listed) **program funding structure** for a community health centre, on individual or community health outcomes?

20. What is the effect of having a specific (listed) **funding structure for health professionals** at a community health centre, on individual or community health outcomes?

21. What is the effect of **community awareness campaigns** for a community health centre and availability of services, on individual or community health outcomes?

22. What is the effect of **recruitment & retention programs** for rural health centres, on individual or community health outcomes?

23. What is the effect of a community health centre to be **affiliated with an educational institution**, on individual or community health outcomes?

24. What is the effect on individual or community health outcomes for a community health centre to be involved in **conducting research**?
Appendix 7: Search Strategies

1. CEC-type model: Search conducted October 18-21, 2011

Due to the broad nature of this question we were unable to identify any reviews of studies examining CEC-type models in general in PubMed, Embase, or The Cochrane Library. Using CADTH's Grey Matters tool (http://cadth.ca/resources/grey-matters), a list of grey literature sources was identified to conduct a grey literature search. These ten sources were selected based on generalizability and for their focus on health contexts most likely to be relevant to Canada and Nova Scotia. During the searches, two additional grey literature sources were identified and added to the original list. With each grey literature source, the following steps were followed, and notes taken to document website browsing and searches conducted if possible:

- Check for organization of website (e.g., by topic area, using filters, alphabetized list of reports, other)
- Follow up on potential subject areas of interest or scan content lists
- If search functionality exists, search for the following terms as likely descriptors for CEC-type models of health care delivery:
  - Collaborative care
  - Enhanced primary care
  - Health Facility/facilities
  - Multidisciplinary center/centre/centers/centres
  - Nursing station(s)
  - Polyclinic(s)
  - Satellite clinic(s)
  - Wellness center/centre/centers/centres

- Number of results from searches was noted
- Titles of results were assessed using the title screening criteria “Is the content of this record relevant to the component search at hand?” (i.e., Does this document appear to describe CEC-type models?)
- Full text of potentially relevant grey literature was retrieved to be assessed in full text

The itemized lists of exactly which filters, headings, tabs, or the like were accessed and scanned is available on request; it is difficult to include this information in detail as every website is laid out differently and search functionality varies. Our team members used the guidelines above to search and explore each of the sites in the following table. For description of individual searches conducted, please contact the Nova Scotia Cochrane Resource Centre.

<table>
<thead>
<tr>
<th>Source/site:</th>
<th>Included/ Excluded</th>
<th>Results (full notes on search/exploration of site available on request):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turning Research Into Practice (TRIP) database <a href="http://www.tripdatabase.com">www.tripdatabase.com</a></td>
<td>Excluded</td>
<td>Content not relevant</td>
</tr>
<tr>
<td>Centre for Health Services and Policy Research (CHSPR), University of British Columbia <a href="http://www.chspr.ubc.ca/cgi-bin/pub">www.chspr.ubc.ca/cgi-bin/pub</a></td>
<td>Included</td>
<td>3 documents saved for further assessment</td>
</tr>
<tr>
<td>Health Quality Council, Saskatchewan <a href="http://www.hqc.sk.ca">www.hqc.sk.ca</a></td>
<td>Excluded</td>
<td>Content not relevant; search not functioning correctly</td>
</tr>
<tr>
<td>Intute <a href="http://www.intute.ac.uk">www.intute.ac.uk</a></td>
<td>Excluded</td>
<td>Content not relevant; site no longer being</td>
</tr>
</tbody>
</table>
2. Hours of access

Emergency care: Search conducted August 15, 2011

PubMed


5. #1 OR #2 OR #3 OR #4

6. "Hours of operation*[TIAB] OR "Hours of service*[TIAB] OR "Business hours*[TIAB]

7. #5 AND #6

8. "After-hours care*[MH] OR "after hours*[TI] or "out of hours*[TI]

9. (#5 AND #8) OR (#7 AND #8)

10. "24 hours*[TI] OR "24-hours*[TI] OR "on-call*[TI] OR "on call*[TI]

11. (#7) OR (#9) OR (#5 AND #10)

12. #11 AND English[lang] [667 results/ 16 reviews]

Embase

1. 'emergency health service'/exp OR 'emergency ward'/exp OR 'hospital care'/exp OR 'hospital utilization'/exp OR 'emergency care'/exp AND [humans]/lim AND [english]/lim AND [Embase]/lim

2. 'health care access'/exp AND [humans]/lim AND [english]/lim AND [Embase]/lim

3. hours AND [humans]/lim AND [english]/lim AND [Embase]/lim

4. #1 AND #2 AND #3 AND [humans]/lim AND [english]/lim AND [Embase]/lim

5. #1 AND #2 AND #3 AND [Embase]/lim AND [review]/lim AND [humans]/lim AND [english]/lim AND [medline]/lim [7 results]
Primary care services: Search conducted September 2, 2011

PubMed
2. Hours of operation[TAIB] OR Business hours[TAIB] OR Office hours[TAIB]
4. 1 AND (2 OR 3)
5. #4 AND English[lang]

Embase
1 - 'community care'/exp OR 'community care'
2 - 'health center'/exp OR 'health center'
3 - 'primary health care'/exp OR 'primary health care'
6 - 'general practice'/exp OR 'general practice'
7 - 'general practitioner'/exp OR 'general practitioner'
8 - 'primary care physician'
10 - 'general practice cooperatives' OR 'general practice cooperative'
11 - 'primary care nurse practitioner'
12 - 'nurse practitioner'/exp OR 'nurse practitioner'
13 - 'out of hours general practice'
14 - 'after hours general practice'
15 - 'primary care'/exp OR 'primary care'
16 - #1 OR #2 OR #3 OR #6 OR #7 OR #8 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15
17 - hour*:ab,ti
18 - #16 AND #17
19 - 'review'/exp OR 'review'
20 - (literature NEAR/3 review*):ab,ti
21 - 'meta analysis'/exp OR 'meta analysis'
22 - 'systematic review'/exp OR 'systematic review'
24 - #19 OR #20 OR #21 OR #22
25 - medline:ab,ti OR medlars:ab,ti OR Embase:ab,ti OR pubmed:ab,ti OR cinahl:ab,ti OR amed:ab,ti OR psychlit:ab,ti OR psycinfo:ab,ti OR scisearch:ab,ti OR cochrane:ab,ti
26 - 'retracted article'/exp OR 'retracted article'
27 - #25 OR #26
28 - #24 OR #27
The Cochrane Library
1. (hours):kw,ti
2. (after-hours care):kw,ti,ab OR (Health Facility closure):kw,ti,ab
3. MeSH descriptor After-Hours Care explode all trees
4. MeSH descriptor Health Facility Closure explode all trees
5. MeSH descriptor Community Health Services explode all trees
6. MeSH descriptor Community Health Centers explode all trees
7. MeSH descriptor Primary Health Care explode all trees
8. MeSH descriptor General Practice explode all trees
9. MeSH descriptor Physicians, Family explode all trees
10. MeSH descriptor Primary Care Nursing explode all trees
11. (Community Health Care:ti,ab,kw)
12. (Community Health Centre:ti,ab,kw)
13. Community Health Center:ti,ab,kw
14. General practitioner:ti,ab,kw
15. General practice cooperatives:ti,ab,kw
16. Family physician:ti,ab,kw
17. Primary care nurse practitioner:ti,ab,kw
18. Nurse practitioner:ti,ab,kw
19. Out of hours general practice:ti,ab,kw
20. After hours general practice:ti,ab,kw
21. Primary care:ti,ab,kw
22. (#1 OR #2 OR #3 OR #4)
23. (#5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21)
24. (#22 AND #23) 59 TOTAL [1 Cochrane Review, 3 reviews = total of 4]*
*Only look at Cochrane reviews & systematic reviews

3. Health professional staff (emergency): Search conducted September 14, 2011

PubMed
3: #1 OR #2
4: "Physicians"[Mesh] or "Nurse Practitioners"[Mesh] or nurse practitioner[TIAB] or nurse practitioners[TIAB] or Allied Health Personnel[MeSH] or Allied Health Personnel[TIAB] or allied health professional[TIAB] or allied health professionals[TIAB] or "Nurses' Aides"[Mesh] or "Physician Assistants"[Mesh] or "Emergency Medical Technicians"[Mesh] or
Collaborative Emergency Centres: Rapid Knowledge Synthesis
Nova Scotia Cochrane Resource Centre

paramedics[TIAB] or paramedic[TIAB] or rescue personnel[TIAB] or "Nursing Staff, Hospital"[Mesh] or "Medical Staff, Hospital"[Mesh]

5: #3 AND #4


7: #5 AND #6

8: #7 [limited to English] [295]

Embase

1: 'community care'/exp OR 'health center'/exp OR 'health centre'/exp OR ('community health center' OR 'community health centre' OR 'community health care' OR 'collaborative care' OR 'enhanced primary care' OR 'wellness centres' OR 'wellness center' OR 'wellness centers' OR 'wellness centers' OR 'wellness center' OR 'wellness centres' OR 'wellness centers' OR 'wellness center' OR 'wellness centers' OR 'wellness centre' OR 'wellness centres':ab,ti

2: 'ambulatory care'/exp OR 'emergency nursing'/exp OR 'outpatient department'/exp OR 'emergency care'/exp OR 'emergency health service'/exp OR 'hospital'/exp OR 'ambulatory care' OR 'outpatient department' OR 'rural hospital' OR 'accident and emergency' OR 'urgent care' OR (emergency and (nursing OR care OR 'health service' OR 'health services' OR 'medical service' OR 'medical services' OR 'outpatient service' OR 'outpatient services' OR 'outpatient units' OR department OR departments))':ab,ti

3: #1 OR #2

4: 'hospital personnel'/exp OR 'paramedical personnel'/exp OR 'physician assistant'/exp OR ('hospital physician' OR 'hospital Physicians' OR 'Nurse Practitioners' OR 'nurse practitioner' OR 'Allied Health Personnel' OR 'allied health professional' OR 'allied health professionals' OR 'nursing assistant' OR 'nursing assistants' OR 'physician assistant' OR 'Physician Assistants' OR 'Emergency Medical Technicians' OR 'rescue personnel' OR paramedics OR paramedic OR 'Nursing Staff' OR 'Medical Staff'):ab,ti

5: #3 AND #4

6: 'meta-analysis':ab,ti OR 'systematic review':ab,ti

7: #5 AND #7

8 limit #7 to Embase only (excludes MEDLINE results), English only [183]

The Cochrane Library

(ph physician or nurse or paramedic or allied health or support staff):ti,ab,kw and (emergency or urgent):ti,ab,kw

[28 Cochrane reviews, 12 other reviews = 40 total results]

4. Health professional staff (primary): Search conducted September 20, 2011

PubMed

Collaborative Emergency Centres: Rapid Knowledge Synthesis
Nova Scotia Cochrane Resource Centre

3: #1 OR #2
5: #3 AND #4
7: #5 AND #6
8: #7 [limited to English] [793]

Embase
1: 'community care'/exp OR 'health center'/exp OR 'health centre'/exp OR ('community health center' OR 'community health centre' OR 'community health care' OR 'collaborative care' OR 'wellness centers' OR 'wellness centre' OR 'wellness center' OR 'nursing stations' OR 'nursing station' OR 'health facilities' OR 'health facility' OR 'satellite clinic' OR 'satellite clinics' OR polyclinic OR polyclinics OR 'multidisciplinary centre' OR 'multidisciplinary centers' OR 'multidisciplinary center' OR 'multidisciplinary centers' OR 'community care' OR 'health center' OR 'health centre'):ab,ti [120,476]
2: 'primary care'/exp OR 'general practice'/exp OR 'primary health care'/exp OR ('primary care' OR 'general practice' OR 'primary health care' OR 'primary medical care' OR 'general practice'):ab,ti [176,018]
3: #1 OR #2
4: 'general practitioner'/exp OR 'paramedical personnel'/exp OR 'physician assistant'/exp OR 'physician assistant' OR 'family physician' OR 'family physicians' OR 'family practitioner' OR 'family practitioners' OR 'general practitioner' OR 'general practitioners' OR 'nurse practitioner' OR 'nursing professional' OR 'allied health professional' OR 'allied health professionals' OR 'Emergency Medical Technicians' OR 'rescue personnel' OR (clinical OR medic OR medical):ab,ti
5: #3 AND #4
6: 'meta-analysis':ab,ti OR 'systematic review':ab,ti
7: #5 AND #7
8 limit #7 to Embase only (excludes MEDLINE results), English only

The Cochrane Library
(phased by; OR nurse OR paramedic or allied health OR support staff):ti,ab,kw and (primary OR general):ti,ab,kw
[91 Cochrane reviews, 43 other reviews= 134 total results]

5. Collaborative practice (primary or emergency): Searches conducted October 12, 2011
PubMed
4: #1 OR #2 OR #3
6: #4 AND #5
8: #6 AND #7
9: #8 [limited to English] [1446]

Embase
1: 'community care'/exp OR 'health center'/exp OR 'health centre'/exp OR ('community health center' OR 'community health centre' OR 'community health care' OR 'collaborative care' OR 'enhanced primary care' OR 'wellness centres' OR 'wellness centre' OR 'wellness centers' OR 'wellness center' OR 'nursing stations' OR 'nursing station' OR 'health facilities' OR 'health facility' OR 'satellite clinic' OR 'satellite clinics' OR 'polyclinic' OR 'polyclinics' OR 'multidisciplinary centre' OR 'multidisciplinary centres' OR 'multidisciplinary center' OR 'multidisciplinary centers' OR 'community care' OR 'health center' OR 'health centre')]:ab,ti
2: 'ambulatory care'/exp OR 'emergency nursing'/exp OR 'outpatient department'/exp OR 'emergency care'/exp OR 'emergency health service'/exp OR 'hospital'/exp OR ('ambulatory care' OR 'outpatient department' OR 'rural hospital' OR 'accident and emergency' OR 'urgent care' OR (emergency AND (nursing OR care OR 'health service' OR 'health services' OR 'medical service' OR 'medical services' OR 'outpatient service' OR 'outpatient services' OR 'outpatient unit' OR 'outpatient units' OR department OR departments))):ab,ti
3: 'primary care'/exp OR 'general practice'/exp OR 'general practitioner'/exp OR 'primary health care'/exp OR 'primary care' OR 'general practice' OR 'general practitioners' OR 'primary health care' OR 'primary medical care'
OR 'family physician' OR 'family physicians' OR 'family practitioner' OR 'family practitioners' OR 'general practice' OR 'nurse practitioner'):ab,ti
4: #1 OR #2 OR #3
5: 'teamwork'/exp OR 'public relations'/exp OR ('multiprofessional' OR 'multi-professional' OR 'interprofessional' OR 'inter-professional' OR 'interorganizational' OR 'inter-organizational' OR 'teamwork' OR 'multidisciplinary' OR 'multi disciplinary' OR 'collaborative practices' OR 'collaborative practice' OR 'interdepartmental' OR 'inter departmental'):ab,ti
6: #4 AND #5
7: 'meta-analysis':ab,ti OR 'systematic review':ab,ti
8: #6 AND #7
9 limit #8 to Embase only (excludes MEDLINE results), English only [60]

6. Telehealth/Tele-consultation: Searches conducted August 22, 2011

PubMed


AND
("Remote Consultation"[mesh term] OR teleconsultation[tiab] OR telehealth[tiab] OR telemedicine[mesh term] OR telemedicine[tiab]) OR teleemergency[tiab])

AND humans[Mesh term]
AND English[la] [Results= 344 results]

Embase
1. 'review'/exp
2. (literature near/3 review*):ti,ab
3. 'meta analysis'/exp
4. "systematic review"/exp
5. or/1-4
6. (medline or medlars or Embase or pubmed or cinahl or amed or psychlit or psyclit or psychinfo or psycinfo or scisearch or cochrane):ti,ab
7. 'RETRACTED ARTICLE'
8. 6 OR 7
9. 5 OR 8
10. (systematic* near/2 (review* or overview)):ti,ab
11. 'meta analysis':ti,ab
12. 9 Or 10 OR 11
13. 'telemedicine'/exp OR 'telemedicine' OR 'telehealth'/exp OR 'telehealth' OR 'teleconsultation'/exp OR 'teleconsultation' AND [humans]/lim AND [english]/lim AND [Embase]/lim
14. #12 AND #13 [318]
The Cochrane Library
(teleconsultation OR telehealth OR telemedicine OR "Remote consultation" or "teleemergency" OR "teleemergency"):ti,ab,kw [6 systematic review/ 57 reviews - 54 imported, 3 duplicates]
Appendix 8: Flow Charts of Database Search Results

Overall database screening results for all prioritized questions:

- Records identified through database searching (n=6545)
- Records screened after duplicates removed (n=6277)
- Full text assessed for eligibility (n=259)
- Full text identified as primary studies (n=203)
- Reviews identified and data extracted (n=56)
- Articles included in synthesis (n=55)
1. CEC-type models
2. Hours of access
3. Health professional staff (emergency care)

Records identified through database searching (n=518)

- Records screened after duplicates removed (n=495)
- Records excluded at title/abstract stage (n=449)

- Full text assessed for eligibility (n=46)
  - Full text identified as primary studies (n=22)

- Reviews identified and data extracted (n=24)

- Articles included in synthesis (n=8)
4. Health professional staff (primary care)
5. Collaborative Practices (primary and emergency care)

Records identified through database searching (n=1583)

Records screened after duplicates removed (n=1521)

Full text excluded, with reasons (n = 55)
- primary study (n=49)
- withdrawn review (3)
- not available electronically (3)

Records excluded at title/abstract stage (n=1394)

Full text assessed for eligibility (n=127)

Reviews identified (n=69)

Reviews excluded, with reasons (n=50)
- Setting/exposure not relevant (n=47)
- Not matched to question (n=3)

Articles included in synthesis (n=19)
6. Telehealth/Tele-consultation

- Records identified through database searching (n=725)
- Records screened after duplicates removed (n=663)
- Records excluded at title/abstract stage (n=612)
- Full text excluded, with reasons (n=24)
  - published before 2010
  - review of reviews (n=23)
  - not available electronically (1)
- Full text assessed for eligibility (n=51)
- Reviews identified and data extracted (n=27)
- Articles included in synthesis (n=15)
### Appendix 9: Data Extraction Questions from Distiller Form

<table>
<thead>
<tr>
<th>Inclusion criteria:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Is the exposure evaluated relevant to the research question?</strong></td>
<td>Yes/No; text box for notes</td>
</tr>
<tr>
<td><strong>Is the setting relevant to the research question?</strong></td>
<td>Yes/No; text box for notes</td>
</tr>
<tr>
<td><strong>Are outcome(s) related to:</strong></td>
<td>Yes/No; text box for notes</td>
</tr>
<tr>
<td>- Health outcomes (morbidity, mortality, quality of life, patient satisfaction)</td>
<td></td>
</tr>
<tr>
<td>- Process outcomes (quality of care, professional satisfaction, adherence to recommended practice)</td>
<td></td>
</tr>
<tr>
<td>- Costs or Resource Use</td>
<td></td>
</tr>
<tr>
<td><strong>If the answer is No to any of the above three questions, tick box to flag record</strong></td>
<td>Flag; text box for notes</td>
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<table>
<thead>
<tr>
<th>Search details &amp; PICO strategy</th>
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<tbody>
<tr>
<td><strong>Purpose/Objectives of the review</strong></td>
<td>Text box for notes</td>
</tr>
<tr>
<td><strong>Types of studies/reviews included</strong></td>
<td>Text box for notes</td>
</tr>
<tr>
<td><strong>Population</strong></td>
<td>Text box for notes</td>
</tr>
<tr>
<td><strong>Intervention/Exposure</strong></td>
<td>Text box for notes</td>
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<tr>
<td><strong>Comparison</strong></td>
<td>Text box for notes</td>
</tr>
<tr>
<td><strong>Outcome(s) - Select any/all as appropriate, text boxes for notes:</strong></td>
<td></td>
</tr>
<tr>
<td>- Health related outcomes (Morbidity, mortality, quality of life, patient satisfaction)</td>
<td></td>
</tr>
<tr>
<td>- Process Outcomes (Quality of care, professional practice, adherence to recommended practice, professional satisfaction)</td>
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<tr>
<td>- Cost or Resource Use</td>
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<table>
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<tr>
<th>Quality of Review</th>
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<tr>
<td><strong>Authors provided an adequate search strategy</strong></td>
<td>Yes/(blank), text box for notes</td>
</tr>
<tr>
<td><strong>Authors assessed study quality:</strong></td>
<td>Yes/(blank), text box for notes</td>
</tr>
<tr>
<td><strong>Authors provided a table of included studies:</strong></td>
<td>Yes/(blank), text box for notes</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Review Results</th>
<th></th>
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<tr>
<td><strong>Population evaluated</strong></td>
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<tr>
<td><strong>Intervention/Exposure evaluated</strong></td>
<td>Text box for notes</td>
</tr>
<tr>
<td><strong>Outcome(s) - Select any/all as appropriate, text boxes for notes:</strong></td>
<td></td>
</tr>
<tr>
<td>- Health related outcomes (Morbidity, mortality, quality of life, patient satisfaction)</td>
<td></td>
</tr>
<tr>
<td>- Process Outcomes (Quality of care, professional practice, adherence to recommended practice, professional satisfaction)</td>
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<tr>
<td>Results by Outcome</td>
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<td>--------------------</td>
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<tr>
<td>Health Outcomes</td>
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<tr>
<td>• Cost or Resource Use</td>
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<tr>
<td>Process Outcomes</td>
<td></td>
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<tr>
<td>Costs or Resource Use</td>
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## Quality of Evidence

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<th>Health Outcomes</th>
<th>Text boxes for notes:</th>
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<tr>
<td>Type of evidence included</td>
<td>(e.g., RCTs, Observational, Qualitative)</td>
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<tr>
<td>Potential Bias (Comments from authors)</td>
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<td>Generalizability</td>
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<th>Process Outcomes</th>
<th>Text boxes for notes:</th>
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<td>Type of evidence included</td>
<td>(e.g., RCTs, Observational, Qualitative)</td>
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<tr>
<td>Potential Bias (Comments from authors)</td>
<td></td>
</tr>
<tr>
<td>Generalizability</td>
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<table>
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<tr>
<th>Costs or Resource Use</th>
<th>Text boxes for notes:</th>
</tr>
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<tr>
<td>Type of evidence included</td>
<td>(e.g., RCTs, Observational, Qualitative)</td>
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<td>Potential Bias (Comments from authors)</td>
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<td>Generalizability</td>
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</table>

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<th>Notes</th>
<th>Text boxes for notes:</th>
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<tr>
<td>Type of evidence included</td>
<td>(e.g., RCTs, Observational, Qualitative)</td>
</tr>
<tr>
<td>Potential Bias (Comments from authors)</td>
<td></td>
</tr>
<tr>
<td>Generalizability</td>
<td></td>
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</tbody>
</table>

| Other notes: | Text box for notes |
Appendix 10: Evidence Tables for Included Reviews
Reviews included for prioritized searches were summarized into evidence tables. Review objectives, results and conclusions were extracted, in addition to the quality of review methods and quality of evidence available. Conclusions were listed as positive, neutral or negative. Positive results suggested intervention leading to improved outcomes. Neutral results concluded that intervention had no impact on, or had similar outcomes. Negative results concluded that intervention led to decreased outcomes.

2. Hours of access (primary or emergency care)

<table>
<thead>
<tr>
<th>Author Year</th>
<th>Review Objectives</th>
<th>Studies included</th>
<th>Methods</th>
<th>Reported Results</th>
<th>Summary of conclusions</th>
<th>Quality of Evidence available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carret and Domingues 2009</td>
<td>Measure and identify factors associated with inappropriate ED use by adults</td>
<td>22 studies: Cross-sectional (19), case-control (2), and cohort (1) studies</td>
<td>CS; QA; IS</td>
<td>Reported 2 studies evaluated and found an association between difficult access to primary health care and inappropriate ED use. An included cohort study conducted in the US found difficulty in scheduling primary care, difficult telephone contact for primary care, and longer waiting time for a primary care appointment were associated with inappropriate ED use. The association was statistically significant. The variables comprising this indicator, difficulty in scheduling primary care, difficult telephone contact for primary care, and longer waiting time for a primary care appointment were also associated with inappropriate ED use. Meanwhile, in the Brazilian study, difficulty in obtaining a primary care appointment, refusal by the primary care physician to treat patients without a previously scheduled appointment, and primary care being open for shorter hours were associated with inappropriate ED use in the 15-49 age group.</td>
<td>Cost Outcomes: Neutral</td>
<td>Eight studies conducted were in European countries, seven in North America, one in Central America, one in Oceania, three in China, and two in South America. Observational study designs, but studies had to meet Downs &amp; Black criteria.</td>
</tr>
<tr>
<td>Leibowitz 2003</td>
<td>Effect of different models of out-of-hours primary medical care services (practice-based service, deputizing services, EDs, co-operatives, primary care centres, and telephone triage and advice services)</td>
<td>19 comparative studies: RCTs (4), pseudo-RCTs (2), observational (7), pre-post (5)</td>
<td>CS; QA; IS</td>
<td>Reported that there is very little evidence about the advantages of one service model compared with another in relation to clinical outcome. The only area where there is some limited evidence is about differences in prescribing habits. The evidence suggests that deputizing doctors may prescribe less appropriately than doctors from practice-based or co-operative services, and that GPs prescribe more appropriately than junior emergency medical staff. Telephone triage and advice services appear to reduce medical workload through the substitution of telephone consultations for in-person consultations and have potential to reduce costs. This has to be balanced with the finding of reduced patient satisfaction when in-person consultations are replaced by telephone consultations.</td>
<td>Health and Process Outcomes: Neutral</td>
<td>Studies included in this review were from the UK, Australia, Denmark, Ireland, Canada and the USA. There variation between how GP systems operate between countries. The highest quality studies have come from the UK, possibly because government funding and organization of the health service make such studies more feasible. This has perhaps given the review a bias towards findings applicable to the UK system. &quot;A shortcoming of our categorization is that some of our models are types of organization, e.g. co-operatives and deputizing services, and others are modes of delivery. The difficulty in comparing the results of studies carried out in one health care setting with those carried out in a different setting need to be borne in mind when evaluating the studies&quot;</td>
</tr>
<tr>
<td>Author</td>
<td>Year</td>
<td>Review objectives</td>
<td>Studies included</td>
<td>Methods</td>
<td>Reported Results</td>
<td>Summary of conclusions</td>
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<tr>
<td>Salisbury 2003</td>
<td>Broad</td>
<td>Experience with walk-in centres in primary &amp; emergency care (centres designed to offer primary care on a non-appointment walk-in basis - minor injuries &amp; illness; excluded centres designed for medical emergencies and major trauma; ‘Drop-in’ clinics that catered only for one specific health need, such as contraception, were excluded)</td>
<td>244 articles considered relevant (discussion documents, review articles, and primary research); only some discussed in publication.</td>
<td>CS</td>
<td>Patient satisfaction: Studies from both the USA and Canada have demonstrated high levels of satisfaction among patients attending walk-in centres. To summarise the evidence from the international literature, it appears that users of walk-in centres in other countries are predominantly a relatively affluent population of working age and a different population from those using conventional general practice services. The majority of calls to walk-in centres are made when other health services are closed. The problems presented are mainly minor illnesses and minor injuries. People choose this form of care mainly for reasons of convenience, and they are generally very satisfied with the service they receive. The very limited evidence available suggests that walk-in centres provide care of reasonable quality. There is insufficient evidence to draw any confident conclusions about the issues of the impact of walk-in centres on other health care services or on the costs of care. There is a marked lack of available information about the costs of walk-in centres. Only one study was identified (with methodological limitations), which suggested that the cost of care in walk-in centres in Canada was similar to costs in general practice and lower than the costs of hospital emergency departments.</td>
<td>Authors do not comment on potential bias. Authors do not discuss the quality of the care provided. I think that because 244 studies were used however and the results were fairly consistent, this might be an advantage to this study</td>
</tr>
</tbody>
</table>

### 3. Health professional staff (Emergency care)

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Review objectives</th>
<th>Studies included</th>
<th>Methods</th>
<th>Reported Results</th>
<th>Summary of conclusions</th>
<th>Quality of evidence available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilson</td>
<td>2009</td>
<td>ENP for adults presenting to an ED for treatment of a minor injury (care delivered included referral to other practitioners/services, medication, radiographs and other treatment, such as bandaging and suturing)</td>
<td>9 studies: RCTs, non-randomized clinical trials, case-series, case–control and cohort studies</td>
<td>CS; QA; IS</td>
<td>Patient satisfaction with the care received and acceptance of being treated by NP was generally high in all the studies reporting on this outcome. Reducing the amount of medical officer time spent on specified presentations logically has an effect in improving patient access to interventions, reducing issues of ED overcrowding and improving patient satisfaction with health service. Two studies reported that care provided by ENP was effective in reducing wait times for treatment and overall LOS in the ED. Based on evidence from nine studies included, there is no significant difference between the effectiveness of ENP and junior doctors. There were no comparative studies between ENP and other health professionals in the management of minor injuries that could be included. A study comparing ENP with physiotherapists and doctors did not meet the inclusion criteria. Therefore, this conclusion must be interpreted with caution because of the poor to fair methodological study designs used and variable types of outcome measures used. Anecdotally, there does appear to be a significance in the reduction of waiting times for patients to be assessed, waiting times for treatment and overall LOS times, consequently improving the flow of patients through EDs. A single study was identified that compared the clinical and cost-effectiveness of ENP.</td>
<td>Health Outcomes: Positive; Process and Cost outcomes: Neutral</td>
<td>The overall quality of the included studies was generally low (study designs other than RCTs) and studies were heterogeneous (differing triage scoring systems and diagnostic categories used in EDs internationally).</td>
</tr>
<tr>
<td>Reference</td>
<td>Title</td>
<td>Methodology</td>
<td>Findings</td>
<td>Health and process outcomes</td>
<td>Cost outcomes</td>
<td>Notes</td>
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<tr>
<td>Carter 2007</td>
<td>Effect of NPs in the ED (adult and pediatric patients)</td>
<td>36 studies: RCTs (3), surveys (7), case-control (18) and cohort studies (8). CS; QA; IS</td>
<td>Patient satisfaction was consistently high for both NPs and residents, but was often higher for NPs. A survey found 72.5% would be willing to see an NP, although 21% of those people also expected to see a staff physician. Of the 12.1% who were unwilling to see an NP, 36% said they would never be willing and 81.2% said they would see an NP only if they had a different problem. Twenty-five percent said that they would see an NP if it would result in cost savings to the health care system, and 37.5% said they would agree, if it would result in shorter ED wait times. Several of the studies looking at quality of care examined the accuracy of x-ray interpretation. Resident physicians and NPs were found to be equally competent, with a trend toward greater accuracy with more experience, regardless of profession. Most studies found attending physicians have judged NP care to be appropriate (based on protocols); one older (1979) study reported worse performance of NPs judged by staff physicians. One RCT (in rural isolated Australian ED) found documentation, accuracy of physical exam and appropriateness of urgent referrals were higher for the NPs. NPs appear to be more expensive than residents, on a per patient basis (studies have factored in more than the salary, although it is unknown whether the training costs of residents were included). These studies did not compare NPs to attending physicians. The addition of an NP, whether in a minor injury unit in the ED or in a free standing unit, wait times are reduced. The studies do not compare the addition of an NP with the addition of any other staff (e.g., more residents, another attending physician or a physician’s assistant); in a UK study, average wait time to see a practitioner dropped from 56 to 30 minutes, the average time in the department decreased from 1 hour and 39 minutes to 1 hour and 17 minutes. Most studies examined NPs in minor treatment areas; 2 studies suggested that NPs could also reduce wait times by seeing higher acuity patients.</td>
<td>Health and process outcomes: Positive overall;</td>
<td>Cost outcomes: Neutral</td>
<td>Potential bias not discussed. Results focused around non-RCT studies (only one RCT available). Limited generalizability of studies included due to different practices internationally (e.g. UK and Australian systems provide much of their emergency care using senior house officers, whose positions would be about equivalent to North American mid-level residents. This is not the standard in Canada or in the United States, where patients may initially be seen by a resident, but are always directly overseen by a staff physician). Cost–benefit is unclear. Most of the reviewed papers focused on NPs in a minor injury or fast track setting.</td>
<td></td>
</tr>
<tr>
<td>Kleinpell 2008</td>
<td>Effect of NPs and physician assistants (PAs) in acute and critical care settings</td>
<td>31 studies (all settings); 17 research studies in ED (2 RCTs in ED) CS; IS</td>
<td>Two RCTs assessed the impact of NPs in ED settings. In a large RCT comparing NP with resident Medical doctor (MD) care, there were no differences found in accuracy of exams, adequacy of treatment, planned follow-up, or requests for interpretation of x-rays. NPs found to record more medical histories, and fewer patients seen by the NP had to seek unplanned follow-up advice about their injury. A second RCT compared NP-led care for patients with senior house officer care and found no differences in recovery times, levels of symptoms, time off work, or unplanned follow-up between groups. Patients reported higher levels of satisfaction with NP care compared with MD care and NP clinical documentation was rated of higher quality.</td>
<td>Health and process outcomes: Positive</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Hoskins 2011</td>
<td>Effect of ENPs, expanded scope physiotherapists (ESPs) and emergency care practitioners (ECPs) in all emergency care settings (adult and pediatric)</td>
<td>All studies (primary studies &amp; reviews), also commentaries/editorials. 23 papers included: Qualitative, survey data, ECTs, systematic reviews, case control studies. CS; IS</td>
<td>23 studies reported patient satisfaction with “nonmedical roles” in ED care. While the studies all report high levels of patient satisfaction with “non-medical” roles in the ED, one study reported that overall patient satisfaction was higher in patients seen by a doctor rather than an ENP. The most significant feature of patients dissatisfaction in this study was a practitioners perceived lack of social skills irrespective of their professional background. Patients also cite a lack of professional confidence particularly in the ENP group as a reason for dissatisfaction. While all other studies reported that the majority of patients would agree to see an ENP in the future this still meant that significant numbers of patients would prefer to see a doctor. Several authors reported that patients seen by ENPs were more likely to seek follow up in primary care following their initial visit to the ED and this is an area which urgently requires further investigation.</td>
<td>Health Outcomes: Positive</td>
<td></td>
<td>No discussion of potential bias by authors - several study designs with high potential bias included. Unclear generalizability (considered UK context)</td>
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<tr>
<td>Author</td>
<td>Year</td>
<td>Description</td>
<td>Studies</td>
<td>Design</td>
<td>Intervention</td>
<td>Comparison</td>
<td>Process outcomes</td>
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<tr>
<td>Rowe</td>
<td>2011</td>
<td>Compare the effect of triage liaison physicians (TLPs) with nurse-led triage in adult (17 years or older) or mixed (i.e., child/adult) populations.</td>
<td>28 studies: RCTs (parallel or cluster group (2)), CCTs, prospective or retrospective cohort studies, interrupted time series (ITS), case-control studies, and before-after designs</td>
<td>CS; QA; IS</td>
<td>Two RCTs indicated a significant reduction in ED LOS when comparing TLP interventions to nurse-led triage (mean 37 minutes shorter). All the non-RCT studies except for three reported statistically significant reductions in the individual estimates of ED LOS. One RCT showed a significant reduction in the time to physician initial assessment associated with TLP presence when compared to nurse-led triage (mean 30.00 minutes shorter). Most non-RCTs also showed a significant reduction in this indicator patients leaving the ED without being seen; this was not significantly different in included RCT. Individual study results on 'leaving against medical advice' were inconsistent.</td>
<td>Process outcomes: Positive</td>
<td>Heterogeneous findings; small number of small studies (no multicentre). Reports of important outcomes (e.g., times, LWBS, costs) were commonly missing. Due to insufficient data, anticipated subgroup comparisons and sensitivity analyses were not always possible; however, subgroup analyses for triage level 3 patients and by type of intervention (team triage vs. single-physician triage) were completed. Funnel plot suggested some publication bias.</td>
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<tr>
<td>Cohen</td>
<td>2009</td>
<td>Descriptive review of pharmacy practice or services provided in the ED</td>
<td>16 studies (from 12 institutions) included. All study designs considered.</td>
<td>CS; IS</td>
<td>Intervention categories differed among institutions, suggesting a need for standardization. Documentation methods differed among institutions and included paper cards, personal digital assistants, and computer programs. Services provided by pharmacists in the ED included traditional clinical pharmacy services, responding to medical emergencies, providing consultations on medication issues. An observational study found medication histories to be more complete with pharmacist than ED providers; more documentation of medication allergies. Suggestion of cost savings/cost avoiding with pharmacist. Cost-avoidance data reported in the articles reviewed lack formal structured pharmacoeconomic analysis. In most cases, these figures were calculated to justify ED services and pharmacy service expansion.</td>
<td>Process and Cost Outcomes: Cautiously positive</td>
<td>Most of the studies published were not of high quality (descriptive). No quality assessment is clearly described. Selection bias may have occurred as the search strategy selected articles that reported on the benefits of pharmacists in the ED. Heterogeneous scope of pharmacist involvement described.</td>
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<tr>
<td>Doan</td>
<td>2011</td>
<td>Use of PAs in the ED.</td>
<td>66 studies: Included surveys, retrospective and prospective controlled and observational studies, as well as comprehensive reviews.</td>
<td>CS; QA; IS</td>
<td>Two studies evaluated patient satisfaction with PA care in the ED. Both found high rates of satisfaction with PA care, although response rates were low (11% and 25%, respectively). The quality of the care provided by PAs was comparable with that of ED specialist (attending) physicians and senior residents, and their use resulted in shorter wait times for ED patients. It is unclear whether this was attributable to PA presence, or the effect of having additional health-care providers (of any type) within the department. Although there were some statistical differences in the practice patterns between physicians and PAs such as rate of investigations ordered (PAs ordered more throat cultures for pharyngitis and fewer blood cultures for febrile children), no studies addressed whether these differences had an impact on patient outcome. Procedure performance: Four studies compared PAs’ skills in performing procedures. PAs appear equally capable of performing procedures if adequately trained and supervised. PAs represent a less expensive alternative for increased staffing. Indirect evidence suggests some differences in total visit duration and cost for some clinical conditions managed by an emergency physician versus a PA. Role and scope remains to be defined.</td>
<td>Health Outcomes: Positive; Process and cost outcomes: Reported as neutral</td>
<td>Methodological quality of studies was weak to moderate. The heterogeneity in the type of EDs studied and the fact that PAs were often used in combination with NPs prevented pooling of data. Small number of PAs or patients studied, use of historical controls and comparison of study populations with different baselines without adequate adjustment. Similar limitations were observed in studies that evaluated the impact of PAs on patient flow and satisfaction. Cost data suggest savings, but financial implications of PAs might be significantly different in countries other than the USA. Generalizability was limited.</td>
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<tr>
<td>Althaus</td>
<td>2011</td>
<td>Effect of interventions targeting adult frequent users of hospital EDs; most-tested intervention was case management referring to coordination of health services on behalf of</td>
<td>11 studies: 3 RCTs, 2 controlled before-and-after studies, and 6 non-controlled before-and-after studies</td>
<td>CS; QA; IS</td>
<td>Three of the 11 studies reported clinical outcomes, and each of these tested case management. Conflicting findings reported (1 study significant reduction in alcohol and drug use at 12 months; 1 study identified a reduction in alcohol use but no difference in psychiatric symptoms 24 months after intervention and 1 study found no differences in drug use). Use of ambulatory care was evaluated in 6 studies: 2 studies identified a benefit of the intervention (increase in primary care &amp; community care engagement; another described a significant increase in the median number of medical outpatient visits &amp; a significant reduction in the number of patients</td>
<td>Health and cost outcomes: Neutral; Process outcomes: Positive</td>
<td>The quality of the included studies on the whole was moderate and sample sizes were small in all but 3 studies; publication bias could not be assessed; heterogeneity in the selected studies in terms of design, definition of frequent users, intervention type, outcomes, and outcome measurement</td>
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</table>
lacking a primary care practitioner. None of the 4 studies assessing hospitalization identified significant differences. Finally, although one study reported no significant difference in patient satisfaction, (before-after) another revealed high physician satisfaction. 11 studies reported amount of ED use; 7 studies showed reduction in ED use, 1 demonstrated an increase in ED use, and 3 revealed no significant changes. None of the 4 studies assessing hospitalization identified significant differences. Finally, although one study reported no significant difference in patient satisfaction before and after the intervention, another revealed high physician satisfaction. Case management may be intervention of choice to reduce ED use for specific groups of vulnerable patients and for all frequent users of EDs.

Cost analyses conducted in 3 studies have indicated that the introduction of a case management team could reduce ED costs by at least as much as the cost of the team itself.

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<th>4. Health professional staff (Primary care)</th>
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<td><strong>Author Year</strong></td>
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<td>Bower 2000</td>
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<td>Brown 1995</td>
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<td>Name</td>
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<tr>
<td>Boer 2005 (Cochrane Review)</td>
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<td>Fahey 2005</td>
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<td>Gilbody 2003</td>
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<td><strong>Harkness 2009 (Cochrane Review)</strong></td>
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<tr>
<th><strong>Hollinghurst 2006</strong></th>
<th><strong>A meta-analysis on the cost of employing an extra salaried GP compared to a NP to deal with excess patient demand</strong></th>
<th>2 RCTs (from Horrocks 2002 systematic review)</th>
<th><strong>QA</strong></th>
<th><strong>Results suggest that employing NPs to provide first-line care in UK general practice is likely to cost the same or slightly more than employing doctors. This is the case from the perspective of general practices and the NHS. The sensitivity analysis shows that, from the perspective of the NHS, these findings are robust under most assumptions. From the perspective of a general practice, halving the amount of time spent by GPs with patients who originally consulted nurses, results in the greatest reduction in the cost of a NP. In the future, GP involvement in NP consultations is likely to be reduced as nurses gain wider experience and as the regulation of nurse prescribing is relaxed. The contribution of GP costs to initial nurse consultations was mostly from follow-up consultations with GPs within 2 weeks of initial consultations. This may be a result of patient choice, or the relative availability of GPs and nurses for follow-up consultations.</strong></th>
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<td></td>
<td><strong>Cost outcomes:</strong> Negative <strong>Limitation of the current analysis is the recognition that an economic assessment of the efficiency of employing NPs in comparison with GPs requires knowledge of outcomes as well as costs. There is evidence that NP consultations are associated with some benefits in terms of patient satisfaction, but there is limited evidence about other health outcomes.</strong></td>
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<td></td>
<td>This review is focused on UK based research, limiting generalizability. Further, &quot;Attempting to compare the costs of NPs and GPs is complex because of the different ways in which practitioners are trained and employed in general practice&quot;.</td>
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<tr>
<td>Collaborative Emergency Centres: Rapid Knowledge Synthesis</td>
<td>Nova Scotia Cochrane Resource Centre</td>
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<td>The studies used many different outcome measures, reflecting the difficulty in measuring changes in health outcomes after single consultations predominantly about minor illnesses. None of the studies in our review was adequately powered to detect rare but serious adverse outcomes.</td>
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<td>The review was limited by the quality of the available studies: few recent RCTs were available and many observational studies were of poor quality. Ambiguity exists over the use of the term “NP,” with much debate about this role.</td>
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<td>The role of the nurse varied across all included studies.</td>
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</table>

| Horrocks 2002 | NPs vs. doctors as first point of contact (previously undiagnosed patients with undifferentiated health problem) in a primary care setting. | QA | Patients are at least as satisfied with care at the point of first contact with NPs as they are with that from doctors. Although all of the RCTs found no significant differences between doctors and NPs in health outcomes, the research has important limitations. Although assessments of the quality of care and short term health outcomes seem to be equivalent to that of doctors, further research is needed to confirm that NP care is safe in terms of detecting rare but important health problem: a large study with adequate length of follow up is now justified. |
| Keleher 2009 | Primary and community care nurse in primary care setting (nurse led care, or nurses working as supplements) compared to doctor led-care or usual care | QA, IS | Evidence presented in this review suggests that nurses in primary care and community settings can provide effective health care and that they are particularly effective in enhancing patient knowledge and patient compliance. Gathering stronger data would contribute to an evidence base about the most effective and efficient use of nurses’ time. Gathering stronger data would contribute to an evidence base about the most cost-effective ways for these nurses to work. |
| Koshman 2008 | Pharmacist care for heart failure compared to care with no pharmacist | CS, QA, IS | All 12 RCTs (2060 patients) reported all-cause mortality. One study showed a significant difference in all-cause mortality between intervention and control. The pooled estimate of the 12 RCTs showed a non-significant reduction in mortality for pharmacist care compared with control (OR, 0.84; 95% CI, 0.61-1.15; I², 19%).  
Eleven RCTs (2026 patients) reported all-cause hospitalization rates (i.e., the number of patients hospitalized at least once). The pooled OR for all-cause hospitalization rates demonstrated a significant benefit of pharmacist care (OR, 0.71; 95% CI, 0.54-0.94) (Figure 3). There was, however, heterogeneity in these results (I², 50%).  
Of the 11 RCTs (1977 patients) reporting hospitalization rates, 3 demonstrated statistically significant reductions with pharmacist care, and the pooled-effect estimate revealed a significant benefit with pharmacist care (OR, 0.69; 95% CI, 0.51-0.94). There was also some heterogeneity in these results (I², 40%).  
Interventions that include some element of pharmacist care reduced the rates of both all-cause hospitalization and heart failure hospitalization by almost one-third. |
Effect of multidisciplinary teams in management of health conditions

5. Collaborative Care (Emergency and Primary)

Effect of multidisciplinary teams in management of health conditions
<table>
<thead>
<tr>
<th>Author Year</th>
<th>Review Objectives</th>
<th>Studies Included</th>
<th>Methods</th>
<th>Reported Results</th>
<th>Overall Conclusions</th>
<th>Quality of Evidence Available</th>
</tr>
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<tbody>
<tr>
<td>Kilner, 2009</td>
<td>Role of teamwork and communication in the ED, specifically related to physiotherapy practice</td>
<td>No experimental studies; Before and after studies (5), descriptive case studies (5); descriptive cross-sectional (4) design</td>
<td>CS, QA, IS</td>
<td>Teamwork and communication play a role in four main areas in the ED: improving patient satisfaction, improving staff satisfaction, reducing clinical errors and improving patient safety, and positively affecting access block; very limited evidence.</td>
<td>Health outcomes: teamwork and communication in ED positive (limited evidence)</td>
<td>Australian ED context</td>
</tr>
<tr>
<td>Carter 2009</td>
<td>Team-based care involving pharmacists or nurses; effect in patients with hypertension</td>
<td>37 studies were included; 89% RCTs (also included controlled before-after studies, interrupted time-series studies); 1 study provided cost outcomes. Poor reporting of SR methods</td>
<td>Interventions involving pharmacists or nurses were associated with significantly improved BP control. Our analysis found that studies involving pharmacists resulted in not only lower BP but a greater OR of achieving BP control compared to studies involving nurses. However, the reductions in systolic BP and confidence intervals for controlled BP overlap for the different providers. Only one study performed a cost-effectiveness analysis. Clinic visit costs were significantly higher in the pharmacist-managed clinic ($131 per patient) than the physician clinic ($74) (p&lt;0.001), but the costs for emergency room visits was significantly lower in the pharmacist-managed clinic than the physician clinic ($0 vs $10.84 per patient, p&lt;0.04). The cost of decreasing SBP/mm Hg was $27 for the pharmacist-managed clinic and $193 for the physician clinic. The cost of decreasing DBP/mm Hg was $48 in the pharmacist managed clinic and $151 in the physician clinic.</td>
<td>Health outcomes: Positive; Cost/Resource Use: Neutral</td>
<td>Most studies were RCTs, but QA not conducted; search strategy was not comprehensive; suggestion of no publication bias; Only one study performed a cost-effectiveness analysis. Analysis could not determine if there is a preferred level of qualifications such as a PharmD degree with residency or a MS NP degree. Twenty-five studies conducted in the US; twelve studies (9 nursing, 2 in community pharmacies, 1 pharmacist in clinics) were conducted in countries other than the U.S.</td>
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<td>Holland, 2005</td>
<td>Multidisciplinary (team: GP+other) interventions on hospital admission and mortality in heart failure</td>
<td>30 RCTs</td>
<td>CS; QA; IS</td>
<td>Health related: Multidisciplinary interventions reduced both hospital admission and all-cause mortality. The more effective interventions were delivered at least partly in the home.</td>
<td>Health related: Positive</td>
<td>Funnel plots suggest little evidence of publication bias; no discussion of generalizability</td>
</tr>
<tr>
<td>Johansson, 2010</td>
<td>Multidisciplinary teamwork applied to teams working with elderly persons living in the community (Comprehensive Geriatric Assessment concept)</td>
<td>5 RCTs (2 low quality)</td>
<td>CS; QA; IS</td>
<td>Health related: Intervention was successful in reducing deterioration of health and functional ability, improving activities in daily living, and increasing social activity, as well as general well-being and life satisfaction; continuous evaluation and management benefited the possibility of maintaining health status and improving health perception.</td>
<td>Health related: Positive</td>
<td>Two low quality studies included</td>
</tr>
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<td>Gilbody, 2006</td>
<td>Collaborative care in patients with depression (multifaceted, 3 distinct professionals working collaboratively within the primary care setting: a case manager, a primary care practitioner, and a mental health specialist; 2 of these 3 required)</td>
<td>37 RCTs (11 provided long-term outcomes)</td>
<td>CS; IS</td>
<td>Results confirm that collaborative care is effective in improving short-term outcomes in depression and, to our knowledge, summarize for the first time the emerging evidence of longer-term benefit.</td>
<td>Health related: Positive</td>
<td>Moderate level of heterogeneity between studies (I²=52.8%); generalizability not discussed</td>
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### Collaborative Emergency Centres: Rapid Knowledge Synthesis

Nova Scotia Cochrane Resource Centre

Included studies scored maximum of 10 points out of 19 on the CHEC-list, indicating that the quality of the studies can be improved; younger adults underrepresented; most studies from US.

### Effect of GP-specialist collaboration in management of health conditions

<table>
<thead>
<tr>
<th>Author Year</th>
<th>Review Objectives</th>
<th>Studies included</th>
<th>Methods</th>
<th>Reported Results</th>
<th>Summary of conclusions</th>
<th>Quality of Evidence Available</th>
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<tr>
<td>Cape, 2010</td>
<td>Consultation-liaison - professionals providing advice/support to primary care professionals; range of interaction (management of depression)</td>
<td>5 RCTs</td>
<td>CS; QA; IS</td>
<td>There was no significant effect of consultation–liaison on antidepressant use (risk ratio 1.23, 95% CI 0.91 to 1.66) or depression outcomes in the short- (standardized mean difference −0.04, 95% CI −0.21 to 0.14) or long-term (standardized mean difference 0.06, 95% CI −0.13 to 0.26).</td>
<td>Health outcomes (antidepressant use): Neutral</td>
<td>Restricting the review to depression may have excluded patient groups who are more likely to benefit. It is also noteworthy that most studies recruited through screening, and it is possible that such patients have lower levels of motivation for care or reduced capacity to benefit.</td>
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<tr>
<td>Author</td>
<td>Description</td>
<td>Study Design</td>
<td>Health related:</td>
<td>Cost:</td>
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<td>Chang-Quan, 2009</td>
<td>Collaborative care interventions (including mental health professionals and PCPs) in the treatment of depression in older patient</td>
<td>3 RCTs (1 study provided cost data)</td>
<td>Health outcomes: Positive</td>
<td>CS; QA; IS</td>
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<td>Foy, 2010</td>
<td>Collaborative arrangements that facilitated interactive communication between collaborating primary care physicians and key specialists on outcomes for patients receiving ambulatory care (including psychiatry, endocrinology, oncology)</td>
<td>11 RCTs (6 cluster and 5 patient-level); 1 CCT; 3 Controlled Before and After; and 8 uncontrolled before–after studies</td>
<td>Health related: Positive</td>
<td>CS; QA; IS</td>
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<tr>
<td>Mitchell, 2002</td>
<td>Formal liaison of GPs with specialist service providers (organized cooperation including consultation, case conferences) on patient health outcomes and resource use; range of illness groups.</td>
<td>7 studies: 4 RCTs, 1 cluster RCT, 1 matched controls, and 1 pragmatic controlled study</td>
<td>Health outcomes: Positive; Costs: negative</td>
<td>CS; QA; IS</td>
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<td>Costs:</td>
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<tr>
<td>Mitchell 2008</td>
<td>Co-ordinated multidisciplinary care (GP participant or leader) on outcomes in stroke</td>
<td>18 publications (5 trials, 7 qualitative studies, 6 described guidelines and local care models); publications represent only 3 separate RCTs</td>
<td>Health related: Neutral</td>
<td>CS, QA, IS</td>
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Collaborative Emergency Centres: Rapid Knowledge Synthesis
Nova Scotia Cochrane Resource Centre

- Only 3 RCTs were included in this review; results were heterogeneous; studies identified in the review were conducted in the US or UK so generalizability is limited.
- Significant heterogeneity; inclusion of study designs with lower internal validity increased risk for bias. No studies involved oncologists. Studies included were generalizable to U.S. contexts (such as Western Europe, Australia, and Canada).

Small number of heterogeneous studies; quality of studies assessed but not reported.
Exploring different approaches to improve collaborative practice

<table>
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<tr>
<th>Review Objectives</th>
<th>Studies included</th>
<th>Methods</th>
<th>Reported Results</th>
<th>Limitations</th>
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<tr>
<td>Bower, 2006</td>
<td>Identify active ingredients in collaborative care models for depression in primary care (case management role in primary care; fostering closer liaison between primary care clinicians and mental health specialists; mechanism to collect and share patient information).</td>
<td>Updated systematic review search from Gilbody 2003 (included 37 RCTs); meta-regression to explore important components of collaborative care</td>
<td>As a complex intervention, collaborative care defies simple definition. Our decisions about inclusion and exclusion were informed by our previous conceptual work (Bower &amp; Gilbody, 2005), but we took a liberal approach to inclusion precisely because the study focused on the degree to which variability in collaborative care models influenced outcomes. There was no significant predictor of the effect of collaborative care on antidepressant use. Key predictors of depressive symptom outcomes included systematic identification of patients, professional background of staff and specialist supervision.</td>
<td>The validity of the coding scheme used to extract data on the interventions has not been confirmed. Problems of inconsistent reporting and missing data in the published studies limit results. Most studies were conducted in the USA.</td>
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| Butler, 2011      | Level of integration of provider roles or care process affects clinical outcomes (considered 2 dimensions: (1) the level of integration of the steps in the process of care and (2) the degree of systematic linkage between the roles of clinicians) (depression care) | 26 Controlled trials and quasi-experimental design studies. US studies only. | There was no correlation between the outcomes and the extent of clinician integration or the implementation of structured processes of care, nor was there evidence that more intensive intervention in both areas produced better results for persons with depression. | Models are limited to select settings in the US. Quality of studies reported as ‘fair’ |

Collaborative Emergency Centres: Rapid Knowledge Synthesis
Nova Scotia Cochrane Resource Centre

Smith, 2008
(Published as a Cochrane Review in 2007)

Shared-care health service interventions designed to improve the management of chronic disease across the primary-specialty care interface (any structured intervention: liason meetings, shared care records cards, computer assisted shared care and e-mail, other); diabetes, hypertension, asthma, and COPD.

19 RCTs (3 met QA criteria), 1 Controlled before and after or ITS studies (9296 is similar review)

No consistent improvements in physical and mental health outcomes, psychosocial outcomes, psychosocial measures including measures of disability and functioning, hospital admission, default of participation rates, recording of risk factors and satisfaction with treatment. Improvements in prescribing. No evidence from health outcomes to support the widespread introduction of shared care services at present. Eleven studies reported cost data, although only 3 of these reported economic analyses linking costs to outcomes. Results were mixed.

Health, process, cost outcomes: Negative

Majority were suboptimal quality studies; insufficient detail about participating primary care practitioners make it difficult to determine generalizability (studies conducted in United Kingdom, the United States, Australia, New Zealand, Denmark, Ireland, and Sweden); short-term follow-up only.
Practice-based IPC interventions can improve health care processes and outcomes, although generalizable inferences about the key elements of IPC are difficult. One study on daily interdisciplinary rounds in inpatient medical wards showed positive impact on LOS and total charges, but another study on daily interdisciplinary rounds in a community hospital telemetry ward found no impact on LOS. Monthly multidisciplinary team meetings improved prescribing of psychotropic drugs in nursing homes. Video conferencing compared to audio-conferencing multidisciplinary care conferences showed mixed results; there were a decreased number of case conferences per patient and shorter length of treatment, but no differences in occasions of service or length of the conference. Multidisciplinary meetings with an external facilitator, who used strategies to encourage collaborative working, was associated with increased audit activity and reported improvements to care.

**6. Telehealth/Tele-consultation**

**Tele-consultation**

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<tr>
<th>Author Year</th>
<th>Review Objective</th>
<th>Studies Included</th>
<th>Methods</th>
<th>Reported Results</th>
<th>Overall Conclusions</th>
<th>Quality of the Evidence Available</th>
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<tbody>
<tr>
<td>Johansson, 2010</td>
<td>Telemedicine systems (telestroke) in acute stroke management compared to traditional care on health, process and cost outcomes</td>
<td>Eighteen studies: two RCTs and one controlled clinical trial, fifteen observational study design such as case series or prospective cohorts.</td>
<td>CS; IS</td>
<td>Telemedicine technologies, whether using a telephone-based system or a real-time VC system, are safe and feasible in acute stroke management. Telestroke interventions can support areas with insufficient neurological services with evidence-based stroke care. All the telemedicine networks reported a positive experience and improved quality of care, suggesting that the implementation of such systems is feasible and acceptable. There are few economic studies on teledermatology technology in stroke managements. More research is needed to explore the clinical and economic impact of teledermatology technology in stroke management, so as to support policy makers in making informed decisions.</td>
<td>Health and process outcomes: Positive</td>
<td>Lack of discussion on bias. Lack of discussion on generalizability. There was no explicit quality assessment (with many case reports being considered). Study locations: ten were located in the United States, three in Germany, and one each in Canada and China.</td>
</tr>
<tr>
<td>Young, 2011</td>
<td>Telemedicine ICU (tele-ICU) coverage compared to pre-tele-ICU usage</td>
<td>13 studies involving 35 ICUs. All the studies used before and after designs.</td>
<td>CS;QA; IS</td>
<td>Given the significant resources required for tele-ICU implementation, further evaluation is dearly needed. Tele-ICU coverage is associated with lower ICU mortality and LOS but not with lower in-hospital mortality or hospital LOS.</td>
<td>Health outcomes: Positive (mortality and LOS) Neutral: (Hospital mortality and LOS)</td>
<td>Often found important information missing (lack of consistent measurement, reporting, and adjustment for patient severity). Limited by ability to examine differences in the impact of tele-ICU coverage in subgroup and meta-regression analyses. High degree of heterogeneity.</td>
</tr>
<tr>
<td>Van der Heijden, 2010</td>
<td>Uses of telehealth for tertiary teledermatology on dermatology patients on health, process and cost outcomes</td>
<td>11 studies: 5 observational. 6 analytic, one controlled intervention study, 5 descriptive studies. No RCTs were found.</td>
<td>CS; IS</td>
<td>Tertiary teledermatology research is still in early development. Future research should focus on identifying the scale of tertiary teledermatology and on what modality of teledermatology is most suited for what purpose in communication among dermatologists. Patient and physician satisfaction were both reported once. In the study in which patient satisfaction was measured, it was the sole focus of the study. Satisfaction was measured by means of a survey. The satisfaction reported was high No study performed a cost analysis. Diagnostic accuracy, validity, and reliability were measured in four studies. Diagnostic accuracy was measured by comparing telediagnosis to histopathological diagnosis and</td>
<td>Health outcomes: Positive</td>
<td>Lack of intervention studies found, the reported outcome measures are not as solid as outcome measures would be in studies with an experimental setting. In the descriptive and observational studies, the outcome measures reported were more a qualitative description of the parameters than a quantitative measurement. Population and Generalizability not defined or discussed. No explicit quality assessment was discussed.</td>
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resulted in a 78.8% accuracy rate in teledermatology

<table>
<thead>
<tr>
<th>Author, Year</th>
<th>Review Objective</th>
<th>Studies included</th>
<th>Methods</th>
<th>Reported Results</th>
<th>Overall Conclusions</th>
<th>Quality of Available Evidence</th>
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<tbody>
<tr>
<td>Wade, 2010</td>
<td>Synchronous or real time video communication used to patients in any clinical discipline on cost outcomes</td>
<td>36 articles met the inclusion criteria.</td>
<td>CS;QA; IS</td>
<td>It is concluded that synchronous video delivery is cost-effective for home care, and for on-call hospital specialists, and it can be cost-effective for regional and rural health care, depending upon the particular circumstances of the service. However, it is not cost-effective, from the health services perspective, for local delivery of service between hospital specialists and primary care, particularly due to additional health care staffing. Improvement in the quality of economic analyses is also needed to provide data for more accurate modelling of the effects of widespread introduction of telehealth into the health care system.</td>
<td>Cost/Resource use: Positive = home care, on-call hospital specialists, rural care (distance). Negative = local delivery of services between primary &amp; specialist care.</td>
<td>A higher proportion of the non-random comparisons showed lower costs and better outcomes than did the RCTs, suggesting that the studies with a lower level of evidence are biased in favour of telehealth. Generalizability is a problem for telehealth research as a whole, due to variability in clinical disciplines, environmental settings, workforce and health care financing. This review attempts to deal with this by considering only real time video communication, which has similar infrastructure and ways of clinical practice, and also by grouping the results into similar organisational settings; however this variability means that generalisation should still be considered with caution. Although there are patterns in the results by organisational setting, numbers in these groups are low, and the conclusions would be strengthened by additional research in each area.</td>
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**Verhoeven, 2010**

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<tr>
<th>Objective</th>
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<th>Quality of the Evidence Available</th>
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<tr>
<td>Synchronous and asynchronous teleconsultation for patients with type 1 and 2 gestational diabetes care compared to usual care on health, process and cost outcomes.</td>
<td>90 studies met inclusion criteria. The most frequently applied methodological approach was an observational study (case series or before–after design), which was used in 48 studies. Twenty-eight studies were RCTs, and 8 involved quasi-experimental studies.</td>
<td>CS,QA; IS</td>
<td>The included studies suggest that both synchronous and asynchronous teleconsultations for diabetes care are feasible, cost-effective, and reliable. However, it should be noted that many of the included studies showed no significant differences between control (usual care) and intervention groups. Future research needs quasi-experimental study designs and a holistic approach that focuses on multilevel determinants (clinical, behavioral, and care coordination) to promote self-care and proactive collaborations between health care professionals and patients to manage diabetes care.</td>
<td>Most frequently mentioned were the lack of a significant difference between the intervention and the control group, the inability to measure long-term effects of the intervention, the fact that interventions sometimes inherently lead to improved results because of a selection bias, some patient groups benefit more from the intervention than others, e.g., patients with poor metabolic control, high use of health care, motivated patients, and inexperienced patients, or other shortcomings. Studies were performed mainly in the United States (n = 45). Six were conducted in Asia, four in Australia, and the remainder in Europe. There was significant statistical heterogeneity among the pooled RCTs.</td>
</tr>
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| Krishna, 2009 | Cell phones and text messaging delivery of health information or education interventions to adults and children (38,060 participants with 10,374 adults and 27,686 children) | 20 RTCs and SCTs. English language publications with a complete English abstract. Excluded studies that did not use a control group. | QA; IS | Information and education interventions delivered through wireless mobile technology resulted in both clinical and process improvements in the majority of studies included in this review. Chronic diseases such as diabetes and asthma, requiring regular management, as well as smoking cessation requiring ongoing advice and support, benefited most from the cell phone interventions. Use of cell phones and text messaging in improving health care, although gaining interest, is still in its infancy. As the ownership and use of cell phones increases, and more patients are willing to incorporate them into their daily lives for regular disease management such as for diabetes or asthma, more benefits will be documented. | Health and process outcomes: Positive |

**Telehealth**

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<tr>
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<th>Quality of the Evidence Available</th>
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<tbody>
<tr>
<td>Polisena, 2009a</td>
<td>Cost-effectiveness of home telehealth of various complexities for chronic diseases compared to usual care.</td>
<td>22 studies (14 RCTs, 4 case control studies, 4 pre-post studies)</td>
<td>CS,QA; IS</td>
<td>Most studies in our economic review found home telehealth to be cost-saving from health care system and insurance provider perspectives. Conclusions must be qualified as the quality of the studies in terms of economic evaluations was poor. The studies were also heterogeneous possibly due to diverse study populations, interventions, and the health care systems in which they are based, so it remains a challenge to make an informed decision on resource allocation. Together, the reviewed studies show a general trend towards improvement associated with the use of most modalities; however, inconsistent evidence between trials for the same modality and differences between modalities makes a definitive conclusion difficult. Telementoring appears to be an acceptable method for monitoring of heart failure patients. Controlled, randomized studies directly comparing different modalities and evaluating their success and feasibility when used as part of routine clinical care, are now required.</td>
<td>Cost/Resource use: Positive</td>
<td>Most studies were considered to be of poor quality. Some studies in the economic review had small sample sizes and a lack of information on patient characteristics, clinical outcomes, and study perspectives. There are no published economic reviews specific to home telehealth on which to make an informed policy decision. Past systematic reviews on the cost-effectiveness of telemedicine interventions found the existing evidence on which to draw a conclusion to be very limited. The studies were also heterogeneous possibly due to diverse study populations, interventions, and the health care systems in which they are based, so it remains a challenge to make an informed decision on resource allocation.</td>
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Polisana, 2009b  | Home telehealth (home telemonitoring (HTM) and/or telephone support (TS) compared with usual care (UC) for patients with diabetes on health and cost outcomes.  | 12 RCTs and 9 observational studies  | CS;QA; IS  | In four studies, most patients thought that home telehealth was better than UC and that the system was reliable, simple and user-friendly. Four studies found no differences between groups in patient satisfaction or health related QOL, and both groups expressed high satisfaction with their overall diabetic care. Although patients in the TS group reported greater self-efficacy, fewer symptoms of depression and fewer days in bed compared with those in UC in one study, no intervention effect was observed on diabetes-specific health related QOL. One study reported fewer symptoms of poor glycaemic control (HbA1C) and had significantly more satisfaction with home telehealth compared with UC. The home telehealth interventions were similar or favourable in terms of health related QOL or patient satisfaction compared with the UC arm. The study results indicate that home telehealth interventions were similar or favourable to UC in terms of QOL, patient satisfaction, adherence to treatment or compliance compared with UC. Patient adverse events were not discussed in any of the selected studies. Study results indicated that home telehealth helps to reduce the number of patients hospitalized, hospitalizations and bed days of care. Home telehealth was similar or favourable to UC across studies for quality-of-life and patient satisfaction outcomes. More studies of higher methodological quality are required to give more precise insights into the potential clinical effectiveness of home telehealth interventions.  

Ekeland, 2010  | Impacts and costs of telemedicine services (review of reviews)  | 80 heterogeneous systematic reviews.  |  | Overall outcome: Despite large number of studies and systematic reviews on the effects of telemedicine, high quality evidence to inform policy decisions on how best to use telemedicine in health care is still lacking. Large studies with rigorous designs are needed to get better evidence on the effects of telemedicine interventions on health, satisfaction with care and costs.  

Garcia-Lizana, 2010  | Information and communication technology (ICT); direct patient-based interventions (preventive treatments were excluded  | 10 RCTs  | CS;QA; IS  | Evaluation of symptoms: 4/9 studies showed improved depression symptoms; 5/9 no significant difference compared to control; QOL: 4/4 showed no significant difference with control; Patient satisfaction: 5/5 no difference (1/1 no difference with technology and quality both)  
There is insufficient scientific evidence regarding the effectiveness of ICT use in the management of depression, and more research is needed to further evaluate the efficiency. However, there is a strong hypothesis that videoconference-based treatment obtains the same results as face-to-face therapy, and that self-help Internet programs could improve symptoms when traditional care is not available. 3/3studies showed no difference in resource use during 12 months follow-up.  

Collaborative Emergency Centres: Rapid Knowledge Synthesis  | Nova Scotia Cochrane Resource Centre  |  |  | The number of studies in our systematic review and their sample sizes were low for a number of outcomes measured, and some studies failed to report themeasures of variation for several continuous outcomes. Patients with cognitive impairment, mental illness, a language barrier, no telephone line or computer to transmit data or a life expectancy of less than 1 year were excluded from most studies, so the generalizability of their findings may be limited. Also, it was unclear in several studies what clinical services (e.g. health-care providers involved in patient’s disease management) were delivered by the home telehealth interventions. Patients with cognitive impairment, mental illness, a language barrier, no telephone line or computer to transmit data or a life expectancy of less than 1 year were excluded from most studies, so the generalizability of their findings may be limited. Health outcomes: The QOL and patient satisfaction outcomes were summarized qualitatively because they were measured with various instruments.  

Data collection and assessment of each review done by one external expert. Generalizability not discussed. However, inclusion criteria stated that all e-health interventions within the health care system were included.  

The limitations of this study are due partly to the quality of the included RCTs, the variability of the interventions, the lack of control-group in many cases, and, in particular, the heterogeneity of the follow-up periods, including the loss of follow-up in several of the RCTs analyzed. Two studies reported results from a wide range of patient demographics; Review included studies from US, Canada, UK, Aus, Sweden considering populations of different type/stages of depression.
<table>
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<tr>
<th>Author, Year</th>
<th>Description</th>
<th>Study Design</th>
<th>Quality Assessment</th>
<th>Health Outcomes</th>
<th>Process Outcomes</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Griffiths, 2010</td>
<td>Preventive and treatment Internet interventions for patients with depression and anxiety disorders</td>
<td>26 RCTs</td>
<td>CS,QA; IS</td>
<td>Health outcomes: Positive</td>
<td>Process outcomes: Positive</td>
<td>The findings of this review clearly demonstrate that the Internet can be an effective medium for the delivery of interventions designed to reduce the symptoms of depression and anxiety conditions. Moreover, the effect sizes for the depression trials, both with and without therapist input, were at least as large as the standardised effect sizes relative to controls reported in recent meta analyses of psychological treatment in primary care (0.31) and antidepressant treatment of depression (0.37). Similarly, the anxiety effect sizes reported here are consistent with controlled effect sizes reported for face-to-face treatment of panic disorder and social phobia.</td>
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<tr>
<td>Luxton, 2010</td>
<td>Safety of unsupervised telemental health care delivery for patients with mental health issues</td>
<td>9 studies: including 6 RCTs</td>
<td>CS; IS</td>
<td>Health outcomes: Positive</td>
<td>The limited data and low count of peer-reviewed studies, however, limit our ability to make generalized conclusions about the safety of these treatments.</td>
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<tr>
<td>McLean, 2010</td>
<td>Telehealth care interventions used for the treatment of asthma (children and/or adult)</td>
<td>21 studies: all RCTs. The 21 trials included in the final review were published across 25 reports.</td>
<td>CS;QA; IS</td>
<td>Health outcomes: Neutral (QOL)</td>
<td>The level of intervention may vary in telehealth care, with tasks delegated to less senior, less expensive health care professionals and to patients themselves for self-care when their asthma is stable. This variation may lead to more effectively tailored care. The benefits of telehealth care are mediated by education, an enhanced therapeutic relationship, more intensive monitoring of the patient and feedback.</td>
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<td>Swanepoel, 2010</td>
<td>Audiological services with a telehealth component, either synchronous or asynchronous (1) audiological screening, (2) audiological diagnosis, (3) audiological intervention, and (4) patient-clinician perceptions</td>
<td>26 articles (majority being case reports)</td>
<td>CS; IS</td>
<td>Health outcomes: Neutral</td>
<td>Process outcomes: Neutral</td>
<td>Several screening applications for populations consisting of infants, children, and adults have demonstrated the feasibility and reliability of telehealth using both synchronous and asynchronous models. The diagnostic procedures reported, including audiometry, video-otoscopy, oto-acoustic emissions, and auditory brainstem response, confirm clinically equivalent results for remote telehealth-enabled tests and conventional face-to-face versions. Intervention studies, including hearing aid verification, counseling, and Internet-based treatment for tinnitus, demonstrate reliability and effectiveness of telehealth applications compared to conventional methods. Tele-audiology holds significant promise in extending services to the underserved communities but require considerable empirical research to inform future implementation.</td>
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Glossary of Selected Terms from the Report

Allied health professionals: “Allied Health professionals are involved with the delivery of health or related services pertaining to the identification, evaluation and prevention of diseases and disorders; dietary and nutrition services; rehabilitation and health systems management, among others”(129).

Ambulatory services: Health care services provided to patients on an ambulatory basis, rather than by admission to a hospital or other health care facility. The services may be a part of a hospital, augmenting its inpatient services, or may be provided at a free-standing facility (130).

Collaborative Emergency Centres: A CEC-type centre focuses on the delivery of health care services including both primary care and access to emergency care through a seamless collaborative team approach. Primary care encompasses access to health promotion, wellness, chronic disease management, illness and injury prevention, and diagnosis and treatment of illness and injury. A health care provider must be available on-site, and has a formal supportive relationship with other professional(s) or institution(s) elsewhere through telephone or technological means.

Canadian Triage Acuity Scale (CTAS): A 5 level triage scale designed to classify the acuity of a patient's condition.

Clinical trials: Work that is the report of a pre-planned clinical study of the safety, efficacy, or optimum dosage schedule of one or more diagnostic, therapeutic, or prophylactic drugs, devices, or techniques in humans selected according to predetermined criteria of eligibility and observed for predefined evidence of favourable and unfavourable effects. While most clinical trials concern humans, this publication type may be used for clinical veterinary articles meeting the requisites for humans. Controlled clinical trials, and randomized clinical trials are specific types of clinical trials (131).

Cochrane Reviews are systematic reviews produced by The Cochrane Collaboration, and are published in The Cochrane Library. The Cochrane Collaboration offers a handbook for systematic reviewers that "provides guidance to authors for the preparation of Cochrane Intervention reviews" (132). The rigorous predefined guidelines demanded of a Cochrane Review, in addition to the recommended update of all Cochrane Reviews every two years, increases the reliability of these evidence syntheses.

Commentaries: Work consisting of a critical or explanatory note written to discuss, support, or dispute an article or other presentation previously published. It may take the form of an article, letter, editorial, etc. They appear in publications under a variety of names: comment, commentary, editorial comment, viewpoint, etc. (133).

Deputizing doctors: Commercial companies employing doctors to provide after-hours service. The use of deputizing services after hours is widespread in urban areas of the United Kingdom and Australia (2).

Evidence synthesis: There are many common types of evidence synthesis, see: narrative reviews, jurisdictional reviews, scoping reviews, systematic reviews, meta-analyses, and Cochrane Reviews.

Grey literature: "Grey literature stands for manifold document types produced on all levels of government, academics, business and industry in print and electronic formats that are protected by intellectual property rights, of sufficient quality to be collected and preserved by library holdings or institutional repositories, but not controlled by commercial publishers i.e., where publishing is not the primary activity of the producing body" (134).

Jurisdictional reviews: Reviews that seek to provide an overview of policies, practices, legislations or regulations as observed through a range of jurisdictions. There are no guidelines available for the conduct of jurisdictional reviews. While jurisdictional reviews can answer the question, “what are others doing”, they usually do not consider the effectiveness of interventions.

Knowledge translation: Defined by the Canadian Institutes of Health Research (CIHR) as a “dynamic and iterative process that includes the synthesis, dissemination, exchange and ethically sound application of knowledge to improve health, provide more effective health services and products, and strengthen the health care system” (83). The use of evidence from research to make informed decisions in health care is often lacking; increasing recognition of these gaps
in translating knowledge into action have led to greater efforts in involving decision-makers in knowledge creation, distillation, and dissemination of evidence (135). The process of knowledge translation takes place within a complex system of interactions between researchers and knowledge users. The process can vary in intensity, complexity and level of engagement (136).

**Mental health workers:** Mental Health Workers described in a systematic review by Harkness (2006) included counsellors, psychologists, psychiatrists, community psychiatric nurses, nurse therapists, practice nurses, and social workers (16).

**Meta-analyses** are quantitative syntheses often included within systematic reviews. Meta-analyses use “statistical methods to summarize the results of independent studies” (137), with the advantage that more precise estimates of, for example, the effect of an intervention, result from pooling information from all relevant studies (132).

**Narrative reviews** report knowledge on a topic based on previously published research (138). They are often labelled as editorials, commentaries or narrative overviews (138). Although they may have been written by a recognized expert, narrative reviews often lack systematic research methods as they may not identify all relevant studies. Furthermore, narrative reviews may be more likely to support opinions, prejudices or commercial interests (84).

**Paraprofessionals:** A whole category of mental health personnel who are not qualified as psychiatrists, psychologists, social workers or nurses, and who are below a master’s degree level of education. Alternatively, paraprofessionals may be experienced patients, residents from local catchment areas or college students (11).

**Physician assistants:** Physician assistants are fully licensed medical practitioners who are trained to provide care under the direction and supervision of a doctor. Although the doctor is ultimately responsible for the patient and establishes the degree of physician assistant’s supervision, physician assistants exercise autonomy in medical decision making. Typical duties include taking a history, performing a physical examination, evaluating laboratory data, instituting treatment, performing procedures, screening ED patients with “routine” problems, admitting certain patients and communicating with consultant services (6).

**Qualitative studies:** Research that derives data from observation, interviews, or verbal interactions and focuses on the meanings and interpretations of the participants (139).

**Rapid reviews** are literature reviews using accelerated or streamlined traditional systematic review methods (140, 141). Rapid reviews strive to produce evidence synthesis with the most rigorous and transparent methods possible within a restricted timeline. They can benefit policy and clinical decision making by providing rapid access to high quality evidence. Rapid reviews are a new concept and are increasing in use. Varieties in nomenclature (rapid review, rapid health technology assessment (HTA), rapid evidence assessment), time frames (1-9 months, or no reported time) and streamlining methods (restricted searching, restricted screening, restricted quality appraisal, restricted data extraction) demonstrate the lack of a universally accepted definition or methodological protocol for rapid reviews (140, 141). Although rapid reviews are increasingly used, the lack of predefined methods may result in poor methodological transparency and limited understanding of the implications of streamlining (141).

**Residents:** Graduates of medicine in programs of training in medicine and medical specialties offered by hospitals. Graduates train to meet the requirements established by accrediting authorities (142).

**Scoping reviews** “map rapidly the key concepts underpinning a research area and the main sources and types of evidence available”(143). Scoping reviews can be undertaken as a stand-alone project, or as part of a greater project. They can vary in breadth and depth and can examine the range of research evidence on a select topic, determine the value of undertaking a full review, summarise and disseminate research findings, or identify gaps in existing literature (143). Scoping reviews often take a descriptive or narrative perspective towards summarising evidence. Limitations of scoping reviews include a lack of quality appraisal of primary research, and a lack of evidence synthesis; they often deal with quantity, rather than quality of evidence (143).

**Systematic reviews:** Reviews that comprehensively and systematically identify, select, assess, synthesize and report research evidence for a clearly defined question(84). While any review’s methods are subject to bias, a systematic
review’s pre-specified, transparent approach reduces the risk of being misled by chance or biased selection and appraisal of evidence (144). Systematic reviews can be limited due to the variation in reliability and quality of included studies, and the need for the review itself to be updated with the production of new primary studies (145, 146). In addition, the length of time it takes to produce a thorough systematic review is not always conducive to decision making, where research is often desired sooner rather than later (143).

**Telemedicine Intensive Care Unit (ICU):** The application of telemedicine to hospital critical care units; this includes any telecommunication system installed in the ICU to facilitate real-time access to critical care specialists located elsewhere (55).

**Triage liaison physician:** “Physicians working with triage (a system of sorting patients based on acuity and risk) staff to expedite the care of patients, based on medical need, who are subject to unpredictable wait times due to lack of available ED treatment spaces” (9).

**Web presence:** The collection of websites and web-resources associated with a company, organization or individual.
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