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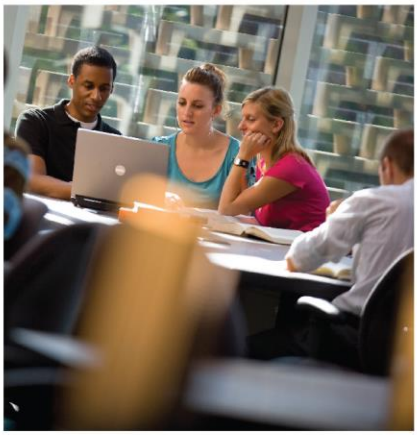
OPTIMIZING CLINICAL PRACTICE IN ONTARIO BASED ON DATA, EVIDENCE AND GUIDELINES



EVIDENCE >> INSIGHT >> ACTION

Evidence Brief:
Optimizing Clinical Practice in Ontario Based on Data, Evidence and Guidelines

6 March 2015

McMaster Health Forum

For concerned citizens and influential thinkers and doers, the McMaster Health Forum strives to be a leading hub for improving health outcomes through collective problem solving. Operating at regional/provincial levels and at national levels, the Forum harnesses information, convenes stakeholders, and prepares action-oriented leaders to meet pressing health issues creatively. The Forum acts as an agent of change by empowering stakeholders to set agendas, take well-considered actions, and communicate the rationale for actions effectively.

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Conflict of interest

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

Merit review

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

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KEY MESSAGES

What's the problem?

- Clinical practice in Ontario is not consistently being optimized based on data, evidence and guidelines.
- Yet Ontario is home to some of the world's best data, evidence, guideline and implementation 'shops.'
- These initiatives support optimal practice with different perspectives and little coordination.
- Health-system arrangements also aren't being effectively harnessed to optimize clinical practice.
- No big initiatives appear to be on the way to systematize and scale up efforts to optimize clinical practice.

What do we know (from systematic reviews) about three viable elements of an approach to address the problem?

- Element 1 – Support dynamic efforts to identify clinical practices to be optimized and the causes of underlying problems
  - Important components of this element include: identifying the clinical practice to be optimized (using explicit criteria and high-quality data and evidence); specifying who needs to do what differently; ascertaining the causes of the problem; engaging key stakeholders; and iteratively refining the understanding of the problem and the level at which it can most helpfully be considered.
  - We found systematic/structured approaches for identifying the clinical practices to be optimized (e.g., conducting systematic reviews and/or using checklists) and theory-based approaches for identifying the underlying causes of problems in those practices (e.g., the Behaviour Change Wheel and the Theoretical Domains Framework).
- Element 2 – Use rigorous processes to select and implement approaches to optimizing clinical practices
  - Several high-quality reviews found beneficial effects on optimizing clinical practice for educational materials, educational meetings, educational outreach visits, local opinion leaders, audit and feedback, computerized reminders, and tailored interventions.
  - The effect sizes found for each of these interventions are similar, but have large variability, suggesting that the likely effects of interventions vary in relation to the degree to which the causal mechanisms of action for the intervention address the specific barriers identified. The variability also reinforces the importance of diagnosing the underlying cause of the problem and then, based on the diagnosis, selecting from the array of candidate strategies and iteratively refining, tailoring and combining them in a way that maximizes the impact of efforts to optimize clinical practice.
- Element 3 – Monitor, evaluate and review the approaches selected to optimize clinical practices
  - We found three systematic reviews that outlined beneficial effects of quality-improvement strategies, which could be useful for this element given the focus of these approaches on using a formalized and systematic approach to assessing performance and making changes to improve health outcomes, system performance and professional development.
  - Activities related to this element could also be guided by the RE-AIM (Reach, Effectiveness, Adoption, Implementation, and Maintenance) framework, which has been used extensively to improve the sustainable adoption and implementation of effective, generalizable, evidence-based interventions.

What implementation considerations need to be kept in mind?

- While potential barriers exist at the levels of providers, organizations and systems (if not patients/citizens, who are unlikely to be aware of or particularly interested in the specifics of these approach elements), one significant barrier lies in broadening the scope of practice optimization in Ontario beyond a competitive enterprise engaged in largely by researchers (which has contributed to these centres and initiatives being seen as global leaders) to include a complementary and more coordinated programmatic, sustainably funded, province-wide approach.
- On the other hand, a number of potential windows of opportunity could be capitalized upon, which include a growing focus on optimizing practice based on data, evidence and guidelines, and the openness of the leaders of Ontario's centres for expertise and small-to-medium-scale initiatives to contribute to a more coordinated, programmatic, sustainably funded, province-wide approach to practice optimization.

REPORT

Optimizing clinical practice based on data, evidence and guidelines is a challenge faced in every health system around the world. The way the challenge manifests itself at the level of the patient has been remarkably consistent over time: tough decisions made at the intersection of clinical expertise, patient values and preferences, and the best available data, evidence and guidelines.(1) Rigid clinical decision support systems, insufficient attention to patient goals of care and shared decision-making (particularly in the face of multimorbidity), and the large volume of available data, evidence and guidelines (of variable reliability and clinical significance) are variations on a now two-decades-old theme about just how tough these decisions can be.(2)

But it's timely to ask what can be done to optimize clinical practice in Ontario based on data, evidence and guidelines. The Excellent Care for All Act has invigorated discussions in the province about basing all decisions, including clinical practice decisions, on the best available evidence.(3) And the Registered Nurses' Association of Ontario, in commissioning this brief (and the stakeholder dialogue it was prepared to inform), is seeking to advance these discussions, both to inform the continuous improvement of its own practice-optimization efforts and to stimulate continuous improvement across the Ontario health system.

What's in scope for the brief (and dialogue) is the full range of:

1) clinical practices and the full range of clinicians working within them (i.e., nursing, medical and other forms of professional practice across the home and community care, primary care, acute care, long-term care and public health sectors, as well as in cross-sectoral initiatives such as Health Links);
2) approaches to optimizing clinical practice (i.e., patient-, provider-, organization- and system-targeted approaches); and
3) data (including performance data), research evidence (including systematic reviews of effects and of many other types of studies) and guidelines.

Additional background about the process of preparing the brief is provided in Box 1.

Box 1: Background to the evidence brief

This evidence brief mobilizes both global and local research evidence about a problem, three potential elements of an approach to addressing the problem, and key implementation considerations. Whenever possible, the evidence brief summarizes research evidence drawn from systematic reviews of the research literature and occasionally from single research studies. A systematic review is a summary of studies addressing a clearly formulated question that uses systematic and explicit methods to identify, select and appraise research studies and to synthesize data from the included studies. The evidence brief does not contain recommendations, which would have required the authors of the brief to make judgments based on their personal values and preferences, and which could pre-empt important deliberations about whose values and preferences matter in making such judgments.

The preparation of the evidence brief involved five steps:

1) convening a Steering Committee comprised of representatives from the partner organizations, key stakeholder groups, and the McMaster Health Forum;
2) developing and refining the terms of reference for an evidence brief, particularly the framing of the problem and three potential elements of an approach for addressing it, in consultation with the Steering Committee and 25 key informants, and with the aid of several conceptual frameworks that organize thinking about ways to approach the issue;
3) identifying, selecting, appraising and synthesizing relevant research evidence about the problem, approach elements, and implementation considerations;
4) drafting the evidence brief in such a way as to present concisely and in accessible language the global and local research evidence; and
5) finalizing the evidence brief based on the input of several merit reviewers.

The three potential elements of an approach could be supplemented or replaced by other elements or given greater or lesser attention relative to each other.

The evidence brief was prepared to inform a stakeholder dialogue at which research evidence is one of many considerations. Participants' views and experiences and the tacit knowledge they bring to the issues at hand are also important inputs to the dialogue. One goal of the stakeholder dialogue is to spark insights – insights that can only come about when all of those who will be involved in or affected by future decisions about the issue can work through it together. A second goal of the stakeholder dialogue is to generate action by those who participate in the dialogue, and by those who review the dialogue summary and the video interviews with dialogue participants.

As the 'canaries in the coal mine,' the evidence brief gives particular attention to clinicians working with limited infrastructure to support optimal practice (e.g., working alone or in relative isolation professionally, working with limited or no staff to support practice optimization, and working with limited or no electronic health records) (Box 2). If efforts to optimize clinical practice aren't working or won't work for this group, then new approaches will need to be considered.

While the focus of the evidence brief is the Ontario health system, the brief will touch upon the potential to commercialize Ontario's innovations in this domain beyond the province.(4) As the brief will describe, Ontario is home to many world-leading groups in this domain, yet their impacts have not been fully realized within or beyond the province.

Also, while financial incentives will be discussed briefly as a category of approaches to optimizing clinical practice, they will be the focus of a separate evidence brief to be prepared over the spring and summer and of a separate stakeholder dialogue to be convened in early fall.

Box 2: Equity considerations

A problem may disproportionately affect some groups in society. The benefits, harms and costs of elements of an approach to address the problem may vary across groups. Implementation considerations may also vary across groups.

One way to identify groups warranting particular attention is to use "PROGRESS," which is an acronym formed by the first letters of the following eight ways that can be used to describe groups†:

- place of residence (e.g., rural and remote populations);
- race/ethnicity/culture (e.g., First Nations and Inuit populations, immigrant populations and linguistic minority populations);
- occupation or labour-market experiences more generally (e.g., those in "precarious work" arrangements);
- gender;
- religion;
- educational level (e.g., health literacy);
- socio-economic status (e.g., economically disadvantaged populations); and
- social capital/social exclusion.

The evidence brief strives to address all Ontarians, but (where possible) it also gives particular attention to clinicians working with limited infrastructure to support optimal practice (e.g., working alone or in relative isolation professionally, working with limited or no staff to support practice optimization, and working with limited or no electronic health records). Many other groups warrant serious consideration as well, and a similar approach could be adopted for any of them.

† The PROGRESS framework was developed by Tim Evans and Hilary Brown (Evans T, Brown H. Road traffic crashes: operationalizing equity in the context of health sector reform. *Injury Control and Safety Promotion* 2003;10(1-2): 11–12). It is being tested by the Cochrane Collaboration Health Equity Field as a means of evaluating the impact of interventions on health equity.

THE PROBLEM

The problem can be understood in relation to the following five themes:

1) clinical practice in Ontario is not consistently being optimized based on data, evidence and guidelines**;**
2) yet Ontario is home to some of the world's best data, evidence, guideline and implementation 'shops;'
3) these 'shops' support optimal practice with different perspectives and little coordination;
4) health-system arrangements (i.e., governance, financial and delivery arrangements) also aren't being effectively harnessed to optimize clinical practice; and
5) no big initiatives appear to be on the way to systematize and scale up efforts to optimize clinical practice.

Each of these themes is addressed below in turn. The themes were derived both from the available research evidence (Box 3) and from key-informant interviews.

Box 3: Mobilizing research evidence about the problem

The available research evidence about the problem was sought from a range of published and "grey" research literature sources. Published literature that provided a comparative dimension to an understanding of the problem was sought using three health services research "hedges" in MedLine, namely those for appropriateness, processes and outcomes of care (which increase the chances of us identifying administrative database studies and community surveys). Published literature that provided insights into alternative ways of framing the problem was sought using a fourth hedge in MedLine, namely the one for qualitative research. Grey literature was sought by reviewing the websites of a number of Ontario organizations, such as Health Quality Ontario and the Ontario Ministry of Health and Long-Term Care.

Priority was given to research evidence that was published more recently, that was locally applicable (in the sense of having been conducted in Ontario or, failing that, in Canada), and that took equity considerations into account.

Clinical practice in Ontario is not consistently being optimized based on data, evidence and guidelines

Ontario, like other jurisdictions, struggles with the challenge of consistently optimizing clinical practice based on data, evidence and guidelines. Practice atlases from the Institute for Clinical Evaluative Sciences (ICES), annual reports from Health Quality Ontario, and many other sources routinely document opportunities for improvement in clinical practice.(5;6)

The opportunities can take many forms. They can lie in addressing any of: 1) inappropriate or low-quality care; 2) negative patient experience; 3) unacceptable or high costs (or inefficient care more generally); and 4) poor health outcomes, among other targets. The opportunities can also exist at any of the following levels: 1) individual; 2) groups (team or professional cadre); 3) organization (practice, site, institution); 4) sector; and 5) system. The province's regulatory colleges systematically address the 'extreme' cases of inappropriate or low-quality care and negative patient experience at the individual level, when complaints are brought against clinicians, but these cases are relatively rare and not the focus of this evidence brief. If we turn to the sector level, we see tremendous diversity.

The homecare and primary care sectors, for example, feature many clinicians working with limited infrastructure to support optimal practice. They may be working alone or in relative isolation professionally, working with limited or no staff to support practice optimization, and working with limited or no electronic health records. Some will be doing their performance reporting by hand or not doing any performance reporting themselves.

The cancer care sector, on the other hand, is somewhat unique in Ontario in its systematic, proactive, sector-wide efforts to seize opportunities for optimizing clinical practice. It operates almost like a 'closed' sub-system compared to other parts of Ontario's health system, and with unique forms of delegated authority. However, even in cancer care there are some aspects of the process, such as the prioritization of practices to be optimized, that are not as systematic as they could be.

Yet Ontario is home to some of the world's best data, evidence, guideline and implementation 'shops'

While Ontario shares with other provinces and countries the challenge of consistently optimizing clinical practice based on data, evidence and guidelines, it is among a relatively small number of jurisdictions globally that hosts a high number of centres of expertise and small-to-medium-scale initiatives that can support practice optimization. To illustrate this richness, we identified examples of centres and initiatives that are active in Ontario (Table 1), many of which are widely seen as global leaders. While we have assigned each centre or initiative a single area of focus, several of them are active across multiple areas of focus (as we note in parentheses in the table, where applicable).

Many of the initiatives and some of the centres are particularly noteworthy for how they are:
1) organized as research projects (not as institutionalized programs within the health system);
2) funded on a one-off, time-limited basis by research-funding agencies or government (not as sustainable enterprises); and
3) geographically restricted (not system-wide endeavours and certainly not positioned with a view to exporting the approach to other health systems, as the National Institute for Health and Clinical Excellence (NICE) has so successfully done with NICE International).

And despite their global leadership roles, some of these 'shops' have been said to be 'running on gas fumes,' with both insufficient funds to achieve the necessary reach and impact and insecure funds that preclude long-range planning.

Table 1: Examples of centres and initiatives that are available to optimize clinical practice in Ontario

Focus	Ontario 'shops' and Canadian 'shops' that support Ontario (and their principal contributions)
Data	• Institute for Clinical Evaluative Sciences (performance, capacity and other types of data, which are available through atlases/reports and customizable data and analytical service requests) • Canadian Institute for Health Information (performance, capacity and other types of data, which are available through reports, interactive online databases like Your Health System, and customizable data and analytical service requests)
Evidence synthesis (best evidence on one topic)	• Cochrane Canada (production of, and capacity building for, systematic reviews of effects, with five of six review groups, including the one focused on optimizing practice, and all four of the methods groups, based in Ontario)
Evidence 'refineries' (best evidence across a broad range of topics)	• ACCESSSS (database and customizable evidence service for pre-appraised studies and reviews about clinical care) • Health Evidence (database and customizable evidence service for pre-appraised reviews of effects about public health) • Health Systems Evidence (database and customizable evidence service for pre-appraised reviews, as well as overviews of reviews, economic evaluations, and other types of evidence, about health-system arrangements and implementation strategies) • Tools for Practice (bi-weekly summary of evidence that can change primary-care practice)
Guideline methods development	• AGREE II (tool to assess the quality and reporting of practice guidelines, the development of which was led by Ontario-based researchers) • GRADE (tool to assess the quality of evidence and the strength of recommendations, the development of which was led in part by Ontario-based researchers and a co-chair who is an Ontario-based researcher) • Guideline Implementability for Decision Excellence Model – GUIDE-M (tool to create optimally implementable guidelines and to support the better use of guidelines)
Guideline production	• Cancer Care Ontario's Program in Evidence-Based Care (production of clinical practice guidelines on the full spectrum of cancer care) • Mac GRADE Centre (methodological support for the use of GRADE to assess the quality of evidence and strength of recommendations in guidelines, as well as for the preparation of many World Health Organization

	and professional association guidelines) • Registered Nurses' Association of Ontario's Best Practice Guidelines (clinical and healthy work place environment guidelines, as well as related order sets, quality indicators (through its NQuIRE program), implementation resources, and Best Practices Spotlight Organization designations) • Initiatives such as: o Canadian Cardiovascular Harmonized National Guidelines Endeavour (C-Change) (harmonized guidance about cardiovascular risk factors from eight guideline groups) (7) o Canadian Diabetes Association clinical practice guideline initiative (guideline and a variety of related patient- and provider-targeted tools) o Canadian Stroke Best Practice Recommendations (guidelines, toolkits and other guideline implementation supports) o Canadian Task Force on Preventive Health Care (guidelines, guideline appraisals, and related dissemination strategies)
Evidence and guideline implementa-tion	• Centre for Effective Practice (guideline quality ratings, tool development, continuing professional development, and guideline implementation supports) • Centre for Practice-Changing Research at the Ottawa Hospital Research Institute (evidence and guideline implementation supports, as well as patient decision aids and rapid reviews) • National Collaborating Centre for Methods and Tools (supports for optimizing practice in public health) • Initiatives such as Knowledge Translation Canada's consultation service (evidence and guideline implementation supports)
Quality improvement	• Health Quality Ontario (supporting continuous quality improvement, as well as public reporting about clinical practice, among other topics, and making evidence-based recommendations about standards of care and funding of technologies) • Initiatives such as: o Adopting Research to Improve Care - ARTIC (evidence and guideline implementation supports through six projects in Ontario academic hospitals) o Building Bridges to Integrate Care – BRIDGE (supports for the evaluation of care-integration models in the greater Toronto area) o Improving and Driving Excellence Across Sectors - IDEAS (capacity building for quality improvement, leadership and change management)
Continuing professional development	• Ontario's faculties of health sciences and health professions offer a broad range of continuing professional development opportunities that can support practice optimization (although these opportunities can vary dramatically in the extent to which they are based on data, evidence and guidelines)

These 'shops' support optimal practice with different perspectives and little coordination

The high number of centres of expertise and small-to-medium-scale initiatives that can support practice optimization in Ontario can be seen as both a blessing and a potential curse. The blessing lies in the potential to cover all aspects of practice optimization to the world's highest standards (and to package and promote the expertise and initiatives in other health systems). The potential curse lies in the confusion that can arise among clinicians as well as among patients and health-system leaders when the scope of responsibilities between these 'shops' overlap, and when they use different frameworks, tools and language without any effort at coordination at the sectoral if not the system level.

Consider the case of a primary-care practice that may receive:

1) data from Health Quality Ontario that would allow it to benchmark itself against other primary-care practices in the province;
2) a practice atlas from the Institute for Clinical Evaluation Sciences suggesting that care for a specific condition is variable in the province and of poor quality locally;
3) a newsletter containing a 'Cochrane Corner' that profiles a systematic review that is relevant to primary care;
4) a customized evidence service from ACCESSSS that profiles a new study that was rated as high quality by methodological experts, and highly relevant to practice by a panel of primary-care physician volunteers;
5) two new practice guidelines targeting the primary care sector, with one about cancer screening prepared by Cancer Care Ontario and another about healthy workplace environments prepared by the Registered Nurses' Association of Ontario;
6) notification from the Centre for Effective Practice that a new primary-care guideline had been highly rated using the AGREE II tool;
7) a reminder from Health Quality Ontario about supports available to prepare a quality-improvement plan for a primary-care practice;
8) an invitation from IDEAS to send a staff member to a two- or nine-day capacity-building workshop focused on quality improvement, leadership and change management; and
9) marketing materials from its local faculty of health sciences for upcoming continuing professional development sessions.

While the volume of opportunities for practice optimization is itself daunting, what complicates matters further is the mix of perspectives used by these different groups. The perspectives can vary in orientation, approach, impetus and scope (Table 2) and in their focus within and between sectors (e.g., in the cancer sector, efforts and investments are not the same across all the potential areas that need to be addressed), and be implicit or explicit. And while each perspective can add value in its own right, the opportunities can look like a 'dog's breakfast' to the primary-care practice that is being informed of them. The seemingly promising introduction of primary-care leads in some of these centres and initiatives can help matters if they work in a coordinated way, but it can also further complicate matters if these leads don't follow closely what is happening among other groups and strive to work in a coordinated way when it makes sense for the advancement of the sector. And primary care is, of course, just one sector among many in the health system.

Perhaps the starkest summary statement that can be made for this sub-section and the preceding sub-section is that Ontario lacks a coordinated, programmatic, sustainably funded, province-wide approach to optimize practice based on data, evidence and guidelines, notwithstanding having many of the building blocks right at hand.

Table 2: Perspectives used in initiatives to optimize clinical practice in Ontario

Domain	Examples of the breadth of perspectives
Orientation	Supply-side approaches (i.e., production, packaging and push) versus demand-side (e.g., performance reporting or performance-based payment) approaches
	Disease-focused (e.g., diabetes) versus body system-focused (e.g., cardiovascular risk) versus patient-goal-focused approaches
	Diffusion versus dissemination versus implementation-driven approaches
	Quality improvement (e.g., 'local' plan-do-study-act cycles) versus evidence and guideline implementation versus creating generalizable knowledge about evidence and guideline implementation
Approach	Professional behaviour-change interventions (including patient-mediated interventions) versus organization- and policy-driven approaches (including financial incentives)
	Intervention-based versus intervention mechanism-based approaches
	Empirically driven versus theory-based approaches
	One-size-fits-all approaches versus toolkits that explicitly support matching approaches to problems and contexts
Impetus	Top-down approaches versus locally driven approaches
	Researcher-driven approaches versus provider, organization or system-driven approaches
	Mandatory approaches versus voluntary approaches (and within mandatory approaches, mandatory to do something specific versus mandatory to do something prioritized locally)
Scope	Single behaviour-focused approaches versus organizational culture-focused approaches
	Short term results-focused approaches versus long-term capacity building-focused approaches

Health-system arrangements also aren't being effectively harnessed to optimize clinical practice

While centres and initiatives provide many of the building blocks for practice optimization, other building blocks lie in broader health-system governance, financial and delivery arrangements. Like other provinces and territories, Ontario has long operated with a 'private delivery/public payment' model that has meant that governance, financial and delivery arrangements have rarely been harnessed specifically to optimize practice, leaving these arrangements to the discretion of hospitals and physicians rather than seeing them as the responsibility of those making decisions about the system in which they function. But this has been changing. Ontario now has in place many health-system arrangements to ensure that optimized practice is not penalized in some cases, supported in others, and even actively promoted in still others (Table 3). That said, not all of the arrangements have been shown to achieve the goals set for them. For example, a recent systematic review about payment to facilities for episodes of care (called Quality Based Procedures in Ontario) found no consistent, systematic differences in mortality rates and volume of care when compared to traditional payment mechanisms.(8) And significant sums of money can be spent on supports from consultants specializing in LEAN approaches and on organizations like the Institute for Healthcare Improvement, despite the relative dearth of research evidence about the effectiveness and cost-effectiveness of these approaches.

Table 3: Health-system arrangements being partially harnessed to optimize clinical practice in Ontario

Arrangement type	Examples	Potential opportunities for future action
Governance arrangements		
• Legislative accountability to optimize clinical practice	• Excellent Care for All Act requires the development of quality-improvement plans	• Sectors not (yet) covered by the Act (i.e., sectors other than hospitals, Community Care Access Centres, long-term care homes, and interprofessional team-based primary care models) • Requiring the use of data, evidence and guidelines to prioritize and implement improvements
• Delegated authority to use a range of system-levers to optimize clinical practice	• Cancer Care Ontario	• Sectors other than cancer care (or conditions other than those being addressed through initiatives at Cancer Care Ontario)
• Delegated authority to use select system-levers to optimize clinical practice	• College of Physicians and Surgeons of Ontario	• Requiring the use of data, evidence and guidelines among o the quality requirements for Independent Health Facilities and Out-of-Hospital Premises o the continuing-competence requirements for physicians (and other health professionals)
• Delegated authority for public reporting and for supporting quality improvement	• Health Quality Ontario	• Indicators other than the 40 currently prioritized, many of which deal with wait times and relatively few of which deal with optimal practice based on data, evidence and guidance • Quality improvement explicitly based on data, evidence and guidelines (although this is changing)
• Accreditation or other designation mechanisms for organizations supporting optimal practice	• Registered Nurses' Association of Ontario's Best Practice Spotlight Organizations • Accreditation Canada	• Professions other than nursing, or practice environments where nurses are not in leadership roles (e.g., much of primary care) • Organizations that do not participate in accreditation or do not emphasize practice optimization based on data, evidence and guidelines in the accreditation process
Financial arrangements		
• Payment to facilities for episodes of care based on clinical pathways	• Quality-Based Procedures	• Episodes of care other than the 10 currently covered • Episodes of care for which the clinical pathway is not based on quality-assessed evidence or guidelines
• Contracting with organizations to deliver optimal care	• Local Health Integration Networks • Community Care Access Centres	• Requiring the use of data, evidence and guidelines to set performance targets or reporting requirements
• Incentives, premiums and special payments for providers	• Some Family Health Teams	• Targets other than the ones currently covered • Targets that are not based on quality-assessed evidence or guidelines
• Inclusion of drugs or devices on lists of publicly funded 'technologies'	• Ontario Drug Benefit Program • Assistive Devices Program	• Inappropriate prescribing of drugs or inappropriate authorization of devices that have been shown to be ineffective or harmful for particular indications
Delivery arrangements		
• Order sets (and decision-support systems more generally) incorporated in electronic health records	• Registered Nurses' Association of Ontario	• Lack of regulatory requirement that order sets (and decision-support systems more generally) be based on quality-assessed evidence and guidelines
• Training and support for optimizing clinical	• Improving and Driving Excellence	• Quality improvement explicitly based on data, evidence and guidelines

practice	Across Sectors (IDEAS) • Health Quality Ontario (see above)	
• Information and educational materials for optimizing clinical practice	• Ministry of Health and Long-Term Care's 'Health Bulletins' (e.g., H5N1 Flu Virus Fact Sheet)	• Health Bulletins explicitly based on data, evidence and guidelines

Other health-system arrangements either hold little promise for optimizing practice or have not been introduced. As an example of the former, changes to the Ontario Health Insurance Plan (OHIP) Schedule of Benefits, which would need to be made in negotiation with the Ontario Medical Association, are likely too 'blunt' a tool to optimize practice (although the absence of or a dramatic reduction in a fee code might contribute to some unsafe or ineffective practices not being used). As an example of the latter, Ontario has no standards for minimum practice or organization size (to make it possible to have dedicated staff and supports operating at appropriate scale) or standards for some of the work undertaken by LHINs (to make practice optimization efficient for large organizations whose work crosses LHIN boundaries).

The primary-care practice faced with the many opportunities for practice optimization described in the previous sub-section may then also face:

1) a legislative requirement to develop a quality-improvement plan, but not to ensure that the plan is grounded in data, evidence and guidelines;
2) a regulatory requirement for its clinicians to document a minimum level of continuing professional development, but with no distinction made between development opportunities that are and aren't based on data, evidence and guidelines (both in terms of their content and pedagogical approach);
3) stiff competition to be selected to become a Best Practice Spotlight Organization with the support of the Registered Nurses' Association of Ontario;
4) incentives, premiums and special payments for achieving particular targets and not for systematizing an approach that would optimize practice across a broader set of domains;
5) a choice of electronic health records that contain clinical decision support systems that may or may not be based on high-quality data, evidence and guidelines; and
6) no requirement to operate at a large enough scale to hire, say, a half-time staff person to support practice optimization.

No big initiatives appear to be on the way to systematize and scale up efforts to optimize clinical practice

While groups, organizations and the government continue to make significant contributions to optimizing clinical practice in Ontario based on data, evidence and guidelines, and significant rhetorical attention is being given to quality improvement and to data and evidence (and to a lesser extent guidelines) across the system, it's difficult to identify existing or planned initiatives to systematize and scale up efforts to optimize clinical practice. Perhaps the most concrete shift on the horizon is Health Quality Ontario's intent to better connect its evidence synthesis work, which has historically focused on informing decision-making about technologies, and its quality-improvement work. And perhaps the most concrete opportunity on the horizon is the Ontario Strategy for Patient-Oriented Research (SPOR) Support Unit's operational management team and working groups which have, for the first time in many people's view, brought together a broad diversity of the leads for key centres and initiatives with the aim of achieving greater coordination in conducting and supporting the use of patient-oriented research.

Additional equity-related observations about the problem

As alluded to previously, the problem is particularly salient for clinicians working with limited infrastructure to support optimal practice. For example, any efforts to optimize clinical practice based on data, evidence and guidelines will be particularly challenging for the many clinicians in the homecare and primary-care sectors who have limited infrastructure to support such efforts. The reality of working alone or in relative isolation professionally, with limited or no staff support, and with limited or no electronic health records, is that many activities related to optimizing practice have higher opportunity costs because clinicians are more likely to have to do much of the work themselves and use more time-consuming, paper-based approaches. Moreover, many of the health-system arrangements related to optimizing practice don't apply or would be difficult to apply to these clinicians. For example, there is no requirement to develop quality-improvement plans, and no incentives, premiums or special payments tied to practice optimization for primary-care physicians working in solo practice. Similarly, pursuing a Best Practice Spotlight Organization designation or participating in a nine-day training program offered by the Improving and Driving Excellence Across Sectors (IDEAS) program would be challenging for those working in relative isolation professionally. As well, no big initiatives appear to be on the way to address the particular challenges to practice optimization faced by clinicians working with limited infrastructure.

THREE POTENTIAL ELEMENTS OF AN APPROACH TO ADDRESSING THE PROBLEM

Many approaches could be selected as a starting point for deliberations about an approach for optimizing clinical practice in Ontario based on data, evidence and guidelines. To promote discussion about the pros and cons of potentially viable approaches, we have selected three elements of a larger, more comprehensive approach to optimizing clinical practice. The three elements were developed and refined through consultation with the Steering Committee and key informants who we interviewed during the development of this evidence brief. The elements are:

1) support dynamic efforts to identify clinical practices to be optimized and the causes of underlying problems;
2) use rigorous processes to select and implement approaches to optimizing clinical practices; and
3) monitor, evaluate and review the approaches selected to optimize clinical practices.

The elements could be pursued separately or simultaneously, or components could be drawn from each element to create a new (fourth) element. They are presented separately to foster deliberations about their respective components, the relative importance or priority of each, their interconnectedness and potential of or need for sequencing, and their feasibility.

The principal focus in this section is on what is known about these elements based on findings from systematic reviews. We present the findings from systematic reviews along with an appraisal of whether their methodological quality (using the AMSTAR tool) (9) is high (scores of 8 or higher out of a possible 11), medium (scores of 4-7) or low (scores less than 4) (see the appendix for more details about the quality-appraisal process). We also highlight whether they were conducted recently, which we define as the search being conducted within the last five years. In the next section, the focus turns to the barriers to adopting and implementing these elements, and to possible implementation strategies to address the barriers.

Box 4: Mobilizing research evidence about elements of an approach to addressing the problem

The available research evidence about elements for addressing the problem was sought primarily from Health Systems Evidence (www.healthsystemsevidence.org), which is a continuously updated database containing more than 4,200 systematic reviews and more than 2,200 economic evaluations of delivery, financial and governance arrangements within health systems. The reviews and economic evaluations were identified by searching the database for reviews addressing features of each of the approach elements and sub-elements.

The authors' conclusions were extracted from the reviews whenever possible. Some reviews contained no studies despite an exhaustive search (i.e., they were "empty" reviews), while others concluded that there was substantial uncertainty about the element based on the identified studies. Where relevant, caveats were introduced about these authors' conclusions based on assessments of the reviews' quality, the local applicability of the reviews' findings, equity considerations, and relevance to the issue. (See the appendices for a complete description of these assessments.)

Being aware of what is not known can be as important as being aware of what is known. When faced with an empty review, substantial uncertainty, or concerns about quality and local applicability or lack of attention to equity considerations, primary research could be commissioned, or an element could be pursued and a monitoring and evaluation plan designed as part of its implementation. When faced with a review that was published many years ago, an updating of the review could be commissioned if time allows.

No additional research evidence was sought beyond what was included in the systematic review. Those interested in pursuing a particular element may want to search for a more detailed description of the element or for additional research evidence about the element.

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Element 1 – Support dynamic efforts to identify clinical practices to be optimized and the causes of underlying problems

Sub-elements of this element might include activities to:

- identify the clinical practices (e.g., inappropriate or low-quality care, negative patient experience, unacceptable/high cost, poor health outcomes) to be optimized based on:
    - explicit criteria (e.g., performance data that show a lack of improvement over time or a shortfall relative to peers) or divergence from evidence from systematic reviews or from guidelines; and
    - high-quality data and evidence, and systematically elicited tacit knowledge, views and experiences of key stakeholders (including patients);
- specify who needs to do what differently;
- ascertain the causes of the problem as it affects those who need to do things differently;
- engage key stakeholders to assess the first three bullets and identify the appropriate level (e.g., provincial, organizational) at which the problem should be considered (using qualitative or quantitative methods); and
- iteratively refine the understanding of the problem as necessary and select an optimal description of the problem, its causes, and the level at which it can most helpfully be considered

Engaging in the general process described by the sub-elements above could be achieved by using a systematic/structured approach to identify clinical practices to be optimized and by using iterative/theory-based approaches to identify the underlying causes of problems in those practices.

One possible systematic approach is conducting and then periodically updating a systematic review that identifies key areas of clinical practice that need to be optimized in the province. An example of this is an older high-quality systematic review that assessed the magnitude and the nature of clinical quality problems in general practice in the United Kingdom, Australia and New Zealand.(10) This could also be completed in tandem with a comprehensive, integrated checklist that was developed in a recent medium-quality review to identify factors that might prevent or enable improvements in clinical practice (or more generally, to identify the determinants of practice).(11) Based on 12 checklists that were identified in the review, an integrated checklist with 57 potential determinants of practice was developed (many of which include theory-based elements). The determinants of practice were grouped into the following seven domains:

- guideline factors (e.g., whether recommendations are based on strong evidence, feasible and appropriate);
- individual health professional factors (e.g., knowledge/skills, attitudes and behaviours);
- patient factors (e.g., patient needs, beliefs, knowledge, preferences, motivation and behaviour);
- professional interactions (e.g., communication and influence, team processes, and referral processes);
- incentives and resources (e.g., availability of resources, financial and non-financial incentives and disincentives, information systems, quality and safety monitoring systems, continuing education, and availability of assistance for clinicians);
- capacity for organizational change (e.g., mandate, authority, accountability and leadership); and
- social, political, and legal factors (e.g., economic constraints, contracts, legislation, payer or funder policies, and malpractice liability).

In addition to the checklist, five worksheets were developed as part of this review that are designed to support the development of tailored implementation strategies based on the areas identified as warranting targeted implementation efforts.(11)

Theory-based approaches are different in that they focus more on iteratively testing and refining an approach based on an existing theory (e.g., by drawing on theories related to behaviour change) to ensure it is attuned to the underlying causes of a problem. Several frameworks have been published related to the process of developing implementation interventions with the goal of changing behaviour. The Behaviour Change Wheel (12) and the Theoretical Domains Framework (13) are two well-known and extensively used frameworks in this area.

The Behaviour Change Wheel was developed through a recent medium-quality systematic review of 19 frameworks of behaviour change. The Behaviour Change Wheel is centred around a "behaviour system" that includes three essential conditions of: 1) capability (i.e., an individual's psychological and physical capacity to engage in a specified activity): 2) opportunity (social and physical factors that lie outside the individual that make a behaviour possible or prompt it); and 3) motivation (cognitive processes that energize and direct behaviour).(12) These three conditions of the behaviour system provide a basis for identifying underlying causes of a particular problem, and then for designing interventions that address areas where the need for behaviour change has been prioritized. Encircling this hub are nine groupings of interventions that could be used to address deficits in the three conditions, which are further encircled by seven policy activities that could be used to support the implementation of those interventions (see element 2 for more details about these activities).(12)

The Theoretical Domains Framework, which was developed through an expert consensus process and validation exercise, offers a process to identify relevant psychological and organizational theory to support clinical behaviour change at the individual level.(13;14) A recent application of this approach indicates that at the stage of identifying what needs to be changed, it is important to specify who needs to do what differently and assess the barriers and enablers that need to be addressed (i.e., ascertain the causes of the problem). The tasks used for specifying who needs to do what differently include:

1) identifying gaps between evidence and practice (using explicit criteria and high-quality data and evidence);
2) identifying the types of behaviours that need to change in order to reduce or eliminate the evidence-to-practice gap; and
3) specifying the health professional groups that need to change behaviour.(13)

Specific groups of tasks involved for ascertaining the cause of the problem can be time-intensive and include selecting theory(ies) and frameworks to identify possible pathways to change and likely barriers and enablers along the pathway, and then collecting data (quantitative and/or qualitative) to identify barriers and enablers. As another complementary framework outlines, causes of the problem could be at one or more of the following five levels:

1) motivation at the individual level (e.g., how knowledge, beliefs about capabilities and consequences, skills, memory, emotion and goals exert influence);
2) tasks at the individual or team level (e.g., how work routines and procedures function);
3) roles at the professional level (e.g., how responsibilities are assigned);
4) rules at the organizational level (e.g., how authority is allocated); and
5) strategies (e.g., how resources are allocated) at the system level (e.g., governance, financial and delivery arrangements).(15)

A key component of both structured/standardized and iterative/theory-based approaches is the need to first engage in a stakeholder-engagement process to specify who needs to do what differently, and to ascertain the causes of the problem. We identified one systematic review that assessed stakeholder-engagement processes for program evaluation,(16) and four reviews that evaluated public and consumer engagement processes.(17-20) The review about stakeholder engagement found limited research evidence about stakeholder involvement in program evaluation. However, the review did find that there was considerable overlap in the key features of stakeholder-engagement processes in the literature, and indicated that the methodological centrepiece of these processes is entering into collaboration with a collective willingness to participate and placing emphasis on the need to draw on the strengths of each member while respecting their unique positions and expertise.(16)

Of the four reviews about public and consumer engagement, two indicated that it can be helpful for improving the dissemination of information and processes for developing interventions, as well as for enhancing awareness and understanding among citizens.(18;20) However, all of the reviews indicated that the available evidence is limited and that it is difficult to draw firm conclusions about the benefits of particular public- and consumer-engagement processes.

A summary of the key findings from the synthesized research evidence is provided in Table 4. For those who want to know more about the systematic reviews contained in Table 4 (or obtain citations for the reviews), a fuller description of the systematic reviews is provided in Appendix 1.

Table 4: Summary of key findings from systematic reviews relevant to Element 1 – Identify the clinical practice to be optimized and the causes of the problem

Category of finding	Summary of key findings
Benefits	• **Engage key stakeholders to assess sub-elements 1-3** o An older high-quality review found some evidence that community engagement improves the dissemination of information and processes for developing interventions.(20)
Potential harms	• None identified
Costs and/or cost-effectiveness in relation to the status quo	• None identified
Uncertainty regarding benefits and potential harms (so monitoring and evaluation could be warranted if the option were pursued)	• Uncertainty because no systematic reviews were identified o **Identify the clinical practice to be optimized** ▪ No reviews specified benefits, harms and costs, but three provide descriptions of key features of approaches that could be used (see below). o **Specify who needs to do what differently** o **Ascertain the causes of the problem** o **Iteratively refine the understanding of the problem as necessary and select an optimal description of the problem, its causes, and the level at which it can most helpfully be considered** • Uncertainty because no studies were identified despite an exhaustive search as part of a systematic review o Not applicable • No clear message from studies included in a systematic review o **Engage key stakeholders to assess sub-elements 1-3** ▪ A recent medium-quality review indicated that while there is some evidence to support the developmental role of public involvement (e.g., for enhancing awareness and understanding among citizens), no clear conclusions can be drawn due to lack of clarity about what success looks like.(18) ▪ Another medium-quality but older review similarly found few studies that described the effects of involving patients in the planning and development of healthcare.(19)
Key features of the element if it was tried elsewhere	• **Identify the practice that needs to be optimized** o An older high-quality review used a systematic approach to assess the magnitude and the nature of clinical quality problems in general practice in the United Kingdom, Australia and New Zealand,(10) and similar reviews could be conducted and periodically updated in Ontario (or other jurisdictions) to identify areas of practice in the province that need to be optimized. o A recent medium-quality review outlined a structured approach to identify factors that might prevent or enable improvements in clinical practice through an integrated checklist and five worksheets designed to support the development of tailored implementation strategies based on the areas identified as warranting targeted implementation effort.(11) o The Behaviour Change Wheel, which was developed using a recent medium-quality review, supports the identification of behaviours associated with underlying causes of a particular problem and designing interventions to address areas where the need for behaviour change has been prioritized.(12) • **Engage key stakeholders to assess sub-elements 1-3** o Four reviews focused on public and consumer engagement. ▪ An older medium-quality review defined patient involvement as "the active

	participation in the planning, monitoring, and development of health services of patients, patient representatives, and wider public as potential patients."(19) ▪ An older high-quality review indicated that community-engagement activities used a variety of approaches, including convening community groups, committees and workshops, and engaging educators, champions and volunteers.(20) ▪ A recent medium-quality review about public involvement in healthcare policy found that key features of public involvement are poorly defined and rarely detailed.(18) ▪ A recent low-quality review outlined that having the potential to find common ground is a requirement for using public engagement to address issues, and that common goals include activities related to developing policy direction, recommendations and tools, priority setting, resource allocation and risk assessments.(17) ▪ The same review indicated that public-engagement processes include three broad characteristics: 1) a sponsor seeking input from the public; 2) participants considering an ethical- or values-based dilemma; and 3) provision of accurate and balanced information to participants about the dilemma.(17) o A recent medium-quality review indicated that there was considerable overlap in the key features of stakeholder-engagement processes in the literature, and found that the methodological centrepiece of stakeholder involvement is entering into collaboration with a collective willingness to participate and that draws on the strengths of each member while respecting their unique positions and expertise.(16)
Stakeholders' views and experience	• **Engage key stakeholders to assess sub-elements 1-3** o Case studies including project administrators' views about public engagement in the planning and development of healthcare in an older medium-quality review provided support to the view that patient engagement has contributed to changes in services.(19)

Element 2 – Use rigorous processes to select and implement approaches to optimizing clinical practices

Sub-elements of this element might include activities to:

- select candidate strategies and techniques (active ingredients – e.g., audit and feedback, procedure change, financial incentives, public reporting) based on a theoretical framework, research evidence and other inputs, and on an understanding of the issue and context;
- assess how the active ingredients are likely to function (causal mechanisms – e.g., increase knowledge, motivate, prompt) in relation to what's known about the issue and context;
- consider how, by whom and at what level the active ingredients could be delivered (mode of delivery – e.g., website, personalized email, electronic health record) in light of what's known about the issue and context;
- articulate what the active ingredients aim to change (intended targets – e.g., motivation, tasks, roles, rules, strategies);
- engage key stakeholders to assess the first four bullets and identify barriers and facilitators to the approach;
- iteratively revise the approach as necessary and select an optimal approach; and
- advocate for, recommend or implement a chosen approach that is appropriate to the issue and context (i.e., acceptable, affordable and feasible).

Many candidate strategies and techniques (active ingredients) and methods for delivering them to optimize clinical practice (i.e., provider-targeted implementation strategies) have been evaluated, and as of January 2015 there were 860 systematic reviews evaluating provider-targeted implementation strategies in Health Systems Evidence (www.healthsystemsevidence.org). While assessing these reviews is beyond the scope of this brief, a recent (non-systematic) review provides a summary of the results of the highest quality and most up-to-date systematic reviews produced by the Cochrane Effective Practice and Organizational Change (EPOC) group.(21) In Table 5 below we provide an overview of the key features identified for each of the eight strategies profiled in the review, which includes their causal mechanisms (based on those identified in the Behaviour Change Wheel described in element 1), mode of delivery, and intended targets.

This set of EPOC reviews found beneficial effects of optimizing clinical practice for educational materials,(22) educational meetings,(23) educational outreach visits,(24) local opinion leaders,(25) audit and feedback,(26) computerized reminders,(27) and tailored interventions.(28) While each of these interventions has been found to have positive absolute effects ranging from 2-12%, an older medium-quality systematic review found that combining them in multifaceted interventions does not result in increased effects on optimizing practice.(29) In addition, we also identified a recent overview of systematic reviews, which found that financial incentives were generally ineffective at improving compliance with guidelines.(30)

A notable finding across these reviews is that the absolute effect sizes are similar (from 2% to 12% improvements in outcomes), but have large distributions of observed effects. Given this, Grimshaw et al. suggest that the likely effects of interventions vary in relation to the degree to which the causal mechanisms of action for the intervention address the specific barriers identified.(21) This interpretation makes it even more essential to engage in the set of activities -- outlined in the description of the first element -- for diagnosing the underlying cause of the problem, and then selecting from the array of candidate strategies and iteratively refining and tailoring them to ensure the active ingredients, causal mechanisms, mode of delivery and intended targets are combined in a way that maximizes the impact. This interpretation is further supported by the Behaviour Change Wheel outlined in element 1, which indicates that "[a] given intervention might change one or more components in the behaviour system. The causal links within the system can work to reduce or amplify the effect of particular interventions by leading to changes elsewhere."(12) Furthermore, efforts to tailor interventions need to draw on the broader categories of interventions outlined in Table 5, but for those working at the programmatic level (as opposed to those making decisions about the overall direction), it will be important to draw on a more detailed taxonomy of 93 behaviour change techniques.(31)

Table 5: Key features of professional behaviour-change interventions (content for this table has been directly extracted from the summary of interventions presented in Grimshaw et al. 2012) (21)

Description of candidate strategy/technique (active ingredients)	Causal mechanisms*	Mode of delivery	Intended targets
Printed educational materials (22) • "Distribution of published or printed recommendations for clinical care, including clinical practice guidelines, audio-visual materials and electronic publications" • Commonly used, and relatively low cost and feasible	• Education • Training	• Delivered personally or through mass mailings	• Knowledge and potential skill gaps of individual clinicians • Motivation (when written as a persuasive communication)
Educational meetings (23) • "Participation of healthcare providers in conferences, lectures, workshops or traineeships" • Commonly used, main cost is for the release time for healthcare professionals, and generally feasible	• Education • Training • Persuasion	• Didactic or interactive meetings	• Knowledge (for didactic approach) or knowledge, attitudes and skills (for interactive approach) at the individual healthcare professional/peer group level
Educational outreach (24) • "Use of a trained person who meets with providers in their practice settings to give information with the intent of changing the providers' practice. The information given may have included feedback on the performance of the provider(s)" • Used across a wide range of healthcare settings, especially to target prescribing behaviours, and require considerable resources (including the costs of detailers and preparation of materials) • The detailer will tailor their approach to the characteristics of the individual clinician, and typically use additional provider behaviour-change strategies to reinforce their message	• Education • Training • Persuasion	• The detailer aims to get a maximum of three messages across during a 10- to 15-minute meeting with a clinician	• Knowledge and attitudes through a social-marketing approach (32) • Most studies of educational outreach have focused on changing relatively simple behaviours that are in the control of individual clinician behaviours, such as the choice of drugs to prescribe
Local opinion leaders (25) • "Use of providers nominated by their colleagues as 'educationally influential,' and the investigators must have explicitly stated that their colleagues identified the opinion leaders." • Colleagues identify different opinion leaders for different clinical problems,(33) and opinion leaders were not stable over time.(34) • Resources required include the costs of the identification method, training of opinion leaders, and additional service costs • Informal leadership is not a function of the individual's formal position or status in the system; it is earned and maintained by the individual's technical competence, social accessibility, and conformity to the systems norms	• Persuasion	• Opinion leadership is the degree to which an individual is able to influence other individuals' attitudes or overt behaviour informally, in a desired way, and with relative frequency • Opinion leaders have a unique and influential position in their system's communication structure; they are at the centre of interpersonal communication networks	• Knowledge, attitudes and social norms of the opinion leader's peer group, and the potential success is dependent upon the existence of intact social networks within professional communities

• As compared to their peers, opinion leaders have greater exposure to all forms of external communication, have somewhat higher social status and are more innovative			
Audit and feedback (35;36) • "Any summary of clinical performance of healthcare over a specified period of time" to change health professional behaviour, as indexed by "objectively measured professional practice in a healthcare setting or healthcare outcomes." • The resources required to deliver audit and feedback include data abstraction and analysis costs and dissemination costs • Feasibility may depend on the availability of meaningful routine administrative data for feedback	• Education • Persuasion • Enablement • Modelling	• Information extracted from medical records, computerized databases, or observations from patients • Summary of performance may include recommendations for clinical action and action planning	• Healthcare provider/peer groups' perceptions of current performance levels • Create cognitive dissonance within healthcare professionals as a stimulus for behaviour change (e.g., Adams and colleagues observed that healthcare professionals often over-estimated their performance by around 20% to 30%) (37)
Reminders (27) • "Patient- or encounter-specific information, provided verbally, on paper or on a computer screen…" • The resources required vary across the delivery mechanism, and there is insufficient knowledge at present about how to prioritize and optimize reminders • The majority of early studies on computerized reminders were undertaken in highly computerized academic health science centres in the United States, and their generalizability to other settings is less certain.(38)	• Environmental restructuring	• Provided on paper or on a computer screen (e.g., computer aided decision support and drugs dosage) • Reminders may be encountered through general education, medical records and/or interactions with peers	• Prompt health professionals to recall information and remind them to perform or avoid some action to aid individual patient care (39)
Tailored interventions (28) • "Strategies to improve professional practice that are planned taking account of prospectively identified barriers to change."	• Dependent on the composition of the tailored strategy	• Dependent on the composition of the tailored strategy	• Professional practice based on prospectively identified barriers to change
Multifaceted interventions (29) • Any intervention including two or more components and that potentially target different barriers in the system • Multifaceted interventions are likely to be more costly than single interventions, and when planning multifaceted interventions, it is important to carefully consider how components are likely to interact to maximize benefits.	• Dependent on the composition of the multifaceted strategy	• Dependent on the composition of the multifaceted strategy • Few studies provide any explicit rationale or theoretical base for the choice of intervention, and it is therefore unclear whether an *a priori* rationale based on possible causal mechanisms or an 'everything but the kitchen sink' approach is used for the choice of components in multifaceted interventions	• Professional practice (potentially based on prospectively identified barriers to change)

* Mechanisms listed in this column are based on those included in the Behaviour Change Wheel (12)

A summary of the key findings from the synthesized research evidence is provided in Table 6. For those who want to know more about the systematic reviews contained in Table 6 (or obtain citations for the reviews), a fuller description of the systematic reviews is provided in Appendix 2.

Table 6: Summary of key findings from systematic reviews relevant to Element 2 – Use rigorous processes to select and implement approaches to optimizing clinical practices

Category of finding	Summary of key findings
Benefits	• **Select candidate strategies and techniques (active ingredients) based on a theoretical framework, research evidence and other inputs, and on an understanding of the issue and context** o High-quality systematic reviews found absolute effect sizes related to optimizing practice ranging from 2%-12% for printed educational materials, educational meetings, educational outreach, local opinion leaders, audit and feedback, computerized reminders, and tailored interventions.(22-28)
Potential harms	• None identified
Costs and/or cost-effectiveness in relation to the status quo	• The costs associated with implementing the interventions can vary substantially with interventions such as printed educational materials costing substantially less than interventions such as educational outreach or audit and feedback. • While costs of interventions can vary substantially they need to be assessed in relation to the full chain of events from intervention, the resulting improvements in clinical practice, and the subsequent cost savings at the system level. For example, a cost-effectiveness analysis using this perspective for educational outreach found that it was cost saving with an approximate absolute effect of 5%.(40)
Uncertainty regarding benefits and potential harms (so monitoring and evaluation could be warranted if the option were pursued)	• Uncertainty because no systematic reviews were identified o **Iteratively revise the approach as necessary and select an optimal approach** • Uncertainty because no studies were identified despite an exhaustive search as part of a systematic review o Not applicable • No clear message from studies included in a systematic review o Not applicable
Key features of the element if it was tried elsewhere	• See Table 5 for a description of the key features of each of the candidate strategies and techniques profiled
Stakeholders' views and experience	• None identified

Element 3 – Monitor, evaluate and review the approaches selected to optimize clinical practices

Sub-elements of this element might include activities to:

- monitor the extent of implementation of the active ingredients and their uptake across different modes of delivery;
- (when resources allow) evaluate the impacts of the approach on its intended targets (effectiveness study), its costs and cost-effectiveness, the causal mechanism (process evaluation), and the views and experiences of those involved (acceptability study);
- review the approach based on monitoring and evaluation data to decide whether it should be stopped, modified or scaled up; and
- (where appropriate) commercialize an effective and efficient approach beyond Ontario.

While not directly relevant to this element, we found three systematic reviews related to quality-improvement interventions.(41-43) We also outline below the key components of the RE-AIM (Reach, Effectiveness, Adoption, Implementation, and Maintenance) framework (44), which has been used extensively to improve the sustainable adoption and implementation of effective, generalizable, evidence-based interventions.(45) A summary of the key findings from the synthesized research evidence is provided in Table 7, and a summary of the RE-AIM components and guiding questions is provided in Table 8. For those who want to know more about the systematic reviews contained in Table 7 (or obtain citations for the reviews), a fuller description of the systematic reviews is provided in Appendix 3.

Quality-improvement interventions may offer helpful insight about efforts to monitor, evaluate and review selected approaches given the overall focus of quality improvement on using a formalized and systematic approach to assessing performance and making changes to improve health outcomes, system performance, and professional development.(46) One older medium-quality review found that collaborative quality-improvement interventions contributed to improvements in processes of care, patient care and organizational performance.(42) Another older but low-quality review found that patient- or clinician-driven quality-improvement was more effective than approaches driven by managers or policymakers.(43) Lastly, an older medium-quality review found several contextual factors that were associated with quality improvement success, which include: leadership from top management; a supportive organizational culture; availability of data infrastructure and information systems; experience with or years involved in quality improvement; physician involvement; motivation to change; sufficient resources; and effective team leadership.(41) The same review noted that key limitations for quality improvement success were a lack of a practical conceptual model, a lack of clear definitions of contextual factors, and a lack of well-specified measures.(41)

The goal of the RE-AIM framework "is to encourage program planners, evaluators, readers of journal articles, funders, and policy-makers to pay more attention to essential program elements, including external validity, that can improve the sustainable adoption and implementation of effective, generalizable, evidence-based interventions."(47) In general, RE-AIM provides a starting point for systematically assessing the impact of programs and policies by facilitating the assessment of their reach, effectiveness, adoption, implementation and maintenance. Using information extracted from the RE-AIM framework, we provide in Table 8, the broad guidelines and questions to address when using the framework to assess the impact of interventions.(48) Collectively, these components can be used to assess impact at both the individual (i.e., end-user) and organizational (i.e., delivery agent) level (45) as part of a monitoring and evaluation plan to ensure that the impact of the selected and implemented approaches to optimizing clinical practices are optimized.

Table 7: Summary of key findings from systematic reviews relevant to Element 3 – Monitor, evaluate and review the approaches selected to optimize clinical practices

Category of finding	Summary of key findings

Benefits	• Monitor the extent of implementation of the active ingredients and their uptake across different modes of delivery
	  ○ Quality improvement
	  ▪ A medium-quality but older review found a positive effect for collaborative quality-improvement interventions on processes of care, patient care and organizational performance as a result of participation in a quality-improvement collaborative.(42)
	  ▪ Another review that was conducted recently but was of low quality found clinician/patient-driven quality-improvement interventions were effective, but that manager/policymaker-driven approaches were less effective.(43)
	  ▪ The same review also found that the most effective quality-improvement strategies included clinician-directed audit and feedback, decision support systems and the use of small-group discussions in continuing medical education.

Potential harms	• None identified
Costs and/or cost-effectiveness in relation to the status quo	• None identified

Uncertainty regarding benefits and potential harms (so monitoring and evaluation could be warranted if the option were pursued)	• Uncertainty because no systematic reviews were identified
	  ○ **(When resources allow) Evaluate the impacts of the approach on its intended targets, its costs and cost-effectiveness, the causal mechanism and views and experiences of those involved**
	  ○ **Review the approach based on monitoring and evaluation data to decide whether it should be stopped, modified or scaled up**
	  ○ **(Where appropriate) Commercialize an effective and efficient approach beyond Ontario**
	• Uncertainty because no studies were identified despite an exhaustive search as part of a systematic review
	  ○ Not applicable
	• No clear message from studies included in a systematic review
	  ○ Not applicable

Key features of the element if it was tried elsewhere	• **Monitor the extent of implementation of the active ingredients and their uptake across different modes of delivery**
	  ○ An older medium-quality review found several contextual factors that were associated with quality improvement success, which include: leadership from top management; a supportive organizational culture; availability of data infrastructure and information systems; experience with/years involved in quality improvement; physician involvement; motivation to change; sufficient resources; and effective team leadership.(41)
	  ○ Key limitations for quality-improvement success were a lack of a practical conceptual model, a lack of clear definitions of contextual factors, and a lack of well-specified measures.(41)

Stakeholders' views and experience	• None identified

Table 8: RE-AIM elements and questions to ask (*reproduced with permission from Gaglio and Glasgow 2012) (48)

RE-AIM element	Questions to ask
Reach • Percent and representativeness of participants	• Can the program attract a large and representative percent of the target population? • Can the program reach those most in need and most often left out?
Effectiveness • Impact on key outcomes, quality of life, unanticipated outcomes and sub-groups	• Does the program produce robust effects across sub populations? • Does the program produce minimal negative side effects and increase quality of life or broader outcomes?
Adoption • Percent and representativeness of settings and staff that participate	• Is the program feasible for the majority of real-world settings in terms of costs, expertise, resources, etc.? • Can it be adopted by low-resource settings and typical staff serving high-risk populations?
Implementation • Consistency and cost of delivering the program and any adaptation made	• Can the program be consistently implemented across program elements, different staff and over time? • Are the costs (e.g., personnel, upfront, marginal, scale up and equipment costs) reasonable and proportionate to effectiveness?
Maintenance • Long-term effects at individual and setting levels	• Does the program include principles to enhance long-term improvements (e.g., follow-up contact, community resources, peer support and ongoing feedback)? • Can the settings sustain the program over time without added resources and leadership?

Additional equity-related observations about the three options

The reviews we identified for each of the three elements did not provide specific observations related to clinicians working with limited infrastructure to support optimal practice (e.g., those working alone or in relative isolation professionally, working with limited or no staff to support practice optimization, and working with limited or no electronic health records). However, several implications can be drawn related to this group and the three elements of a comprehensive approach. For example, the first element requires sufficient data and high-quality evidence to identify the clinical practices to be optimized, and is therefore difficult to accomplish for clinicians working with limited infrastructure. Furthermore, without sufficient supports, including the views and perspectives of this group in stakeholder-engagement processes will also be challenging. For the second element, several of the interventions outlined would be challenging to implement for clinicians with limited infrastructure. For example, computerized reminders could not be implemented for those with limited or no electronic health records, and supporting an audit and feedback approach would be challenging for those with limited or no staff to support the intensive collation of documentation that would be required. However, while challenges exist, they further highlight the need to tailor interventions to the context in which they are being implemented, with interventions that require little investment of time and resources by the individual clinician (e.g., educational materials and/or outreach) being more likely to be implemented and achieve greater effects. That said, this also raises the issue of economies of scale and at what level an intervention should be designed and delivered. For example, the challenge of limited infrastructure for some could be addressed by using provincial-level administrative data to efficiently provide interventions such as audit and feedback. Similar challenges are faced for the third element as actively monitoring, evaluating and reviewing the selected approaches to optimizing practice will require consistent reporting on clinical practice from all of the intended targets, which would be more challenging for clinicians working with limited infrastructure (although provincial administrative data could also be used for this purpose as well).

IMPLEMENTATION CONSIDERATIONS

A number of barriers might hinder implementation of the three elements of a potentially comprehensive approach to optimizing practice based on data, evidence and guidelines, which needs to be factored into any decision about whether and how to pursue any given element (Table 9). While potential barriers exist at the levels of providers, organizations and systems (if not patients/citizens, who are unlikely to be aware of or particularly interested in the specifics of these approach elements), perhaps the biggest barrier lies in broadening the scope of practice optimization in Ontario beyond a competitive enterprise engaged in largely by researchers (which has contributed to these centres and initiatives being seen as global leaders) to include a complementary and more coordinated programmatic, sustainably funded, province-wide approach.

Table 9: Potential barriers to implementing the elements

Levels	Element 1 – Support dynamic efforts to identify clinical practices to be optimized and the causes of underlying problems	Element 2 – Use rigorous processes to select and implement approaches to optimizing clinical practices	Element 3 – Monitor, evaluate and review the approaches selected to optimize clinical practices
Patient/Individual	• Likely not visible to patients except for those systematically engaged in the prioritization process or the relatively small numbers of patients who attempt to influence the process to ensure it addresses their own needs		
Care provider	• Some care providers may resist the prioritization of clinical practices to be optimized	• Some care providers may resist particular approaches to optimizing clinical practices	• Some care providers may resist monitoring and evaluation, particularly if they involve public reporting
Organization	• Some groups and organizations may not have the staff to participate in the assessments	• Some groups and organizations may not have the staff to participate in the approaches • Some groups and staff may not have the key success factors in place (as outlined in the paragraph following the table)	• Some groups and organizations may not have the infrastructure to participate in monitoring and evaluation
System	• System leaders may not want to invest in a more coordinated programmatic approach	• System leaders may not want to invest in a more coordinated programmatic approach	• System leaders may not want to see centres and initiatives distracted by opportunities in other health systems

A recent low-quality review that assessed the sustainability of new programs and interventions found that partial sustainability was more common than the continuation of the entire program or intervention (even when full implementation was initially achieved).(49) The same review indicated that fidelity ratings used to assess sustainability at the care-provider level found that less than half sustained the program or intervention at high levels of fidelity, and proposed that fidelity-maintenance strategies are needed as part of implementation efforts. Such strategies could draw on the findings of a recent, medium-quality systematic review that identified the key success factors for implementation to be: "1) the organization and staff have planned for the initiative; 2) there are enough people with necessary and synergistic skills to implement the initiative; 3) there are capabilities and a receptiveness for change; 4) the chosen implementation [approach] meets needs and is the best fit for the organization and stakeholders; 5) the necessary human and financial resources are available for implementation; 6) there is support and momentum throughout the

implementation process; and 7) processes to support mid-to-long-term acceptance are established during preparation and anchored throughout the implementation process"(50)

On the other hand, a number of potential windows of opportunity could be capitalized upon (Table 10), which also need to be factored into any decision about whether and how to pursue one or more of the approach elements. These potential windows of opportunity include a growing focus on optimizing practice based on data, evidence and guidelines, and the openness of the leaders of Ontario's centres for expertise and small-to-medium-scale initiatives to contribute to a more coordinated, programmatic, sustainably funded, province-wide approach to practice optimization.

Table 10: Potential windows of opportunity for implementing the elements

Type	Element 1 – Support dynamic efforts to identify clinical practices to be optimized and the causes of underlying problems	Element 2 – Use rigorous processes to select and implement approaches to optimizing clinical practices	Element 3 – Monitor, evaluate and review the approaches selected to optimize clinical practices
General	• The Excellent Care for All Act provides a legislative impetus to optimizing practice based on data, evidence and guidelines (3) • A newly elected leader of the governing party and a relatively recently elected majority government provide an opportunity to introduce and institutionalize new approaches • The Premier's mandate letter to the Minister of Health and Long-Term Care explicitly states: "You will take the lead in ensuring that changes are informed by evidence — and that Ontario's precious health care dollars improve quality of care and health outcomes for patients and families."(51) • The newly appointed deputy minister has long championed both the use of research evidence and, in his role as Chair of the Ontario Health Innovation Council,(52) the commercialization of Ontario-supported innovations • Discussions continue (among the Ontario Ministry of Health and Long-Term Care, the Ontario Primary Care Council and the Physician Provincial Leadership Council, among others) about how to improve access, quality, integration and accountability in the primary care sector • The leaders of Ontario's centres for expertise and small-to-medium-scale initiatives are open to contributing to a more coordinated, programmatic, sustainably funded, province-wide approach to optimizing practice based on data, evidence and guidelines • As already outlined in the 'problem' section: o Health Quality Ontario intends to better connect its evidence synthesis work, which has historically focused on informing decision-making about technologies, and its quality-improvement work o The Ontario Strategy for Patient-Oriented Research (SPOR) Support Unit's operational management team and working groups (and its partner, the Health System Research Fund) have, for the first time in many people's view, brought together a broad diversity of the leads for key centres and initiatives with the aim of achieving greater coordination in conducting and supporting the use of patient-oriented research.		
Element-specific	• Capacity exists in many centres and initiatives to design and support such efforts	• Capacity exists and tools have been created in many centres and initiatives to support such processes	• Capacity exists at the Institute for Clinical Evaluative Sciences, among other centres, for such monitoring and evaluation

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APPENDICES

The following tables provide detailed information about the systematic reviews identified for each option. Each row in a table corresponds to a particular systematic review and the reviews are organized by element (first column). The focus of the review is described in the second column. Key findings from the review that relate to the option are listed in the third column, while the fourth column records the last year the literature was searched as part of the review.

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

The last three columns convey information about the utility of the review in terms of local applicability, applicability concerning prioritized groups, and issue applicability. The third-from-last column notes the proportion of studies that were conducted in Canada, while the second-from-last column shows the proportion of studies included in the review that deal explicitly with one of the prioritized groups. The last column indicates the review's issue applicability in terms of the proportion of studies focused on optimizing clinical practice.

All of the information provided in the appendix tables was taken into account by the evidence brief's authors in compiling Tables 5, 6 and 7 in the main text of the brief.

Appendix 1: Systematic reviews and economic evaluations relevant to Element 1 - Support dynamic efforts to identify clinical practices to be optimized and the causes of underlying problems

Sub-element	Focus of systematic review or economic evaluation	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that dealt with the prioritized group	Proportion of studies that focused on optimizing practice and policy
Identify the clinical practice (e.g., inappropriate or low-quality care, negative patient experience, unacceptable/ high cost, poor health outcomes) to be optimized	Development of a checklist for identifying determinants of practice (11)	The review identified 12 checklists focused on identifying determinants of practice, but none were found to be comprehensive as compared to an aggregated list of determinants and domains. The identified checklists were used to develop a checklist with 57 potential determinants of practice grouped in seven domains: guideline factors, individual health professional factors, patient factors, professional interactions, incentives and resources, capacity for organizational change, and social, political and legal factors. Five worksheets were also developed to facilitate the application of the checklists.	Not reported	4/9 (AMSTAR rating from McMaster Health Forum)	0/12	0/12	12/12
	Development of a method for characterizing and designing behaviour-change interventions (12)	Nineteen frameworks of behaviour-change interventions were identified and used to develop a new framework called the Behaviour Change Wheel. Of the frameworks identified, none assessed the full spectrum of behaviour-change interventions. At the centre of the Behaviour Change Wheel is the 'behaviour system', which consists of three essential conditions: capability, opportunity and motivation. The behaviour change system is encircled by nine interventions that can be used to address deficits in one or more of the elements of the behaviour system, and around these are seven categories of policy that can be used to enable the implementation of these interventions. The Behaviour Change Wheel was successfully used to characterize interventions within the English Department of Health's 2010 tobacco control strategy and the National Institute of Health and Clinical Excellence's guidance on reducing obesity.	Not stated	6/8 (AMSTAR rating from McMaster Health Forum)	Not applicable – the review included frameworks of behaviour change and not single studies (19 papers describing frameworks were included)	0/19	19/19
	Quality of clinical care in general practice in the U.K., Australia and New Zealand (10)	The majority (85%) of included studies assessed the quality of care provided for chronic conditions, and 12% and 2% examined preventive care and acute conditions, respectively. The processes of care in almost of all of the studies did not meet standards of	1999	8/10 (AMSTAR rating from McMaster Health	0/90	0/90	0/90

Sub-element	Focus of systematic review or economic evaluation	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that dealt with the prioritized group	Proportion of studies that focused on optimizing practice and policy
		care as outlined in national guidelines or in those set by the investigators. While the review outlines deficiencies in the research, and clinical and policy agendas in general practice, additional work is required to assess the quality of clinical care in a representative sample of the population, identify reasons for sub-standard care, and test strategies to improve the clinical care provided in general practice.		Forum)			
Specify who (i.e., what health professional group) needs to do what differently (i.e., what behaviour change)	No reviews identified						
Ascertain the causes of the problem at some or all of five levels (motivation, tasks, roles, rules and strategies)	No reviews identified						
Engage key stakeholders to assess sub-elements 1-3 and identify the appropriate level (e.g., provincial, organizational) at which the problem should be considered (using qualitative or quantitative methods)	Effectiveness of community-engagement approaches and methods for health promotion interventions (20)	There is little evidence on the effects of specific interventions on health promotion. Varying qualities of evidence suggest that interventions that engage the community improve the dissemination of information and the development of interventions. The review includes no evidence regarding the effectiveness of community-engagement approaches and methods for health-promotion interventions with regards to optimizing clinical practice. The evidence from one study suggests that community champions used in planning/design or delivery of health-promotion interventions can increase their level of knowledge, skills and confidence following training, and feel that they make the greatest impact in areas in which they have ownership and a stronger voice within their communities. The community-engagement approaches reviewed included the use of community groups, committees, educators, volunteers, workshops and champions. In addition, the community-engagement methods and approaches	Not reported (published in 2008)	9/10 (AMSTAR rating from McMaster Health Forum)	4/21	2/21	0/21

Sub-element	Focus of systematic review or economic evaluation	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that dealt with the prioritized group	Proportion of studies that focused on optimizing practice and policy
		focused on the planning, design and delivery of intervention(s) in areas of cardiovascular health, childhood immunization, injury prevention, sexual health, smoking, alcohol, nutrition and physical activity.					
	Examining the peer-reviewed empirical evidence on outcomes of public involvement in healthcare policy (53)	The outcome of public involvement in healthcare policies remains largely underdeveloped and poorly documented. There is little to no evidence for the longer-term impact demonstrated by public involvement. There is no clear conclusion on the effectiveness of policy development from involvement activities. The review includes no evidence regarding the effectiveness of public involvement with regards to optimizing clinical practice. There is some evidence for the developmental role of public involvement (e.g. enhancing awareness, understanding and competencies among lay participants), but the unclear definition of success impedes on forming a conclusion about public involvement. There is limited data available to address the primary research questions. The key features of public involvement remain poorly defined, and its objectives are rarely specified in the literature. Indicators used to determine outcomes of this form of intervention remain inconsistent and poorly specified.	2010	4/9 (AMSTAR rating from McMaster Health Forum)	5/19	0/19	0/19
	Examining the effects of involving patients in the planning and development of healthcare (54)	A review of 337 studies involving patients in the planning and development of healthcare found that few studies described the effects of involving patients in the planning and development of healthcare. The review defined patient involvement as "the active participation in the planning, monitoring, and development of health services of patients, patient representatives, and wider public as potential patients." Case studies reporting on project administrators' views about the impacts of patient engagement support the view that involving patients has contributed to changes to services. An evidence base does not exist for the effects on use of services, quality of care, satisfaction, or health of patients. The effects of patient involvement on accessibility and acceptability of services or impact on the satisfaction, health or quality of life of patients has not been examined. The effect of patient contributions to the planning and development of services on the quality and effectiveness of these services across various settings is unknown.	2000	5/9 (AMSTAR rating from McMaster Health Forum)	2/40	0/40	0/40

Sub-element	Focus of systematic review or economic evaluation	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that dealt with the prioritized group	Proportion of studies that focused on optimizing practice and policy
	Stakeholder involvement in program evaluation (16)	A review of 41 studies on the involvement of stakeholders in program evaluation consisted of reports of original research on stakeholder involvement, independent of actual evaluations, or reports of actual evaluations or meta-evaluations. There is a small percentage of studies reporting original research. Nearly half of the reviewed studies were set in health or education. The dominance of these disciplines suggests that stakeholder involvement is emphasized to a greater extent within these disciplines. Considerable overlap was found between the component and component features that the studies addressed, reflecting a conceptive commonality among researchers of stakeholder involvement. The component, *Affective Aspects of Involvement and Collaboration, Communication, and Interaction*, where parties "enter into collaboration with the appropriate degree of willingness to participate …draw on the strengths of each while respecting the positions and expertise of each other", reflects the methodological centre of stakeholder involvement. The review found very little research on stakeholder involvement in evaluation. The limited number of studies reviewed should not be taken to imply that stakeholder involvement has received little attention in the broader literature.	2010	4/9 (AMSTAR rating from McMaster Health Forum)	Not Reported	0/41	0/41
	Public deliberation as a method for increasing public input for health research (17)	Public deliberation is presented in the literature as a specific area of political science, and it encourages members of the public to engage in and be informed about issues that shape their public life. Evidence remains consistent in suggesting that public deliberation is a method of obtaining public input on decisions that are important to society. The goals of public deliberation are to obtain informed public opinion, to obtain input that includes under-represented individuals and groups, to bring insights into social values and ethical principles, and to promote the acceptance of public decisions. In addition, the effects of deliberation on participants improve understanding of the complexity of decisions and enhance civic-mindedness. Identified issues that are best suited for public deliberation involve ethical and social dilemmas. It is also important to note that the potential to find common ground is a requirement for issues addressed through public deliberation. Common deliberative tasks in healthcare include the development of policy direction, recommendations and tools, priority setting and resource allocation, and risk assessments. The process of public engagement is facilitated through discussion and prompts the public to develop solutions to societal problems posed to them. It includes	2010	1/9 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	Not reported

Sub-element	Focus of systematic review or economic evaluation	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that dealt with the prioritized group	Proportion of studies that focused on optimizing practice and policy
		three broad characteristics: a sponsor seeking input from participants (i.e., the public); participants considering the ethical- or values-based dilemma; and an information phase in which participants are given accurate and balanced information about the relative positions involved by way of educational materials, experts, etc.					
Iteratively refine the understanding of the problem as necessary and select an optimal description of the problem, its causes, and the level at which it can most helpfully be considered	No reviews identified						

Appendix 2: Systematic reviews and economic evaluations relevant to Element 2 – Use rigorous processes to select and implement approaches to optimizing clinical practices

Sub-element	Focus of systematic review or economic evaluation	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that dealt with the prioritized group	Proportion of studies that focused on optimizing practice
Select candidate strategies and techniques (active ingredients) based on a theoretical framework, research evidence and other inputs, and on an understanding of the issue and context	Effects of local opinion leaders on professional practice and healthcare outcomes (25)	Opinion leaders are individuals who are perceived as "likeable, trustworthy, and influential" and can aid and persuade healthcare providers to use evidence when treating and managing patients. The review found that local opinion leaders alone and local opinion leaders with audit and feedback were found to be generally effective for improving appropriate care behaviour (based on 40 and five randomized controlled trial (RCT) comparisons respectively). Multifaceted interventions that included the use of opinion leaders in addition to one or more interventions had mixed results for improving appropriate care behaviour (based on 10 RCT comparisons). Moreover, the effectiveness of opinion leaders varies both between and within studies that have different types of interventions, settings and outcomes measured. In most studies included in this review, the role of the opinion leader was poorly defined making it more difficult to optimize the effectiveness of these leaders. The use of a local opinion leader as the only intervention was evaluated in five studies. In 13 studies, local opinion leaders were supplemented by other interventions such as educational materials, outreach activities, audit and feedback, chart reminders, evidence summaries, seminars and lectures, and discussions. The time span of interventions ranged from one week up to 18 months. In most studies a description of the frequency of opinion leader involved was not provided. In most studies the opinion leader intervention was compared to no other intervention and therefore it is not possible to identify the best way to optimize the effectiveness of opinion leaders.	2009	10/10 (AMSTAR rating from McMaster Health Forum)	6/18	0/18 (all studies involved clinicians who do not fall under the prioritized group)	18/18
	Effects of continuing education meetings and workshops on professional practice and healthcare outcomes (23)	Educational meetings (e.g., courses, conferences, lectures, workshops, seminars and symposia) for physicians and other healthcare professionals, alone or combined with other interventions, improved professional practice and the achievement of treatment goals by patients. Seven of 81 studies targeted interventions for improving the detection of cancer, and these studies did not find any statistically significant impact of educational meetings on professional practice. The effects on professional practice and patient outcomes were small and	2006	10/11 (AMSTAR rating from McMaster Health Forum)	4/81	2/81	81/81

Sub-element	Focus of systematic review or economic evaluation	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that dealt with the prioritized group	Proportion of studies that focused on optimizing practice
		varied between studies. It appeared that higher attendance at meetings was associated with enhanced effects, that mixed education (interactive and didactic) was more effective than either alone, and that the effects were lower for more serious outcomes and complex behaviours.					
	Effects of on-screen, point-of-care computer reminders on processes and outcomes of care (27)	Coordinating the use of genetic testing and related services in B.C. computer reminders lead to a 4.2% median improvement in process adherence for all outcomes, 3.3% for medication ordering, 3.8% for vaccinations and 3.8% for test ordering. Generally, point-of-care computer reminders achieve small improvements in physician behaviour.	2008	9/11 (AMSTAR rating from McMaster Health Forum)	1/28	0/28	28/28
	Effectiveness of financial incentives in changing healthcare professional behaviours and patient outcomes (30)	The overview of systematic reviews included four reviews which reported on a total of 32 studies. Two of the reviews scored 7 (i.e., moderate quality) on AMSTAR criteria, and two scored 9 (i.e., high quality), and the quality of included studies was reported to be low to moderate. Payment for working for a specified time period was generally ineffective, improving 3/11 outcomes from one study reported in one review. Payments for each service, episode or visit, providing care for a patient or specific population, and providing a pre-specified level or providing a change in activity or quality of care, were all generally effective. Mixed and other systems were of mixed effectiveness. Assessing the effect of financial incentives overall across categories of outcomes, they were: of mixed effectiveness on consultation or visit rates; generally effective in improving processes of care; generally effective in improving referrals and admissions; generally ineffective in improving compliance with guidelines outcomes; and generally effective in improving prescribing costs outcomes. The authors concluded that financial incentives may be effective in changing healthcare professionals' practices, but did not find evidence that they improve patient outcomes. Financial incentives are utilized as extrinsic sources of motivation and work to provide individuals monetary transfers conditional upon them acting in a certain manner. The authors grouped financial incentives into five different categories: 1) payment for working for a specified time period; 2) payment	2010	No rating tool available for this type of document (overview of systematic reviews)	n/a (included systematic reviews as the unit of analysis)	Not reported	n/a (included systematic reviews as the unit of analysis)

Sub-element	Focus of systematic review or economic evaluation	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that dealt with the prioritized group	Proportion of studies that focused on optimizing practice
		for each service, episode, or visit; 3) payment for providing care for a patient or specific population; 4) payment for providing a pre-specified level or providing a change in activity or quality of care; and 5) mixed or other systems.					
	Whether different factors influence the effectiveness of educational outreach visits (EOVs), and whether adding another intervention to EOVs, such as the use of patient-mediated interventions or using manuals or computerized reminders to prompt clinicians to perform clinical actions, alters their effectiveness (24)	Educational outreach visits allow trained persons to visit clinicians where they practice and offer them information on how to change their practices to improve how they care for their patients. The information offered might include feedback about their performance, or could be based on how to overcome obstacles in changing behaviours. Multifaceted interventions that included educational outreach and distribution of educational materials and/or other intervention compared to a control group, compared to audit and feedback and compared to educational materials, were all found to be generally effective for improving appropriate care. Educational-outreach interventions used alone compared to a control group and compared to educational materials were found to be generally effective. There was insufficient evidence for comparisons of multifaceted versus educational meetings, educational outreach visits versus continuity of care, and multifaceted versus reminders. The authors concluded that educational-outreach visits alone or when combined with other interventions have relatively consistent and small effects on prescribing that are potentially important. The effects on other professional behaviours, however, appeared to be more variable. Additionally, the authors point out that while educational outreach visits may be costly, the savings may outweigh the costs if the intervention is targeted at inappropriate prescribing and its effects are enduring.	2007	8/11 (AMSTAR rating from www.rxforchange.ca)	1/69	1/69	69/69
	Effects of audit and feedback on professional practice and healthcare outcomes (35)	The audit and feedback process consists of an individual's professional practice or performance being measured and compared to professional standards or targets (i.e., auditing of professional performance). The results of this comparison are subsequently delivered to the individual in hopes of encouraging the individual to follow professional standards (i.e., providing feedback). The process is often used in combination with other interventions such as reminders or educational meetings, and is often used in healthcare settings. Most of the studies included in the review measured the effects of audit and feedback on physicians, and some measured the	2010	8/11 (AMSTAR rating from www.rxforchange.ca)	11/140	Not reported	140/140

Sub-element	Focus of systematic review or economic evaluation	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that dealt with the prioritized group	Proportion of studies that focused on optimizing practice
		effects on nurses or pharmacists. In all comparisons (audit and feedback alone compared to no other interventions, audit and feedback with educational meetings compared to no intervention, audit and feedback as part of a multifaceted intervention compared to no intervention, audit and feedback combined with complementary interventions compared to audit and feedback alone, and audit and feedback compared to other interventions) audit and feedback was found to be generally effective. However, the authors note that it is uncertain according to the evidence whether audit and feedback is more effective when used in combination with other interventions. Using multivariable meta-regression, the authors indicated that the effectiveness of feedback may increase when baseline performance is low, when feedback is provided more than once, when it includes both explicit targets and an action plan, when the source of feedback is a supervisor or colleague, and when it is delivered both verbally and in a written format.					
	Effects of printed educational materials on professional practice and healthcare outcomes (22)	Printed educational materials are utilized to improve healthcare professionals' knowledge, attitudes, skills and awareness to improve practice and patient outcomes. Common means of presentation include paper formats (e.g., monographs), publications in peer-reviewed journals, and clinical guidelines. The review focused on passive dissemination of printed educational materials, which involves the distribution of published or printed recommendations for clinical care (including monographs, publications in peer-reviewed journals, and clinical practice guidelines) being delivered personally or through mass mailing. Most of the printed educational materials utilized in the studies were endorsed, did not specify an educational component, were printed in black and white with a few tables and figures, and were longer than two pages. The systematic review included 45 studies (31 of which were interrupted time series analyses and 14 randomized controlled trials), and nearly all included studies (44/45) aimed to compare the effectiveness of printed educational materials to no intervention. When used alone and compared to no intervention, the review found that printed educational materials have a small beneficial effect on professional practice outcomes. However, the review indicated that there is insufficient information to reliably estimate the effect of printed educational materials on patient outcomes.	2011	8/11 (AMSTAR rating from www.rxforchange.ca)	12/50	Not reported	50/50

Sub-element	Focus of systematic review or economic evaluation	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that dealt with the prioritized group	Proportion of studies that focused on optimizing practice
		The authors also aimed to identify the influence of various characteristics of printed educational materials in determining the effectiveness of the intervention. It was noted that effectiveness may vary more according to: 1) source of information; 2) tailoring; 3) purpose; 4) level of evidence; and 5) format, and that effectiveness may not vary much based on the frequency, mode, or duration of delivery.					
	Guideline dissemination and implementation strategies (55)	86.6% of comparisons reporting dichotomous process data observed improvements in care; however, there was considerable variation in the observed effects both within and across interventions. No relationship was found between the number of component interventions and the effects of multifaceted interventions. Only 29% of studies reported any economic data. Within this subset, the majority of studies only reported costs of treatment, and only 25 studies reported data on the costs of guideline development or guideline dissemination and improvement. Overall, the methods of these economic evaluations and costs analyses were deemed poor. Authors emphasize that policymakers need this information about the costs and benefits of various guideline dissemination and implementation strategies in order to make informed decisions about whether it is worthwhile to introduce guidelines. Single interventions compared with no intervention: Reminders, audit and feedback, patient-mediated, and the distribution of educational materials were found to be effective for improving appropriate care with medium effect sizes. Time series data were reported for the distribution of educational materials, and half of the studies showed an immediate effect or effect over time. Insufficient evidence exists for educational meetings, other professional interventions (interviewing physicians about outpatient referrals, and a rapid rule-out protocol), continuity of care, and revision of pharmacy-related professional roles. Single interventions compared with another intervention - Insufficient evidence exists on three comparisons of single interventions compared with another intervention: physicians responding to reminders compared with reminders, educational materials compared with reminders, and reminders	1998	7/11 (AMSTAR rating from www.rxforchange.ca)	15/235	1/235 (1 study was set in a military medical clinic)	235/235

Sub-element	Focus of systematic review or economic evaluation	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that dealt with the prioritized group	Proportion of studies that focused on optimizing practice
		compared with patient-mediated interventions. Multifaceted interventions compared with no intervention were found to be effective for improving appropriate care with medium effect sizes. Time series data show that these interventions also have immediate effects, most of which are sustained over time. Multifaceted interventions compared with intervention controls were found to be effective for improving appropriate care with small effect sizes.					
	Effects of tailored interventions to address barriers to change in health professional performance (28)	Tailored interventions to change professional practice are interventions planned following an investigation into the factors that explain current professional practice and any reasons for resisting new practice. These factors are referred to as barriers to change. It was found that the selection of interventions tailored to prospectively identified barriers is more likely to improve professional practice than no intervention or than dissemination of guidelines or educational materials alone. The overall effectiveness of such interventions, as indicated by the meta-regression, is modest. However, there is wide variation in effectiveness between studies and between the targeted behaviours within single studies, from lack of effect to relatively large effect. There is currently insufficient evidence on the most effective approaches to tailoring, including how barriers should be identified and how interventions should be selected to address the barriers. There is also no evidence about the cost-effectiveness of tailored interventions compared to other interventions to change professional practice. As such, authors recommend that it is reasonable to employ low-cost tailored interventions in practice, but that evidence on the cost-effectiveness of the alternative methods of tailoring is needed to justify the use of more costly tailored approaches. In 13 studies, more than one method was used to identify barriers. These methods include interviews with health professionals and occasionally patients (n= 11), focus group interviews (n=10), questionnaire surveys (n=6), review of the literature (n=4) in four, review of performance data (n=2), a meeting or workshop (n=2), and other methods including observation and consultation with an expert group (n=4). Some studies employed a variety of methods. The depth of investigation of barriers was	2009	7/11 (AMSTAR rating from www.rxforchange.ca)	2/26	0/26	26/26

Sub-element	Focus of systematic review or economic evaluation	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that dealt with the prioritized group	Proportion of studies that focused on optimizing practice
		categorized as low in six studies, moderate in 13, and high in seven. Studies reported barriers in the following EPOC domains: administrative concerns (n=13), clinical uncertainty (n=9), patient expectations (n=5), information management (n=3), sense of competence (n=2), financial disincentives (n=2), and other (n=15). Barriers in the 'other' category included negative staff attitudes, anxiety about changing practice, a perception that the clinical issue was not a priority, and advocacy of certain drugs by pharmaceutical companies. In terms of the influence of prospective identification of barriers on intervention design, six studies reported drawing on behavioural theory to guide the choice of strategies in response to the identified barriers. The other 20 studies made no reference to any theoretical foundation when developing interventions.					
Assess how the active ingredients are likely to function (causal mechanisms)	No reviews identified (see overview in Table 5)						
Consider how the active ingredients could be delivered (mode of delivery)	No reviews identified (see overview in Table 5)						
Articulate what the active ingredients aim to change (intended targets)	No reviews identified (see overview in Table 5)						
Engage key stakeholders to assess sub-elements 1-4 and identify barriers and facilitators to the approach (using qualitative or quantitative methods)	See reviews summarized in appendix for the sub-element related to engaging stakeholders						
Iteratively revise the approach as necessary and select an optimal approach	No reviews identified						

Sub-element	Focus of systematic review or economic evaluation	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that dealt with the prioritized group	Proportion of studies that focused on optimizing practice
Advocate for, recommend or implement a chosen approach -- active ingredients, causal mechanisms, mode of delivery and intended targets -- that is appropriate to the issue and context (acceptable, affordable and feasible)	No reviews identified						

Appendix 3: Systematic reviews relevant to Element 3 – Monitor, evaluate and review the approaches selected to optimize clinical practices

Sub-element	Focus of systematic review or economic evaluation	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that dealt with the prioritized group	Proportion of studies that focused on optimizing practice
Monitor the extent of implementation of the active ingredients and their uptake across different modes of delivery	Contextual factors associated with quality-improvement (QI) success (41)	The review revealed that the current body of work is in the early stage. Common factors that were used in studies to relate to QI success include organizational characteristics (e.g., size, ownership, teaching status), leadership from top management, competition, organizational culture, years involved in QI and data infrastructure. Factors that were consistently examined to be associated with QI success, but reported less frequently, include board leadership for quality, organizational structure, customer focus, physician involvement in QI, microsystem motivation to change, resources and QI team leadership. Researchers state that current research suffers from conceptual ambiguity and methodological weaknesses. As a result, they could not make definitive conclusions about the influence of specific contextual factors in QI success. This review included studies that examined the association between contextual factors and success in the setting of a healthcare QI initiative. Authors define QI as "systematic, data-guided activities designed to bring about immediate, positive changes in the delivery of health care." In terms of organizational setting, included studies were based in inpatient clinics (57%), nursing homes (21%), outpatient clinics (9%), both inpatient and outpatient clinics (6%), and other settings (6%). In terms of particular QI success measures, included studies examined the extent of implementation of QI practices (32%), perception of success or improvement (40%), adoption of Total Quality Management (15%), superior organizational performance or outcome (11%), pre/post process or outcome changes(19%), and other (2%).	2009	7/10 (AMSTAR rating from McMaster Health Forum)	4/48	Not reported in detail	Not reported in detail
	Effectiveness of various quality-improvement strategies for enhancing healthcare (43)	This review sought to assess the published literature assessing the relative effectiveness of various quality-improvement strategies (QIS) as applied to patients with medical conditions in the setting of formal clinical studies. Systematic reviews of controlled trials were selected in determining effect sizes for specific QIS, which were compared as a narrative meta-review. Research evidence suggests clinician/patient-driven quality-improvement strategies are more effective compared to manager/policymaker-driven approaches. However it must be noted that manager/policymaker-driven	2008	2/11 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported in detail	Not reported in detail

Sub-element	Focus of systematic review or economic evaluation	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that dealt with the prioritized group	Proportion of studies that focused on optimizing practice
		approaches have, in many cases, attracted inadequate rigorous evaluations to accurately determine their comparative effectiveness. The most effective quality-improvement strategies included clinician-directed audit and feedback, decision support systems, clinical practice guidelines, specialty outreach programs, chronic disease management programs, and the use of small-group discussions in continuing professional education.					
	Effectiveness of quality-improvement collaboratives in enhancing the quality of care (42)	The review included nine controlled trials, which found a moderate positive effect of quality-improvement collaboratives on processes of care and patient outcomes. This review additionally examined the findings of 60 uncontrolled reports, of which 53 trials indicated specific improvements in patient care and organizational performance due to participation in a quality-improvement collaborative. Several of the reports demonstrated dramatic improvements (i.e., 30 to 80%), but most of these uncontrolled reports were found to be methodologically weak and were likely biased in favour of positive findings. A quality-improvement collaborative intervention brings together multidisciplinary teams from various healthcare departments or organizations to allow them to collaborate for several months in a structured working environment with the aim of improving the provision of their care. They are being used increasingly in countries such as Australia, Canada, the United Kingdom and the United States. Quality-improvement collaboratives have been used in various clinical areas and organizational contexts, and within both large and small healthcare systems.	2006	4/11 (AMSTAR rating from www.rxforchange.ca)	Not reported in detail	Not reported	69/69
(When resources allow) Evaluate the impacts of the approach on its intended targets (effectiveness study), its costs and cost-effectiveness, the causal mechanism (process evaluation) and views and	No reviews identified						

Sub-element	Focus of systematic review or economic evaluation	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that dealt with the prioritized group	Proportion of studies that focused on optimizing practice
experiences of those involved (acceptability study)							
Review the approach based on monitoring and evaluation data to decide whether it should be stopped, modified or scaled up	No reviews identified						
(Where appropriate) Commercialize an effective and efficient approach beyond Ontario	No reviews identified						

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