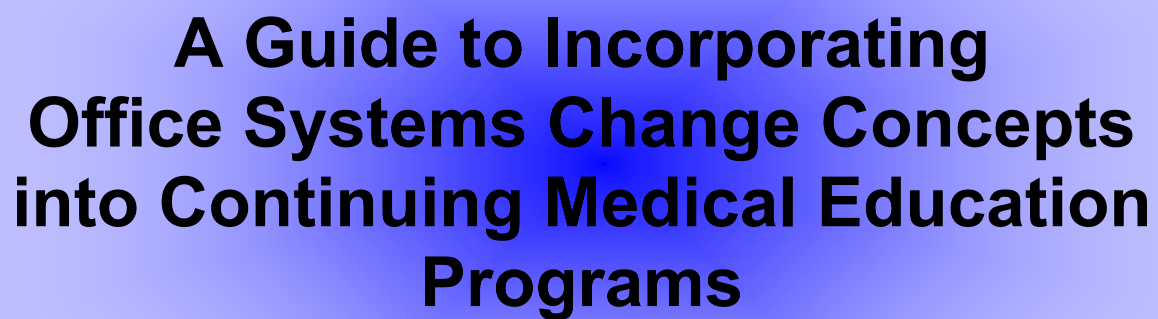

A Guide to Incorporating Office Systems Change Concepts into Continuing Medical Education Programs

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TABLE OF CONTENTS

		Page
Executive Summary		1
Background		2
Section 1:	Key Concepts in Office Systems Change	4
Section 2:	Key Determinants of Successful Office Systems Change	8
	• Systematic change process	9
	• Other determinants	12
Section 3:	CME Instructional Design Strategies to Promote Office Systems Change	14
	• Differences between traditional and systems-change CME	16
	• Instructional design options for systems-change CME	17
	• Introducing systems change concepts into other types of programs	20
Section 4:	CME Office Issues Related to Systems Change CME	22
Summary		25
References		27
Appendix 1:	Factors that interact to affect the ability of physicians to change their office systems	31

Executive Summary

Gaps between the evidence of best practice documented in the literature and its implementation in practice can compromise patient health outcomes and safety. Systematic reviews of the literature suggest that traditional single-method CME approaches involving lectures or mail-out of clinical practice guidelines are ineffective at promoting uptake of evidence into practice. The recently introduced concept of knowledge translation recognizes the important role that office systems play in helping physicians use evidence-based information in an efficient way to improve patient health outcomes. A key concept in knowledge translation is the use of multi-faceted educational interventions that address a variety of factors which influence how evidence is used in practice. Office systems that are in place within a practice are one factor that should be considered. Systems change CME integrates clinical content with information about systems of care within which clinical knowledge is used. For example, changing office systems has improved preventive care (e.g. vaccination, cancer prevention) and management of chronic diseases such as asthma. Systems change CME also often includes content related to change management.

This Guide is intended to give CME program developers and providers some background information about office systems change that helps explain why single method CME programs are unlikely to be effective in encouraging practice change. It also makes some recommendations for designing small-group CME programs that are explicitly intended to support clinical knowledge translation through office systems change. Note that while systems change concepts can be raised and promoted in other CME settings (e.g. large group conferences, small group programs where systems change is not an explicit program outcome), effective office systems change is most likely to occur in a small group program that is explicitly designed for that purpose. The focus of the recommendations is on the design of interactive short courses for small groups of physicians, rather than large conference-style programs.

The Guide is organized into four major sections:

- **Section 1** introduces key concepts in office systems change to establish why this is an important target for CME activities
- **Section 2** summarizes key determinants of successful office systems change that have been reported in the literature. The most important appears to be use of a systematic change management strategy.
- **Section 3** presents some instructional design options for small-group CME programs that are intended to help physicians make changes in their office systems. A comparison of traditional with office-systems change CME is provided in this section.
- **Section 4** addresses CME office issues related to developing and running systems-change CME programs

Key Concept:

- Systems change CME integrates clinical content with information about systems of care within which clinical knowledge is used to promote integration of best evidence with efficient patient management

Background

Gaps continue to exist between the evidence of best practice documented in the literature and its implementation in practice.[1] This may lead to under use, overuse or misuse of medical treatments which can compromise patient health outcomes and safety.[1]

Traditional approaches to changing patient care typically use a single method (e.g. traditional, lecture-style CME or mail out of clinical practice guidelines) and focus on only a few factors perceived to be of greatest importance by the group designing the intervention.[2] Literature reviews have repeatedly shown that single-method CME interventions are ineffective at promoting uptake of evidence into practice.[3] This is not surprising because uptake of evidence is affected by characteristics of the research evidence, as well as a complex interplay of barriers and facilitators to change at the level of the patient, physician, practice system and wider health care environment.[4] In part this may also be related to a mismatch between the outcome measures chosen to evaluate the effectiveness of a CME program and design of the program. Programs that are designed to disseminate information or promote implementation of new knowledge will not necessarily result in sustainable changes in practice.[5]

The concept of knowledge translation recognizes that to optimize patient care physicians need both evidence-based information and the support of an effective office system to help them use information efficiently.[1] A systems perspective has been advocated more broadly in making reforms to health care.[6] This requires taking a broad view of all possible contributing factors to less-than-desirable health outcomes.[8] Standard-setting organizations in the United States began advocating for improvement of health care quality through health systems improvements in the late 1980's. In the late 1990's the issue of health care quality and improvement, and practice-based learning for improvement of systems-based practice was recognized as an important direction for CME and subspecialty organizations (e.g. ACGME, ABMS, AAFP).[6,7] In Canada, the CanMeds competencies developed by the Royal College of Physicians and Surgeons in 1996 do not explicitly identify systems thinking as an outcome of specialist training. However this is implicit the description of the roles of manager and health advocate.[9] In 2003, the concept of knowledge translation was introduced to CME. It broadened the scope of CME to encompass efforts to change systems, both at the practice level and in the wider environment.[1] Systems-based CME encourages physicians to consider a wide variety of factors that affect health outcomes for their patients and seek solutions integrated into the processes of care that make it easy for everyone (physician, staff, other health professionals, patients) to do the right thing.[2,8] Supporting assessment and redesign of physician office systems is an important component of systems-based CME and knowledge translation efforts.

Key Concept:

- to optimize patient care physicians need both evidence-based information and the support of an effective office system to help them use information efficiently

- Systems-based CME encourages physicians to consider a wide variety of factors that affect health outcomes for their patients and seek solutions integrated into the processes of care that make it easy for everyone (physician, staff, other health professionals, patients) to do the right thing

Purpose of this Guide

This Guide is intended to give CME program developers and providers some background information on office systems change. It also offers practical suggestions for designing interactive CME short courses that will support knowledge translation through office systems change. Note that while systems change concepts can be raised and promoted in other CME settings (e.g. large group conferences, small group programs or workshops) where systems change is not an explicit program outcome, effective office systems change is most likely to occur in a small group program that is explicitly designed for that purpose.

This Guide is based on a review of key literature related to office systems change. Wider health systems change, while also a part of knowledge translation, is beyond the scope of this document. The program design suggestions included in the Guide have not been empirically tested to confirm their effectiveness but are based on recommendations gathered from the CME and practice systems change literature.

Section 1: Key Concepts in Office Systems Change

What are "office systems"?

- Organized series of interrelated activities in the practice to consistently address patients' care needs
  - integrate clinician and staff roles, responsibilities and tools (e.g. charts, flow sheets, computerized records)[10,11,12]
  - related terms: practice systems, care management processes, processes of care[13,14]
- Office systems are often integrated with other systems or processes of care outside the office, and liaison with external resources or systems may need to be considered when defining all the components of an office system

Why are office systems needed?

- Office systems help the clinician and office staff "do the right thing" to ensure desired patient outcomes are achieved and maximize patient safety [8]
  - medical errors often result from flawed processes rather than lack of knowledge, skill or good intentions [15]
  - effective systems of care can help prevent medical errors caused by lapses (omissions); incorporating decision support systems can assist in preventing mistakes (choice of wrong rule or misapplication of a rule)[15]
- Lack of a systematic, organized approach to patient care is considered to be a threat to patient safety[15] and a factor in low compliance with recommendations for both preventive services[11,12] and effective management of chronic diseases[16,17]

Do all practices need to have the same office systems?

- No - office systems must be tailored to specific practice needs
- Office systems and care processes are influenced by factors such as staffing patterns in the office, different types of care provided (e.g. preventive, acute, chronic, end-of-life care) and transitions between them, patient transitions between the office and care resources in the community, and specific needs of the patient population.[14,20]
- Office systems and care processes may also be affected by practice organization e.g. solo practice, group practice, practices working under alternative reimbursement models (e.g. capitation), clinics associated with a hospital or university

Key Concept:

- Office systems are the interrelated series of clinician and staff roles, tasks and tools that are used in a practice to address patient's care needs in a consistent, organized manner.

Why is office systems change important?

- Literature reviews suggest that traditional continuing medical education (CME) methods aimed at improving a physician's clinical knowledge and skills have only a modest and variable effect on patient care.[3] This is probably because many factors influence a physician's actions and contribute to patient care outcomes. (Appendix 1)[1,4]

- Studies have shown that educational programs aimed at changing office systems are more effective than traditional CME alone in changing patient care outcomes, particularly when they use multiple interventions that include traditional CME approaches (e.g. lectures)[3]

- Studies show that changing office systems can improve adherence to recommendations for preventive care (e.g. vaccination, cancer screening)[11, 12] and improve management of chronic illness such as diabetes and asthma[17,18,19]

What are some related concepts?

- **Quality improvement:** improvement of processes associated with providing a service that meets or exceeds the user's expectations[21]
    - differs from traditional quality assurance methods primarily in the emphasis on understanding and improving underlying process and systems rather than on trying to correct individuals' mistakes after the fact [21]

- **Total quality management** is closely related to quality improvement[21]

- **Practice-based learning and improvement** uses continuous quality improvement methods to encourage the use of current medical evidence in both decision-making and care delivery[7]

What affects the ability of physicians to change their office systems?

- A complex interplay of factors affects the ability of physicians to make changes to their clinical habits and office systems (Appendix 1)

- Four main domains of factors are common to all models of practice and clinical systems change: patient factors, physician factors, office/practice system factors, and wider environment factors (Figure 1)[5,13,14,15,16,20,21,22,23,24,25,26,27,28]
    - **Patient factors**: characteristics of the patient that influence their decisions to seek care, participate actively in their own care, and follow the recommendations of the health care team e.g. age, gender, culture, education level, health knowledge, disease-related factors (Appendix 1)
    - **Physician factors**: characteristics of the individual provider that influence the patient care decisions that he/she makes e.g. beliefs, attitudes, motivation, knowledge, financial resources, time (Appendix 1)

Key Concept:

- Studies show changing office systems can improve adherence to recommendations for preventive care and improve management of chronic illness.

- **Office system/practice system factors**: characteristics of the office systems in which physicians practice (Appendix 1)
  - includes factors related to other staff and health professionals that directly contribute to the care of a patient within a practice
  - typically there are multiple interacting care processes within an office system
  - complexity of the system and related care processes may be determined by the organization of practice e.g. solo practitioner, group practice, alternative reimbursement practices, clinic within a hospital system or group of practices
- **Wider environment factors**: characteristics of the environment outside the practice which can influence care and alter a practice's resources and capabilities, including values and beliefs of both health care providers and patients e.g. health care system, reimbursement systems, public policy, availability of community resources for patients, financial incentives, access to specialists (Appendix 1)

➤ Studies of the diffusion of innovations in health care suggest that factors related to the proposed change itself can also affect the success of its uptake[5,28] e.g. relevance to practice, compatibility with existing systems, modifiability, ease of use, complexity (Appendix 1)

➤ Within each domain, factors can be grouped according to whether they are: [14,26]

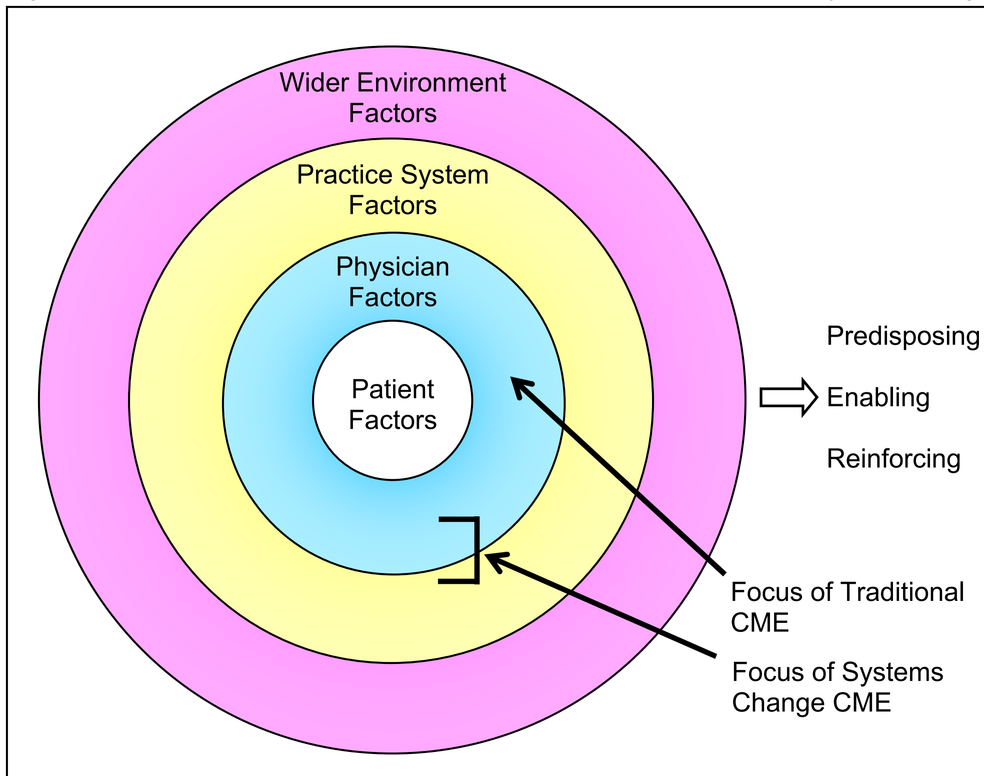
- **Predisposing**: provide motivation to perform a particular behavior
- **Enabling**: required to perform a behavior
- **Reinforcing**: support or reward a behavior

➤ Appendix 1 summarizes predisposing, enabling, and reinforcing factors to consider both when defining a target office system or process, and when designing CME programs

Key Concept:

-A complex interplay of factors in 4 main domains affects the ability of physicians to make changes in their clinical habits and office systems: patient, physician, office/practice system, wider environment factors

Figure 1. Domains of factors common to all models of practice and clinical systems change*



*Factors of greatest importance are widely variable between situations, and are influenced by practice setting, clinical area, medical condition

How are these factors relevant to CME program design?

- Traditional CME programs typically focus on changing physician factors, usually the enabling knowledge and/or skill

- Systems change CME targets a broader range of physician factors simultaneously with practice system factors, and often includes information on change management strategies
  - CME programs that include multiple educational strategies and physician supports are required to address the broad scope of factors that will affect physicians' change efforts
  - when designing a strategy for promoting systems change (e.g. CME program) attempt to identify factors in each domain most likely to affect successful implementation, and try to accommodate them in the strategy[28]
- Patient and wider environment factors can be targeted with more complex multi-faceted change interventions[3]; this is beyond the scope of this Guide

Key Concept:

- Systems change CME targets a broader range of physician factors simultaneously with practice system factors, and often includes information on change management strategies

Section 2: Key Determinants of Successful Office Systems Change

There is a considerable body of literature in the area of practice systems change, including evaluative and descriptive studies, that illuminates some of the factors associated with successful and sustained office systems change (Table 1). Of these, the most important appear to be physician leadership, successful teamwork in the practice, and the use of a systematic change management strategy. [10,11,12,30,31,32,33,34] While a systematic change strategy is more likely to be successful than a less structured approach, some of the other factors can make a difference even if the full systematic change strategy outlined below is not used. In particular, leadership and commitment from physicians in the practice are essential regardless of the strategy used.

Table 1. Key determinants of successful office systems change

Leadership
Teamwork
Systematic change management strategy
Multifaceted interventions
External facilitation/coaching
Tailored solutions
Adequately developed resource materials
Electronic medical record/clinical information system tools
Sound practice environment & supportive culture
Patient involvement
Integrating improvement activities into regular work

What is the role of leadership?

- visionary, committed leaders and administrative support are essential for successful systems change[5,12,14,16,21,31,34,38,39]
  - within health care organizations that support primary care practices[14,21,34]
  - within the practice
    - physician champion - essential to provide ongoing motivation for change, allocate time and resources to the change process, and provide clinical expertise[12,34,39]
    - staff leader - works with physician champion, oversees tests of new innovations, helps define new roles for staff, and encourages staff to persist with system changes[31,34,38]

What is the role of teamwork?

- teamwork is important in both the processes of care in the office and the change process
  - team approach to care, involving several types of staff, is more efficient than physician-dominated systems of care
    - when defining care processes, develop explicit roles and responsibilities for all staff11,14,31,38

Key Concept:

- The most important key determinants of successful office systems change appear to be physician leadership, successful teamwork in practice, and the use of a systemic change management strategy.

- involving all staff in practice change efforts creates buy-in, motivation and commitment to change – staff should be involved in:
  - initial assessment of readiness to change, values, beliefs regarding target care process[31,33,36,38]
  - developing goals and standards of care for the practice[11]
  - helping redesign systems, defining new patient care roles they will be involved in, and designing tools they will be using[12,38,40]
- regular staff meetings focused on systems improvement facilitate communication and consensus development, and provide ongoing peer support for all staff[33,38]

What is meant by a systematic change strategy?

- Successful office systems change initiatives typically include intentional activities in each of three main areas: planning, implementation and evaluation/revision (Figure 2)
  - **Planning**
    - identify and describe the process of interest
    - identify staff who should be involved in the project
    - set performance goals for outcomes of the process
    - assess current (baseline) performance
    - identify possible solutions for improvement
  - **Implementation**
    - test changes on a small scale (e.g. a few patients) and refine (rapid-cycle PDSA) to a workable solution – repeated cycles often needed
    - Implement workable changes on a larger scale (e.g. all patients)
  - **Evaluation & revision**
    - reassess performance after full implementation
    - revise processes as necessary to meet performance goals

How feasible is a systematic change strategy in a busy practice?

- A complete quality improvement process such as that used by the Institute for Healthcare Improvement (IHI) Collaboratives program [31,34,35] is a very complex and time-consuming process, and is demanding of both individuals and organizations[21]
  - IHI uses a peer support network and participation in a structured change process that relies on a rapid-cycle PDSA (Plan-Do-Study-Act)[34,35,37]
    - promotes testing changes on a small scale and revising until a workable solution is found that can be implemented practice-wide
    - emphasizes measurement to determine performance at baseline, during test cycles, and after implementation[34,35]

- A committed practice undertaking a small project can be successful with a few hours of clinician and staff time spread over several weeks or months when using a simplified process, such as the "Preventive GAPS Approach"[32]
  - "Preventive GAPS Approach" is a 4-step process that was developed to help offices make changes in their preventive care processes: **G**oal-setting, **A**ssessment, **P**lanning, **S**tart-up (implementation)[32]

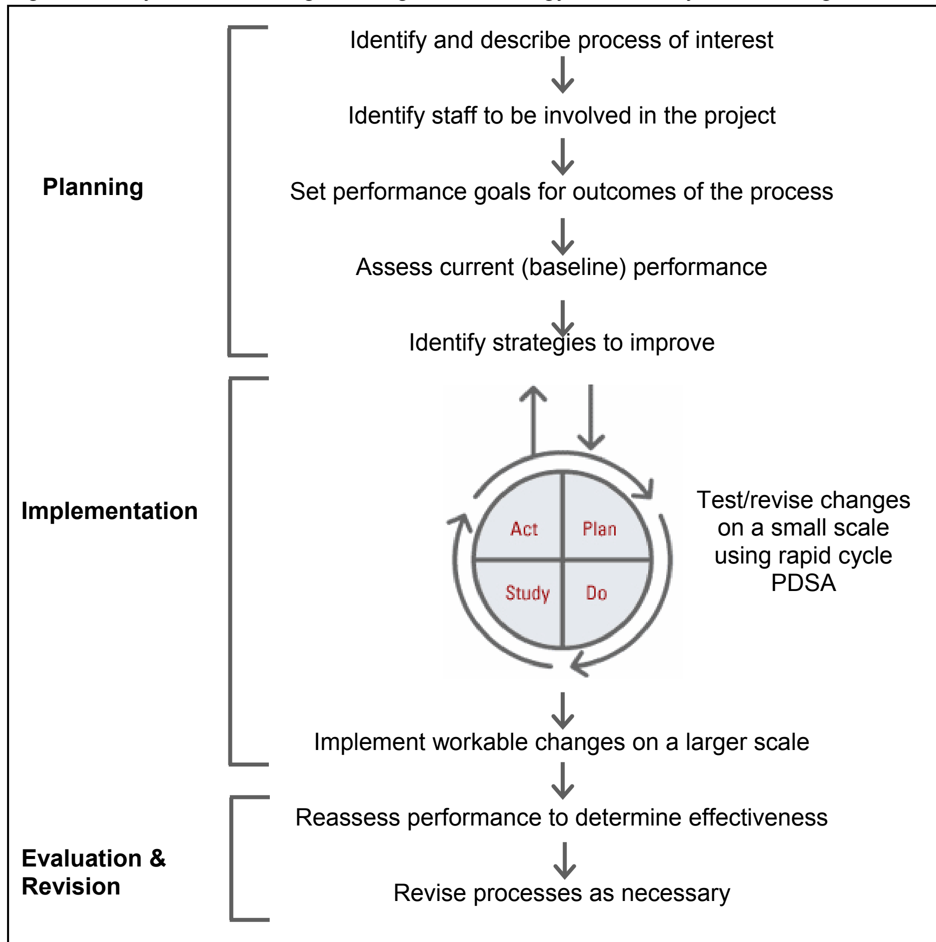
Key Concept:

- A systematic change strategy includes planning, implementation and evaluation activities.

- Committed practices can successfully complete small systems change projects with a few hours of staff and clinician time spread over several weeks or months.

- Some practices may be unable to change using any method or process[32]

Figure 2. Systematic change management strategy for office systems change



What is involved in the planning phase?
All of the following activities should be accomplished to some extent, but need not take a lot of time[32]. It is particularly important to describe the process of interest so that potential improvement strategies can be identified.

- **Identify and describe process of interest** [15,21,34,35]
  - select a target office and/or care process to be addressed and describe each step of the process, who is involved, and what tools are used
  - emphasize processes related to clinical conditions and/or patient care activities that are important to the practice and that offer the greatest opportunity for success[21]
    - small, easy-to-handle project in an area that particularly needs improvement is recommended for "first-time" systems change initiatives [33]
    - some flexibility in allowing each office to select the process of greatest interest or need is recommended
  - staff members should be involved in selecting and/or describing the target process – practice assessment tools may help[36]

Key Concept:

- Clearly describing the system or process of interest – who, what, where, when, how – is a critical step in planning for systems change.

- **Identify staff to be involved in the project** [12,30,33,34,35]
  - include at least one staff member familiar with and/or involved with all the different parts of the target process
  - in small practices all staff may be involved. Teamwork is another key determinant of successful office systems change (Table 2).

- **Set performance goals for outcomes of the process**[11,12,30,32,33,36,37]
  - establish desired standards that are appropriate for the practice i.e. "what are we trying to accomplish?"
  - evidence-based practice guidelines are often promoted as a desired standard, however compromises may be required to adapt to the demands of the practice[11,31]
  - aims should be time-specific, measurable (e.g. numerical), and specify the patient population affected[34,35]

- **Assess current (baseline) performance**
  - some measurement of performance before, during and after the change intervention is strongly recommended in order to assess progress and success – "where are we now/how far have we come?"[34,35,37]
  - type of data to be collected and data sources will depend on the area, process and goals of performance
    - e.g. chart reviews, critical incidents, patient surveys or interviews, discussions within staff about who does what and when, analyse clinic flow/processes e.g. patient flow analysis [11,15 32,36]
  - performance measurement (baseline and follow-up) is the step most often omitted or poorly/incompletely performed[33]

- **Identify strategies to improve**
  - identify activities, processes, and supporting tools that can be used to address gaps between current and desired level of performance[11] i.e. "what changes can we make that will result in improvement?"[12,30,33,34,35]
    - tools alone without supporting processes are ineffective – consider when tool will be used, who will use it
    - centrally-developed tools and processes should be customized to needs of the practice[12,30,31]

What is involved in the implementation phase?

- **Test changes on small scale and refine before practice-wide implementation**
  - rapid-cycle PDSA (Plan, Do [try it], Study [observe results], Act [revise as necessary]) helps organizations move past the planning stage by encouraging small-scale testing of possible solutions and revising to develop a workable solution [11,12,30,34,35,37]
  - measures and data sources used to assess baseline performance can be used to determine how effective the change is in a small number of test cases[34,35]

Key Concept:

- After describing the process, identify activities, processes and supporting tools that can possibly improve outcomes of the process.

- **Implement workable changes on a larger scale**
  - staged approach to wide-scale implementation is recommended e.g. implement for one type of patient, one physician etc. then spread to entire organization[34,35]

What is involved in the evaluation phase?

- **Reassess performance to determine effectiveness of the change**
  - repeat measures used in baseline assessment to determine how effective the change is in wide-scale implementation[11,15,25,33,34]

- **Revise processes as necessary**

What are some other key determinants of successful office systems change?

- **Multifaceted interventions** – systems change interventions that include multiple strategies are more likely to be effective than those that rely on a single strategy [3,19,21,40,41,43,44]
  - include strategies to facilitate learning by all staff about clinical best practices, effective quality improvement processes, and new office processes as they are implemented [11,12,30,45,46]

- **External facilitation/coaching**
  - provides positive reinforcement/external motivation for change - e.g. upcoming meeting with facilitator motivates task completion[31,39,40]
  - provides support and serves as a resource during all stages of the change process[12,19,46]
  - helps develop change expertise in the practice and avoid loss of performance associated with "train the trainer" models[12,30,33,36]
    - physicians and staff leading the practice change initiative need to be educated about the change process regardless of whether an external facilitator is provided[12]
  - in absence of external facilitation, team leaders with systems change experience are helpful[12]

- **Tailored solutions** – solutions tailored to the needs of the practice and designed to become incorporated into the day-to-day office routine are more likely to be sustained than standardized interventions that are applied the same way in all practices[5,20,32,47]
  - each practice should prioritize their own performance goals, based on existing guidelines[11,30,31,32]
  - adapt routines, forms, best practice examples from other sites and the literature to the needs of the practice[36,38,39,47]

- **Adequately developed content/resource materials** – multifaceted programs typically provide both supplementary educational materials and supplementary tools[12,29,30,36, 39,43,44,45,48,49,50]
  - educational materials alone are insufficient to change systems[12,47]
  - tools should be designed to be adaptable to the needs of each site[30,32,36,47,48]

Key Concept:

- Some measurement of performance before, during and after the change is recommended to assess progress and success.

- Successful systems change initiatives typically include multiple educational strategies are supported with external coaching encourage solutions tailored to the needs of the practice, and provide supplementary tools and resources that practices can adapt to their needs

  - tools alone are not sufficient to change a practice – must develop specific processes by which tools will be used (who does what with the tool and when) then train staff to use them[11,22,50]

- **Electronic medical record (EMR) / Clinical information technology systems (CITS) tools** – recommended to improve access to and management of clinical information[13,16,21,38], however successful office systems change can occur in paper-based offices[11]
  - support care management processes e.g. recall lists, reminders, access external sources of information e.g. labs[13,25,16,38,39,40]
  - electronic decision support e.g. integrated guidelines and tools to promote use of best evidence such as medication ordering reminders[13,38,40]
  - assist with data collection in assessing current and changed practice[5,16,38]

- **Sound practice environment and supportive culture –** change is more likely with:
  - practice culture that emphasizes openness, collaboration, teamwork, learning from mistakes[5,21]
  - systematic and efficient office procedures, positive working relationships and communication among staff[39]
  - period of relative practice stability with low staff turnover, changes in practice business arrangements[12,32]

- **Patient involvement** – consider ways to involve patients in the systems change process
  - survey patients about their experience as part of baseline and/or follow-up data collection[31,32,33,48,51]
  - consider system changes that educate patients about process and standards of care (e.g. CPGs), use patient reminder systems[32,38]
  - proposed new office systems should take into account social (e.g. literacy, language skills) and cultural factors in the patient population[39]

- **Make time for improvement activities; integrate improvement activities into regular work**
  - significant progress can be made with 1-2 hours of clinician time and a few hours of office staff time spread over several weeks or months[32]
  - establish regular staff meetings to discuss quality improvement[33]
  - improvement work should be seen as part of the office routine, not as an extra burden or special project[35,38]

Section 3: CME Instructional Design Strategies to Promote Office Systems Change

There are a variety of ways in which instructional designers and CME providers can enhance the design of CME programs to promote office systems change. One option is to design a program that is explicitly intended to help participants make changes in their office systems. The other option is to include content about office systems change where appropriate in programs designed for other purposes.

Note that effective change is most likely to occur in small group programs that are explicitly designed for that purpose. The most important characteristic of these systems change-focused CME programs is that they are multi-faceted. They should include practice-based activities before and after the CME course. These programs are usually costly and time-consuming to develop and run. Table 2 illustrates the differences between systems change and traditional CME programs.

Table 2. Differences between traditional and systems-change CME programs

Element	Traditional CME	CME with a Systems Change Focus
Content focus	Delivering clinical information and encouraging integration with current clinical knowledge	Integration of clinical content with information about systems of care and/or content related to change management
Target audience	Primarily MD	Multidisciplinary, involving all office staff, is strongly encouraged
Format	Typically large or small group educational meetings	Usually small-group multifaceted programs, including educational meeting(s), practice-based activities, interaction with external coach, peer support
Pre-program activities - purpose	Needs assessment: encourage reflection on current practice to identify potential gaps in knowledge, skills and attitudes in key clinical content areas	Practice assessment: encourage reflection on systems of care in the practice which influence how clinical knowledge is used and/or organizational culture of the practice that will affect ability of the practice to change systems
Pre-program activities - options	May occur prior to course or at beginning of course – Self-assessment of clinical knowledge – Self-assessment of attitudes and usual practice behaviors – "Virtual Needs Assessment" – Chart audit to document actual practice	Usually occurs prior to the first group meeting – Practice assessment survey focused on systems of care, organizational culture and/or readiness to change – Patient surveys or interviews – Flow studies of office systems – Chart audit or other measurement activity to document baseline performance

Key Concept:

- Systems change CME programs incorporate multiple educational strategies of which educational meetings are only a small part. Practice-based activities before and after the CME course are essential to encourage change implementation.

Element	Traditional CME	CME with a Systems Change Focus
Program activities	– Mini-lectures – Case-based discussion focused on using clinical content in a patient context – Role playing e.g. MD-patient communication – Simulations, hands-on activities – Video presentation illustrating a target skill – Question & answer session – Commitment to change exercise	– Mini-lectures – Case-based discussion focused on systems of care, roles of different staff in a patient's care – Role-playing e.g. interprofessional communication – Video presentation illustrating some aspect of the system – Systems mapping exercise – Systems strategies brainstorming – Consensus process on practical standards of care – Systems change planning
Follow-up activities - purpose	Extends learning, reinforces key messages, promotes reflection and encourages integration of new clinical knowledge into practice	Encourages ongoing commitment to implementing the systems change plan; may provide assistance with change efforts, tool redesign, staff education
Follow-up activities - options	Optional component of traditional CME programs. Typically consists of a single follow-up activity, which is usually self-directed and optional for the participant – Commitment to change follow-up – Self-directed practice audit – Self-directed learning activity	Essential component of systems change CME programs. Often facilitated, multi-faceted and recurring – Change plan follow-up by coach or facilitator – Assistance in change efforts by external facilitator or coach – Practice audit to evaluate change efforts – Audit and feedback to allow practices to compare their results with those of others – Academic detailing – Peer support – information exchange with others involved in the systems change program
Supplementary educational materials	– Printed handouts/workbooks – Key references and/or copy of latest CPG	– Printed handouts/workbooks – MD materials: key references, copy of latest CPG, guidelines summary – Staff materials: QI process manual, "menu" of office systems options to consider, newsletters – Patient materials: educational pamphlets, videos/DVD, suggested web resources, newsletters
Supplementary tools	– MD tools e.g. algorithms, pocket cards, decision aids	– MD tools (paper, PDA, Internet) e.g. algorithms, pocket cards, decision aids, risk assessment tools, exercise or prevention prescription pads – Staff tools: patient data collection forms, chart flow sheets, chart stamp/sticker, patient surveys/interview forms, patient interview scripts, examples of patient communications, referral forms or form letters – Office tools: posters/banners, list of recommended equipment or devices, – Patient tools: diaries, self-assessment tools, reminder cards/letters, decision aids

What are the key differences between traditional and systems change CME?

- Differences in the content focus, target audience, format, and need for supplementary tools are particularly important.
  - **Content focus:** Systems change CME integrates clinical content with information about systems of care within which clinical knowledge is used. In addition, systems change programs usually contain content related to change management to help promote improvement in systems of care within a practice.
  - **Target audience –** Multidisciplinary education is strongly encouraged. All office staff who will be involved in implementing and using new office systems should be included.
  - **Format –** Systems change CME typically has multiple components, of which educational meetings are only a small part. Much of the learning involves practice-based strategies to encourage implementation of planned changes.
  - **Supplementary tools –** Supplementary tools are materials that can be integrated into systems of care to make it easy for those involved (clinicians, staff, patients) to "do the right thing".

- Differences between systems change and traditional CME programs impact the choice of instructional design strategies in programs intended to promote office systems change.

When should a systems change-focused CME program be considered?

- CME programs explicitly intended to help physicians make changes to their office-systems are time-consuming and costly to develop and run. They also require a significant commitment on behalf of participants, both in terms of attendance at formal program activities, and completion of informal but crucial practice-based activities.

- A CME program explicitly designed to promote knowledge translation through practice systems change might be considered when:
  - Needs assessment indicates that physicians already have adequate knowledge but significant practice system barriers prevent them from offering improved services to patients
  - Practice system issues are known to contribute to suboptimal care and evidence exists that improvement in office systems will result in better patient outcomes. Relative advantage and financial feasibility of the improved system should be demonstrable.[5, 35]
  - Examples of high-performance systems are available that can serve as models.[35]
  - A tool has been developed to improve application of knowledge in practice. Redesign of systems or processes is usually required to accommodate effective use of a new tool, especially if the tool is to be used by office staff or patients.

Key Concept:

- Because CME programs that are explicitly intended to promote systems change are resource intensive to develop and run, they are most suitable for situations where the benefits of systems change are demonstrable.

What are some instructional design options for systems change-focused CME programs?
A full systems change CME program typically has five components:

- **Pre-course activities** – reflective activity focused on office systems usually is done prior to the first group educational meeting
- **Educational meeting** – usually a small group, interactive program
- **Post-course activities** – activities that encourage planning and implementation of revised office systems; when a coach or external facilitator are involved, they may also provide direct support to the practice with planning and implementing change, tool redesign, and staff education
- **Supplementary educational materials** – materials that help extend learning beyond the group educational component of the program
- **Supplementary tools** – materials that can be integrated into systems of care to make it easy for those involved (clinicians, staff, patients) to "do the right thing".

Recommendations for CME short course design[52] are relevant to the design of systems change CME programs. Instructional design options for each program component are outlined below.

- **Pre-course activities**[11,12,31,32,33,35,39,43,44,46,47,48,49,51]
  - **Needs assessment** – a typical CME needs assessment encourages participants to reflect on their current practice and identify gaps in their clinical knowledge, behaviours, and skills – should be supplemented with a practice assessment (see below)
  - **Practice assessment –** encourages reflection on systems of care in the practice which influence how clinical knowledge is used and/or organizational culture of the practice that will affect the ability of the practice to implement systems change; external facilitation may be provided to do this
    - Practice assessment survey – all staff should be involved
    - Patient surveys or interviews to gather information on patient experience in the office
    - Flow studies of office systems
    - Chart audit or other measurement activity to document baseline performance on key indicators
- **Activities during the course**[3,12,19,30,31,33,39,44,49]
  Course activities should encourage participants to reflect on how their office systems affect patient care and begin planning for office systems change. They should also help participants understand key characteristics of the desirable system or process, and give them an opportunity to discuss how it would affect them personally[5]. It is important to address predisposing factors relevant to the proposed

Key Concept:

- A systems change CME program typically includes a pre-course reflective activity, a small group educational event, follow-up practice-based activities to encourage change implementation and supplementary resources and tools.

- A practice assessment encourages reflection on systems of care in the practice and/or the organizational culture of the practice that support effective patient care

system change to provide motivation to consider a change. Two or more of the following activities are suggested.

- **Mini-lectures –** about systems that support effective clinical care and/or about change management
- **Case-based discussions** – focused on systems of care and roles different staff or health professionals can play in a patient's care
- **Systems mapping exercise –** identify all staff a patient interacts with and the nature of the interaction, tools used to support the interaction, flow of information involved in meeting a patient's care needs including how patient accesses external resources
- **Systems brainstorming activity –** identify different office systems strategies that can be used to achieve desired clinical outcomes (because different offices will use different systems, participants can learn from one another)
- **Consensus process –** participating MDs review current guidelines, identify and agree on 5 to 8 key elements that have the greatest potential effect on patient care if they were consistently followed, identify key clinical outcome measures for each, and key systems strategies options for each
- **Role-playing** – related to changing roles of office staff in patient management e.g. interprofessional communication to improve patient care
- **Video presentation** – e.g. illustrating some aspect of a desirable system of care
- **Systems change planning –** participants identify an area for improvement in their practice, set goals for desired level of practice appropriate to their office, select measures to assess level of performance, note ideas for systems change, make plans for what to do when back in practice
  - Very effective if other office staff in addition to the physician are involved
  - Usually done at the end of the program as a transition activity that extends learning into the practice – similar to a commitment-to-change exercise

Key Concept:

- Course activities should encourage participants to reflect on how their office systems affect their ability to apply best evidence in clinical decision making and begin planning for systems change.

- Post-course practice based activities are necessary to encourage participants to follow through with planned changes. Coaching, peer support, or follow-up meetings are often needed.

- **Follow-up activities**[12,19,30,31,33, 35,39,40,43,44,45,46,47,48,49,50,51,53]
  - **Change plan follow-up** – coach or facilitator contacts participant to discuss progress with the change plan (see above), identify and resolve barriers, encourage change efforts
    - support can be provided in a small group with other participants, or by personal follow-up either on-site or by phone
    - systems change is a prolonged process so multiple follow-ups at 3 – 4 month intervals may be needed
  - **Facilitated change efforts –** external facilitator may provide support to the change process
    - technical support for systems change e.g. provide materials, assist with tools or forms redesign
    - assist with change management e.g. developing goals and change plans, implementation, monitoring

    - assist with educating staff on planned changes
- **Practice audit –** measurement data identified as part of the change plan is collected by practice staff at intervals and compared to baseline for self-assessment of progress
- **Audit and feedback** – measurement data provided by the practice is collated externally and provided back to the practice so that they can compare their progress with that of other practices involved in the same systems change program
- **Academic detailing/educational outreach** – mini-lectures by an external resource to practice MDs and/or staff on topics related to the practice change initiative
    - project staff, key opinion leaders or educationally influential colleagues
- **Peer support** – change leaders at each site (MD and/or designated staff leaders) exchange information with others involved in the same systems change program
    - face-to-face meetings
    - teleconferences
    - e-mail listserv
    - contribute to regular newsletter describing progress in different practices

Supplementary educational materials[12,19,30,31,33,35,40,41, 43,45,46,47,48,49,50]

Some of these materials may already exist and some may have to be developed specifically for the program. Existing materials can be located using literature and/or Internet searches or by contacting professional organizations.

- Printed handouts, workbooks
- Audit tools – chart or practice audit materials to encourage objective assessment of office systems at baseline and change implementation follow-up
- Key clinical references e.g. copy of latest practice guideline, guideline summary, protocols
- Change management resources e.g. quality improvement process manual, list of office systems options to consider, newsletters
- Patient educational resources e.g. educational pamphlets, videos/DVDs, recommended web resources, sample newsletters

Supplementary tools[12,19,30,39,41,43,45,46,47,48,49,50]

Tools can be informational only, encourage data recording, or support decision-making. Some tools may already exist, others may have to be developed specifically for the program. Existing tools can be sourced using the Internet, contacting professional organizations, or by contacting authors of published papers or demonstration projects on office systems change.

- **Clinician tools** e.g. algorithms, pocket cards, decision aids, risk assessment tools, exercise or prevention prescription pads
    - paper, PDA and/or Internet formats
- **Staff tools** e.g. patient data collection forms, chart flow sheets, chart stamp/stickers, recall system, patient surveys/interview forms, scripts for patient phone or office interviews, examples of patient reminder

Key Concept:

- Supplementary tools are materials that can be integrated into the process of care to make it easy for those involved (clinician, staff, patients) to “do the right thing”.

letters, referral forms or form letters e.g. to connect patients with external resources or arrange for specialist consultation
  - include instructions on how to use tools effectively
- **Office tools** e.g. posters/banners/wall charts, list of recommended equipment or devices, list of external resources with contact information
- **Patient tools** e.g. diaries, self-assessment tools or worksheets, questionnaires, reminder cards or letters, patient-oriented decision aids (e.g. decisionaid.ohri.ca/decaids.html)

How can systems change concepts be introduced into other types of CME courses?

- If a full systems change CME program is not feasible, there are ways that program designers can raise awareness of the importance of office systems in integrating new knowledge into practice. At this "precontemplative" stage, addressing predisposing factors that affect motivation to change is particularly important. Participants will need to be convinced that the office system has a significant impact on patient care, that a new system is compatible with their unique practice characteristics, and that it is achievable within the constraints (especially time, financial, and staff-related issues) they face in their practice.

- Options for raising awareness of the need to change office systems or processes include:
  - Incorporate practice systems-related questions into pre-course needs assessments, then follow-up with content related to the impact of office systems on application of emerging evidence in practice
  - Include brief information about supportive practice systems in a primarily clinical presentation
  - Include discussion activities that ask participants to consider office systems in their practice that support or are barriers to application of new clinical knowledge
  - Include discussion activities that ask participants to share examples of office systems that make it possible for them to integrate new clinical guidelines and expectations for care into their practice
  - Incorporate a discussion of supportive office systems into case presentations, including how to access or use other resources (e.g. office staff, other health professionals, resources in the community) to improve patient outcomes
  - Encourage participants to think about changes that can be made to their office systems during the commitment-to-change activity at the end of a program
  - Design practice audit tools as course follow-up activities to help physicians identify and reflect on office systems

Key Concept:

- If a full systems change CME program is not feasible, consider including activities in the course to raise awareness of the importance of office systems in integrating new knowledge into practice

What are some other interventions that can be used to support systems change CME?

- Factors beyond a physician's direct control often influence their ability to use new evidence in their practice or provide a desired level of patient service. These factors may need to be addressed in other ways in order

to support physicians' efforts to optimize their office systems and care processes.[2]

- **Organizational interventions** – interventions at the health system level may encourage and support systems change efforts at the practice level e.g. changing payment structures to reward practices for implementing systems shown to improve patient care, publicly released "scorecards", requiring reporting on quality of care data[13,21,31,35,44,45,51]
- **Patient-mediated interventions** – interventions directed at patients that encourage them to take a more active role in their health care and prompt physicians to provide key services[16,38,39,45,48,54]

Key Concept:

- Factors beyond a physician's direct control often influence their ability to provide a desired level of patient service. These may need to be addressed in other ways in order to support physician's efforts to optimize their office systems.

Section 4: CME Office Issues Related to Systems-Change CME

CME is a system itself which interacts with physicians and attempts to influence their practice behaviors.[55] This system tries to assess what physicians know (or don't know), provide education to address these needs in a variety of formats, and attempts to evaluate outcomes of the educational programs. Changes within the CME system are required to promote office systems change as an approach to knowledge translation.

Specifically, systems-change CME requires CME offices, providers and developers to take a broad perspective on what is needed to help physicians integrate new knowledge into their practice. Physicians should be viewed as one part of a complex system, rather than as the main determinant of how new knowledge is translated into practice.[55] In addition to updates on new clinical information, physicians need information on other factors, including their systems of care, which influence how information is used. By considering wider system influences on physician decision-making in designing programs, providers can help physicians recognize the important role that practice system factors play in their ability to apply emerging evidence to improve patient outcomes. CME providers can also promote systems change by collaborating with health care organizations who initiate, support and monitor health care quality improvement projects.[55]

Here are some factors to consider when planning for a CME program that includes office systems change-related content:

- **Conducting a general needs assessment**
  - general needs assessments that are used to plan program content should include a means to gather information related to office systems and other factors that influence how target clinical knowledge is used in practice – lack of clinical knowledge is rarely the sole factor in underutilization of evidence in practice[4]
    - national needs assessments focused on systems of care could help guide key systems-change messages of a number of organizations[55]

- **Establishing a budget**
  - Consider the desired level of change, from simple awareness of the role office systems play in using new knowledge to improved patient care through sustained adherence to planned change[56]
    - higher desired levels of change will require a more complex, multi-faceted and long-term program that will be more costly to develop and run

- **Establishing a planning committee**
  - include expertise on the planning committee from the major disciplines involved in the process of interest
  - try to identify and include physicians who have an interest in systems change, and preferably high-performing office systems in place for the process of interest

Key Concept:

- Systems-change CME requires CME offices, providers and developers to take a broad perspective on what is needed to help physicians integrate new knowledge into their practice. Physicians should be viewed as one part of a complex system, rather than as the main determinant of how new knowledge is translated into practice

Developing program objectives

- state program outcomes that are realistic and consistent with the amount of time, effort and budget that will be invested in developing the program, as well as the time frame over which the program can/will be delivered
  - sustained office systems change is a long-term project for most practices and typically requires multiple educational interventions over time

Developing program content

- identify literature demonstrating improved patient outcomes associated with systems change in the area of interest
- create a menu of options for an effective office system that will achieve the desired outcomes
  - gathered from the literature and from other organizations, practices or research units
- locate or design supporting tools that could be used as part of an improved office system
- locate or develop supporting educational materials that participants can refer to during practice-based activities
- include content related to psychosocial, organizational and financial considerations relevant to implementing new information in practice [55]
- for programs intended to help physicians begin to make changes in their office systems, consider content related to change management

Selecting educational strategies

- type of content, desired level of information to be developed in the learner[57], and intended practice-related outcome determine the educational strategies (Table 3) that are most appropriate and cost-effective for the program[55]
  - Ebell's levels of information mastery[57,58] correlate well with Pathman's four stage model of guidelines adoption by physicians[56] and serve as a useful framework for choosing educational strategies
  - effectiveness of various dissemination and implementation strategies in different circumstances is poorly understood[4]
- if adoption of new office systems is a desired outcome, consider educational strategies that include others besides physicians who are involved in the care process
  - content will need to be adaptable to different target audiences

Recruiting and training local program facilitators

- identify local experts or respected peers who support the goal of office systems change, and preferably have some experience with making change to their office systems
- train-the-facilitator program should include content related to role that office systems play in helping physicians integrate new information into practice, and options for improving target office systems
- include content on coaching if facilitators will be following up with participants to check on and encourage their change efforts

- **Evaluating outcomes**
  - define indicators for success that are related to changes in systems and how they relate to changes in patient care[4]
  - choose measures that are consistent with program outcome objectives e.g. dissemination (physician awareness, agreement with systems change) vs. implementation (physician adoption, routinization of systems change)

In addition, CME programs can be used to attempt to influence some of the key determinants of office systems change. For example:

- Identify, develop and nurture physician leaders in this area

- Promote teamwork – efficient use of non-physician health providers to allow the doctor to do what they do best

- Promote and support systematic change initiatives through program design (Section 3)

Table 3. CME instructional design options to promote different levels of program outcomes

CME Instructional Design Options		**Stages of Guidelines Adoption by Physicians and Associated Levels of Information** [1,7,55,56,57,58]			
		Awareness	**Agreement**	**Adoption**	**Adherence**
		Convey **data** – facts which by themselves have no meaning	Acquire **information** – meaning is attributed to facts	Develop **knowledge** – understand relevance to personal practice & sufficient value to warrant testing	Gain **wisdom** – repeated appropriate application of integrated new & existing knowledge
Pre-Course	Needs assessment	x			
	Practice assessment	x			
During the course	Lectures	x			
	Case examples		x		
	Case-based discussion		x	x	
	Systems mapping	x	x		
	Systems brainstorming	x	x	x	
	Consensus process			x	
	Role-playing			x	
	Video presentation		x		
	Change plan/CtoC			x	
Post-course	Practice audit	x	x	x	x
	Change plan follow-up			x	x
	Peer support			x	x
	Academic detailing	x	x	x	
	Supplementary reading	x	x	x	
	Supplementary tools			x	x

Summary

Helping physicians critically evaluate and make changes to their office systems that support integration of best evidence into routine patient care activities is a new way of looking at CME. Office systems change is not a fast or easy process, and CME programs that effectively promote and support physicians' systems change efforts can be complex and costly endeavors. However the eventual rewards of systems change CME on patient health outcomes are worth the effort. Encouraging physicians to consider how office systems in their practice support or are barriers to application of new clinical knowledge is an important first step that can readily be incorporated into most CME programs. A variety of other instructional strategies are available when designing more ambitious and intensive CME programs that include office systems change as an explicit program outcome.

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Appendix 1. Factors that interact to affect the ability of physicians to change their office systems [5,13,14,15,16,20,21,22,23,24,25,26,27,28]

	Predisposing (provide motivation to perform a behavior or make a change)	**Enabling** (required to perform a behavior or support a change)	**Reinforcing** (support or reward performance of a behavior or change)
Patient Factors	• demographics e.g. socioeconomic status, age, gender • beliefs – health beliefs influenced by sociocultural and religious factors; beliefs regarding benefit of proposed behavior/change • attitudes – towards the health system, provider, or health care activity; value placed on health; willingness to comply with the proposed change • expectations regarding health care and its outcomes • internal health locus of control (belief that health is determined by one's behavior) • self-efficacy (belief in one's ability to make the recommended behavior change)	• educational level/capability to learn • health knowledge • ability to accept financial burden of the change (e.g. ability to pay for non-insured items, insurance coverage) • logistical factors (e.g. convenience, scheduling, transportation) • physiologic factors including physical or emotional factors related to the condition or potentially caused by the proposed change	• social support/approval • inherent reinforcing value of the activity
Physician Factors	• sociodemographics e.g. gender, personal health habits, stress level • beliefs e.g. role of MD/other health professionals/patients; importance of patient self-management; practice philosophy (patient vs. problem orientation & scope of clinical information used); practice style (i.e. degree of shared control and affective connection with patient, time management, perception of competing demands); beliefs regarding patient willingness to accept the proposed change • attitudes e.g. compatibility of goals and values with the proposed change; personal commitment to patient safety; perceived benefits/costs of the change • motivation e.g. self-efficacy, confidence in patient, interest in providing a service or achieving a particular target ("bee-in-the-bonnet"), previous experience with systems change, openness to innovation	• knowledge • skills: clinical, organizational, technical – including computer knowledge, skills • financial resources to adopt a new process or system • time to attend to the change process	• patient satisfaction • professional satisfaction (e.g. case finding, positive patient outcomes) • peer recognition, support from colleagues • perceived performance gap compared to peers • public recognition of quality of care

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Office/Practice System Factors	• organizational leadership and culture – includes organizational commitment to safety/quality patient care, attitudes and ideology in the office, importance placed on the target service, openness to innovation/change – usually need at least one champion for change in the practice - leader with an interest in quality improvement or the target service • alignment of motivation of key stakeholders in a practice • shared vision among all staff, including physician cohesiveness/ groupness in multi-physician practices, and clinician and office staff understanding of opportunities for change • teamwork – supports initiation of quality improvement initiatives	• decision support systems, including systems for accessing specialists • clinical information systems – note that providing CIS to organizations that lack interest or incentives to use them is unlikely to be effective • financial resources to support the change • supportive team environment - includes involvement of non-MD staff in care processes; clarity of roles, responsibilities, expectations for all staff • knowledge and skills of non-MD staff involved in care processes • staff relationships and communication - includes management infrastructure, decision-making approaches, good relationships between staff, stable practice (low staff turnover) • office efficiency and organization including care management processes and procedures, and use of tools to support office care processes • other office resources e.g. equipment, manuals • resources to support patient self-management • linkages with resources in the community • practice size – larger organizations may have more resources to support change but more people involved in decision-making can inhibit change • patient mix and volume	• clinical information systems and care monitoring processes that provide feedback on quality of care, progress with QI initiatives • teamwork – supports continued performance to achieve targets

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Wider Environment Factors	• characteristics of the community within which the practice resides e.g. culture • characteristics of the health care organization/system e.g. goals, values, priorities for care – a receptive organization is required to support the change process • standards imposed by professional organizations • public policy/regulations • illness epidemiology of the community • extent to which colleagues are implementing the change	• reimbursement/payment structure e.g. capitation tends to encourage more systematic processes • financial incentives e.g. support for CIS, "pay for performance" initiatives • access to specialists • health care system/organization structure • support from higher management in larger organizations • health system organizational integration supporting continuity of care e.g. ability to share information with other providers, services or levels of care • availability of community resources e.g. exercise programs, education classes, home care • characteristics of the patient population that determine their interest and ability in assuming a more active role in their care	• systems for reporting quality of care data and activities to outside body • public and patient demand for safety • liability law/litigation (considered to be an inefficient incentive) • accreditation • professionalism/professional culture
Factors Related to the Innovation	• compatibility with existing systems, values, beliefs • perceived benefits/advantages vs. existing system • appeal - extent to which innovation is appealing to use • relevance – extent to which process innovation will add value to patient care • perceived risks – to physician, practice, patient	• clarity of procedures & guidelines for the process innovation • trialability – ease with which proposed changes can be tested • frequency of use – process or system to be changed must be used often enough to enable testing and refining changes • complexity – complex changes are best implemented in a step-wise manner if possible • refinability – ease with which the process or supporting tools can be modified to meet the needs of the practice • task relevance – new process is workable, easy-to-use • support provided e.g. training, help desk	• observability – degree to which results of the change are noticeable/can be measured