

Assessment of Barriers to Changing Practice as CME Outcomes

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Introduction: Continuing medical education (CME) is meant to drive and support improvements in practice. To achieve this goal, CME activities must move beyond simply purveying knowledge, instead helping attendees to contextualize information and to develop strategies for implementing new learning. CME attendees face different barriers to implementing learning, depending on both personal and practice specific contexts. We sought to develop a framework, applicable across multiple CME activities, for categorizing barriers that learners anticipated encountering after CME activities.

Methods: Building on previous work, qualitative research methods were used to develop an enhanced framework classifying attendee-perceived barriers to implementing CME learnings in practice. Three thousand one hundred thirty (3130) narrative responses on attendee-perceived barriers to implementing learnings were collected from 75 Kaiser Permanente Colorado live CME activities for family medicine, internal medicine, pediatric, and OB/GYN clinicians in 2008 and 2009.

Results: Our CME Learning Transfer Barrier Framework contains 27 discrete barriers in 12 barrier categories (including “none”). The barrier framework was applicable across two years of live CME activities for different clinician target audiences.

Discussion: Assessing, characterizing, and summarizing barriers to implementing learning during CME activities can provide valuable information to inform subsequent CME interventions, and provide feedback to organizational leaders to inform performance improvement efforts. The framework may be applicable to other CME formats and to CME activities for audiences in different practice settings.

Key Words: education, medical, continuing, transfer, physician's practice patterns, professional practice

Introduction

Traditional (didactic, knowledge-focused) continuing medical education (CME) does not consistently lead to sustained improvements in practice^{1–5} While enhancing knowledge is

important, CME is now expected to improve clinician performance and care outcomes.^{6–8} Recent analyses conclude that properly structured CME can help change physician performance,^{1–3,9} although more studies are needed to help CME providers proactively develop outcomes-improving interventions.^{7,10}

Suboptimal performance and health care outcomes are usually not due solely to deficits in explicit knowledge (knowing “what to do”).¹¹ Improving health care involves changing practice on both inter- and intrapersonal levels and expanding focus to include system or organizational contextual issues (including knowing how to practically use new knowledge or skills in the course of day-to-day work).¹² The Theory of Planned Behavior¹³ posits that individual attitudes, beliefs, and perceived situational influence and control influence individual behavior and change, including in health care settings.^{14,15} A given change may involve more perceived loss than perceived gain for some individuals—these perceptions represent a barrier to changing behavior.¹⁶

Health care occurs in complex adaptive systems in which different individuals may have differing incentives or motivations to change and may face different barriers to change.^{17–19} Whether in small private practices or large

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health care organizations, health care is delivered by individuals interacting in both smaller local (microsystem²⁰) and larger contexts; context is an important factor influencing adoption of new practice behaviors and the likelihood of sustaining change and improving performance.^{21–24} Universal agreement on the need to change or the effects of proposed change is rare.¹⁹ Change happens at different speeds in different parts of a system.¹⁹ New interventions reshape both users and the environment—this mutual adaptation²⁵ creates dynamic situations in which many barriers to change may arise. Changes in health care are, thus, complex with many potential barriers to successful adoption of new attitudes, beliefs, behaviors and processes.

CME that addresses predisposing, reinforcing, and enabling factors is more likely to change practice.^{4,26} Predisposing factors include individual attitudes and beliefs (including perceived barriers); enabling factors may include tools to overcome barriers to change; reinforcing factors could include follow-up educational or noneducational initiatives addressing barriers to change.^{1,4,27} The Transtheoretical Stages of Change model²⁸ can be applied in the planning, implementation, and evaluation of CME activities.²⁹ CME can be used to raise awareness of the need to change behavior (for pre-contemplators), help convince individuals that change is important (for contemplators), or, by asking individuals to identify potential barriers, help individuals prepare for or continue an already initiated change.

Rogers³⁰ identifies simplicity as one of the key characteristics of successfully disseminated innovations. Identifying barriers as part of a CME activity evaluation can position CME providers to assist individuals leading practice change efforts by providing information that could help simplify the implementation process. Identified barriers can also then be addressed in subsequent CME or other implementation initiatives, as multifaceted strategies targeted at different barriers may be needed to increase the likelihood of successful change.^{27,31}

Qualitative comments on barriers to change may provide rich information, but long lists of narrative comments without summary or framing can be time-consuming to read and interpret, both for busy health system leaders and CME planners. Summary categorizations of barriers to change, with supporting narrative examples as indicated, may be more useful. A schema to categorize barriers may provide CME attendees a safe and easy way to share their perceptions of issues in the organization. Feedback to attendees about barriers they identified and any subsequent organizational action might demonstrate that attendee time providing feedback is well-spent, illustrate that organizational leaders are open to feedback, and increase attendee motivation to actively participate in subsequent improvements.^{32,33}

Previous authors^{34–36} have described barriers physicians may face in translating evidence into practice. Other authors^{37–40} have developed preliminary schemes for identifying barriers to implementing learning after CME activities in small studies, single activity analyses, or focused clinical

areas. Building on these studies^{34–40} and our own previous barrier work⁴¹ emerging from journal club and case conference sessions, we sought to enhance previous analyses by developing a barrier framework that can be broadly applied across multiple CME activities. Our framework also draws from a more general literature on training, focusing on characteristics of proposed change, individuals or groups, and the organization to identify opportunities and barriers for successful learning transfer.⁴² We conducted a qualitative analysis of barriers identified by participants at in-person CME activities over a two-year period.

Setting and Methods

Kaiser Permanente Colorado (KPCO), a group model health maintenance organization, provides care to about 500,000 patients in the Denver, Colorado, metropolitan area. The Colorado Permanente Medical Group (CPMG) includes approximately 900 physicians across multiple specialties providing the majority of care to KPCO patients. Attendees at CPMG Department of Education accredited conferences complete online evaluations within three weeks to receive CME credit. The evaluation asks participants about changes they plan to make in their work^{43–45} and to identify perceived barriers to making those intended changes. We collected narrative responses to the barriers question from 39 conferences in 2008 and 36 conferences in 2009 delivered to audiences of family medicine, general internal medicine, pediatric, and obstetrics/gynecology (OB/GYN) physicians, nurses, and clinical pharmacy specialists. Conferences were 1–2 hours in length, emphasizing case-based, interactive discussion, with less than half the time spent on didactic presentation. Physicians comprised the vast majority of attendees and respondents; due to limitations in the way narrative comments were extracted from our database, we did not separately analyze physician and other clinician responses.

Narrative comments to the barriers question were coded by four raters, starting with categories developed in previous work.⁴¹ Additional codes were iteratively developed until no new themes emerged.⁴⁶ Intercooder reliability was assessed using the percentage agreement method.^{47,48} The denominator was the number of barrier responses coded; the numerator was the number of responses in which all four coders agreed. Iterative coding continued until an intercooder agreement of 80% was achieved, which, although the percentage method may overestimate true agreement, is generally considered acceptable.⁴⁹ Differences were resolved by consensus, with clarification on clinical context provided as needed by the lead author (DWP). Building on previous constructs,^{36,41} barrier codes were then grouped by consensus into categories.

Results

More than 90% of responses were from physicians. TABLE 1 shows the attendance, evaluation return, and total number of

TABLE 1. Attendance, Evaluation Return, and Barrier Statements in Target CME Activities

Activities		Attendance Total Mean Median	Evaluation return % (mean, range)	Barrier statements
2008	39	4411	62.3% (19.4%–90.3%)	1634
		113.1		
		116		
2009	36	4234	74.4% (39.2%–92.2%)	1496
		117.6		
		117		

barrier statements from the CME activities. Overall, there were 0.58 barriers per returned evaluation (0.50 per evaluation for OB/GYN, 0.58 for pediatric, and 0.61 for adult primary care topics).

From the 3130 statements, we derived 27 discrete barrier codes and 12 categories of barriers, including “none” (TABLE 2). Twenty-nine percent of responses indicated no barriers to making intended practice changes. Four major categories (time, patient, organizational, and provider factors) comprised the majority of perceived barriers to implementing learning. “Time” (26% of responses) was most frequently reported, followed by “patient” (15%), “organization” (12%), and “provider-related” barriers (9.6%). The remaining barriers were reported less than 5% of the time (FIGURE 1). Barrier frequencies were similar between 2008 and 2009, except that patient barriers were more commonly noted in 2009 compared with 2008 (19.85% vs. 11.38% of barriers, $p < 0.01$). Most provider self-identified barriers related to memory or habit (FIGURE 2). Adult primary care audiences were more likely to identify “time” as a barrier compared with pediatric (31.5% vs. 22.7%, $p < .0001$) or OB/GYN audi-

ences (31.5% vs. 14.6%, $p < .0001$). Other barriers were similarly reported across the different audiences.

Discussion

In our sample, as in previous studies,^{36–39} time was a commonly noted barrier. Often, the single word “time” appeared as a barrier; its meaning was often unclear. Other responses noted the length of patient appointment time was insufficient to allow new processes to be implemented, or that they had a lack of time to learn or practice a new concept.

We identified 7 barriers associated with organizational structure, policies and routines: system policies, priorities, workload, panel size, and staffing shortages; lack of access to supplies, equipment, tools, tests, and furniture; absence of easily accessible information (especially in the electronic medical records or by computer); uncertainty about the cost of care; infrastructure (such as the layout of a building or room); weak professional and clinical relationships between departments; and weak relationships between KPCO and other organizations.

Patient beliefs, attitudes, priorities, or predetermined goals may run counter to and hinder implementation of a change (eg, patient beliefs that antibiotics are needed for bronchitis could be a barrier to decreasing unnecessary antibiotic use). Lack of compliance (adherence) and patient complexity (multiple co-morbidities or complex family or social situations) can make it difficult to implement a change.

Providers (clinicians) who are required to change may themselves be a barrier. They may lack knowledge, experience, or competency and may be uncomfortable engaging in the new behavior. They may not be able to recall information when it is needed. They may perceive little future opportunity to practice the change (eg, using newer medications for managing seizure disorders in children, as primary care clinicians would usually refer such patients to a neurologist for medication management).

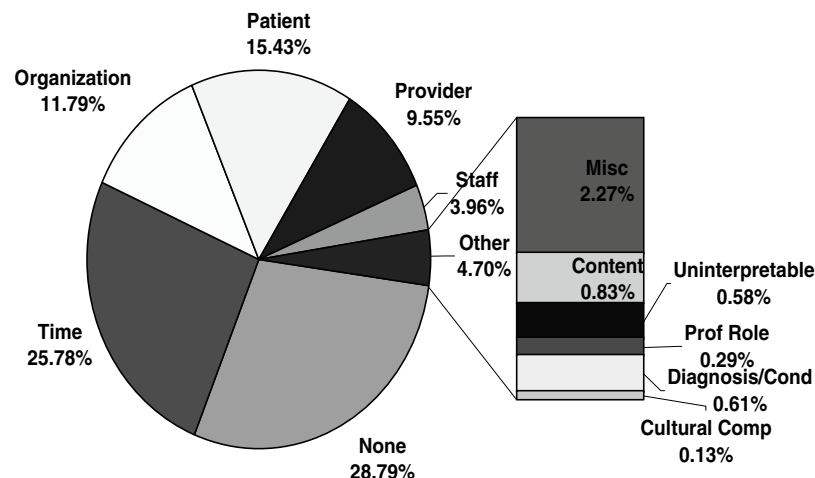


FIGURE 1. Frequency of reported barriers.

TABLE 2. CME Learning Transfer Barrier Categories

Definition/subcategory	Definition
None	Respondent indicates no perceived barriers to implementing learning
<i>Time (as it effects the provider)</i>	<i>An interval of minutes or hours</i>
1. Time	“Time” is given as a response with no other explanation.
2. Appointment time	Length of appointment time, time spent with patient, time to complete assessment/diagnosis of patient is inadequate.
3. Learning time	Not enough time has been reserved to learn new concepts or techniques or practice new skills.
<i>Organization</i>	<i>The business entity: KPCO, CPMG</i>
1. Systems design, policies, benefits	Organizational structures, priorities, or policies, such as workload, panel size, limited access to services, limited scope of benefits/formulary, staffing shortage due to hiring freeze, difficult access to services.
2. Equipment, supplies, tools, diagnostic tests, treatments, trainings	The necessary furniture, medical equipment, supplies, patient handouts, medication, diagnostic tests, treatments, or trainings are unavailable or not offered.
3. Information, technical systems or resources, documentation	Inadequate or unavailable computerized aids, such as clinical guidelines, electronic health record, registries, decision support, information/reference resources.
4. Cost of care, cost of benefit	Expenses related to care are unknown or prohibitive.
5. Infrastructure, physical layout	The building or room layout is not conducive.
6. Relationship with other KPCO departments	Information is not readily shared; access to expertise of others within KPCO is limited; communication across departments is difficult; internal referrals are difficult to obtain.
7. Relationship with outside providers	Access to providers outside of KP for consult or referral is difficult; referral process to outside providers is difficult.
<i>Patients</i>	<i>Patient, family, legal guardian</i>
1. Agenda, knowledge, beliefs, bias, priorities, readiness to change	Patient has a predetermined goal, understanding, attitude, comprehension, or conviction about care, or has other priorities for or denial about their health; patient is difficult to deal with, or not ready to change.
2. Compliance	Patient is not willing or motivated to follow directions, or will not explain the problem.
3. Complexity	Patient has co-morbidities that make assessment, diagnosis, or treatment more involved or difficult than usual.
<i>Provider</i>	<i>Physician, Pharmacist, Physician’s Assistant, Nurse Practitioner</i>
1. Comprehension, training, proficiency, competency, clinical skills within scope of practice	Provider does not have the knowledge, training, experience, proficiency, competency, clinical skills, or ability to perform the task(s); provider is not comfortable performing task; provider doesn’t usually perform task in his/her practice; provider does not see need to perform task (attitude/beliefs).
2. Behavior, memory, usual routine, habit, emotional response	Provider can’t remember/recall the information when needed; learning disrupts or is not part of usual routine of care; provider is not comfortable addressing or is unable to communicate or express emotions.
3. Opportunity	Provider has not had/does not have the chance to use new knowledge or skills due to patient panel case mix.
4. Fear, legal concerns	Provider indicates fear of consequences or legal ramifications.

(Continued on next page)

TABLE 2. Continued

Definition/subcategory	Definition
<i>Staff</i>	<i>Staff, unit-based team</i>
1. Comprehension, training, proficiency, competency, clinical skills within scope of practice	Staff does not have the knowledge, training, proficiency, competency, clinical skills, or ability to perform the task(s).
2. Time, competing demands	Staff does not have time, too many competing demands for staff, not enough staff/local staffing shortage.
3. Motivation, willingness	Staff is not motivated, compliant, agreeable or eager; not willing to change how they do things.
<i>Diagnosis or health condition</i>	<i>Pathophysiology, treatment, or presentation, or co-occurrence with other conditions, is complex or challenging</i>
<i>Content of CME</i>	<i>Clinician perceives the content either is not accurate, correct, complete, evidence-based, or relevant, or perceives faculty bias</i>
<i>Roles</i>	<i>Lack of clarity on who should do what when, unsure of work routine or work flow, outside scope of usual and customary practice</i>
<i>Cultural competency/diversity (patient/family specific)</i>	<i>Patient's cultural, ethnic, racial background is an issue (eg, patient's cultural beliefs regarding disease etiology or treatment conflict with recommendations presented at CME activity), provider perceived lack of training or resources in addressing cultural differences</i>
<i>No response</i>	<i>Non-decipherable response, includes "?" "ok" "."</i>
<i>Miscellaneous</i>	<i>Other responses that don't fit any other category, includes incomplete or vague responses</i>

KPCO = Kaiser Permanente of Colorado.
 CPMG = Colorado Permanente Medical Group.
 CME = continuing medical education.

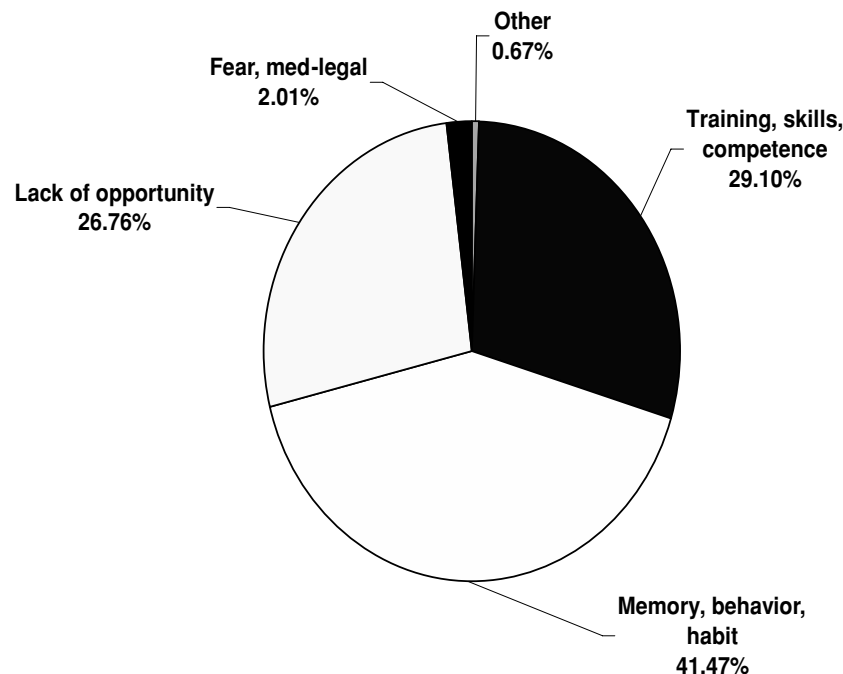


FIGURE 2. Subcategorization of "provider" barriers.

Staff (nurses, receptionists and other members of a care team) lack of proficiency, competency, or ability to perform a task in their scope of work may be a barrier to implementation. Staff may lack sufficient time to implement a change due to competing job demands, or lack motivation to make the change. Staff and providers may both experience role conflicts or confusion when implementing a new workflow.

The complexity of making a diagnosis or treating a difficult condition, alone or in combination with other factors, was noted as a barrier (eg, some attendees at a CME activity on adult Attention Deficit Hyperactivity Disorder noted difficulty differentiating this disorder from other conditions). Respondents sometimes perceived that content in a CME activity was not accurate, correct, complete, or evidence-based (eg, some attendees disagreed with the discussion of the evidence on prostate specific antigen for cancer screening). Although infrequently noted, it provides potentially important feedback about individual CME activities.

We constructed an overarching framework for the identified barrier categories by considering major components in a change process: the innovation (the added knowledge, skills, competencies and processes addressed in the CME activity); the way the innovation is communicated (the mode and format of the CME activity); the targets (and hopefully

adopters) of the proposed change (CME activity attendees); and the system, climate, or context within which the change is intended to occur. As downstream recipients of intended change, we included patients in the framework. CME attendees and patients both bring individual viewpoints into a change process. The Learning Transfer Barrier Framework depicted in FIGURE 3 thus contains three main components: interventional (combining the innovation and the way it is communicated), individual, and systems or contextual components. FIGURE 3 shows the relationship of the barrier categories emerging from our analysis to these change process components. As depicted, some barrier categories (time, staff) span different change components, and cultural competency has components that relate to both the patient and provider categories.

Adult primary care audiences more frequently identified “time” as a barrier, compared with pediatric or OB/GYN audiences. This most likely reflects the nature of adult primary care, where caring for patients with multiple, often complex co-morbidities is more common than in OB/GYN or pediatric settings. It is also more likely related to the specific CME topic, objectives, and outcomes than characteristics of individual learners. For example, in a CME activity targeted at decreasing use of antibiotics in upper respiratory infections

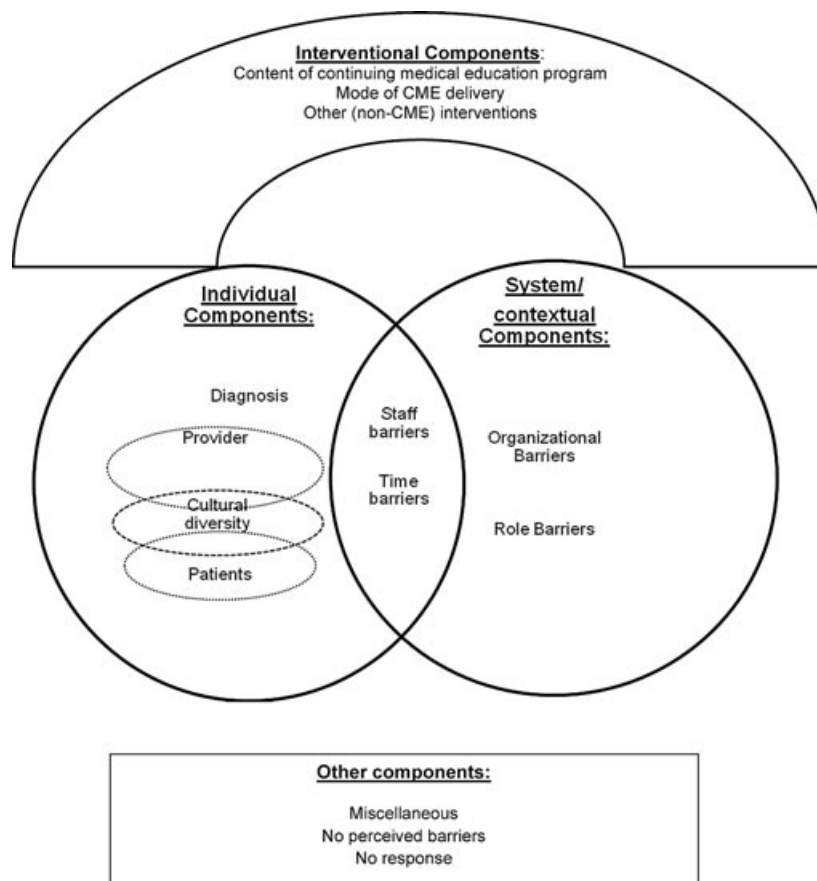


FIGURE 3. Learning Transfer Barrier Framework.

in adults, beliefs that patients expect to receive antibiotics was the most frequently identified (62%) barrier. In the pediatric setting, patient (parent) barriers were only the third most frequently identified barrier overall, but the most commonly identified barrier (43%) in a program targeted at increasing immunization rates among children, while time was the most frequently identified barrier (35%) to implementing key quality improvement efforts in asthma, attention-deficit hyperactivity disorder, and obesity.

Limitations

Occasionally, some learner-identified barriers (eg, appointment time, patient complexity) were anticipated by planners in advance, who incorporated tools for addressing these barriers into the conference. We were not able to determine whether these barriers were reported less frequently when they were anticipated and explicitly addressed. We did not analyze, and were thus unable to compare, barriers by attendee role on the health care team (physician, nurse, pharmacy specialist, etc). CME attendance was voluntary; not every individual completed a CME evaluation; and answering the barriers question was not required to submit an evaluation and receive CME credit. Thus, our findings likely reflect selection and response bias. However, the large number of responses received and the applicability of the schema over two years across different audiences suggest that the responses are representative of the barriers encountered by clinicians in our practice system.

Implications for Future Practice

We believe the categories and the Learning Transfer Barrier Framework described in this paper can be used to assess barriers to implementing learning identified in other conferences and other types (eg, online, point of care, etc) of CME activities in our and other settings. We expect that with further use in other settings the schemas will continue to evolve. In a predominantly fee-for-service audience, lack of reimbursement may be a commonly noted barrier to changing practice after CME; this might be classified as a systems barrier, a policy barrier,²⁶ or a new category. The relative proportions of barriers would likely vary based on the characteristics of the practice system(s) in which the target audience practices.

The barrier categories and framework could be used by CME planners to proactively anticipate and address barriers in the planning of CME activities, even when specific barriers had not been previously identified in earlier educational or other efforts (quality improvement pilots, etc). Barriers identified from a previous CME activity can also serve as needs assessment for follow-up educational activities in the same topic area.^{30,31} Barriers from CME activities can be summarized using our schema and then discussed with organizational or systems leaders to help inform ongoing or future practice improvement efforts. Comparing potential changes in barriers from successive CME programs on the same topic

can provide leaders with additional perspective on a system's readiness, willingness, and ability to change.

Questions for Future Research

Additional research is needed to continue to refine the role of barrier identification in CME. We are exploring methods (eg, CME attendee interviews, checklists on CME evaluations) to better delineate the concept of time as a barrier. Identified barriers can be compared with the type of requested practice change; one would expect that more complex practice changes would be associated with more barriers. Response patterns in CME activities explicitly addressing barriers to change can be compared with barriers in activities that do not. The likelihood of making a commitment to change statement^{43–45} and the number and types of these statements can be analyzed by the types of identified barriers to change. The likelihood of successful practice change (assessed by follow-up CME evaluations or other metrics) can be compared with the types of barriers identified; differences between initially identified and actually encountered barriers can be compared; and strategies for successfully overcoming identified barriers can also be assessed. Perceived ability (self-efficacy) to overcome perceived barriers can be assessed and compared with follow-up self-reported practice change. To identify potential enablers of practice change, interviews can be conducted with individuals who initially report the absence of barriers to change, and their self-reported subsequent practice changes can be assessed.

Lessons for Practice

- Barriers identified during CME programs inform future practice improvement efforts.
- Barrier analysis can serve as needs assessment for follow-up educational activities in the same topic area.
- Comparing barriers from successive CME programs on the same topic can provide a contextual framework for performance improvement leaders on a system's readiness and willingness to change and progress made toward a desired change.

Barriers to change, particularly organizational barriers, might vary across different health care systems, by time since completion of training, and by clinician experience in a given health care setting. In the future, comparison of barriers faced by different members of the health care team should be conducted as a prelude to discussions and follow-up interventions focused on improving communication, functioning, and performance in health care teams.⁵⁰ Interrater reliability,

preferably confirmed with other methods,^{47–49} should be reassessed in different settings. Finally, analysis of barriers might reveal recurring individual level patterns of barriers (eg, insufficient appointment time) that might partially explain some instances of CME's lack of dramatic effect in changing behavior. CME planners could consider tailored educational interventions to help these individuals address their barriers (such as methods of structuring and more efficiently conducting patient visits). Future studies could then examine whether such strategies increase the likelihood of these individuals implementing learning from CME into practice.

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