

# The Majority of Accredited Continuing Professional Development Activities Do Not Target Clinical Behavior Change

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## Abstract

### Purpose

Continually improving patient outcomes requires that physicians start new behaviors, stop old behaviors, or adjust how they practice medicine. Continuing professional development (CPD) is the method most commonly used by physicians to improve their knowledge and skills. However, despite regular physician attendance at these activities, change in clinical behavior is rarely observed. The authors sought to identify which of Bloom's domains (cognitive, affective, or psychomotor) are targeted by the learning objectives of CPD activities offered by medical associations, regulatory bodies, and academic institutions in the province of Quebec, Canada.

### Method

The authors evaluated the objectives of 110 accredited CPD activities offered to physicians and other health professionals from November 2012 to March 2013. The objectives of each activity were extracted and classified into learning domains using Bloom's taxonomy.

### Results

Ninety-six percent of the learning objectives analyzed targeted the cognitive domain, which consists of six levels of increasing complexity: knowledge, comprehension, application, analysis, synthesis, and evaluation. Half (47%) targeted knowledge and comprehension, whereas only 26%

aimed to improve skills in analysis, synthesis, and evaluation.

### Conclusions

Most accredited CPD activities within this sample were generally not designed to promote clinical behavior change because the focus of these activities was on remembering and understanding information instead of preparing physicians to put knowledge into practice by analyzing information, evaluating new evidence, and planning operations that lead to behavior change. Educators and CPD providers should take advantage of well-established theories of health professional behavior change, such as sociocognitive theories, to develop their activities.

**C**ontinuing professional development (CPD) is the process by which health professionals maintain and enhance their clinical performance to meet the needs of patients in today's rapidly evolving health care systems. In many countries, participation in accredited CPD activities is mandated by professional or regulatory bodies or stimulated by other incentives.<sup>1</sup> CPD should not only improve knowledge but also change professional behavior in daily practice. However, most certified CPD activities focus on knowledge dissemination that serves to reassure health professionals about the quality

of their practice without producing a significant change in their behavior.<sup>2-5</sup> CPD activities that might lead to change in clinical practice are therefore needed.

Much current effort by CPD providers focuses on developing strategies to assess the outcomes of the activities they offer. Many conceptual frameworks for CPD outcomes assessment are derived from Kirkpatrick's model,<sup>6</sup> which assesses training effectiveness by measuring four distinct levels: participants' satisfaction; participants' knowledge, skills, or attitudes; transfer of learning to practice (i.e., behavior); and organizational outcomes such as productivity and quality (see Table 1). Thus, CPD activities specifically targeting the behavior change component of improving training effectiveness can be assessed using Level 3 outcome measures.<sup>6</sup> In reality, however, most CPD providers only assess Level 1 and 2 outcomes, using postactivity self-administered questionnaires. Level 3 and 4 outcomes have been measured in the context of research projects using health services methods,<sup>7,8</sup> using self-reported

questionnaires,<sup>9</sup> or during professional inspection visits by regulatory bodies.<sup>5</sup>

The stated learning objectives of CPD activities describe their desired outcomes and thus should help shape the activities. According to most continuing medical education guidelines, learning objectives should clearly state, in measurable terms, the behavior the learner is expected to adopt on completion of the activity.<sup>10-12</sup> They should also indicate the context in which the behavior should occur and the criteria for acceptable performance.<sup>13</sup>

Bloom's taxonomy<sup>14</sup> is one tool used by CPD providers to structure the learning objectives of CPD activities. This taxonomy defines three types or domains of learning: affective, psychomotor, and cognitive. Affective learning relates to attitudes in clinical practice; psychomotor learning relates to physical skills. Cognitive learning is divided into six levels of increasing complexity: knowledge, comprehension, application, analysis, synthesis, and evaluation (Table 2). Although the lowest levels

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**Table 1**  
**Applying Kirkpatrick’s Training Model to the Evaluation of CPD Activities<sup>a</sup>**

Level	Component of change	Description
Level 1	Reaction	Evaluates participants’ satisfaction with a CPD activity. This level generally provides data relating to participants’ perception/satisfaction with the program, delivery, instructors, and environment.
Level 2	Learning	Evaluates participants’ changes in knowledge, skills, or attitudes. Usually assessed with pre- and posttest studies to detect what participants have learned after a CPD activity.
Level 3	Behavior change	Evaluates the extent to which learning has influenced the postlearning behavior or the performance of a health care professional in her or his practice.
Level 4	Patient/health outcomes	Evaluates the tangible results (such as improvement in patient health) of the influence of CPD activities in health care professionals’ behavior.

Abbreviation: CPD indicates continuing professional development.

<sup>a</sup>Kirkpatrick’s model<sup>6</sup> is a conceptual framework that enables assessment of training effectiveness by measuring four distinct levels.

of cognitive learning may enable CPD participants to comprehend and apply knowledge in their current practice, they are not equipped to analyze or critique it. Participants in a CPD activity that targets higher cognitive levels are more likely to implement a behavior change in their

clinical practice. For example, synthesis involves using knowledge to produce a set of operations, and evaluation involves judging knowledge in terms of external criteria.<sup>15</sup> Thus, the more complex the level of cognitive learning achieved during a CPD activity, the more

effective the activity is likely to be at translating knowledge into clinical and organizational behavior change (Levels 3 and 4 of Kirkpatrick’s model).<sup>15,16</sup>

In this study, we sought to identify which of Bloom’s domains and levels of cognitive learning<sup>14</sup> are targeted by the learning objectives of CPD activities offered by medical associations, regulatory bodies, and academic institutions in the province of Quebec, Canada.

**Method**

**CPD activities search**

This study was a secondary analysis of an existing database that originated in a before-and-after study for the development of a theory-based instrument to assess the impact of CPD activities on clinical practice.<sup>17,18</sup> These data on CPD activities were collected from all eight of the Quebec institutions responsible for accredited CPD activities: the College of Family Physicians of Canada, Médecins francophones du Canada, the Fédération des médecins omnipraticiens du Québec, the Fédération des médecins

**Table 2**  
**Bloom’s Learning Domain Taxonomy, as Applied to a CPD Activity on Cardiogenic Shock in Critically Ill Patients in Emergency Medicine<sup>a</sup>**

Learning domain	Definition according to Bloom’s taxonomy	Example of a learning objective
<b>Cognitive</b>	Learning domain involving thinking of all sorts. Cognitive learning is divided into six hierarchical levels.	
Knowledge	Lowest level of cognitive domain. In CPD activities this involves remembering previously learned material (from specific facts to complete theories).	Define cardiogenic shock.
Comprehension	Ability to grasp the meaning of material. This may be demonstrated by interpreting material (explaining or summarizing) and by predicting consequences or effects.	Identify patients who are in cardiogenic shock.
Application	Ability to use material in new and concrete situations.	Apply the guidelines to manage a patient in cardiogenic shock.
Analysis	Ability to analyze material and divide it into its constituent parts. This level requires from learners an understanding of both the content and the structural form of the material.	Adapt the guidelines to different clinical situations concerning the management of a patient with cardiogenic shock.
Synthesis	Ability to analyze several systems simultaneously and discuss how each system interacts with the other. It involves creative behaviors, with a major emphasis on the formulation of new patterns or structures.	Foresee how septic shock might affect cardiac function and lead to cardiogenic shock.
Evaluation	Highest level of the cognitive domain. It involves the performance of independent judgments based on analysis and synthesis. Judgment is much more than applying answers to certain problems. It is creating new answers based on information available.	Develop a more efficient way to manage cardiogenic shock.
<b>Affective</b>	Learning domain involving feelings, emotions, attitudes, values, and motivations (that guide behavior and decisions)	Manage staff and resource materials during the treatment of a patient with cardiogenic shock.
<b>Psychomotor</b>	Learning domain involving motor and sensory skills needed to perform a behavior	Cardiovert an unstable patient in cardiogenic shock presenting with supraventricular tachycardia.

Abbreviation: CPD indicates continuing professional development.

<sup>a</sup>Bloom’s taxonomy<sup>14</sup> describes the structure of learning objectives for CPD activities and defines three domains of learning: affective, psychomotor, and cognitive. This table illustrates how the learning domain targeted by the CPD activity will determine how the learning objective is formulated.

spécialistes du Québec, and four medical schools (McGill University, Université de Montréal, Université Laval, and Université de Sherbrooke), which together offer an average of 1,200 accredited activities per year (data available from authors). We included each CPD activity that was offered to practicing physicians between November 2012 and March 2013 and that met the following criteria: It was accredited by a medical association, a regulatory body, or an academic institution in the province of Quebec; it was related to a behavior relevant to clinical practice; and it was a group-based educational activity, preferably conducted as a live activity for groups of 50 participants or fewer, because smaller-scale interactive sessions are more likely to change physician behavior than larger-scale didactic sessions.<sup>2</sup> Activities could occur in any setting (e.g., a university, a conference center, a practice setting) and could use any single or combination of instructional methods (e.g., lectures, workshops, case studies, demonstrations) and material (e.g., audience response systems, videos, card games, real or simulated patients). Activities embedded within large programs offering several activities in one setting, such as two-day conferences, were also eligible and were evaluated individually.

### Analysis of CPD activity learning objectives

We extracted all learning objectives from eligible activities. Two reviewers (A.F. and P.T.L.) independently classified the stated objectives of each CPD activity according to the definition of the learning domains described in Bloom's taxonomy.<sup>14</sup> Both reviewers were experienced in data extraction and in designing and performing systematic reviews. We computed the frequency of each learning domain targeted by the learning objectives of each activity to evaluate how often the different levels of learning were targeted in CPD activities. We computed the interrater reliability of agreement between reviewers. Discrepancies in classifications were resolved through consensus. We also evaluated the verbs used in the learning objectives to describe intended behaviors. First, we classified these verbs using the list of sample verbs used in many continuing medical education guidelines for assessing Bloom's learning domains<sup>10–12</sup> (e.g., "cite" and "list" are verbs used to communicate knowledge). However, as some verbs belong to more than one

learning domain (e.g., "discuss" can be used to "communicate comprehension" or for "synthesis," depending on the context), reviewers evaluated all verbs in the context of the full wording of the learning objective. Finally, we calculated the frequency of each learning domain according to the type of instructional method used.

Ethical approval for the project was received from the institutional review board of the Centre Hospitalier Universitaire de Québec.

## Results

### Characteristics of CPD activities

Out of 110 eligible activities (see Table 3), the majority (92) were embedded within large programs offering several activities in one setting, such as a medical conference. A mix of different instructional methods was used. However, confirming what is currently described in the literature,<sup>19</sup> the majority of the activities analyzed (96) were lectures, the method most commonly used by CPD providers. Nine activities used interactive workshops, and 5 others used case studies as instructional methods. Two activities used a combination of simulated patients

and videos as instructional material. The target population for 85 activities was physicians only, whereas 25 activities targeted health care professionals in general, including nurses, pharmacists, and occupational therapists. The duration of the identified activities varied from one hour to two and a half days.

### Evaluation of the learning objectives

A total of 404 learning objectives described the goals of the 110 CPD activities identified in this study (Table 4), representing an average of four learning objectives (SD = 1.6, range 1–10) per activity. We observed that the majority of the learning objectives (389) targeted the cognitive domain of learning, and most of these concentrated on "knowledge" (94) and "comprehension" (94). These levels correspond to Kirkpatrick's Level 2; that is, the outcomes of these activities relate to the recall of previously learned material and the ability to grasp its meaning. According to Bloom's taxonomy, these represent the simplest levels of understanding. Out of 122 verbs, the terms most often used in objectives classified under these two levels were "recognize" (30), "know" (22), "describe" (21), "identify" (21), and "explain" (10). Ninety-eight learning objectives analyzed

Table 3

**Characteristics of CPD Activities, From a Study of Learning Domains Targeted by the Objectives of CPD Activities, Quebec, Canada, 2012–2013**

CPD activity	Characteristic
<b>Eligible, no.</b>	110
<b>Setting, no.</b>	
Conference centers	92
Universities	18
<b>Instructional methods used, no.<sup>a</sup></b>	
Lectures	96
Interactive workshops	9
Cases studies	5
<b>Instructional material, no.</b>	
Simulated patients	2
Videos	2
<b>Target population, no.</b>	
Physicians	110
Family physicians	50
Specialists (specialty-specific)	19
All specialists	16
Health care professionals in general (including physicians of any specialty)	25
<b>Duration, time</b>	1 hour to 2.5 days

Abbreviation: CPD indicates continuing professional development.

<sup>a</sup>Not mutually exclusive.

**Table 4**  
**Learning Objectives Defined by Eligible CPD Activities Analyzed According to Bloom's Taxonomy, From a Study of Learning Domains Targeted by the Objectives of CPD Activities, Quebec, Canada, 2012–2013<sup>a</sup>**

Learning domain assessed	Frequency (%)	Verbs most commonly observed in the learning objectives
<b>Cognitive</b>	389 (96.3)	
Knowledge	94 (23.3)	Know, recognize, describe
Comprehension	94 (23.3)	Identify, explain, indicate
Application	98 (24.2)	Apply, perform, use
Analysis	65 (16.1)	Diagnose, investigate, analyze
Synthesis	18 (4.5)	Manage, combine, propose
Evaluation	20 (4.9)	Determine, recommend, judge
<b>Affective</b>	6 (1.5)	Humanize, encourage, advise
<b>Psychomotor</b>	9 (2.2)	Perform, handle, master

Abbreviation: CPD indicates continuing professional development.

<sup>a</sup>A total of 404 learning objectives were analyzed in 110 eligible CPD activities. Bloom's taxonomy<sup>14</sup> describes the structure of learning objectives for CPD activities and defines three domains of learning: affective, psychomotor, and cognitive.

targeted the “application” level of the cognitive domain. In this level, learners apply what they know and comprehend to a given situation. The three verbs most used in this level were “perform” (13), “use” (11), and “apply” (10). Higher levels of the cognitive domain (i.e., the most complex) were less often targeted by the learning objectives analyzed. “Analysis” (65), “synthesis” (18), and “evaluation” (20) together represented only 25% of the learning objectives analyzed.

In addition, we observed that the other two of Bloom's learning domains,

affective and psychomotor, were targeted by only 1.5% (6) and 2.2% (9) of learning objectives, respectively. The affective learning domain refers to learners' attitudes, interests, or emotions toward a subject. Verbs found in this domain were “humanize,” “balance,” “enhance,” “reflect,” “encourage,” and “advise.” The psychomotor domain is related to the use of motor skills in clinical practice. The verbs found to represent this domain were “handle” (e.g., a defibrillator), “examine” (e.g., a newborn), “master” (a technique), and “perform” (e.g., a knee exam).

**Table 5**  
**Learning Objectives Defined by Eligible CPD Activities Analyzed According to Bloom's Taxonomy and the Instructional Method Used During Activities, From a Study of Learning Domains Targeted by the Objectives of CPD Activities, Quebec, Canada, 2012–2013<sup>a</sup>**

Learning domain assessed	Instructional method used, no. (%)		
	Lectures	Interactive workshops	Case studies
<b>Cognitive</b>			
Knowledge	80 (23.7)	9 (22)	5 (20)
Comprehension	80 (23.7)	6 (14.6)	8 (32)
Application	79 (23.4)	16 (39)	3 (12)
Analysis	61 (18.1)	2 (4.9)	2 (8)
Synthesis	13 (3.9)	4 (9.8)	1 (4)
Evaluation	14 (4.1)	2 (4.9)	4 (16)
<b>Affective</b>	6 (1.8)	—	—
<b>Psychomotor</b>	5 (1.5)	2 (4.9)	2 (8)
<b>Total</b>	338	41	25

Abbreviation: CPD indicates continuing professional development.

<sup>a</sup>Bloom's taxonomy<sup>14</sup> describes the structure of learning objectives for CPD activities and defines three domains of learning: affective, psychomotor, and cognitive.

The learning objectives were not influenced by the type of instructional method used (see Table 5). On average, 45% of the learning objectives of all activities analyzed targeted knowledge and comprehension levels. Interactive workshops were least likely to target knowledge and comprehension (37%) and more likely to target the application level. Higher levels of the cognitive learning domain were targeted on average by 25% of the activities (26% of lectures, 20% of interactive workshops, and 28% of case studies). As CPD activities often described learning objectives that corresponded to several different learning levels at once, we also analyzed how these levels were distributed among the different activities. We found that for 49% of the 110 total CPD activities analyzed, 50% or more of learning objectives belonged in the “knowledge” or “comprehension” levels. Moreover, in 78% of the total CPD activities analyzed, 50% or more of learning objectives belonged in the “knowledge,” “comprehension,” or “application” levels. Only 16% of CPD activities focused on the higher cognitive skills of “analysis,” “synthesis,” or “evaluation.” The interrater reliability between reviewers was moderate (Kappa = 0.63). To enhance the reliability of our findings, they discussed all discrepant classifications until consensus was reached.

## Discussion

### A pathway to clinical change

Our findings show that half of the learning objectives from our sample corresponded to the “knowledge” and “comprehension” levels of the cognitive domain. Learning objectives for an introductory course may be appropriately concentrated in the lower levels, such as “knowledge” and “comprehension,” whereas those for upper-level courses will normally be concentrated in the upper levels of the cognitive domain.<sup>14,15</sup> The overall goal of CPD activities is not only to convey information.<sup>1</sup> It is also to encourage critical thinking and reasoning skills (i.e., more complex and applicable forms of knowledge) among health professionals in order to promote a behavior change related to better outcomes for patients.<sup>1,20</sup> Thus, the acquisition of higher thinking skills should be the norm in most CPD activities. Of all the activities in our sample, 78% of them addressed



“knowledge,” “comprehension,” or “application” levels of cognitive learning. Although at this level participants are theoretically able to comprehend and apply what they know to a given situation, it is important to note that these skills may not equip health professionals to differentiate old practices from new ones (analyze) or critique them (evaluate) in order to plan (synthesize) and implement new clinical behavior, which should be the main goal of CPD activities. In addition, verbs often used in the learning objectives analyzed, such as “know,” “learn,” “appreciate,” and “understand,” can be interpreted in many different ways and are inappropriate for describing observable behaviors.<sup>10–12</sup>

For health professionals to maintain and enhance their clinical performance in order to meet the needs of patients, they must achieve higher learning levels in all domains (cognitive, affective, and psychomotor). Through dissemination of more complex levels of knowledge, CPD providers can transfer skills that are more tangible and operational and thus more likely to change participants’ clinical practice.<sup>6,15</sup>

### Towards new models?

Not all physicians are at the same learning stage when they attend a CPD activity, and hence not all of them are ready to change their practice.<sup>21</sup> Social cognitive theories, such as the theory of planned behavior (TPB), explain how people acquire and maintain certain behavioral patterns, while also providing the basis for intervention strategies.<sup>22,23</sup> The TPB has long been used to investigate health professionals’ behavior changes in clinical practice. A systematic review evaluating the intentions and behaviors of health care professionals suggested that although other theories better capture the dynamic underlying intention, the TPB is the most appropriate theory for predicting behavior.<sup>23</sup> Our systematic review of interventions targeting health care professionals found that CPD planners rarely use the TPB (or any other sociocognitive theory) in designing their activities.<sup>24</sup> The TPB indicates that health professionals’ clinical behaviors will be determined by their intention to engage in those behaviors. Intention, in turn, is the result of the attitude toward the behavior, the influence of significant others, and the perceived ease or difficulty of behavioral performance.

These variables could be helpful to CPD providers because they correspond well to Kirkpatrick’s four-level model for assessing the success of a CPD activity. The learning outcomes related to attitude and skill improvement (Kirkpatrick’s Level 2) determine behavioral intention, whereas Level 3 outcomes predict behavior related to clinical practice. The necessary transition from Level 2 to Level 3 can only occur as a result of changes promoted by the content and format of the CPD activity. As required by the TPB, CPD activity learning objectives should specify the population, clinical condition, behavior of interest, and, wherever possible, the timeframe required to perform the behavior.<sup>22</sup> One study has demonstrated how a CPD activity based on the TPB proved to have a more positive impact on the uptake of evidence-based practice than CPD activities that were not theory based.<sup>25</sup> We recommend that CPD providers benefit from these well-known theories to design CPD activities that equip physicians and health care providers with the skills needed to change their practice. This in turn will lead to improved clinical performance for the benefit of patients, health care professionals themselves, and the health care system.

A first step for a CPD provider would be to clearly delineate the clinical behavior to be reinforced using the TACT principles (target, action, context, and time). A CPD activity could, for example, aim for a group of family physicians (target) to implement recommendations on screening for breast cancer in average-risk women aged 40 to 74 years (action)<sup>26</sup> in their clinical practice (context) within the next three months (time). Next, sociocognitive theories propose that interventions must also be designed according to determinants of behavior if they are to achieve behavior change. According to the TPB, those determinants are attitude, subjective norm, perceived behavioral control, and intention. Thus, the CPD provider should find out beforehand which of these determinants need to be addressed in order for the family physicians to make the desired behavior change. If the group has negative attitudes toward the screening recommendations, the activity could include presenting the research that led to the new recommendations, and demonstrating its benefits to patients. However, for a group with very positive

attitudes toward the recommendations, such an approach is unlikely to enhance uptake. This focus on physicians’ judgment of and attitude toward the screening recommendations targets higher learning domains than providing information about the recommendations. Thus, a focus on behavior change will require a new form of planning from CPD designers, which includes (but is not limited to) identifying relevant determinants of behavior change and formulating learning objectives that focus on the higher cognitive skills and on affective and psychomotor domains.

### Limitations

This study has some limitations. First, we acknowledge that many factors other than the learning objectives of a CPD activity can influence their effect on performance outcomes. CPD activities that disseminate knowledge can lead to clinical practice change even if that change is not an explicit learning objective. However, addressing factors that are known to determine behavior change, such as motivation to change or the clinical context, may be a better strategy for achieving desired performance outcomes than simply promoting knowledge acquisition.<sup>27</sup> Second, over the last two decades, there have been attempts to identify the instructional strategies for learning activities that are most effective in either changing professional behavior or improving patient outcomes. A number of articles<sup>2,19,28,29</sup> report that traditional CPD activities such as large conferences are not effective in changing professional behavior, whereas interactive sessions do appear to promote a change in professional practice and in patient outcomes.<sup>2</sup> However, we believe that a successful CPD activity—that is, one that constitutes an effective intervention for clinical behavior change—will align the planning of learning objectives based on sociocognitive theories with the content taught, the instructional strategies, and the evaluation methods. Finally, further research should be done to assess the available resources and structures already in place in the CPD community and the impact of CPD activities that address the various learning domains, including cost–benefit analysis. This could lead to the development of more efficient CPD activities.

The learning objectives of CPD activities in their present form do not promote change in clinical behavior. This is at

least partly attributable to the fact that their learning objectives do not target a desirable degree of cognitive complexity. Most objectives focus on transmission of knowledge rather than application of knowledge. We suggest the use of established theoretical frameworks, such as the TPB, to develop CPD activities that encompass all necessary constructs for tangible change in professionals' clinical behavior and that will ultimately lead to improved patient outcomes.

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