

Improving the Clinical Impact of Continuing Education: Integrating Multiple Educational Models and Formative Analysis to Optimize Outcomes

A Clinical Care Options (CCO) White Paper

CME providers need to be focused on delivering education that moves away from the “one and done” mentality and toward curriculum-based approaches—not the static, immovable curricula of the past, but dynamic, flexible educational models that both ensure multiple exposures and continuous teaching moments and are designed to address educational needs as they evolve and change. This white paper outlines how specific educational frameworks incorporate elements such as formative assessment and reinforcement to strengthen the impact of education on learners.

Pace of Change

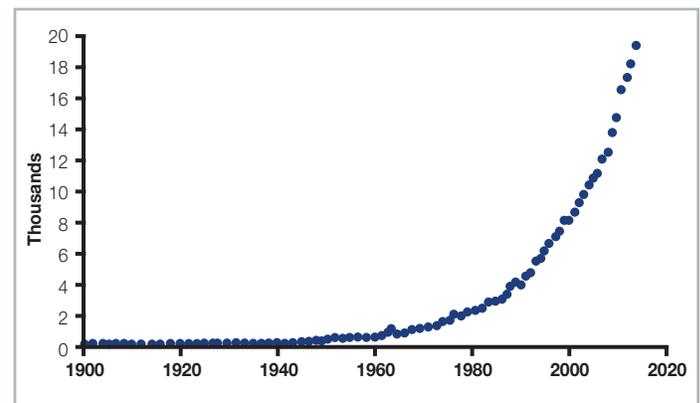
As clinical development accelerates at an unprecedented pace, the crush of new information has become overwhelming for specialists and generalists alike.^[1] The explosion of new treatment options, guidelines, and expert recommendations can be seen in many facets of clinical science and medicine.

Just a few examples include:

- The number of new agent approvals per year has accelerated dramatically. In 2013, the FDA approved just 27 new drugs and biological agents; compare that with 41 new approvals in 2014 and 45 in 2015. Some of these were similar or related to previously approved therapies, but many had never before been used in clinical practice.^[2]
- The body of medical literature has ballooned to more than 50 million available scientific papers, with a new one being published almost every 30 seconds.^[3] In many rapidly changing therapeutic areas, it has become nearly impossible for any single practicing clinician to stay abreast of the published medical literature. For example, the number of published studies in breast cancer has grown from 5572 in 1995 to 19,615 in 2015, an increase of 252%.^[4] **Figure 1** shows the nearly exponential growth in results for this search term since the year 1900.
- Information overload is now rampant in a world of smart-phones, new information sources and systems, and constant interruptions. Clinicians have limited bandwidth and capacity for attaining new knowledge; yet, due to the rapid advance of technology, they are now inundated with a large amount of nonindividualized (and often unsolicited) information, transmitted directly to the device in the palm of their hand, often right at the time it happens. Not only can this situation prove annoying, inconvenient, and frustrating, but it can also have negative implications for physician performance and patient safety.^[5]

- Indeed, the “alarm fatigue” of the recent past (ie, desensitization to clinical alarms in busy hospital units)^[6] has evolved into a more insidious form, “alert fatigue”: today’s computerized provider order entry systems (CPOE) and other technologies spew out so many auditory and visual warnings that clinicians may ignore them or fail to respond appropriately.^[7] Educational models that are not sensitive to these phenomena risk becoming part of the problem, rather than part of the solution.

Figure 1. PubMed results for search term “breast cancer.”



Evolution of CME: Current Issues

With these examples in mind, it is becoming increasingly clear that traditional models of CME program development may fail to meet the rapidly evolving demands of practicing clinicians who must process a flood of new information and apply it to their clinical practice.

Some of the issues include:

Lack of reinforcement through multiple exposures: A “once and done” mentality is far too common in CME. Learning ideally should be an evolutionary process. Educational theory tells us that for adults to master complex new concepts, they require multiple exposures and reinforcements to achieve behavior change. There are now at least 39 systematic reviews of CME effectiveness that, taken together, overwhelmingly confirm that multiple exposures to education is one of the key factors leading to positive outcomes as a result of participation in CME activities.^[8]

Lack of responsiveness: Current clinical knowledge and best practices are constantly changing, yet many CME programs are launched without consideration for how current knowledge and competence measures could change over time. Just a cursory look at the recent progress in cancer immunotherapy development makes it clear that key educational points can become outdated from one week to the next. Yet, in our current development paradigms, the delay between the identification of a critical practice gap and the actual launch of a brand new program to address that gap can be substantial, amounting to several months in many cases. The conclusion is increasingly inescapable: Clinicians who do not receive education in real time will, unfortunately, be delivering suboptimal treatment to their patients. This evolution in practice gaps speaks to a need for educational interventions that can be updated during even relatively short program lifespans (eg, 1 year).

Lack of variety: Clinicians have different learning preferences. Some prefer live meetings, while others gravitate toward online offerings; and once online, format preferences are all over the map. Unfortunately, many providers don't, or aren't able to, plan holistic educational strategies that take into account learning preferences and multiple formats.

Lack of relevance at the point of care: Our research demonstrates that age is a major determining factor of CME activity preference and technology adoption.^[9] Physicians—especially the young Millennials who are poised to become the dominant force in health-care in a few short years^[10]—are accustomed to searching for the information and education they need to treat patients at the point of care. There are few educational initiatives that have an integrated point-of-care component to accommodate the customization of learning that takes place while the patient is sitting with a physician who has a computer on the desktop or a smartphone in hand.

Lack of continuity in outcomes assessment: Although outcomes assessment has become a standard component of CME interventions, much less work has been done on comparing outcomes across educational activities. Not looking at outcomes in the context of similar or related programs is a missed opportunity to gain insights into how knowledge and best practices change over time and how future programs can more effectively focus education for the target learner population.

Patient-Centric Challenges at the System Level

The bigger picture is that today's CME providers face multiple challenges in terms of integrating learning resources into delivery models that have the potential to advance patient care. Clinicians are increasingly making decisions as part of multidisciplinary healthcare teams focused on population health management.^[11] They are coping with new data-driven payment and delivery models at a time when there is increasing emphasis on care that is focused on the patient and coordinated around the needs of the patient. In this milieu, CME providers who want to help optimize care delivery, improve patient health, and increase affordability will have to develop models of education that account for these challenges—not only for individual clinicians, but for the teams, organizations, and systems responsible for delivering on those metrics.

Older CME Paradigms: Hitting Their Limits

The CME community's evolution toward dynamic, effective curricula is being sparked by the limitations of traditional approaches to CME program development. The classic approach to CME is unquestionably effective regarding improved knowledge and competence. However, that effectiveness does not automatically carry forward to the higher goals of performance and patient and community health. The realities of program development often lead to unacceptable delays in the deployment of education with the potential to truly improve the performance of healthcare teams and patient health. Against a backdrop where it may take up to 17 years for new and practice-changing information to be fully adopted into routine clinical practice,^[12,13] it is imperative that CME become part of the solution, rather than another barrier to best practice.

To help overcome the adoption curve issue, providers who offer dynamic curricula approaches are seeking to integrate the gap identification process into the program so it can have an *immediate clinical impact*, thus reducing the number of patients who are offered suboptimal treatment options.

Building a Curriculum in a Continuum

To overcome these barriers, we believe that CME providers need to focus on structuring programs as a continuum of education that is planned and released strategically over time. The continuum strategy should seek to use a variety of carefully selected online and/or live formats, arranged in a logical flow designed to both build learner awareness of educational needs, and provide education that addresses those needs.

The individual components of the continuum intervention may vary depending on the educational needs. The important part is that each component should function not only as a standalone educational activity, but also as part of the larger plan, simultaneously reinforcing and complementing the educational needs addressed by the other components.

One example of this is **Clinical Impact**, an educational framework developed by CCO:

Baseline gap analysis: The core of any effective CME program is informed by a rigorous gap analysis that outlines the key educational needs that must be addressed to improve knowledge, competence, performance, and patient health, both for individuals and in systems of care. A continuum-based approach is no different and requires a comprehensive needs assessment as the bedrock.

Education, first wave: The baseline gap analysis sets the stage for an initial wave of educational deliverables that work together to build awareness of professional practice gaps and offer tools and interventions/activities to overcome those gaps.

Formative assessment: Often, the focus of CME activity evaluation and outcomes is on summative assessment (ie, evaluating learning at the end of an activity and comparing it with an established standard or benchmark). Increasingly, the focus for CME providers needs to be on formative assessment (ie, monitoring learning and providing ongoing feedback over the course of an educational intervention). In particular, how have learners engaged with the first wave of content? Are there new/additional or evolving areas of need?

Education, second wave: Informed by areas of strength and weakness as identified in the formative assessment, additional interventions can be planned to target areas where learners are struggling or otherwise suboptimally learning.

Outcomes assessment: To evaluate the impact of the program, a comprehensive, cross-activity outcomes assessment should be conducted.

By specifically incorporating elements of formative assessment and reinforcement into this framework, CCO seeks to strengthen the clinical impact of the educational initiative and overcome the cognitive overload that is so prevalent in today's medical practice.

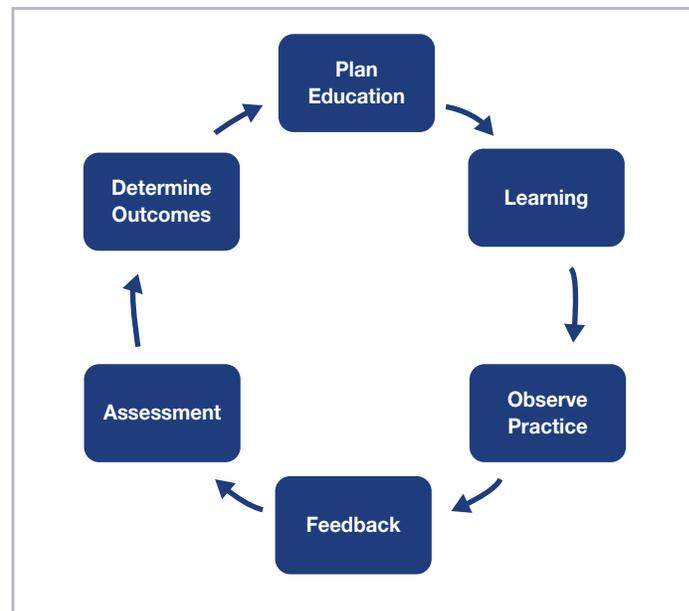
Formative Assessment: Shifting the Bell Curve Forward

Many educational interventions could be improved through reassessment of educational need. One technique to accomplish this is a planned *formative assessment* designed to help learners develop and improve over time. By incorporating such an assessment into an educational curriculum, providers can be proactively prepared to develop new or revised interventions that take into account professional practice gaps that have evolved or arisen anew since the initial launch of a program or curriculum.

Formative assessment stands in contrast to traditional *summative assessment*, in which the impact of education is measured based on the performance of individuals as a specific point in time (eg, how well has a group of students learned following participation in one instructional unit); by using multiple choice questions, surveys, and other forms of testing, evaluators can determine whether trainees have met specific criteria for progression.^[14]

On the other hand, formative assessment (**Figure 2**) describes a framework in which performance is analyzed and used to inform future cycles of education. Much like the cycle of quality improvement in medicine, formative assessment of education is not an event or snapshot of performance, but instead, a process that is organized and integrated over time.^[14]

Figure 2. Formative assessment cycle.^[15]



In the context of continuing medical education, formative assessment may have several distinct advantages over more traditional forms of assessment^[15]:

- It can motivate the learner to achieve more
- It informs learners of their progress and needs for improvement
- It enhances the value of education for future learners
- It can improve the achievement of learners from one instructional unit to the next^[16]

Unfortunately, the principles of formative assessment are often overlooked in the world of education. When applied methodically and in a way that is analogous to principles of continuity and coordination of care, CME curricula can be structured to deliver education that is progressively “smarter” in adapting to current educational needs based on learner performance earlier in the program lifecycle.

Although the role of summative assessment still has its place in medical education, we believe formative assessment can be used to enhance the value of education in a way that overcomes some of the information overload aspects of today’s clinical practice, especially in fast-changing clinical areas where new approvals, new guidelines, or new clinical knowledge may quickly render older education obsolete.

One successful approach to formative assessment that CCO has implemented is outlined in the following **Table** (see below). By applying a formative assessment approach to a live meeting series, we are able to validate the approach to education, providing an opportunity to reassess, and if needed, reorient our educational strategy. The formative assessment in this case may include collective evaluation of data from interviews with participants, review of activity evaluations, analysis of ARS results, faculty feedback, and outcomes question validation testing.

Table. Formative Assessment for a CME-Certified Live Meeting Series (Local Events)

Step 1	Conduct first 3 activities in the series
Step 2	Conduct FORMATIVE ASSESSMENT and evaluate data
Step 3	Modify instruction, content, and/or outcomes questions, as needed
Step 4	Conduct remaining activities
Step 5	Evaluate educational outcomes for the series

More recently, CCO has adopted principles of formative assessment to validate the content of CCO’s Interactive Decision Support Tools (IDSTs) deployed as part of our **Clinical Impact** series of educational initiatives. Our IDSTs are automated online decision aids that prompt the learner to input a patient case and receive treatment recommendations specific to that patient case from multiple experts. Through a formative analysis of the data learners input into the IDSTs, we will be able to discern practice patterns and

trends (eg, how many learners are selecting nonoptimal treatment choices and how many are changing their treatment choice after receiving the expert feedback). That analysis can then be used to assess learner needs in “real time” and rapidly develop new and more targeted education based on those learned needs.

Integrating Point-of-Care Learning Into the Continuum

One other key component of the curriculum–continuum strategy is to incorporate a *point-of-care* element into the educational intervention. This is because, in our experience, we find that clinicians engage with online medical information and education in two unique, but connected ways:

1. Participation in *structured educational programs* relevant to their therapeutic area of specialty. Sometimes this participation occurs proactively (eg, the learner decides to access a CME site and browse or search for a relevant activity) and sometimes reactively (eg, the learner receives an email notification for a specific program, and clicks through to the activity of interest).
2. Lookups of clinically relevant *information at the point of care*, which may occur before, during, or after a specific patient visit. Although some browse for information, search is the predominant way most point-of-care resources are designed to be accessed.

How do these two types of interaction interrelate? Our experience indicates that many clinicians who conduct point-of-care lookups in resources tend to “go deeper” by following links to related CME activities, either at the time of the lookup, or later, when they may have a longer block of uninterrupted time to participate in a CME activity.^[17] In an analysis of *inPractice*, CCO’s own point-of-care resource, we were able to document 25,148 unique visits to CCO HIV-related CME programs over the course of 886 days that had originated with learners who started out on the *inPractice* site.

For this reason, we feel that a contemporary continuing education curriculum should ideally offer point-of-care resources that allow learners to explore and look up related information that addresses their very specific professional practice gaps. These linkages tend to amplify one another. By providing multiple linkages to *inPractice* within the CME activities, we are able to offer convenient access to point-of-care content for those learners who need to go deeper. In turn, the point-of-care resource serves to amplify the impact of the program when learners accessing the resource are presented with links back to the CME content. Effectively, the point-of-care resource serves as an effective extension of the reach-and-distribution strategy for the curriculum itself.

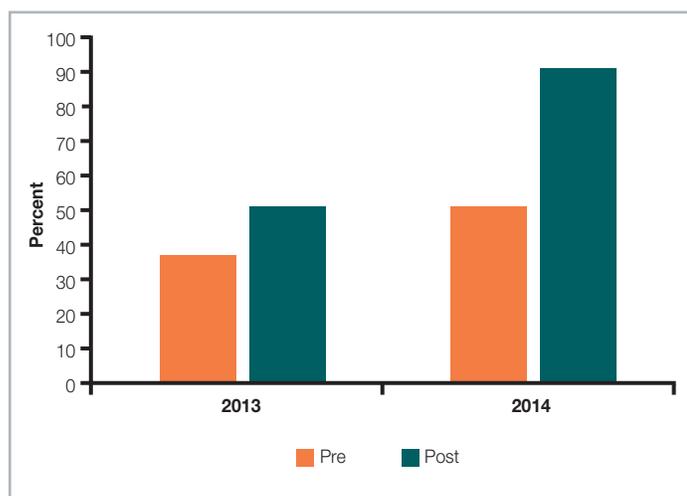
Quantifying the Impact: A Holistic Approach to Outcomes Assessment

Whereas measuring outcomes for each individual CME activity is useful, we believe that outcomes analysis focused on a continuum of activities and interventions may provide broader and more contextual insights on the impact of continuing education. Outcomes analysis for one individual activity quantifies the impact of one type of intervention on a subset of a learner population, whereas outcomes analysis for a curriculum or other grouped set of activities quantifies the impact of multiple interventions on a more inclusive set of learners (eg, an interprofessional team) and in some cases, the impact on entire organizations and systems.

Evaluating outcomes of individual educational activities is standard, but much less work has been done analyzing outcomes across multiple activities that are developed with the same, or similar, educational objectives. Accordingly, CCO is putting increased emphasis on strategies to assess outcomes across multiple different but related activities. By evaluating findings of different educational interventions over time, we have been able to provide unique insights into how educational needs evolve.^[18]

For example, we have evaluated learner performance on a cancer immunotherapy outcomes measure repeated in several independent satellite symposia held concurrently with both the 2013 and 2014 annual meetings of the American Society of Clinical Oncology (ASCO). As shown in **Figure 3**, we were able to demonstrate not only an increase in baseline knowledge of cancer immunotherapy principles over time (pre-education “optimal” responses of 38.0% in 2013 vs 51.6% in 2014), but also an increased uptake of knowledge as a result of the educational interventions (posteducation “optimal” responses of 51.4% in 2013 vs 92.2% in 2014).

Figure 3. Optimal responses to pre- and posteducation outcomes questions; ASCO satellites, 2013 vs 2014.



In sum, this analysis showed both an improvement in outcomes, but also suggested a clear and ongoing lack of basic knowledge regarding principles of cancer care that are increasingly important across interdisciplinary healthcare teams, organizations, and systems. Partial results of this analysis were presented at the Alliance for Continuing Education in the Health Professions annual meeting and are available on our Web site as a downloadable slideset.^[18]

Conclusion: Impact of a Dynamic Curriculum

The educational trends outlined in this white paper support the potential for development of “living” curricula of interconnected activities that build and that reinforce one another and that inform the development of one another through formative assessment. With an eye toward that evolution in mind, CCO has recently designed several new educational interventions that seek to dynamically evolve during the 1-year program life cycle based on a careful and deliberate analysis of actual learner behavioral data obtained through the program itself. The opportunity is to deliver education over time within a set of educational parameters, defined by an initial set of professional practice gaps but flexible enough that those gaps can be prospectively reassessed.

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About Clinical Care Options

Clinical Care Options (CCO), a leader in the development of innovative, interactive, online, and live CME-certified CME programs and proprietary medical education technologies for healthcare professionals, creates and publishes original CME and information resources that are designed specifically for healthcare providers. CCO's educational programs are developed not only to provide the latest scientific information, but also to support the understanding, confidence, application, and competence of healthcare professional learners. In addition to the latest point-of-care resource, *inPractice*®, CCO provides a spectrum of live and online educational programs and formats.

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