

Report to the CUSOM Curriculum Reform Steering Committee

Assessment, Competencies, and Outcomes Committee
June 2018

Executive Summary

Committee Charge

The Assessment, Competencies and Outcomes committee was charged with determining an appropriate framework and approach to assessment within the new curriculum for the CUSOM. Based on literature review and review of best practices around the country, we were able to identify several guiding principles for assessment that should be incorporated into the new curriculum.

Guiding Principles for Assessment

- Assessment should be driven by a clear definition of the outcomes and an agreed-upon framework that we expect from CUSOM graduates (outcomes-based education).
- Grading should be criterion-based, using a competency-based framework as opposed to our current, normative grading.
- The overall assessment plan must be centrally coordinated and regularly reviewed.
- An electronic portfolio with a student dashboard is needed to support adequate documentation of all student assessment data points.
- The principle of “assessment for learning” as opposed to “assessment of learning” should drive assessment in the new curriculum. This means that there should be timely access to feedback and evidence of performance to promote reflection and self-directed learning as well as frequent low-stakes assessments to gather evidence and continue to drive and support learning.
- Multiple assessment methods should be used longitudinally to generate multiple data points about each student.
- Student assessment data should inform program evaluation.
- A competency committee should be used for making high-stakes decisions such as whether a student progresses to the next phase or is ready to graduate. There should be clear hard-stops and correlated remediation opportunities.
- Coaches will be necessary to support student reflection and learning planning.
- Faculty, residents, and students who assess students should receive training and feedback on their assessments.
- There should be an increased emphasis on direct observation of student clinical performance.
- There should be an emphasis on longitudinal relationships between the assessor and student.

Outcomes Framework

Student outcomes should be determined by a large group of stakeholders. While the committee did not fully agree on a specific outcomes’ framework, but there was consensus that we should include the Core EPA’s for entering residency as part of any outcomes framework we adopt. Most importantly, any program outcomes should be measurable, manageable, feasible, and defensible.

Next Steps

- A retreat to specifically discuss and define the outcomes expected of CUSOM graduates. This includes both refining the framework and determining the specific outcomes expected. Attendees should include a broad representation of stakeholders.
- This committee should coordinate with all other curriculum reform committees, but in particular, the Longitudinal Curriculum and Basic Science committees - specifically in relation to coaching, longitudinal relationships as a context for assessment, and changes to curriculum.
- There are numerous ways to assess learners in medical education, and our program of assessment should include many of them. We must think carefully about what the best assessment methods are for each particular outcome.

Suggested Pilots

- Increased frequency of assessment across all blocks and clerkships with feedback provided on all items
- Use of open-ended items in addition to multiple choice questions in basic science coursework
- Regular, low or no-stakes oral exams delivered either individually or in moderately-sized groups
- Use of trained assessors as an adjuvant to observations and evaluations completed by preceptors

Definitions

For the sake of clarity and a shared understanding, we have provided a list of terms commonly used in this document along with their definitions.

Term	Definition
Assessment (general)	Gathering and providing data about a student’s performance, including their knowledge, skills, and attitudes
Ad-hoc assessment	An immediate, informal type of assessment, likely done in the classroom or clinical setting as learning occurs
Outcomes-based assessment (Competency-based assessment)	An approach to assessment that focuses on the outcomes desired from students and uses that to guide curriculum development and assessment. This model de-emphasizes time-based learning and increases individualization of experiences for learners
Criterion-referenced	Students are compared to/measured against an established measure or set of criteria
Formative assessment	Assessment done with the purpose of guiding future performance; requires feedback. This can also be thought of as “low stakes assessment”
MCQ	Multiple-choice questions
Narrative assessment	A statement from an assessor that provides evidence of a student’s strengths and weaknesses, give examples of achievement or deficiencies, and serve as the bases for direct, meaningful feedback (Pangaro)
Normative-referenced	Students are compared to/measured against the performance of their peers within their same level of training
Summative assessment	A “summary” of student performance used to make a judgment of acquisition of skills, attitudes, and or/knowledge. This can also be thought of as “high stakes assessment.”

Literature Review

Assessment is a central component of medical education both for the learner and for the program. Assessment refers to gathering and providing data about how a student is performing. For the program, assessment allows us to ensure that our students are meeting standards such that they are able to provide high quality patient care – ultimately knowing what our students can and cannot do is the school’s way of upholding our commitment to the public to provide high quality patient care. In addition, assessment data becomes the basis of choosing applicants for advanced training programs such as residency and fellowship and provides evidence to support the evaluation and improvement of an educational program. More importantly, from the learner’s perspective, assessment is what provides direction and motivation for future learning. Effective assessment helps students understand their strengths and weaknesses and what they need to do to move to the next level. Thoughtful assessment drives education.

Advances in assessment in medical education are currently focused on adopting competency-based medical education or outcomes based medical education (OBME) (2, 3). Moving toward a truly OBME curriculum

involves starting with the end in mind and defining the outcomes expected of graduates which then inform curriculum development (4). Starting with the end in mind directs the curriculum and assessment efforts designed to assure that the goals have been accomplished. At the heart of this change, is the argument proposed by Cooke et al. that medical education needs to be individualized with standardized outcomes (5). This means that although the outcomes expected of each individual graduate may be the same, the process of getting there is unique.

If our goal is to embrace OBME, the first step in curriculum reform will be to carefully define what outcomes we expect of the CUSOM graduates. This is a challenging task and something that will require input from all stakeholders.

Implementing OBME involves a substantial shift in how we think about assessment that will ultimately improve assessment for the learners, the teachers, and the school. Currently, our individual student assessments are distributed across different courses and the emphasis is on grading. For OBME, we will need a comprehensive program of assessment in which the different individual assessments are integrated and linked together to form a more complete picture of each student. We need to be able to see how a student is progressing in the history taking skills across different clerkships as opposed to just within one individual clerkship.

Programmatic assessment refers to this idea of centralized and organized approach to assessment across the entire four years of medical school. Programmatic assessment has recently been described in the literature as a central feature of OBME and there are numerous articles describing the key features (6, 7). I consolidated these into a mnemonic of three key aspects of programmatic assessment. In planning a program of assessment, there are three P's to consider

- 1) Overall Assessment Plan
- 2) People involved in assessment
- 3) Paper (tools used for assessment)

Overall Assessment Plan

For programmatic assessment to be successful, the overall assessment plan must be centrally coordinated and based on the expected outcomes of the graduates (6, 7). Assessment must be frequent and continuous using multiple different methods to gather data. This assures that data are gathered about all of the expected outcomes, and that multiple data points are accumulated about each specific outcome. This means that the stakes for any given assessment are lower as there are multiple assessments for each outcome. This change supports the concept of assessment for learning where assessment is meant to help students grow and learn and provide formative feedback. Because each assessment is only one data point, each individual assessment carries less weight. In this model the central purpose of assessment is to drive learning and improvement; if enough data are collected those data can ultimately be combined to make high-stakes decisions. The methods used to make these high-stakes decisions must be trustworthy and evidence-based. In particular, any high-stakes decisions such as whether or not a student is ready to progress to the core clinical experience or if he/she has met the outcomes and are able to graduate should be made by a group of individuals who comprehensively review all of the data available about the student's performance. There is evidence to suggest that using a group to make high-stakes decisions reduces bias and allows for difficult decisions to be made if necessary (9, 10) To implement this, there needs to be a clear means of collecting, storing, and analyzing all of the assessment data such as an online portfolio or dashboard (11).

People involved in assessment

The people involved in assessment include the teachers, the learners, as well as coaches/mentors. For the teachers, there clearly needs to be an emphasis on high quality assessment - which will take training and practice. In addition, evidence supports the idea that, at least for clinical assessments, longitudinal

relationships between the student and the assessor improve the quality of the assessments (12). Moving towards a model that focuses on assessment for learning encourages the learners to be more self-regulated and active participants in their education. Our students will need to become master adaptive learners who are constantly learning and growing as the world of medicine changes around them after they finish their formal education (13). Developing these life-long learning skills is supported by engaging our students in the learning and assessment process during their medical school years. Finally, students need mentoring/coaching to help them in processing and understanding their assessment data and translating the data into plans for learning and improvement. Self-regulated learning is not something that learners can do on their own, at least initially (14). We must put a system in place to support our students and help them learn these skills.

Paper (tools used for assessment)

Finally, our approach to the tools used for assessment will also change. The central tenet here is that any single assessment point is flawed, and therefore we must accumulate multiple assessments of different types and in different contexts to truly have a complete picture of each learner (6, 7). There are numerous different ways to assess learners in medical education and our program of assessment should include many of them. We must think carefully about what the best assessment methods are for each particular outcome. There is increasing evidence that supports the use of frequent testing as a means of supporting retention of knowledge in the preclinical years (15). In addition, although multiple choice questions are important as students must learn to do well on them for passing the USMLE, open-ended questions may actually better test and support deeper understanding of concepts and should be included in any assessment plan (16). In choosing an assessment of clinical skills, our emphasis must be on direct observation and specific feedback to our learners. This means that qualitative data (narrative descriptions of a student's performance) are just as important, if not more important, as quantitative data (17, 18). If scales are used, evidence suggests a strong benefit for using criterion referenced as opposed to normative referenced scales (19). This means that scales should include narrative descriptions of what is expected for each level rather than a number or a comparison with peers (i.e. below expectations, meets expectations, above expectations). Ongoing assessments of learners beyond medical school graduation will also be important to help measure the success of a new OBME program.

To truly embrace OBME and assessment for learning at CUSOM, we must engage stakeholders, start with the end product of our medical school in mind, and thoughtfully craft a comprehensive, integrated learner assessment program. While such a program may look considerably different than our current assessment structure(s), it will undoubtedly have beneficial impacts for students and our school.

Committee Process

We began this process by sharing the [CUSoM Guiding Principles of Assessment](#) document that was authored during the first curriculum reform process. To give the committee a place from which to think about assessment as a cohesive, centralized endeavor, we decided to use Karen Hauer's (UCSF) Six Principles of Programmatic Assessment as a way to frame our discussions at each meeting. We discussed the model at our first meeting and asked the group to consider 1) whether we agreed or disagreed with the framework presented 2) what this might look like at CUSoM, and 3) if adopted, what might we keep or change?

We also prepared a [document](#) comparing our current assessment processes with what is currently being done at UCSF to give us a better idea of how we currently might and might not fit a model of centralized assessment. After giving the committee time to discuss and compare, we asked members to plan to interview colleagues at peer institutions to find out more about their assessment practices.

We felt it was important to gather information that would paint an accurate picture of how committee members felt about topics and suggestions that had come up in discussion but might not be highlighted in the

committee report. To gauge whether we had consensus about any of the aspects of centralized assessment that we had put forth, we created an [Assessment, Competencies, and Outcomes Committee Survey](#) to administer to our committee members, the results of which are linked above. Topics with the most varied opinions and that garnered the most discussion included moving Step 1 to after the clinical years, moving to pass/fail for clinical grading, and use of the EPAs in our program competencies.

Because students were not able to regularly attend meetings due to meeting schedules or Step 1 study period, we decided to include assessment-related questions on course evaluation surveys for the Spring ICC courses. The [student survey questions and responses](#) are linked here.

Best Practices/Approaches from other Institutions

UCSF

UCSF has a robust centrally coordinated program of assessment that was created in parallel to their Bridges curriculum. They have also been able to be scholarly in their innovation as evidenced by several recent publications that were highly influential to this committee's work. In particular, the guiding principles for assessment created by UCSF resonated with the committee and were used as starting point for much of our discussion and recommendations. One aspect of the UCSF approach to assessment that is unique and important to consider is that their assessment program was designed in parallel to the curriculum meaning that they were actually able to consider the outcome first and then how they would teach and assess rather than adding assessment on afterwards. So far, UCSF has implemented their new approach to assessment in the preclinical years and they currently rely on both MCQ type questions as well as numerous open-ended essay questions based off of what is done at Case Western University. They have not yet finalized their approach to assessment in the clinical years but will be using the Core EPAs for entering residency. They have created a robust coaching program in which one coach is paired with 12 students over the course of the four years and the coach is responsible for meeting with students to review their assessment data in their electronic dashboard and make plans for future learning. The coaches are also the primary teachers of the clinical skills component of the curriculum and are currently paid at 0.2 FTE per coach (56 total coaches).

Case Western

The crux of the Case Western curriculum is the belief that frequent formative assessment is central to learning and a key aspect of assessment. In the preclinical years, there are optional weekly MCQ questions and two required essay questions per week. The end of the block assessments are essay-based (4-5 essays with multiple sub-parts that take about 3-4 hours to complete). Post-assessment, the students are given an ideal answer and then asked to reconcile their answer with the ideal answer to determine if they met it. They have a homegrown electronic portfolio system that maps student assessment data to specific milestones, which encourages students to reflect more deeply.

Cornell

Cornell has one central committee that manages all assessments. They also have an assessment map in addition to a curriculum map that shows how every learning objective is assessed in every year. The assessment committee meets monthly and reviews this map. They do not currently use the EPAs and also don't have a portfolio where students have access to their assessment information.

Stanford

One interesting aspect of assessment at Stanford is that grading in the clinical years is separated into three separate grades -- 1) patient care, 2) professionalism, 3) medical knowledge. All three are reported on the transcript and are criterion based rather than norm-referenced.

Uniformed Services University

USUHS is using spaced education in the clinical year with a system that delivers MCQ questions to students via email spaced throughout the third year. Students are given the same question again if they do not answer it correctly. They have also moved Step 1 to after the clerkships.

Discussion of an outcomes framework

The last two meetings were spent discussing a potential outcomes framework for the CUSOM. Currently we are using a competency-based framework and have 48 different sub-competencies in 8 domains. The committee felt that this number of different outcomes was not manageable and meant that the competencies may be seen as separate from our current curriculum rather than truly integrated. There was clear consensus that the outcomes must be chosen and considered early in the reform process such that the outcomes can clearly direct the new curriculum. This means that the outcomes must be flexible and modifiable as time changes as we want our curriculum to be nimble.

Determining what our specific framework for outcomes should be turned out to be our most difficult task and not something we were able to gain consensus on. We discussed various options such as the competencies as they exist currently, using the entrustable professional activities (EPAs), or implementing a combination of both, or even going with an entirely different approach. In reviewing the program competencies and outcomes of other schools (OHSU, UCSF, Vanderbilt, Southern Illinois, University of Calgary), it does seem that most are still using a competency framework but many are overlying EPAs.

This committee recommends that determining our student outcomes should be done by a large group of stakeholders. While the committee did not fully agree on a specific outcomes' framework, there did seem to be consensus that we should include the Core EPA's for entering residency as part of the outcomes framework. Any program outcomes should be measurable, manageable, feasible, and defensible.

Current Assessment Practices CUSoM

Strengths <i>(aspects of curriculum that currently address purpose and should be maintained)</i>	
<ul style="list-style-type: none"> • Recent expansion of resources to support student success and remediation, including a Promotions Committee • A CAPE with robust formative and summative assessments, including a comprehensive CPE, OSCEs, and the ability to run assessments on physical exam, inter-professionalism, communication, and clinical skills • Problem-based learning sessions • We have many experienced faculty who are able to make judgments about student performance in clinical settings • The ongoing CQI process has been an asset, and many of the recent changes to the curriculum (the shift to pass/fail, for example) have been able to happen due to momentum, flexibility, and openness to change • Common standards for performance and grading at each level 	
Weaknesses in Current Model	Proposed Changes to address weaknesses in current model
<ul style="list-style-type: none"> • Exam questions found in outside resources may not have been vetted and sometimes do not align with content taught at CUSoM • MCQs are the only way medical knowledge is assessed in Phase I & II • Limited expertise and experience among basic science block directors to write discriminating questions • Block director time to write questions is limited, and writing new questions from year to year is not possible 	<ul style="list-style-type: none"> • Increased frequency of assessment with feedback provided on all items • Use of open-ended items in addition to multiple choice questions – there was much interest in this but concern over the bandwidth it would take to grade, so could utilize a model in which students grade other students’ answers or, as at Case Western, ideal answers are provided for students to use as comparison to their own answers. • Regular, low or no-stakes oral exams delivered either individually or in moderately-sized groups
Considerations for Implementation	
<ul style="list-style-type: none"> • We should consider that any changes we recommend should be carefully considered within whatever changes are recommended by other committees and whatever new curriculum we decide to implement. • We should consider building a process for sharing meaningful student information for learning across medical school that both protects students and allows us to collect information that may help students succeed/remediate. • We should incorporate multiple methods of assessment/types of data, in accordance with the principles of programmatic assessment. 	

Threads Assessment

There is variability in how threaded content is assessed, and some competencies associated with certain threads are not assessed at all. In 2016, the Threads Assessment Task force was charged with developing a Thread Assessment Plan to help ensure that students meet the competencies associated with thread content. The findings of that committee are included below. Some changes have occurred since 2016, so this should be updated. (For example, the interprofessional education program has added assessments, including assessments of team functioning, observational assessments by interprofessional team members, and capstone projects that are evaluated with rubrics.) Each thread director gathered the associated competencies, goals, objectives, current strategies for how content is delivered and assessed, and the content and assessment gaps. Each of the threads have the following assessments:

Thread	Assessments
Humanities, Ethics, and Professionalism	MCQs in Phases I/II (IPED, M2M, Anesthesia block); Foundations & Clinical block assessment forms, writing assignments in the Women’s Care and Surgery blocks
Evidence-Based Medicine	3 MCQ exams in Phase I during M2M; formative journal club exercises
CHES	MCQs in Phases I/II
Medicine and Society	only assessed in Phase I/II sessions that have curriculum that is tested relative to the sessions with associated learning objectives

The Threads Assessment Taskforce recommendations included:

- Make the First Course part of the curriculum with appropriate assessments that count for a Pass/Fail grade. Continue the First Course into the curriculum with designated time and space following many blocks and into the ICCs
- Include Thread content into Phase I/II block exams (MCQ questions if applicable) and clinical assessments (possibly add open-ended questions)
- Expand CAPE exams to include threaded content and in the ICCs
- Expand EBM online platform to include other content for discussion in Journal Club and into Phase III

Guiding Principles for Assessment

Based on the above discussion and literature review, the committee created a set of guiding principles for assessment in the new curriculum as well as suggestions for pilots for the coming year.

- **Assessment should be driven by a clear definition of the outcomes and an agreed-upon framework that we expect from CUSOM graduates (outcomes-based education).**
- **Grading should be criterion-based, using a competency-based framework as opposed to our current, normative state.**
- **The overall assessment plan must be centrally coordinated.**
- **An electronic portfolio with a student dashboard that will support adequate documentation of all student assessment data points.**
 - To maximize assessment, we need to emphasize longitudinal relationships
 - Portfolios should enable students to reflect, review, and participate in their own assessment.
 - We have several experts on portfolios on campus and should leverage their experiences in creating something that is accessible and usable for our students and faculty.
- **The principle of “assessment for learning” as opposed to “assessment of learning” should drive assessment in the new curriculum. This means that there should be ready access to feedback and evidence of performance for reflection and self-directed learning as well as frequent low-stakes assessments to gather evidence and continue to drive and support learning.**
 - This means that the frequency of testing should increase. However, every assessment must also have feedback to promote learning.
- **Multiple assessment methods should be used longitudinally to generate multiple data points about each student.**
- **Student assessment data should inform program evaluation.**
- **A competency committee should be used for making high-stakes decisions such as whether a student progresses to the next phase or is ready to graduate. There should be clear hard-stops with correlated opportunities for remediation.**
- **Coaches will be necessary to support student reflection and learning planning.**
 - This will require funded positions with faculty development to assure that all students have a similar coaching experience and that each coach has enough time per student to truly impact their learning and longitudinal relationship-building.
 - The exact role of the coach is still to be determined. One additional option discussed in the committee is that the coaches could also serve as assessors for students not in their coaching group (i.e. the coach from group A could assess group B and vice versa).
- **Faculty, residents, and students who assess students should receive training and feedback on their assessments.**
- **There should be an increased emphasis on direct observation of student clinical performance.**
 - There should be an emphasis on longitudinal relationships between the assessor and student.

- **The assessment program should be continually monitored to assure that implementation and outcomes are achieved. Such evaluation would address adherence to the principles of assessment, examine data on assessment quality and use, provide feedback to all involved in the process.**

Next Steps

- A retreat to specifically discuss and define the outcomes expected of CUSOM graduates. This includes both refining the framework and determining the specific outcomes expected. A broad representation of stakeholders should be included.
- The Assessment, Competencies, and Outcomes committee should coordinate with all other curriculum reform committees, but in particular, the Longitudinal Curriculum and Basic Science committees - specifically in relation to use of coaching and development of new curriculum.
- There are numerous ways to assess learners in medical education, and our program of assessment should include many of them. We must think carefully about what the best assessment methods are for each particular outcome.

Pilots in Phases I & II (Science Content)

Current	Consider for Future
<ul style="list-style-type: none"> • Cumulative Exams in Phase I & II 	<ul style="list-style-type: none"> • Increased frequency of assessment with feedback provided on all items • Use of open-ended items in addition to MCQs – there was much interest in this but concern over faculty time required to grade, so consider students grading other students’ answers. • Regular, low or no-stakes oral exams delivered either individually or in moderately-sized groups.

Pilots in Phases III & IV (Clinical Settings)

Current	Consider for Future
<ul style="list-style-type: none"> • Clerkship grading (honors/high pass thresholds) 	<ul style="list-style-type: none"> • Modifications to assessment process to align more with intended outcomes of CUSOM • Use of trained assessors as an adjuvant to observations and evaluations completed by preceptors that students work with

Committee Members

Name	Title
Adam Panzer	Phase II Medical Student
Brad Bendiak	Phase I/II Lecturer
Chris King	Director, Hospitalized Adult Care Block
Daisy Talavera (Co-chair)	Curriculum and Assessment Specialist
David Ecker	Director, CPE; Director, ICC
Gretchen Guiton (Steering Committee)	Director, Office of Evaluation
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Jason Hendrickson	Phase IV Medical Student
Jeannette Guerrasio	Remediation
Jennifer Gong (Co-chair)	Assistant Director, Office of Evaluation
John Soltys	Phase IV Medical Student
Joseph Sakai	Director, Psychiatric Care Block
Kimi Kondo	Director, Integrated Radiology Curriculum
Lindsey Lane	Vice Chair of Education, Department of Pediatrics
Maria Frank	Co-Block Director, Human Body
Matt Rustici	Director, Problem-Based Learning
Maureen Stabio	Phase I/II Lecturer
Meredith Alston	Program Director, Obstetrics & Gynecology
Michele Doucette	Assistant Dean of Integrated Curriculum
Miriam Post	Chair, Promotions; Pathology Content Steward
Mona Abaza	Program Director, Otolaryngology
Tai Lockspeiser (Steering Committee)	Director, Electives
Timothy "Ty" Kelly	Phase II Medical Student
Todd Guth	Co-Director, Emergency Care/FDC
Wendy Madigosky	Director, Foundations of Doctoring; IPED

Literature Review References

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Meeting Minutes & Supporting Documents

[December 5th, 2017](#)

[January 30th, 2018](#)

[March 6th, 2018](#)

[April 24th, 2018](#)

[May 22nd, 2018](#)

[June 5th, 2018](#)