

**UNIVERSITY OF BRITISH COLUMBIA**

**Faculty of Medicine**

**MD Undergraduate Program Curriculum Renewal**

**Final Report of the Working Group on Student Assessment  
For the Implementation Task Force on Curriculum Renewal**

**December 11, 2012**

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## **Mandate**

This Implementation working group is charged with the responsibility to create the assessment framework for UBC's new MD undergraduate program that reflects the renewed Social Responsibility and Accountability framework and the outcomes-based goals as articulated by the Exit Competencies working group. The working group is to complete this task utilizing an ongoing reciprocal, collaborative relationship with the Exit Competencies working group.

The Final Report describes the goals, principles, overall design, and governance of the new assessment system. The assessment system is designed to ensure that students achieve the required exit competencies (both through steering influences and measurement) and reflects the core principles driving curricular renewal of social responsibility (to the public), diversity (student and program site), flexibility (student and program site), and continuity (physician advisor, portfolio assessment by a single Progress Committee). The assessment system and its governance reflect the design of the new curriculum and a competency-based educational program. The resource implications of the new assessment are also outlined.

## Introduction

The Student Assessment Working Group began in September 2010 with a mandate and specific deliverables defined in the previous phase of Curriculum Renewal. With these elements before the group, the initial task was to clarify the broad goals and principles that would underlie and define the new system, and begin reviewing the assessment literature. The group worked to develop initial consensus and then considered competence-based assessment methods and strategies that would be appropriate for the new curriculum.

In early 2011 the key and enabling competencies developed by the Exit Competencies Working Group were presented to the working group. Other working groups were also completing their efforts and the elements of each of these efforts required consideration from the Assessment working group, as we continued to develop the fundamental elements of the Assessment System in a manner that would reinforce rather than impede the new curriculum. The group recognized that similar efforts were occurring within the Curriculum Design team and efforts were made to align the Assessment system with the key aspects of the Curriculum Design as it too was being developed.

With the development and dissemination of the Curriculum Design final modifications to the Assessment Framework could then be undertaken. The Student Assessment Working Group had been analyzing the competencies to determine the most appropriate assessment methods and strategies. The Curriculum Design allowed the Assessment working group to consider the appropriate timing of key elements of the framework, and as the milestones for each key competency continue to be developed, further refinements to the Assessment framework will be possible under the guidance of our recommended governance structures.

The group has utilized the broad expertise within the group, peer-reviewed literature, and external experts for ideas, information and consultation.

## Membership of the Student Assessment Working Group

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## Steps in the Development of the Assessment System

1. Identified the principles and key features of the new assessment system and the Goals of the assessment system, including a literature review and consultation.
2. Conducted a systematic analysis of the exit competencies. (May 2010)
3. Provided feedback to the Exit Competencies Working Group as the first step in an iterative process.
4. Reviewed in depth the assessment strategies that the working group thought should be components of the new assessment system including:
  - a. Programmatic level OSCE's
  - b. Progress Tests
  - c. Workplace-based assessment and other performance assessments (e.g., Mini-CEX, clinical skills tutors, small-group CBL tutors, multisource feedback, clinical preceptor assessment)
  - d. Portfolios
5. Analyzed the design of the new curriculum to be able to develop an assessment system that is aligned with the educational program. (Winter 2012)
6. Designed the structure of the new assessment system and its governance. (Spring/Summer 2012)

Sought stakeholder input through presentations to multiple committees within the Faculty of Medicine. (Spring/Summer 2012)

## Guiding Principles

The following are the principles upon which the design of the Assessment System for the new curriculum is based.

1. The values of Curriculum Renewal, including integration, continuity, flexibility and social accountability, must be reflected in the assessment system.
2. Assessment must be linked to the Exit Competencies and matched to the design of the curriculum
3. The methods used must be appropriate to the competency being measured and be of high quality, defined in terms of reproducibility/reliability, validity, feasibility, fairness, and benefit to learning.
4. Competency-based medical education requires early immersion into the practice environment and adapting the principles of work-based assessment to the evolving professional responsibilities of the learners.
5. The system will maximize opportunities for “assessment for learning” to facilitate learning and remediate deficiencies.
6. Monitoring students’ achievement of the required competencies i.e., “assessment of learning” must be progressive, cumulative, and limited to strategic points (milestones) in the learning trajectory with a focus on integration and application of knowledge and skills across disciplines fundamental to the practice of medicine.
7. Recognizing the continuum of medical education from undergraduate to postgraduate and continuing professional development, elements of the assessment system will reflect assessment processes in other phases of the continuum as much as possible.
8. Assessment will be conducted at a programmatic level to allow for the achievement of the above principles, and to develop efficiency and adaptability within the assessment framework.

## Goals of the Assessment System

If the Assessment System including its governance structure, is implemented as planned and functions as intended, the system will:

1. Optimize the capabilities of all learners by providing motivation and direction for future learning with regular, appropriate, and, timely assessment with feedback that is always formative and is taken in aggregate over time for use in summative decision-making.
2. Foster a culture that encourages learners to seek improvements in their own, their colleagues’, and their group’s/team’s performance toward achieving better health outcomes for patients and populations.
3. Assure the public, the faculty of medicine, and the profession that all graduates have achieved the required competencies.
4. Function as part of a continuous quality improvement process that reflects the reality of the learning process and leads to better student performance, a more effective curriculum and improvements in the assessment system itself.

## From Theory to Practice

The new Assessment System is a system of interlocking pieces that achieves the goals of the framework through the strengths of each element individually as well as the interplay between each element. The three key “legs” constitute the framework: OSCE’s, Progress Tests, and e-Portfolios. Based on the current literature, we believe that the use of the assessment system we propose, which brings together the strength of several assessment strategies cumulatively overtime, will ensure that our lens is broad to reliably assess the development of competencies of our learners (See Ref 6 Hodges 2006). The assessment framework is then supported by two governance structures: the Student Assessment Committee and the Student Progress Committee.

The three elements of the framework are initiated at the start of the Undergraduate program and revisited longitudinally throughout the four years of the student’s undergraduate career (Figure 1). The proposed timing for these elements is graphically illustrated in Figure 2 and represents our understanding of the current Curriculum Design. If the design is adjusted as Implementation progresses, then the governance structures we have proposed will allow adjustments to the timing of the OSCE’s. The other two elements are designed to be effective independent of the details of the design and the timing of its elements, although clearly remedial efforts would still have to be coordinated with the design of the curriculum.

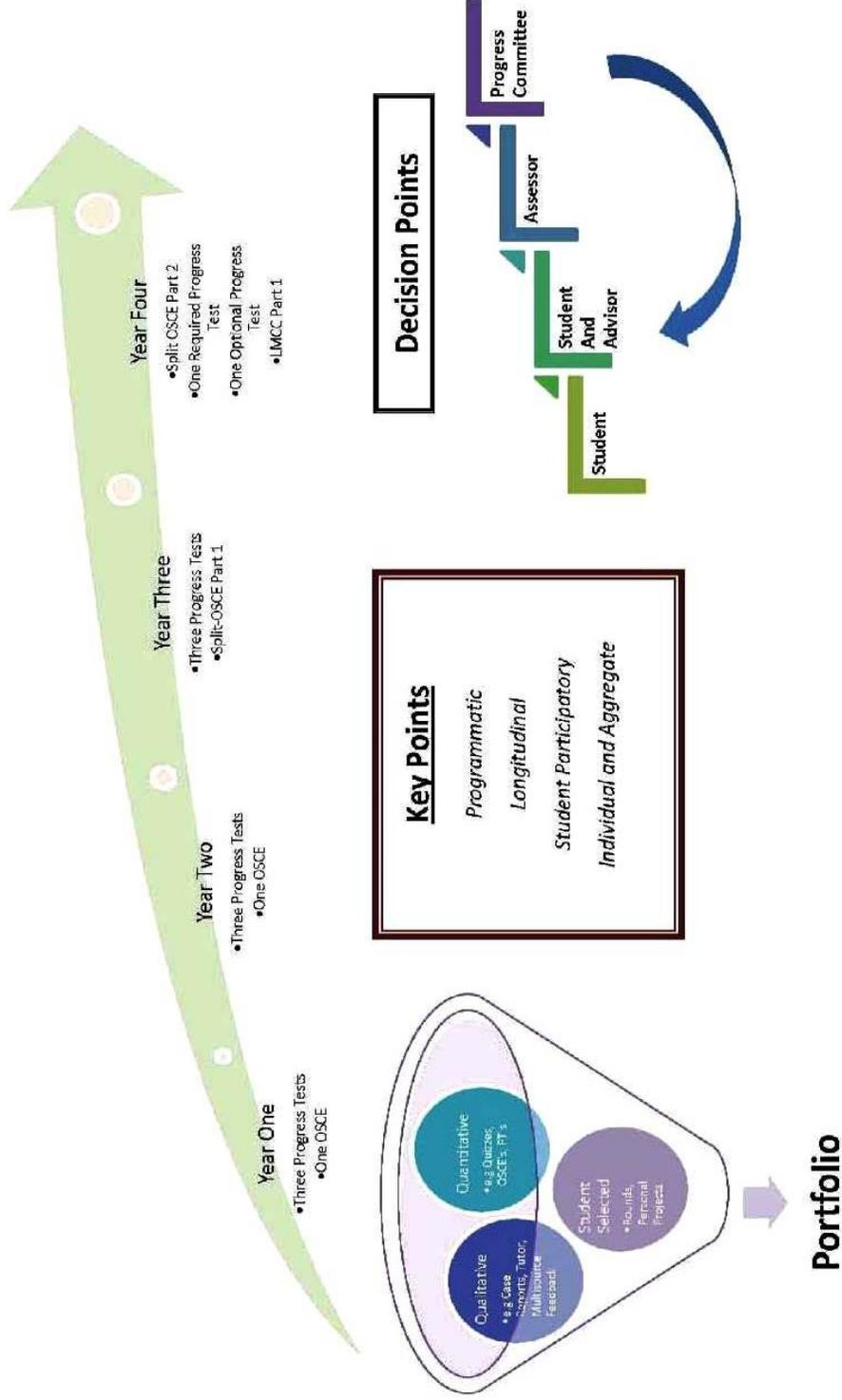
The Assessment working group anticipates the development of competency-based milestones that can then be mapped to the curriculum design. These milestones can then be assessed using a combination of knowledge application exercises, clinical reasoning exercises, workplace-based assessment, progress tests, OSCEs and a portfolio (where all assessments are held). In particular, the portfolio and the OSCE will allow adjustment of the components within each in order to target the milestones. Meanwhile, the Progress Tests will be targeted at an exit level of competency and will not need specific milestones in order to be effective. Given that any attempt to develop milestones for each exit competency cannot hope to achieve the nuance or entirety of an exit level of competence, the Progress test will allow the student and faculty to demonstrate progressive improvement along the continuum towards their exit competencies.

A complex system such as an effective assessment framework requires oversight and flexibility. This oversight will require a team of faculty members with a demonstrated interest and understanding in assessment who can ensure the integrity of the assessment framework and its subunits, while at the same time acting to improve the assessment framework as the science of medical education and assessment continues to progress. Further, at critical points during the student’s undergraduate experience important decisions regarding appropriate progress and development must be finalized. The intervals will be of sufficient duration to permit self-paced and formative learning, as well as, the identification and remediation of deficiencies. Up to the present time, there has been a clear distinction between formative assessment i.e. “assessment for learning” and summative assessment i.e. “assessment of learning”. Formative assessment was thought to allow students to self-assess and would never be used (would not “count”) in formal summative decision-making. In general, formative assessment with the provision of feedback was infrequently provided and/or poorly aligned with assessments used for summative purposes. Summative assessment currently consists of several, high-stakes, snap-shot exams measuring students’ knowledge and skills in separate disciplines. Experts in the field of assessment are recommending the use of frequent meaningful assessments of students’ development of cognitive and clinical skills with timely feedback. These assessments collected over time can be taken in aggregate to inform summative decision-making related to student progress (Ref 16). In addition, through the use of a portfolio, the student with the support of their physician advisor will reflect on the areas of strength and those in need of improvement. The student will develop learning plans with specific goals and timelines and will reassess if those goals have been met. The use of a portfolio with a prescribed and limited number of

items to be used for summative assessment allows for differences in student progress (respects diversity and provides flexibility) in developing the required competencies. There will be a tendency to reduce the contents of the summative portfolio to a score/number, determined by assigning values to the various individual assessments, for the purpose of making advancement decisions. Guidelines should be developed to assist the faculty in making student advancement decisions in a holistic manner that takes all individual assessments into consideration (i.e., “expert professional judgement” Ref 16, Van der Vleuten 2012). The Assessment framework will depend upon the creation and management of a Student Progress Committee to allow for these decisions to be made on a biannual basis, and for recommendations regarding continuation, remediation, or dismissal. A biannual timetable will allow the student an appropriate interval to demonstrate development, and provide surety to the Faculty of Medicine that students are being monitored and quality is being assured.

The science of Assessment demonstrates the tremendous value associated with a programmatic approach to summative assessment. In the opinion of the Assessment working group, the unique characteristics of the UBC Undergraduate medical education program with its combination of significant student numbers dispersed across multiple distributed sites also necessitates a programmatic approach. Finally, as the curriculum renewal process proceeds with the goals of a longitudinal, spiral curriculum and the attendant principles already described, a programmatic approach will allow a consistent approach to assessment that resists the fragmentation that is an ever-present challenge with distribution.

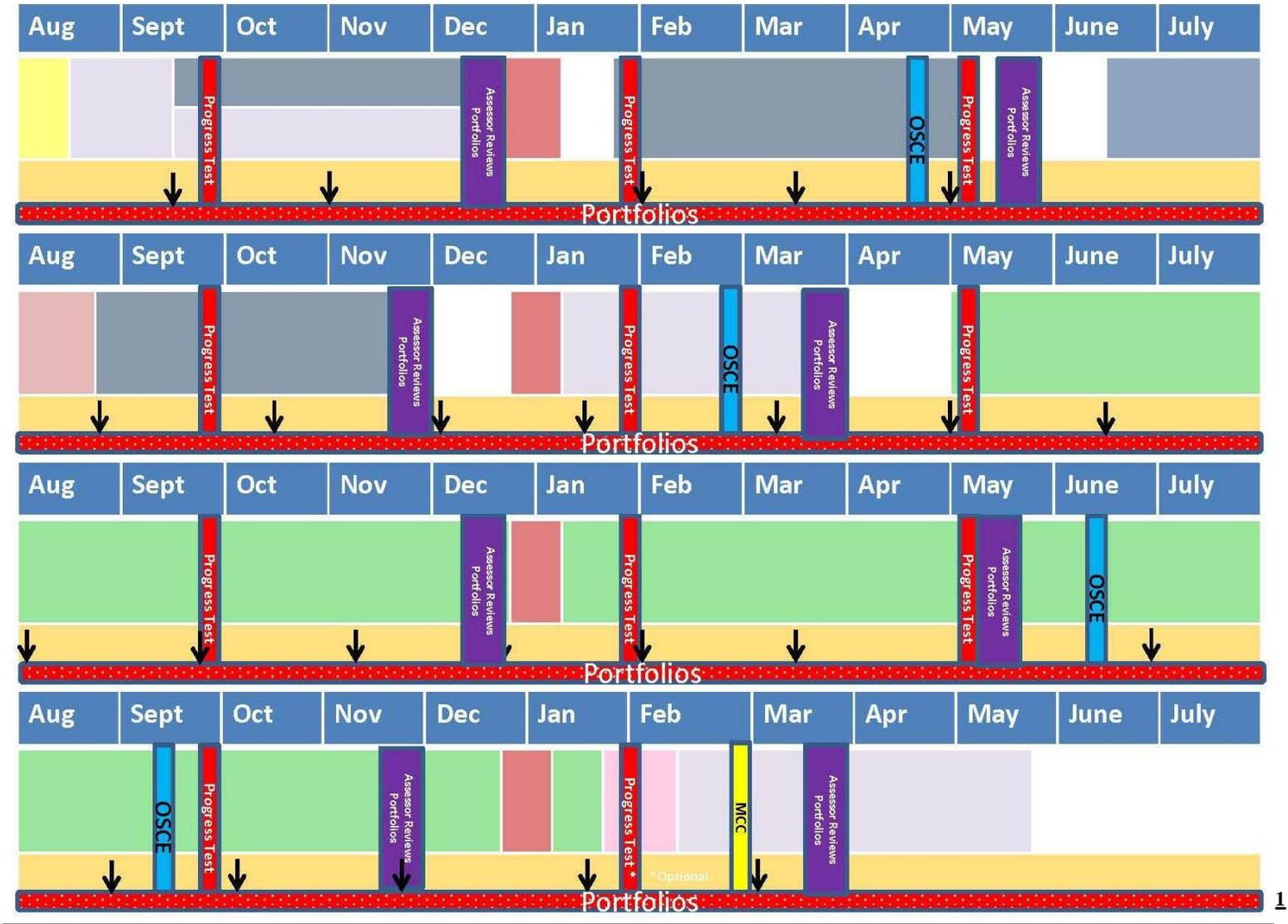
# Assessment Framework 1.0



## The New Assessment System

1. A portfolio approach that documents learning and reflection will be a core part of the assessment system.
2. Educational milestones for each key competency must be developed to serve as the template for assessment.
3. Promotion and advancement decisions, based on multiple assessments performed in different contexts, aggregated overtime, will be made at designated intervals and coordinated/overseen at a programmatic level.
4. Learners should strive to improve rather than be satisfied with their current level of competence.
5. Students will be expected to focus on areas of weakness, develop and carryout a learning plan, and then re-self-assess to identify further directions for improvement.
6. A Pass/Fail, criterion-referenced system that encourages collaboration among learners should be implemented. Note: This change was implemented in September 2012 program-wide.
7. Patients, standardized-patients, peers and other health care and allied professionals should be involved as assessors when that role is consistent with their expertise.

**Figure 2 Student Assessment points overlaid the Curriculum**



<sup>1</sup> Note: The arrows represent portfolio review with the ALC physician and the student, approximately every six weeks.

# **Use of the e-Portfolio in the MD Program Assessment System**

## **Philosophical underpinning of the use of a portfolio in the MD program**

Greater and greater emphasis is being placed on the assessment of the CanMEDS competencies by many healthcare educational institutions at all levels, including UBC Medical School. However, the tools available for assessment of non-medical expert competencies are very limited (1). Schools, such as UBC, that expect students to meet explicit competencies have a responsibility to provide learners with formative feedback about gaps in knowledge and skills and to identify areas for improvement (2). Further, the skills of self-directed assessment seeking and reflection around these competencies have, up to now, not been taught well (3). It is generally accepted that the mastering of any skill is best done with basic training and a plentitude of deliberate practice, which involves coaching and feedback strategies. Other medical schools have used portfolios for a number of years with good student engagement and evidence of improved outcomes (4-7). Further, there is evidence that early exposure to portfolios in medical education is an effective tool to stimulate students' reflective ability (3). Finally, it is generally accepted that the alignment of the objectives of curriculum and assessment produces the best outcomes for learners (8,9). For these reasons, portfolios are recommended by the Student Assessment Working Group as a means of teaching these skills and assessing the non-medical expert CanMEDS competencies. Key to the successful use of portfolios in an educational program are that the structure of the portfolio be simple, clearly specified and understandable; activities and materials be relevant to physician competencies; students be coached and engaged; and that the portfolio is summatively assessed (4, 5, 6). Recent research shows that web-based portfolios enhanced student motivation and were perceived to be more user-friendly by faculty mentors, while at the same time were comparable to paper-based portfolios in terms of content quality (10). This evidence supports our recommendation of an electronic portfolio (ePortfolio) to increase student and faculty acceptance.

## **Purposes and Characteristics of the ePortfolio at UBC**

The purpose of the ePortfolio is to guide and assess the development of competence with each of the exit outcome competencies. Students, with assistance of their physician advisor and peers (models to be explored), will use information from all assessments (Qualitative and quantitative) and other work they produce (see 3.a below), to reflect on their learning and to guide future learning toward the development of the required exit competencies. In essence, the effective use of a portfolio as described above assists students in developing the reflective practice skills that are required for self-directed, life-long learning. Further, it sets the habit of seeking and accumulating evidence of progress/skill, activities that are becoming increasingly important for residency training and professional revalidation. The use of the portfolio in our MD program will fulfill the accreditation requirement of standard ED-5-A Active learning. It is envisioned that all of the requirements for demonstration of each required competency will be developed, collected, and reviewed within the portfolio. A key activity will be mentored and supported reflection by the students on their work and how it demonstrates their progress in developing each competency. It is also envisioned that the portfolio will be carried over into the student's postgraduate training program where portfolios are now also being implemented at UBC. Therefore, the portfolio that is adopted for use in the MD program ideally should be transportable to/compatible with the portfolio used in postgraduate training and beyond. In addition, the portfolio adopted for use in the MD program should be useful to the other health professions in the Faculty of Medicine. All of these factors should be considered in the decision-making process.

## **The Structure of the ePortfolio**

The portfolio will be divided into seven sections based on the UBC exit competencies (1.a below). Each section will be divided into three main areas defined by access (2.a below). The student, in consultation

with their physician advisor, controls the bulk of the content of the portfolio, as well as, who has access to any given section. The results of all assessments prompted by the MD program (e.g., OSCEs and Progress Tests) will be uploaded automatically by the MD program into the appropriate section or into one general area such that the student is required to move each into the appropriate competency-focused section and access area in the portfolio. Ideally, the portfolio would include a notification function that would alert the student and their physician advisor when new items are added to the portfolio. In addition, the student will be enabled to add various materials of their own choosing that they think to be relevant to demonstrating progress within any given competency domain (3.b below). The student will use this portfolio as the basis for discussion during regularly scheduled performance reviews with their physician advisor (6 week intervals) who will have access to anything the student has placed in the formative area. The student will reflect on these discussions, supplement the portfolio, and develop a summative portfolio twice each year that will be reviewed by a physician assessor for progress decision-making purposes. The expectation is for the student, at the outset, to identify areas of potential growth (i.e., weakness or gaps in each competency), citing data from the collections of assessments. Subsequent assessment cycles should demonstrate growth, again, through citing of various sources of feedback/evidence and identify new avenues of development before the next assessment cycle is complete. The student's physician advisor will sign off on the summative portfolio verifying that it is an accurate representation of the student's progress in developing each competency. The physician *assessor's* role will be to review and judge the portfolio as indicating progress has been adequate, that too little information was provided, or that a more extensive review should be conducted by the Progress Committee. To orient the *assessor*, the student will be expected to develop a brief (i.e., one paragraph) reflective essay outlining their perceptions of progress for each competency section and citing evidence contained within the summative space. The essays would have hyperlinks that would link back to the reference data so that the document/item could be viewed in its entirety by the *assessor* (or, in those cases when students are flagged by an assessor, by the Progress Committee). Physician *assessors* and, if needed, the Progress Committee have access only to the summative assessment space.

This approach to assessment will allow many low-stakes assessment points to be used to make high-stakes decisions rich in information and with a minimum of bias and error.

1. The portfolio will be divided into 7 sections based on the UBC exit Competencies/CanMEDS roles:
  1. Advocate
  2. Communicator
  3. Collaborator
  4. Manager
  5. Medical Expert
  6. Scholar
  7. Professional
2. Process of self-assessment and personal development (refer to 6. ALACT Method, below)
  - a. Students will be introduced to the e-portfolio in 1st year during transition to medical school. As part of the introduction they will self-assess on CanMEDS competencies with the expectations that they will identify some areas of weakness and potential challenges to development based on past experience. Citation of evidence will be limited.

b. They will meet with their physician advisor and based on this self-assessment will develop plans for learning and development for the coming months, focusing on small, sustainable changes. They will decide what types of evidence they will gather to substantiate these changes based on the types of content listed in number 4 below.

c. The student and the physician advisor will document in the formative assessment area the learning plan for each competency.

d. Before their next meeting with their physician advisor, the student will review the learning plan and prepare documentation of their on-going learning and development to further self-evaluate and identify gaps and additional learning opportunities.

e. Again, the student and the physician advisor will document the revised learning plans.

f. Twice a year, the student, with the oversight of their physician advisor, will develop a formal report of learning for review by the physician assessor. This will be placed in the summative assessment space. Once signed off by both the student and the physician advisor, this document will be permanently locked.

g. The physician assessor (who will be drawn from the pool of physician advisors with the constraint that advisors not serve as assessors for their own students) will review the submitted report and make a recommendation to the Student Progress Committee that the report shows one of the following: i) sufficient evidence of progress, ii) more information is required, or iii) that progress is insufficient.

h. This entire process will be repeated throughout the four years of medical school. The focus will be on gradual, sustainable growth and development.

i. The physician advisor, being isolated from summative assessment of their students, will encourage the student to be open and honest with the expectation that the pattern of development will likely be a saw-tooth incline rather than smooth and uneventful, in keeping with the reality of human development.

j. It is recognized that greater success may be achieved by encouraging the student to work with other students, in groups, to support each other's efforts and to get more regular feedback on development from each other. This may be achieved within ALC's or across ALC boundaries.

3. Password protection is essential/firewalls- level of security

Each of the 7 sections will be divided into at least 3 or 4 areas that are defined by who has access. The existence of a shared space, either one for the entire portfolio, or a shared space in each section of the portfolio (likely to work best) needs to be determined as does who should have access to such a shared space (i.e., would it be accessible only to other students and faculty in the ALC or more broadly?)

a. Student access to their portfolio- all sections, i.e.

Private space,	All information included in the portfolio
Formative assessment space,	Information the student releases to the advisor
Summative assessment space	Information the student releases to the <i>assessor</i>
Shared space with others	Information desired to be made more public

- b. Physician Advisors access - to the formative and summative portfolios of students they advise
- c. Physician Assessors access - to summative portfolios of assigned students
- d. Progress Committee access - to the summative portfolio of all students though they will only review student portfolios triaged by *Physician Assessors* and those selected for random checks.
- e. Other Students and Faculty(?) Shared space- other students in the same Academic Learning Community (ALC) or shared more widely with teachers and students in the program (TBD).

TABLE OF ACCESS AND UTILITY

	<b>PRIVATE SPACE (DIARY)</b>	<b>FORMATIVE ASSESSMENT SPACE</b>	<b>SUMMATIVE ASSESSMENT SPACE</b>	<b>SHARED SPACE</b>
<b>STUDENT</b>	Personal notes/experiences	Items regarding day-to-day development, draft of summative assessment, etc.	Demonstration of reflection, self-assessment and development by use of citing data/feedback. Some mandatory items, e.g. OSCE, progress tests, etc.	Blog, questions, discussion in a wider circle.
<b>PHYSICIAN ADVISOR</b>	No access	Feedback to student, notes on meetings, plans for further meetings.	Read only	Open access
<b>PHYSICIAN ASSESSOR</b>	No access	No access	Read only	Open access
<b>PROGRESS COMMITTEE</b>	No access	No access	Read only	Open access
<b>OTHER STUDENTS OR FACULTY</b>	No access	No access	No access	Open access

4. Contents

a. Types of Documents

- i. Case logs (need to work out privacy/consent issues re patients?)
- ii. Exam results- Progress Tests (PT), OSCE's, Program generated scores will upload directly into the portfolio. Some of these e.g. PT, OSCEs may be mandatory inclusions in the summative portfolio, but the student will need to move these into the summative section.
- iii. Other Assessments (e.g. Knowledge application exercises, Quizzes, Clinical reasoning exams, short answer questions, Mini-CEX/RIME, preceptor, clinical skills teacher, small

group tutor, multisource feedback, field notes from medical, nursing and clerical staff and patients – 360 degree feedback)

iv. Reflective essays on each competency – with linkage to evidence in the formative portfolio. Students will do this twice per year

v. Other items that students may choose to include as evidence of learning, e.g. CV , reflections of volunteer work, scholarly work, reflection on a significant clinical event, etc.

- b. File types
  - i. Word documents
  - ii. Images- Jpeg, tiff, other?
  - iii. video
  - iv. audio
  - v. power point
  - vi. other?

## 5. Information technology issues

- a. The portfolio will be electronically based.
- b. The portfolio must be accessible via internet and wirelessly over a secure connection (VPN).
- c. The portfolio software and its supporting communications software must be very robust with a virtual zero tolerance for failure to perform.
- d. There will be at least 3 and possibly 4 different levels of access with variable access to each level by individual and write and read or read only access. (see above Table of Access and Utility)
- e. All updates and support work must be done, as much as possible, with minimum interruption of service, particularly during normal daytime hours, including evenings and weekends, when students will be working on their portfolio.
- f. All updates and support work must be done, as much as possible, with minimum of one week's notice to all users and cannot occur within three weeks of an assessment cycle.
- g. An individual's portfolio must temporarily lock out other users while being accessed by anyone, to prevent loss or corruption of data.
- h. Summative assessment space must permanently lock once student approves it for viewing by physician assessor or the progress committee.

## 6. ALACT (Action, Looking back at action, Awareness, Creating alternative methods and Trial) Method:

- a) Action: help learner select activities and environments that are directed at a specific learning objective
- b) Look back on action: reflect on quality of performance and characteristics of the experience
  - i) Was the learning objective achieved?
  - ii) What role did the learner play in the success or failure to achieve the objective?
    - (1) Learner takes personal responsibility for learning
    - (2) Learner actively seeks out external feedback and data to answer the question from a wide variety of sources both positive and critical to obtain the truest picture of reality
    - (3) Learner evaluates their own self –assessment in the face of external evidence
  - iii) Include evidence supporting the above processes and outcomes in portfolio
  - iv) Physician Advisor meets with and works with learner on evaluation and portfolio with the following guidelines:

- (1) Provide a safe environment by differentiating between the learner and their performance (or lack thereof)
  - (2) Focus on description of behavior, avoiding labeling of the individual
  - (3) Encourage learners to be concrete in their reports
    - (a) What went well?
    - (b) What went wrong or what could have been done better?
    - (c) How did you resolve this?
    - (d) What was the outcome of your efforts?
  - (4) Encourage learners to carefully scrutinize all information in portfolio.
    - (a) Which information supports your answers or evaluations?
    - (b) Which information contradicts your answers or evaluations?
  - (5) Encourage learners to conceptualize other stakeholder's perspectives of the learning situation.
    - (a) What did you want?
    - (b) What did the patient/colleague/nurse/etc. want?
    - (c) What did you think?
    - (d) What do you think others thought?
    - (e) What did you do?
    - (f) What did others do?
    - (g) What emotions did you experience?
    - (h) What emotions do you think others experienced?
- c) Awareness of essential aspects: Reflection
- i) Means of achieving their objective – effective or not?
  - ii) Was the goal(s) selected suitable or not?
  - iii) Were there moral or ethical elements to the choices?
  - iv) Include a written reflection in the portfolio that answers the above questions drawing on the evidence already placed in the portfolio from step (ii) above.
  - v) Physician Advisors must ask the right questions, not necessarily have all the answers. Use is made of a process of consultation and discussion rather than lecturing.
  - vi) Learners must own their learning and seek their own answers and evidence.
- d) Creating or identifying alternative methods of action: Change
- i) Part of the process of new goal setting – physician advisor assists
  - ii) Search for alternative strategies or abandon original goals, as appropriate
  - iii) Write this down in portfolio = PDP or Personal Development Plan
  - iv) Both learner and physician advisor agree to new learning plan and review it at the next meeting
  - v) Encourage learners to be concrete in their goals - SMART method (Specific, Measurable, Acceptable, Realistic, Time-bound)
- e) Trial
- i) Is equivalent to the original action and restarts the learning cycle.

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## Objective Structured Clinical Examinations (OSCE)

The UBC FoM Undergraduate Medical Education program has extensive expertise and experience with OSCE's. Consequently, the Assessment working group will not burden the reader with detailed analysis of OSCE's but instead will provide a brief summary.

The Objective Structured Clinical Examination (OSCE) is an assessment method that is geared to assess competencies in relation to communication, clinical reasoning, clinical examination, performing of procedures, analytical skills as well as other health related competencies. An OSCE usually comprises a circuit of short (5–10 minute) stations, in which each student is examined with one or two examiner(s) and either real or standardized patients (trained actors). Each station has a different examiner, as opposed to the traditional method of clinical examinations where a student would be assigned to an examiner for the entire examination. Students rotate through the stations, completing all the stations on their circuit. In this way, all students are assessed in the same stations. It is considered to be an improvement over traditional examination methods because (a) a relatively large number of observations can be collected over a short period of time, thus enabling trustworthy measurement and ensuring that the student receives some direct observation that will allow credible feedback to be delivered, (b) the stations can be standardized, enabling improved peer comparison, and (c) complex procedures can be assessed without endangering patient health.

Thus, in the planning stage of the OSCE, station authors need to determine which steps of the encounter are both key to the clinical situation and appropriate for the level of training. A combination of checklists and global ratings are used. Checklists assess thoroughness and provide useful orientation to examiners regarding the intended focus of the station, while global ratings generally provide better indications of clinical expertise. There are various standard setting methods to determine passing scores for each OSCE. OSCEs are considered a valid and a reliable assessment tool, although the number and content of stations and the number of assessors will influence these parameters.

The Assessment working group confirms that the literature supports continuing use of this modality, and has two further recommendations:

1. The undergraduate program must leverage its current expertise to further innovation in the development and implementation of OSCE's. Further innovation will improve the benefits attributable to this modality and provide for the flexibility that is inherent in the rest of the assessment framework.
2. The OSCEs will require central oversight to achieve innovation, provide timely knowledge translation as the literature pursuant to OSCE's continues to progress, and to ensure that the OSCEs are sequenced appropriately to reflect stage of training, thus allowing accumulation of performance sophistication and minimizing inappropriate redundancy.

## Progress Tests

Progress Tests are MCQ examinations that represent exit competency level material. Such exams occur repeatedly through the four years of the program, with different MCQ's each time. Each progress test will be relatively low-stakes, and can provide powerful formative feedback to students. Multiple sittings of the exam allow demonstration of a learning trajectory that in aggregate can be part of higher stakes decision making. Exit-level knowledge competencies emphasize long-term knowledge retention, and require students to focus on continuous improvement rather than cramming to “pass the exam” or simply for the sake of maintaining scores that are set on an arbitrary grade-based scale. Experience in other schools shows that Progress Tests contribute to early identification of learners experiencing difficulty. Finally, Progress testing based on the MCCQE Part 1 also prepares students for the licensure exam.

The concept of Progress Testing was first developed in 1970, and since then medical schools throughout the world have made this transition. In 2010, “Medical Teacher” dedicated the entire Volume 32, Number 6 issue to Progress Tests. In the introductory commentary they describe a selection of medical schools that were using progress testing at that time. This included European schools in the Netherlands, Belgium, United Kingdom, Ireland, Germany, and Austria and North American schools including McMaster, University of South Florida, Case Western, Southern Illinois, Vanderbilt, University of New Mexico, Penn State, Texas Tech, Medical College of Georgia, and the University of Minnesota. This list was not intended to be exhaustive but demonstrates the widespread uptake of the concept of progress testing.

The students in the MDUP need to maintain high achievement levels on the MCCQE Part 1. In fact, McMaster made adjustments to their assessment system, beginning to use progress tests, because of poor performance against this benchmark. A paper published by Norman et al. in the above-mentioned issue of *Medical Teacher* demonstrated that the change yielded immediate improvement. The NBMEs commonly used in Year 3 have never been a benchmark for us as we simply remove items from the exam that we think to be inappropriate for our students. There is burgeoning literature about using multi-institution collaborations with progress tests to provide some further information around comparative performance. Since the Assessment Working Group is advocating collaborating with McMaster there would be a significant opportunity to do similar comparisons.

The decision of whether progress tests should be criterion-referenced or norm-referenced and whether students should be encouraged to guess are important questions and the literature provides some guidance concerning this. Because each progress test can differ in the degree of difficulty, the use of criterion referencing is not recommended. A correction for guessing for progress tests is recommended i.e., students are encouraged to select the “Do not know option”. Incorrect answers receive negative points so that students are encouraged to reflect on whether they understand the subject matter and have reasonable confidence in answering. Others have argued that it is beneficial to support this type of decision-making in future physicians (learning to recognize what he or she does not know).

### **Proposed use of Progress Testing in the UBC MD Student Assessment System**

1. The progress test should be administered frequently. The working group recommends three times per year with 180 items per test.
2. Cumulative progress on the progress test will be used as a component of summative assessment.
3. The results of all administrations of the progress test will be used for formative purposes. Students will receive sufficient feedback and counseling to permit the remediation of deficiencies and the development of individualized learning goals.
4. It is recommended that a flagging system be developed for progress test performance to ensure that students in difficulty are identified early so as to provide the necessary support.
5. Students would be expected to achieve and maintain a trajectory that is consistent with the passing of the MCC examination.

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## **Workplace-based Assessment**

Workplace-based assessment that involves direct observation of students performing relevant physician tasks in a clinical setting should be the core assessment strategy used in the new assessment system. To emphasize the importance of Workplace-based assessment, the Working Group has recommended that the Student Assessment System should have a Subcommittee on Workplace-based assessment. The Workplace Based Assessment Subcommittee will select, modify and/or develop the instruments used for the assessment of clinical performance of individual students and teams in the workplace. The task of exploring the literature for best practices, consulting with experts in this area and innovating must be carried out by the Student Assessment Committee.

## **Governance Recommendations**

Governance has been ably analyzed by the Governance working group, and the Assessment working group considered with interest the many important aspects elucidated by this group. In terms of the Assessment framework, the working group recognized that the success of the Assessment framework would require further description of governance as it pertained to assessment and progress of the student.

The Assessment working group would re-emphasize three critical points before discussing the two committees we recommend:

1. An oversight body is needed which is part of governance of the educational program and that evaluates and guides the evolution of the assessment system.
2. Monitoring is necessary to determine if the assessment system was implemented as planned and functions effectively to achieve the desired goals and objectives.
3. The assessment oversight body needs to review and revise the assessment system over time to reflect changes in the curriculum and advances in assessment science. This is also necessary to meet the objective of curriculum renewal to be a continuous, on-going process.

# Student Assessment Committee

## Student Assessment Committee Terms of Reference December 6, 2012

### Purpose:

The Student Assessment Committee provides overall leadership of the assessment system for the UBC MD Undergraduate Program and has the authority and responsibility to develop, maintain, and evaluate the assessment system. The Committee will develop the policies and procedures regarding student advancement, remediation and dismissal that will be implemented by the Student Progress Committee. The Committee will monitor to determine if the assessment system is implemented as planned and functions effectively to achieve the desired goals and objectives. The Committee needs to review and revise the assessment system over time to reflect changes in the curriculum and advances in assessment science. In doing the above the Committee ensures the faculty, students, the profession and the public that graduating students are competent to enter residency training.

### Authority:

The Student Assessment Committee receives its authority from and reports to the MD Undergraduate Education Committee MDUEC.

### Membership:

Members of the Student Assessment Committee should have a clear understanding of the goals, objectives and design of the UBC Undergraduate MD Program Assessment System, the assessment standards required by UBC Senate, and the CACMS/LCME standards that pertain to assessment. Requisite expertise in assessment should be present within the committee membership.

Membership (voting and nonvoting) should reflect the distributed nature of the MD program.

Some members are *ex officio*, i.e. they are members by virtue of holding another office. Others are elected or appointed as noted.

### Voting

#### Ex officio

- Director of Assessment (Chair of SAC)
- Head of the Educational Assessment Unit
- Chair of the ePortfolio Subcommittee
- Chair of the Progress Test Subcommittee
- Chair of the OSCE Program Subcommittee (Director of the OSCE Program)
- Chair of the Workplace-based Assessment Subcommittee
- Chair/Director of Physician Advisor Program (or one from each site)
- UBC representative to the MCC

### Appointed:

Representatives from each of the following:

Clinical clusters component (first 1.5 year) one representative  
Transition into Clerkship- one representative  
Clerkship- two representatives  
Transition into Residency- one representative  
One junior MD student  
One senior MD student  
One postgraduate faculty medical education (PGME) representative  
One health professions faculty representative

### **Non-voting**

Director of Curriculum  
ESU representative  
One MEDIT representative (e.g., ePortfolio, PT)

### **Appointment Process**

Some members are *ex officio* members.  
Faculty members are appointed by the Chair, MD Undergraduate Education Committee on the recommendation of the director of the corresponding curricular component.  
Student representatives are appointed by the Medical Undergraduate Society upon request from the Faculty of Medicine.

### **Term**

For *ex officio* members the term of office on the Student Assessment Committee is the same as their term in their respective MDUP positions.  
Appointed members will have a term of three years, renewable for a second term.  
Student representatives will have a term of one year, renewable for as long as they remain in the program.

### **Chair:**

The Director of Assessment will be the Chair. The committee will provide feedback to the Associate Dean undergraduate Medical Education regarding performance of the Chair on an annual basis. The Director of Assessment receives direction regarding the assessment system from the Student Assessment Committee.

### **Subcommittees**

The Student Assessment Committee will have four subcommittees (alphabetical order):

- ePortfolio Subcommittee,
- Progress Test Subcommittee,
- OSCE Program Subcommittee
- Workplace-based Assessment Subcommittee

The work of each subcommittee must be approved by the Student Assessment Committee.

The **ePortfolio Subcommittee** will develop the guidelines for summative review of the portfolio to allow physician *assessors* to determine if students have achieved the required milestones for

each competency, if more information is required to permit a determination, or if the student has not achieved the required milestones. The guidelines will also be used by students and their physician advisors in preparing the summative portfolio.

The **ePortfolio Subcommittee** will also oversee the development and training of physician advisors to optimize student guidance in using the portfolio and preparing their summative portfolio.

The **OSCE Program Subcommittee** will oversee the administration of OSCE examinations across the four year program at each distributed campus, review/revise/approve the blue print, content and scoring methods, set policy and oversee standard setting following each test administration, and review the aggregate results of each test administration.

The **Progress Test Subcommittee** will oversee the Progress test i.e., review/revise/approve the blue print and content of each examination, and review the aggregate results of each test administration. The Chair of the Progress Test Subcommittee can review and approve the content of each Progress test with the permission of the subcommittee and seek the input of other subcommittee members as required.

The **Work-place Based Assessment Subcommittee** will select, modify and/or develop the instruments used for the assessment of clinical performance of individual students and teams in the workplace. This subcommittee should work closely with the ePortfolio Subcommittee to incorporate the results derived from workplace-based assessment into the portfolio.

The committee may also form ad hoc subcommittees to accomplish its work.

## **Meetings**

Monthly or as required at the call of the Chair.

## **Committee Secretary**

The committee should have administrative support. TBD

## **Minutes and Reports**

The Student Assessment Committee shall keep notes/minutes of all meetings. Minutes are provided to all voting and corresponding members.

Annual reports are provided to the MD Undergraduate Education Committee and as requested.

## **Quorum and decision-making processes:**

The quorum – should be the same as any other faculty of medicine committee

## **Lines of Accountability and Communication:**

The Student Assessment Committee reports to the MDUEC. All substantive changes to the assessment system including the policies and procedures regarding student advancement, remediation and dismissal must be reviewed and approved by the MDUEC, as well as, other faculty and/or UBC committees as required.

## **Responsibilities:**

1. Establish the overall structure of the assessment system in the MD Undergraduate Program.
2. In collaboration with content experts, “course/unit” , rotation and clerkships directors, develop policies and procedures regarding student advancement, remediation and dismissal to be implemented by the Student Progress Committee.
3. Provide the faculty with appropriate and valid assessment methods to measure targeted competencies as well as the program’s instructional goals (e.g. Knowledge Integration and Analytical Skills, Communication Skills, Professional Behaviors, Clinical Skills (including Clinical Reasoning), Practical and Technical Skills, Collaboration and Teamwork skills, Patient Advocacy Knowledge and Skills, Information Management Skills, Personal Management Skills, Health Policy Issues).
4. Collaborate with the Evaluation Studies Unit in developing the evaluation framework for the assessment system. Review all evaluation data pertaining to the assessment system to identify problems and develop solutions, and to identify strengths and enhance these within the assessment system.
5. Review the performance (aggregate, anonymous data including MCCQE Part I data) of the assessment system on a programmatic basis.
6. Report on the assessment at each phase of the program to the MD Undergraduate Education Committee, describing the implementation of the assessment system and indicating areas of good performance and problem areas requiring attention.
7. Revise the assessment system as needed to reflect advancements in assessment science.
8. Identify and communicate to the MDUEC when faculty (including physician advisors and the Progress Committee) and students require educational activities (development activities) to ensure they understand elements of the assessment system, especially when changes are introduced.
9. Maintain an inventory of assessment expertise within the faculty; assist in building capacity in this area within the faculty.
10. Identify, develop and maintain a pool of skilled physician advisors to work within the portfolio system, applying best practices in counselling and personality development with regards to the students and themselves.
11. Ensure compliance with CACMS/LCME accreditation standards and UBC policies.

## **Review of Terms of Reference**

The Terms of Reference of the Student Assessment Committee will be reviewed annually by the Student Assessment Committee with proposed changes approved by MD Undergraduate Education Committee.

**The following are tasks related to student assessment carried out by the Educational Assessment Unit:**

1. Coordinate the preparation, delivery, processing and reporting of high quality, error-free, written exams e.g., clinical reasoning exams, knowledge application exercises, performance-based (OSCE), work-based clinical assessment (observed clinical skills, miniCEX, RIME), oral and lab examinations.
2. Prepare and review with all stakeholders the time lines for assessment preparation, delivery at all sites and production of student assessment data to ensure feasibility.
3. Ensure that infrastructure and administrative support are working well to deliver the assessment system throughout the distributed program.
4. Prepare the draft assessment budget annually, which includes projected normal operational costs and development costs (with input from each campus).
5. Provide feasibility analysis for all changes in the assessment system.
6. Assist the faculty in developing assessments that reflect the following:
  - a. Alignment of assessment content with course and clerkship competencies and exit competencies;
  - b. Adherence to established best practices e.g. item writing guidelines, blueprinting, standard setting methods.
  - c. Adherence to the Guiding Principles of the blueprint, as outlined above.
7. Ensure security of the assessment materials in keeping with the purpose of the assessment data.

## **Student Progress Committee**

### **Student Progress Committee Terms of Reference December 6, 2012**

**Purpose:**

The Student Progress Committee is responsible for reviewing the progress of medical students in all four years of the distributed MD Undergraduate Program in accordance with the MD program assessment system. The committee makes summative decisions of student development of the required competencies based on the appropriate milestones at specific points in the MD program, including decisions on advancement with or without remediation, probation, suspension, dismissal and graduation.

**Authority:**

The Student Progress Committee receives its authority from and reports to the MD Undergraduate Education Committee MDUEC.

## Membership:

Members of the Student Progress Committee should have a clear understanding of the competency-based medical education program and the milestones that students must achieve at strategic points in the curriculum. The members must also understand the goals, objectives and design of the UBC Undergraduate MD Program Assessment System including how the portfolio is evaluated to measure students' development of competencies. Members must be prepared for their role in the decision-making process. Members will be expected to recuse themselves from decisions affecting students for which a conflict of interest exists.

Membership (voting and nonvoting) should reflect the distributed nature of the MD program.

## Voting

### Appointed:

A faculty lead for each MD Competency, i.e.,  
Medical Expert, Communicator, Collaborator, Manager, Advocate, Scholar and Professional  
Two faculty members from the Pre-clerkship program  
Two faculty members from the Clerkship program  
One postgraduate faculty medical education (PGME)  
One health professions faculty

### Non-voting (ex-officio):

Director of Assessment  
Chair of the OSCE Subcommittee of the SAC  
Chair of the ePortfolio subcommittee of the SAC  
Chair of the Progress Test subcommittee of the SAC  
Head of the Educational Assessment Unit  
Director of the Physician Advisor program  
Director of Curriculum

## Appointment Process

Some members are *ex officio* members.  
The faculty leads for each MD competency are appointed by the Chair, MD Undergraduate Education Committee.

## Term

For *ex officio* members the term of office on the Student Progress Committee is the same as their term in their respective MDUP positions.  
Appointed members will have a term of three years, renewable for a second term.

**Chair: Note: The time commitment required of the Chair may be such that a funded non-ex officio appointment maybe appropriate.**

The responsibilities of the Chair are to:

a) Chair meetings of the Student Progress Committee,

- b) Ensure strict adherence to the “University Guidelines” and “Policies and Procedures” within the Faculty of Medicine by which student performance will be assessed.
- c) Consult with university legal representation as required.
- d) Report the decisions of the committee directly to the MD Undergraduate Education Committee.
- e) Work collaboratively with students, their advisors and others as needed<sup>a</sup>, to develop a remediation plan and establish a learning contract that must be fulfilled to remain in good standing in the MD program.
- f) Provide annual reports as required by the faculty.

<sup>a</sup> Director of the student’s ALC, Student Affairs personnel at the student’s program site, and individual(s) with sufficient expertise on matters related to professionalism if applicable.

### **Subcommittees**

The committee may also form ad hoc subcommittees to accomplish its work e.g., review portfolios when the number is too large for the committee.

### **Meetings**

Four times per year or as required at the call of the Chair e.g., reassessment of students who have completed remedial work.

### **Committee Secretary**

The committee should have administrative support. TBD

### **Minutes and Reports**

The Student Progress Committee shall keep notes/minutes of all meetings. Minutes are provided to all voting and corresponding members. Members shall keep minutes and meetings proceedings confidential and will shred/destroy all documentation that contains personal information. Reports of student progress following each period of summative assessment shall be provided to the MD Undergraduate Education Committee.

### **Quorum and decision-making processes:**

The quorum must ensure that the committee has the expertise to make summative decisions on the development of all the required competencies.

### **Lines of Accountability and Communication:**

The Student Progress Committee reports to the MDUEC. All substantive changes to the policies and procedures regarding student advancement and remediation must be reviewed and approved by the MDUEC, as well as, other faculty and/or UBC committees as required.

### **Responsibilities:**

- a. The committee shall review the portfolios of all students flagged to the Progress committee by physician *assessors* either in need of remediation or as being insufficiently clear as to allow a recommendation to be made. In addition, the committee will review a subset of randomly selected portfolios for quality assurance purposes for each period of summative review.

- b. The committee shall request that students provide additional evidence of achievement of a competency if the information provided in the portfolio is insufficient to make a decision.
- c. The committee shall review the portfolios of all students whose performance on the progress test falls below the standard set by the Student Assessment Committee.
- d. The committee shall review the portfolios of all students that fail the MCCQE Part I exam in February of the 4<sup>th</sup> year of the program and those who choose not to take the Part I exam in the February test period.
- e. The committee shall approve the learning contracts i.e., remediation plans of all students who have not developed the required competencies at a specific point of summative assessment in the program. These plans may include recommendations that the student seek assistance from the Student Affairs Office or be required to meet with other professionals to determine the underlying problem (additional assessments health or other) or as a part of the learning contract.
- f. The committee shall re-assess the portfolios of students who have undertaken remedial activities to determine if they can advance in the program, continue remedial work, or must be dismissed from the program.
- g. The committee shall approve the assignment of awards and scholarships
- h. The committee shall provide to the MDUEC the names of students who, at the end of each period of summative assessment a) have achieved the required milestones, b) require remediation, and c) are recommended for dismissal from the program.
- i. The committee shall provide to the MDUEC the names of students who, at the end of year 4, have earned the MD degree.
- j. The committee shall make recommendations to the Student Assessment Committee regarding the assessment system and the policies and procedures related to student advancement, remediation and dismissal.

### **Review of Terms of Reference**

The Terms of Reference of the Student Progress Committee will be reviewed annually by the Student Progress Committee with proposed changes approved by the MD Undergraduate Education Committee.

Student Assessment Working Group  
December 5, 2012

## Resource Implications

1. Faculty time will be required to develop the educational milestones for each of the competencies that will serve as the template for assessments.
2. Faculty time will be required to develop and review assessments such as knowledge application exercises, clinical reasoning exercises, workplace-based assessments, and OSCEs using blueprints based on the educational milestones.
3. Faculty time will be required to develop assessments that foster integration, knowledge and skills application across the disciplines
4. Faculty and administrative time will be required to develop instructional materials on how to use the new assessment methods.
5. IT resources are needed to develop and maintain an ePortfolio that is student and faculty friendly and meets the assessment needs outlined in this document.
6. Administrative time will be required to prepare staff to implement changes in assessment throughout the four year program
7. Administrative time will be required to implement progress testing in the program. Initial planning will require the most time; ongoing delivery will require less time. Faculty are not required for invigilation. Some time will be required by the Chair of the Student Assessment Progress Test Subcommittee and initially the subcommittee itself, in vetting the items used in any individual Progress test three times annually.
8. Students must be informed of all assessments in a timely manner and will need educational support to help them understand the system and the use of some assessment tools.
9. Faculty must be familiar with the assessment plan and will need educational support to help them understand the system and the use of the assessment tools.
10. Physician advisors must be familiar with the assessment system and specifically the design and use of the portfolio. Faculty and administrative time and finances will need to be earmarked for the development of faculty capacity around the physician advisor and assessor role.
11. The quality of assessments must be regularly analyzed as part of the process of monitoring the quality of teaching (i.e., the educational program).
12. Financial resources will be saved by discontinuing the use of external examinations for summative assessment within the program.

## Other Working Group Recommendations

1. A comprehensive research study of the Progress Test during the 12-13 Academic year
2. Faculty Development Workshops on the new assessment system with a review of a Progress Test-Fall and Winter at each campus.
3. On-going research studies of the various components of the assessment plan with the assistance of CHES.
4. Continue discussions with Drs. Elaine Dannefer ([dannefe@ccf.org](mailto:dannefe@ccf.org)) and Dr. Neil Mehta ([mehtan@ccf.org](mailto:mehtan@ccf.org)) at Case Western Reserve, Cleveland Clinic Lerner's College of Medicine MD

program about an ePortfolio and its use in the assessment system. A confidentiality agreement has been signed between UBC Faculty of Medicine and the CCLCM to permit these interactions.

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## Appendix A: Assessment Methods Considered

### ASSESSMENT STRATEGIES: STRENGTHS AND LIMITATIONS

While it is impossible to make absolute statements about the elements of utility (reliability, validity, feasibility, acceptability, and educational impact) for any assessment strategy due to context and implementation success having considerable impact, there are accepted strengths/limitations identified by the Assessment Working Group that should be considered. In the following table we highlight some of those factors that seem particularly relevant to particular tools (i.e., rather than trying to be comprehensive given that doing so would yield considerable redundancy).

<b>Tool</b>	<b>Strengths</b>	<b>Limitations</b>
<b>Clinical Chart Review (CCR)</b>	<ul style="list-style-type: none"> <li>• Clinically based</li> </ul>	<ul style="list-style-type: none"> <li>• Standard setting may be difficult</li> <li>• Specific student performance may be difficult to isolate due to multiple person input of chart</li> </ul>
<b>Comprehensive Integrated Puzzle (CIP)</b>	<ul style="list-style-type: none"> <li>• Requires knowledge integration across disciplines</li> </ul>	<ul style="list-style-type: none"> <li>• Requires cross discipline teams to construct</li> <li>• If close ended matching, then cues expected answers</li> </ul>
<b>Daily Encounter Card (DEC)</b>	<ul style="list-style-type: none"> <li>• Provides immediate constructive feedback through direct observation</li> <li>• Can enable aggregation of ratings to inform the rotation ITER</li> </ul>	<ul style="list-style-type: none"> <li>• Creates considerable paperwork that needs to be tracked and logged</li> </ul>
<b>High Fidelity Simulation (HFS)</b>	<ul style="list-style-type: none"> <li>• Tailored to educational goals</li> <li>• Can be observed by faculty</li> <li>• Often realistic and credible</li> <li>• Provides practice of clinical skills without harming patients</li> <li>• Provides standards by which performance can be judged</li> </ul>	<ul style="list-style-type: none"> <li>• Timing and setting may seem artificial</li> <li>• Requires suspension of disbelief</li> <li>• Expensive</li> </ul>
<b>In-Training Evaluation Report (ITER)</b>	<ul style="list-style-type: none"> <li>• Assesses multiple domains of practice</li> <li>• Flexible</li> <li>• Longitudinal assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Student characteristics influence assessment</li> <li>• Poor discrimination between domains</li> <li>• Reliability issues if implemented/used poorly and there is insufficient faculty development around good assessment feedback</li> </ul>

<b>Tool</b>	<b>Strengths</b>	<b>Limitations</b>
<b>Mini-Clinical Evaluation Exercise/Exam (Mini-CEX)</b>	<ul style="list-style-type: none"> <li>• Authentic work-place based</li> <li>• Requires/promotes direct observation</li> <li>• Assesses ability to focus and prioritize e.g physical or diagnosis</li> <li>• Structured teaching encounter</li> <li>• Immediate feedback</li> <li>• High reliability with sufficient numbers</li> </ul>	<ul style="list-style-type: none"> <li>• May be considered intrusive by faculty</li> <li>• Requires faculty development</li> <li>• Student self-selection of encounter may limit generalizability</li> <li>• Takes time</li> </ul>
<b>Multiple Choice Question Exam (MCQ)</b>	<ul style="list-style-type: none"> <li>• Able to assess many content areas in relatively little time</li> <li>• High reliability</li> <li>• Computer scoring</li> <li>• Can include Key Feature questions (KFE)</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult to write well</li> <li>• Can result in cueing</li> <li>• Can seem artificial and removed from real situations</li> <li>• Requires Training to develop KFE</li> </ul>
<b>Multisource Feedback (360° Assessment) (MSF)</b>	<ul style="list-style-type: none"> <li>• Assess multiple domains</li> <li>• Interprofessional</li> <li>• Multiple raters</li> <li>• Credible</li> </ul>	<ul style="list-style-type: none"> <li>• Time intensive</li> <li>• May affect patient-physician dynamic</li> <li>• Often provide global impressions rather than analysis of specific behaviours</li> <li>• Reliability may vary but is improved with increased number of assessments</li> </ul>
<b>Oral Exam (ORAL)</b>	<ul style="list-style-type: none"> <li>• Feedback provided by credible experts</li> <li>• Student can clarify answers</li> </ul>	<ul style="list-style-type: none"> <li>• Reliability of results can be improved if aggregated over many observations</li> <li>• Sex and race bias has been reported</li> <li>• Time consuming: may require two or more examiners with associated financial costs</li> <li>• Requires examiner training</li> <li>• Examiner cueing</li> <li>• Standardization issues</li> </ul>
<b>Objective Structured Clinical Exam (OSCE)</b>	<ul style="list-style-type: none"> <li>• Tailored to educational goals</li> <li>• Reliable if implemented well</li> <li>• Consistent case presentation and ratings</li> <li>• Observation by faculty or standardized patients</li> <li>• Realistic</li> </ul>	<ul style="list-style-type: none"> <li>• Timing and setting may seem artificial</li> <li>• Checklists may penalize examinees who use shortcuts</li> <li>• Expensive</li> </ul>

<b>Tool</b>	<b>Strengths</b>	<b>Limitations</b>
<b>Peer Assessment (PA)</b>	<ul style="list-style-type: none"> <li>• Ratings encompass habitual behaviours</li> <li>• Credible source</li> <li>• Correlates with future academic and clinical performance</li> <li>• Helps students to become more autonomous, responsible and involved.</li> <li>• Encourages students to critically analyze work done by others</li> <li>• Helps clarify assessment criteria</li> <li>• Gives students a wider range of feedback.</li> </ul>	<ul style="list-style-type: none"> <li>• Confidentiality</li> <li>• Anonymity</li> <li>• Student concerns about reciprocity/harming friends or colleagues</li> <li>• Students assessment training required</li> </ul>
<b>Professionalism Mini Evaluation Exercise (P-MEX) or Studentship Report</b>	<ul style="list-style-type: none"> <li>• Intended to evaluate a competency that is normally difficult to quantify</li> <li>• Can be used in variety of clinical settings</li> <li>• Provides for timely feedback</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult to standardize</li> <li>• Quantification of performance particularly disconnected in this domain from real goal of formatively promoting professional behaviour</li> </ul>
<b>Portfolios</b>	<ul style="list-style-type: none"> <li>• Display projects for review</li> <li>• Foster reflection and development of learning plans</li> <li>• Promotes formative development</li> <li>• Longitudinal assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Do not accurately describe actual behaviour unless training and feedback provided</li> </ul>
<b>Procedural Skills Exam (PSE)</b>	<ul style="list-style-type: none"> <li>• Based on direct observation</li> <li>• Use of checklists may help to make exam more objective</li> <li>• Provides immediate feedback</li> </ul>	<ul style="list-style-type: none"> <li>• Potential for student anxiety</li> <li>• Limited number of sessions per assessment</li> <li>• Variations between the raters</li> </ul>
<b>Progress Test (PT)</b>	<ul style="list-style-type: none"> <li>• Longitudinal nature allows for charting progress</li> <li>• Identifies students who may need remediation</li> </ul>	<ul style="list-style-type: none"> <li>• Potentially frustrating to novice learners</li> <li>• Increases frequency of testing</li> </ul>

<b>Tool</b>	<b>Strengths</b>	<b>Limitations</b>
<b>Scholarly Activity (Papers, Reports, Research Projects) (SACT)</b>	<ul style="list-style-type: none"> <li>Assesses higher order cognitive processes</li> <li>Assesses scientific inquiry, research study, evidence based medicine, and critical appraisal skills</li> <li>Avoids cueing</li> <li>Assesses medical writing skills</li> </ul>	<ul style="list-style-type: none"> <li>Time consuming to do and to score</li> <li>Requires multiple samples of performance to establish reliability</li> <li>Long testing time required to encompass a variety of domains</li> </ul>
<b>Self-Assessment (SA)</b>	<ul style="list-style-type: none"> <li>Fosters reflection and development of learning plans</li> <li>Instructive around the traps of personal bias around self-assessment</li> </ul>	<ul style="list-style-type: none"> <li>Does not accurately describe actual behaviour, skill, or knowledge</li> </ul>
<b>Short Answer or Constructed Response Questions (SAQ)</b>	<ul style="list-style-type: none"> <li>Avoids cueing</li> <li>Assesses interpretation and problem solving ability</li> </ul>	<ul style="list-style-type: none"> <li>Reliability dependent on training of graders</li> </ul>
<b>Script Concordance Test (SCT)</b>	<ul style="list-style-type: none"> <li>Assesses problem solving in ambiguous and ill-defined cases</li> <li>Avoids cueing</li> </ul>	<ul style="list-style-type: none"> <li>Not yet proven to transfer to real life situations requiring clinical reasoning</li> <li>Difficult to develop</li> </ul>

## **DESCRIPTION OF ASSESSMENT METHODS**

### **Clinical Chart-Review (CCR):**

A clinical chart review using a trained rater to assess a student's documentation of clinical encounters. The abstracted data are compared against standard practice guidelines. It includes the evaluation of real charts, selected from the student's clinical experience, that serve as the basis for assessment. This form of assessment is more clinically based, as the actual performance of the student can be explored.

### **Comprehensive Integrative Puzzle (CIP):**

The CIP has the format of an 'extended matching' crossword puzzle. Its answer sheet is a grid comprising rows and columns. The left-hand column contains diagnoses or brief clinical vignettes. To complete the cells of the grid the student is required to match, stepwise, the various 'disciplinary investigations' to the diagnoses or clinical vignettes.

### **Daily Encounter Card (DEC) Field Notes:**

An encounter card or field note (or daily encounter card, DEC) is a small-scale variant of an ITER. Typically containing a scale to assess various domains of competence, the DEC/Field Note is completed at the end of a clinical encounter or the end of a shift, by a single assessor, based on direct observation of the student. Providing immediate formative feedback, encounter cards/field notes can also be used in a summative fashion to inform the rotation ITER. Some evidence exists that properly designed DEC/Field Notes can provide accurate constructive feedback to students, overcoming strong biases among faculty to be lenient or overly positive when documenting student performance.

### **High Fidelity and Virtual Patient Simulations (HFS/VP):**

Virtual patient simulation systems can be defined as 'an interactive computer simulation of real-life clinical scenarios for the purpose of healthcare and medical training, education or assessment' (Ellaway & Masters 2008) and as 'computer programs that simulate real-life clinical scenarios in which the learner acts as healthcare professional obtaining a history and a physical exam and making diagnostic and therapeutic decisions'. Realistic models frequently are used in medical education to simulate clinical situations accurately. Along with appropriate instruction and practice, students can use simulation models to acquire necessary skills and expertise. Ideally, simulation techniques permit acquisition of clinical skills without jeopardizing patient health and safety.

### **In-Training Evaluation Reports (ITER):**

An in-training evaluation report (ITER) typically consists of a series of scales to assess multiple domains of competence. Multiple observations (from 1 or more observers) of previously observed clinical behaviour inform the global assessment for each domain. An ITER is of particular value in assessing complex, non-Medical Expert competencies. Items on ITERS should reflect the goals and objectives set out for the experience and be designed according to commonly accepted guidelines for maximum

reliability (i.e., concrete descriptive anchors, a 5-7 point scale with an obvious centre score and feasible extreme options). Direct observation of actual (not simulated or self-reported) behaviour provides the highest fidelity sample for assessment. Direct observation provides the opportunity to make multiple assessments over time and across a breadth of clinical circumstances. Any domain of competence can be assessed to some degree via direct observation.

### **Mini-Clinical Evaluation Exercise (Mini-CEX):**

It was developed as a means of assessing the students in their clinical setting. It is considered to be a workplace based assessment and can be used as a formative or else a summative assessment task. The procedure provides the student with an excellent opportunity to receive feedback from their preceptors and also provides them with a tool to keep track of students' progress.

The mini-CEX assessment process requires about half an hour in total for each session. Each mini-CEX is aimed at a particular competency domain. Thus, the aim of a particular mini-CEX evaluation might be to assess the student's competency in data gathering, counseling, diagnosis, therapy, etc.

The session starts with a discussion between the preceptor and student in relation to the mini-CEX evaluation and how it is done. This is followed by the student encountering a patient in his or her own clinical setting with the preceptor playing the role of an observer. Each session takes about 15 – 20 minutes and while the encounter is going on, the preceptor marks the student's performance on the mini-CEX evaluation form.

When the encounter concludes, the student and the preceptor sit together and review the encounter in relation to the mini-CEX evaluation and the final rating obtained by the student. This provides the student with structured feedback in relation to his or her performance and is considered the most important part of the mini-CEX evaluation. The feedback session will usually last for 10 – 15 minutes.

Several of these assessments are conducted throughout the year to achieve adequate reliability. The encounters can occur in various settings (ambulatory, emergency department, and inpatient), so the patients present a broader range of challenges. This allows the students to be assessed by different faculty members as they interact with several patients who pose a wide range of clinical problems.

### **Multiple Choice Question Exam (MCQ):**

Selected-response questions include multiple choice, matching item, true or false, and alternate choice. Selected-response written exams require the student to recognize the correct answer. These exam formats are most appropriate for assessing factual knowledge across multiple domains but can, if properly constructed, also assess problem-solving. Selected response exams tend to be easily standardized, easy to mark and amenable to question-banking, but they are difficult to construct because of the sensitive nature of the answer lists.

Strategies for writing MCQs well have been well established and are summarized by the National Board of Medical Examiners ([www.nbme.org](http://www.nbme.org))

### **Key Features Question Exam (KFE) Type of MCQ:**

The term “key features” was introduced by Bordage and Page following a review and analysis by Norman et al (1985) of the research on the nature and assessment of CDM skills. A key feature is defined as a:

1. critical or essential step(s) in the resolution of a problem,
2. step(s) in which examinees (in our case, graduating medical students) are most likely to make errors in the resolution of the problem, or
3. difficult or challenging aspect in the identification and management of the problem in practice.

The use of key features facilitates the development of clinical problems that are more discriminating measures of competence. The definition of a key feature highlights the fact that not all steps in the resolution of a problem are equally important and that testing time is better spent by focusing on evaluating the critical or challenging steps, the key features. The key features represent discriminating features between successful and unsuccessful students.

Key features problems are designed to specifically assess decision-making skills rather than recall of factual knowledge. The challenge posed by key features problems is the application of knowledge to the resolution of a problem — that is, the use of knowledge to guide decisions to elicit clinical clues, to formulate diagnostic impressions, to order investigative or follow-up procedures, to acquire data to monitor a course of action or evaluate the severity or probability of an outcome, or to select a management course. For example, key features problems should not assess examinees' ability "to describe features of delirium tremens" (a knowledge issue); rather, they should assess their ability "to recognize delirium tremens in a specific patient" (a clinical reasoning issue) and "to prescribe appropriate therapeutic measures" (a clinical decision issue). The distinction is not just semantic but focuses on different skills. While it may be easier to list the cardinal features of delirium tremens, it may be altogether different and more challenging to recognize delirium tremens within a clinical scenario and to prescribe an appropriate course of action.

The concept of key features represents two important shifts from traditional positions in the assessment of clinical competence. First, it shifts emphasis from the methods of assessment to the object of assessment and, in fact, the key feature approach can be applied to any of the assessment strategies listed here that require the generation of standardized problems. The first question to be addressed in developing a key features problem is, **“What is the problem that is to be assessed?”**; selection of the problem must be guided by and directly linked to the competencies targeted. The next question to tackle is, **“What are the critical, essential, or challenging elements in the resolution of this problem?”** that is, “What are this problem’s key features that should be assessed?” The subsequent question is then, “Which method or methods are best suited to measure the key features for this particular problem?” Commonly used key features formats include short answer, multiple choice with multiple correct answers, and long menu items.

Key feature questions shift the emphasis from assessing all aspects of solving a problem to assessing only the essential elements relative to each problem. This shift recognizes that the essential elements in resolving a problem are unique or specific to each problem (referred to as “case specificity”). Flexibility in formats and scoring keys emphasizes the strengths of this problem-based examination format in accommodating the realities and complexities of clinical medicine.

### **Multisource Feedback (and 360° Assessment) (MSF):**

360° assessment and multisource feedback are aggregate assessments of behaviour based on multiple inputs from multiple individuals who form the student's sphere of influence, including peer assessment. This assessment technique is appealing to educators wishing to get accurate assessments of teamwork,

professionalism and collaboration skills. Each assessor should only comment on areas where they have reasonable expertise and exposure to learner behaviour.

### **Oral Exams (ORAL):**

Standardized oral examinations involve real-time dialogue between an examiner and a student. A clinical scenario is verbally presented and questions probing investigation and management of the case are asked. They require physician examiners who are trained in providing data, questioning the student and scoring the responses consistently using structured answer keys. The questions should be realistic with emphasis placed on patient management rather than in-depth knowledge probing. CanMEDS competencies such as Manager, Professional, Scholar and Collaborator can be assessed through skillful development of the question scenario and focused questioning around these areas.

### **Objective Structured Clinical Examinations (OSCE):**

The Objective Structured Clinical Examination (OSCE) is an assessment method that is geared to assess competencies in relation to communication, clinical reasoning, clinical examination, performing of procedures, analytical skills as well as other health related competencies. An OSCE usually comprises a circuit of short (5–10 minute) stations, in which each student is examined with one or two examiner(s) and either real or standardized patients (trained actors). Each station has a different examiner, as opposed to the traditional method of clinical examinations where a student would be assigned to an examiner for the entire examination. Students rotate through the stations, completing all the stations on their circuit. In this way, all students are administered the same stations. It is considered to be an improvement over traditional examination methods because (a) a relatively large number of observations can be collected over a short period of time, thus enabling trustworthy measurement and ensuring that the student receives some direct observation that will allow credible feedback to be delivered, (b) the stations can be standardized, enabling improved peer comparison, and (c) complex procedures can be assessed without endangering patient health.

Thus, in the planning stage of the OSCE, station authors need to determine which steps of the encounter are both key to the clinical situation and appropriate for the level of training. Checklists are often used and provide useful orientation to examiners regarding the intended focus of the station, but global ratings generally provide better indications of clinical expertise. There are various standard setting methods to determine passing scores for each OSCE. OSCEs are considered a valid and a reliable assessment tool, although the number and content of stations and the number of assessors will influence these parameters.

### **Peer Assessment:**

Peer assessment, in which students comment on and judge their colleagues work, has a vital role to play in formative assessment, but peers are generally reticent to provide honest feedback/ratings if used in a summative assessment package.

One of the desirable outcomes of education should be an increased ability in the learner to give and receive feedback. Peer assessment exercises are seen as means by which these general skills can be developed and practiced. A peer-rating format can encourage a greater sense of involvement and responsibility, establish a clearer framework and promote excellence, direct attention to skills and learning and provide increased feedback.

Reports of the types of assessment where peer assessment has been used for summative purposes include essay writing, clinical skills, speeches and oral presentations, interpersonal skills, and small group activities.

### **Professionalism Mini Evaluation Exercise (P-MEX) or Studentship Report:**

As the evaluation of professional behaviors has been identified as an area for development, the Professionalism Mini-Evaluation Exercise (P-MEX) was developed using the mini-Clinical Examination Exercise (mini-CEX) format to evaluate professional behaviors in medical students. Although the mini-CEX includes “humanistic qualities/professionalism” as one category, it does not identify specific behaviors to be observed in realistic contexts, a prerequisite for evaluating professionalism. The P-MEX was designed to be used in any situation where a student’s behavior can be observed, including patient encounters, small group sessions, and sign-out rounds. The evaluation is based on interactions that are relatively short (10-20 min) and that occur frequently as a part of training so that each student can be assessed on several occasions by different faculty members. The assessor is expected to give timely feedback to the student, thus giving it the potential to be formative and summative.

### **Portfolios:**

See Body of the Report

The portfolio provides a tool for collecting and managing multiple types of assessment evidence from multiple contexts and sources within the curriculum to document competence and promote reflective practice skills.

Portfolios used for assessment can be defined as purposeful collections of evidence used by students to document and reflect on learning outcomes. The literature suggests that a portfolio approach can be designed to promote reflection on learning, accommodate a wide range of assessments, including authentic performance-based methods, and give students responsibility for integrating and assessing evidence of their own learning. The faculty and oversight committee approved the use of a portfolio assessment process for both formative and summative purposes.

Portfolio assessment system may be designed on the basis of the following considerations:

1. If reflective practice is a goal, setting aside time and providing physician advisors who are prepared for their role is critical to helping students reflect on evidence of their learning and professional development.
2. Distinctly separate processes and reviewers for formative portfolio (FP) and summative portfolio (SP) assessments can ensure that confidentiality of reflections of a personal nature is not compromised by the rigor and judgments required for making promotion decisions.
3. Student responsibility for selecting evidence and analysis of their learning is critical to maintaining student engagement in assessing progress, as is the use of the portfolio for summative assessment.
4. Requiring essays aimed at integrating the competencies needed for the practice of medicine, such as asking students to reflect on the various roles of the doctor, can facilitate reflection on learning.
5. Rigorous measurement standards are necessary if portfolios are to be used for summative purposes: fairness (clear instructions, equal assistance, and due process), validity (appropriate standards, evaluators capable of making sound judgments, and quality authentic evidence), and reliability (trained evaluators and adequate curricular experiences providing multiple sources of assessment).

The following features in implementing a portfolio system have been found useful:

- The quality of evidence is critical for this primarily qualitative approach to assessment. Faculty and students need to be trained to provide observation-based, narrative feedback on the performance-based criteria to identify areas needing improvement and areas of strength. All teaching faculty who provide feedback should be expected to participate in a rigorous faculty development program. Students also need to participate in teaching sessions on giving feedback, and learn in the course of receiving feedback what constitutes useful feedback.
- Students need sufficient curricular experiences and feedback to ascertain achievement of standards for competencies. If a review by the curriculum committees finds that curricular experiences and/or opportunities to obtain quality feedback are insufficient to demonstrate achievement of standards, standards must be revised or the educational program (curriculum, assessments, etc.) must be improved.
- The role of the physician advisor is critical, and appointing clinical faculty already recognized for their mentoring abilities is vital. Protected time and regular meetings of the advisors allow problem solving, ensure similar support of students, help develop skills for encouraging reflective practice, and offer collegial support. Resources need to be put in place to develop and maintain the skill sets involved in this role, including communications, motivation, collaboration and others. It is recommended that the faculty themselves maintain a personal portfolio, preferably before they start their role as a physician advisor.
- Appointing senior faculty interested in education and experienced in exercising judgment with regard to students is critical to ensure solid decisions that are viewed as credible by students and faculty. Agreeing on standards for portfolios before beginning the review process takes time and should not be short changed.
- The consistent engagement in a competency-based, formative feedback approach is challenging for faculty. Therefore, communication is critical for developing a shared understanding of the portfolio system. Giving students responsibility for documenting achievement of competencies challenges the tradition of teacher-centered assessment. Creating a culture supportive of a portfolio system requires multiple approaches, especially in the early stages. For example, letter sent to all faculty stressing the value of the portfolio for student learning and the soundness of the process for making summative decisions; an education conference featuring the portfolio system, during which the faculty have the opportunity to read and discuss portions of actual portfolios and to view a video of students being interviewed about the process.
- A central committee to oversee the development and implementation of the assessment system ensures its integrity by establishing policies consistent with the assessment principles. The committee also creates portfolio experts for various subgroups within the program who educate others and protect the integrity of the system.
- An evaluation plan that collects regular feedback from all participants in the portfolio system is essential for identifying changes that need to be made in the course of initial implementation and for ongoing program improvement.
- A rigorous approach to establishing the reliability and validity of data and fairness of judgments in a portfolio-based assessment is critical. As a result, it is important to carefully consider these issues as part of designing the assessment system. The important next step includes detailed analysis of the quality and interpretation of assessment data from measures used for the portfolios.
- Refine the assessment instruments and use focus groups of both students and physician advisors to make sure the planned electronic portfolio meets user needs. The assessment director needs to coordinate with the information technology team to ensure that the conceptual framework of the portfolio assessment system informs the overall development of the electronic portfolio.

- Consultants should be used to provide critical expertise for the development and implementation process. Portfolios are complex tools, and experience provides useful lessons. It is vital that the electronic portfolio serves the needs of the users and that procedures on the e-portfolio are as simple and easy to use as possible. This will allow for efficient, rapid use by the users.
- Be sure that the portfolio system meets Committee on the Accreditation of Canadian Medical Schools (CACMS)/Liaison Committee on Medical Education (LCME) accreditation standards and adhere to core assessment principles. If necessary, provide CACMS-LCME with a clear rationale for every aspect of the portfolio process during the accreditation site visit.

### **Procedural Skills Exam (PSE) or Direct Observation of Procedural Skills (DOPS):**

Performance-based tests are the most reliable and valid methods available for assessing the proficiency of physicians in performing procedures. Observing learners perform the procedures and assessing that performance by direct observation allows for the observation and immediate correction (if necessary) of discrete skills. An observer gathers and records information about the skill of the student and assesses that skill. The technique involves a supervisor or an expert clinician observing a student performing a procedural task on a real patient in the usual clinical setting. It is used in the workplace and includes three main characteristics:

1. Used only to assess clinical procedural tasks such as a simple venipuncture to a more sophisticated surgical procedure. (It is not used for assessing skills such as communications, history taking or patient examinations.)
2. Used only with real life patients (not simulated patients or dummies).
3. Assesses a student pertaining to a specific skill rather than performance over time.

The supervisors or the expert clinicians who mark the student use a checklist or a global rating to evaluate the student's performance. The items in the check list are determined by the experts in the field who recognize the necessary skills in performing a clinical procedural task.

### **Progress Test (PT):**

See Body of the Report

Progress testing is a form of longitudinal examination that in principle tests students at regular intervals and enables them and their course supervisors to monitor their progress over the course of a training program. It was designed by the University of Missouri-Kansas City School of Medicine and the University of Maastricht to assess the knowledge of undergraduate medical students. <http://careers.bmj.com/careers/advice/view-article.html?id=20001185 - ref3>

The theory behind progress testing is that the whole medical school student body (first year students through to final year students) sit the same test together at regular intervals. The questions in each progress test are drawn randomly from an extensive bank of questions. The development of knowledge of each year group and each individual can then be mapped over a period of time. Progress testing (PT) is a contemporary, longitudinal approach to assessment. What makes progress testing unique is that the standard required is that of a newly qualified professional rather than of a current student. Students in the early years achieve low scores but show steady improvement as they move towards graduation. Because it is longitudinal, it has unique scope for objectively charting progress, the early diagnosis of learning problems and as a tool in course evaluation.

Progress tests have generally been used in medical schools that employ a problem based learning approach, where knowledge gain is not expected to follow the modular subject-oriented structure of more traditional curricula.

### **Scholarly Activity (Papers, Reports, Research Projects) (SACT):**

Medical education must take place in an environment of inquiry and scholarship in which students learn to evaluate research findings, and develop habits of inquiry as a continuing professional responsibility. Some programs require the completion of a scholarly activity prior to the completion of their program. Some suitable examples include participation in the preparation of scholarly papers such as collective reviews and case reports, and active involvement in an original research project. While some students may be allowed to fulfill this requirement with non-research based designs such as administrative or community service projects, others may opt to complete original research before graduating.

The primary role of the scholarly project is *to instruct students in the process of scientific inquiry*. By learning the elements and mechanisms of this process, the student is expected to achieve a better understanding of the medical literature and acquire the tools that will enable the independent critical evaluation of scientific evidence. While it is clear that the scholarly project serves some role in teaching students the methodology of research, it is considered as only a supplement to the overall research curriculum that also includes journal clubs and didactic lectures. Other goals of the scholarly project include:

1. To teach problem-solving ability. It has been noted that the basic elements used in the scientific method (observation, hypothesis formulation, testing of hypothesis, and analysis of data) are similar to the process used in the clinical evaluation and diagnosis of patients.
2. To learn the art of medical writing. The technical skills needed to produce well-written documents are not taught during medical school and are rarely emphasized during premedical training. However, even nonacademic practitioners are often faced with the daunting task of writing protocols or policy statements during their medical careers.
3. To expose the student to research for consideration of an academic career. It has been well documented that students who have had some research experience are more likely to pursue academic careers.
4. To focus an area of interest or expertise.

The scholarly project is usually described in terms of examples of activities that are deemed acceptable to fulfill the residency requirements (prospective studies, case reports, etc.). The scholarly project should focus on process and not product. In this approach any project undertaken as a scholarly activity should contain the general elements that demonstrate the process of the scientific method. These elements include:

1. Problem identification and/or hypothesis formulation.
2. Some form of information gathering or data collection.
3. An analysis of data or some evidence of analytic thinking.
4. A statement of conclusion or interpretation of results.

There is further consensus that these elements should be documented in some written form. When appropriate, that written form should follow appropriate research writing guidelines.

### **Self-Assessment (SA):**

Assessing and evaluating one's abilities is a critical ingredient for lifelong learning. Self-assessment is defined based on providing guidance on improvement, responding to the question, "What aspects of my

performance need work?" and not, "How good am I?" The act of self-assessing is important to creating good habits for continuous quality improvement, but the outcome is unlikely to provide an accurate picture of one's abilities. Self-assessment, therefore, should complement, but not replace other means of assessment in an overall program.

### **Short Answer or Constructed Response Questions (SAQ):**

Constructed-response written exams require the student to recall information in response to a question. Typically, information recall is a more difficult task than recognition of the right answer. Constructed-response formats include essay question and short answer questions. Questions tend to be easier to develop and can be banked but are harder to mark given the multitude of ways that learners can express themselves. Exams should be standardized, provide explicit instructions and blank spaces for each answer, and be supported with a marking template developed a priori. Constructed-response exams can be used to assess both factual knowledge and problem-solving related to a number of competencies. For example, a question about an elderly patient who had a fall might focus on injury complications (Medical Expert, Skilled Clinician) or risk factors for a fall (Health Advocate, Resource to a Population).

### **Script Concordance Test (SCT):**

According to script theory, clinicians mobilize networks of organized knowledge, called "scripts", to process information and progress toward solutions to clinical problems. For example an ear, nose and throat specialist working with an outpatient suffering from vertigo is focusing on his or her knowledge of vertigo-inducing illnesses. As soon as a new patient comes into the room, complaining of a cervical mass for instance, the vertigo knowledge is "washed out" and networks of knowledge related to cervical masses are called to mind with direct questions to ask, physical exams to do or investigation/treatment options to decide on. These knowledge networks are acquired during clinical training and refined with each clinical encounter. They are specifically adapted to the tasks clinicians commonly perform.

According to theory, scripts are made up of links between illnesses, clinical features and management options. Health professionals progress toward solutions to clinical problems with hypotheses (or management options) and their related knowledge networks (scripts) in mind. They actively use them to make judgments on the effect that each new piece of information has on the status of the hypothesis or option. Script concordance testing (SCT) is based on the principle that the multiple judgments made in these clinical reasoning processes can be probed and their concordance with those of a panel of reference experts can be measured. This provides a tool for assessing clinical reasoning.

The test format is used to assess reasoning in ambiguous or uncertain situations. These situations frequently occur in daily practice, especially for primary care physicians. They are nevertheless poorly measured with usual tests. Clinicians find the test appealing because its cognitive tasks are the same as those they carry out constantly in their daily practice. A series of studies looking at fields such as family medicine, midwifery, surgery or radiology have documented the reliability and construct validity of test scores.

## Appendix B: Exit Competencies Mapped by Assessment Methods

Physician Role	Key Competencies	Potential Assessment Tools <sup>2</sup>
Medical Expert	<ul style="list-style-type: none"> <li>Master <b>core medical knowledge and foundations of medicine</b> and apply that knowledge to the practice of medicine at the level of an individual patient and population at large;</li> </ul>	MCQ/KFE; ORAL, PT, SAQ, SCT
	<ul style="list-style-type: none"> <li>Collect, interpret, document, and communicate both a <b>complete and a focused medical history</b>, as appropriate;</li> </ul>	Mini-CEX/RIME,DEC/FieldNote, ITER, KFE, SP, DEC; OSCE, SAQ
	<ul style="list-style-type: none"> <li>Collect, interpret, document, and communicate both a <b>complete and focused physical examination</b> (including mental status examination where appropriate);</li> </ul>	Mini-CEX, RIME, DEC, ITER, KFE; SP, DEC, OSCE, SAQ
	<ul style="list-style-type: none"> <li>Collect, interpret and communicate <b>commonly used laboratory investigations</b>;</li> </ul>	CCR, DEC, Mini-CEX/RIME, ITER, KFE; SP, DEC/FieldNote, OSCE, SAQ
	<ul style="list-style-type: none"> <li>Integrate and communicate the historical, physical, and investigative findings into a meaningful <b>differential diagnostic formulation</b>, including identifying the most probable diagnosis in a patient;</li> </ul>	CCR, Mini-CEX/RIME, CIP, DEC, HFS, ITER, MCQ/KFE, ORAL; PT, SCT
	<ul style="list-style-type: none"> <li>Demonstrate <b>effective therapeutic and ongoing management of an individual patient and population</b> at large.</li> </ul>	CCR, ITER; MCQ/KFE, MSF
Collaborator	<ul style="list-style-type: none"> <li>Integrate knowledge of one’s own role with knowledge about the roles of generalist and specialist physicians, and other health professionals in order to appropriately establish and achieve patient and/or patient supporter goals (<b>Role Clarification</b>);</li> </ul>	DEC/FieldNote; HFS, ITER, MSF, OSCE; Portfolio, PA, SA
	<ul style="list-style-type: none"> <li>Apply the principles of team work dynamics and processes to enable effective health professional collaboration (<b>Team Functioning</b>);</li> </ul>	DEC/FieldNote; HFS, ITER, MSF, OSCE; Portfolio, PA, SA
	<ul style="list-style-type: none"> <li>Seek out, integrate, and value, as a partner, the input and the engagement of all team members, including the patient/caregiver/community, in designing and implementing health care delivery (<b>Patient/Patient Supporter-Centred Care</b>);</li> </ul>	ITER, MSF, PA, SA
	<ul style="list-style-type: none"> <li>Communicate with colleagues, physicians, and other health professionals in a collaborative, responsive and responsible manner (<b>Inter- and Intraprofessional Communication</b>);</li> </ul>	DEC/FieldNote, ITER, MSF, OSCE; PA, Portfolio, SA

<sup>2</sup> See abbreviations below table.

Physician Role	Key Competencies	Potential Assessment Tools <sup>2</sup>
	<ul style="list-style-type: none"> <li>Apply leadership principles that support a collaborative practice model through recognition of the leader depending upon the patient/patient supporter needs and context (<b>Collaborative Leadership</b>);</li> <li>Actively engage self and others, including the patient and caregivers, in preventing, negotiating and resolving inter-- and intraprofessional conflict (<b>Conflict Resolution</b>).</li> </ul>	DEC/FieldNote, ITER, MSF, OSCE; PA, Portfolio, SA DEC/FieldNote, ITER, MSF, OSCE; PA, Portfolio, SA
Communicator	<ul style="list-style-type: none"> <li>Appropriately develop and maintain <b>ethical supportive relationships, rapport and trust</b> with patients and their supporter(s);</li> <li>Accurately <b>elicit relevant information and perspectives</b> from patients and their supporter(s) , colleagues, and other professionals;</li> <li>Accurately <b>convey relevant information and explanations</b> to patients and their supporter(s) ;</li> <li>Develop a <b>shared plan of care</b> with patients, their supporter(s), and other professionals;</li> <li>Effectively <b>convey oral and written information</b> associated with a medical encounter;</li> <li>Communicate effectively with <b>third parties</b> other than health professionals.</li> </ul>	Mini-CEX/RIME; DEC/FieldNote, ITER, MSF; OSCE Mini-CEX/RIME; DEC, ITER, MSF; OSCE, PA CCR; DEC/FieldNote, ITER, MSF;OSCE; Portfolio CCR; DEC/FieldNote, ITER, MSF;OSCE; PA, Portfolio CCR; DEC/FieldNote, ITER, MSF;OSCE; Portfolio CCR; DEC/FieldNote, ITER, MSF;OSCE; Portfolio
Health Advocate	<ul style="list-style-type: none"> <li><b>Individualize patient care</b> according to the unique physical and psychosocial needs of the patient;</li> <li>Identify the <b>determinants of health</b> and participate in activities that improve the health of the community(ies) or vulnerable populations based on the Social Responsibility and Accountability framework of the UBC Faculty of Medicine;</li> <li>Demonstrate proficiency in <b>educating individual patients and specific populations on health promotion and disease prevention</b> strategies;</li> <li>Maintain <b>personal health and well-being</b> such that the health care that one provides is sustainable.</li> </ul>	MSF; ITER / DEC/FieldNote; Portfolio ORAL, SACT; SAQ; Portfolio DEC/FieldNote, ITER, MSF, OSCE, Portfolio DEC/FieldNote, ITER, MSF; PA, Portfolio, SA
Manager	<ul style="list-style-type: none"> <li>Explain the structure and function of the <b>Canadian health care system</b> and how it influences the types of health care delivery provided and the patients and populations</li> </ul>	DEC/FieldNote, ITER, HFS, MSF; VP

Physician Role	Key Competencies	Potential Assessment Tools <sup>2</sup>
	<p>who receive them;</p> <ul style="list-style-type: none"> <li>Describe the rationale and a decision-making framework for the efficient, effective, and equitable <b>allocation of finite health care resources</b>;</li> <li>Participate in systemic <b>quality process evaluation and improvement</b>, including patient safety initiatives;</li> <li>Maintain a healthy <b>work-life balance</b>;</li> <li><b>Manage time</b> effectively in a clinical setting;</li> <li>Employ <b>information technology</b> to acquire, organize and use information for the purposes of patient and population care, scholarly inquiry, and self-directed learning.</li> </ul>	<p>CCR; MCQ, ITER, ORAL; SAQ</p> <p>CCR; MCQ/KFE, MSF, SAQ, Portfolio, SACT</p> <p>DEC/FieldNote, ITER, MSF; PA, Portfolio, SA</p> <p>DEC/FieldNote, ITER; MSF; OSCE</p> <p>ITER, Portfolio; SA, SACT</p>
Professional	<ul style="list-style-type: none"> <li><b>Accountability to patients</b>;</li> <li><b>Accountability to the medical profession and other health professionals</b>;</li> <li><b>Accountability to society</b>;</li> <li><b>Commitment to altruistic principles</b>.</li> </ul>	<p>CCR, Mini- CEX/RIME, DEC; HFS, ITER, MSF, P-MEX, Portfolio</p> <p>MSF, ORAL, PA, P-MEX, Portfolio; SACT</p> <p>MSF, P-MEX, Portfolio; SACT</p> <p>MSF, P-MEX, Portfolio; SACT</p>
Scholar	<ul style="list-style-type: none"> <li>Apply a <b>scholarly inquiry</b> approach to learning and patient care;</li> <li>Discuss the <b>ethical principles of clinical and translational research</b>, including the ways in which such research is conducted, evaluated, explained to patients, and applied to patient care;</li> <li>Develop and implement a plan for <b>continual personal learning</b>;</li> <li><b>Facilitate the learning of others</b> as part of professional responsibility (patients, health professionals, society).</li> </ul>	<p>ITER, Portfolio, SA, SACT</p> <p>Mini-CEX/RIME, ITER, ORAL, Portfolio, SA, SACT</p> <p>P-MEX, Portfolio, SACT</p> <p>ITER, MSF, ORAL, Portfolio, SA, SACT</p>

CCR = Clinical Chart Review;

CIP = Comprehensive Integrated Puzzle

DEC = Daily Encounter Card/Field Note  
HFS = High Fidelity Simulation  
ITER = Preceptor / Tutor In Training Evaluation Report  
Mini-CEX = Clinical Examination  
MCQ = Multiple Choice Question Exam KFE Key Feature Exam type of MCQ  
MSF = Multisource Feedback (360° Assessment);  
ORAL = Oral  
OSCE = Objective Structured Clinical Exam  
PA = Peer Assessment  
P-MEX = Professionalism Mini-Evaluation Exercise or Studentship Report  
Portfolio = Portfolio  
PSE = Procedural Skills Exam  
PT = Progress Test  
RIME = Reporter/Interpreter/Manager/Educator  
SA = Self Assessment  
SACT = Scholarly Activity Paper / Report / Research  
SAQ = Short Answer Question or Constructed Response Question examination  
SCT = Script Concordance Test  
SP = Standardized Patient

## Appendix C: Student Assessment Frequently Asked Questions (FAQ's)

### Preamble

Assessment is fundamental to our medical education culture and has become a key discussion point for medical educators throughout the world. One cannot improve without access to good data regarding one's performance. At UBC, work done in 2010 clearly demonstrated universal dissatisfaction among faculty, administrators, and students about the current assessment system and encouraged Curriculum Renewal to ensure that a route to improvement was elucidated. Assessment has multiple purposes, but within undergraduate medical education assessment provides impetus and guidance for learning, allows judgment of learning achievement, and provides a basis for outside decision making (e.g., applications to post-graduate programs). No single assessment instrument can hope to fulfill all of these roles, thus the assessment system will require multiple instruments and processes in order to achieve a high degree of functionality. Our new assessment system will also need to be flexible and accommodative, allowing us to respond and adjust to changing needs within and outside of our program, and allowing the integration of new assessment processes as the field evolves.

Discussion of the assessment framework will necessarily lead to questions that will be captured within this FAQ, and as further questions occur the FAQ will be adjusted to reflect the evolving discussion

## Questions

### *1. Why are we changing the Assessment System?*

Assessment is an integral aspect of the undergraduate curriculum and of performance improvement more generally. With changes occurring to the curriculum design it is critical that the assessment framework be adjusted to reflect the design principles. As is often stated, “assessment drives learning”, but assessment also drives curriculum. This can occur either overtly or covertly, but without changing the assessment system the end result would be a curriculum that was being pushed towards the previous version by an unchanged assessment system.

## ***2. What are Progress Tests?***

They are MCQ examinations that represent exit competency level material. The exam would occur repeatedly through the four years of the program, with different MCQ’s each time. Each progress test will be relatively low-stakes, and can provide powerful formative feedback to students. Multiple sittings of the exam allow demonstration of a learning trajectory that in aggregate can be part of higher stakes decision making. Exit-level knowledge competencies emphasize long-term knowledge retention, and require students to focus on continuous improvement rather than cramming to “pass the exam” or simply for the sake of maintaining scores that are set on an arbitrary grade-based scale. Experience in other schools shows that Progress Tests contribute to early identification of learners experiencing difficulty. Finally, Progress testing based on the MCCQE Part 1 also prepares students for the licensure exam.

## ***3. Is anyone actually using Progress Tests?***

Yes. The concept of Progress Testing was first developed in 1970, and since then medical schools throughout the world have made this transition. In 2010, “Medical Teacher” dedicated the entire Volume 32, Number 6 issue to Progress Tests. In the introductory commentary they describe a selection of medical schools that were using progress testing at that time. This included European schools in the Netherlands, Belgium, United Kingdom, Ireland, Germany, and Austria and North American schools including McMaster, University of South Florida, Case Western, Southern Illinois, Vanderbilt, University of New Mexico, Penn State, Texas Tech, Medical College of Georgia, and the University of Minnesota.

#### ***4. How do we benchmark ourselves against other schools and programs?***

We need to maintain high achievement levels on the MCCQE Part 1. In fact, McMaster made adjustments to their assessment system, beginning to use progress tests, because of poor performance against this benchmark. A paper published by Norman et al. in the above-mentioned issue of *Medical Teacher* demonstrated that the change yielded immediate improvement against this particular benchmark. The NBMEs commonly used in Year 3 have never been a benchmark for us as we simply remove items from the exam that we think to be inappropriate for our students. There is burgeoning literature around using multi-institution collaborations with progress tests to provide some further information around comparative performance. Since the Assessment Working Group is advocating collaborating with McMaster et al, there would be a significant opportunity to do similar comparisons.

#### ***5. The students often note that they write an exam and the MCQ's ask about material that they "weren't taught". Will the progress tests solve this?***

The purpose of the progress exam is not to perfectly match the immediate short term objectives of a particular week or two in the course. The exam instead represents the expected end-point for students. This means that in the first year we expect the student will see questions on material they have never encountered, with the initial "score" for the first sitting of the exam typically averaging around 10%. This has dual benefit: It immediately breaks the normal and arbitrary scales to which students are accustomed, thereby lessening complaints that one's normal level of performance was not achieved and, more importantly, it better aligns with the principle that medical practitioners should not simply take their best guess when practicing medicine, requiring students to think more carefully and be more judicious in determining what knowledge they do and or should have at a particular point in training. It is not the score that matters but rather the change in the performance over time. A progress test will encourage students to learn towards the expected exit competencies with the attendant knowledge and integrated understanding.

#### ***6. Why a split OSCE in Years 3/4?***

The UBC FoM Undergraduate program has had experience with the use of split OSCE's, particularly within the Integrated Clerkships, and some advantages of this approach have become evident. Most notably, it will allow formative feedback after Part One and subsequent improved performance in Part Two. Also, the newly proposed Curriculum Design has resulted in a robust but prolonged clerkship experience. The students, advisors, and faculty would likely benefit from having an OSCE prior to the end of this clerkship experience to allow an understanding of the student's performance and the program's performance. Full OSCEs in both Years 3 and 4 may be cost prohibitive.

### ***7. What does "Programmatic" mean?***

The competency-based curriculum design and the spiral curriculum are more than just an aggregate of courses. Instead, it reflects a deliberate program over four years designed to achieve a graduate with multiple integrated competencies. In a similar vein, "a good programme of assessment is more than a random set of good instruments" (Schuwirth & Van der Vleuten 2011). Programmatic assessment means that the assessment framework is placed within the entire context of the undergraduate curriculum and scans the breadth of competencies and depth of skill expected of students. Decisions about assessment modalities and timing should occur within this philosophical framework rather than considering each assessment protocol in isolation.

### ***8. Why individual and aggregate?***

The medical education literature repeatedly references the dangers and inaccuracies inherent in single-moment high-stakes assessments. Individual assessments though are a superb method for providing feedback that is informative to learning. By ensuring that each single moment of assessment remains low-stakes we can encourage reflection and responsive learning. However, students and faculty will need to be assured that competencies are being achieved. Aggregates of data points can provide this assurance. The suggestion is that the greater the stakes, the more data points that should be gathered.

***9. Portfolios are often mentioned but less often implemented. Are you sure we should be doing this?***

Absolutely. There are challenges to portfolio implementation, certainly, however many of these challenges are ameliorated by the design of the curriculum itself, most notably the development of ALC's. To effectively use portfolios, students will require guidance and encouragement from the outset. The students will also need repeated assurances that the portfolio is a key element of their undergraduate experience that will likely continue into the rest of their career as postgraduate and continuing professional development stages of training are increasingly reliant on portfolios. The key to all of this will be providing students safe space and encouragement to document critical incidents and difficult moments privately, to share items with their advisor for reflective learning, and to generate evidence for the Assessor and Progress Committee to make decisions about "promotion/advancement". As has been discussed in other working groups, this will need to be an e-portfolio.

***10. What about the MCQ's/OSCEs, etc. my department or discipline currently uses?***

The disciplines and departments have had many years of experience and dedication in developing various forms of assessment, and the new framework encourages this continued effort and involvement. We will need to provide MCQ's into the Progress Test database, for example. We also anticipate that there will continue to be assessments contributed by the different rotations. Critical to this though will be the recognition that we are encouraging low-stakes assessment moments. As an example, weekly quizzes or semi-weekly quizzes which can be reviewed by the student to further learning, scored by tutors to guide educational tailoring, and captured within the portfolio, would be natural fits within the assessment framework. High-stakes single moment assessments such as the NBME's would be counter to the assessment framework. The development of clinically relevant work-placed based assessment is encouraged, especially the assessment of student's development of clinical reasoning, knowledge-application and problem-solving.

***11. Can you tell me more about the Physician-Advisor role?***

The Physician-Advisor is a concept developed by the Curriculum Design group denoting the “coach” of a group of students within an ALC. The Curriculum Design and Assessment Working Groups within the ITFCR are meeting with Dr. Dawn Dewitt to further describe the roles and responsibilities of this individual. From the perspective of the Assessment Working Group, the Physician-Advisor will meet regularly with their students to review concerns and issues with regards to ongoing learning. They will be able to aid the student with reviewing items within the Portfolio and maximizing the learning associated with these items. The AWG recommends that the Physician-Advisor have a minimal role in Summative Assessment of their students in order to protect the “coach” relationship that they will have developed.

### ***12. Can you tell me more about the Physician Assessor role?***

Although “assessment for learning” is a key principle in modern assessment frameworks, there must be moments whereby students receive formal confirmation that they have met the expectations of the program and will be allowed to continue further in the Undergraduate program, or conversely asked to remediate. To initiate the process, an Assessor will need to review the students’ performance to-date and refer students-of-concern to the Progress Committee. This individual will need to be familiar with the curriculum and the assessment framework, making the likeliest candidate for this role the Physician-Advisors. Therefore, the *Physician Advisor* for one group of students will likely serve as the *Physician Assessor* for a different group of students. To ensure that this is achievable, the *Physician Assessor* must act primarily in a “triage” capacity. In depth analysis of students-of-concern will then be a responsibility of the Student Progress committee.

### ***13. How will assessment be governed and managed?***

The governance working group has provided guidance to all of us about how they envision the governance of the undergraduate program. New positions have been created and recently filled i.e. the Directors of Assessment and the Director of Curriculum. The Director of Assessment will form the Student Assessment Committee recommended by the Working Group on Student Assessment. The Student Assessment Committee with the leadership of the Director of Assessment will implement, manage and improve the programmatic assessment framework recommended by the Working Group on Student Assessment. The new Student Assessment Committee will

provide leadership and decisions about the instruments that may or may not be utilized, as well as overseeing timing. This will also allow efficiencies in the creation and implementation of assessment instruments.

#### ***14. Can we afford this?***

Although the actual costing of the items remains to be done, our initial consideration is that costs for some items will be counter-weighted by savings on others. The successful implementation of a new curriculum design will require a similar implementation of a new assessment framework. However, many of our sister institutions have implemented aspects of this new framework and are willing to collaborate and share their ideas and software. The cost of Progress Tests in partnership with another Canadian medical school is extremely small in comparison to the money currently spent on internal exams (question bank membership fees, professional and faculty time) and the cost of using NBMEs (either in their current form or as progress tests). OSCE costs will remain unchanged. The cost of implementing an e-portfolio has yet to be determined and it is possible for UBC to partner with another school that may defray costs; by participating in these collaborations, we can minimize the “start-up” costs that would be required to create some of these items. Time will be required for physician advisors to work with students in reviewing their assessment data to develop learning plans, and preparing for points of summative assessment. Time will also be required for portfolio assessment for summative decision-making twice per year. Ongoing faculty development will be required to prepare physician advisors for their role. These costs all need to be considered. The benefits of longitudinal advising and assessment are such that one could ask if we can afford not to do this.

## Appendix D: Accreditation Standards Related to Student Assessment

I. OVERARCHING REQUIREMENTS RELATED TO ASSESSMENT	
Standard	Requirements
ED-1-A Format of the objectives	The educational objectives are framed in competency based terms which state what students are expected to know and to do.
	The educational objectives are measurable.
	The educational objectives of the program are linked to the objectives of all courses and clerkships.
	The curriculum is designed/structured to support students in achieving each of the educational objectives/outcome competencies.
	The achievement of the educational objectives by students is documented by a variety of specific performance measures of knowledge, skills and professional behaviours (internal and external measures) at appropriate stages of the educational program.
ED-26 Variety of assessment methods	Student achievement of the educational objectives (i.e. knowledge, skills, and professional behaviours) of each course, clerkship, segment and the program as a whole are systematically assessed using a variety of appropriate methods.
	The curriculum committee (or subcommittee) formulates and oversees the policies and procedures related to student assessment.
	There is central oversight of the process used to set the exam schedule particularly in the pre-clerkship part of the program.
ED-29 Standards of achievement	Faculty members in the relevant biomedical and clinical sciences have a role in setting the standards of student achievement in those disciplines and contribute to setting of such standards in interdisciplinary and inter-

	professional learning experiences
	The curriculum committee has a role in setting the standards of achievement (e.g. establishing the grading policy for individual courses and clerkship rotations).
ED-30 Formative and Summative Assessment	Formative assessment is provided for all courses and clerkships in the program (e.g. practice tests and/or study questions with feedback).
	Students would agree that they know what to study and how to prepare for summative assessment in all courses/clerkships and/or end of year or end of the program.
	There is summative assessment of students' knowledge, and skills for all courses and clerkships in the program.
	Students receive the results of summative assessments for course and clerkships in six weeks or less from the time of the assessment
	Students receive feedback on their performance in summative assessments regarding areas of strength and gaps in knowledge and/or skills (examples include: exam review sessions, summary performance analysis).
ED-31 Mid-course and clerkship feedback	There is a policy that applies to courses of 4 weeks duration or greater that students receive formal mid-course feedback in all small group or 1:1 learning activities for which there is a summative performance assessment by the tutor/preceptor.
	There is a policy that applies to all clerkships of 4 weeks duration or greater that students receive formal mid-clerkship/rotation feedback.
	In courses and clerkships less than 4 weeks duration, self-testing or alternative means to permit students to measure their progress in learning are available
ED-32 Narrative Feedback	Narrative feedback is provided in all courses of 4 weeks duration or greater with small group or 1:1 learning activities for which there is a summative performance assessment by the tutor/preceptor.
	Narrative feedback is provided in all clerkships of 4 weeks duration or greater.

ED-33 Curriculum Management	The curriculum committee assures that the methods used to assess student performance are appropriate for the type of learning that is being assessed.
	To ensure that the program is effective and of high quality, the curriculum committee makes appropriate revisions to the objectives, the design, the content, teaching and assessment methods based on issues identified during systematic regular reviews and when problems are identified based on external sources indicating deficiencies in the program.
ED-34 Design and implementation of the curriculum	Faculty select i.e. , design and implement, the teaching and assessment methods used in the medical education program
ED-42 Single standard for promotion and graduation	The requirements for passing each course, clerkship, segment of the program and the program as a whole is the same at all instructional sites/distributed campuses.
	The requirements for graduation from the MD program are the same at all distributed campuses.
	A mechanism exists that ensures that the same principles are consistently applied in analyzing student performance data and making pass/fail and advancement decisions at all instructional sites/distributed campuses (e.g., student grades on all courses and rotation are reviewed by a single integrated committee(s) and advancement decisions are made by this body(ies) in distributed programs).
Ed-46 Program evaluation	The educational program oversight committee and the curriculum committee annually review and use the results of student performance on: internal and external exam used in the program; comprehensive OSCE and/or integrated knowledge assessments; and faculty and preceptor assessments to improve the educational program.
MS-18 Academic advising	There is a formal mechanism by which students experiencing academic difficulty are identified and directed to appropriate counseling.

	There is a program designed to assist entering students who may be at academic risk in adapting to the academic and personal demands of the MD program.
MS-34 Appeals process	There is a fair and formal (documented) process for taking any action that may adversely affect the status of a medical student.
	The process includes: timely notice of the impending action, disclosure of the evidence on which the action would be based, an opportunity for the student to respond, and an opportunity to appeal any adverse decision related to promotion, graduation or dismissal.
	A description of the process for taking any action that may adversely affect the status of a medical student, and a description of the appeals process are communicate to all medical students and teaching faculty.
MS-35 Confidentiality of student records	Medical student records are confidential and are only available to those members of the faculty and administration with a need to know.
	Medical students can allow access to their educational records to others
	Confidentiality of student records is governed by provincial and federal legislation.
MS-36 Medical students access and ability to challenge their records	Students have access to review the file containing the results of all assessments (exams and faculty assessments) accumulated during their tenure as a student.
	Students have the right to challenge the results of examinations and other faculty assessments (e.g. preceptor , and tutor) of their performance.
	Students have access to review all documentation describing their performance produced for internal (promotion and graduation) or external purposes (MSPR).
FA-6 Faculty must make decisions on admissions,	Faculty must make decisions on promotion and graduation

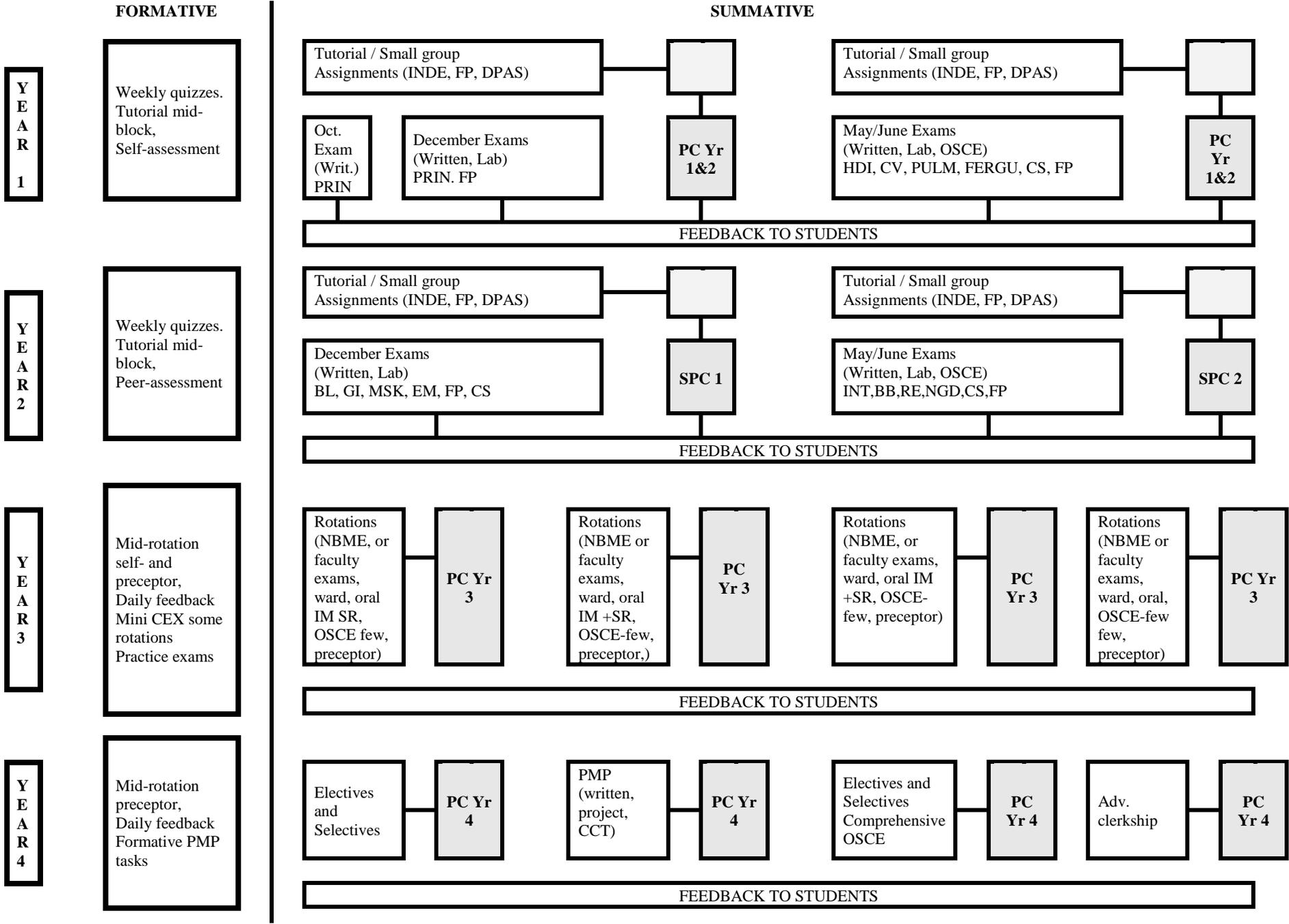
promotion and graduation and provide academic and career counseling for students	
II. ASSESSMENT OF SPECIFIC AREAS OF KNOWLEDGE, SKILLS OR BEHAVIOURS	
ED-17-A Clinical and translational research	Students are assessed on their achievement of the specific learning objectives on principles and ethics of clinical and translational research, how it is conducted, evaluated and applied to the care of patients.
ED-21 Cultural competence	There are educational objectives (i.e., knowledge, skills and professional behaviours) that students are expected to achieve in cultural competence.
	Students are assessed on the achievement of these cultural competency objectives.
ED-23 Medical ethics education, breaches and remediation	Students receive formal instruction in medical ethics and are assessed on their achievement of these objectives before engaging in patient care.
	Students' knowledge, skills and professional behaviours related to medical ethics are systematically assessed throughout the program.
	The system of identifying breaches of ethics inpatient care by medical students includes appropriate remedial activities to address identified gaps in student achievement of the objectives related to medical ethics.
ED-27 Direct observation of student performance	There is a policy/requirement that student's core clinical skills and professional behaviours specified in the program's educational objectives are observed.
	Students' core clinical skills are observed as specified in the program's educational objectives in each course

	and clerkship.
	Students' responses to the relevant questions in the AAMC CGQ (or other data source) indicate that core clinical skills are observed in each clerkship. Student responses to the relevant CGQ questions indicate that they are confident in their core clinical skills and readiness to enter residency training.
	Students are required to demonstrate core clinical skills in OSCE exams at appropriate times throughout the educational program.
ED-28 Assessment of problem solving, clinical reasoning and communication skills	Students' skills in the following areas are formally assessed in the educational program: <ul style="list-style-type: none"> <li>a) problem-solving</li> <li>b) clinical reasoning</li> <li>c) clinical decision-making and</li> <li>d) communication skills</li> </ul>
III. FACULTY AND/OR RESIDENTS' KNOWLEDGE AND FACULTY DEVELOPMENT REQUIREMENTS AND OTHER RESOURCES	
ED-8 Comparability across instructional sites	Faculty at all sites are aware of the specific objectives and student assessment requirements of the course or rotation in which they participate.
	Faculty leadership across instructional sites review student performance (assessment) data and student evaluation data and participate in program improvement.
	Faculty at all sites have access to faculty development activities to enhance their teaching and assessment skills.
ED-24 Resident preparation	Residents/graduate students at all sites participate in centrally or departmentally delivered faculty development activities to prepare them for their role in teaching and assessing medical students.
ED-30 Formative and	The directors of courses/clerkships and those responsible for the development of centralized examinations (e.g., end of year OSCEs or comprehensive written exams) have access to individuals with expertise in the

summative assessment	assessment of knowledge, skills and professional behaviours.
	Workshops to enhance faculty skills in the assessment of medical student knowledge, skills and professional behaviours are offered on a yearly basis (includes preceptor skills workshops, workshops for the assessment of individual student performance).
ED-36 Authority for, and sufficient resources to manage and evaluate the program	Resources (individuals with the requisite expertise, software and question items) are adequate in supporting formative, and summative assessment; analysis and reporting of student performance data within the required time-line.
	A program of faculty development that ensures that faculty, and residents are prepared for their roles in teaching and assessment of medical students.
FA-4 Commitment to enhance teaching skills	Faculty responsible for development and implementation of course, clerkship or larger curricular units are able to, or have access to individuals with the required expertise, to design learning activities and corresponding student assessment methods in a manner consistent with the program's educational objectives and sound educational principles.
	Faculty members have access to professional development activities to enhance their skills in teaching and assessment of medical students.
FA-11 Professional development for education and research	Faculty members and community physicians appointed by the faculty participate in professional development activities to assist them in enhancing their skills in teaching and assessment of medical students.

## Appendix E: Existing UBC MD Program Student Assessments

**APPENDIX E UBC MD UNDERGRADUATE PROGRAMME: SCHEMATIC OF THE ASSESSMENT SYSTEM**



Note: Students are permitted to review Summative exams in years 1 and 2 and provide feedback on questions. In addition, students have the right to request a review of their exam and to meet with a faculty member to discuss the exam and their performance.

Students receive immediate feedback on online summative faculty exams and can meet with a faculty member to discuss their performance.

Students only receive the scaled score on NBME exams (IM, SR, PED, PSY, OBGYN) and a bar graph indicating their performance in relation to all test takers in North America. Exam reviews are not permitted for any students by policy of the NBME.

With the exception of Family Practice, Clinical skills and Doctor Patient and Society, all other courses are block based from 1-9 weeks in duration. Exams are NOT given at the end of the block but are given at the end of the semester for those blocks that have been completed. The exams are NOT integrated- students are examined separately on each course.

ABBR

PC Promotions Committee- separate committees for Years 1 and 2, Year 3 and Year 4.

INDE is Clinical skills

DPAS Doctor Patient and Society

FP Family Practice longitudinal course in year 1 and 2

PRIN Principles of Human Biology

HDI Host defenses and Immunity

CV Cardiovascular system

PULM Pulmonary system

FERGU Fluids, electrolytes, renal genital urinary system

CS Clinical Skills

BL Blood and Lymphatics

GI Gastrointestinal system

MSK Musculoskeletal system

EM Endocrine system and metabolism

INT Integument system

BB Brain and Behaviour system

RE Reproduction

NGD Normal Growth and Development

IM Internal Medicine, SR surgery, PED paediatrics, PSY Psychiatry, OBGYN Obstetrics and Gynecology

PMP Preparation for Medical Practice two 3 week units that take place during the middle of year 4