UC Riverside, School of Medicine Policies and Procedures
Policy Title: Policy of Generating Reports of Program Learning Outcomes from Institutionally-Written Multiple Choice Questions (MCQ) Exam and Quizzes
Policy Number: 950-06-043

Responsible Officer:	Senior Associate Dean for Medical Education
Responsible Office:	Office of Medical Education
Origination Date:	May 11, 2023
Date of Revision:	June 15, 2023; November 16, 2023
Scope:	Examsoft and weekly quizzes policy

I. Policy Summary

The UCR SOM curriculum is based on an educational paradigm, known as competency-based medical education (CBME), which is "an outcomes-based approach to the design, implementation, assessment, evaluation and continuous maintenance of the medical education program using an organizing framework of competencies" (The International CBME Collaborators, 2009). CBME enables both the assessment of students' abilities and curriculum management decisions that are based on performance outcomes linked to the UCR SOM measurable competencies (e.g., Educational Program Objectives (EPOs).

All learning units (e.g., block courses, longitudinal experiences, threads), which use in-house written **multiple-choice question (MCQ)** quizzes and exams, will generate learning outcome reports for students and program outcome reports for faculty leaders (e.g., Block course directors, and thread directors) and the Medical Education Committee (MEC) committees and its subcommittees.

ExamSoft software generates learning outcome data for each student and the Office of Student Success called "Strengths and Opportunities Reports"; and program outcome data for faculty leaders, MEC committee and subcommittees, and the Office of Medical Education Quality Integration (OMEQI) called "Summary Reports."

II. Policy Text

A. Linking Individual MCQ Items to Standardized Categories

1. For institutionally written MCQ exam or quiz, each MCQ item on the exam/quiz must be linked to each of 7 categories:

Category		Selection*	Comments
Institution-level Categories	1. Educational Program Objectives (UCR SOM EPOs)	Choose between 1 to 3	UCR SOM measurable competencies
	2. USMLE subject areas	Choose between 1 to 3	From the USMLE Content Guide
	3. Institutional science pillars of medicine	Choose between 1 to 4	• Basic Sciences • Clinical Sciences • Health Systems Sciences • Behavioral Sciences

Course-level Categories	4. Course learning objectives	Choose between 1 to 3	Course learning objectives
	5. Course event learning objectives (e.g., session learning objectives)	Choose between 1 to 3	Learning objectives from an instructional session in the course
	6. Block Course Module Integration (Y1 and 2 only)	Choose between 1 to 6	• Foundational Module • Clinical Skills Module • Doctoring Module • Case-based Learning Module • LACE Module • Thread 1. List of each thread
Cognitive Processing Dimension of Item	7. Level of Bloom's Taxonomy	Choose 1	• Knowledge • Application • Synthesis

*listed in order of relevance

2. Strengths and Opportunities Reports are provided to students linked to the session learning objectives and USMLE subject areas.
3. Summary Reports are provided to course/clerkship directors, OMEQI, MEC committees and subcommittees for all six categories.
4. Summary Reports are used as higher-order program learning outcomes (e.g., Kirkpatrick's Pyramid Level 2b – Acquisition of Knowledge) as part of the evaluation of courses and clerkships, longitudinal experiences, threads, and the medical school.

B. Standardized Process

1. The faculty instructor and faculty leader (e.g., block course, or applied sciences thread director) is responsible for ensuring that test items are written in NBME style, and tagged as described below.
2. Each quiz will provide formative feedback in the form of a description on how to arrive at the correct answer.
3. Every lecture should contain a **slide 2** listing all block course objectives linked to the School's EPOs. This is prepared by the Block directors, in consultation with all module directors (see example in **Appendix I**).
4. Every lecture should contain a **slide 3** in which the session learning outcomes are listed and linked to the block objectives listed in slide 2 and to the USMLE categories (see example in **Appendix I**).
5. Every faculty leader creating institutionally written exams must submit all their MCQ (minimum 5 questions per hour of session in Year 1, and minimum 4 questions per hour of session in Year 2) tagged to the session learning outcomes and the USLME categories that each quiz is assessing (from slide 3 in their lecture(s)). See example in **Appendix II**. These need to be submitted to the curriculum team *a minimum of 2 weeks prior to the date of their exam.*
6. Every block director is responsible for the selection of quizzes for the weekly test (Years 1 and 2) and the final test (in Year 1 only), and must ensure, together with the course coordinator(s) and

the project manager, that all test items are linked to each of the 7 categories as stated in II.1.1 before the final exam is issued.

7. Upon receipt of the test items, the Academic Technologies Project Manager will prepare the items for the testing software prior to the testing date.
8. After the test has been administered, the faculty leader will have the opportunity to review the results and make any scoring adjustments as per existing OME policies. The faculty leader will notify the Academic Technologies Project Manager and the appropriate coordinator when the quiz or exam results can be released to the students.

C. Sharing Outcomes

1. Strengths and Opportunities Reports provide results to individual students and the Office of Student Success and block directors based only on the "USMLE Subject Areas and Session Learning Objectives" categories (e.g. example below).

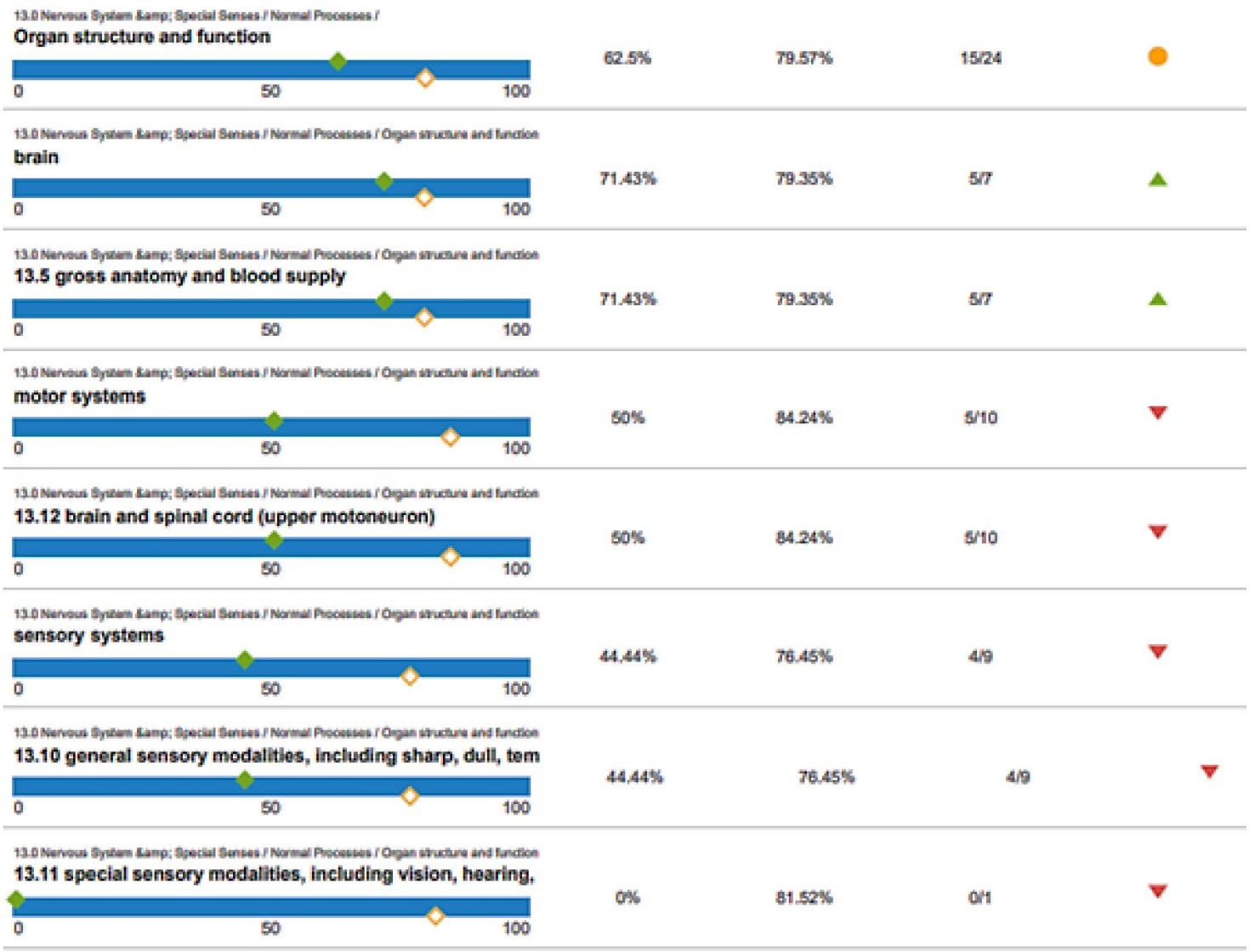
STUDENT SCORE: 75%		
	Course	MDCL_234_001_23S - MUSCULOSKELETAL MEDICINE
	Instructor	M. Mendoza
	Assessment	Block 4 - 2023 Week 4 Quiz MED
	Assessment Date	04/10/2023
	Questions	16
	Incorrect Questions	4

Category Performance

Student Score | Average | Score Range | At-Risk | Needs Review | Doing Well

Block 4 - SLOs 2023

CATEGORY NAME	STUDENT SCORE	AVERAGE SCORE	POINTS	STATUS
Anatomy Lecture: Anterior and Medial Thigh 4-5	100%	78.05%	2/2	▲
Anatomy Lecture: Anterior and Medial Thigh 4-5 / **Understand the neurovascular anatomy in the anterior and r**	100%	78.05%	2/2	▲
Anatomy Lecture: Anterior and Medial Thigh 4-5 / **Understand the structures and functions of all muscles in th**	100%	78.05%	2/2	▲



Faculty leaders, OMEQI and the appropriate MEC committees and subcommittees receive a Summary Report depicting all 7 categories.

Formative feedback/review sessions on weekly quizzes. (Years 1 and 2) and final exam review (Year 1 only).
Directors will set non-mandatory (proctored) exam review sessions where students can access the formative feedback provided in each quiz.

Policy on tardiness or unexcused absences to weekly quizzes.
Students are expected to be in class ready to take the test by the time listed in the block course schedule. Students that are not ready to take the test by the established time will not be allowed to enter the classroom and take the test and will receive a zero. Students are still invited to review the quiz as described in point 3. For excused or unanticipated absences (as defined in the policies on : Attendance and Planned, Emergency, Unexcused and Extended Absences and the Pre-Clerkship Tardiness Policy), a make-up weekly-quiz test will be offered within the same week.

Approvals:

MEDICAL EDUCATION COMMITTEE (11/16/2023)

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Appendix I.

Example of Slide 2 for all lectures in Block course 4 (AY 22/23)

https://docs.google.com/spreadsheets/d/1Varvvz0lpxk3i5uO8MI6MCFOO4nFHGLR/edit#gid=1501407970

*The SOM adopted the PCRS as our EPOs

Block course 4 objectives

	Course objectives	SOM EPOs*
4.1	Describe the development, structure, function, innervations, skeletal structure, vascular supply, and actions of limb and back muscles.	1.4, 1.5, 2.2, 2.3
4.2	Apply knowledge of the anatomy of nerves, muscles, and joints to the diagnosis of injuries of the limbs and back.	1.4, 1.5, 2.2, 2.3
4.3	Describe the principles and processes of nervous system embryological origin and function, including the morphology and function of the major cell types of the nervous system and the processes of synaptic transmission, and nerve conduction.	1.4, 1.5, 2.2, 2.3
4.4	Describe the normal organization and function of the spinal cord, including gross and microscopic anatomy, vascular supply, and embryology.	1.4, 1.5, 2.2, 2.3
4.5	Explain and illustrate the pathophysiology, clinical signs and treatment of spinal cord injuries, and identify such pathologies in imaging studies.	1.4, 1.5, 2.2, 2.3
4.6	Apply the knowledge of the neuroanatomy, neurologic exam, and concept of localization to neurological assessment of major spinal cord disorders.	1.4, 1.5, 2.2, 2.3
4.7	Describe the normal organization and function of the motor and somatosensory systems and identify major functional areas of the brain in gross material, and MRI scans.	1.4, 1.5, 2.2, 2.3
4.8	Describe the development, structure, function and pharmacology of the neuromuscular junction and the basic mechanisms of neuromuscular disorders.	1.4, 1.5, 2.2, 2.3
4.9	Describe basic principles of clinical pharmacology, and the pharmacology of pain.	1.4, 1.5, 2.2, 2.3
4.10	Describe the basic principles of cognitive development and major factors producing stress.	1.4, 1.5, 2.2, 2.3, 2.5
4.11	Describe the neurogenetics of selected neuromuscular diseases.	1.4, 1.5, 2.2, 2.3
4.12	Describe the principles of identifying and treating substance abuse and screening techniques for identifying individuals at risk for violent behavior.	1.4, 1.5, 2.2, 2.3, 2.4

	Course objectives (cont.)	SOM EPOs
4.13	Determine the fundamental principles relating to the critical analysis of published data from clinical trials.	1.5, 2.2. 2.3, 2.6, 3.6
4.14	Discuss recommended preventive screening guidelines with a patient.	1.9, 2.4, 3.8, 4.1, 6.2, 8.7
4.15	List, analyze, and document a complete history on patient	1.2, 1.5, 4.1, 5.1, 5.3, 5.5
4.16	Perform a supervised exams of a patient breast and musculoskeletal exam of the upper and lower extremity on a patient	1.2, 1.5, 4.1, 5.1, 5.3, 5.5
4.17	Review and interpret the basic parts of radiograph	1.4, 2.1, 2.2, 2.3
4.18	Screen a patient for intimate partner violence during a history interview	1.2, 1.5, 2.5, 4.1, 5.1, 5.3, 5.5
4.19	Develop and apply self-directed learning skills, effective communication and collaboration skills.	1.2, 1.5, 2.5, 5.4, 5.5
4.20	Apply differential diagnosis skills to direct clinical investigations and treatment	1.2, 1.5, 2.5, 2.6, 5.4, 5.5
4.21	Become familiar with the anatomy of the Upper & Lower Extremities, Back and Neck and their clinical landmarks as they pertain to the bones, joints, tendons and muscles	1.1, 1.2
4.22	Be able to describe the Range of Motion (ROM) for each component of the exam	1.2
4.23	Practice Performing and Demonstrate the different techniques for the Musculoskeletal exam	1.1; 1.5
4.24	Learn when to apply the skills used in the Musculoskeletal exam in the clinical context	2.2; 6.1; 8.1
4.25	Work in groups and use feedback to improve and enhance the acquired clinical skills	2.1; 3.1; 3.3; 3.5; 3.8; 4.2; 4.3; 7.1; 7.4; 8.8

Example Slide 3

Session learning outcomes:

At the end of this session students will be able to: (SLO)	SLO maps to Block Objective(s) #	SLO maps to USMLE #
1. Apply basic principles of pharmacokinetics to calculate drug dosing, dose intervals	4.9	8.20, 18.65
2. Describe the main general categories of drug toxicity	4.9	8.24, 8.25, 7.31, 9.19, 12.15, 11.29
3. Describe factors altering pharmacokinetics	4.9	8.23, 8.24, 8.25

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https://docs.google.com/spreadsheets/d/1Varvvz0lpxk3i5uO8MI6MCFOO4nFHGLR/edit#gid=1501407970

PHARMACOLOGY

Appendix II

Example of MCQ with SLO tagging.

1. In pharmacokinetics, the bioavailability of a given drug is an important property as it defines (together with the Vd) the amount of drug needed to be administered to reach a desired systemic drug plasma concentration, when the route of administration is not IV. The oral bioavailability (F) of a drug is best defined as:

   a. It is the fraction of drug that is metabolized by phase I enzymes.
   b. The ratio of the drug plasma concentration over time after oral administration (AUC_{po}) versus the drug plasma concentration over the same time period after IV administration (AUC_{iv}).
   c. It is the fraction of the drug that is eliminated per unit of time.
   d. It is the ratio between the amount of drug administered versus the initial drug plasma concentration.
   e. It is the drug clearance (CL) times its volume of distribution (Vd).

Answer B: the pharmacokinetics of a drug (amount of drug plasma concentration over a finite amount of time) is best represented by the area under the curve (AUC) in a plot [drug plasma] concentration vs time. The AUC of a drug over a defined time period is always maximal when the drug is directly administered via the IV route. The ratio of the AUC after the drug is administered via any other route (orally as in the question) vs the AUC after IV administration of the same drug (AUCiv) gives the bioavailability. Some drugs get too extensively metabolized and/or too rapidly eliminated after oral administration and never reach systemic circulation. Such drugs will have a very low (or even zero) bioavailability, and likely will never be administered orally. These include biologics or peptides, for example, that are digested in the GI tract. The other answers are distractors.

SLO assessed.

At the end of this session students will be able to: (SLO)	SLO maps to Block Objective(s) #	SLO maps to USMLE #
3. Describe basic concepts of pharmacokinetics	**4.9**	**8.23, 8.24, 8.25**