BSOM Testing SOP

Rationale

Assessment within the MD program at the Brody School of Medicine will occur in the context of programmatic curricular alignment such that the assessments are aligned with institutional and course/clerkship level learning objectives and learning activities. This includes formative and summative assessments, and will utilize written examinations, (MCQ, SAQ, Essay), performance assessments (OSCE and simulation), assignments (reports, projects, self-reflection), and oral examinations among the assessment tools.

Examinations administered at Brody School of Medicine follow the procedures in this document to provide a secure examination environment, consistent with what is required by the National Board of Medical Examiners. This allows consistent and accurate assessment of student knowledge fund.

Scope

The Standard Operating Procedure applies to all medical student assessments at BSOM. It outlines the procedures for creating and administering assessments to students enrolled in BSOM courses and clerkships, and contains recommendations to enable the creation of a highly reliable process. The SOP also communicates expectations to key stakeholders for creating and administering assessments and affects students, staff, faculty members, and course/clerkship directors of the Brody School of Medicine who design, create, and administer assessments.

Definitions

ADA: The Americans with Disabilities Act, which prevents discrimination against people with disabilities.
Accommodation: A change or adjustment from the normal curriculum or equipment format that allows an individual with a disability to access content or complete tasks to pursue a regular course of study.
BSOM: Brody School of Medicine
ECC: Executive Curriculum Committee
CD: Course or clerkship director
NBME: National Board of Medical Examiners
MCQ: multiple-choice questions, written in the single best answer format used by the NBME
Exam, examination: a high-stakes assessment that contributes greater than or equal to 5% of a course grade
Quiz: a low-stakes MCQ assessment that contributes to < 5% of a course grade
Assessment Architecture: a planning document including the key characteristics of an assessment, such as the date, time, duration, type of assessments, identity of courses participating, number of items per course, and total number of items.
Testing Blueprint: a planning document used by the course director to ensure the balanced content representation of the MCQs used on an assessment
ExamSoft: the testing platform used for the development and administration of multiple choice quizzes and examinations at BSOM
Secure Review: a component of ExamSoft allowing students to review the questions and answers on an assessment either immediately or at a fixed time after completing the assessment

General Sequence of Events for Blocks 1-4

Scheduling of Dates and Times for Assessments, Faculty Review and Student Review of the Assessments.
Each course director, with approval by the ECC, will designate the type of assessment that will be administered to students to appropriately measure mastery of the course/clerkship learning objectives. During the calendar planning for the academic year, the year specific curriculum committee chair and course directors identify the types of assessments to be utilized, dates and times for assessments, faculty review of the assessment, and post-administration student review. For room scheduling, the estimated duration of the examinations is 30 minutes longer than anticipated to allow for delays in starting and completing the examinations.

Because the timing and duration of the MCQ and laboratory portions of the examination for students with ADA testing accommodations (see BSOM ADA Accommodations SOP for full details) do not match the schedule of students without testing accommodations, additional planning is needed to create individualized schedules to meet the students’ needs. The Test Administrator coordinates with the course directors to create individualized schedules. This information should be communicated to the impacted students, Course Directors, and Associate Deans for Medical Education and Student Affairs by the Testing Administrator. A reminder email should be sent by the Testing Administrator to the impacted students, Course Directors, and Associate Deans for Medical Education and Student Affairs on the last business day before the exam.

Once the draft of the assessment plan is determined, the year specific curriculum committee chair reviews this plan with the testing administrator to identify and resolve any scheduling conflicts within and across the curriculum. After approval by the year-specific curriculum committee and the ECC, the assessment schedule is incorporated into the block calendar and published on the OME webpage.

Determination of the Assessment Architecture.
Before the beginning of each block, each quiz and examination requires an Assessment Architecture identifying: the courses participating in the examination, the types of assessment
being administered (MCQ, labs, short answer/essay/case analysis), the total number of examination items, the number of examination items for each participating course, the schedule for the exam day (including modifications in the schedule for students with testing accommodations), the date and time by which assessment items are due to OME, identification of courses participating in computerized exam administration, scheduling of the date and time for preview of the assessment by the course directors, and identification of proctors. The testing administrator uses this information to create folders in the “Questions” tab of ExamSoft.

### Determination of Testing Blueprint

Course Directors use the number of examination items indicated in the testing architecture to determine the distribution of questions and topics for each examination and quiz. The syllabus should contain a description of the distribution of questions and how it contributes to the course grade. The questions should be equitably distributed across the content to reflect the course objectives. Each question is linked to the course content using a consistent nomenclature.

### Identification of an Assessment (Course) Roster

At the beginning of each block, the testing administrator populates each course utilizing ExamSoft with all members of the currently enrolled medical class. The testing administrator confirms the identity of any students granted testing accommodations or who are enrolled in an individualized curriculum with Student Affairs. Simultaneously, the testing administrator confirms with the course directors the identity of any graduate students enrolled in the medical courses who participate in the MCQ assessments. The Office of Graduate Studies is responsible for notifying the Testing Administrator of any graduate student with testing accommodations. This information is used to determine the number of versions of an examination that must be constructed by the testing administrator and informs the creation of the seating chart. The seating charts are generated for each assessment in a block at the beginning of the block.

### Guidelines for Developing MCQ Items

Assessments not employing essay or free text should only use single best answer formats that require test-takers to select the single best response. Avoid use of true/false (C-type, K-type, and X-type) questions.

**Best Practices for Item Construction: (Appendix A)**

- Items should focus on an important concept
- Items should assess application of knowledge, not recall of an isolated fact, ideally by using clinical vignettes or analysis of data.
- Question should be able to be answered without seeing the options.
- The options should all be homogenous and plausible.
- Do not use true-false questions.
- Avoid negatively phrased A type questions- for example, all of the following are correct except or which of the following statements is not correct.
• Include as much of the item as possible in the stem; the stems should be long and the options short.
• Avoid superfluous information.
• Avoid tricky or overly complex items.
• Write options that are grammatically consistent and logically compatible with the stem.
• Distractors should have the same relative length as the answer.
• Avoid use of imprecise terms - usually, frequently, often, commonly, most of the time, almost never.

Course directors must communicate expectations regarding question development, timeline for submission, and rationale to the instructors teaching in the course.

Questions written by individual instructors must be reviewed and vetted at the course/clerkship director or departmental level prior to being turned into the Test Administrator for use as part of an assessment. The CD is responsible for the quality, relevance, and oversight of questions submitted.

**Uploading of Examination Questions and preparation for exam administration.**

Course directors utilizing ExamSoft work with the teaching faculty to ensure that the questions are uploaded and identified before the deadline indicated in the assessment architecture and notify the testing administrator. Within 72 business hours prior to the exam, the course directors communicate final proctors to the testing administrator.

**Creation and Faculty Preview of the Assessment.**

Three business days before the assessment, the testing administrator combines the MCQs submitted for each quiz or examination into a single assessment folder labeled with the Block, Exam or Quiz, and number of assessment (1, 2, ...). This combined assessment is distributed to involved course directors two business days before the assessment to allow review and modification. Course Directors must review the exam and submit modifications no later than one business day prior to the assessment. Following this review, the testing administrator posts the assessment and any additional variations needed for students enrolled in part of the medical curriculum to ExamSoft using the time frames identified in the Assessment Architecture.

**General Sequence of Events for Clerkships**

• The clerkship director proposes an assessment architecture that is at least 60% objective evaluations including OSCE, NBME, oral exams, presentations, and/or projects and no more than 40% Clinical Evaluations.
• The assessment architecture is reviewed and approved by the Clinical Curriculum Committee and Executive Curriculum Committee.
• Once the assessment architecture is approved by the ECC, the clerkship director will work with the Testing Administrator, Director of Clinical Skills, and other appropriate individuals to schedule the assessments. Each clerkship is responsible for providing 1 proctor for NBME exam administration.
• Students must be available until 5pm on the days of NBME subject examinations regardless of the scheduled time of administration.
Administering the Assessment.
Prior to the assessment, the testing administrator routinely checks the testing rooms to ensure that the testing stations are functioning properly and that the testing environment (lighting, HVAC) is suitable.

Day of assessment:
- Testing administrator ensures that the rooms are open and seating chart is posted outside the exam rooms 15 minutes before the beginning of the assessment.
- Proctors arrive at least 15 minutes before the assessment.
- Students are allowed to enter the room 10 minutes before the assessment. They should proceed to their assigned seat, log on to the testing site and download the assessment. All students should be seated by the start time of the assessment.
- Assessment password is posted at the front of the classroom at the starting time for the assessment.
- Students complete the assessment and submit when completed.
- Secure review for ExamSoft assessments
  - Occurs immediately after a quiz is completed
  - Occurs within a few days after an examination, at the date and time indicated in the testing architecture and noted on the block calendar
- Students having trouble logging on, downloading, starting or completing an assessment should alert a proctor to signal the need for assistance.
- Students with testing accommodations follow a schedule matching their accommodation.

Administration of NBME Exams:
- Students are expected to be available until 5pm on Friday afternoons of NBME exams.
- Administration of the NBME subject exams will follow guidelines described by the NBME.
- For NBME exams required, but not contributing towards a course or clerkship grade, it is recommended that they follow the NBME guidelines for those students approved for NBME testing accommodations.
- NBME exams required and contribute towards a course or clerkship grade will follow the ADA accommodations procedure.
- NBME Testing Irregularities –
  - All testing rooms should be reserved until 5pm on testing day to accommodate students.
  - Technical difficulties will be addressed through instructions in the NBME Chief Proctor’s Manual.
  - If exam cannot be immediately restarted, the Testing Administrator will contact the NBME and attempt to restart the exam in 30 minutes.
  - If unsuccessful, the Associate Dean of Medical Education, in conjunction with other appropriate parties, will make the decision whether or not to exit the exam with specific key strokes to keep the first exam from being scored.
  - If exam is unable to be administered on the scheduled morning, students will return at 1pm for exam administration.
In the event that a major technical difficulty is experienced and is unable to be resolved by the final day of the clerkship, the exam will be administered on the next day of classes. If the technical difficulty occurs at a time that is followed by a significant break (greater than 1 week), every attempt will be made to allow students the opportunity to take the exam on the Monday of the week of break.

### Responsibilities

There are several key stakeholders involved in the testing process. Listed below are each key stakeholder, along with their expected responsibilities and time frame for completion.

#### Associate Dean for Medical Education

- Oversees all testing operations at BSOM and reports on irregularities and compliance with question submission and test development to the Executive Curriculum Committee.
- Ensures that the Testing Administrator is trained and operating according to established procedures of BSOM.
- Distributes NBME scores and related information to the clerkship directors and coordinators.
- Communicates any failures to course & clerkship directors to facilitate remediation plans.

#### Executive Curriculum Committee

- Responsible for oversight of assessment architecture and assessment process.

#### Curriculum Committee Chair

- **Block Planning**
  - Set/Schedule Calendar for block two months prior to the start of the block.
  - Identify assessment days. Establish assessment architecture, including types of assessments, exam/quiz dates and durations, question allotment, exam preview (proofreading) date, and secure review date as appropriate.

#### Course Director

- **Block Planning**
  - Review assessment architecture (working with Curriculum Committee Chairs), exam durations, question allotment, exam preview date, and secure review date.
  - Responsible for communicating the assessment architecture to all teaching faculty and overseeing each assessment in conjunction with the testing administrator.
  - Ensures that the timing for questions (90 seconds per question based on current NBME practice) is applied to blended and individualized exams and clearly communicated to students in the syllabus.
o Works with year-specific Committee Chair to schedule Secure Reviews as a component of block planning.

- **Beginning of Block** by the end of the first week of each block
  - Send a list of graduate students and confirm off-cycle students enrolled in the course to the testing administrator.
  - Identify 1 proctor for blended assessments. Identify 4 proctors for all departmental and NBME assessments. Please note: if only 1 department is involved in the exam, the department must provide all 4 proctors
  - At the beginning of each block meet with Testing Administrator for testing/proctor protocol training.

- **Three business days prior to assessment**
  - Questions are reviewed for content and clarity at the course director and departmental level before being uploaded to the testing software.
  - Course directors identify questions to include in the assessment and submit them to the appropriate ExamSoft folder.
  - Questions are linked to course and course/lecture objectives and keywords using a consistent nomenclature.

- **Two business days prior to assessment**, blended assessment received from the testing administrator is previewed and any edits communicated to the testing administrator within 1 business day.

- **On the testing day**, ensure proctor(s) arrive at testing center 15 minutes before the scheduled start of the examination.

- **CD or a designee must attend all Secure Review sessions to answer student questions about the assessment.** Faculty must rotate through all testing rooms.

- No changes can be made to the approved calendar or assessment architecture without approval of the curriculum committee. These must be communicated to the testing administrator immediately.

- **Item analysis should be performed after each exam.** The following analyses should be performed and reviewed with instructors in the context of the entire exam:
  - Analysis of item difficulty
  - Analysis of item discrimination
  - Analysis of item options

- **Post-exam**, the CD is responsible for reviewing and addressing each of the student challenges in light of the item analysis. A report describing omitted questions and acceptance of multiple answers for a question should be provided to the year-level curriculum committee and ECC after each exam.

- Each course director or designee should participate in a block post-exam review to improve on the quality of assessment for the upcoming year.

**Clerkship Director:**
- Responsible for recommending assessment architecture to the CCC and ECC for approval that meets the objectives of the clerkship.

**Instructor(s):**
- At the Beginning of the Block
If serving as a proctor, meet with Testing Administrator for testing/proctor protocol training at the beginning of the block.

**Throughout the Block**

- Generate questions for assessments using best practices (Appendix A).
- Use item analysis and/or comments from previous administrations to improve quality and clarity questions prior to submission.
- Instructor generated questions should be completed in time to allow departmental and course director review of questions prior to the submission deadline of three business days before an assessment.

**After the Assessment**

- Instructors submitting questions should attend the Secure Review sessions so that students’ questions can be answered.
- Review the item analysis to revise questions for subsequent use.

**Testing Administrator**

**Training**

- Testing Administrator must annually review, NBME Chief Proctor Video Tutorial and the NBME Facility Readiness Checklist.
- The Testing Administrator is responsible for developing and providing BSOM proctor training to all proctors on an annual basis offered at the beginning of each block.
  - Prepare and communicate to all proctors how to handle crises, examination emergencies, and assessment troubleshooting.
  - Provide all proctors with checklist to follow for each examination session.
  - Ensure proctors abide by FERPA guidelines at all times.

- Check with Student Affairs at the beginning of each Block to identify students with ADA Accommodations. Per student affairs.

- Disseminate SOP to students at the beginning of each academic year.

- Environment
  - Administrator routinely (weekly) checks all testing rooms and ensure all equipment (computers, iPad) is functioning properly, is ready for examinations, and is secure. If a computer, partitions, lighting, HVAC, etc. is not operating properly, testing administrator contacts the proper department to resolve the issue.

- Block Planning
  - Schedule Exams.
    - Use 25 Live to reserve all rooms for each assessment (quiz and exam), preview, and secure review.
    - Update and manage OME Exam & Quiz Calendar in Outlook so all involved faculty/staff have access to exam schedules and locations.
    - Coordinate and communicate schedules for students with testing accommodations to students, Course/Clerkship Directors, proctors, Associate Dean of Student Affairs and OME at the beginning of the block with a reminder email one business day prior to the exam.
o Oversees creation of exam seating charts at the beginning of the block.
o Develops and maintains standardized log of student breaks.
o At the beginning of the block, schedule proctors on the OME Exam & Quiz Calendar in Outlook and confirm that proctors are available 3 business days prior to the assessment.
  ▪ NBME requires one proctor per 25 students per room.
  ▪ OME provides proctors for testing of students with ADA approved testing accommodations.
  ▪ Proctors for the two major testing rooms are designated by each Clerkship Course/Director.
o Build assessment folders for each exam and quiz in courses at the beginning of each block labeled.
o Send out a “friendly reminder email” 3 business days prior to an assessment to all course directors to remind them to submit questions for the upcoming assessment. The email states the OME Testing Administrator is awaiting approved questions from the course to be included in the assessment.
o A second email will be sent to the course director, departmental chair, and Associate Dean for OME if questions are not submitted within 2 business days prior to the assessment.
o Any courses not submitting questions within 1 business day will not be allowed to participate in the assessment. Students, the departmental chair, year-specific curriculum committee and the ECC will be notified of this change to the assessment architecture at that time.
o After all questions are submitted, create the assessment with approved questions from each course participating in the assessment.
o Once the assessment has been created, send an email to all course directors notifying them that the assessment is available for preview.
o Once the assessment has been reviewed and approved by all course directors, or 1 business day prior to the assessment, post the assessment according to testing blueprint and activate secure review.

▪ Day of Assessment
  o 15 minutes before the start of the assessment. Oversee the preparation of the rooms for the assessment (lighting, noise machines), posting of the seating charts outside of rooms, posting of start and end times, and posting of password, and distribution of numbered scratch paper.
o Identify the communication plan between rooms and relay to proctors in each room. Administrator ensures all proctors can communicate across all rooms during examinations via skype, email, text, or alternative mechanism described at the beginning of each assessment.
o 10 minutes after the start of the assessment. Review the download testing log to identify any problems or absences. Report any absences to Student Affairs.
o Monitor all rooms for technical difficulties, irregularities, and other concerns throughout the assessment.
o At times when there is more than one exam room in use for a given timeframe, the Testing Administrator will serve as the ‘circulating proctor’ observing activity outside of the testing rooms unless needed to respond to testing concerns.
Once the assessment is complete, ensure all pencils are collected and scratch paper is securely discarded.

After assessment closes, examine the uploaded testing log to ensure all examinees have successfully uploaded the assessment.

Report all testing irregularities on assessments to the Associate Dean for Medical Education, ECC and, if appropriate, to the NBME.

**Post Assessment**
- Maintains an official file of seating arrangements, testing schedules, proctor assignments, test irregularities, time logs, and student breaks.
- Reports compliance with test development timeline and any irregularities to the Associate Dean for Medical Education and ECC.
- Responsible for scheduling all make-up exams in coordination with the Office of Student Affairs.

**Proctors**

**Day of Assessment**

**15 minutes before the beginning of the assessment**: Proctors arrive, inspect the room and contact Test Administrator with any concerns (temperature, lighting, etc.).

**10 minutes prior to assessment as students arrive**:
- Instruct students entering exam room that electronic devices are prohibited. Ensure all devices are left in designated location, including all “SMART” or electronic watches. Head and ears must not be covered by hats or hooded sweatshirts/jackets. No personal/unauthorized items are allowed in the secure testing area. Such items include but are not limited to, outerwear (all outerwear will need to be removed and inspected – no blankets will be allowed), hats, food, drinks, purses, briefcases, notebooks, notes, pagers, watches, cell phones, recording devices, and photographic equipment.
- Foam earplugs are allowed and must be provided by the student. If ear muffs are preferred, these must be provided by the student and inspected by the proctor prior to use. Headphones with Bluetooth (or any sending/receiving capability) will not be allowed.
- A designated space will be available (table outside of the large testing rooms) where students can store any food/drink that they feel that they will need during the exam. To access this food, students will need to request permission from a proctor.
- Students are not permitted to access any unauthorized items during the exam administration.
- Oversee the distribution of numbered scratch paper and pencils.
- Each student will be issued a clean piece of paper and a pencil on entry into the exam room.
- Proctors will distribute numbered pieces of paper (paper numbers will match computer station numbers), to ensure that all papers are returned at the end of the exam.
- Students are not allowed to make notes on their paper prior the official start of the exam. Once the exam begins, students are permitted to make calculations.
or notes only on the paper provided. In the event a new piece of paper is needed, the student can raise her/his hand and request to exchange the original sheet for a new numbered sheet.

- **At the beginning of the exam:**
  - Post the assessment password and the start and end time for all to view (clocks are available on each computer monitor).
  - Communicate NBME instructions to students prior to all NBME assessments.

- **During the assessment:**
  - Test proctors are not authorized to answer questions from examinees regarding examination content/format/questions.
  - Record the time for students arriving after the testing start time and relay that information to the Testing Administrator for inclusion in the exam report.
  - While the assessment is ongoing, the proctor is responsible for monitoring the room for irregularities.
  - Monitor and address distractions during assessments.
  - Maintain a standardized log of student breaks, recording the time of departure and return.
  - Leaving the Testing Room:
    - Students must not leave the testing site at any time during the administration unless they inform and obtain permission from the testing proctor or are instructed to do so by the proctor.
    - Proctors will keep a time log of student entry and exit from the exam room. Students will be responsible for signing in and out on this log.
    - Only one student is allowed in each restroom (male/female) at a given time.

- **After the assessment:**
  - Collect paper, pencils, and clean room.
  - Ensure that all scratch paper is accounted for by seat assignment.
  - Turn in time log, paper, and pencils to the Testing Administrator.

**Student Affairs**

- **Beginning of Block or Cohort**
  - Order all NBME exams for M1-M4 courses and clerkships.
  - Order and communicate availability of self-assessment vouchers for NBME assessments to clerkship coordinators for distribution to their students.
  - Upload rosters to NBME testing page so testing administrator can see updated roster of students for each course and clerkship examination.
  - Send list/roster of medical students with notation of students requiring accommodations to testing administrator.
  - Communicate students with individualized curriculum to the testing administrator.

- **Post-assessment**
  - Upload individual scores and performance profile from NBME into E*Value for students to review.
  - Communicate any failures to students to facilitate remediation plans.
Prepare a monthly report of outstanding examinees and coordinate scheduling students for make-up exams with Testing Administrator.

**Medical Students (Examinees)**

- Review the Brody School of Medicine Code of Professional Conduct and the Code of Student Conduct as they are always in effect.
- Students are expected to be available until 5pm on Friday afternoons of NBME exams.
- During an assessment, students are not allowed to communicate with students who have not completed the assessment.
- **On the day of Assessment/Review**
  - Arrive 10 minutes prior to the assessment and proceed to your seat.
  - Late arrivals are admitted to the assessment but are not given extra time to complete the assessment. Students who arrive late will take the exam with the remaining time.
  - Students must adhere to the instructions provided by the proctors administering the examination.
  - Students must carefully review and agree to abide by any instructions provided or that appear at the start of the examination session.
- **Guidelines for question challenges:**
  - Student challenges should be submitted to the curriculum representative within 24 hours after the secure review.
  - The curriculum representative will review the challenges and forward the ones that they feel are appropriate to the course director.
- Students are not permitted to ask proctors or other personnel questions regarding examination content, format, or other questions.
- Students are not allowed to leave the testing room with any notes or paper.
- No unauthorized personal items are allowed in the secure testing areas. Such items include but are not limited to hats, hoodies, purses, blankets, briefcases, notebooks, notes, pagers, watches, cell phones, recording devices, and photographic equipment. Foam earplugs are allowed but must be supplied by the student. If earmuffs are preferred, these must be provided by the student and inspected by the proctor prior to use. Headphones with Bluetooth capabilities or other sending/receiving capabilities are not allowed.
- Outerwear needs to be removed and inspected prior to entry into the secure testing area.
- Each student will be issued a clean piece of paper and a pencil on entry into the exam room.
- Proctors will number the pieces of paper (paper numbers will match computer station numbers), to ensure that all papers are returned at the end of the exam.
- Students are not allowed to make notes on their paper prior the official start of the exam. Once the exam begins, students are permitted to make calculations or notes only on the paper provided. In the event a new piece of paper is needed, the student can raise her/his hand and request to exchange the original sheet for a new numbered sheet.
- A table is available outside of testing room or in a designated space where students can store any food/drinks or personal belongings not allowed in the testing rooms.
• Students are not allowed to access any unauthorized items during breaks taken in the middle of an assessment.

Procedures for Implementation and Review

This procedure is reviewed and approved by the Curriculum Committees, including the Executive Curriculum Committee, M1 Curriculum Committee, M2 Curriculum Committee, and the Clinical Curriculum Committee every three years.

This procedure is disseminated by the Office of Medical Education to students and teaching faculty/administration as part of a “student handbook” during orientation each year.

Applicable Laws, Regulations & Standards

LCME Standard 9, Element 8
LCME Standard 3, Element 5
Appendices

APPENDIX A

Recommendations from the Ad-hoc Testing Committee on Question Construction
Content adapted from the NBME Item Writing Guide. Additional information can be accessed http://www.nbme.org/publications/item-writing-manual.html

Why should learners be tested?
- Communicate material that is important
- Motivate learning
- Identify learning needs
- Assess attainment of learning objectives
- Determine grades
- Identify areas where instruction can be improved

What should be tested?
- Exam content should match course/clerkship and session objectives
- Important topics should be emphasized
- The testing time devoted to each topic should reflect the relative importance
- The sample of items should be representative of the instructional goals.

Recommendation #1: The committee recommends that assessments not employing essay or free text should only use single best answer formats that require test-takers to select the single best response. Avoid use of true/false (C-type, K-type, and X-type) questions.

Background: One Best Answer (A-type) questions consist of a stem (e.g. a clinical case presentation) and a lead in question, followed by a series of choices, typically one correct answer and three to four distractors. When written correctly, incorrect options do not have to be entirely wrong, but less correct than the keyed option.

Why Single Best Answer?
- Prevents test-taker from having to guess author’s intent
- More efficient/easier to write as incorrect options do not have to be entirely wrong
- Same stem can be paired with different lead-ins to create item sets (diagnosis and management)

Best Practices for Item Construction:
- Items should focus on an important concept
- Items should assess application of knowledge, not recall of an isolated fact, ideally by using clinical vignettes or analysis of data.
- Question should be able to be answered without seeing the options.
- The options should all be homogenous and plausible.
- Do not use true-false questions.
- Avoid negatively phrased A type questions- for example, all of the following are correct except or which of the following statements is not correct.
- Include as much of the item as possible in the stem; the stems should be long and the options short.
- Avoid superfluous information.
• Avoid tricky or overly complex items.
• Write options that are grammatically consistent and logically compatible with the stem.
• Distractors should have the same relative length as the answer.
• Avoid use of imprecise terms- usually, frequently, often, commonly, most of the time, almost never.

Recommendation #2: Item analysis should be performed after each exam. The following analyses should be performed and reviewed in the context of the entire exam:
  o Analysis of item difficulty
  o Analysis of item discrimination
  o Analysis of item options

Avoid flaws related to testwiseness:
• Grammatical clues- one or more distractors don’t follow grammatically from the stem
• Logical cues- a subset of the options is collectively exhaustive
• Absolute terms- terms such as always or never are in some options
• Long correct answer- correct answer is longer, more specific, or more complete than other options
• Word repeats- a word or phrase is included in the stem and in the correct answer
• Convergence strategy- the correct answer includes the most elements in common with the other options

Avoid flaws related to irrelevant difficulty:
• Options are long, complicated, or double
• Numeric data are not stated consistently
• Terms in the options are vague (rarely, usually)
• Language in the options is not parallel
• Options are in a nonlogical order
• None of the above is used as an option
• Stems are tricky or unnecessarily complicated
• The answer to an item in hinged to the answer of a related item

Guidelines for Writing Foundational and Clinical Science Items:
• An assessment blueprint should be developed for each assessment to keep item writers focused on important topics and key content.
• Test application of knowledge using clinical vignettes or experimental vignettes to provide context to the question being asked.
• Focus items on common or potentially catastrophic problems; Avoid “zebras.”
• Pose decision-making tasks appropriate for the level of training.
• Questions should focus on specific tasks that students must be able to undertake at the next stage of training: What is the most likely diagnosis, additional labs needed, formulate the next step in management.
• Focus on areas in which clinical reasoning mistakes are commonly made.
• Use of vignettes ensures that the student not only knows the information, but can apply it to hypothetical situations.
Writing one-best-answer items

- Whenever possible, items should be written with a clinical stem.
- Clinical vignettes should begin with presenting problem of a patient, followed by the history including duration, physical findings, results, initial treatment, subsequent findings.
- Vignette may only include a portion of this information, but should be supplied in that order.
- Stem lead-in should pose a clear question that the examinees should be able to answer without looking at the options.
- Vignettes should avoid red herrings and lying patients.

Examples of types of foundational and clinical lead-ins:

- Which of the following is the most like cause/mechanism of this effect?
- Which of the following is the most likely causal infectious agent?
- This patient most likely has a defect in which of the following?
- This patient most likely has a defect in which of the following enzymes?
- Which of the following cytokines is the most likely cause of this condition?
- Which of the following structures is at greatest risk for damage during this procedure?
- The most appropriate medication for this patient will have which of the following mechanisms of action?
- Which of the following factors in the patient’s history most increased his/her risk for developing this condition?
- Which of the following is the most likely explanation for these findings?
- Which of the following is the most likely location of the patient’s lesion?
- Which of the following is the most likely pathogen?
- Which of the following findings is most likely to be increased/decreased?
- Which of the following is the most appropriate intervention?
- For which of the following conditions is the patient at greatest risk?
- Which of the following is most likely to have prevented this condition?
- Which of the following is the most appropriate next step in management to prevent morbidity/mortality/disability?
- Which of the following is the most likely diagnosis?
- Which of the following is the most appropriate next step in diagnosis?
- Which of the following is most likely to confirm the diagnosis?
- Which of the following is the most appropriate initial or next step in patient care?
- Which of the following is the most effective management?
- Which of the following is the most appropriate pharmacotherapy?
- Which of the following is the first priority in caring for this patient?

Example of grammatical cues:
A 60-year-old man is brought to the emergency department by the police who found him lying unconscious on the sidewalk. After ascertaining that the airway is open, the first step in management should be intravenous administration of

A. Examination of CSF
B. Glucose with vitamin B1 (thiamine)
C. CT scan of the head
D. Phenytoin
E. Diazepam

Options A and C do not follow logically from the stem

**Logical Cues:**

Crime is
A. Equally distributed among the social classes
B. Overrepresented among the poor
C. Overrepresented among the middle class and rich
D. Primarily an indication of psychosexual maladjustment
E. Reaching a plateau of tolerability for the nation

Options A, B, and C include all possibilities so the student knows that one must be correct

**Absolute terms:**

In patients with advanced dementia, Alzheimer’s type, the memory defect
A. Can be treated adequately with phosphatidylcholine
B. Could be a sequel of early parkinsonism
C. Is never seen in patients with neurofibrillary tangles at autopsy
D. Is never severe
E. Possibly involves the cholinergic system

Options C and D can be eliminated based on the absolute terms

**Word Repeats:**

A 58-year-old man with a history of heavy alcohol use and previous psychiatric hospitalizations is confused and agitated. He speaks of experiencing the world as unreal. This symptom is called
A. Depersonalization
B. Derailment
C. Derealization
D. Focal memory deficit
E. Signal anxiety

Unreal appears in the stem and in the options
APPENDIX B

Brief Guidelines for BSOM Examinations

1. Proctor assignments
   a. Proctors (one proctor per 25 students per room) are identified at the beginning of the block as part of the testing blueprint.
   b. Courses/clerkships participating in the examination or quiz provide at least 1 proctor.

2. The Day Before the Assessment
   a. OME prepares the room and computers
      i. Rooms are clean and organized ready to administer an assessment.
      ii. Computers are checked to insure all updates are completed.
      iii. Supplies are already in the testing room:
         a. Pencils
         b. Numbered Blank paper
         c. Sheet of reference values if needed

3. The Day of Testing
   a. 15 minutes prior to the exam, the Testing Administrator or designee opens the rooms and prepares the room for the exam (lighting, noise machines).
   b. 15 minutes before the start of the exam, OME posts the seating chart.
   c. 15 minutes prior to exam time proctors arrive at the testing rooms.
   d. Proctors inspect the room and contact OME with any concerns (temperature, lighting, etc.).
   e. A detailed Brody School of Medicine Testing Procedures (Updated XXXX) is posted on the OME web site and on the doors to the testing center.
   f. All electronic devices are to be left outside the room, including “SMART” watches.
   g. Head and ears are not covered by hats or hooded sweatshirts/jackets.
   h. Students are allowed into the room after the proctors arrive.
   i. Proctors oversee the distribution of paper and pencils.
   j. At the beginning of the exam, proctors post the examination password.
   k. 10 minutes after the start of the exam, OME reviews the download testing log to identify any problems or absences.
   l. As examinees finish, proctors collect the used numbered paper and pencils and ensure that all paper is collected based on the numbering.
m. After the examination, OME examines the upload testing log to ensure all examinees have successfully closed out the testing session.

n. After the testing session, OME ensures that rooms are clean and personal articles removed.

4. Examinee Responsibilities:
   a. Students are expected to be available until 5pm on Friday afternoons of NBME exams.
   b. Examinees arrive 10 minutes before the assessment.
   c. Examinees arriving late are admitted to the exam but are not be given extra time to complete the exam. Student Affairs is notified of the late arrival.

Personal Items:
   o No personal/unauthorized items are allowed in the secure testing area. Such items include but are not limited to, outerwear (all outerwear will need to be removed and inspected – no blankets will be allowed), hats, food, drinks, purses, briefcases, notebooks, notes, pagers, watches, cell phones, recording devices, and photographic equipment.
   o There will be a table, just outside of the testing rooms, where students can store any food/drink that they feel that they will need during the exam. To access this food, students will need to request permission from a proctor.
   o Students are not permitted to access any unauthorized items during the exam administration.

Noise Reduction Devices:
   o Foam earplugs are allowed and must be provided by the student. If earmuffs are preferred, these must be provided by the student and inspected by the proctor prior to use. Headphones with Bluetooth (or any sending/receiving capability) will not be allowed.

Written Notes:
   o Each student will be issued a clean piece of paper and a pencil on entry into the exam room.
   o Proctors will number the pieces of paper (paper numbers will match computer station numbers), to ensure that all papers are returned at the end of the exam.
   o Students are not allowed to make notes on their paper prior the official start of the exam. Once the exam begins, students are permitted to make calculations or notes only on the paper provided. In the event a new piece of paper is needed, the student can raise her/his hand and request to exchange the original sheet for a new numbered sheet.
Instructions:
  o Students must adhere to the instructions provided by the proctors administering the examination.
  o Students must carefully review and agree to abide by any instructions provided or that appear at the start of the examination session.

Leaving the Testing Room:
  o Students must not leave the testing site at any time during the administration unless they inform and obtain permission from the testing proctor or are instructed to so do by the proctor.
  o Proctors will keep a time log of student entry and exit from the exam room. Students will be responsible for signing in and out on this log.
  o Only one student is allowed in each restroom (male/female) at a given time.

Late Arrivals:
  o An excused absence for an exam must be requested prior to the start of the exam. Late requests will not be considered.
  o If a student is late to an exam, they will be allowed to take the exam with the time remaining. No additional time will be granted.

During every exam, the Brody School of Medicine Code of Student Conduct is in effect. Any testing irregularities will be brought to the attention of the Associate Dean for Student Affairs and processed according to the Code. Any testing irregularity on an NBME exam must be reported to the NBME as outlined in their policy: http://www.nbme.org/students/Subject-Exams/security.html.

IN CASE OF EMERGENCY

Fire alarms cause testing to be halted immediately. Students should not close out the examinations, but should leave them open, exit the room and proceed to the gathering point assigned for their class. Students should not discuss the examination during this time, as it may be possible to resume the examination.