

## **CHAPTER 5: ASSESSMENT METHODS**

### **Introduction**

A subcommittee was formed and charged with formulating both course and programmatic assessments. See Appendix II for subcommittee members.

When selecting an appropriate method to assess clinical reasoning, several factors should be considered. These include reliability, validity, generalizability, educational impact, practicality, and cost. Reliability is the extent to which a test is repeatable and yields consistent scores. Validity is the extent to which a test measures what it is designed to measure. In order to be valid, a test must be reliable; but reliability does not guarantee validity. Generalizability refers to the results of a specific assessment being reproducible with other groups or assessments covering similar but not identical content. Assessment directly affects educational impact since assessment drives learning. Practicality (the ability to administer a particular assessment) and cost, both in time and dollars, are also key considerations when selecting a method.

Health professions education has yielded many new and innovative methods to assess various aspects of knowledge and competency. The assessments generally fall into two categories, formative and summative. Formative assessment is used primarily to provide feedback to students about their educational progress while summative assessment measures the achievement of learning outcomes in a course or program. Methods related specifically to the assessment of clinical reasoning are discussed below.

### **Course Assessments**

#### **Written Examinations**

Written examinations take on many forms and are used in varying frequency in health professions education. These examinations can be classified into two categories: open response (e.g. fill-in-the-blank or essay) and selected response (e.g. multiple choice). Open response examinations require the learner to recall knowledge rather than to recognize it. These examinations are reliable if constructed and scored well. However, significant time is required to score short answer and essay questions, and it is difficult to create a comprehensive answer key. These factors often limit the use of open response examinations in health professions education.

Selected response written examinations consist of a question, clinical vignette or other stem followed by a list of answers from which the learner can select. In general, these written examinations require the learner to recognize the answer rather than to recall it. Multiple choice examinations generally evaluate a learner's knowledge related to a subject; but advanced forms of selected response examinations, such as extended matching, key features, and script concordance examinations, can be used to assess higher levels of thinking, reasoning and clinical decision making.

**Extended Matching Questions (EMQ)** (Beullens et al., 2005)– Extended matching questions are a variant of multiple choice questions. A question formatted as an EMQ has an introductory statement or stem similar to a multiple choice question (MCQ): the stem may be in the form of a question, statement or clinical vignette. Learners are then given a list of multiple items from which to choose an answer. This list is generally 10 to

20 items long and, often, items in the list may be selected more than once. Multiple stems can be used for a single list of answer items as well. Unlike MCQ format examinations which are useful for measuring medical knowledge, EMQ examinations are very useful to assess clinical reasoning and decision making, which is considered a higher order of learning.

Sample EMQ

For each case described below, select the <b>single</b> most likely diagnosis. Answers may be used once, more than once or not at all.	
A 41 y/o male presents complaining of intense lower back pain of two days duration. He describes a sudden onset of the pain while lifting a 75 lb. box. The patient is experiencing no pain or numbness in the buttock or leg. The pain is midline at the L4 level and the regional muscles are tender and taut to palpation.	
A. Disc prolapse B. Lumbar muscle strain C. Facet inflammation D. Joint infection E. Disc degeneration	F. Primary bone tumor G. Space occupying lesion H. Fracture I. Metastasis J. Degenerative joint disease

**Key Features Examinations** (Page, Bordage, & Allen, 1995) – A key feature examination is a type of written assessment used to measure clinical decision-making skills. A key feature is defined as a critical step in the resolution of the problem. A key feature assessment considers two areas of clinical decision making: (1) it focuses on a step in which examinees are most likely to make an error, and (2) it is a difficult aspect of the identification and management of a problem in practice. A typical key feature problem begins with a clinical vignette of sufficient length to establish the problem and its parameters. The vignette is followed by a series of questions aimed at identifying areas of common mistakes or difficult diagnostic pathways. These questions can be presented in various formats, including fill-in-the-blank, short answer, multiple choice or extended matching. While key feature problems have been shown to perform well when assessing clinical decision-making skills, extensive planning and development of items and scoring criteria are required.

Sample Key Features Question

<p>Paul, a 56 y/o man consults you in the outpatient clinic because of pain in his left leg which began two days ago and has been getting progressively worse. He states his leg is tender below the knee and swollen around the ankle. He has never had similar problems. His other leg is fine.</p>	
<p>Question 1</p> <p>What diagnosis would you consider at this time? List up to three.</p> <p>1. _____</p> <p>2. _____</p> <p>3. _____</p>	
<p>Question 2</p> <p>With respect to your diagnosis, what elements of his history would you particularly want to elicit? Select up to seven.</p>	
<p>A. Activity at onset of symptoms</p> <p>B. Alcohol intake</p> <p>C. Allergies</p> <p>D. Angina pectoris</p> <p>E. Anti-inflammatory therapy</p> <p>F. Cigarette smoking</p> <p>G. Cough</p>	<p>H. Headache</p> <p>I. Low back pain</p> <p>J. Paresthesia</p> <p>K. Polydipsia</p> <p>L. Previous knee problems</p> <p>M. Recent dental procedure</p> <p>N. Wounds on foot</p>

**Script Concordance Test** (Charlin, Roy et al., 2000; Charlin, Tardif et al., 2000) – The script concordance test is another method to assess clinical decision-making skills and clinical reasoning. The questions are preceded by a clinical vignette that is described in a few sentences. The actual questions in a script concordance test follow a specific format consisting of three parts. The first part includes a diagnostic hypothesis, an investigative action or a treatment option that is relevant to the situation. The second part presents new information that may have an effect on the diagnostic hypothesis, an investigative action or a treatment option. The third part is a five-point Likert type scale. Script concordance questions require development and scoring by a panel of two to ten experts.

Script Concordance Sample

A 22 y/o female presents with acute ankle pain of two days duration. The pain is a result of a running injury.

<b>If you were considering the utility of the following treatment...</b>	<b>...and the following new information were to become available...</b>	<b>...you would then consider this treatment...</b>				
Ultrasound	Stress fracture of talus bone	-2	-1	0	+1	+2
Elevation	Ankle edema	-2	-1	0	+1	+2
Wobble board exercises	Ligament instability	-2	-1	0	+1	+2
Bracing	Ligament laxity	-2	-1	0	+1	+2
-2 Useless      -1 less useful      0 neither more or less useful      +1 useful      +2 very useful						

**Electronic Real-time Student Feedback**

Electronic real-time student feedback is a method by which students can simultaneously submit responses to questions posed by faculty in class. This is accomplished via an electronic response device called the I-Clicker. Quizzing students in this manner can provide insight into a student's ability to reason through a unique patient presentation. An immediate record of student responses can be captured and saved for grading purposes. This method of inquiry allows a faculty member to provide immediate feedback and clarification based on student group responses. No significant data related to reliability or validity of this assessment method is available, so this method should be utilized primarily as a formative tool.

**Standardized Patient Encounters** (Dent & Harden, 2005)

Standardized patients (SP) are individuals that have been trained to portray various clinical conditions and scenarios or may be patients with actual diagnoses that have been trained to standardize their responses about their condition for assessment purposes. While SPs are not necessarily solely an assessment tool, they are a vehicle to allow an assessment of a learner's performance in many aspects of clinical competency. Often, standardized checklists, global rating scales or narrative responses are used with SPs. Most often, SPs are used in OSCEs, but can also be effectively used as a stand-alone assessment tool.

**Case-Based Discussion (CbD)** (Goulet et al., 2007)

Case-based Discussion (CbD), also known as Chart Stimulated Recall, is a form of work-based assessment in which a person is evaluated based on performance in real-life situations. In CbD, the student presents two patient files into which he/she has made entries and then the evaluator selects one of the two files for review. A discussion between the student and evaluator about the aspects of the case related to clinical decision making and reasoning ensues. After this discussion, the evaluator judges the

quality of the performance using a score sheet and provides feedback to the student. This process is repeated a minimum of five times in a year and should include multiple evaluators and a representative sampling of case types.

The CbD approach is both a reliable and valid approach to workplace assessment in respect to clinical reasoning. Factors necessary to insure reliability include an appropriate number of cases (5 to 8), multiple raters, multiple case types, a defined scoring rubric, and an effective method of constructive feedback.

Sample CbD Score Sheet

Clinical Setting	CHC	MHC	EXTERNAL			
Case Complexity	LOW	MED	HIGH			
Grade the following areas using scale heading as appropriate	Below Expectations	Borderline	Meets Expectations	Above Expectations	Completely Exceeds Expectations	
Record Keeping						
Clinical Assessment						
Treatment						
Investigations						
Follow-up						
Clinical Reasoning						
Overall Clinical Care						
Key Learning Points			Discussion with Faculty			
Agreed Action						

**Student Self-Evaluation** (Holmboe & Hawkins, 2008)

When developing clinical reasoning abilities, it is necessary for the learner to incorporate self-reflection into their practice. This requires the student to conduct an accurate self-evaluation of his/her abilities. It has been demonstrated that practitioners have a poor ability to perform an accurate self-assessment that truly reflects performance. In fact, inaccuracy in self-assessment appears to be worse in the least competent physicians. They tend to overestimate their ability and competence.

The focus of self-evaluation should be less on accuracy and more on recognizing internal and external cues in order to arrive at a point of self-realization. It is important for the self-evaluation process to lead the student to reflect both “in-action” (knowing when to seek help during the act of doing) and “on-action” (looking critically at actions post-experience). Guided self-assessment is a process that uses a systematic approach combining structured scoring rubrics with accurate mentor feedback. This process combines a level of standardization, reflection with a mentor, and clear evaluation criteria. While incorporating this approach reduces extraneous factors that negatively influence outcomes, it should be realized that the ultimate goal of self-evaluation is not to

accurately self-judge clinical performance but rather to hone one's ability to reflect on that performance.

There are several accepted methods for conducting self-evaluation. These include open-ended questionnaires, checklists and survey instruments. Typical topics addressed in self-assessment include learning needs, confidence in performing procedures, general clinical skills, critical appraisal knowledge and professionalism.

Sample Open-ended Questionnaire Items

1. What strengths in your clinical practice did this demonstrate?
2. What learning did this reveal?
3. Which one learning need do you address as a priority?
4. Decide exactly what you would like to achieve.
5. Why do you consider this action worthy of reflection?

**Global Rating Assessment** (Gray, 1996)

Global rating assessments are similar to checklist evaluations except that the rater makes judgments on general categories of an ability rather than specific components. Global ratings can be of two types: 1) ratings on a specific ability observed over a period of time (e.g. end of a clinical rotation); or 2) ratings of an ability considering all aspects of the necessary attitudes, knowledge and skills required (e.g. rating performance of chiropractic technique, considering all the components necessary, into a single score). Global ratings are generally considered to be summary evaluations.

Certain weaknesses are inherent in these evaluations. Most notable is consistency between raters and rater bias. These weaknesses can be attenuated by recognizing potential pitfalls and conducting appropriate rater training. Global rating assessments become much more reliable when completed in a series and by multiple raters. Due to the need for direct observation of a learner's performance, global ratings also provide an opportunity for formative feedback between the learner and rater.

Sample Global Rating Form

<b>Rating Scale</b>						
(4) Exceptional – exceeds expectations (3) Satisfactory – meets and occasionally exceeds expectations (2) Marginal – Meets some expectations, falls short in some areas (1) Unsatisfactory – performance falls short of reasonable expectations				<input type="checkbox"/> Mid Trimester <input type="checkbox"/> End of		
Intern	Trimester 7 8 9 10	Evaluator	Date			
			<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Diagnosis</b>						
1. Understands importance of collecting sufficient clinical information to avoid making a premature diagnosis.						
2. Generates a diagnosis consistent with history and examination findings.						
3. Exhibits clinical reasoning and correlation skills to support a diagnosis.						
4. Identifies the pathophysiologic process responsible for the patient's clinical presentation.						
5. Generates a list of differential diagnoses appropriate to findings.						

**Objective Structured Clinical Examination (OSCE)** (Dent & Harden, 2005)

An OSCE is designed to obtain a cross-sectional sampling of a learner's competence through a series of themed encounters. Each learner rotates through stations that have various clinical scenarios represented. Typically, stations contain a standardized patient (SP), an individual who has been trained to portray a specific clinical presentation, set of symptoms or other situation that may be encountered in practice. Other station options may include visual information, oral examination or a written task. Learners are usually asked to perform a specific skill or other focused aspect of clinical care.

An OSCE typically consists of 8 to 20 stations at which a learner may spend anywhere from 3 to 30 minutes. Often, this encounter is followed by a post-encounter station where written or oral feedback to or from the learner is required. This feedback can be formative, summative, or both. OSCE's are usually scored with a standardized checklist or global rating scales. These exams are both reliable and valid for assessing many clinical skills, communication skills, clinical reasoning and fund of knowledge.

Sample OSCE Rotation

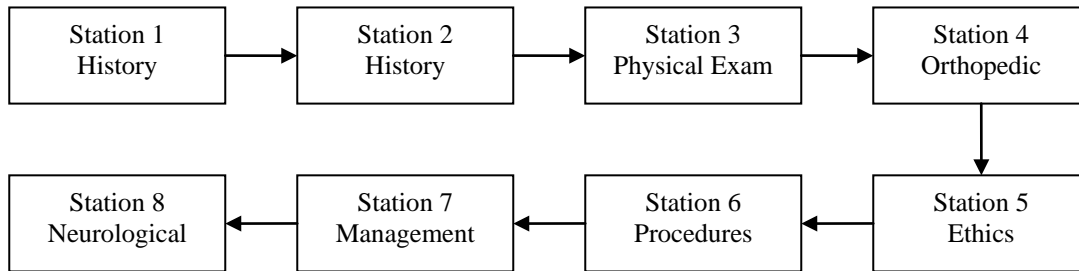


Table 5.1 lists the course assessment strategies and shows whether they are formative and/or summative methods.

**Table 5.1: Assessment Strategies**

<b>Assessment Methods</b>	<b>Formative</b>	<b>Summative</b>
Extended matching questions		X
Key features questions		X
Script concordance questions		X
Electronic real-time student feedback	X	X
Standardized patient encounters	X	X
Case-based discussion (Chart Stimulated Recall)	X	X
Student self-evaluation	X	
Intern global rating	X	X
Objective Structured Clinical Evaluation (OSCE)	X	X

**Programmatic Evaluation**

Evidence from programmatic evaluation is essential to enhance the quality of the educational process. Implementation of the QEP, first in the pilot courses and then throughout the curriculum, requires utilization of methods to evaluate its effectiveness. Several instruments and data sets will be used as indicators of successful implementation of the QEP.

**Student Course Evaluations**

Each course related to the QEP will be evaluated by students on a periodic basis. These evaluations will monitor course effectiveness and relevancy from the student's perspective. Particular attention will be given to targeted elements of the course that relate to the QEP (e.g., the type and use of instructional strategies, assessment methods, learning outcomes, and content). The benchmark goal for TCC's QEP courses is that they are at or above the mean evaluation scores of all courses offered in the curriculum.

**Diagnostic Thinking Inventory (DTI)** (Bordage et al., 1990)

The Diagnostic Thinking Inventory (DTI) is a 41-question self-assessment tool that is designed to give insight into an individual’s clinical reasoning process. Each item on the questionnaire consists of two opposing statements separated by a six-point scale that connects the two statements. Students are required to select a point on the scale that represents their diagnostic thinking related to the statement.

The DTI has a sufficiently high level of both reliability and validity to successfully measure clinical reasoning ability. Some questions of construct validity related to reasoning styles of novices versus experts may somewhat diminish the DTI as a complete measure of an individual’s clinical reasoning ability. However, as long as the tool is used as designed, it provides a reliable measure of a student’s strengths and weaknesses, as well as the effects of educational interventions.

This questionnaire is a validated tool to measure reasoning ability in the health professions educational setting. Since this instrument is not grounded in content knowledge, it can be used at all levels of the curriculum. Specifically, results from administration of the DTI will be evaluated in cohorts or larger samples related to the QEP curriculum. This approach will provide a tool to monitor the performance of educational interventions and curricular sequencing and is measured by reviewing the performance trend over a five year period.

**Sample DTI Item**

When I know very little about a particular condition,								
I can still come up with a diagnosis	<table style="margin: auto; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> </table>							
	I have great difficulty in reaching a diagnosis							

**Clinical Skills Competency Examination I and II**

The Clinical Skills Competency Examinations (CSCE) I and II are OSCE-type examinations administered on a programmatic level. These exams are clinical performance exams administered at two specified points in the curriculum (end of Clinic I, and end of Clinic III) and are designed to evaluate various clinical competencies and learning outcomes. Certain elements of these exams are related to clinical reasoning, such as employment of reasoning skills in history-taking, selecting appropriate diagnostic procedures, formulating a differential diagnosis, and making patient management decisions. Analysis of scores from these examinations over a continuum provides an opportunity to evaluate curricular effectiveness using standardized data that is generalizable. The benchmark goal is that the combined scores for those elements of the exam related to clinical reasoning be above the mean scores for the entire exam.

### **Health Sciences Reasoning Test (HSRT)**

The HSRT is designed for learning outcomes assessment of undergraduate and graduate professional school students in the health sciences. The HSRT is a valid and reliable 33-item multiple choice format test. Items present necessary informational content in text-based and diagrammatic formats. Questions are designed to draw inferences, to make interpretations, to analyze information, to identify claims and reasons, and to evaluate the quality of arguments. Test items are set in clinical and professional practice contexts and supply the necessary content for applying one's thinking skills. Students are neither advantaged nor disadvantaged based on specific subject-matter factual content knowledge or specialized experience. Success on this testing tool depends on the correct application of their thinking skills, not on memorized information. The HSRT demonstrates both construct and content validity for assessment of clinical reasoning skills. Baseline scores must be established over a period of time prior to determining benchmark goals for the HSRT. Insight Assessment, the designer of the HSRT, provides various reports to assist the institution in measuring program performance. Due to copyright laws, a copy of the HSRT cannot be included in the QEP submission. However, the HSRT can be viewed by the onsite team.

### **National Board Examinations, Parts I, II, III and IV**

The National Board of Chiropractic Examiners (NBCE) administers a series of nationally based standardized examinations that are used for attaining licensure in most states. The examinations are given in multiple parts at prescribed intervals in the curriculum. Part I evaluates basic science knowledge. At the conclusion of the first year of QEP implementation, the goal is meeting or exceeding the national mean for National Board scores that pertain to the courses in the QEP. Parts II, III and IV all have elements related to clinical practice. While there are no specific sections of these board examinations labeled as clinical reasoning, certain information can be extrapolated from subsets of scores in areas that require some element of clinical reasoning. It is understood that this is not a direct programmatic measure but it does provide an independent and standardized set of data for comparison. By the conclusion of full implementation of the QEP, the goal is that scores in those subsets related to clinical reasoning be at or above the national mean scores.

### **Faculty Interviews**

Faculty interviews will be conducted following initiation of the pilot courses and as each course related to the QEP is implemented. The interviews will focus on the positive and negative aspects of the course. Results from the interviews will be used for quality improvement purposes.

#### **Sample Open-ended Faculty Interview Questions**

1. How do you feel, in retrospect, about this way of structuring the course?
2. Did integrating clinical reasoning into the course pose any special planning challenges?
3. How did students respond to active learning teaching strategies used in the course?
4. What areas of the course should be targeted for improvement or modification?

**Core Concepts in Basic Sciences, Core Concepts in Clinical Sciences, Core Concepts in Clinical Applications (Capstone Examinations)**

The College administers a series of capstone examinations independent of any course at defined intervals in the curriculum. These exams contain multiple choice type questions and are divided into six basic science and seven clinical science categories. Historically, these examinations have been used to monitor student preparedness for National Board examinations. Additionally, some inferences of programmatic effectiveness have been drawn from these exams. To further enhance the usefulness of this existing assessment tool, question types designed to measure clinical relevance of acquired knowledge will be added. Specific performance on the new question types can be monitored as an indicator of programmatic effectiveness. Implementation of this process will first require development of valid and reliable questions. Once implemented, several administrations of these examinations will be required to establish a baseline for comparison.

**Knowledge-Based Inference Tool (KBIT)**

The Knowledge-based Inference Tool is a web-based program used to develop pattern recognition skills. KBIT provides a platform for students to experience multiple cases with similar presenting symptoms and coaches them to recognize subtle differences that distinguish one diagnosis from another. One aspect of the program tracks student performance related to accuracy of selecting an appropriate diagnosis. While this tracking mechanism is not a formal assessment of clinical reasoning or decision making, data from these exercises can be used to monitor possible trends that may occur and provide insight to curricular strengths and weaknesses related to the QEP topic.

**Case-Based Discussion (CbD)**

Case-based discussion may be utilized as both a course assessment and programmatic evaluation tool. A thorough description of CbD has been provided in the course assessment section.

Table 5.2 lists the programmatic evaluation strategies and shows whether they are formative and/or summative methods.

**Table 5.2: Programmatic Evaluations**

<b>Evaluation Methods</b>	<b>Formative</b>	<b>Summative</b>
Student course evaluations	x	
Diagnostic Thinking Inventory (DTI)	x	
Clinical Skills Competency Examinations I & II (CSCE I and CSCE II)	x	x
Health Sciences Reasoning Inventory (HSRI)	x	
National Board Parts I, II, III and IV	x	x
Faculty Interviews	x	
Core Concepts in Basic Sciences, Core Concepts in Clinical Sciences, Core Concepts in Clinical Applications		x
Knowledge-based Inference Tool (KBIT)	x	
Case-based Discussion (Chart Stimulated Recall)	x	

### **Assessments and Criteria for Determination of Programmatic Success**

The assessments and evaluations selected for the QEP were chosen to link clinical reasoning learning outcomes to programmatic outcomes, demonstrating infusion of clinical reasoning across the curriculum. It is considered essential to tie student learning outcomes in the QEP courses to each programmatic outcome through the evaluation process. Specific criteria are identified for each assessment and will be used to determine mastery of the learning outcomes related to clinical reasoning. Tables 5.3, 5.4 and 5.5 detail these important links.

**Table 5.3: Programmatic Outcome #1**

<p align="center"><b>Programmatic Outcome #1</b> Integration and application of basic science knowledge with the clinical presentation</p> <p align="center"><b>Related Courses</b> Spinal Anatomy, Gross Anatomy I, Human Biochemistry, Gross Anatomy II, Spinal Biomechanics, Cellular and Cardiovascular Physiology</p>		
<b>Student Learning Outcomes</b>	<b>Evaluation Method</b>	<b>Criteria</b>
<p>1A) Acquire requisite basic science knowledge as a foundation for clinical reasoning.</p> <p>1B) Demonstrate the relevance of basic science information to clinical application.</p> <p>1C) Understand the basic science mechanisms that relate to clinical presentation and findings.</p>	NBCE Part I scores	<p>1<sup>st</sup> Year: Fail rate ≤ 15% on all parts</p> <p>2<sup>nd</sup> Year: Fail rate ≤ 13% on all parts</p> <p>3<sup>rd</sup> Year: Fail rate ≤ 10% on all parts</p>
	Core Concepts In Basic Sciences Capstone Exam	70% pass rate or higher
	Course-based exams related to SLOs	Students achieve or exceed course exam pass rate of 70%
	Core Concepts In Basic Sciences Capstone Exam	70% pass rate or higher on relevant questions
	Design-A-Case	Indirect measure for trend analysis
	Faculty Interviews	Indirect measure for trend analysis
	Student Course Evaluations	Indirect measure for trend analysis

**Table 5.4: Programmatic Outcome #2**

<b>Programmatic Outcome #2</b> Introduction and application of clinical reasoning strategies in the pre-clinical setting		
<b>Related Courses</b> Clinical Case Applications I, II, III and IV, Basic Communication and History-Taking Skills, Advanced Communication and History-Taking Skills, Clinical Neurology		
Student Learning Outcomes	Evaluation Method	Criteria
2A) Demonstrate history taking, examination and diagnostic skills as a foundation for clinical reasoning.  2B) Incorporate basic science knowledge to formulate a diagnosis based on acquired patient information.  2C) Demonstrate the use of analytic processes (hypothetico-deductive reasoning) and non-analytic resources (pattern recognition) when solving clinical problems.  2D) Apply various decisions aids and evidence to the clinical decision process.	NBCE Part II scores	1 <sup>st</sup> Year: Fail rate ≤ 15% on all parts 2 <sup>nd</sup> Year: Fail rate ≤ 13% on all parts 3 <sup>rd</sup> Year: Fail rate ≤ 10% on all parts
	Core Concepts In Clinical Sciences Capstone Exam	70% pass rate or higher
	Course-based exams related to SLOs	Students achieve or exceed course exam pass rate of 70%
	Standardized Patient Encounters	Students will satisfactorily perform clinical skills based upon critical criteria
	Faculty Interviews	Indirect measure for trend analysis
	Student Course Evaluations	Indirect measure for trend analysis
	Health Sciences Reasoning Test	Initial: Compare to established normative data until institutional norms are established During QEP implementation: All group subscores at “average strength” After full QEP implementation: All group subscores at “strong”

**Table 5.5: Programmatic Outcome #3**

<b>Programmatic Outcome #3</b> Application of clinical reasoning skills in the patient care setting		
<b>Related Courses</b> Clinical Case Applications IV, Clinic I, II, III and IV, Case Management I and Orthopedics III		
<b>Student Learning Outcomes</b>	<b>Evaluation Method</b>	<b>Criteria</b>
<p>3A) Demonstrate the ability to manage clinical uncertainty in the decision-making process.</p> <p>3B) Identify common errors in clinical reasoning and provide strategies to avoid them.</p> <p>3C) Demonstrate the use of regular self-reflection in the clinical learning setting.</p> <p>3D) Effectively utilize clinical reasoning in patient diagnosis and treatment.</p>	NBCE, Parts III & IV	1 <sup>st</sup> Year: Fail rate ≤ 15% on all parts 2 <sup>nd</sup> Year: Fail rate ≤ 13% on all parts 3 <sup>rd</sup> Year: Fail rate ≤ 10% on all parts
	Core Concepts In Clinical Applications Capstone Exam	70% pass rate or higher
	Intern Global Assessments	Group ratings of satisfactory on clinical reasoning elements
	Knowledge Based Inference Tool (KBIT)	Indirect measure for trend analysis
	Diagnostic Thinking Inventory	Initial administration (trimester 6) mean of 153. Second administration (trimester 10) mean of 168.
	Case-based Discussion	Group ratings of satisfactory on clinical reasoning elements
	Course-based exams related to SLOs.	Students achieve or exceed course exam pass rate of 70%
	CSCE I and II	Students achieve or exceed 70% on clinical reasoning related elements
	Standardized Patient Encounters	Students satisfactorily perform clinical skills based upon critical criteria
	Faculty Interviews	Indirect measure for trend analysis
	Student Course Evaluations	Indirect measure for trend analysis
	Health Sciences Reasoning Test	Initial: Compare to established normative data until institutional norms are established During QEP implementation: All group subscores at “average strength” After full QEP implementation: All group subscores at “strong”

**Programmatic Evaluation Schedule**

Table 5.6 illustrates the evaluation methods to be used during each trimester for determination of the efficacy of the QEP program.

**Table 5.6: Programmatic Evaluation Schedule**

<b>Evaluation Tool</b>	<b>Location</b>	<b>Trimester</b>
Faculty Interview / Course Evaluations Health Sciences Reasoning Test	Gross Anatomy I, Spinal Anatomy, Human Biochemistry Spinal Anatomy	1
Faculty Interview / Course Evaluations	Gross Anatomy II, Spinal Biomechanics, Cellular & Cardiovascular Physiology	2
Faculty Interview / Course Evaluations	Clinical Case Applications I, Basic Communication and History-Taking Skills	3
Faculty Interview / Course Evaluations	Clinical Case Applications II, Advanced Communication and History-Taking Skills	4
Faculty Interview / Course Evaluations Health Sciences Reasoning Test Core Concepts in Basic Sciences NBCE Part I	Clinical Case Applications III Clinical Case Applications III Capstone Examination Independent Examination	5
Faculty Interview / Course Evaluations Diagnostic Thinking Inventory	Clinical Case Applications IV Clinical Neurology Clinical Case Applications IV	6
CSCE I Core Concepts in Clinical Sciences NBCE Part II Faculty Interview / Course Evaluations KBIT	Clinic I Capstone Examination Independent Examination Case Management I, Clinic I Clinic I	7
Core Concepts in Clinical Applications NBCE Part III Faculty Interview / Course Evaluations KBIT	Capstone Examination Independent Examination Orthopedics III, Clinic II Orthopedics III, Clinic II	8
CSCE II Faculty Interview / Course Evaluations KBIT	Clinic III Clinic III Clinic III	9
NBCE Part IV Faculty Interview / Course Evaluations Diagnostic Thinking Inventory KBIT Health Sciences Reasoning Test	Independent Examination Clinic IV Clinic IV Clinic IV Clinic IV	10