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# Assessment Part I: Basics of Assessment

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# Disclosures & Disclaimers

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- No conflicts of interest to report.



# Today's Objectives

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Participants will be able to:

1. Define the various assessments required by the ACGME.
2. Describe basic elements of learner assessment, including terminology.
3. Discuss how assessment should be used in determining learner competence, with reference to ACGME milestones.
4. Begin to formulate a comprehensive assessment framework for individual residency programs.

# Three Outstanding Resources!

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## ASSESSMENT IN HEALTH PROFESSIONS EDUCATION

Edited by

Steven M. Downing  
Rachel Yudkowsky



## Handbook on Medical Student Evaluation and Assessment



Louis N. Pangaro, M.D.  
William C. McGaghie, Ph.D.  
Editors



ACGME

## The Milestones Guidebook

Eric S. Holmboe, MD  
Laura Edgar, EdD, CAE  
Stan Hamstra, PhD

Version 2016



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# What Does ACGME Require?



# Formative Evaluation

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- The faculty must evaluate resident performance in a timely manner **during each rotation** or similar educational assignment, and document this evaluation at completion of the assignment.

# Formative Evaluation

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- Provide objective assessments of competence in patient care and procedural skills, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and systems-based practice based on the specialty-specific Milestones;

# Formative Evaluation

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- Use multiple evaluators (e.g., faculty, peers, patients, self, and other professional staff)
- Document progressive resident performance improvement appropriate to educational level
- Provide each resident with documented **semiannual evaluation** of performance with feedback.

# Clinical Competency Committee

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- Review all resident evaluations semi-annually;
- Prepare and ensure the reporting of Milestones evaluations of each resident semi-annually to ACGME; and,

# Summative Evaluation

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- The specialty-specific Milestones must be used as **one** of the tools to ensure residents are able to practice core professional activities without supervision upon completion of the program.

# Summative Evaluation

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- The program director must provide a summative evaluation for each resident upon completion of the program. This evaluation must:
  - Become part of the resident’s permanent record maintained by the institution, and must be accessible for review by the resident in accordance with institutional policy;
  - Document the resident’s performance during the final period of education; and,
  - Verify that the resident has demonstrated sufficient competence to enter practice without direct supervision.

# Confidential Evaluations

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- The evaluation of the faculty must include at least annual **written confidential** evaluations by the residents.
- Residents and faculty must have the opportunity to evaluate the **program confidentially and in writing** at least annually
- The program must use the results of residents' and faculty members' assessments of the program together with other program evaluation results to improve the program.

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# Basic Elements & Terminology



# What is Assessment?

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“Any systematic method of obtaining information from tests or other sources, used to draw inferences about characteristics of people, objects or programs” (*Standards for Educational and Psychological Testing; AERA, APA, NCME, 1999*).

Very broad definition!

# What is Assessment?

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- Assessment is the process of gathering or collecting information pertaining to learner knowledge, performance and/or competence.

# Assessment or Evaluation?

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- **Assessment:** refers to the process of determining the progress of an individual learner.
- **Evaluation:** refers to the process of making a judgment about the effectiveness of a program (or part of a program, e.g., curriculum).

# Assessment or Evaluation?

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- **Assessment:** process of data collection pertaining to knowledge and/or performance.
- **Evaluation:** making a judgment about knowledge or performance based on objective criteria.

# Formative or Summative?

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- **Formative** assessment: information gathered during a course of study and designed to give learner feedback on what they have learned and not yet learned; done to “**form**” or shape the subsequent performance of a learner.
- **Summative** assessment: information gathered at the conclusion of a course of study and designed to “**sum up**” what a learner has achieved (evaluation); often includes a “grade” or other indicator of achievement, along with recommendations for improvement.



# FORMATIVE SUMMATIVE



WHEN THE **CHEF**  
TASTES THE SOUP



WHEN THE **GUESTS**  
TASTE THE SOUP

@bryanmathews

FROM STEVE WHEELER'S BLOG "THE AFL TRUTH ABOUT ASSESSMENT"



# Why Do We Assess?

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- Primarily because we want to use information gathered via assessments to **make decisions** about whether a learner (e.g., resident physician) has achieved a given level of knowledge and/or competence.
- **Is this the only reason?**



# Purposes of Assessment

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- **Assess knowledge or competence**
- **Generate feedback for improvement**
- **Gauge academic progress**
- **Predict performance**
- **Assign “grades”**
- **Document learner experience**
- **Judge effectiveness of education program**
- **Comply with accreditation requirements**



• *Pangaro & McGaghie, 2015*

# Two More Useful Distinctions

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- **Normative** Assessment: assigning a grade or score based on comparison of a learner with (most often) a peer group.
- **Criterion-Based** Assessment: assigning a grade or score based on an absolute minimum standard of proficiency.
- **Why is this important?**



# OBE (Outcomes-Based Education)

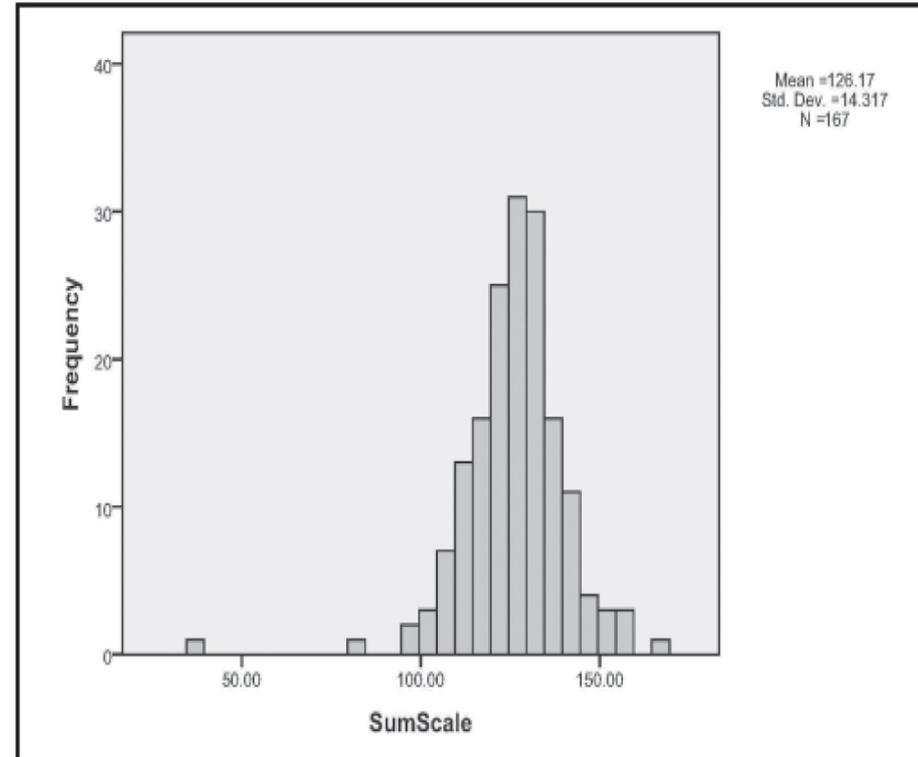
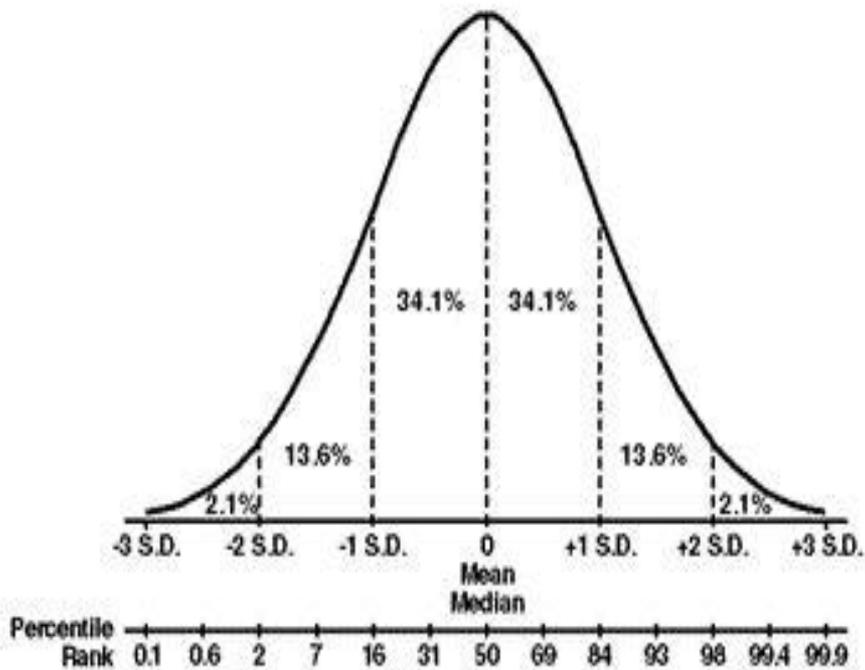
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- What should a competent physician look like at the end of the training process, and at various stages during that process?
- Start with competencies, then develop content and structure of the curriculum, teaching methods, training sites and teachers.
- Assessment plays central role in determining whether learners have achieved the competencies.
- “Begin with end in mind” – emphasis on outcomes over process.

Holmboe ES, 2008



# Which is Normative? Criterion-Based?



# High Stakes or Low Stakes?

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- These terms refer to the consequences of the assessment:
  - What are examples of both?
  - What are the implications for assessment of health professions learners?
- The higher the stakes, the more important it is to have assessment processes that are **valid** and **reliable**



# And finally.....

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- **Competency**: an observable ability
- **Competence**: the overall capability of a person to perform a task properly
- Strictly speaking, a competency-based system is not based on time, but rather is developmental in nature.

# Tension Between Two Models

Kablinger & Pheister

Role-based  
Learning Objectives

Learner-centered  
Training Outcomes

Time Based

Tea steeping  
Curriculum-based  
Delivery of information  
Example - 4 years of  
training

Competency Based

No set time  
Learner driven  
Achievement of competencies  
Example - Milestones

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# Determining Learner Competence



# Scenario (Hamstra, 2012)

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You are the residency program director for a large subspecialty training program in a mid-sized academic health center. Your program was recently site visited by the ACGME, and the site visitor report expressed concerns about the fact that your program “lacks comprehensive assessment tools.” According to the report, only the competency of medical knowledge is being assessed “using valid and reliable tools.” You and your colleagues are a bit surprised by this finding, as you felt that the program was already using some perfectly good assessment tools. Your department Chair has read the report and is supportive, but has limited resources to offer you and sees you as the “departmental expert” in regard to medical education. She makes it clear that it is your job to develop and put into place assessment tools that will measure competence in all six of the ACGME competencies.

What steps would you take next? What information will you need, and where will you get it?



# What Tools Should We Use to Determine Competence?

The screenshot shows a web browser window displaying the ACGME website. The URL in the address bar is [www.acgme.org/Specialties/Recommended-Assessment-Tools-for-the-General-Competencies/pfccatid/22/Radiation Oncology/articleid/479](http://www.acgme.org/Specialties/Recommended-Assessment-Tools-for-the-General-Competencies/pfccatid/22/Radiation%20Oncology/articleid/479). The page features a navigation menu with links for 'ABOUT US', 'CONTACT US', and 'NEWSROOM'. A search bar is located in the top right corner. The main content area is titled 'RECOMMENDED ASSESSMENT TOOLS FOR THE GENERAL COMPETENCIES' and includes a list of specialties on the left, a description of the tools, and a list of specific assessment forms with links to download them.

**ACGME** Accreditation Council for Graduate Medical Education

Home > Specialties > Recommended Assessment Tools for the General Competencies

**SPECIALTIES**

- RADIATION ONCOLOGY
  - Overview
  - Program Requirements and FAQs and Applications
  - Milestones
  - Documents and Resources
  - Review Committee Members and Staff
- ALLERGY AND IMMUNOLOGY
- ANESTHESIOLOGY
- COLON AND RECTAL SURGERY
- DERMATOLOGY
- EMERGENCY MEDICINE
- FAMILY MEDICINE
- INTERNAL MEDICINE
- MEDICAL GENETICS AND GENOMICS
- NEUROLOGICAL SURGERY
- NEUROLOGY
- NUCLEAR MEDICINE
- OBSTETRICS AND GYNECOLOGY
- OPHTHALMOLOGY
- ORTHOPEDIC SURGERY
- OSTEOPATHIC
- NEUROLOGICAL/ORTHOPEDIC MEDICINE
- OTOLARYNGOLOGY
- PATHOLOGY
- PEDIATRICS

**RECOMMENDED ASSESSMENT TOOLS FOR THE GENERAL COMPETENCIES**

The Review Committee for Radiation Oncology has provided these sample assessment tools, intended to be suggestions; their use is not required by the Review Committee. Program directors should feel free to use them, and may modify them as appropriate to fit the needs of their programs. The procedure evaluation forms need not be completed for all patients, but only for a representative sample.

As part of our ongoing commitment to helping provide materials for program directors and staff, we welcome your suggestions at any time and appreciate your feedback. Please contact Review Committee staff by phone (312.755.5491) or e-mail ([www@acgme.org](mailto:www@acgme.org)).

**INSTRUCTIONS:** Recommended Assessment Tools These assessment tools are intended to be 'suggestions'; their use is not required by the Residency Committee. Program directors should feel free to use them or not, and should modify them as appropriate to fit the needs of a program. The procedure evaluation forms need not be completed for all patients, but only for a representative sample.

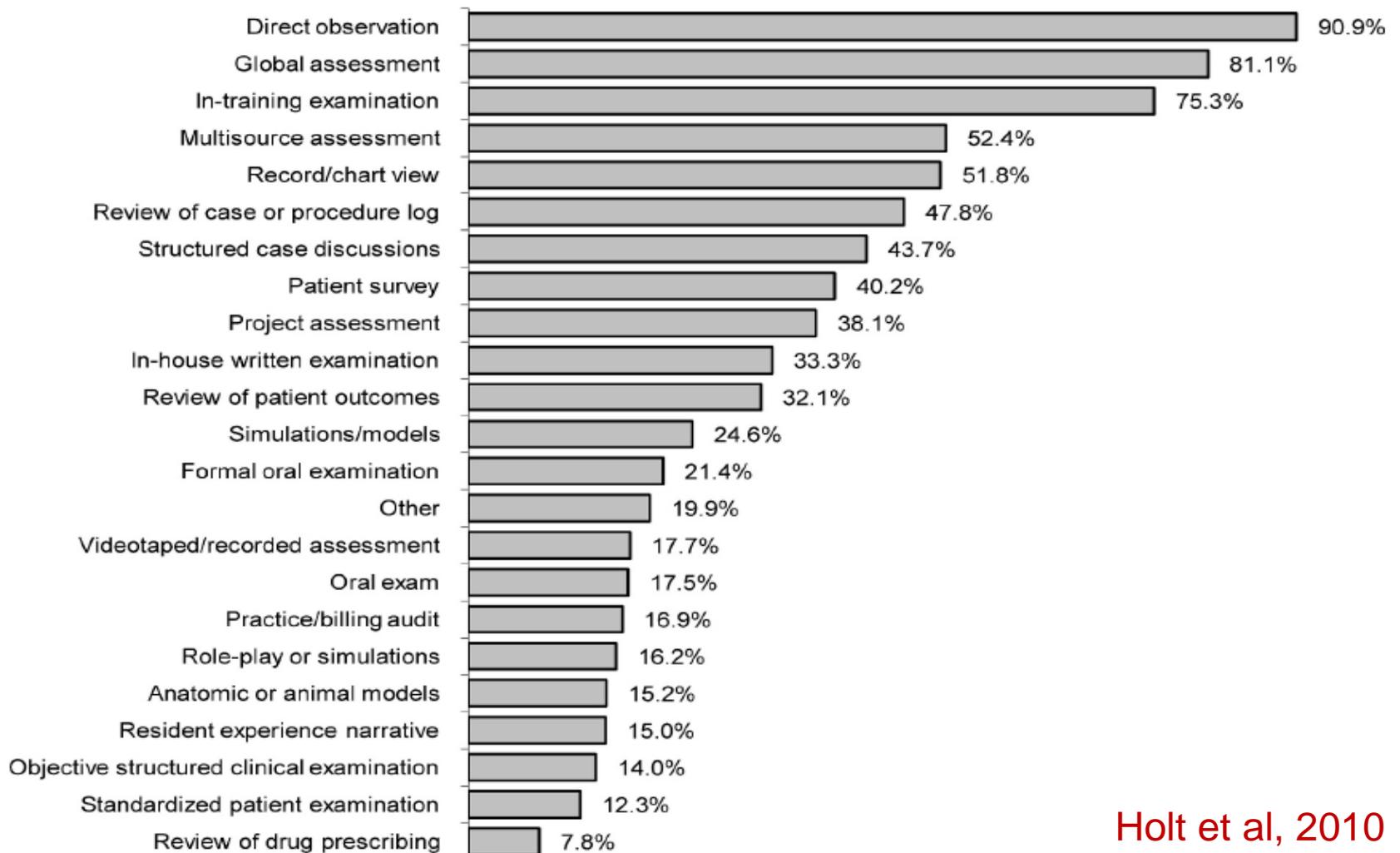
**All Documents are in PDF Format**

- [CHART STIMULATED RECALL](#) This form may be used by faculty to evaluate clinical decision-making using patient records in an oral examination.
- [PROFESSIONALISM MINI-CEX](#) This form may be used by faculty to assess a resident's professionalism in encounters with patients and staff.
- [BRACHYTHERAPY FORM](#) This form may be used by faculty to evaluate a resident's brachytherapy expertise. A representative sample of each major type of brachytherapy procedure should be evaluated periodically throughout a resident's training.
- [SIMULATION FORM](#) This form may be used by faculty to evaluate a resident's simulation expertise. A representative sample of cases of each disease type and stage may be evaluated periodically throughout the resident's training.
- [COMMUNICATION, INTERPERSONAL SKILLS, & PROFESSIONALISM EVALUATION FORM](#)
- [EVALUATION MODIFIED 360 FORM](#) These forms were designed to be used periodically (once or twice a year) to

<http://www.acgme.org/Specialties/Recommended-Assessment-Tools-for-the-General-Competencies/pfccatid/22/Radiation%20Oncology/articleid/479>



# ACGME Survey (Based on Data from ADS, 2008-2010)



Holt et al, 2010

FIGURE 2

PERCENTAGES OF PROGRAMS USING EACH ASSESSMENT METHOD

# What Tools to Use?

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- Must find proper balance between comprehensive approach and feasibility.
- Can/should learners assess their own competence?
- What can you reasonably expect your faculty to do, given the competing demands on their time?
- Is it really necessary for every faculty member to assess every resident on every competency?



# Sub-Competency Mapping Grid (Whicker SA, 2016)

		Ambulatory (Riverside)	Continuity Clinic	Direct Observation	Elective (inpt)	Elective (otpt)	ICU/CCU	Peer	Ward	Self	ED?	Total
PC1	Gathers and synthesizes essential and accurate information to define each patient's clinical problem(s).											0
PC2	Develops and achieves comprehensive management plan for each patient.											0
PC3	Manages patients with progressive responsibility and independence.											0
PC4	Skill in performing procedures.											0
PC5	Requests and provides consultative care.											0
MK1	Clinical knowledge											0
MK2	Knowledge of diagnostic testing and procedures.											0
SBP1	Works effectively within an interprofessional team (e.g. peers, consultants, nursing, ancillary professionals and other support personnel).											0
SBP2	Recognizes system error and advocates for system improvement.											0
SBP3	Identifies forces that impact the cost of health care, and advocates for, and practices cost effective care.											0
SBP4	Transitions patients effectively within and across health delivery systems.											0
PBL1	Monitors practice with a goal for improvement.											0
PBL2	Learns and improves via performance audit.											0
PBL3	Learns and improves via feedback.											0
PBL4	Learns and improves at the point of care.											0
PROF1	Has professional and respectful interactions with patients, caregivers and members of the interprofessional team (e.g. peers, consultants, nursing, ancillary professionals and support personnel).											0
PROF2	Accepts responsibility and follows through on tasks.											0
PROF3	Responds to each patient's unique characteristics and needs.											0
ICS1	Communicates effectively with patients and caregivers.											0
ICS2	Communicates effectively in interprofessional teams (e.g. peers, consultants, nursing, ancillary professionals and other support personnel).											0
ICS3	Appropriate utilization and completion of health records.											0
	Total items/eval	0	0	0	0	0	0	0	0	0	0	0

# Four Important Issues to Consider

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- Alignment of assessment with objectives/competencies/curriculum
- Rater and learner characteristics
- Inter-rater reliability
  - Frame of reference/shared mental model
- Faculty development!!!!

# Alignment with Objectives

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- “.....must assure that the assessment of a learner is properly aligned with the stated learning objectives (content validity) and that the assessment instruments chosen optimally serve to assess competence manifested in measureable performance (construct validity).”

- Pangaro & McGaghie, 2015

# Rater & Learner Characteristics

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- Age, gender, clinical experience, teaching experience, comfort, confidence, personality, work ethic.
- Prior experience with patient scenario.
- Relationships (complicated!)
- Rater's own level of clinical skills:
  - Faculty with higher history and patient satisfaction scores may be more stringent raters  
(Kogan JR et al, 2010)



# Inter-Rater Reliability

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- The majority of variance is with the raters, not the tool
- Leniency bias (doves)
- Stringency bias (hawks)
- Halo effect (one positive trait = positive across the board)
- Central tendency effect (most are average)
- Anchoring bias (use of first piece of information offered)
- Contrast bias (to what are you comparing the resident?)



# Frame of Reference

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- “A set of ideas, conditions, or assumptions that determine how something will be approached, perceived, or understood.” (*Merriam-Webster dictionary*)
- The ACGME milestones: a FOR?
  - “The achievement of competency for unsupervised practice”
  - Based on developmental steps that are clearly defined and observable

# Frame of Reference

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- Different basis upon which ratings are given:
  - Self
  - Normative/trainee level
  - Absolute standard
  - Practicing physicians



# Faculty Development

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To make effective use of the methods of assessment based on observation, educational institutions must commit the necessary resources for faculty development. However, too often faculty development translates into a project or a brief workshop. If faculty development is to be truly successful, medical educators need to embrace new strategies that embed faculty development in real-time teaching and clinical activities. Faculty development, like quality improvement and maintenance of competence, must become a continuous process and appropriately rewarded. As noted earlier, the quality and safety of patient care depend on it.

**“new strategies that embed faculty development in real-time teaching & clinical activities.”**

Holmboe ES, Practical Guide to the Evaluation of Clinical Competence, 2008



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# Developing a Framework

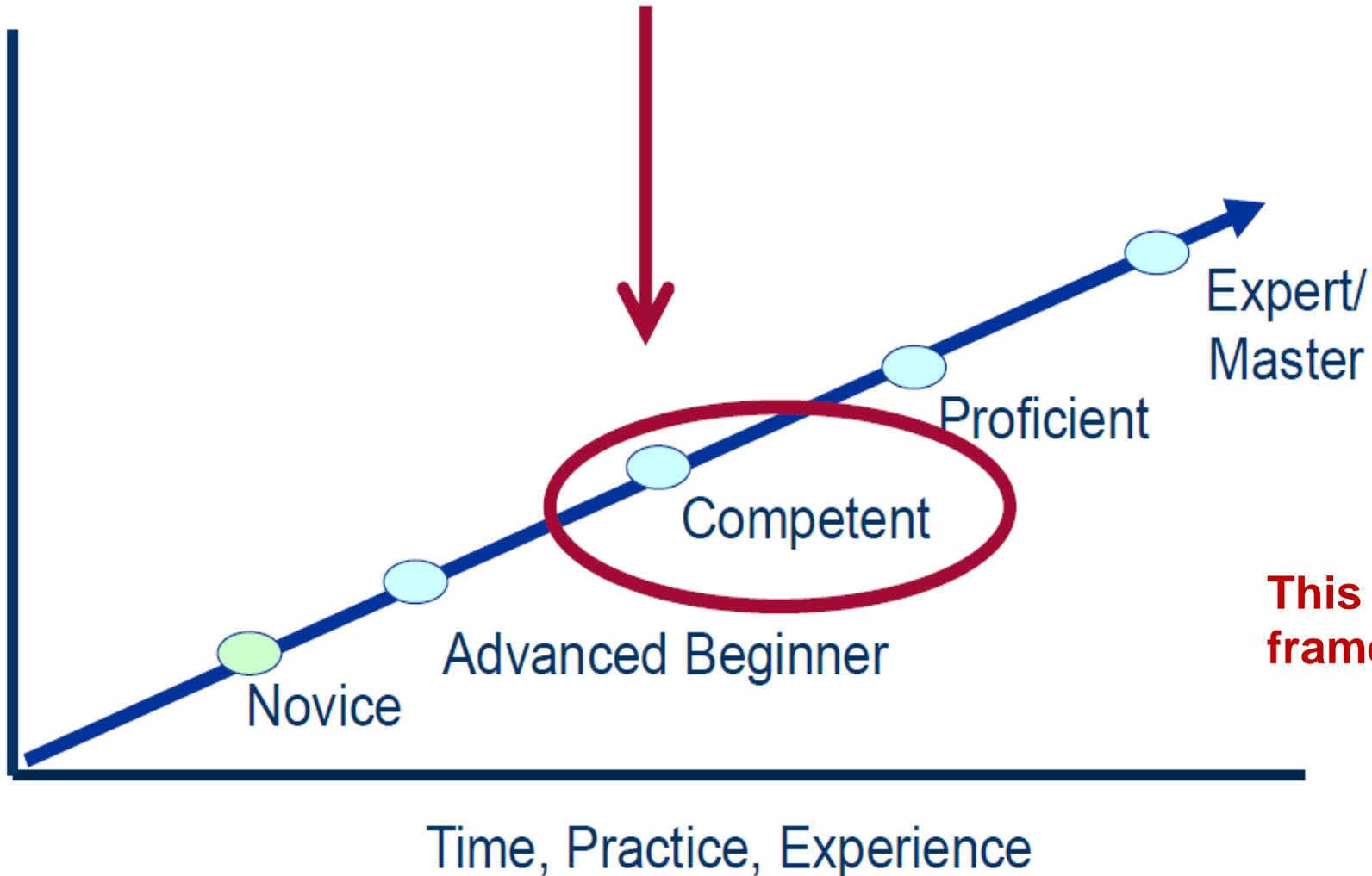


# Assessment Frameworks in the Literature

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- Bloom's **KSA** Taxonomy (**K**nowledge/Cognitive, **S**kills/Psychmotor, **A**ttitude/Affective)
- Miller's Pyramid (Knows, Knows How, Shows How, Does)
- Dreyfus Model (Novice, Advanced Beginner, Competent, Proficient, Expert, Master)
- RIME (Reporter, Interpreter, Manager, Educator)

# What is Needed by the Patient



# Mastery Learning: It Is Time for Medical Education to Join the 21st Century

William C. McGaghie, PhD

## Abstract

Clinical medical education in the 21st century is grounded in a 19th-century model that relies on longitudinal exposure to patients as the curriculum focus. The assumption is that medical students and postgraduate residents will learn from experience, that vicarious or direct involvement in patient care is the best teacher. The weight of evidence shows, however, that results from such traditional clinical education are uneven at best. Educational inertia endorsed until recently

by medical school accreditation policies has maintained the clinical medical education status quo for decades.

Mastery learning is a new paradigm for medical education. Basic principles of mastery learning are that educational excellence is expected and can be achieved by all learners and that little or no variation in measured outcomes will result. This Commentary describes the origins of mastery learning and presents

its essential features. The Commentary then introduces the eight reports that comprise the mastery learning cluster for this issue of *Academic Medicine*. The reports are intended to help medical educators recognize advantages of the mastery model and begin to implement mastery learning at their own institutions. The Commentary concludes with brief statements about future directions for mastery learning program development and research in medical education.

“Clinical experience alone is insufficient to guarantee the acquisition and maintenance of clinical competence....a new educational model embodied in mastery learning is needed.....” (page 2)

*Academic Medicine*, 2015





# The Milestones Guidebook

Eric S. Holmboe, MD  
 Laura Edgar, EdD, CAE  
 Stan Hamstra, PhD

Version 2016

Figure 1a: General Description of Milestone Levels

Milestone Description: Template				
Level 1	Level 2	Level 3	Level 4	Level 5
What are the expectations for a beginning resident?	What are the milestones for a resident who has advanced over entry, but is performing at a lower level than expected at mid-residency?	What are the key developmental milestones mid-residency?  What should they be able to do well in the realm of the specialty at this point?	What does a graduating resident look like?  What additional knowledge, skills & attitudes have they obtained?  Are they ready for certification?	Stretch Goals – Exceeds expectations
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				

“Competency-based medical education serves as the foundation for the NAS....and is also grounded in a CQI and innovation philosophy” (page 5)



# Key Questions

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1. Do I have good assessment procedures for each of the six competency areas?
2. Do I have a systematic approach to data collection and subsequent consideration/use of the data?
3. What tools will I use? Have they been found to be reliable/valid in the context in which I will use them?
4. What is reasonable to expect from busy faculty?
5. Are my residents well aware of what is expected of them (objectives) and how they will be assessed?
6. How will I use assessment data to provide residents with feedback and a final judgment on progress?



## Implementing and Using Milestones Effectively

While we still have much to learn, early research combined with solid educational theory does provide some useful guidance for programs.

### *Involving Residents and Fellows*

#### **Summary - Practical Tips**

- 1. Share and discuss the pertinent Milestones set with residents and fellows at the beginning of the program. This helps them to gain a shared understanding of the goals of the program and Milestones.*
- 2. Have residents and fellows complete individualized learning plans, using the Milestones as an important guide.*
- 3. Consider having residents and fellows complete a self-assessment of their Milestones that they can compare and contrast, with a trusted advisor, to the Milestone judgments of the CCC every six months.*
- 4. Enable residents and fellows to seek out assessment (i.e., self-directed assessment seeking), especially direct observation, from faculty members.*



### **Summary - Practical Tips**

1. *Share and discuss the pertinent Milestone set with faculty members as a group at the beginning of the academic year (at a minimum). This helps faculty members develop and use a shared understanding of the goals of the Milestones.*
2. *Observe, observe, observe! Faculty observation of key competencies is essential to effective feedback, coaching, and professional development.*
3. *Embed observation in “what faculty do” – clinic precepting, procedures, bedside rounds, discharge planning, joining part of an admission, and so on.*
4. *Participate in faculty development around the Milestones, assessment and observation, feedback as core educator skills.*
5. *Help faculty members understand where their assessments map onto the pertinent Milestones related to their role in the program.*



# Questions

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# References

1. Downing SM, Yudkowsky R (editors). Assessment in Health Professions Education. New York: Routledge Publishing Group, 2012.
2. Pangaro LN, McGaghie WC (editors). Handbook on Medical Student Evaluation and Assessment. North Syracuse, NY: Gegensatz Press, 2015.
3. Holmboe ES, Edgar L, Hamstra S. The Milestones Guidebook. Available at <https://www.acgme.org/Portals/0/MilestonesGuidebook.pdf>. Accessed May 1, 2017.
4. American Educational Research Association, American Psychological Association, and National Council on Measurement in Education. Standards for Educational and Psychological Testing. Washington, DC: American Educational Research Association, 1999.
5. Holmboe ES, Hawkins RE. Practical Guide to the Evaluation of Clinical Competence. St. Louis: Mosby/Elsevier Publishing, 2008.
6. Hamstra SJ. Designing and Selecting Assessment Instruments: Focusing on Competencies (Chapter 12). In The Royal College Program Directors Handbook (2013). Available at [https://www.acgme.org/Portals/0/Hamstra\\_Royal\\_College\\_PD\\_Handbook\\_Chapter\\_12.pdf](https://www.acgme.org/Portals/0/Hamstra_Royal_College_PD_Handbook_Chapter_12.pdf). Accessed May 1, 2017.

# References

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7. ACGME, Recommended Assessment Tools for the General Competencies in Radiology. Available at <http://www.acgme.org/Specialties/Recommended-Assessment-Tools-for-the-General-Competencies/pfcatid/22/Radiation%20Oncology/articleid/479>
8. Holt KD, Miller RS, Nasca TJ. Residency Programs' Evaluations of the Competencies: Data Provided to the ACGME About Types of Assessments Used by Programs. Journal of Graduate Medical Education 2010; 2 (4): 649-55.
9. ACGME Common Program Requirements (as of June 30, 2017). Available at [http://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/CPRs\\_07012016.pdf](http://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/CPRs_07012016.pdf). Accessed May 1, 2017.
10. Kogan JR, Hess BJ, Conforti LN, Holmboe ES. What Drives Faculty Ratings of Residents' Clinical Skills? The Impact of Faculty's Own Clinical Skills. Academic Medicine 2010; 85 (10 Suppl): S25-8.
11. Kogan JR. Assessment in Medical Education: Evidence-Based Clinical Skills Assessment in the Competency Era. American Board of Internal Medicine Plenary Session Presentation, 2012.
12. McGaghie WC. Mastery Learning: It Is Time for Medical Education to Join the 21<sup>st</sup> Century. Academic Medicine 2015; 90 (11): 1-4.