Mastery Learning in Geriatrics Education

Sara Bradley, MD
Diane B. Wayne, MD
Northwestern University Feinberg School of Medicine
Objectives

- Recognize variation in clinical skill among experienced professionals
- Review principles of mastery learning and deliberate practice
- Describe mastery learning applications to geriatrics education
Traditional Training ≠ Competence
Most Education Interventions

- Pretest
- Simulation-based Training
- Posttest
Example: Lumbar Puncture Skills
2 videos here of LP simulation
Typical Educational Outcomes

- PGY1 Simulator-Trained Residents Pretest: M=46.3%, SD=17.4%
- PGY1 Simulator-Trained Residents Posttest: M=94.2%, SD=8.5%

P < .001
Mastery Learning: Excellence for All

Pretest

Lecture, video, demonstration and deliberate practice

Posttest

Do not meet standard

PASS
Design and Sequencing of Training Activities

A. Ericsson 2007
Mastery Learning Bundle

Features

1. Baseline, i.e., diagnostic testing;
2. Clear learning objectives, units ordered by difficulty;
3. Educational activities (e.g., deliberate skills practice) focused on objectives;
4. Minimum passing *mastery* standard (MPS) for each unit;
5. Formative testing → *mastery* of each unit;
6. Advancement if performance ≥ MPS; or
7. Continued practice or study until MPS is reached
8. Time *varies*, outcomes are *uniform*

McGaghie et al., *Chest* 2009
Deliberate Practice (DP)

Features

1. Highly motivated learners with good concentration;
2. Engagement with a well-defined learning objective or task; at an
3. Appropriate level of difficulty; with
4. *Focused, repetitive practice*; that leads to
5. Rigorous, precise measurements; that yield
6. Informative feedback from educational sources (e.g., simulators, teachers); and where
7. Trainees also monitor their learning experiences and correct strategies, errors, and levels of understanding, engage in more DP; and continue with
8. Evaluation to reach a *mastery* standard; and then
9. Advance to another task or unit
10. Goal: *constant improvement*

Ericsson *Acad Med.* 2004; McGaghie et al., *Chest* 2009
Designing a Mastery Learning Curriculum

1. Define learning objectives
2. Develop curriculum (lecture, video, demonstrations, deliberate practice)
3. Select assessment modality (exam, OSCE, simulator, SP)
4. Create skills checklist (develop, pilot, rater training/IRR)
5. Establish a minimum passing standard
6. Study educational and clinical outcomes
Outcome Measurement

- Reliable Data
- Feedback to Learners
- Valid Decisions or Judgments
- Research Progress

Reliable Data
Mastery Learning in the Classroom

Cardiac Auscultation

Paracentesis

Code Status Discussion

Central Venous Catheter Insertion
Mastery Learning at the Bedside

85% reduction in CLABSI

Barsuk et al JAMA Intern Med 2009
Mastery Learning Cost Effectiveness

Cost Savings From Reduced Catheter-Related Bloodstream Infection After Simulation-Based Education for Residents in a Medical Intensive Care Unit

Elaine R. Cohen, BA; Joe Feinglass, PhD; Jeffrey H. Barsuk, MD; Cynthia Barnard, MBA, MSJS; Anna O’Donnell, RN, BSN; William C. McGaghie, PhD; Diane B. Wayne, MD

- The total annual estimated savings were approximately $820,000, 139 patient hospital days, and 120 MICU days.
- When compared with the cost of our intervention ($112,000), the net savings was approximately $708,000

7:1 ROI

Cohen et al. Simul Healthc. 2010
SBML in Action: Intern Boot Camp

Includes:
- Internal Med.
- Neurology
- Anesthesiology
- Gen. Surgery

Dissemination to 105 VA Hospitals
Mastery Learning in Geriatrics

- Aging of population
- Education not standardized
- New competency-based approaches
  - EPAs and Milestones
- How can we apply mastery learning to enhance geriatrics education and ensure competence for graduating medical students?
AAMC Minimum Geriatric Competencies

The graduating medical student, in the context of a specific older adult patient scenario (real or simulated), must be able to:

### MEDICATION MANAGEMENT

1. Explain impact of age-related changes on drug selection and dose based on knowledge of age-related changes in renal and hepatic function, body composition, and Central Nervous System sensitivity.

2. Identify medications, including anticholinergic, psychoactive, anticoagulant, analgesic, hypoglycemic, and cardiovascular drugs that should be avoided or used with caution in older adults and explain the potential problems associated with each.

3. Document a patient’s complete medication list, including prescribed, herbal and over-the-counter medications, and for each medication provide the dose, frequency, indication, benefit, side effects, and an assessment of adherence.

### COGNITIVE AND BEHAVIORAL DISORDERS

4. Recognize, compare and contrast among the clinical presentations of delirium, dementia, and depression.

5. Formulate a differential diagnosis and implement initial evaluation in a patient who exhibits delirium, dementia, or depression.

6. In an older patient with delirium, urgently initiate a diagnostic work-up to determine the root cause (etiologies).

7. Perform and interpret a cognitive assessment in older patients for whom there are concerns regarding memory or function.

8. Develop an evaluation and non-pharmacologic management plan for agitated demented or delirious patients.

### SELF-CARE CAPACITY

9. Assess and describe baseline and current functional abilities in an older patient by collecting historical data from multiple sources, making sure to include instrumental activities of daily living, activities of daily living, and capacity/competence assessment, and performing a confirmatory hearing and vision examination.

10. Develop a preliminary management plan for patients presenting with functional deficits, including adaptive interventions and involvement of interdisciplinary team members from appropriate disciplines, such as social work, nursing, rehabilitation, nutrition, and pharmacy.

11. Identify and assess safety risks in the home environment, and make recommendations to mitigate these.

### FALLS, BALANCE, GAIT DISORDERS

12. Ask all patients > 65 y.o., or their caregivers, about falls in the last year, watch the patient rise from a chair and walk (or transfer), then record and interpret the findings.

13. In a patient who has fallen, conduct a gait assessment and construct a differential diagnosis and evaluation plan that addresses the multiple etiologies identified by history, physical examination and functional assessment.

### HEALTH CARE PLANNING AND PROMOTION

14. Define and differentiate among types of code status, health care proxies, and advance directives in the state where one is training.

15. Accurately identify clinical situations where life expectancy, functional status, patient preference or goals of care should override standard recommendations for screening tests in older adults, noting that risk/benefit, not age alone is not a basis for withholding standard screening or treatment.

16. Accurately identify clinical situations where life expectancy, functional status, patient preference or goals of care should override standard recommendations for treatment in older adults.

### ATYPICAL PRESENTATION OF DISEASE

17. For each organ system identify at least 3 changes of normal aging (e.g., normal labs for older adults) and their impact on the patient, including their contribution to homeostasis (the age-related narrowing of homeostatic reserve mechanisms). Know when clinical signs and presentations are normal aging and not disease.

18. Generate a differential diagnosis based on recognition of the unique presentations of common conditions in older adults, including acute coronary syndrome, dehydration, urinary tract infection, acute abdomen, and pneumonia.

### PALLIATIVE CARE

19. Assess and provide initial management of pain and key non-pain symptoms based on patient's goals of care.

20. Identify the psychological, social, and spiritual needs of patients with advanced illness and their family members, and link these identified needs with the appropriate interdisciplinary team members.

21. Present palliative care (including hospice) as a positive, active treatment option for a patient with advanced disease.

### HOSPITAL CARE FOR ELDERS

22. Identify potential hazards of hospitalization for all older adult patients (including immobility, delirium, medication side effects, malnutrition, pressure ulcers, procedures, peri and post operative periods, transient urinary incontinence, and hospital acquired infections) and identify potential prevention strategies.

23. Explain the risks, indications, alternatives, and contraindications for indwelling (Foley) catheter use in older adult patients.

24. Communicate the key components of a safe discharge plan (e.g., accurate medication list, plan for follow-up), including comparing/contrasting potential sites for discharge.

25. Conduct a surveillance examination of areas of the skin at high risk for pressure ulcers and describe existing ulcers.

https://pogoe.org/Minimum_Geriatric_Competencies
<table>
<thead>
<tr>
<th>Topic</th>
<th>Competency #</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Falls/Gait Assessment</td>
<td>12,13</td>
</tr>
<tr>
<td>2 Cognitive Impairment (dementia/depression)</td>
<td>4,5,7,8</td>
</tr>
<tr>
<td>3 Delirium / approach to an agitated patient</td>
<td>4,5,6,8</td>
</tr>
<tr>
<td>4 End of life discussion</td>
<td>20,21</td>
</tr>
</tbody>
</table>
Table Assignments

• Work in groups to discuss how to develop a mastery learning curriculum for your topic

• Each table will have one topic & will focus on:
  – Curriculum design
  OR
  – Assessment strategy

• Report back to large group
Further Discussion:

Collaborate to design, implement, & study mastery learning in geriatrics

Meet us during the Meet the Professors Lunch today!

sara.bradley@nm.org
dwayne@northwestern.edu