Competency Based Education

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Acknowledgements

- American Board of Surgery
- Society for Improving Medical Professional Learning (SIMPL)

Disclosures

- Advisor Board Society for Improving Medical Professional Learning (SIMPL): 501c3 Nonprofit for which I receive no compensation

Present method of certification in General Surgery

- 5-year program with graduated level of autonomy
- 850 cases, 250 in last year
- Passing Qualifying Exam (written) and Certifying Exam (Oral)

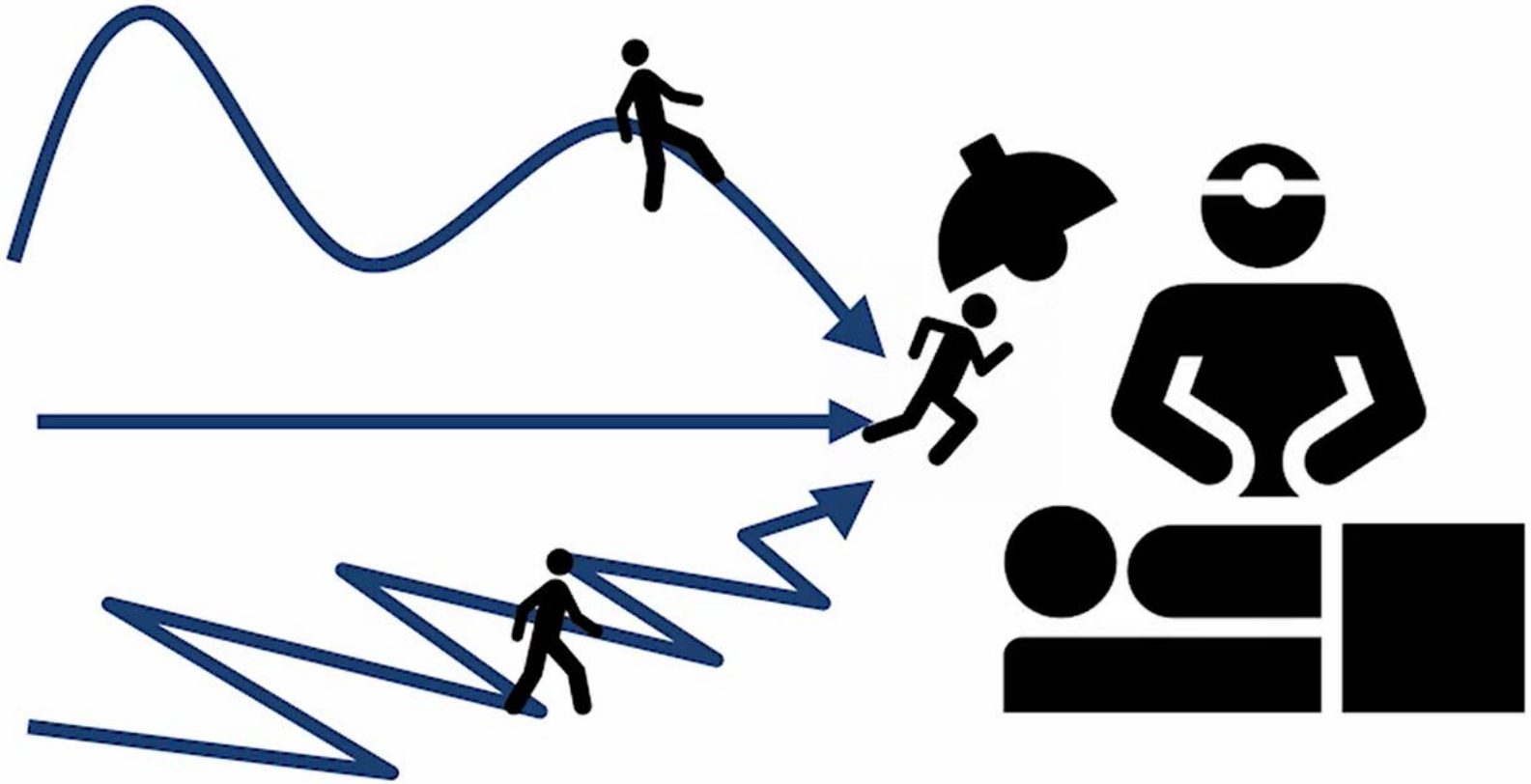
Change in last 2 years

- Entering class of 2023 will all be measured by Entrustable Profession Activities (EPA's)

Major Themes

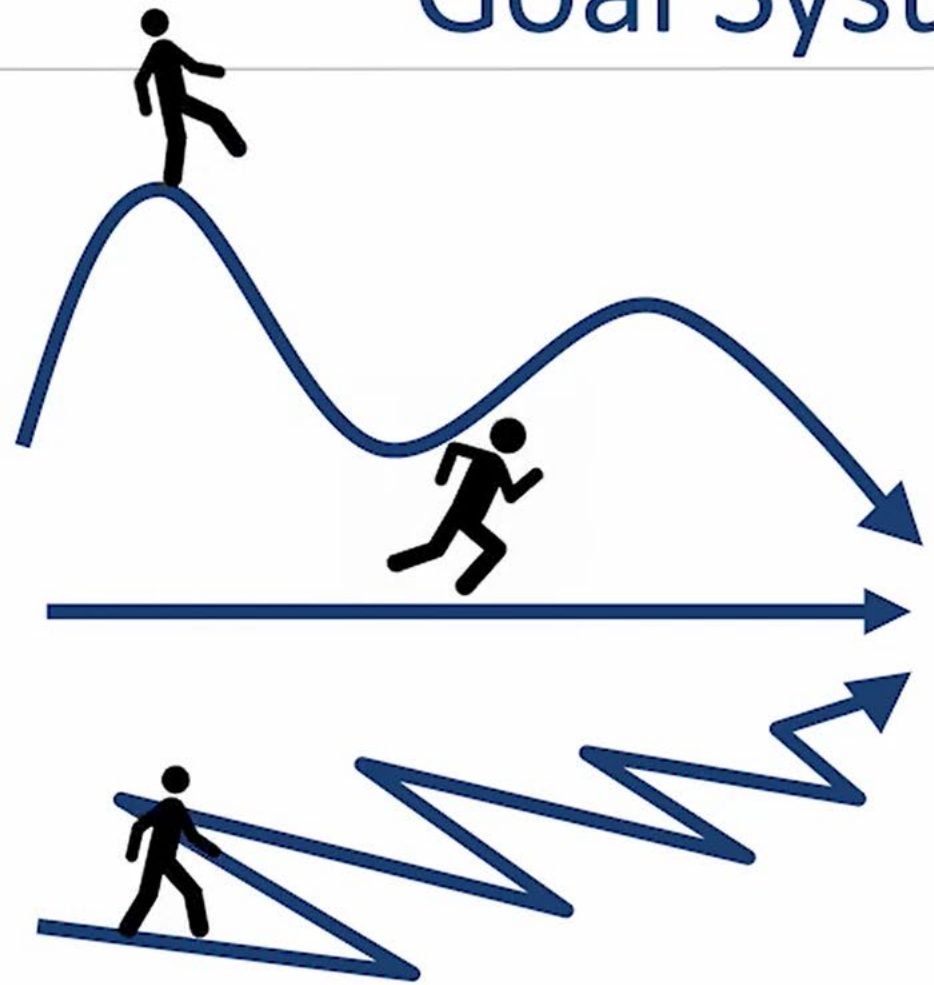
- Present methods of assessment are retrospective, reductionist and anecdotal
- We are progressing from expert opinion to milestones and now to EPA's with the residency evaluation process
- EPA's are based on Work Based Assessments (WBA's, SIMPL is a tool that uses WBA's as a method
- A group of EPA's can be used to assess a resident's competency for indepement practice

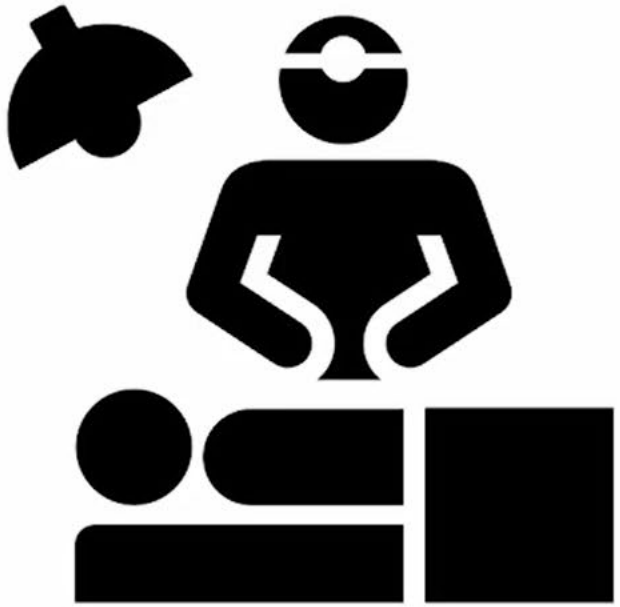
Current System



Fixed Time =

Goal System





Fixed Outcome

Milestones

Patient Care - 1

Level 0: Cannot perform focused, accurate H&P

Level 1: Performs focused, accurate H&P

Level 2: Diagnoses *many* "core" condition and can initiate *some* management

Level 3: Diagnoses and can manage *most* "core" conditions

Level 4: Leads a team caring for "core" conditions; recognizes atypical presentations

Englander, *Med Educ*, 2017

Patient Care 3: Intra-Operative Patient Care – Technical Skills

Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates limited tissue-handling skills	Inconsistently demonstrates careful tissue handling	Consistently demonstrates careful tissue handling	Adapts tissue handling based on tissue quality	Identifies innovative operative techniques, instrumentation, operative approaches, or significant improvement in established techniques
Requires prompting to identify appropriate tissue plane	Identifies appropriate plane but requires redirection to maintain dissection in the optimal tissue plane	Visualizes tissue plane, identifies and dissects relevant normal anatomy	Visualizes tissue plane, identifies and dissects relevant abnormal anatomy	
Moves forward in the operation only with active direction	Moves forward in the operation but requires prompting to complete the operation	Moves fluidly through the course of the operation and anticipates next steps	Adapts to unexpected findings and events during the course of the operation	
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐

Comments:

Not Yet Completed Level 1 ☐

Not Yet Rotated ☐

WHAT IS COMPETENCE

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PERSPECT BIOL MED, 2009

"If applied inappropriately, [competency-based training] can result in demotivation, a focus on minimum acceptable standards, increased administrative burden and a reduction in the educational content." Leung, W. **Competency Based Education**, BMJ 2002

Touchie, C., Ten Cate, O. **The promise, perils, problems and progress of competency based medical education,** *Medical Education*, 2016

THEORY VS REALITY

"SURGICAL COUNCIL ON RESIDENT EDUCATION (SCORE) C… CURR… …S
"ESSENTIAL-COMMON" OPERATIONS AND 70 "ES… …IONS; FOR ALL 158
OF THESE, RESIDENTS ARE EXPECTED TO … …RSTANDING OF THE
PROCEDURES AND THEIR PERIOPE… …ESS OF THEIR INDIVIDUAL
EXPERIENCE." MALANGO… …**CORE**: CURRICULUM OUTLINE

88 "essential-common" oprations and 70 "essential-uncommon" operations; 158 total

"I DID 1… …NS AND 11 PULMONARY LOBECTOMIES DURING MY TRAINING, BUT
ONLY 4 … …OMIES AND 3 SPLENECTOMIES. IN FACT, SEVERAL OF THE 26 DIFFERENT
CASES I D… …THAN 10 TIMES ARE NOT CONSIDERED "ESSENTIAL" AT ALL, AND SHOULD BE
PERFORMED BY FELLOWSHIP-TRAINED SUBSPECIALISTS." SORENSON, MJ *J GRAD MED ED* 2014

OPERATIVE VOLUME NATIONALLY OF GRADUATES 2005 TO 2011

- TOTAL VOLUME INCREASED 21%
- LAPAROSCOPIC INCLUDED BASIC AND COMPLEX INCREASED
- OPEN CAVITARY OPERATIONS DECREASED
- ONLY 9 OPERATIONS DONE MORE THAN 20 TIMES
- ONLY 20 OPERATIONS DONE MORE THAN 10 TIMES

MALANGONI, ET AL 2013

Operation	Mean ± SD	Median (2010-2011)	Median (2005)
Cholecystectomy (laparoscopic)	114.8 ± 44.7	107	90
Colonoscopy	64.7 ± 29.3	55	24
Inguinal hernia repair	52.2 ± 19.6	50	49
Appendectomy (laparoscopic)	48.5 ± 24.6	45	19
Partial colectomy	45.3 ± 16.2	43	48
Ventral hernia (all)	43.5 ± 16.9	41	38
EGD	35.9 ± 17.2	34	14
Thyroidectomy, partial/total	24.8 ± 15.3	22	17
Inguinal hernia repair (laparoscopic)	23.5 ± 15.5	20	11
Enterectomy	19.6 ± 11.2	19	15
Breast biopsy	21.4 ± 15.5	18	33
Partial colectomy (laparoscopic)	19.1 ± 13.0	16	4
Inguinal/umbilical hernia repair (pediatric)	18.7 ± 10.9	16	19
Lower extremity amputation	19.6 ± 11.2	15	17
Appendectomy	18.5 ± 13.5	15	27
Tracheostomy	15.5 ± 12.2	13	12
Exploratory laparotomy	15.2 ± 10.5	13	11
Carotid endarterectomy	14.2 ± 10.3	12	16
Cholecystectomy	11.6 ± 5.9	11	13
Partial mastectomy	12.6 ± 10.8	10	4

MALANGONI, ET AL 2013

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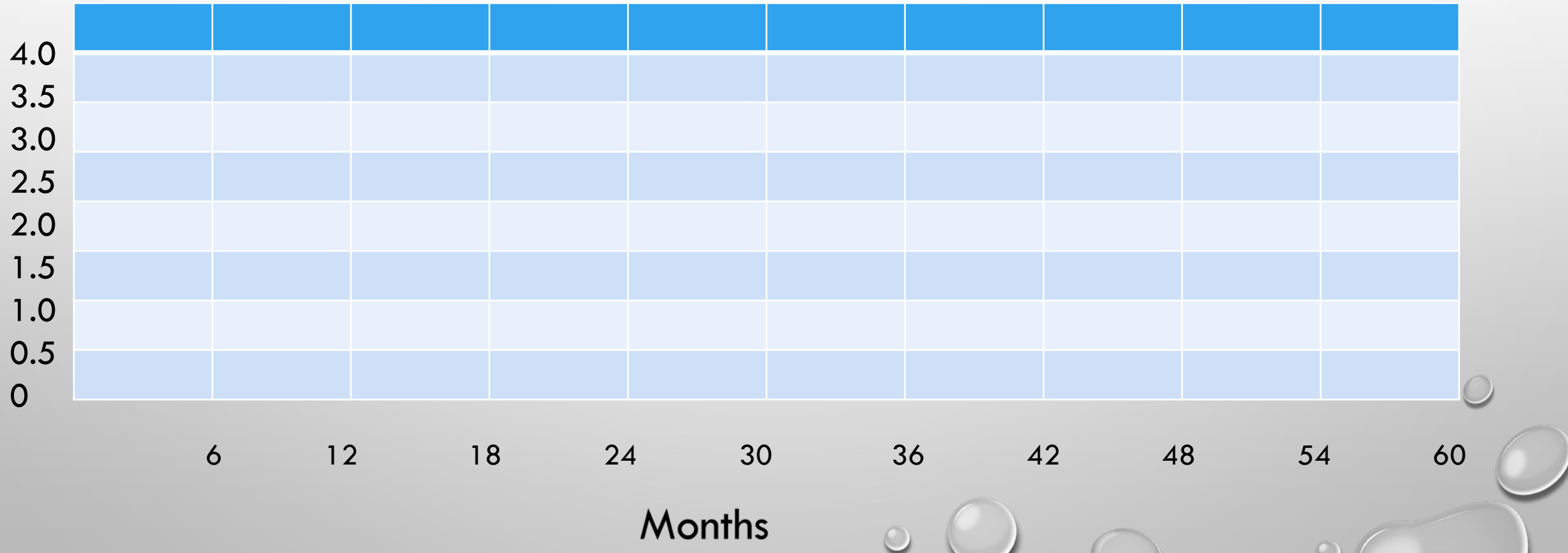
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐

Comments:

Not Yet Completed Level 1 ☐

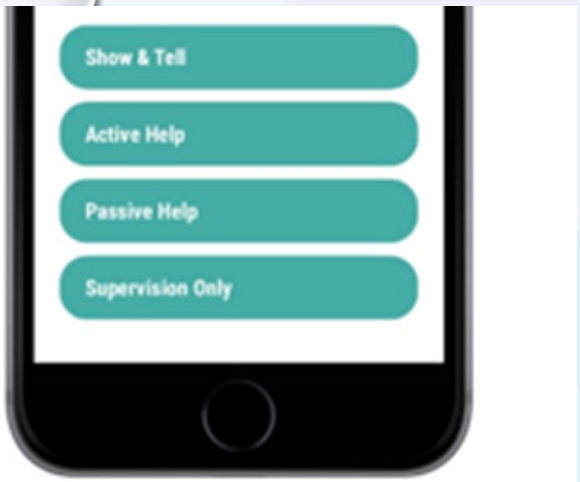
Not Yet Rotated ☐

LONGITUDINAL PC3 (INTRA-OPERATIVE PATIENT CARE-TECHNICAL SKILLS) MILESTONE



SIMPL AS TOOL TO MEASURE WBA

- PROCEDURE
- DIFFICULTLY- EASY/INTERMEDIATE/DIFFICULT
- PERFORMANCE- UNPREPARED/INEXPERIENCED/INTERMEDIATE/**PRACTICE READY**/EXCEPTIONAL
- AUTONOMY- SHOW AND TELL/ACTIVE HELP/PASSIVE HELP/SUPERVISION



SIMPL Autonomy measure?

Supervision

Passive

Active

Show& Tell

6 12 18 24 30 36 42 48 54 60

Months

Table 1

Descriptive Statistics for the Ottawa Surgical Competency Operating Room Evaluation (O-SCORE)*

A Single Item is Sufficient

Is a Single-Item Operative Performance Rating Sufficient?

CONCLUSIONS: Single-item operative performance measures produced ratings that were virtually identical to gold-standard scale ratings. Misclassifications occurred infrequently and were minor in magnitude. Ratings using the single-item scale: take less time to complete, should increase the sample of procedures rated, and encourage attending surgeons to complete ratings immediately after observing performances.

4.									
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completed for 163 observations. Min indicates

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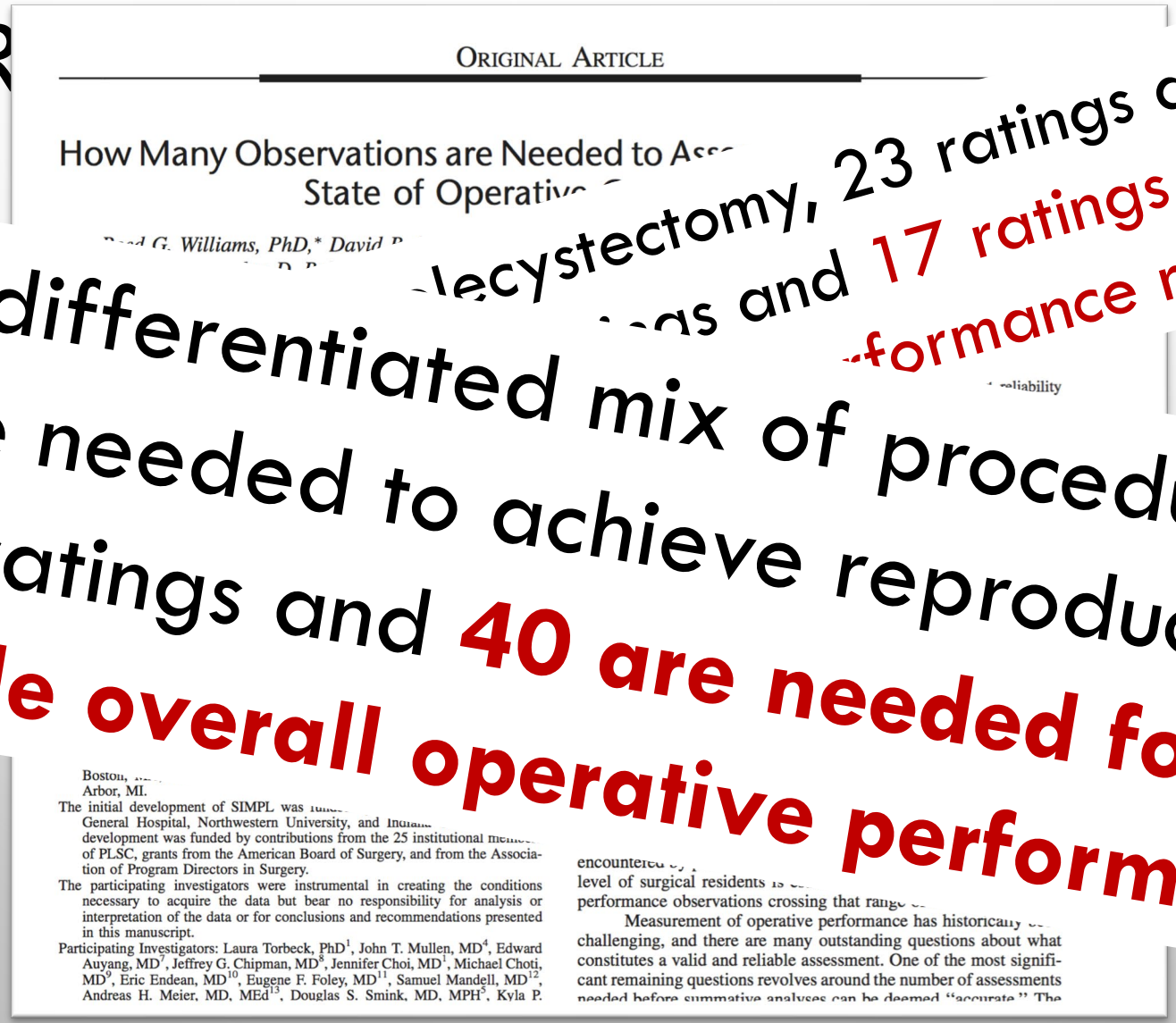
…AND RELIABLE ASSESSMENT



ORIGINAL ARTICLE

How Many Observations are Needed to Ass
State of Operativ

Boston, …
Arbor, MI.

The initial development of SIMPL was fu… General Hospital, Northwestern University, and Indiana… development was funded by contributions from the 25 institutional memb… of PLSC, grants from the American Board of Surgery, and from the Associa… tion of Program Directors in Surgery.

The participating investigators were instrumental in creating the conditions necessary to acquire the data but bear no responsibility for analysis or interpretation of the data or for conclusions and recommendations presented in this manuscript.

Participating Investigators: Laura Torbeck, PhD[1], John T. Mullen, MD[4], Edward Auyang, MD[7], Jeffrey G. Chipman, MD[8], Jennifer Choi, MD[1], Michael Choti, MD[9], Eric Endean, MD[10], Eugene F. Foley, MD[11], Samuel Mandell, MD[12], Andreas H. Meier, MD, MEd[13], Douglas S. Smink, MD, MPH[5], Kyla P.

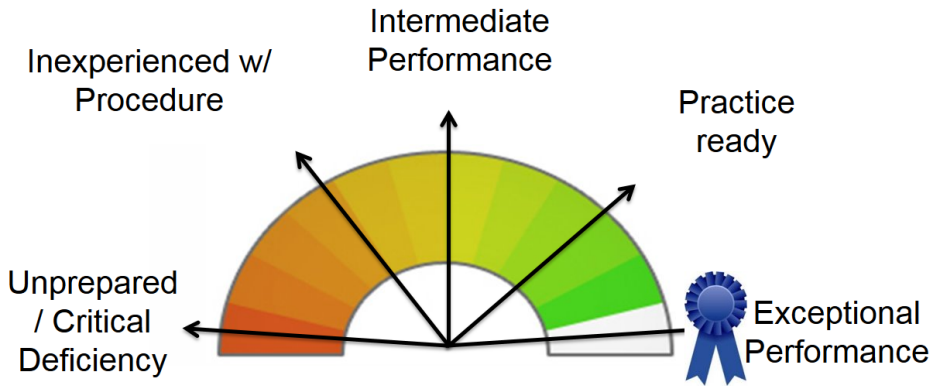
encountered … level of surgical residents … performance observations crossing that range …

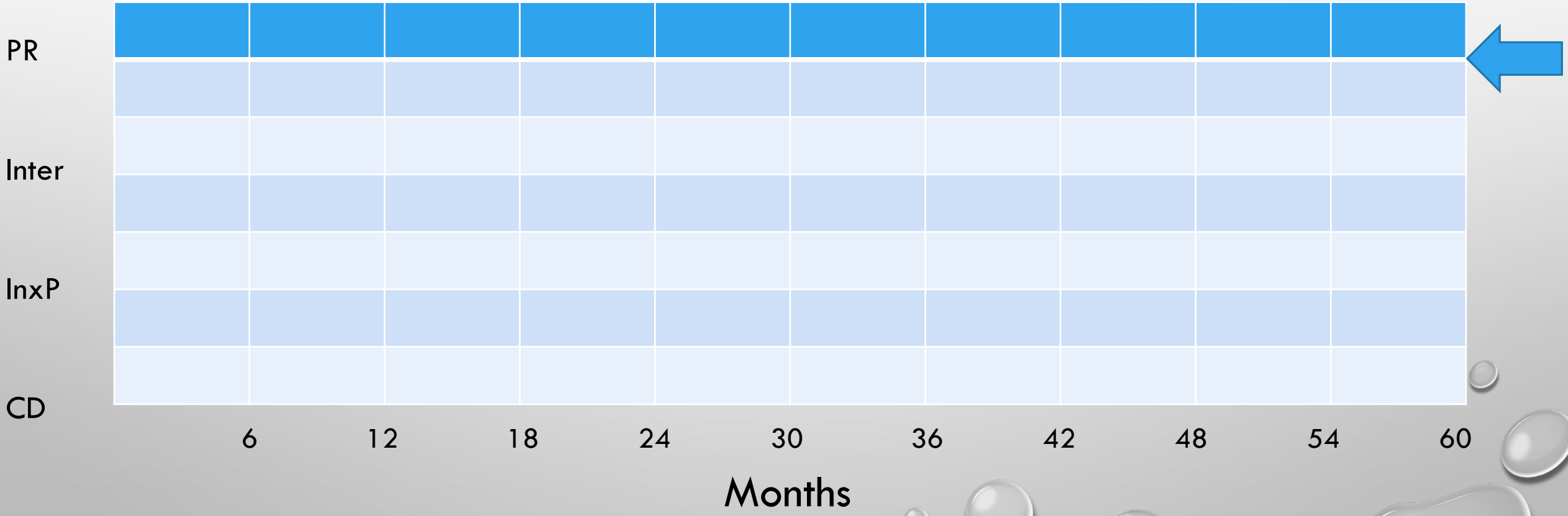
Measurement of operative performance has historically … challenging, and there are many outstanding questions about what constitutes a valid and reliable assessment. One of the most significant remaining questions revolves around the number of assessments needed before summative analyses can be deemed "accurate." The

…lecystectomy, 23 ratings are needed to …gs and 17 ratings are needed to …formance ratings.

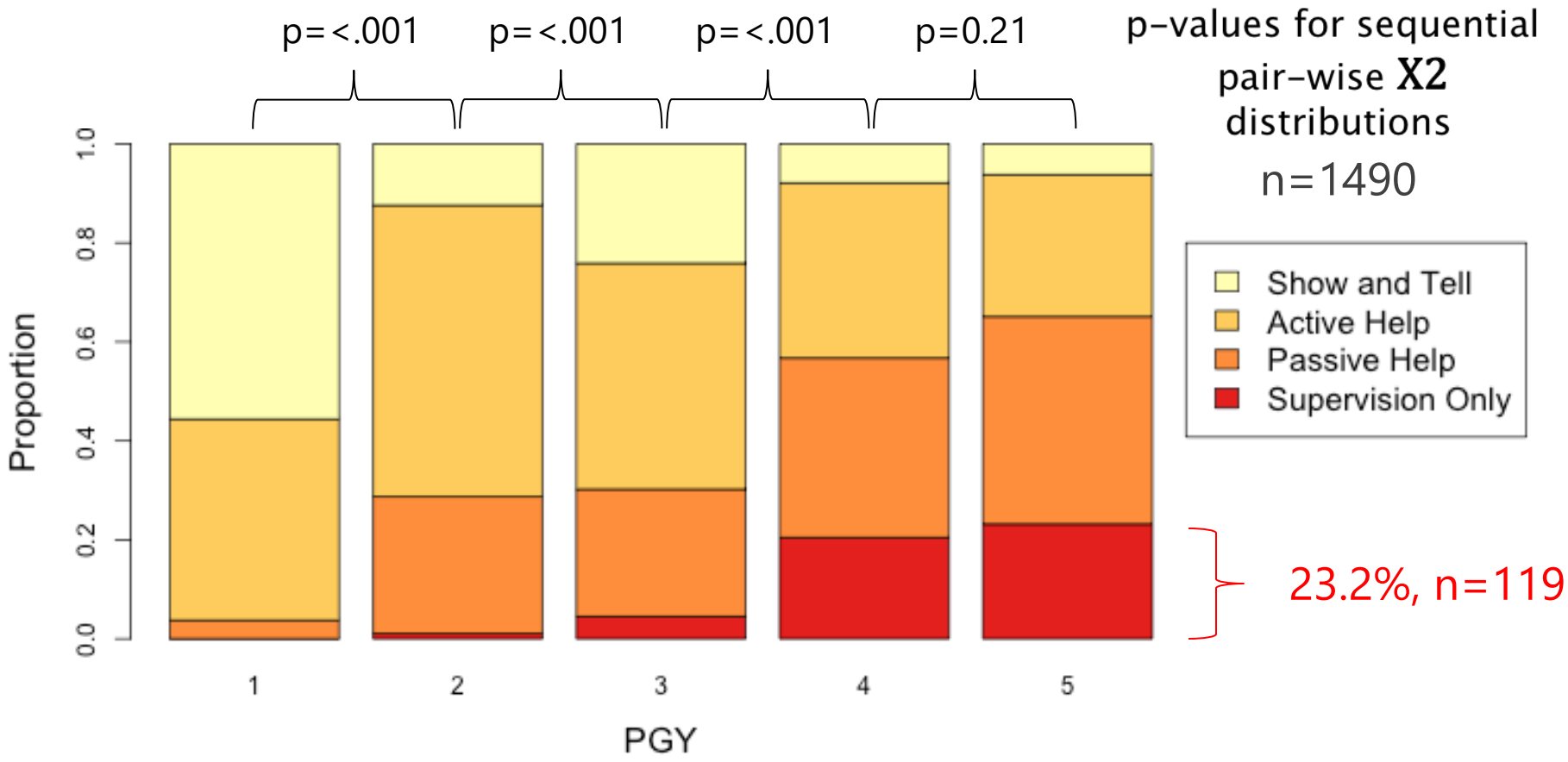
For the undifferentiated mix of procedures, 60 ratings are needed to achieve reproducible autonomy ratings and **40 are needed for reproducible overall operative performance ratings**

SIMPL PERFORMANCE SCALE





Results: Zwisch Levels by PGY

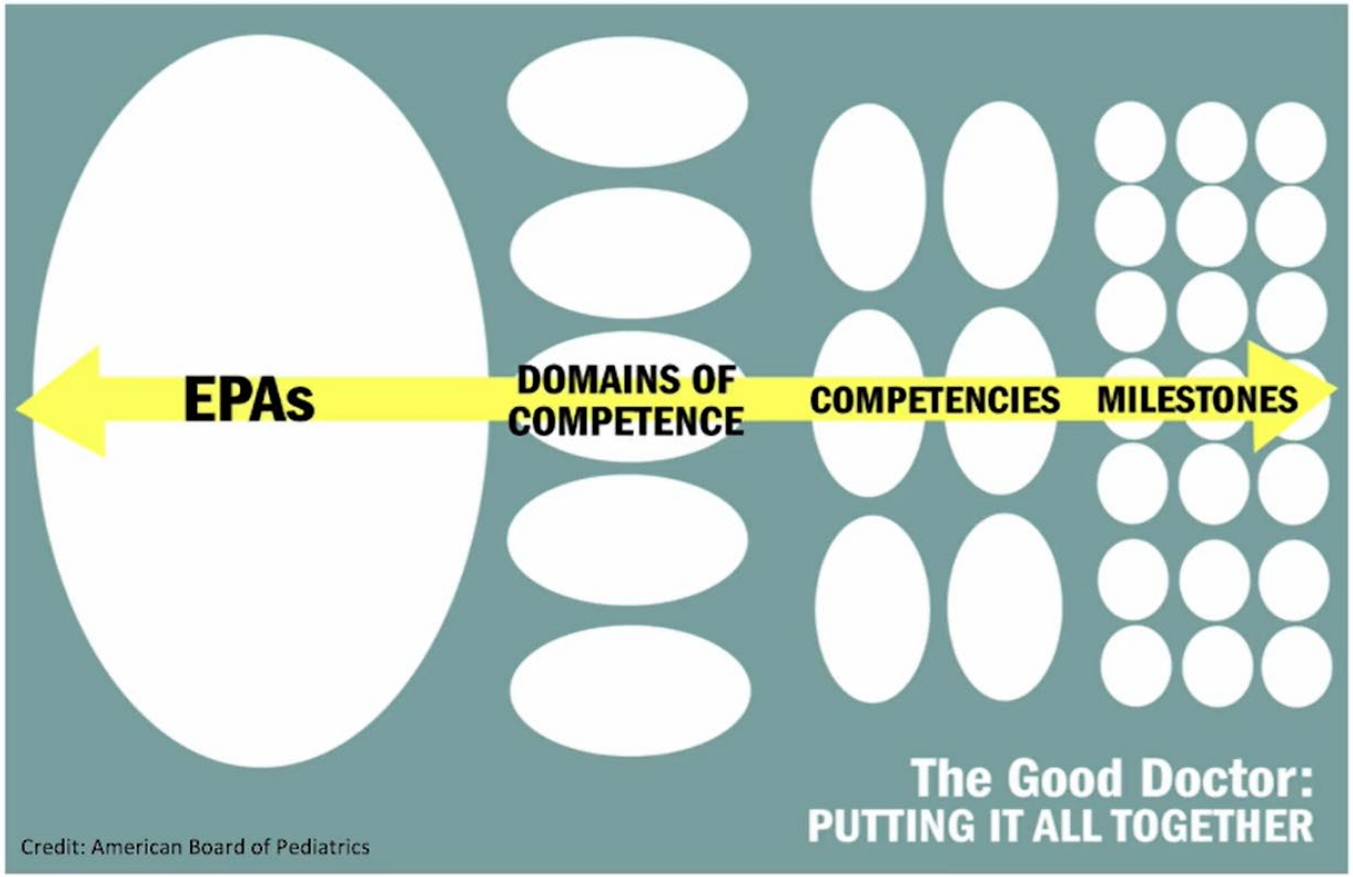


George et al 2014

Entrustable Professional Activities

- EPAs are units of work a physician performs that can be directly observed - things people do, such as evaluating and managing a patient experiencing a specific medical concern.
- Competencies are broad and foundational domains of ability, such as medical knowledge or interpersonal skills.
- Milestones are capabilities that describe progress at advancing levels of competence along the sequence from novice to expertise.
- Asuite of EPA’s for a specialty can define the core clinical activities resident should exhibit to be deemed competent

Integrating Competencies / Milestones / EPAs

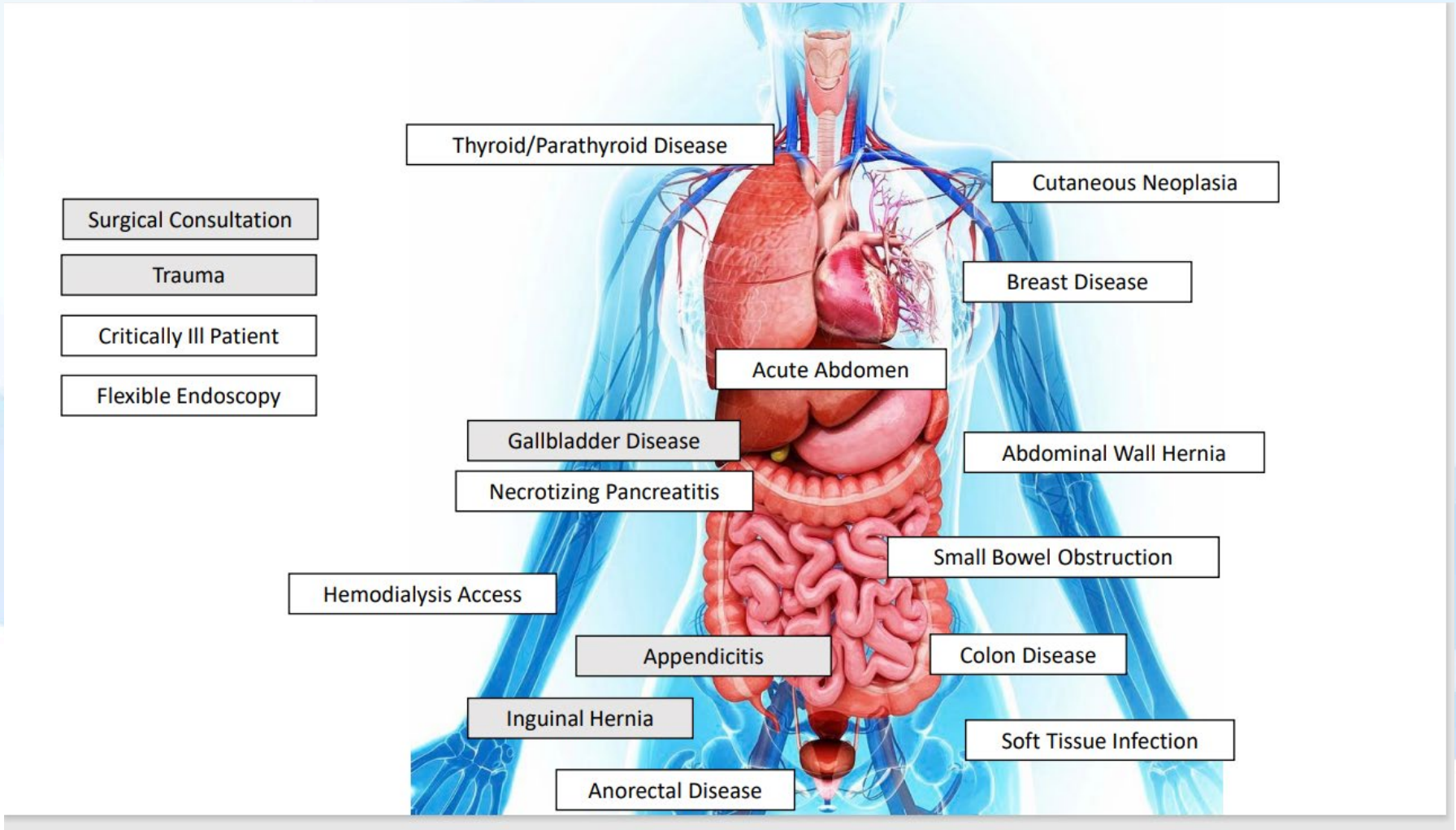


General Surgery EPAs

EPAs Chosen to Represent:

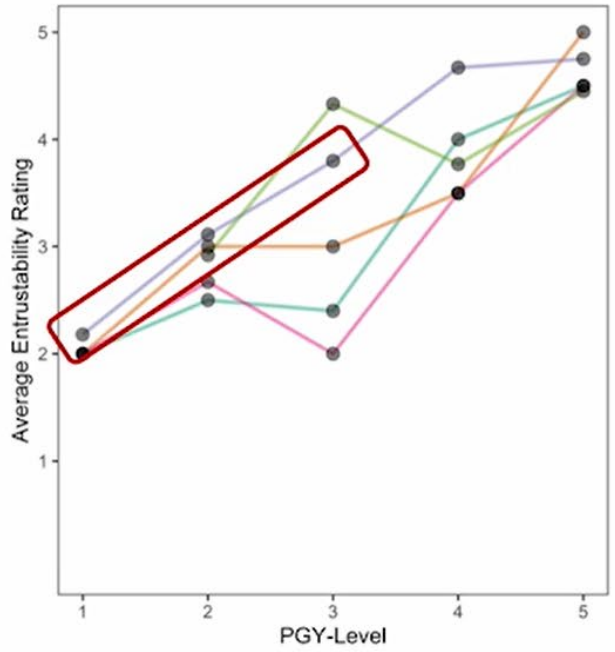
- Undeniable **core skills** of a general surgeon
- Common conditions
- Include other essential non-technical skills
  - Communication
  - Professionalism
- Management of the **entirety of the disease process**

General Surgery EPA's



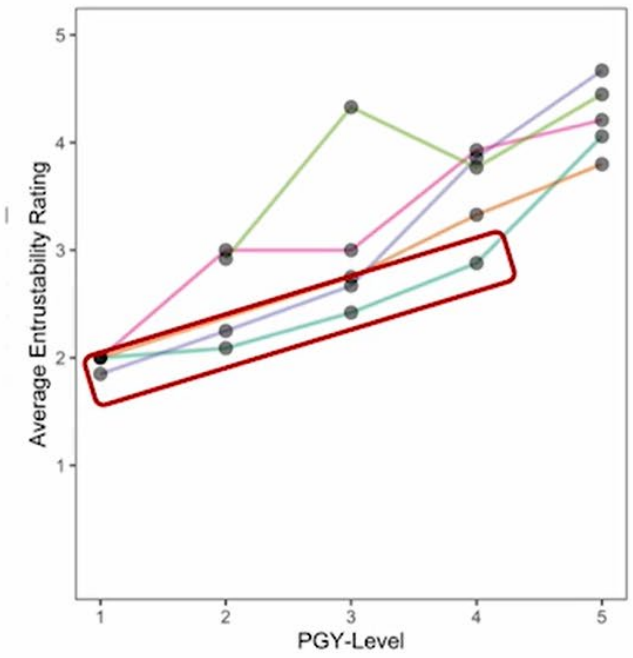
Average Entrustment by Phase and PGY Level

Figure 5. Average entrustment rating by PGY level (pre-operative)*



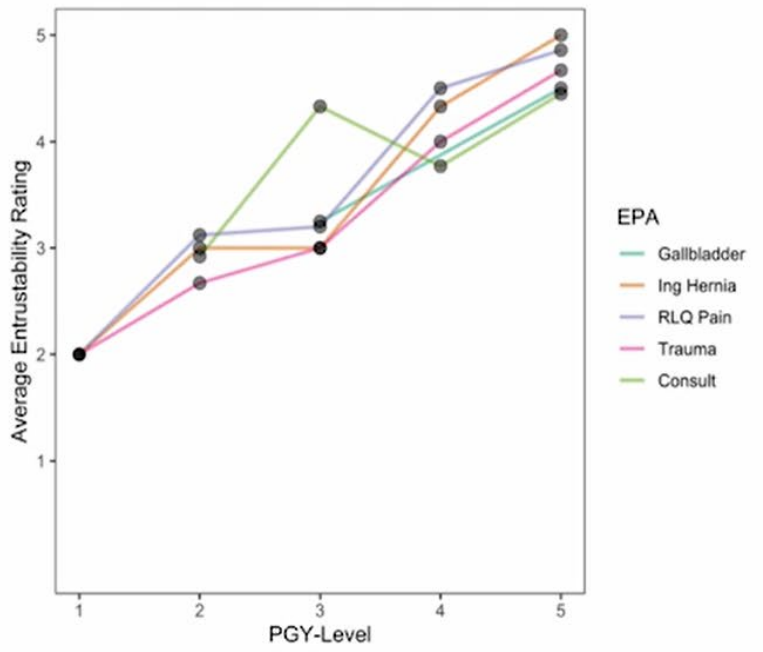
Pre

Figure 6. Average entrustment rating by PGY level (intra-operative)*



Intra

Figure 7. Average entrustment rating by PGY level (post-operative)*



Post

Evaluate and manage a patient with gallbladder disease

Intra-Operative Phase

Describes the anatomic structures and relationships in gallbladder (GB) surgery (eg, cystic duct, cystic artery, hepatocystic triangle) and identifies them with assistance in a routine case. (MK2 L1)

Describes basic steps of the operation and the critical view of safety. (MK2 L1)

Handles instruments safely but tentatively, demonstrates a lack of coordination between both hands, and is inefficient with suturing and knot-tying. (PC2 L1)

Articulates sharps safety, safe surgical energy use, and surgical field sterility. (PC2 L1)

Requires active instruction to move the operation forward. (PC3 L1)

Centers the operative field (anatomy and instruments) with the camera with frequent adjustments and reminders. (PC3 L1)

Coordinates hand movements for simple maneuvers, though inefficiently and with direct instruction. (PC3 L1)

Identifies variations in cystic duct and artery anatomy in a straightforward case; articulates implications for the operation. (MK2 L2)

Knows common positioning options but cannot name factors for one over another. (PC3 L2)

Smoothly performs basic maneuvers, such as suturing and knot-tying. (MK2 L2)

Provides a basic description of the operative plan; omits some steps. (PC3 L2)

Places subsequent laparoscopic trocars after initial entry, uses surgical energy safely, closes skin independently. (PC2 L2)

Demonstrates understanding of port site triangulation and safe entry into the abdomen, requiring guidance. (PC2 L2)

Places clips accurately with guidance. (PC3 L2)

Identifies plane of dissection (eg, to remove the GB from liver bed), requires redirection to maintain the optimal plane. (PC3 L2)

Usually demonstrates careful tissue handling and coordinated use of both hands. (PC3 L2)

Moves the operation forward, though sometimes requires direction. (PC3 L2)

Requires assistance to control bleeding or perform IOC. (PC3 L2)

Identifies variable cystic duct and artery anatomy despite inflammation or scarring, requires assistance to adapt the operative approach in response. (MK2 L3)

Performs lap chole with straightforward anatomy and minimal inflammation safely, including identifying the critical view of safety. (PC2 L2)

Performs IOC independently in a routine case. (PC2 L3)

Demonstrates careful tissue handling. Dissects cystic duct and artery efficiently, obtains critical view of safety, and places clips accurately in a routine case or with 1-2 challenges. (PC3 L3)

Moves fluidly through the operation; anticipates next steps and logistical needs and clearly communicates to the OR team. (PC3 L3)

Identifies plane of dissection (eg, to remove GB from the liver bed) accurately in a routine case. (PC3 L3)

Recognizes when deviation from the initial operative plan (eg, conversion to open or subtotal) is required. (PC3 L3)

Adapts to unexpected/variant anatomy in a complex cholecystectomy (eg, inflamed, shortened cystic duct), changing the operative approach (subtotal or dome-down). (MK2 L4; PC3 L4)

Functions as teaching assistant for a case with normal anatomy, recognizing when technical requirements necessitate them to take over. (PC2 L4)

Performs IOC safely in the presence of scarring and inflammation. (PC2 L4)

Adapts operative technique to tissue quality and case complexity. Identifies correct plane, dissects the cystic duct and artery, obtains critical view of safety in presence of scarring/inflammation. (PC3 L4)

Devises and implements a plan when deviation from the initial operative plan (eg, conversion to open or subtotal cholecystectomy) is required. (PC3 L4)

Implements early management steps, including calling for assistance, when a complication is identified. (PC3 L4)

Analyzes how choice of instruments will affect overall procedure cost. (SBP3 L3)

More Take Home Messages

- We need to move beyond gestalt/opinion in evaluating trainees
- The demands on a practicing physician are wide ranging and include frequent and infrequent tasks
- Competency can be measured
  - Simpler data collection facilitate buy in from faculty
  - **Simple 4 point-scale evaluation can generate powerful inclusions by many data points by multiple observers**
  - What you choose to measure remains key issue

QUESTIONS?