Metrics for Improved Procedural Outcomes

Michael T. Brannick

ACS-AEI Postgraduate Course

September 2014
2 Kinds of Knowledge

**Declarative**
- Knowledge of *what*
- What is a scalpel (what’s its use? Pick from collection.)
- Train by *explanation*, demonstration.
- Errors of fact and conception.
- Test by multiple choice, short answer, fill in the blank

**Procedural**
- Knowledge of *how*
- How to use a scalpel to make an incision safely
- Train by demonstration, *practice* of task.
- Errors of sequence and execution.
- Test by demonstration - examine proficiency under given condition(s)
**Tasks & Task Analysis**

- What are the main functions or duties?
- What steps are required to accomplish the main functions or duties?
- What task experience do trainees already have?

**KSAs (Competencies)**

- What must the person know to successfully complete steps?
- What capacities (e.g., persistence, motor skills) must the person have to successfully complete steps?
- What do they know before they get to training?
1. General instruction to trainee
2. Trainee attempts task
3. Feedback* to trainee on task performance
4. Repeat steps 2 and 3 until mastery or futility.

*Feedback should be based on task performance and useful for behavioral improvement.
Role of Metrics

- Provide feedback to trainee
  - Areas of strength
  - Opportunities for growth
- Document skills
  - Skill development/improvement
  - Skill mastery or level attainment
- Provide feedback to instructor
  - Course design
  - Individual instruction/attention
Increasing Objectivity of Judgments

- Global ratings – behavioral descriptions
- Checklist approach
  - Define behavior specifically enough that everyone agrees (e.g., peg cannot fall out of view)
- Judgment analysis
  - Passing scores for OSCE (based on checklist)
  - How do judges decide novice to expert in tissue handling?
Some Examples at CAMLS

- Neuro-endoscopic surgery
- Robotic surgery - FRS
- Nursing post-op scenario & metrics
  - (TLH – Dr. Hart)
  - (FLS)
- A variety of measures
- Based on task analysis
- Metrics organized by KSA or by task
- Illustration of the process for developing training incorporating metrics
- Evaluation of the measures is a work in progress – will share some issues
1. Neuro-endovascular

- Coiling is a task without much literature
- Used to keep blood vessel from bursting in the brain
  - Find the aneurism
  - Gain access
  - Travel to the site
  - Determine the best approach to fix it
    - stent needed?
    - What kind of coil?
  - Fill the aneurism with metal
  - Exit
• Simulator for practice
  o Engineering measures? (e.g., time to complete)
  o Expert measures? (e.g., GOALS)
  o Crowd source? (some kind of judgment)
• Desirable qualities
  o Reliable (consistent over time and judges)
  o Valid (task related, proficiency related)
  o Assessment could be used in practice
• **Learning objectives (behavioral definitions related to performance)**

  o Correctly chooses between procedures for (a) aneurysms which can be coiled directly and (b) wide-neck aneurysms, which require stent-assisted coil occlusion or balloon-remodeling to prevent coil prolapse

  o Selects appropriate coil sizes by examining angiograms for vessel diameter, aneurysm dome, and neck size in order to prevent possible coil migration

  o Selectively catheterizes the lesion in preparation for coil introduction

  o Advances the coil slowly and smoothly under fluoroscopy into the lesion without rotation of the delivery wire
<table>
<thead>
<tr>
<th>Partial Evaluation List</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Checklist items e.g., avoids ‘coin stacking’ plus global scales</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Overall Coiling Quality</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well below acceptable standard and likely to fail</td>
<td>Borderline</td>
<td>Deficiencies but would probably function adequately</td>
<td>Good</td>
<td>Clearly superior with no flaws and likely to function well</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Procedural Knowledge</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requires specific instruction for most steps and sequencing</td>
<td>Demonstrates knowledge of all <em>important</em> steps and sequencing</td>
<td></td>
<td></td>
<td>Demonstrates familiarity with all steps and sequencing</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge of Instruments</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequently selects inappropriate instruments (e.g., size, stiffness, or shape of guidewire) or combinations of guidewires, catheters, and coils</td>
<td>Makes occasional mistakes when selecting proper instruments (e.g., size, stiffness, or shape of guidewire) and combining guidewires, catheters, and coils.</td>
<td></td>
<td></td>
<td>Obviously proficient when selecting individual instruments (e.g., size, stiffness, or shape of guidewire) and combining guidewires, catheters, and coils.</td>
<td></td>
</tr>
</tbody>
</table>
• Can people use the scales reliably?
• Can people distinguish between novice and expert videos?
• 4:30-5:12; 6:00-7:15;
  https://usfcas.az1.qualtrics.com/SE/?SID=SV_2tur1bZgQd7GLwV
2. Robotic Surgery Team Skills

- Fundamentals of Robotic Surgery (FRS)
- Development and validation are occurring now
- Has both training and evaluation components
  - Cognitive, Perceptual/motor, and Behavioral/Teamwork
Teamwork Assessment

- TeamSTEPPS dimensions
  - Leadership
  - Communication
  - Mutual Support
  - Situational Monitoring

- Surgeon can be assessed on these through simulation
- Team of confederates to play roles in scenario
- Scenario incorporates the robot
## FRS Teamwork Assessment

<table>
<thead>
<tr>
<th></th>
<th>Leadership</th>
<th>Situational Monitoring</th>
<th>Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brief</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introductions – everyone is named</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>States expectations for the case</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asks if needle is out</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Asks for specific tool and arm</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
• Video – shows examples of targeted behaviors (3:00-6:30)

• Instrument swap

• Mistaken tool

• Suture

• Teamwork behavior

• Shows request of specific arm and instrument, closed loop

• Shows civil correction

• Shows specific suture, handoff and communication
Teamwork Assessment Issues

- Checklist rather than rating
- Proficiency mark: What is an expert in teamwork?
3. Training for Nurses – process illustration

- Screen Shots to illustrate development of course – postop appendectomy
- Learning objectives
- Background
- Technical information
- Metrics
Simulation Learning Objectives:

1. Perform complete head-to-toe assessment with a focused assessment relative to abdominal surgery
2. Assess for pain level and determine proper interventions
3. Identify process for tracking patient allergies identified via patient medication administration record
4. Recognize post-operative complications caused from abdominal surgery
5. Interpret appropriate symptoms of infection
6. Identify the consequences of abdominal pain (i.e., respiratory compromise)
7. Teach on the importance of non-pharmaceutical interventions post-surgery (i.e., Incentive Spirometry, TCDB, splinting and early ambulation)
# Background - Case

## General Scenario Data

### Simulation Information
- **Course Type:** Non-CME
- **Residency Yr. (PGY):** Not Applicable
- **Specialty:** Nursing
- **Medical/Nursing Students Yr.:** Nursing
- **Nurses:** RN

### Scenario Information
- **Scenario Name:** Postop Appendectomy
- **Scheduled Date:** September 22 & 23, 2014
- **Simulator:** X HPS  □ SP  □ Hybrid (HPS & SP)

### Patient Information
- **Patient Last Name:** Flying Dove
- **Patient First Name:** Aiyana
- **Height:** 153.9 cm  **Weight:** 93.7 kg
- **Gender:** F  **Marital Status:** Married  **Age:** 59  **DOB:** 07/01/1960
- **Religion:** Spiritualism  **Race:** Native American

### Scenario Presentation
- **Day Two (2) of a postoperative emergent open appendectomy.**
- **Chief Complaint:** Abdominal pain with resultant appendectomy
- **Social Habits/History:** Married, works at a florist
- **Diet:** Regular
- **PMH:** Depression, constipation, postmenopausal (on Premarin), HTN
- **Surgery:** C-section x 2
- **Current Medications:** D5NS 100/hr, Lopperor, MVI, Colace, Lexapro
- **Allergies:** Morphine causes rash and pruritus
**Background - Team**

**Roles:**

- **Primary RN:** same as the "team leader"
- **Nurse Tech:** (goes in with the Primary RN to take vitals as part of the initial assessment). Takes direction from RN roles.
- **Secondary RN/Communicator:** Assists as directed by team lead and suggests in the team lead struggles. Pages doctor if asked, and interacts with patient’s family members, etc.
- **Recorder**
- **Family member:** asks a lot of questions like “What’s going on? Is he going to die? Where is the doctor? Get the doctor here now!” Instruct them to stand next to the bed so the learners learn to provide family centered patient care.
Instructor Information:

Identify the team leader for this scenario and evaluate them using the checklist and the global rating scale. If you are unclear as to the categories, refer to the accompanying anchor guide to assist you with your evaluation. Provide information to the Simulation Technician as to the specific simulator changes needed based on the learners’ behaviors.

Give learners the scenario presentation information as if you are the patient’s current RN giving shift report to on coming RN.

Give “report” away from the other learners except the Nurse Tech, family member and the team leader, so that they will not have prior knowledge about the patient until they are called into the room when the primary RN (team lead) needs help.

The learners playing the roles of Nurse Tech, and family member may listen into the report. The simulation may still need to be utilized in this manner to build critical information for role
# Moulage Instructions:

<table>
<thead>
<tr>
<th>Green drainage for abdominal wound</th>
<th>Serosanguineous drainage for abdominal wound</th>
<th>JP Drain with trace serous/Serosanguineous drainage (preferably cells settling)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thigh high TED hose bilaterally</td>
<td>SCD’s</td>
<td>Morphine allergy band</td>
</tr>
</tbody>
</table>

## Required Equipment:

<table>
<thead>
<tr>
<th>Simulator Mannequin</th>
<th>Morphine 2mg/2mL vial</th>
<th>Abdominal distension</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABD pads, gauze, paper tape</td>
<td>Cardiac monitor</td>
<td>IV D5NS at 100ml/hr</td>
</tr>
<tr>
<td>2 Percocet tabs 5mg/325mg each</td>
<td>IV pump, 1 channel</td>
<td></td>
</tr>
<tr>
<td>Zofran 4mg/2mL vial</td>
<td>Stethoscope</td>
<td>Fentanyl 100mcg/2mL</td>
</tr>
</tbody>
</table>
### Chart data

**Patient’s Name:** Flying Dove, Aiyana  
**Patient#:** 12345  
**DOB:** 07/01/1960

**Allergies:** Morphine causes rash and pruritus

**Admit To:** Center for Advanced Medicine and Learning Simulation

**Nursing Facility Attending Physician:** Joe D. Camls

**Admission Diagnosis:** Abdominal pain and fever

**Previous Medical History:** Depression, constipation, postmenopausal (on Premarin), HTN Surgery: C-section x 2

**Home Medications:** D5NS 100/hr, Lopressor, MVI, Colace, Lexapro

---

### Routine Medications (state diagnosis or rationale)

**Oxygen:**

- [ ] Room air
- [ ] NC 
- [ ] LPM
- [ ] VM 
- [ ] NRB

**Titrate for saturation:** [ ] %

Call MD if Saturation is below [ ] %, or O₂ requirements greater than [ ]

<table>
<thead>
<tr>
<th>RX Name</th>
<th>Dosage</th>
<th>Route</th>
<th>Frequency</th>
<th>Diagnosis/Rationale for Drug</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colace</td>
<td>100mg</td>
<td>PO</td>
<td>Daily</td>
<td>constipation</td>
</tr>
<tr>
<td>Lexapro</td>
<td>10mg</td>
<td>PO</td>
<td>Daily</td>
<td>Depression</td>
</tr>
</tbody>
</table>

---

©2014 University of South Florida, Center for Advanced Medical Learning and Simulation. All Rights Reserved.
# Flow – case progression

## Case Progression

<table>
<thead>
<tr>
<th>Patient Status</th>
<th>Learner Action Desired</th>
<th>Sim. Operator Instructions &amp; Triggers</th>
</tr>
</thead>
</table>
| **General appearance:** Patient appears uncomfortable, grimacing with every movement in the bed. No acute distress | The learner is expected to:  
✓ Properly assess the patient for pain and anxiety  
✓ Educate the patient on non-pharmacological actions that will assist in minimizing post-operative pain  
✓ Evaluate respiratory status and identify a vital sign change(s) that may indicate pain or post-operative complications | **Monitor:** HR SR 99, RR 22, BP 139/79, pOx 94%  
2LNC, T 35.6°C  
**Patient:** The patient appears uncomfortable, grimacing as she moves around in the bed.  
The learner should eventually complete the assessment and determine an order for pain medication is necessary.  
Also, learners should observe green drainage on abdomen, and the physician should be notified with findings. *A fresh set of vital signs should be taken PRIOR to calling.* |
| **Neuro:** A0x4. Her pupils are equal, round, and reactive to light and accommodation, 3mm with brisk reaction. Moderate nausea. Pain 5/10 in abdomen accentuated when taking deep breaths or repositioning in bed |  |  |
| **HEENT:** Normocephalic. Atraumatic, unremarkable |  |  |
Flow chart – event embedding

Initial Stage

Monitor
T: 35.6°
HR: 99
RR: 22
BP: 139/79
pOx: 94% 2LNC

- General appearance: Patient appears uncomfortable, grimacing with every movement in the bed. No acute distress
- Neuro: A0x4. Her pupils are equal, round, and reactive to light and accommodation, 3mm with brisk reaction. Moderate nausea. Pain 5/10 in abdomen accentuated when taking deep breaths or repositioning in bed
- HEENT: Normocephalic. Atraumatic, unremarkable
- Neck: Supple with no jugular vein distension
- Lungs: Diminished bases, incentive Spirometry at bedside. Snowing between 800 and 1000 ml with respirations slightly shallow
- CV: Regular rate and rhythm. No murmurs, rubs, or gallops. Pulses equal bilaterally x4 extremities. PMI non-displaced.
- ABD: Distended, tender, dressing with small amount of pink tinged serous drainage, JP drain in place with traces of thin pink drainage
- Rectal: Deferred
- Ext: 2+ edema bilaterally upper and lower extremities, mild periorbital edema
- Skin: WDI, ted hose bilaterally, SCD

Stage One

Doctor is contacted and orders for medication provided

Learner exhibits pain

At 4 minute mark, SaO2 drops 2% immediately.

Patient goes into Respiratory Arrest; the HR is V-Tach at 190. End Scenario

Allergy to Morphine recognized?

Rx order changed to Fentanyl, VS changes to: RR 17, HR 88, pOx 95%
Doctor orders:

**IMPORTANT NOTE:** MD orders a medication that pt is allergic to.

- Zofran 4mg iv q6h prn nausea
- Percocet 1-2 tabs po q6h prn pain 1-4
- **Morphine** 1-2 mg IV q2h prn Pain 5 or greater
- O2 titrate for SaO2 of 92 or greater

**Trigger:** If the Morphine is given, patient goes into Respiratory Arrest; the HR is V-Tach at 190.
Debriefing

Guided Reflections for this Simulation

1. How did you feel throughout the simulation experience?
2. Describe the objectives you were able to achieve?
3. Which ones were you unable to achieve (if any)?
4. Did you have the knowledge and skills to meet objectives?
5. Were you satisfied with your ability to work through the simulation?
6. To Observer: Could the nurses have handled any aspects of the simulation differently?
7. If you were able to do this again, how could you have handled the situation differently?
8. What did the group do well?
9. What did the team feel was the primary nursing diagnosis?
References, Evidence-Based Practice Guidelines, & Protocols Used for this Evaluation:

- The Joint Commission Accreditation Hospital: 2014 Hospital National Patient Safety Goals
- U.S. Department of Health & Human Services:
  - Centers for Disease Control and Prevention
  - TeamSTEPPS®, Agency for Healthcare Research and Quality
- American Association of Critical-Care Nurses
  - Scope and Standards for Acute and Critical Care Nursing Practice
  - Standards for Establishing and Sustaining Healthy Work Environments: A Journey to Excellence
  - Scope and Standards for Acute Care Clinical Nurse Specialist Practice
  - Essentials of Critical Care Orientation (ECCO)
- American Nurses Association: Code of Ethics for Nurses
- American Association of Colleges of Nursing: BSN Essentials
- Society for Critical Care Medicine: Fundamental for Critical Care Support (FCCS course for ICU)
- National League for Nursing
- The International Nursing Association for Clinical Simulation & Learning
- Society for Simulation in Healthcare

©2014 University of South Florida, Center for Advanced Medical Learning and Simulation. All Rights Reserved.
# Post-Op Appendectomy - Performance Checklist

<table>
<thead>
<tr>
<th>Date: __________________________</th>
<th>Evaluator’s Name: ____________________________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start Time: ____________________</td>
<td>Room Number: ___________________________________________________</td>
</tr>
</tbody>
</table>

Roles: Please print first and last name of each of the learners.

- **Primary Nurse** (Team Lead’s): ___________________________________________
- **Nurse Tech**: ___________________________________________________________
- **Secondary RN / Communicator**: ___________________________________________
- **Recorder**: ___________________________________________________________________
- **Family Member**: _________________________________________________________
- **Other**: ___________________________________________________________________

Select Yes, No, or Not Applicable for each of the following statements: The learner/s...

- **completed** all the steps:                                               | **met the objectives:**                           |
  - Yes □ No □ NA □                                                       | Yes □ No □                                      |
- **identified** the patient correctly:                                     | **utilized TeamSTEPPS© communication:**          |
  - Yes □ No □ NA □                                                       | Yes □ No □ NA □                                 |
- **used medications safely:**                                              | **ensured patient safety was maintained:**       |
  - Yes □ No □ NA □                                                       | Yes □ No □ NA □                                 |
- **implemented** initiatives to prevent infections (universal protocol, utilizes aseptic techniques, proper isolation): | **performed** a focused head-to-toe assessment with emphasis on disease process: |
  - Yes □ No □ NA □                                                       | Yes □ No □ NA □                                 |
- **implemented** patient/family centered care (HCAHPHS):                   | **responded** to alarms appropriately:           |
  - Yes □ No □ NA □                                                       | Yes □ No □ NA □                                 |
- **prioritized** care efficiently:                                         | **responded** to changes in patient status appropriately: |
  - Yes □ No □ NA □                                                       | Yes □ No □ NA □                                 |
### Performance Checklist: Postop Appendectomy

<table>
<thead>
<tr>
<th>#</th>
<th>Checklist</th>
<th>Successfully Completed</th>
<th>Needs Improvement</th>
<th>Failed to Perform</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td><strong>Stage One: Initial Assessment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Properly assess the patient for pain and anxiety</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Educate the patient on non-pharmacological actions that will assist in minimizing post-operative pain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Evaluate respiratory status and identify a vital sign change(s) that may indicate pain or post-operative complications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Become familiar with post-operative appendectomy complications, expected wound assessment findings, and any abnormal findings</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Global Performance Evaluation Anchor Guide

<table>
<thead>
<tr>
<th>Key Element</th>
<th>1 - Unsatisfactory</th>
<th>2 - Needs Development</th>
<th>3 - Meets Expectations</th>
<th>4 - Exceeds Expectations</th>
<th>5 - Greatly Exceeds Expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Critical Decision Making</strong></td>
<td>Learner is unable to make swift decisions or lacks the confidence to be properly assertive in a medical environment possibly to the detriment of a patient. Decisions that are made are poorly thought out or are illogical. Fails to access proper resources in a set time frame during a life-threatening situation.</td>
<td>❯❯ ◀◀</td>
<td>Learner applies general decision-making skills to patient processes, reaching conclusions in a logical manner. The possible outcomes are weighted in order to reach a determinant course of action. Teamwork, medical databases and set standards is to solve problems. Considered an asset to the healthcare process.</td>
<td>❯❯ ◀◀</td>
<td>Learner is able to quickly and effectively examine circumstances deriving the most appropriate decision for a positive patient outcome. Through the use of ever-improving efficiencies, the learner gains confidence to operate safely and autonomously in achieving optimal patient outcomes. Functions as a role model to their peers.</td>
</tr>
<tr>
<td><strong>B. Task Management &amp;</strong></td>
<td>Learner is unorganized or uncoordinated with responsibilities that negatively impacts patient outcomes. Often there is a need for repetition or assistance to meet goals. The learner is reactive to...</td>
<td>❯❯ ◀◀</td>
<td>Learner satisfactorily prioritizes tasks to improve patient outcomes and clusters work to minimize repetitive actions. This learner tries to be proactive and performs the processes well enough to...</td>
<td>❯❯ ◀◀</td>
<td>Learner excels at organizing tasks, multitasking and prioritizing responsibilities to be improving efficiencies. This includes utilization of effective time management methods. Demonstrates a clear...</td>
</tr>
<tr>
<td>#</td>
<td>Competency</td>
<td>1 - Unsatisfactory</td>
<td>2 - Needs Development</td>
<td>3 - Meets Expectations</td>
<td>4 - Exceeds Expectations</td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------------------------------------</td>
<td>--------------------</td>
<td>-----------------------</td>
<td>------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>A</td>
<td>Critical Decision Making</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Anticipation, planning, and assessment of available resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Continuous reevaluation of the situation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Ask questions, gathers information before making decisions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Evaluates the effectiveness of their actions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Interpreting data</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Makes sound decisions based on recognition of relevant patient data</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Task Management &amp; Efficiency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Flexibility and responding to change</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Handling multiple tasks and prioritizing of tasks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Copes with disruptions and distractions</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Delegates tasks/assignments within the scope of practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Nausea led to vomiting
- Did not monitor & notice it in the
- Slow to protect body
- Anyway was not protected & multiple episodes of vomiting
Information on Trainees (average by time)
Summary

- Current metrics are based on task analysis
- Organized by competency (KSA) or task
- Can be oriented either to individuals or teams
- Ongoing studies of reliability and validity

• Showed examples from neuro-endo, robotic surgery, post-op nursing
• Feedback to Individuals
• Proficiency indicators
• Curriculum revision
• THANKS for your attention!