Supplemental Digital Appendix 1—End-of-rotation evaluation (pg. 1-3) Supplemental Digital Appendix 2—SIMPL questions for intraoperative performance and autonomy (pg. 4) Supplemental Digital Appendix 3—Random effects data (pg. 5)

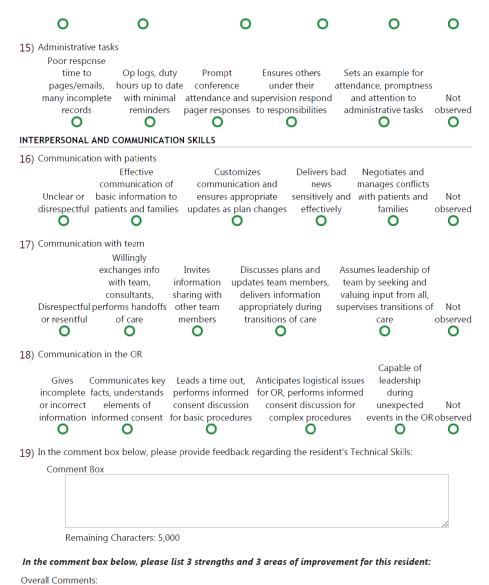
Supplemental Digital Appendix 1

End-of-rotation Evaluation Used for Assessing Surgical Residents at Northwestern University Feinberg School of Medicine, 2015-16

Resident Evaluation		
[Subject Name] [Subject Status] [Evaluation Dates] [Subject Rotation]	Evaluator [Evaluator Name] [Evaluator Status]	
PATIENT CARE		
Diagnosis Operation Unable Performs a focused, Accurate to efficient and accurate Accurately diagnoses perform H+P of all patients many common main the second sec	rately diagnoses Recognizes and initiates <u>atypical</u> anagement for <u>presentations</u> of a <u>tost</u> common large number of Not conditions conditions observe	
manage with a senior post op problems and co common post resident <u>physically</u> with a senior op	Supervises junior ges common residents managing omplex post common and complex problems postoperative Not <u>pendently</u> problems observe O O O	
(e.g. knot tying, (e.g. knot tying, developing instrum NG tube, foley, NG tube, foley, instrument and	ent at most Proficiency in use of ent handling all instruments and exhibits equipment for Not cal efficiency essential operations observe	
most operative most common most common m	ssive help for Supervision only for ost common most common Not operations operations observe O O O	
knowledge symptoms and recognizes variations know expected of a treatment of some in presentation of medical common many common co	nificant Comprehensive wledge of knowledge of common many conditions and basic ommon knowledge of advanced Not nditions conditions observe	
6) Knowledge about operations Basic Basic knowledge of Significant kno Does not knowledge of steps and <u>most</u> com know steps steps of <u>some</u> perioperative care operations of common common for <u>many</u> common knowledge of operations operations complex operations	imon knowledge of common , basic operations, basic of <u>some</u> knowledge of <u>many</u> Not	
operations operations operations complex operations	erations complex operations obse	

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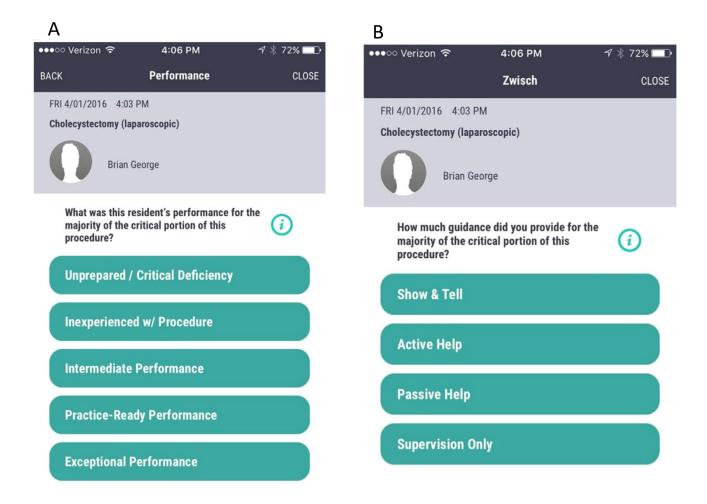
```
Discharge Planning
         No
                      Lists
                                Knows how to access
    knowledge of
                   resources
                                 resources including
                                                        Efficiently arranges
                                                                            Coordinates activities
    steps required available (e.g.
                                 complex ones (e.g.
                                                       disposition planning
                                                                             of residents, nurses,
                                                      including preparing all
                                    home TPN or
                                                                                                    Not
       for safe
                   social work.
                                                                               etc. to optimize
      discharge
                     OT, PT)
                                     antibiotics)
                                                        necessary materials
                                                                              discharge planning observed
                                                                                                     0
         Ο
                       О
                                         О
                                                                О
                                                                                      О
8) Health systems
         No
                    Knows how health
                                           Understands how
                                                                                 Participates in QI
    understanding
                   systems operate and
                                         local hospital works Makes suggestions
                                                                                   project and
    of health care
                   recognizes systems
                                         and follows protocols for changes and
                                                                                    develops
       delivery
                  component to medical and guidelines for
                                                              reports problems
                                                                                   protocols to
                                                                                                    Not
       systems
                          errors
                                                 care
                                                               with technology
                                                                                   improve care
                                                                                                 observed
                            О
                                                  0
          О
                                                                      О
                                                                                        О
                                                                                                     О
PRACTICE-BASED LEARNING
9) Teaching
                                                       Effective teaching when
                                                                                   Recognizes
     Ignores Teaches willinglyCommunicates accurately
                                                           responsible for
                                                                                   teachable
    or abuses and uses media and effectively to learners
                                                        conference or formal
                                                                                  moments and
                                                                                                    Not
    students appropriately
                                and at conferences
                                                             presentation
                                                                                 engages learner observed
       O
                    О
                                                                 О
                                                                                       О
                                                                                                     О
                                         О
10) Self-directed learning
                                Independently uses
                                                       Looks for patterns in
                                                                                  Leads skills
    No self- Participates in
                                literature to answer
                                                       patient care and uses
                                                                                experiences and
    directed conferences and
                               questions related to
                                                      literature to understand
                                                                                conferences for
                                                                                                    Not
    learning learning activities
                                     patients
                                                              them
                                                                                junior learners
                                                                                                 observed
                                                                О
                                                                                                     0
       0
                    С
                                        О
                                                                                      О
11) Personal learning plan
     Unaware of
                   Identifies weaknesses in Develops learning Independently Develops process to
       gaps in
                      knowledge base or
                                             plan to address practices surgical
                                                                                 keep up with
                                                                                                    Not
      knowledge
                        technical skills
                                                                   skills
                                                                                   literature
                                                                                                 observed
                                                  gaps
         Ο
                             О
                                                   О
                                                                    О
                                                                                      O
                                                                                                    О
12) Care improvement
         Does not
                                        Uses relevant Identifies probable Ongoing self-evaluation
                           Actively
     recognize impact
        of errors or
                        participates in
                                         literature to
                                                        causes for bad
                                                                             and improvement
       demonstrate
                       M+M. responds
                                                        outcomes and
                                                                            applying strategies
                                           support
        interest in
                       appropriately to discussions at
                                                         strategies for
                                                                         developed from M+M to
                                                                                                    Not
                                                                                 patients
        improving
                          feedback
                                           M+M
                                                        improving care
                                                                                                 observed
                                             О
            О
                             О
                                                              0
                                                                                    О
                                                                                                    0
PROFESSIONALISM
13) Professional behaviors
                                                                                Role model for
      Undesirable Polite, respectful, Maintains composure
                                                               Accepts
                                                                                  colleagues,
    behaviors (e.g.
                      responsive,
                                        under stress,
                                                           responsibility for
                                                                                  consistently
         lying,
                      honest and
                                     recognizes limits of
                                                          error and initiates
                                                                               prioritizes patient
                                                                                                    Not
     disrespectful)
                      trustworthy
                                         knowledge
                                                           corrective actions
                                                                                    needs
                                                                                                 observed
                                                                                      0
                                                                                                     0
          0
                          0
                                             О
                                                                  О
14) Personal Health
      Behavior
                                          Monitors own personal
                                                                   Models
                 Complies with duty hour
                                           health and mitigates
                                                                 appropriate Promotes a healthy
        and
      physical
                 standards, understands
                                             fatique or stress.
                                                                management work environment
```



Supplemental Digital Appendix 2

SIMPL Questions Used to Assess the Intraoperative Performance (A) and Autonomy (B) of Surgical Residents from the Northwestern University Feinberg School of Medicine, (2015-2016)

*SIMPL (system for improving and measuring procedural learning), a smartphone-based application, is an assessment tool used to provide immediate feedback to residents in the workplace. SIMPL ratings are based on the Zwish Scale. For more information on the Zwisch Scale, see Bohnen JD, George BC, Williams RG, et al. The feasibility of real-time intraoperative performance assessment with SIMPL (System for Improving and Measuring Procedural Learning): Early experience from a multi-institutional trial. J Surg Educ. 2016;73:e118-e130.



Supplemental Digital Appendix 3

Random Effects Contributing, to Different Degrees, to Variance in Both End-of-Rotation (EOR) and SIMPL Scores in a 2017 Study Comparing EOR and SIMPL, a Workplace-Based, Post Operative Case Feedback Tool at Northwestern University Feinberg School of Medicine

	Variance	Proportion of
		Total Variance
Faculty on EOR Evaluation	0.21	0.21/0.59
Resident on EOR Evaluation	0.02	0.02/0.59
Rotation on EOR Evaluation	0.11	0.11/0.59
Residual on EOR Evaluation	0.26	0.26/0.59
Resident on SIMPL	0.14	0.14/0.82
Rotation on SIMPL	0.51	0.51/0.82
Residual on SIMPL	0.17	0.17/0.82