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**Utilization of Self-Determination Theory to Improve Medical  
Student Outcomes**

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**Utilization of Self-Determination Theory to Improve Medical  
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by

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# **Utilization of Self-Determination Theory to Improve Medical Student Outcomes**

by

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Medical students often face issues with their mental health and the academic rigor of classes and clerkships while working towards their Doctor of Medicine. To help support student motivation, self-determination theory can be utilized. Self-determination theory principles can help support medical student mental health and academic success. Instructors can also utilize self-determination theory principles to support student motivation. Self-determination theory suggests that autonomy, belonging (or relatedness), and competence are fundamental psychological needs of students. Instructors can design clerkships in ways that can support these needs, leading to improved student outcomes.

## Table of Contents

List of Tables .....	v
Introduction.....	1
Statement of the Problem.....	1
Review of the Literature .....	6
SDT and Medical Student Well-Being .....	7
SDT and Medical Student Academic Success .....	8
Instructor Use of SDT Principles .....	10
Summary of Previous Research .....	12
Applications to Practice .....	12
A Case Study of a Syllabus.....	14
Appendix: Excerpt from Sample Syllabus.....	21
References.....	31

## List of Tables

Table 1 .....	13
Table 2 .....	20

## **Introduction**

Medical students often struggle both with their mental health and the academic rigor of medical school while working to earn their Doctor of Medicine. One way to address this problem is for medical educators to create motivationally supportive environments that satisfy students' basic psychological needs for autonomy, belonging, and competence, as described in self-determination theory (SDT). In this report, I will first describe the challenges medical students face both with their well-being and academically. I will then review the literature on self-determination theory in medical students from both the student and the instructor perspective. For students, I will be examining how students' own psychological needs predict their academic and well-being outcomes. I will also be examining how instructors and learning environments can support or thwart students' needs. Finally, using an example of a surgery clerkship syllabus, I will provide specific applications to practice, with the goal of understanding how medical educators can utilize self-determination theory to benefit students and learning during clinical rotations.

## **Statement of the Problem**

One important milestone in every medical student's journey to becoming a doctor is the completion of the required clinical clerkships. Typically, the clinical year is the first time that students get to experience the joys and frustrations of taking care of real patients in hospitals and clinics. Students are typically required to complete core rotations in surgery, internal medicine, pediatrics, women's health, neurology/psychiatry, and family medicine (*Percentage of Schools with Separate Required Clerkships by Discipline*, 2020). Each of these clerkships are typically 8 weeks in length, with variation between institutions. Each clerkship has unique requirements of

students, with differing numbers of hours spent in the hospital or clinic, differing call schedules, and differing requirements for passing or achieving honors.

In designing these unique and diverse clerkships, clerkship directors and medical educators should consider that medical students are very vulnerable to depression and anxiety symptoms, both of which can affect general well-being and motivation in school. In one study looking at factors associated with depression and anxiety in Brazilian medical students, researchers found that the prevalence of depressive symptoms in students was 41%. The prevalence of state-anxiety, defined as the transitory emotional state varying over context and time, was 81.7%, and trait-anxiety, defined as individual tendencies to react to situations as anxiety-provoking, was 85.6% (Brenneisen Mayer et al., 2016). In another study looking at burnout in medical students, residents, and early career physicians, researchers found that burnout is more prevalent in these populations compared to matched peers in other fields. Medical students and residents were also more likely than population control samples to exhibit symptoms of depression (Dyrbye et al., 2014). While psychiatric morbidity is very common in medical students, few seek help (Dahlin & Runeson, 2007). With the clinical year being one of the most demanding for medical students, it is imperative that clerkships work with students to cultivate an environment that fosters productivity, high motivation, and well-being in students.

In addition to struggling with well-being and mental health, medical students also struggle to achieve academically. To fully understand the academic stresses of medical school in the United States, it is helpful to review the requirements for graduation and advancement to graduate medical education (residency). Beginning in the pre-clinical years of medical school, students must pass all exams administered by the individual program. During the clinical years of medical school, students must pass National Board of Medical Examiners (NBME) subject

exams as required by their medical school. For licensing, all medical students must take and pass the United States Medical Licensing Examination (USMLE) Step 1, Step 2 Clinical Knowledge (CK), and Step 3. Step 1 is typically taken some time between years 2 and 3 of medical school. Step 2 CK is typically taken some time during the third or fourth year of medical school. Step 3 is typically taken during the first year of residency. For medical students, Step 1 and Step 2 CK are high-stakes, summative exams, the scores of which have a significant impact on their academic future. The concern for students is typically not passing these exams but obtaining a high score so they may match into the residency of their choice. In the most recent performance data put out by NBME, the pass rate for Step 1 was 97% for people taking the exam for the first time and 66% for those repeating the exam. The pass rate for Step 2 CK was 98% for first-time test takers and 72% for those repeating the exam (*2019 Performance Data*, 2019). The examinees who have been shown to have a harder time passing these exams are non-US citizens, non-native English speakers, and those not trained in the US (De Champlain et al., 2006). Not passing Step 1 or Step 2 CK on the first try can make matching into a residency much more difficult. According to a National Resident Matching Program (NRMP) survey of program directors in 2020, 28% of respondents said they would not consider and 57% said they would seldom consider applicants who had not passed Step 1 on the first attempt. In this same survey, 33% of respondents said they would not consider and 57% said they would seldom consider applicants who had not passed Step 2 CK on the first attempt (*Results of the 2020 NRMP Program Director Survey*, 2020).

Beyond the stress of merely passing the exam, scores for Step 1 and Step 2 CK are a major factor in residency applications. Many programs have a required minimum Step 1 and Step 2 CK score, below which they will not generally offer interviews. In 2020, the median score



below which programs generally do not grant interviews was 216 for Step 1 and 220 for Step 2 CK. There are also scores above which programs will almost always grant interviews, regardless of the rest of the application. In 2020, the median score was 234 for Step 1 and 235 for Step 2 CK (*Results of the 2020 NRMP Program Director Survey, 2020*). In addition to the survey results of residency program directors, researchers also looked at the association of Step 1 and Step 2 CK scores with residency match specialty and location. They found that there were significant associations between USMLE Step 1 and Step 2 CK scores and residency specialty. The specialties with the highest scores (dermatology) and the lowest scores (family medicine) were consistent with NRMP reported data. The authors hypothesize that students might choose a specialty in which they could be competitive based on their scores. Alternatively, students who want more competitive specialties might put more time and energy into studying for the exams (Gauer & Jackson, 2017).

In addition to the pressures that medical students face to pass and score highly on USMLE Step 1 and Step 2 CK, students must still manage pre-clinical and clinical requirements unique to their medical school. According to data from the Association of American Medical Colleges, who monitors graduation rates and medical student attrition, the four-year graduation rate for MD-only medical students (those not seeking additional degrees, such as a master's or PhD) fell from around 90% in 1970 to 83% in the 1980's, where it remains today. The class expected to graduate in 2013 had the lowest graduation rate up to that point, with only 81% expected to graduate in four years. When looking further at this data, the AAMC found that only 62-72% of students who took a leave of absence for any reason, whether for academic, health, or other reasons, graduated within eight years (Caulfield et al., 2014). As previously discussed, medical students are at higher risk for having problems with their mental health and well-being.

With this data, it becomes clear that students who need to take time off for mental health reasons can face academic repercussions as well.

Medical students face challenges with their mental health and the academic rigors of medical school. One mechanism to address these issues is to create a motivationally supportive environment for medical students. In the present study, I will use self-determination theory as a lens through which to examine the motivation of medical students in the clinical environment. Self-Determination Theory (SDT) is a motivational theory that focuses on different types and qualities of motivation instead of examining overall quantity of motivation in students (Deci & Ryan, 2008). At the most basic level, the different kinds of motivation can be organized into intrinsic motivation and extrinsic motivation. Intrinsic motivation refers to the desire to do something because it is inherently interesting or enjoyable. Alternatively, extrinsic motivation refers to doing something for a separable outcome (Ryan & Deci, 2000a). Another central distinction in motivation types in SDT is between autonomous and controlled motivation. Autonomous motivation includes both intrinsic motivation and the types of extrinsic motivation in which a person has identified with the value of the activity and it has been incorporated into their sense of self. Controlled motivation, on the other hand, consists of external regulation and introjected regulation. In external regulation, a person's actions are dependent on external reward or punishment. In introjected regulation, a person's actions have been partially internalized and are based on approval, avoidance of shame, self-esteem, and ego (Deci & Ryan, 2008).

When students have more autonomous motivation, they are predicted to have an array of positive outcomes when compared to controlled motivation. Autonomous forms of motivation have been shown to be enhanced with support for student's basic psychological needs for autonomy, belonging, and competence (Ryan & Deci, 2020). In the context of the theory,

autonomy refers to “being the perceived origin or source of one’s own behavior,”; belonging (or relatedness) refers to “feeling connected to others,”; and competence refers to “feeling effective in one’s ongoing interactions with the social environment and experiencing opportunities to exercise and express one’s capacities,” (Ryan & Deci, 2002). The sub-theory of SDT that works to explain the variation in intrinsic motivation based on the presence or absence of these supporting conditions is known as Cognitive Evaluation Theory (CET). In this theory, it is posited that events such as feedback, communication, and rewards that lead to feelings of competence in students leads to increased intrinsic motivation. However, feelings of competence will not enhance intrinsic motivation unless accompanied by a sense of autonomy, or an internal locus of control. Students must experience their behavior as self-determined for intrinsic motivation to be supported. For example, students who receive extrinsic rewards for behavior tend to show decreased intrinsic motivation for an activity. Similarly, threats, deadlines, and imposed goals decrease intrinsic motivation. Finally, according to CET, intrinsic motivation is more likely to flourish when students feel a sense of security and relatedness in the social environment (Ryan & Deci, 2000b). In short, when students’ basic psychological need for autonomy, belonging, and competence are met, there is facilitation of intrinsic motivation, integration, and psychological wellness, while unmet needs inhibit motivation, integration, and wellness (Ryan & Deci, 2016).

### **Review of the Literature**

While Self-Determination Theory was originally created within the context of non-medical education, researchers have looked at the motivation of undergraduate pre-medical and graduate medical students to see what drives their learning. Generally, these studies find support

for SDT in medical students, demonstrating that intrinsic motivation is positively related to well-being and academic outcomes.

### ***SDT and Medical Student Well-Being***

By Ryan and Deci's definition, a basic psychological need is one which, when satisfied, contributes to health and well-being, but when unsatisfied, contributes to pathology and ill-being. In examining this definition, they found that placing strong relative importance on intrinsic aspirations was associated with well-being indicators such as self-esteem, self-actualization, and the inverse of anxiety and depression. On the contrary, placing strong relative importance on extrinsic aspirations was negatively related to these same well-being indicators. Overall, it was concluded that satisfaction of the basic psychological needs of SDT correlated with improved well-being (Ryan & Deci, 2000b).

In one study by Dreison et al. (2018) investigating factors in mental health provider burnout, researchers examined how job resources that were in line with the SDT basic psychological needs affected the dimensions of burnout. The researchers looked at the job resources of supervisor autonomy support, self-efficacy, and staff cohesion, which mirror the needs for autonomy, competence, and belonging, respectively. These job resources were negatively correlated with emotional exhaustion and depersonalization. The job resources were also positively correlated with personal accomplishment, although only self-efficacy was statistically significant. It was also found that higher levels of perceived supervisor autonomy support and staff cohesions were predictive of lower levels of emotional exhaustion, and higher levels of self-efficacy were predictive of higher personal accomplishment. These authors' findings support the theory that satisfying the basic psychological needs of SDT can improve well-being (Dreison et al., 2018).

In another study, researchers found that controlling behavior by superiors, and thus a lack of autonomy support, was an antecedent of work-home interference, leading to decreased feelings of well-being and increased feelings of burnout among medical residents. In addition to mediating exhaustion and burnout, this work-home interference directly mediated residents' psychosomatic health complaints and sleep deprivation (Geurts et al., 1999). In another article examining the well-being of physicians, the authors summarized literature identifying autonomy as the central organized characteristic promoting physician wellness. Based on this review, they recommended allowing physicians to have increased influence over their work environment, to participate in organizational decisions that affect medical practice, and to have increased control over their own schedule (Shanafelt et al., 2003).

In one article looking at both well-being and academic outcomes, students were found to fall into four clusters (R. Kusrkar et al., 2013). These groups were high intrinsic, high controlled motivation (HIHC); low intrinsic, high controlled motivation (LIHC); high intrinsic, low controlled motivation (HILC); and low intrinsic, low controlled motivation (LILC). In terms of well-being outcomes, this study measured exhaustion by using the "exhaustion from studying" scale from the Maslach Burnout Inventory- Student Survey. Students who were interest motivated (HILC) had less exhaustion than those who were status motivated (LIHC) or low motivation (LILC). In addition, the interest and status motivated students (HIHC) had significantly less exhaustion than the low motivation students (LILC).

### ***SDT and Medical Student Academic Success***

In addition to looking at well-being outcomes, the previous study also examined academic outcomes based on the four groups of motivation in students. Interest-motivated students (HILC) had more deep study strategy, more self-study hours, and higher GPAs than

status-motivated (LIHC) and low-motivation students (LILC). Overall, students who were interest motivated had the optimal learning profile, with high deep study strategy, low surface study strategy, more time spent in self-study, and higher GPAs. Learning profiles were found using a validated motivation measure (the Academic Motivation Scale), and study strategies were measured using a validated questionnaire (the Study Process Questionnaire) (R. Kusurkar et al., 2013). The same researcher also used structural equation modeling to see the effect of the ratio of autonomous motivation to controlled motivation, measured as relative autonomous motivation (RAM). These researchers found the high RAM, or a high ratio of autonomous motivation to controlled motivation, positively affected good study strategy and study effort (R. A. Kusurkar et al., 2013).

According to one study, most medical students displayed a mix of both autonomous and controlled motivation. Researchers found autonomous and controlled motivation to correlate positively, supporting the idea that internal and external sources of motivation interrelate. In this study, a clear majority of medical students revealed stronger autonomous motivation compared to controlled motivation. Groups of students with higher levels of autonomous motivation, in complex interaction with other learner qualities, had greater academic success. Medical students with low indices of intrinsic motivation were shown to have restricted growth in academic achievement. There was also a striking negative relationship between a lack of intrinsic motivation and intention to continue medical studies (Sobral, 2004).

In one study, researchers looked at the longitudinal relationships between medical students' motivation beliefs (task value and self-efficacy), achievement emotions (enjoyment, anxiety, and boredom), and academic achievement. The results showed that believing a task had value was positively associated with course-related enjoyment and negatively associated with

boredom. Higher self-efficacy beliefs were negatively associated with course-related anxiety. Student enjoyment was positively associated with the National Board of Medical Examiners (NBME) shelf exam scores, while anxiety and boredom were negatively associated with exam score. In terms of SDT, this study showed that high intrinsic motivation, measured via enjoyment of course material, was associated with higher scores on the NBME shelf exam. In contrast, anxiety and boredom, which thwart intrinsic motivation, were associated with lower course exam grades (Artino et al., 2010).

One qualitative study looked at the factors that determine high academic achievement in undergraduate medical students and found that autonomous motivation was an important driver of high academic performance. In this study, researchers conducted interviews with students from different classes to understand what specific attributes and practices by students led to high academic achievement. After qualitative analysis, the authors found that one key theme amongst students was motivational factors, specifically the necessity to be intrinsically motivated and to have feelings of competence bolstered by exam scores that matched student expectation. Both internal and external sources of motivation contributed to student success (Abdulghani et al., 2014).

### ***Instructor Use of SDT Principles***

In their examination of SDT in medical students, Williams and Deci (1996) found that students who perceived their instructors as more autonomy-supportive became more autonomous in their learning, which in turn accounted for a significant increase in perceived competence during a 20-week course on medical interviewing. They found that there were strong relationships between medical students' self-determination and perceived competence before they started the course. In addition, the autonomy-supportiveness of instructors promoted

students' self-regulating behavior and feelings of competence. An autonomy-supportive educational climate led to increased perceived competence at a behavior, and this relationship was mediated by students becoming more autonomously self-regulated (Williams & Deci, 1996).

In addition to predicting academic success, autonomy and autonomy support in clerkships have also been linked to students' choice of specialty. Autonomy support on clerkships predicted choices of specialty in internal medicine and surgery, with this relationship being mediated by competence and interest. This research suggests that clerkship instructors' being autonomy-supportive can increase interest (intrinsic motivation) in the specialty. When students perceive the learning environment to be supportive, there was increased student interest and higher likelihood that students would select a residency in the corresponding specialty (Williams et al., 1997).

In examining how instructors can support medical student motivation and psychological well-being, researchers looked at students' perceptions of instructor autonomy-support. In one study, higher ratings of autonomy-support significantly predicted better student well-being (Neufeld & Malin, 2020). The relationship between autonomy-support and psychological well-being was found to be completely mediated by medical students' feelings of fulfillment in their basic needs for autonomy, belonging, and competence. Of these factors, belonging was found to have the strongest relationship with psychological well-being. Based on their findings, the authors posit that supporting students' psychological need for autonomy, competence, and relatedness is valuable to student well-being in medical school. In addition, support for medical students might be best achieved through teacher actions that promote feelings of relatedness and competence (Neufeld & Malin, 2020). In a similar study by the same authors, they found that when the learning environment was supportive to basic needs, there was an increase in student



psychological well-being. In addition, satisfaction of competence predicted an increase in medical student resilience. In comparing male and female medical students, female students had lower resilience scores when compared to male peers (Neufeld & Malin, 2019).

### ***Summary of Previous Research***

While there is an acknowledged paucity of research on SDT application in the realm of medical education despite the extensive research on SDT in other realms of education, what research exists supports use of the theory in application (Ten Cate et al., 2011). In general, research on self-determination theory in medical education suggests that SDT principles of autonomy, belonging, and competence predict study strategies, effort, and academic success. When students' basic psychological needs are met, they have improved well-being and decreased anxiety, depression, and burnout. When medical students have higher intrinsic or autonomous motivation, they tend to have better academic outcomes. Instructors can impact student academic outcomes and well-being in a positive manner by supporting students' needs for autonomy, belonging, and competence.

### **Applications to Practice**

Based on the tenets of Self-Determination theory, students should have higher overall quantity and quality motivation when they are interested in the material and their psychological needs for autonomy, belonging, and competence are met. When there is evidence that supporting students' psychological needs will lead to improved student well-being and academic outcomes, the question becomes, "How do medical educators utilize this to benefit students and learning during clinical rotations?" Some practical actions that educators can take to support psychological needs include providing students with choice in their educational pursuits, providing students timely feedback, and cultivating a clinical culture that incorporates students in

teams (Neufeld and Malin, 2020). In addition to the previous suggestions, Neufeld and Malin (2020) identified the following practical actions that educators can take to support psychological needs. I provide the table (below) and then discuss how these principles could be integrated into a syllabus for a surgery clerkship.

**Table 1**

*Practical Guide on Actions that Support and Hinder Medical Students' Basic Psychological Needs for Motivation and Well-Being*

	Teacher actions that support:	Teacher actions that hinder:
Autonomy	Providing choices and options Determining what students want or need Acknowledging student perspective Listening and asking questions of learners Providing clear rationales and relevance Active involvement in learning Supporting self-directed learning Providing clear objectives Pass/fail program structure	Giving directives or commands Using controlling language Over-praising or spoon-feeding Being dismissive or defensive Unfair judgement of students Not providing relevance of material Using incentives, like rewards or punishment
Competence	Providing timely, personalized feedback Structured learning with clear expectations Setting an optimal level of challenge	Embarrassing students Questioning beyond student ability Inadequate guidance and supervision Content overload
Relatedness	Getting to know students Being approachable Shared decision-making Making students feel like a part of the team Showing empathy and humility	Being inaccessible, impersonal, or harsh Not acknowledging mistakes Reinforcing team hierarchies Making students feel like outsiders

Adapted from (Neufeld & Malin, 2020)

## **A Case Study of a Syllabus**

As an example, we can examine the components of a syllabus for a surgery clerkship from a Texas medical school. In this clerkship, students had both self-directed assignments and assignments that take place during scheduled clerkship time. The first self-directed assignment was weekly online study modules and reading. Students were also assigned weekly readings from a popular surgery textbook that corresponded to the weekly faculty-led didactic session. In examining this assignment from the perspective of SDT, weekly readings are a good way to help bolster competence, especially prior to didactic session. These assigned readings provided clear instructions and were accompanied by learning objectives, which gives students clear guidance on what they need to learn to feel prepared and competent during lecture. Students also were able to be self-directed by learning at their own pace and researching topics that came up during the readings that students did not understand. When students feel competent and prepared for didactics with a new attending, it may be easier for the learners and teacher to establish a sense of relatedness over the shared topic at hand. One improvement that could be made to this assignment is improving autonomy for students. Students were limited in the resources they could use to fulfill the requirements. Providing students several resources and allowing student choice could increase sense of autonomy.

The next weekly self-directed assignment was a short write-up on a common surgery topic of the students' choosing. These assignments should include the chief complaint of the patient, a student self-assessment of current knowledge, self-assessment of knowledge gaps, learning objectives, learning resources used for the assignment, the presentation of the pathology, the differential diagnosis, important history and physical exam findings, necessary labs/imaging/diagnostic testing, the management options, and how students could demonstrate

achievement of learning objectives. This assignment demonstrates several autonomy-supportive design elements. Students were encouraged to choose topics that were most relevant to what they had seen in the hospital and clinic and further explore those topics. Students were also allowed to set their own learning objectives within a structured learning framework. Students could develop their competence in areas of surgery that were most relevant to what service they were currently working on instead of having to focus energy on topics that would not help them feel prepared in clinic. For example, a student on the surgical oncology service might not feel as competent in their clinical duties if they were forced to spend time studying hernia repairs, which are not handled by their service. Alternatively, they might feel more competent in their clinical duties after choosing to spend time looking up treatments for pancreatic tumors. Finally, the clerkship director provided helpful feedback on components that were inaccurate or not fully developed, which further enhances student competence by correcting errors and builds a sense of relatedness between faculty and students as they work together to fully develop knowledge and address learning gaps.

At the end of the clerkship, students had to submit a value-based care write-up. Per the syllabus, this write-up should contain a summary of a patient clinical course, identification of a key clinical question and evidence-based answer, analysis of application of value-based care or patient safety principles in the patient's care, and a summary and takeaway message for the reader. While this assignment is autonomy-supportive in that it again allows students to choose the patient case that interests them, it could be improved by asking students to take an interprofessional approach to safety, which could improve belonging in the hospital and within the clinical team. Interprofessional care for patients typically includes the physician, nursing staff, medical technicians, pharmacists, and social workers. Each team member works in unique

areas to ensure that patients are safe and well taken care of, both within and outside of the clinical environment. While the goal at many medical schools is to have students interact with each team member in meaningful ways, asking students to communicate and seek advice from other team members could improve the student's sense of connection to the interdisciplinary team.

In addition to these assignments, every student was required to participate in an Observed Structured Clinical Exam (OSCE) at the halfway point of the clerkship. In the past, the OSCE was performed at the end of the clerkship, which did not allow students the chance to utilize feedback for clinical improvement, thus limiting the ability of the OSCE to help build students' feelings of competence. By timing the OSCE so that students can be observed in their history-taking and physical exam skills and receive feedback on their performance, students can use this to inform their future interactions in the hospital. Students may feel an increased sense of competence when seeing patients for admission or for follow-up care after they have been observed. In addition to receiving feedback on their interpersonal skills, students are also asked in the OSCE to provide a differential diagnosis for the mock patients they see. Having an opportunity to practice and gain feedback on clinical reasoning skills in a formative setting can also help build students' sense of competence in building differential diagnosis lists and being able to explain their reasoning.

Students must also take and pass the National Board of Medical Examiners (NBME) shelf exam in surgery at the conclusion of the clerkship. This high-stakes, summative, cumulative exam covers everything that should have been learned while on the surgery clerkship. While this exam provides objective data on student academic performance, it can be a stress-inducing exam. While studying for the exam, students might feel a sense of social isolation,

which is the antithesis of the psychological need for belonging and relatedness. To help reduce social isolation and build a sense of belonging, it might be beneficial for the clerkship director to set aside time for students to study for this exam as a group. It would also be helpful for clerkship directors to provide resources and guides that they know have been useful to students in the past. In addition, it would be useful to connect didactic sessions and the associated pre-work to NBME topics that commonly appear on the exam. This would allow students the chance to build competence over the course of the clerkship, so that they have a stronger sense of self-efficacy by the time of the exam.

Students were also required to log clinical encounters online to ensure that students saw the full breadth of surgical pathology. This checklist of pathology and clinical skills helps students feel a sense of competence that they are learning important aspects of the specialty and not missing out on important learning opportunities. Students who are not able to see all of the required pathology should be given alternative experiences that allow them to build competence in those areas. In order to promote autonomy, clerkship directors could encourage students to seek out clinical experiences independently as they move through the clerkship. Student autonomy can be supported by giving students the choice of when to acquire these skills in the clerkship, how to go about learning the necessary skills, and what faculty or staff to ask for help in completing the log activities. Students should also be encouraged to engage in learning opportunities that are not included in the log of clinical encounters. The log should be framed as a minimum of what the clerkship director and medical educators hope students learn while on the rotation. Students could be encouraged to independently seek out and explore other topics that interest them within the context of the given clerkship.

Finally, students were evaluated by clinical faculty on patient care skills, medical knowledge, practice-based learning skills, systems-based practice skills, interpersonal and communication skills, professionalism, and leadership. Over the course of the clerkship, students are required to ask for feedback in these areas regularly as they progress through the clerkship. Students have the choice of who to ask for feedback, which supports student autonomy. Students can use this feedback to build competence in the different areas of clinical evaluation. The goal is that after several iterations of asking for and responding to feedback from residents and faculty members, students will have developed increased self-efficacy and competence.

While the above components are required for students to pass the clerkship, additional assignments are required for students to achieve a grade of “Honors” in the clerkship. To achieve “Honors” in the clerkship, students must have outstanding clinical evaluations and complete one team goal and one individual goal. For the team goal, students could choose to either complete peer observation and feedback, design an educational activity around 3 surgery learning objectives, present a quality improvement proposal, or investigate an observed problem in inter-professional care in the hospital. For the individual goal, students could either practice to proficiency the 5 Fundamentals of Laparoscopic Surgery (FLS) technical skills and the UT Southwestern knot-tying and suture curricula, write a case report and literature review, submit a portfolio of clinical work, design an educational activity around a surgery learning objective, or complete a continuous personal improvement report. In both the team goal and individual goal, providing choices for students is autonomy supportive and allows students the opportunity to pursue learning opportunities that are intrinsically motivating to them. In contrast, requiring students to complete certain projects or objectives is a more controlled form of motivation, and should be avoided when possible. These additional learning opportunities can allow students to

build feelings of competence and self-efficacy in areas beyond the traditional curricula. For example, for students who hope to pursue a career in surgery, they might feel intrinsically motivated to learn the 5 FLS technical skills, which would allow them to feel more competent in the OR during laparoscopic cases. Building this skill also might help them develop a greater sense of belonging within the team, as they are more able to participate during cases and contribute meaningfully to the care of patients on the service. The team goal aspect of the honor's criteria is an excellent way to foster relatedness amongst the medical students working together on clinical teams. It is common for medical students to feel the need to compete against one another for grades, recognition, and learning opportunities such as going into the OR and scrubbing into cases. By asking students to work together in meaningful ways, students might feel less need to compete and more desire to utilize other classmates as valuable teammates.

The syllabus requirements to achieve honors could be improved from a SDT standpoint in a couple of ways. In this process of completing these projects, it would be more beneficial for students to build feelings of competence if there was a clear pathway to ask for feedback on what they were working on. Many of the options are time-intensive projects that will be completed over several weeks. Students should be encouraged to reach out to the clerkship director or to a faculty member for feedback and guidance on their progress. It might also foster a greater sense of belonging to get faculty members involved in student projects. Attending physicians on clinical rotations can feel unapproachable and intimidating. By creating a pathway within the clerkship to pair students with a faculty mentor for these honors projects, students would get the opportunity to network in a less formal setting. A summary of recommendations to support students' psychological needs for each type of assignment in the sample syllabus is included below.



**Table 2***Summary of Recommendations to Support Psychological Needs in a Clerkship*

Assignment	Recommendations
Weekly Online Study Modules/Reading	Link modules and reading to didactics for improved competence, provide clear learning objectives, give students choice in resources to use from a list of recommendations
Write-Up on a Common Surgery Topic	Give students the choice of topic and let students design learning objectives for improved autonomy and competence in their specific service, give timely and specific feedback to address learning gaps for improved competence in that area
Value-Based Care Write-Up	Allow students choice of topic for improved autonomy, ask students to work with the interdisciplinary team for improved relatedness
OSCE	Schedule the OSCE at the halfway point in the clerkship so students can receive feedback and feel more competent in the clinical setting
NBME Exam	Consider group review sessions to improve relatedness amongst students, provide resources or guides to help students feel competent
Clinical Log	Provide alternative experiences so students who cannot see all pathologies can feel competent in those areas, encourage students to seek out learning experiences independently to promote autonomy
Clinical Evaluations	Require students to ask for feedback regularly over the course of the clerkship so students can apply feedback and build competence
Honors Projects	Allow students choice of project to complete that best aligns with their goals to promote autonomy and competence, include a team project or team-based goal to promote relatedness amongst students, provide a clear pathway for students to get feedback, enlist faculty to act as mentors to build relatedness between students and attendings

## **Appendix: Excerpt from Sample Syllabus**

### **C. Clerkship Assignments**

Self-Directed:

- Weekly WISE-MD modules and readings
- Weekly readings from assigned textbook (Surgery: A Case Based Clinical Review, Christian de Virgilio, Editor)
- Prep for Patient Care – one entry per week (weeks 2-6)
- Value-based care write-up – one for the 8 week clerkship, due by the end of week 7
- Weekly retrieval practice quizzes on didactics and short answer exam prep

During clerkship scheduled time:

- Scheduled Check-In Sessions with Clerkship Director (variable times)
- Director Mock Pages – 2-4 per Clerkship

### **D. Evaluation and Assessment**

The assessment requirements in each clerkship are determined by the clerkship director in consultation with the Department of Medical Education and the Undergraduate Medical Education Curriculum Committee. All clerkships use multiple assessment methods. The requirements for the Surgery clerkship are listed below. Specific information on how each component is used in grading is described in the next section.

### **Clinical Assessment**

Your clinical performance will be assessed using the Dell Medical School Clerkship Student Assessment Form, which can be found in **Appendix C**. Clinical assessments will be MED 380 - Surgery

10

requested through One45 from at least 2 faculty for each 4-week block, identified by the student as having spent substantial time working with him/her. All assessments will be carefully reviewed by the Surgery Grading committee (a panel compiled of 3-5 faculty members).

In addition, we would like to assess students' improvement over the time spent on our clerkship. To achieve this, students will collect formative feedback using the Qualtrics-based Formative Feedback Assessments (see Appendix D). A minimum of 4 assessments from residents or faculty per each 4-week block is required. Students may solicit additional Formative Feedback Assessments. All solicited formative assessments will be reviewed by the grading committee and used to inform the final clinical assessment. Of note, evidence of purposeful effort, incorporation of feedback into subsequent performance, and improvement throughout the 8 weeks are given consideration. This information may be elicited from patterns of ratings over time or from observer comments.

## **Examinations and Assessments**

### **NBME Shelf Exam**

In the last week of the block, you will take the National Board of Medical Examiners (NBME)

Surgery Subject Examination

- The shelf exam is given on the Friday of the last week of the block. An exact time and location will be given in advance.
- The exam is 2 hours 45 minutes and consists of 110 case-based multiple-choice questions. Each question is framed as a clinical vignette followed by a multiple-choice question. The time and number of questions is determined by the NBME and therefore is subject to change.
- Minimum passing score: Equated Percent Correct Score of **56** or higher

### **In-house Short Answer Examination:**

A Canvas based summative exam consisting of 30 questions relating to material covered in weekly didactics, WISE-MD modules, and assigned readings will be given in week 8. The exam questions are structured to reflect questions encountered in weekly retrieval practice questions.

### **Patient Logbook**

For each clerkship, medical students are required to encounter the following types of patients and clinical conditions and have the indicated level of student responsibility. The setting may be in-patient (IP) or out-patient (OP), as indicated.

The standardized levels of student responsibility include:

Observation (OB): Observation (Clinical Reasoning (CR) only)

Partial Participation (PP): Partial participation (History taking/data gathering (HX) or physical examination (PE))

Full Participation (FP): (Hx, PE and CR)

### **Oral Case Presentation:**

Direct observation will be used to assess student presentations throughout the rotation and will factor into the overall clinical performance assessment that is part of the end of clerkship assessment. There is a module on H&P/Case Presentation for Surgery available Canvas as an optional resource for students.

## **OSCES**

During the 4th-5th week of the clerkship, students will have the opportunity to demonstrate their clinical skills in a standardized venue. Much like the OSCEs during the Developing Outstanding Clinical Skills (DOCS) course, students will be expected to demonstrate clinical skills against a checklist through interaction with a standardized patient. The OSCEs in Surgery will focus on abdominal pain and assessing for post-operative complication. The feedback from the OSCE is formative but may be reviewed by the grading committee to inform final clinical assessment.

## **Mid-Rotation and End-Rotation Feedback Sessions:**

Students will have a mid-clerkship feedback session with the Clerkship Director or a faculty member on their first clinical block during week 4. The Director will have the opportunity to review Formative Feedback Assessments from faculty and residents with the student, and openly discuss progress and opportunities. We will communicate the exact time and place for mid-point feedback within the first 3 weeks of the clerkship.

## **Value-Based Care/Safety Write Up:**

Students are required to submit one value-based care write-up for the 8 week clerkship, due by the end of week 7. Instructions are provided in **Appendix E**, along with the grading rubric used to assess the write-up. A passing score is listed in the rubric.

### **Prep for Patient Care forms**

Students are required to submit one Prep for Patient Care form weekly on Weeks 1-7. These will be uploaded to Canvas. The purpose of these forms is to develop critical thinking habits for the evaluation of a patient from chief complaint through treatment and recovery. A sample of the form is found in **Appendix F**. Students are encouraged to seek feedback on the forms from residents or faculty involved in the care of the patient described in the Prep for Patient Care form. Feedback is provided by the Clerkship Director through Canvas. The forms are assessed as **a completion grade only**.

### **E. Grading**

The grading procedures in each clerkship are determined by the clerkship director in consultation with the Department of Medical Education. Final grades are a composite of several components that will cumulate in either an **Honors, Pass, or Fail**.

The Surgical clerkship director, in consultation with the Surgery Clerkship grading committee, assigns the final clerkship grades. Your overall grade for the 8- week rotation is determined as follows:

#### **To receive a PASS grade the Surgery Clerkship, a student must:**

- Achieve an Equated Percent Correct Score of 56 or higher on the NBME Surgery Shelf Exam

- Achieve a passing score on the short answer exam
- Complete all assignments on time and at an appropriate level
- Achieve passing criteria on clinical assessment – no “performance does not meet expectations”, no more than 3 “marginal performance”

**To receive an HONORS grade for the Surgery Clerkship, the student must:**

- Achieve criteria listed for passing, above, plus the following:
- Commit to one individual and one team goal from the menu provided before the end of week 1, and achieve the goals before the end of week 8 of the clerkship
- Receive “Exceeds Expectations” in 11 out of the 17 competencies or 60% of the 17 competencies that were able to be assessed on the final, summative clinical assessment form, with no “marginal performance” in any competency

Each goal in the individual and team categories will result in demonstrating performance that exceeds expectations in different competency domains in the clinical evaluation form, as indicated in bold. Students may select their team members, but teams must consist of 3 or more students, unless only 2

students in the cohort wish to pursue honors. Students are encouraged to build a team from the group assigned to Acute Care General Surgery on the same block. Students must notify Dr.

Brown of their planned teams and projects by the end of week 2.

**Individual Goals (choose one):**

1. Practice to proficiency on the 5 Fundamentals of Laparoscopic Surgery technical skills and the UTSW knot-tying and suturing curricula. (**practice-based learning**)
2. Write a case report and review of literature around a patient you encountered (CD and student select a journal and the manuscript must meet submission criteria for that journal) (**medical knowledge**)
3. Submit a portfolio of clinical work including: (**practice-based learning, medical knowledge, patient care, leadership**)
  - a. Examples of each type of order listed in learning objectives (post-op, pain medication, antibiotics, laboratory test, diagnostic imaging, consult) – can be written orders with a brief description of the clinical context, or printed out screen-shots of EMR orders
  - b. Examples of each type of note (clinic H&P, post-op progress note, op note, in-patient consult and/or H&P, discharge summary); give at least one example of feedback received on each type of note and show how that feedback was incorporated into subsequent work
  - c. Two Prep for Patient Care entries *per week* (weeks 2-6, 10 total)
  - d. Leadership – complete the IHI module on leadership. Identify a leadership goal to work on during this clerkship (due by end of week 2 when submitting honors plan to Dr. Brown). As part of your portfolio, submit a 2-3 page double-spaced report of your work serving as a leader among your medical student or clinical teams. This should include a statement of your leadership goal, why you chose this goal, the resources you used, how you worked toward the goal, a summary of feedback



you received, how you incorporated this feedback into your work, your takeaway learning and next steps in developing leadership skills.

4. Design an educational activity around a surgery learning objective (**medical knowledge**)
  - a. Plan must be agreed upon by student and clerkship director
  - b. From stated learning objective, select/create instructional methods – videos to watch, simulation/role-play clinical skills practice with feedback, deliberate practice such as reading a vignette and formulating a ddx, or a plan; interpreting lab/imaging findings with formative feedback
  - c. Develop assessment tool – i.e. grading rubric for open-ended questions or oral exam; checklist or rating scale
  
5. Continuous Personal Improvement / Clinical Curiosity (**practice-based learning**) – In a report, identify a skill or knowledge area from the Surgery Learning Objectives as a goal for improvement and personal growth. Write your iSMART goals pertaining to this area. Choose 3 resources as learning methods that will assist you in achieving this goal. Describe how you measured that this goal was achieved? (Teach your team, teach your peers, assess their understanding and answered their questions).

**Teamwork goals (choose one):**

1. Peer observation and feedback – using teamwork to support team members’ personal plans for growth and development (**practice-based learning competency** plus patient care/medical knowledge or others, depending on learning objectives identified by team)

- a. Each team member is observed twice and observes twice – ideally the 2 observations relate to the same goal/learning objective/skill, to solidify learning and demonstrate improvement
  - b. Observation of student performing skill from surgery learning objectives
  - c. Each student submits a one-page double-spaced summary of the goal (i.e. “to take an efficient history with no extraneous questions and not missing critical information” or “to elicit the patient’s values/preferences/perspectives regarding treatment options”), the feedback received from the peer, and changes made based on feedback
2. Design an educational activity around 3 of the surgery learning objectives (**medical knowledge**)
- a. Similar to individual goal but needs to comprise higher level of complexity or quality
  - b. Proposed activity agreed upon before beginning
3. Put together a QI proposal (**systems-based practice**)
- a. Aim statement
  - b. Description of problem with one type of analysis – fishbone, RCA, process diagram
  - c. Description of proposed intervention
4. Inter-professional care/leadership(**leadership**)
- a. Identify a process of surgical patient care involving other health care professionals that your team feels could be improved

- b. Conduct interviews of at least 2 other health care professionals and at least one patient/family member and review relevant literature to inform your team's proposed solution
- c. In collaboration with at least 2 other health care professionals, write a proposal that includes a description of the problem being addressed, the impact of the problem, the team's proposed solution, and resources required and measures of impact of the solution. The length of the proposal will depend on the problem being addressed.

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