

CLINICAL ENCOUNTERS: MEDICAL SCHOOL

WHY IT WORKS

PROBLEM

The burnout triad of emotional exhaustion, interpersonal disengagement, and a low sense of personal accomplishment¹, impacts half of all medical students², and persists in residents and practicing physicians³. Interpersonal disengagement interferes with social support and hinders proper treatment of patients⁴⁻⁶.

Burnout correlates with alcohol and substance use problems^{7,8}. Overall use of alcohol in medical students (91%⁹) is substantially higher than that seen in the general population (56%) as measured by the 2017 National Survey on Drug Use and Health (NSDUH) data on young adults aged 18 to 25 with past month alcohol use¹⁰. In a 2016 study by Jackson et al, 1/3 of medical students had symptoms of alcohol abuse/dependence and that use correlated with the burnout domains of emotional exhaustion and depersonalization². A separate study found that 1/3 of medical students fit criteria for binge drinking and over 1/4 used cannabis in the past year⁹.

Burnout and depressive symptoms overlap¹¹. In a cross-sectional analysis of studies by Rothenstein et al., the rate of depression in medical students averaged 27%¹². Burnout continues to be a problem into medical practice. A similar cross-sectional analysis of depression in residents found an average of 29%; the rate of depression increased as training progressed¹³. The linkage of depression and suicide is well established including in general as well as in physicians¹⁴. The 2016 study by Rotenstein et al. also found that 11% of medical students expressed suicidal ideation and ~16% sought psychiatric treatment¹². Given the common reluctance of individuals to admit to symptoms of suicide or seek psychiatric treatment these figures are likely even higher.

Burnout also correlates with higher BMI^{15,16}, poor sleep^{17,18}, and increased motor vehicle accidents¹⁹. In addition to the common use of alcohol as a coping mechanism, medical students often utilize ineffective coping responses to stress, such as unhealthy self-indulgence or self-criticism²⁰⁻²².



HOW MEDICAL STUDENTS COPE

Students may employ coping skills in order to decrease stress or learn to tolerate it. These skills play an important role in preventing and reducing burnout in medical students. Coping mechanisms may be beneficial, harmful, or some combination of the two. Some less healthy coping mechanisms may offer short-term gains, but later become harmful. Sometimes associated harms may not be recognized.

Medical students' most common positive (effective) coping strategies include better time management, respecting their limits, setting priorities, gaining emotional support, talking to family members or friends, seeking advice and help from others, getting a good night's rest, and participating in leisure activities^{20,21,23}. However, medical students also may employ negative (less effective) coping strategies. The most common of this type include blaming themselves, being self-critical, and using escape/avoidance to deal with problems^{20,24}.

In order to focus on healthy coping strategies instead of less-effective ones, students may benefit from being reminded to call on or develop personal strengths that may help them endure the more difficult challenges in medical school. Examples of strengths that are useful for medical students include the ability to delay gratification or to see the big picture. In addition, some students may reduce their stress loads by learning to be more assertive, improve communication skills, or use better anger management skills. Learning to recognize and correct cognitive errors²⁵, such as over-generalization or black-or-white thinking, may also reduce stress levels for students who tend to make them. Similarly, students may benefit from recognizing common defense mechanisms they may use, such as denial or procrastination, which tend to relieve stress at the moment but not in the long run. The healthy alternative is intentionally selecting healthier coping strategies.

USING SIMULATION TECHNOLOGY TO EFFECT CHANGE

Through Step 2 preparation medical students in the pre-clinical years of medical school are familiar with simulations and comfortable with the experience. A computer-based simulation is available on their schedule and need not compete with their typically very busy schedule.

Simulation technology can expose students to the challenge of clinical care in a realistic and safe environment where strategies can be tested and outcomes assessed. Of the 80% of medical students who positively described their real-life clinical experiences, most credited supportive learning environments (35%) and hands-on experiences (32%)²⁶. A simulation provides such a supportive experience. In a simulation a student can comfortably identify and adapt to stress and making forward-looking changes that build longer-term resilience, an essential component of avoiding burnout.

The individual focus of simulations supports attention, exploration, and confidence in asking questions. In contrast, learning in teams may not always be optimal. In fact, team size negatively affected students' learning experiences²⁷. Students in larger groups were less able or willing to ask questions or share opinions on cases, potentially due to time constraints and traditional hierarchy issues seen in groups²⁶. The later issue may be especially problematic for women and minorities.

Skill training simulations successfully impart health behavior change²⁸⁻³¹. Simulations support positive emotions, engagement, social integration, and connectedness²⁸⁻³⁰. A meta-analysis found that simulations increased self-efficacy in a variety of clinical skills by 20%, declarative knowledge by 11%, procedural knowledge by 14%, and retention by 9% more than control approaches³². Increased self-efficacy is a key component of decreasing the stress of real-world clerkship experiences and preparedness³³. In sum, a simulation can provide an individualized, scaleable,



reproducible, comprehensive, and standardized experience offering preparatory guidance to the clinical care challenges that await the medical student.

THE CLINICAL ENCOUNTERS: MEDICAL SCHOOL EXPERIENCE CAN HELP

Our unique immersive role-playing sim utilizes the best practice standards, an engaging narrative, and an attractive environment to provide:

- an experience tailored to the general and specific needs and capability of the future or current 3rd-year medical student
- choice, exploration, challenge, reflection, and intrinsic motivation
- decision-making opportunities (quick, medium, and slow) with clear consequences
- collaboration and practice building teams
- tailored feedback and positive rewards

To deepen understanding, medical students explore and navigate the learning environment to identify factors and strategies relevant to them, which is an effective pedagogical approach³⁴. Being in control is a key element in the effectiveness of this pedagogical approach³⁵⁻³⁹. Exploration puts the user in control of the **Clinical Encounters: Medical School** experience and leads to increased learning and understanding. Control, self-expression, and creativity support a focus on intrinsic motivation⁴⁰. In our role-playing narrative, the medical student navigates spaces, including clinical settings. The experience components (challenges, co-users, strength, feedback, and development) mirror elements of an entertainment-focused game. Similarly, users struggle with and conquer challenges, level up, and master skills.

As users progress, their avatar experiences causes of success and frustration (e.g., challenges, ethical dilemmas, demands, poor personal health, sleep disturbance, poor life balance, negative feedback). The sim enhances longer-term decisions, required for behavioral change by letting medical students:

- identify attitudes and perspectives that impact poor choices (e.g., unrealistic expectations)
- prioritize activities that establish balance (leaving aside time for rewarding aspects of life)
- examine decisions and their impact (e.g, sacrificing sleep)

THEORIES SUPPORTING THE CLINICAL ENCOUNTERS: MEDICAL SCHOOL APPROACH

Simulations and games for the purpose of learning, or “serious games” capitalize on the engaging and reinforcing nature of games and simulations and are gaining prominence due to a cultural shift toward visual, interactive, and entertainment-based learning⁴¹. They heighten enthusiasm⁴² and engagement, are effective teaching tools⁴³⁻⁴⁷, and increase motivation⁴⁸. Available for a variety of medical topics^{43,44,49-51}, they improve knowledge, retention, and confidence in clinical skills⁴⁵⁻⁴⁸.



The approach is supported by a combination of social cognitive theory (SCT)^{69,70}, the experiential learning model based on Dewey⁵⁴ and Kolb⁵⁵, self determination theory⁵⁶, and cognitive load theory⁵⁷. These models provide theoretical underpinnings for our simulation and guide our use of tailored exploration, reflection, and social learning in an engaging design.

Social Cognitive Theory: The processes central to learning in Social Cognitive Theory of self-observation, self-evaluation, self-reaction, and self-efficacy and their role in motivation and goal attainment are achieved in the **Burntout** simulation via exploration, facing challenges, experiencing the outcomes of choices, and reflecting during debriefing⁵².

In keeping with the social cognitive theory's understanding that individuals differ and play an active role in how they learn, including differences in motivation, behavior, and experience^{52,58}, **Clinical Encounters: Medical School** offers a variety of scenarios; students select scenarios to meet their needs. Variations we will consider include stage of training, introversion vs. extroversion⁵⁹, and learning styles⁶⁰. A wide range of common coping strategies will be included^{61,62}. Students may benefit from trying both familiar and new coping strategies^{20,21,63}.

Experiential Learning: The benefit of mirroring real world experiences and learning from model experiences is described in the experiential learning model of Dewey⁵⁴ and Kolb⁵⁵. **Clinical Encounters: Medical School** offers an opportunity to gain from experiential learning^{54,55,55}. Role-playing engages the participant in a cycle of practicing change by initial self-reflection^{64,65}, taking action, post-action reflection⁶⁶, concluding, and planning that promotes longer-term real-world behavioral change⁶⁷⁻⁷². Student transformation can occur during the simulation or via contemplation afterward, during a debriefing⁷³. Reflection is encouraged during brief pauses to decrease cognitive load temporarily without disengagement and task switching^{74,75}.

Learner Control and Self Determination⁵⁶: Medical students explore and navigate the simulation learning environment³⁴ to identify factors and strategies relevant to them with respect to burnout. Exploration puts the user in control of the **Clinical Encounters: Medical School** experience and leads to increased learning and understanding³⁵⁻³⁹. Giving the student control of their experience and self-expression in the simulation supports development of intrinsic motivation^{40,76,77}. That is, it is an experience perceived as useful in and of itself.

Cognitive Load Theory⁵⁷ holds that cognitive challenges support efficient and rewarding task attainment, but too much challenge feels overwhelming⁷⁸⁻⁸¹. Immersion or heightened engagement adds value by enhancing interest, enthusiasm, and emotional involvement, and engaging both affective and cognitive processes⁸². Research has shown that achieving engagement through an enjoyable level of challenge is important in determining the success of medical simulations^{83,84}. High fidelity elements (accuracy, realism) are valuable if they raise the complexity of the experience sufficiently to yield engagement without overwhelming the learner. At the same time, familiar and announced low stakes practice employing positive feedback and encouragement also contributes to success.

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