inadequately prepared to participate in the clinical application of stewardship principles when they begin clinical clerkships. While stewardship is an evolving practice, students should be reintroduced and exposed to stewardship principles frequently and identify practical skills to optimize stewardship. In addition, students should be familiar with resources, such as practice guidelines and local antibiograms, as optimal therapies and resistance patterns often change. A timeout is a stepwise approach to evaluating the need for antibiotics and the optimal use of antibiotics. Timeouts are a common tool implemented by hospitals to monitor and manage the use of antibiotics. We propose that teaching clinical medical students to perform timeouts can lead to increased comfort with clinical decision making as it relates to antimicrobial stewardship.

**Approach:** We implemented a modified team-based learning (TBL) curriculum to teach medical students to perform timeouts focusing on common inpatient infections. This curriculum was integrated into the inpatient medicine clerkship orientation for third-year medical students. Students received the following presession materials: (1) a prereading assignment covering basic antimicrobial stewardship principles and a summary of guideline-directed management for common inpatient infections, and (2) a readiness test consisting of multiple-choice questions. The in-person session was 1.5 hours, led by 1 instructor and 1 facilitator, given to 25 to 30 third-year medical students during the required inpatient medicine clerkship orientation occurring 6 times per academic year. The instructor begins the session reviewing the readiness test with the group, then students divide into small groups of 4–5 to work through 2 clinical cases using the timeout framework throughout the case. The instructor and facilitator were available to assist the small groups with problem-solving and clarification. Each timeout case and learning points were discussed with the large group at the end of each case, highlighting different approaches to problem-solving and providing real-time feedback.

**Outcomes:** Surveys completed during the pilot academic year 2017–2018 revealed that over 90% of students agreed or strongly agreed that the learning activity would help their performance on the inpatient medicine clerkship (n = 121). Over 75% of students reported an improved understanding of the purpose of a timeout, and 85% reported an improved ability to participate in completing an antibiotic timeout. Qualitative survey data indicated that students valued both the presession reading materials and interactive nature of the learning activity, which provided a useful review of common inpatient infections and helpful tools for applying the principles of antimicrobial stewardship to clinical cases.

**Discussion:** The modified TBL session, focused on teaching antimicrobial stewardship through the structured framework of a timeout, was an effective teaching strategy in introducing and applying basic stewardship principles. Survey data from this study indicate that medical students find value in learning how to perform a timeout during this interactive session. This skill may translate to the early adoption of stewardship principles, self-guided learning, improved patient outcomes, and the lifelong practice of antimicrobial stewardship. However, further study is needed to determine the long-term effects of antimicrobial use and the most optimal modality to teach this skill set.

**Significance:** A modified TBL curriculum shows promise as an effective teaching modality for antimicrobial stewardship. Formal instruction in how to perform timeouts should be an essential component of the curriculum for clinical medical students as they begin their medicine clerkships to promote and reinforce the practice of these skills early in their careers.

**References**


**Incorporating Situational Judgment Tests Into Postgraduate Medical Education Admissions: Examining Educational and Organizational Outcomes**

**Anurag Saxena, MD, MEd, MBA, Loni Desanghere, PhD, Kelly Dore, PhD, and Harold Reiter, MD, MEd**

**Purpose:** CASPer is an online situational judgment test (SJT) that has been developed for use in medical school admissions, with a separate version developed for admission into specialty training. CASPer was developed to be a broad measure of personal and professional qualities for the entire applicant pool at the time of screening to help bring better quality applicants to interview. The purpose of this project was to examine if using CASPer in the residency selection process impacted the prevalence and type of professionalism issues, formal remediation incidents, and associated cost savings within the college.

**Methods:** Resident in difficulty documentation (type of intervention, CanMEDS areas of difficulty, professionalism issues, and costs) across 4 years before the implementation of CASPer (pre-CASPer cohort) and 4 years post-CASPer implementation (post-CASPer cohort) were reviewed. Descriptive statistics and between-group comparisons were used to explore type of interventions and associated problems. Professionalism issues, as documented in resident files, were categorized into different types of unprofessional behavior based on frameworks proposed by Mak-van der Vossen et al and Hilton and Stolnick. Results: The number of residents identified to be in difficulty during the
pre- and post-CASPer time frames were similar (16 and 15 residents, respectively). Likewise, the number of interventions within each cohort were comparable, with 18 interventions documented in the pre-CASPer cohort and 16 interventions documented in the post-CASPer cohort. Despite these similarities, the number of residents requiring formal learning interventions (i.e., remediation or probation) in the pre-CASPer group was significantly higher (P < .05) when compared with the post-CASPer cohort (15 vs 5 respectively). The number of residents requiring informal learning interventions (i.e., enhanced learning plans) that allow the residents to continue the program with additional focused effort in areas that need to be addressed increased from 3 (pre-CASPer cohort) to 11 (post-CASPer cohort). The reduction in formal learning interventions from the pre- to post-CASPer group was associated with a 96% reduction in costs (e.g., salary for additional training, preceptor remunerations, additional assessments to tailor interventions, logistics [vacations, leaves, travel], resident resource office support), from hundreds of thousands to tens of thousands of dollars spent in resources.

Within these formal and informal interventions, the medical expert domain was found to be the most frequent role requiring attention in both the pre- (16/16, 100%) and post-CASPer cohorts (12/15, 80%). Professionalism issues were identified in 75% of pre-CASPer cases but were found in reduced frequency in the post-CASPer group (40%). Categorization of the professionalism issues showed an overall reduction in professionalism concerns, from pre- to post-CASPer cohorts, across all domains (e.g., involvement, integrity, interaction, introspection, ethical practice, reflection/self-awareness, responsibility/accountability, respect for patients, social responsibility) except teamwork.

**Discussion:** The results of this study suggest that the inclusion of the SJT CASPer in the screening of applicants to postgraduate medical training provides important information that can result in a reduction in the number of formal interventions and number of professionalism concerns among selected residents, subsequently reducing associated costs as well as faculty and staff time.

**Significance:** In addition to the immediate benefits of integrating SJTs in the applicant selection process, the cost savings associated with reduced formal interventions can be redirected to enhancing institutional endeavors (e.g., Competence by Design launch) and improving programs (e.g., additional funding for courses and well-being work).

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**Acknowledgments:** The National Board of Medical Examiners Steffler Fund for their original support of CASPer creation.

**Funding/Support:** None reported.

**Other disclosures:** H. Reiter is a cofounder, board member, and shareholder of Altus Assessments, a for-profit company providing services to higher education programs, including CASPer; he is a cofounder and shareholder in ProspectHR, a for-profit company providing off-the-shelf multiple mini-interview materials. K. Dore is a cofounder, board member, shareholder, and vice president, growth of Altus Assessments. A. Saxena is an advisory board member for Altus Assessments.

**Ethical approval:** This project was reviewed and deemed exempt by the Behavioural Research Ethics Board at the University of Saskatchewan (Article 2.5 of the Tri-Council Policy Statement, 2014).

**Previous presentations:** Preliminary data within this larger dataset were presented by Anurag Saxena at Asia Pacific Medical Education Conference, January 2019, Singapore.

**References**

**Purpose:** Previous studies have shown that medical student mistreatment and burnout are common.1,2 Studies suggest that factors within the learning environment are associated with burnout, decline in empathy, and career regret among learners (i.e., medical students and residents).1 Mistreatment, poor feedback, insufficient autonomy, high faculty demands, inadequate role models, and high workload are among likely contributing factors.1,3,4 However, little longitudinal data exist to describe how mistreatment and other learning environment experiences relate to subsequent burnout and other student characteristics.1,5 We conducted this study to examine the association between mistreatment and perceptions of the learning environment and subsequent burnout, empathy, and career regret.

**Methods:** We conducted a cohort study that analyzed data from 2014–2016 Association of American Medical Colleges (AAMC) second-year survey (Y2Q) and 2016–2018 AAMC Graduation Questionnaire (GQ). We performed multiple linear or logistic regression analysis to evaluate associations of the independent variables, measured during year 2 of medical school, with exhaustion, disengagement, empathy, and career regret, measured during year 4 of medical school. All models included mistreatment, Medical School Learning Environment Survey subscale (faculty, emotional climate, and student–student interactions) scores, Oldenburg Burnout Inventory (exhaustion and/or disengagement scores), Interpersonal Reactivity Index score, quality of life score, stress score, and demographics as measured during year 2 of medical school. The model for career regret during year 4 of medical school also included career regret during year 2 of medical school as an independent variable. Medical students who responded to both AAMC surveys were included in the analysis. The study was deemed exempt by the Mayo Clinic Institutional Review Board.

**Results:** Data from 14,126 medical students were analyzed: 52% were women and mean age was 27.7 at graduation. Mistreatment reported by 22.9% on the Y2Q. In multivariable analysis adjusted for Y2Q measures, mistreatment reported on the Y2Q was associated with higher exhaustion score (referent: never; once,