ICRE
The International Conference on Residency Education

CIFR
La Conférence internationale sur la formation des résidents

Conference Research Abstracts

Résumés de recherche de la conférence

Resilient Residency Education

Résilience et formation des residents

#ICRE2020 #CIFR2020

ROYAL COLLEGE
OF PHYSICIANS AND SURGEONS OF CANADA
COLLÈGE ROYAL
DES MÉDECINS ET CHIRURGIENS DU CANADA

Journal of Graduate Medical Education

Available online / disponible en ligne, **www.jgme.org**

2020 Virtual International Conference on Residency Education

La Conférence internationale sur la formation des résidents virtuelle 2020

Since 2012, the *Journal of Graduate Medical Education* (*JGME*) and the Royal College of Physicians and Surgeons of Canada have jointly selected the Top Research in Residency Education from abstracts submitted to the annual International Conference on Residency Education (ICRE).

The submitted research paper abstracts provide a forum for those who use systematic scholarly methods to evaluate educational programs, identify new phenomena, define aspects of training, and assess competence.

Each year, more than 100 abstracts are submitted and undergo peer review. Reviewers pick the Top Research in Residency Education, Top Resident Research, and Top Quality Improvement abstracts.

Winning abstracts are published in the December 2020 and April 2021 issues of *JGME*, and are available online to readers via the *JGME* website (www.jgme.org).

2020 Virtual International Conference on Residency Education
La Conférence internationale sur la formation des résidents virtuelle 2020

Table of Contents

Abstracts have been printed as they were submitted

001

Innovative Teamwork Impacts Accreditation Quality Improvement

R. Husa[1], P. Wade[1]

[1]McGill, Montreal, QC

Introduction: Leading 70 McGill residency training programs during the longitudinal quality improvement and accreditation processes is important for the postgraduate medical education (PGME) office and for the Faculty of Medicine. It requires significant resources. Quality improvement (QI) and accreditation processes are often viewed as unrelated, with funds and activities dispersed ineffectively for on-site reviews, leaving significant gaps throughout the rest of the cycle. How can resources be maximized and expertise built in order to move away from an accreditation-driven system to a culture of continuous QI?

Methods: To promote a proactive culture of quality improvement on a Faculty-wide level and to ensure PGME programs strive for the highest accreditation standards, McGill chose to centralize activities and resources under the Office of Accreditation and Education Quality Improvement. Our Office uses a team-based approach to coordinate accreditation processes and support QI activities. It's comprised of academic leaders and administrative experts, who provide the entire gamut of services to our programs. It also engages in scholarly work. Activities are coordinated at a PGME-wide level, with additional customized program-specific interventions. An Accreditation Committee with representation from all levels (academic, administrative, resident) oversees the process.

Results: In a 2019 survey, 89% of respondents felt prepared for accreditation. Ninety-two percent of the services were rated very useful. All respondents reported needing continued support to address accreditation results and implement QI initiatives.

Conclusions: Developing a centralized Office to support QI and accreditation allows for more efficient resource utilization and promotes more meaningful impact.

002

Validity and Reliability Analysis of the CanERA Resident and Faculty Surveys

A. Ronson[1], S. Taber[1], A. Ray[1], J. R. Frank[1], R. Almond[2], A. MacLellan[3], L. Samson[3]

[1]Royal College of Physicians and Surgeons of Canada, Ottawa, ON; [2]College of Family Physicians of Canada, Mississauga, ON; [3]Collège des médecins du Québec, Montréal, QC

Introduction: The Canadian residency accreditation system (CanERA) comprises 10 components; one is a longer, yet more continuous accreditation cycle with the ongoing review of quality data. Annual resident and faculty surveys are one method used to introduce data throughout the cycle.

Methods: A group of experts, including the accreditation colleges, leaders in medical education, and residents, developed a resident questionnaire with 13 questions across 6 themes: quality of the clinical environment, supervision, intimidation and harassment, work balance, quality of the academic environment, and assessment. Questions were linked to the accreditation standards and adapted from existing learning environment questionnaires. The faculty questionnaire was developed to mirror the resident questionnaire but adapted for the faculty's perspective. The surveys were sent to all residents and faculty at 3 Canadian universities. Exploratory factor analysis and internal consistency testing were conducted.

Results: Exploratory factor analysis of 602 completed resident surveys and 674 completed faculty surveys identified one factor for both surveys (experiences of the learning environment); no items were removed but communalities revealed some problematic questions. Factor loadings ranged from 0.42 to 0.77. Internal consistency coefficients were strong (resident survey: lambda 6 = 0.914, alpha = 0.91; faculty survey: lambda 6 = 0.888, alpha = 0.881).

Conclusions: Analysis demonstrated appropriate internal validity and reliability, providing preliminary evidence that the survey data can be used by residency programs and institutions to monitor quality of residency education in between formal accreditation reviews as part of continuous quality improvement.

003

Accreditation in Canadian Postgraduate Medical Training Programs: An Analysis of Accreditation Standards and Their Ability to Predict Accreditation Outcomes

T. R. Dalseg[1], A. Ronson[2], S. Taber[2], T. Phillips[2], J. R. Frank[2], C. Lee[3]

[1]University of Toronto, Toronto, ON; [2]Royal College of Physicians and Surgeons of Canada, Ottawa, ON; [3]Faculty of Health University of Newcastle, Callaghan, NSW

Introduction: Education accreditation is a critical function in any health professions education system. However, the paucity of research in accreditation undermines validity arguments and impairs system improvements. We sought to characterize the relationship between the scoring of accreditation standards and program accreditation outcomes in a large multidecade collection of Canadian PGME program reviews.

Methods: This quantitative study uses data from Royal College of Physicians and Surgeons of Canada (RCPSC) postgraduate medical specialty accreditation reviews collected between January 2003 and November 2014. We identified which accreditation standards are cited most commonly, the association between standards cited and program accreditation outcome, and utilized a cumulative odds ordinal logistic regression with proportional odds to formulate a predictive model.

Results: From 1468 accreditation reviews, 14818 accreditation standard citations were collected; 6189 (41.8%) were cited as weaknesses. Ultimately, 18 of 129 standards were significantly associated with an unfavorable outcome (any outcome other than accreditation with follow-up at next regular review). Using these variables, a model was created that predicted 54.3% of those programs accredited with notice of intent to withdraw, 69.4% of those accredited programs with external review, and 80.5% of those programs accredited with internal review/progress report.

Conclusions: The accreditation outcome of programs undergoing RCPSC accreditation review can be predicted based on cited standards. The results contribute to the validity evidence for accreditation and will be used to strengthen accreditation system design and residency education. Future research may consider accreditation as a complex system to examine influencing variables and contemplate novel evaluation approaches.

004

Transitioning Toward Best Practices in Residency Application and Selection: A Work in Progress Snapshot of a Canadian University's Residency Programs Admission Processes

J. Leduc[1], P. Chrétien Raymer[2]

[1]Hôpital Sacré-Coeur, Montréal, QC; [2]CHUM, Montréal, QC

Introduction: Best practices in applications and selection (BPAS) for postgraduate medical education (PGME) are now promoted by the AFMC and CaRMS. In this study, we aimed to identify areas for improvement (AFI) in the PGME selection processes at Université de Montréal (UdeM).

Methods: An online questionnaire was sent to 73 PD at UdeM to assess selection procedures related to BPAS.

Results: Fifty-four PD (74% participation) completed the online survey. Most programs had well-defined selection tools, file review steps, and desired candidate characteristics (94%, 80%, and 61%, respectively), but fewer programs had clear "do not rank" (DNR) criteria, procedures to disclose conflict of interests (COI) or methods to manage data obtained outside the formal selection process (32%, 11%, and 2%, respectively). Only 55% of programs openly disclosed to candidates how they generated the final ranking list. Less than two-thirds of programs formally trained their admission committee members for file review and interview processes (57% and 41%, respectively). Only 8% of interviews were performed completely independently, without access to the rest of the applicant's file. A minority of programs (10%) performed psychometric analysis of their selection tools' data.

Conclusions: This study identified many AFI and challenges in our PGME selection processes that will help to guide BPAS implementation in our institution, including improving transparency for some elements (DNR criteria, COI disclosure, and final ranking method), increasing admission committee training and obtaining more resources for psychometric analysis of their selection tools.

005

Enhancing Faculty Skills and Applicant Experiences Through Structured Interviews

A. Gardner[1]

[1]Baylor College of Medicine, SurgWise Consulting, Houston, TX

Introduction: Over four-fifths of surgery applicants receive at least one inappropriate or illegal question during the interview process. We describe the effectiveness of a half-day structured interview training course on improving faculty knowledge and skills and applicant perceptions.

Methods: Faculty across multiple general surgery residency programs participated in a half-day structured interview course led by industrial-organizational psychologists at their respective locations. Faculty completed a 15-item pre and post-course competency assessment to measure changes in knowledge and skills. Applicants were sent a follow-up survey assessing interview day experiences.

Results: One hundred six faculty across 5 programs completed the course. Interviewers demonstrated proficiency on only a third of the items on the interviewer competency assessment prior to completing the course (34%). After the course, baseline knowledge significantly increased across all interviewers ($P < .01$). Approximately one-third of all interviewing applicants (133 of 400) responded to the survey. Overall, applicants agreed that the interview experience was more positive at these programs compared to other programs ($\bar{x} = 3.23$, SD = 0.91), with almost half reporting that the interview days seemed more organized (40%), faculty seemed more organized (45%), and questions asked were more relevant to residency requirements (43%) at these programs. Twice as many applicants agreed than disagreed that they were better able to determine their fit at these programs compared to other programs to which they applied (40% versus 21%, $P < .05$).

Conclusions: Prior to focused training, surgeons demonstrate wide variability in knowledge and skills needed to conduct structured interviews. Training can create more uniform faculty competency and enhance applicant perceptions of the program.

006

Exploring the Profiles of Applicants Over 35 Years Old in Resident Education

L. Niemi-Murola[1], A. Toivonen[1], T. Autti[1]

[1]University of Helsinki, Helsinki, Finland

Introduction: Before education reform in Finland, residents were able to register to more than one program without any application process. We explored the data physicians of older than 35 years registered as residents during years 1999 to 2009 without graduating in due time, to find factors behind the late start.

Methods: We found 877 residents, of whom 289 were over 35 years old (33.0%) when they were registered in the University of Helsinki. Demographic data of these residents was retrieved from the files of the University and their professional status was investigated from different official and unofficial registers in 2019.

Results: In the group who eventually graduated (N = 132 of 289), the mean age to start resident education was 39.0 years (SD 4.0) and it was 41.0 (SD 4.60) in the group who are still in progress (N = 157 of 289, $P < .01$). Of the graduated majority were women (58.4%), 22.6% had a PhD and the most popular specialty was internal medicine (17.5%). The mean duration of education was 4.50 years (SD 3.6) and 78.7% had changed their major. Of those 157 residents still in progress, 54.1% were women, 6.3% had a PhD, and the most popular specialties were occupational health (36.3%), family practice (15.9%), and psychiatry (8.9%).

Conclusions: The residents starting their education when being over 35 years old have a good prognosis for graduating if there are background factors explaining the delay. However, applicants in some specialties need specific counseling before making their career choice.

007

Implications of Using an SJT in Admissions for Predicting Future Professionalism Issues

A. Saxena[1], K. Dore[2], C. Zou[3], H. Reiter[4]

[1]University of Saskatchewan, Saskatoon, SK; [2]McMaster University, Burlington, ON; [3]Independent Consultant, Toronto, ON; [4]McMaster University, Hamilton, ON

Introduction: Admissions faces the challenge to predict future problematic students. Traditional cognitive measures can predict for academics, but non-academic measures traditionally provide little differentiation between applicants or predict professionalism problems. The University of Saskatchewan piloted the use of an online Situational Judgement Test (SJT), CASPer, to broadly measure non-academic qualities at the time of screening for interview.

Methods: This study examined the impact on professionalism issues, formal remediation incidents, and associated cost analysis based on prescreening for non-academic attributed in Canadian specialty selection. A retrospective cohort study examined differences in resident performance prior to and after SJT implementation across multiple specialty selection programs. The analysis examined comparisons between 2 cohorts of first-year residents (PGY-1) after the implementation of CASPer (2017 and 2018, n = 237), and the 2 cohorts prior to the implementation of CASPer (2015 and 2014, n = 234). The outcome included professionalism incidents and remediation issues and a cost-analysis.

Results: In the control group, there were 12 professionalism concerns, and 5 required formal intervention. In the CASPer-assessed group, there were 3 professionalism concerns, 1 required formal intervention. In the control group, there were 7 trainees with low ratings in non-medical knowledge roles, and 5 were remediated. In the CASPer-assessed group, 3 trainees received low ratings on non-medical knowledge roles, and 2 were remediated. The total cost savings for the CASPer-assessed group was $119,754.72 CAD.

Conclusions: The results demonstrate the ability to include an SJT measure of non-academic attributes (CASPer) as an indicator of future professionalism performance in program.

008

Unified Selective Process for Admission to Medical Residency

A. F. Lages[1], R. Valacio[1], T. Marcial[1]

[2]AREMG (Medical Residency Support Association of Minas Gerais, Brazil), Belo Horizonte, MG, Brazil

Introduction: In Brazil, the medical residency is developed in hospitals accredited by a commission of the Ministry of Education. The admission process for the programs is given out by each institution and the beginning of the programs is from March 1 to 31 throughout the country. Minas Gerais is one of the largest states in the country with a population of 22 million inhabitants. The health care system includes public, philanthropic and private hospitals. Medical residences operate in 116 hospitals. For the admission process there would have been 116 different selection processes offering 1918 vacancies to trained doctors each year.

Methods: Through the Medical Residency Support Association of Minas Gerais (AREMG), a non-profit association founded in 2002 and aimed at promoting medical residency in the state, we brought together most institutions and proposed the creation of a unified selective process for access to medical residency where in a single test, plus an overview of their curriculum the candidate would apply to all vacancies that were of their interest.

Results: The main results achieved were the simplification of the process, increased opportunity for all candidates, and increased occupancy rate as there was a large loss due to competition between institutions. This vacancy rate fell from 18.2% in 2009 before the unified process to 3.2% in 2018.

Conclusions: The unified selective process for admission to medical residency contribute significantly contributed to the development of medical residency in Minas Gerais by improving the occupation of vacancies and offering opportunities to a larger number of candidates.

009

Addressing the Diversity–Validity Dilemma in Admissions Using Situational Judgment Tests

F. Juster[1], K. Dore[2], C. Zou[3], H. Reiter[4]

[1]New York Medical College, New York, NY; [2]McMaster University, Burlington, ON; [3]Altus Assessments, Toronto, ON; [4]McMaster University, Hamilton, ON

Introduction: Inclusion of non-academic metrics for specialty selection is complex due to limited validity evidence of most tools. However, non-academic metrics often have smaller subgroup differences compared to cognitive measures. To examine subgroup differences in scores a large cohort of applicants to undergraduate medical education (UME), where validity-supported academic and non-academic tools are used, were examined (grade point average [GPA]; Medical College Admission Test [MCAT and MCAT 2015]; situational judgment test [SJT-CASPer]; and multiple mini interview [MMI]). The authors also examined the diversity implications of the admission tests.

Methods: The authors analyzed data from one cycle of applicants to a US medical school (n = 9096), calculating effect sizes (Cohen's d) for all tools. Comparisons were made across gender, race, ethnicity, and socioeconomic status. To determine the impact of including non-academic selection tools, a series of admissions simulations were conducted to estimate the number of underrepresented-in-medicine applicants who would have been invited to interview with different weightings or thresholds applied for the academic and non-academic scores.

Results: Group differences were significantly smaller or reversed for SJT-CASPer and MMI compared with the cognitive assessments (MCAT, GPA) across nearly all demographic variables/indicators. The simulations suggested that a higher weighting of SJT-CASPer may help increase gender, racial, and ethnic diversity in the interview pool while not compromising academic thresholds; results for low-SES applicants were mixed.

Conclusions: The simulation done in UME has implications and insights for potential to include non-academic measures during screening for specialty training to widen participation given similar subgroup differences patterns.

010

The Influence of a Brief Pathology Elective on Medical Student Interest and Understanding of Careers in Pathology and the Decision to Pursue a Pathology Residency

R. Rafiq[1], T. Dow[1], T. Arnason[1], J. Hatchette[2]

[1]Dalhousie University, Halifax, NS; [2]IWK Health Centre, Halifax, NS

Introduction: There is a shortage of pathologists in Canada, and with only 1% to 3% of medical students pursuing pathology residency, this trend is predicted to continue. Studies have shown there is not a conscious rejection of pathology, but rather a lack of recognition as a career option. Current approaches to exposing medical students to pathology are not well reported. This study assessed student interest and understanding of pathology careers, as explored in the Pre-clerkship Residency Exploration Program (PREP).

Methods: PREP is a 2-week elective that exposes 40 students to 14 specialties, 1 of which is pathology. Students' knowledge, attitudes, and behaviors toward pathology careers were assessed using pre- and post-program questionnaires. Pathology exposure during the program included a half day each of job-shadowing a pathologist and a hospital-based workshop, as well as a resident careers and lifestyle discussion.

Results: Excluding the 3 student PREP directors, 37 students completed the surveys. Findings indicated significant improvements in students' understanding of the daily responsibilities of a pathologist ($P < .01$). Students also reported that PREP provided sufficient exposure to decide on whether to pursue a pathology career ($P < .01$). There was no evidence that the experience changed student attitudes or behaviors toward actually choosing a pathology residency.

Conclusions: These findings indicate that a brief exposure to pathology through PREP can improve students' understanding of pathology careers. To assess if PREP will influence pathology residency recruitment, continued surveying and CaRMS match statistics can be assessed along with the expansion of PREP to other schools.

011

Improving Our Ability to Predict Resident Applicant Performance: Validity Evidence for a Situational Judgment Test

M. Cullen[1], C. Zhang[1], B. Marcus-Blank[1], J. Braman[1], M. Konia[1], M. Hunt[1], M. Lee[1], A. Van Heest[1], R. Englander[1], P. Sackett[1], E. Tiryaki[2], J. Andrews[3]

[1]University of Minnesota, Minneapolis, MN; [2]Minneapolis VA Healthcare System, Minneapolis, MN; [3]American Medical Association, Chicago, IL

Introduction: There is consensus regarding the importance of assessing professionalism in medical students, residents, and practicing physicians. In this study, we examine the relative utility of a new assessment tool, the situational judgment test (SJT), and USMLE Step 1, Step 2 Clinical Knowledge (CK) and Step 3 scores to predict resident performance on ACGME competencies and a multisource professionalism assessment (MPA).

Methods: We developed an SJT to measure 7 dimensions of professionalism. In 2017, 21 residency programs from 2 institutions administered the SJT. We conducted hierarchical regression analyses to determine the relative validity of SJT and USMLE scores in predicting milestone performance in ACGME core competency domains and the MPA upon SJT completion and 3 months later for the MPA and 1 year later for ACGME domains.

Results: At both time periods, the SJT score predicted overall ACGME milestone performance ($r = 0.13$ and 0.17, respectively, $P < .05$) and MPA performance ($r = 0.19$ and 0.21, respectively, $P < .05$). In addition, the SJT predicted ACGME patient care, systems-based practice, practice-based learning and improvement, interpersonal and communication skills, and professionalism competencies ($r = 0.16$, $r = 0.15$, $r = 0.15$, $r = 0.17$ and $r = 0.16$, respectively, $P < .05$) 1 year later. The SJT score contributed incremental validity over USMLE scores in predicting overall ACGME milestone performance ($\Delta R = .07$) 1 year later and MPA performance ($\Delta R = .05$) 3 months later.

Conclusions: SJTs show promise as a method for assessing noncognitive attributes in residency program applicants.

012

Factors Associated With Specialty Interest in Canadian Pre-Clerkship Medical Students

M. Sun[1], T. Dow[1], K. Brennan[1], D. Davies[1]

[1]Dalhousie University, Halifax, NS

Introduction: Numerous studies have suggested early exposure to specialties positively influence students' choice of that field. For residency programs to optimize recruitment and attract the best students, factors that influence student interest in specialties should be considered when designing residency exploration initiatives. The purpose of this study is to identify factors associated with student interest in surgical and nonsurgical specialties at the pre-clerkship level.

Methods: Online surveys were distributed to all first and second-year medical students at Dalhousie Medical School. The survey assessed demographics, current career interest, career-influencing factors, and level of grit. Multivariate logistic regression was conducted incorporating variables with $P \leq .20$ on univariate analysis to identify factors associated with student interest of surgical disciplines, non-surgical disciplines, or undecided.

Results: Of the 49% of students (107 of 219) who completed the survey, 20 (19%) and 30 (28%) listed surgical and non-surgical disciplines as their current career interest, respectively, while 57 (53%) remained undecided. Multivariate analysis revealed lower prioritization of medical lifestyle to be associated with interest in surgical disciplines ($P = .032$), while older age ($P = .001$) and decreased interest in research ($P = .001$) were associated with interest in medical disciplines.

Conclusions: Our study identified lower prioritization of medical lifestyle to be associated with interest in surgery, while interest in medical specialties was associated with older age and decreased interest in research. These findings provide insight into potential deterrents to pursuing careers in surgical and non-surgical specialties, and identify important factors residency programs should target in order to optimize early exposure of their specialty to medical students.

013

Effect of the Transition to an Entrustability Scale on Assessor Stringency and Leniency on Daily Encounter Cards in Emergency Medicine

S. Dewhirst[1], W. J. Cheung[1], T. J. Wood[1], N. Dudek[1], J. R. Frank[2]

[1]University of Ottawa, Ottawa, ON; [2]Royal College of Physicians and Surgeons of Canada, Ottawa, ON

Introduction: Workplace-based assessments (WBAs) are integral to postgraduate medical training. However, assessors have individual tendencies to rate learners leniently/stringently. Outlier assessors produce data that may not reflect the learner's performance. In June 2018, we introduced a new Daily Encounter Card (DEC) using entrustability scales, which reflect the degree of supervision required for a task, and are shown to improve assessment reliability. We hypothesize they will reduce the number of outlier assessors.

Methods: Prospective pre-/post-implementation study, including DECs completed between July 2017 and June 2019 at the Ottawa Hospital Emergency Department. Outlier assessors were identified as follows: an assessor is a potential outlier if the mean of their awarded scores was more than 2 standard deviations from the mean score of all completed assessments. For assessors identified in step 1, their learners' scores were compared to the mean of all learners. This verifies that the assessor was not awarding outlying scores due to working with outlier learners.

Results: 3927 and 3860 assessments were completed by 99 and 116 assessors in the pre- and post-implementation phases respectively. We identified 9 vs 5 outlier assessors ($P = .16$). Of these, 6 vs 0 ($P = .01$) were stringent, while 3 vs 5 ($P = .67$) were lenient.

Conclusions: Our method successfully identified outlier assessors and could potentially identify assessors who might benefit from targeted feedback on their assessments. Transitioning to entrustability scales resulted in a nonsignificant trend toward fewer outlier assessors. Further work is needed to identify ways to mitigate the effects of rater cognitive biases.

014

Does the Ottawa Emergency Department Shift Observation Tool Give More Useful Information—Assessing the Utility of Transitioning to a Novel, Entrustability-Based Assessment Tool in the Emergency Department

S. Dewhirst[1], W. J. Cheung[2], T. J. Wood[2], N. Dudek[2], J. R. Frank[3]

[1]The Ottawa Hospital, Ottawa, ON; [2]University of Ottawa, Ottawa, ON; [3]Royal College of Physicians and Surgeons of Canada, Ottawa, ON

Introduction: The Ottawa Emergency Department Shift Observation Tool (O-EDShOT) was developed to assess a resident's ability to run an emergency department (ED) shift. It is supported by multiple sources of validity evidence and was found to discriminate between learners of different levels. In June 2018 we replaced norm-based daily encounter cards (DECs) with the O-EDShOT. Ideally, assessment score variability is explained by variation in learners' performances. In reality, however, much of the observed variability is explained by other factors. This study seeks to determine the proportion of score variability accounted for by learner variability when using norm-based-DECs vs the O-EDShOT.

Methods: Prospective pre-/post-implementation study, including DECs completed between July 2017 and June 2019 at The Ottawa Hospital ED. A generalizability analysis was performed to determine the proportion of score variability attributable to learner variability for the pre-/post-implementation phases.

Results: 3908 and 3679 assessments were completed by 99 and 116 assessors in the pre-/post-implementation phases, respectively. Generalizability analysis reveals that 21% vs 59% of score variability is explained by a combination of postgraduate year and individual learner, and 51 vs 27 forms/learner are required for a reliability of 0.80 in the pre-/post-implementation phases, respectively.

Conclusions: A significantly greater proportion of score variability is explained by variation in learners' performances with the O-EDShOT compared to norm-based-DECs. The O-EDShOT also requires fewer assessments to generate a reliable estimate of the learner's ability. This suggests the O-EDShOT is a more useful tool than norm-based-DECs and could be adopted in other emergency medicine training programs.

015

A Quantitative, Patient-Oriented Approach to Formative Assessment of CanMEDS Roles

A. M. Esteves[1], M. McConnell[1], A. Garber[1], K. Fung-Kee-Fung[1], E. Ferretti[2]

[1]University of Ottawa, Ottawa, ON; [2]Children's Hospital of Eastern Ontario, Ottawa, ON

Introduction: Since introduction of CanMEDS into the postgraduate curriculum, program directors have struggled to implement robust assessment tools to target performance of these desirable skills. Multi-source feedback from patients and learners themselves has been identified as a legitimate tool for assessing CanMEDS competencies. The primary objective of this study was to determine the reliability and validity of our novel quantitative questionnaire designed to assess trainees' clinical performance in the Communicator, Professional, and Health Advocate roles. Secondary objectives were to engage healthcare consumers in real-time assessment of physicians, promote self-reflection among trainees, and to determine the level of concordance between self-ratings and patients' ratings of competencies.

Methods: This was a prospective case-control study investigating performance of neonatal-perinatal-medicine and maternal-fetal-medicine fellows rotating through high risk pregnancy clinics at The Ottawa Hospital. A total of 70 self-evaluations and 69 patient questionnaires were collected for analysis. Generalizability analyses were conducted for both self and patient surveys to examine the reliability of the questionnaires.

Results: Generalizability analysis demonstrated that both self and patient questionnaires were reliable (g-coefficient > 0.9). Nearly all variability in the responses originated from the interaction between resident and competency indicating that residents varied across all 3 competencies. This suggests that both residents and patients were able to distinguish between the different competencies rather than assigning a global score.

Conclusions: We anticipate that our questionnaire will be a bridging tool to transition into the new Competence by Design assessment strategies with its increased emphasis on direct/indirect observation and actionable, timely feedback.

016

Feedback Friday: Facilitated Team-Based Assessment Fills the Gap in Delivering CanMEDS Intrinsic Role Feedback to Residents

D. R. Taylor[1], H. Braund[1], R. O'Dell[1], N. Dalgarno[1]

[1]Queen's University, Kingston, ON

Introduction: Competency-based medical education relies on feedback from workplace-based assessment (WPA) to direct learning for clinical trainees. Although WBA feedback typically spans the CanMEDS roles, its bias is toward capturing Medical Expert aspects of care. Prior research shows that facilitated and interactive assessment approaches improve collection of feedback for the CanMEDS intrinsic roles. The Queen's University internal medicine residency program introduced a facilitated, team-based assessment initiative ("Feedback Fridays") in July 2017, aimed at improving holistic assessment of resident performance on the inpatient medicine teaching units. This study explores the content discussed during group assessment sessions.

Methods: Fifty-three residents participated in facilitated group assessment sessions. Each session was a 30-minute focus group-style discussion done with one inpatient team. Feedback was summarized and documented in narrative form in electronic WBA forms. These were reviewed and signed by supervising faculty and sent to each resident following the session. Narrative WPA data from the sessions were analyzed thematically.

Results: Residents focused their feedback on four major areas: communication, personal characteristics, leadership and teamwork, and learning opportunities. Feedback within these areas covered a broad range of activities on the inpatient teaching unit including, but not limited to, aspects of direct patient care, team dynamics, and contributions to the learning environment. The focus of feedback emphasized areas related to the intrinsic CanMEDS roles.

Conclusions: The introduction of facilitated team-based assessment in the Queen's internal medicine program improved the quality of narrative feedback provided to residents, with a strong focus on the intrinsic CanMEDS roles.

017

Do Entrustment-Based Ratings Accurately Reflect Trainee Performance?

P. Kalun[1], D. Wilson[1], J. Zering[1], C. Tran[1], R. Sonnadara[1]

[1]McMaster University, Hamilton, ON

Introduction: Assessment frameworks in Competence by Design (CBD) are closely linked to entrustable professional activities, which are assessed using entrustment-based rating (EBR) scales. Although such scales are gaining wide adoption, relatively little is known about the factors that influence EBRs. We explored how EBR scales are influenced by factors other than trainee competence.

Methods: Orthopaedic trainees completed procedures independently on cadavers, and performance was assessed by fellows and staff surgeons. The assessments for each procedure contained several procedural steps, with each step being scored on a 5-point entrustment scale ranging from "I had to do" to "I didn't need to be there." Interviews with assessors explored how their performance ratings in the simulation compared with anticipated ratings of the same performances in the clinical setting. Interviews were transcribed verbatim and analyzed for themes.

Results: EBRs were influenced by several factors beyond trainee competence. Some assessors were more lenient on trainees who struggled due to equipment challenges, reporting this may have negatively impacted performance. Assessors also noted that since trainees were afforded extra time to operate on cadavers compared with patients, trainees were able to work through difficult tasks and potentially achieve higher ratings than in a clinical setting, thus further inflating scores.

Conclusions: EBRs of trainee performance in this high-fidelity simulation were strongly influenced by factors unrelated to trainee competence. Thus, assessments based around EBRs may not accurately track trainee progress in CBD. Programs should include additional data sources to enable more accurate reflections of trainee competence.

018

Informed Consent Observation Tool (ICOT): Development and Validation of a Learning Tool for Surgical Training

J. N. Atkin[1], I. W. Incoll[2], J. Owen[3], P. A. Moore[4], C. Lee[5]

[1]Nikta Projects, Sydney, NSW; [2]Australian Orthopaedic Association, Erina Fair, NSW; [3]Australian Orthopaedic Association, Melbourne, Australia; [4]Australian Orthopaedic Association, Victoria, Australia; [5]University of Newcastle, Sydney, Australia

Introduction: Informed consent (IC) is a crucial aspect of quality patient-centered health care. Research indicates that many doctors do not adhere to legal and ethical best practice in relation to IC, and there are currently no validated tools to assess proficiency. This study aims to develop a valid and reliable tool to evaluate a surgeon's ability to obtain IC and to provide targeted feedback on specific, but often neglected, areas of the process.

Methods: The Informed Consent Observation Tool (ICOT) was developed as a 6-item assessment tool based on elements of legally and ethically valid consent. To trial the ICOT, a group of 38 introductory orthopaedic trainees were asked to obtain informed consent from a simulated patient. For each trainee, one evaluation was completed in person and 2 additional evaluations were completed by the same group of raters using recorded videos of the live sessions. Scores were analyzed to determine interrater and intrarater reliability.

Results: The results demonstrated that the intrarater reliability of the ICOT was high, indicating consistency within each rater's evaluation of trainees. However, interrater reliability was low. Following the initial analysis, the ICOT was amended to improve specificity for each item. The trial was then repeated with the amended ICOT with a second group of introductory trainees and the amendments were found to significantly improve interrater reliability.

Conclusions: The ICOT will help to drive learning in this essential, but rarely explicitly taught, component of surgical practice.

019

Documenting the Process of Using Electronic Health Record Data to Assess Residents' Performance: Unveiling the Emergency Medicine Resident Prototype Report Card

S. Sebok-Syer[1], A. Dukelow[2], R. Sedran[2], J. Shaw[3], L. Lingard[3], L. Shepard[3], A. McConnell[4]

[1]Stanford University Department of Emergency Medicine, Palo Alto, CA; [2]London Health Science Centre, London, ON; [3]Western University, London, ON; [4]Division of Emergency Medicine, London, ON

Introduction: Physician report cards are an important aspect of outcomes-based practice and education. Therefore, we investigated how data collected from the electronic health record (EHR) could assess emergency medicine (EM) residents' independent and interdependent clinical performance and how such information can be appropriately represented in an EM resident report card.

Methods: Cerner EHR data were collected from 2017–2018, representing approximately 150 000 patient visits to the Emergency Department and 850 patient encounters, for one randomly selected fifth-year EM resident. A fifth-year resident was used for developing our prototype because we anticipated this performance level affords the best opportunity to look at both independent and interdependent metrics. Once we extracted all EHR data for our randomly selected resident, we developed an EM resident prototype report card that compared the resident's performance to faculty/other residents' performance.

Results: Our prototype breaks down EHR data by blocks, which better aligns with the rotation schedules of residents. Depending upon the metric (eg, number of patients seen, bounce-back rates, or time to fluids/antibiotics), resident data were compared to faculty or year-appropriate residents. Each metric was accompanied by an explanation of the metric and designation of independent or interdependent based on earlier interviews with faculty and residents. Finally, we present our development timeline and the resident prototype report card.

Conclusions: Our findings document a process for developing resident report cards that incorporates the perspectives of clinical faculty and residents. This work has important implications for capturing residents' contributions to clinical performances by distinguishing between independent and interdependent performance.

020

Validity as Implicit and Risky When Translating Outcome Frameworks to Assessment Programs in Competency-Based Medical Education

W. Tavares[1], P. Rowland[1], D. Dagnone[2], L. A. McEwen[2], M. Sibbald[3]

[1]University of Toronto Wilson Centre, Toronto, ON; [3]Queens University, Kingston, ON; [5]McMaster University, Hamilton, ON

Introduction: Outcome frameworks in competency-based medical education (CBME) have been used to inform assessment frameworks. The challenge, however, is while serving some purposes well (eg, defining outcomes), the translational process of moving from outcome frameworks to assessment activities is uncertain, including impact on validity. We explored the *translation* from outcome framework to formative and summative assessment plans in postgraduate medical education and their impact on assessment validity.

Methods: Interview-based study involving 3 Canadian university postgraduate medical education programs. We recruited program directors and/or committee members from a variety of specialties involved in the development of assessment plans using outcome frameworks. Interviews (n = 24) were guided by Callon's theory of translation, which suggests translation is not just a cognitive exercise, but a social and political act as well. Interviews were analyzed using directed content analysis, informed by Kane's approach to validity.

Results: Using outcome frameworks for assessment planning served as a passage point for good assessment but accountabilities of validity were displaced (ie, belonged to others). Second, validity was represented as not being the core influencer, having to compete with negotiating implementation, accreditation, and technology needs. Third, with many unchecked assumptions, contributions to validity were potentially remained threatened, uncertain, and assumed (rather than demonstrated).

Conclusions: The social environment and process in which the translational processes are taking place shape eventual assessment plans with different stakeholder views/needs diminishing or deemphasizing assessment validity. Assessment planning becomes more or at least additionally about social interactions and negotiations than pure assessment science.

021

Competency-Based Medical Education: Past, Present, and Future

H. Kettaneh[1], D. Dagnone[1]

[1]Queen's University, Kingston, ON

Introduction: In the early 1990s, the RCPSC with support from Associated Medical Services, leveraged the Educating Future Physicians for Ontario collaborative project that was in response to the 1986 Ontario physicians' strike and the 1978 World Health Organization report to develop a competency framework for specialist physicians. The resultant CanMEDS framework has been used to direct PGME in Canada and become the most widely accepted and widely applied physician competency framework in the world. By reviewing not only recent empirical research, but also examining historical roots and conceptual frameworks that underlie the CBME initiative, and capturing the lived experiences of involved actors, this research will tell the multidimensional story of CBME and provide directions and recommendations for the future of CanMEDS roles framework.

Methods: Using a multiphase curriculum-history approach, our research examines the CBME paradigmatic shift in Canada by: (1) examining related archival documents; (2) investigating the available academic literature since 1990; and (3) capturing the perceptions of different stakeholders in a pan-Canadian qualitative study.

Results: Findings suggest that more than 30 years of research has identified many historical, political, technological, and societal happenings found to shape the current CBME curricula in Canada. Final results from this study will be available at the time of presentation.

Conclusions: CBME is a learner-centered, transformational, and progressive innovation that aims to enhance patient safety and meet societal needs. Big data and artificial intelligence, Indigenous education, climate change education, as well as diversity, equity, and inclusion are among the recommendations for future CBME implementation.

022

Ready for Launch? A Survey of Readiness Factors Among 2019 Competence by Design Launch Disciplines in Canada

W.J. Cheung[1], A.K. Hall[2], T.R. Dalseg[3], A. Oswald[4], L. Cooke[5], E. Van Melle[6], A. Skutovich[7], L. Gorman[8], S. Taber[8], J.R. Frank[8]

[1]University of Ottawa, Ottawa, ON; [2]Queen's University, Kingston, ON; [3]University of Toronto, Toronto, ON; [4]University of Alberta, Edmonton, AB; [5]University of Calgary, Calgary, AB; [6]Royal College of Physicians and Surgeons of Canada, Kingston, ON; [7]Royal College of Physicians and Surgeons of Canada, Gatineau, QC; [8]Royal College of Physicians and Surgeons of Canada, Ottawa, ON

Introduction: A critical component for successful implementation of any innovation is an organization's readiness for change. The purpose of this study was to measure readiness to implement Competence by Design (CBD) among the 2019 launch disciplines in Canada.

Methods: A survey was distributed to program directors 1 month prior to implementation. The $R=MC^2$ framework for organizational readiness informed question development which addressed: program motivation, general capacity for change, and innovation-specific capacity. Bivariate correlations were conducted to examine the relationship between motivation, general capacity, and innovation-specific capacity.

Results: Survey response rate was 42% (n = 79). A positive correlation was found between all 3 domains of readiness (motivation and general capacity, $r = 0.73$, $P < .01$; motivation and innovation-specific capacity, $r = 0.52$, $P < .01$; general capacity and innovation specific capacity, $r = 0.47$, $P < .01$). Most respondents agreed that successful launch of CBD was a priority (74%), and that their leadership (94%) and faculty and residents (87%) were supportive of change. Fewer felt that CBD was a move in the right direction (58%) and that implementation was a manageable change (53%). Programs had completed an average of 72% of pre-implementation tasks. There was no difference between disciplines ($P = .11$). Activities related to curriculum mapping, competence committees and programmatic assessment were completed by > 90% of programs, while < 50% of programs had engaged off-service rotations.

Conclusions: Measuring readiness for change aids in the identification of factors that promote or inhibit successful implementation. These results highlight several areas where programs may struggle in preparation for CBD launch.

023

Normalizing CBD: Co-Creating an Evaluation Plan Using the Interests of Program Directors Across Specialties

D. Hamza[1], A. Oswald[1]

[1]University of Alberta, Edmonton, AB

Introduction: The implementation of Competence by Design (CBD) in postgraduate medical education programs across Canada is an area ripe for evaluation. Evaluation can be a prescriptive process; however, evidence suggests that involving relevant stakeholders and co-creating an evaluation plan may facilitate better engagement in the work required to shift to CBD, and normalization of processes. The purpose of this project was to create an inventory of interests of program directors (PDs) from one Canadian university.

Methods: Data from semi-structured interviews were analyzed using descriptive statistics, thematic analysis, and content analysis.

Results: Fourteen of 24 (58%) program directors in the 2017–2019 CBME implementation cohorts participated in this project. Nine of 14 (64%) PDs have specific interest areas for evaluation. Identifying residents in difficulty earlier, particularly for shorter programs (> 2 years), was the most frequently identified interest followed by how much feedback is enough, and how to support faculty in the provision of quality narrative feedback that is documented. Other interests reported by PDs include the appropriateness of new assessments in developing a global impression of learners, how residents navigate assessment of learning (performance) versus assessment for learning (growth), and how residents cope and adapt with the shift in training model.

Conclusions: The development of an inventory supported cross-specialty connections and collaboration on projects, directing resources and expertise to areas of interest and reducing unnecessary overlap. PD engagement in the evaluation process may promote legitimacy of change and the value of participating in studies to better understand CBD.

024

Curriculum Mapping Can Facilitate Transition to Competence by Design

C. Curtis[1], A. Mineyko[1]

[1]University of Calgary, Calgary, AB

Introduction: Curriculum maps outline the content of an educational program identifying links between targeted outcomes, educational opportunities, and assessments, and differences between the intended and delivered curricula. The transition to Competence by Design (CBD) in Canadian specialty residency programs requires thoughtful reorganization of educational programming. A curriculum map of the traditional program may assist with understanding of the existing curriculum and thereby facilitate planning for CBD.

Methods: A comprehensive map of the traditional pediatric neurology residency curriculum at the University of Calgary was constructed by linking objectives with related learning activities and assessments. Qualitative, line-by-line analysis of this map was conducted to identify gaps in the existing curriculum. The traditional map was then used as a framework to plot the CBD outcomes and curricular structure as these were established.

Results: Generating the traditional curriculum map was a time-consuming process, requiring 48 hours. Detailed review identified a number of objectives that did not easily link to formal learning activities or sources of assessment. Many apparent gaps were recognized to link to non-clinical activities (eg, chief resident year). Using the scaffold of the traditional curriculum map reduced the time required for mapping the planned CBD curriculum to 4 hours.

Conclusions: The creation of a curriculum map prior to transition to CBD has improved our understanding of the existing curriculum and will facilitate transition to CBD. Ongoing evaluation of the fit of our predicted CBD map will be necessary to ensure effective implementation.

025

Workplace-Based Assessment in Emergency Medicine: How Do Physicians Use Entrustment Anchors?

T. Robinson[1], N. Wagner[1], A. Szulewski[1], A. K. Hall[1], N. Dudek[2], W. J. Cheung[2]

[1]Queen's University, Kingston, ON; [2]University of Ottawa, Ottawa, ON

Introduction: Competency-based medical education (CBME) has triggered widespread utilization of workplace-based assessment (WBA) tools using entrustment anchors. This study aimed to identify factors that influence supervisors' choice of ratings and explore their experiences using entrustment anchors, specifically the Ottawa Surgical Competency Operating Room Evaluation (OSCORE) scale anchors, within the context of clinical work in the emergency department.

Methods: A convenience sample of 50 semi-structured interviews with emergency medicine (EM) physicians from a single Canadian hospital system were conducted. All interviews occurred within 2 hours of completing a WBA with an EM trainee. Assessors were asked what they considered when rating the trainee and whether they had any difficulty assigning a rating. Interview transcripts were independently analyzed using thematic analysis by 2 research team members.

Results: Interviews captured interactions between 73% (27 of 37) of EM staff and 83% (37 of 50) of EM trainees, across all levels of training. The mean OSCORE rating was 4.34 ± 0.77 (2 to 5). Six major factors that influenced ratings were identified: amount of guidance required, perceived competence through questioning, trainee experience, clinical context, past experience with the trainee, and perceived confidence. Staff rarely reported struggling to assign ratings, save for occasional difficulty with interpretation of entrustment anchors.

Conclusions: Supervisors appear to take several factors into account when deciding what rating to assign a trainee on a WBA that uses entrustment anchors. These results further our understanding of WBAs using entrustment anchors and may facilitate effective faculty development regarding WBA completion as we move forward in CBME.

026

Establishing Factorial Structure as a Basis for Predictive Validity of Milestone Ratings in the Accreditation Council for Graduate Medical Education (ACGME) Framework

K. Yamazaki[1], E. Holmboe[1], Y. Park[2], S. J. Hamstra[3]

[1]Accreditation Council for Graduate Medical Education, Chicago, IL; [2]University of Illinois, Chicago, Chicago, IL; [3]University of Ottawa, Ottawa, ON

Introduction: An overarching goal of competency-based medical education (CBME) is to link ratings of competence during training to clinically relevant outcomes following graduation. Such predictive validity work requires a clear understanding of the factorial structure of subcompetencies.

Methods: National Accreditation Council for Graduate Medical Education (ACGME) Milestone ratings from emergency medicine (EM; 23 subcompetencies, 167 programs) and obstetrics and gynecology (OB-GYN; 28 of 276) from 2017–2018 were examined. For OB-GYN and EM, respectively, data from 1362–1440 and 1601–1802 residents were used in the analysis, depending on PGY level. To account for clustering effects, we obtained the within-program correlation matrix using residents' deviation scores from their program mean. We investigated the factorial structure of the 6-domain Milestones framework as a measure of residents' achievement in each sub-competency. For each PGY level, the number of factors was determined using the Kaiser Criterion, parallel analysis, and interpretability of factor loadings.

Results: For EM, the 14 patient care (PC) subcompetencies loaded on 2 factors (prioritization, procedural skills). For OB-GYN, PC subcompetencies formed 3 factors: obstetrical-technical skills, gynecology-technical skills, and knowledge-based patient care. For both specialties, no factor structure aligned directly with the 6 core competencies, and professionalism and interpersonal and communications skills loaded on a single factor.

Conclusions: This analysis sheds light on the tendencies of faculty and clinical competency committees in rating competence, and their shared understanding of the distinctive content embedded within different Milestones. While the overarching ACGME framework is unlikely to be modified, this information could be useful in revising the content of particular Milestones within each specialty, and/or for CBME leaders in other jurisdictions.

027

Understanding the Impact of the Junior Attending Role on Transition to Practice in CBME

P. E. Wu[1], R. Dunbar-Yaffe[1], M. Mylopoulos[1], H. McDonald-Blumer[1], W. Gold[1], L. Stroud[1]

[1]University of Toronto, Toronto, ON

Introduction: Transition to Practice (TTP) is the final stage of postgraduate training within a competency-based medical education (CBME) framework in Canada. Data is lacking on how residents prepare for independent practice and how the entrustable professional activities (EPAs) of this stage facilitate this transition. One educational model is the junior attending role, wherein senior residents assume the roles and responsibilities of the attending physician under supervision. Anecdotal evidence suggests heterogeneity in terms of this model's structure, and it is unclear whether it achieves the aims of TTP.

Methods: A collective case study informed by constructivist grounded theory. Twenty-one semi-structured interviews were conducted across 2 cases: one centered on the inpatient, most responsible physician junior attending role (general internal medicine), the other on the consultant junior attending role (infectious diseases and rheumatology). Participants were recent graduates who experienced the junior attending role, supervising faculty, and respective program directors.

Results: Experiencing the junior attending role builds resident confidence in both medical expert and non-medical expert domains and comfort in dealing with clinical uncertainty. It seems best suited to attaining inpatient-based EPAs of TTP. Heterogeneity exists in supervisory style. More positive experiences are reported when there is an establishment of clear goals and role definition that preserve the autonomy of the junior attending role, while maintaining safe patient care, and when a strong relationship exists between resident and supervisor.

Conclusions: The junior attending model can prepare residents for independent practice and help achieve select EPAs in TTP. Guidance to both supervisors and junior attendings is needed to ensure a productive educational experience.

028

Assessment-Seeking Strategy: Understanding the Factors That Influence Residents' Decisions to Seek Workplace-Based Assessment

S. Gauthier[1], H. Braund[1], N. Dalgarno[1], D. Taylor[1]

[1]Queen's University, Kingston, ON

Introduction: Competency-based medical education (CBME) relies heavily on workplace-based assessment (WBA) to generate formative feedback (assessment for learning) and to make inferences about competence (assessment of learning). When approaches to CBME rely on residents to initiate WBA, learners experience tension between seeking WBA for learning and for establishing competence. How learners resolve this tension may lead to unintended consequences for both assessment for learning and assessment of learning. We sought to explore the factors that impact the decision to seek and obtain WBA among internal medicine residents.

Methods: We conducted semi-structured interviews with internal medicine residents (n = 15) at Queen's University using purposive sampling. We applied a constructivist grounded theory approach, using the constant comparative method of analysis to describe relationships between factors that impact assessment seeking. Data collection was deemed to be complete once we obtained theoretical sufficiency.

Results: Participants identified 2 main reasons to seek and trigger assessments: the need to fulfill training program requirements and the desire to receive feedback for learning. Analysis further suggested that these factors are often at odds. Participants also described a number of enabling and inhibiting conditions that impact the decision to seek assessments. These included case-specific factors, performance factors, assessor factors, and program factors.

Conclusions: Faced with the dual purpose of WBA in CBME, residents employ specific assessment-seeking strategies in selecting encounters on which they are assessed. Strategies reflect individual motivations to have assessments completed, influenced by contextual barriers and enablers. These findings have broad implications for programmatic assessment in a CBME context.

029

Linking the College of Family Physicians of Canada Key Features to Family Medicine Entrustable Professional Activities as Core Competencies for Assessment

K. Wycliffe-Jones[1], J. Hui[1], J. Brochu[1]

[1]University of Calgary, Calgary, AB

Introduction: This validation project links 2 assessment frameworks in family medicine (FM) residency education by mapping selected College of Family Physicians of Canada (CFPC) key features (KFs) as core competencies to a set of established FM entrustable professional activities (EPAs). The CFPC evaluation objectives (including the 99 priority topics and their KFs) remain the basis for FM resident assessment in Canada. While some FM programs have developed outcome EPAs, none have insofar adopted the CFPC KFs to define their EPAs at the more granular patient-encounter level.

Methods: Twenty-six FM EPAs were developed by the Calgary FM residency program through a 4-round Delphi process. A 3-stage mapping process was utilized to assign specific KFs to each of these EPAs: (1) in Stage 1, two independent reviewers selected KFs for each EPA; (2) in Stage 2, a committee reviewed and accepted/discarded the initially assigned KFs; and (3) in Stage 3, FM teachers participated in online surveys and facilitated small group meetings to agree on the final sets of KFs for each EPA.

Results: Average number of KFs assigned to each EPA was 82 (10–419). The range was 1 to 12 EPAs for each KF (313 KFs were assigned to 1 EPA and 1 KF was assigned to 12 EPAs). One-hundred three ("orphaned") KFs were not assigned to any EPAs.

Conclusions: This study directly links selected CFPC KFs to a set of developed training outcomes (EPAs) for FM, adding to the validity of KFs as ground-level, observable behaviors that can be assessed and used to make higher-level decisions about competence. These may also be utilized by other Canadian FM residency programs.

030

Creating a Culture of Coaching at Queen's University: Exploring Clinical Teacher Coaching Behaviors in Postgraduate Medical Education

J. Trier[1], J. Turnnidge[1], C. McGuire[1], D. Dagnone[1], J. Cote[1]

[1]Queen's University, Kingston, ON

Introduction: Coaching has become an increasingly popular term used in postgraduate medical education. Although adopting effective coaching behaviors provides a salient avenue for enhancing the clinical learning environment and more specifically, resident development, little is understood about what it means to be an effective coach within the postgraduate medical education context. The aims of this study are to explore clinical teachers' perspectives of effective coaching behaviors and to better understand how these behaviors influence resident learning and development.

Methods: Twelve clinical teachers from various medical and surgical specialties at Queen's University participated in one-on-one semi-structured interviews. Interviews were audio recorded and transcribed verbatim. In alignment with a social constructionist approach, transcripts were thematically analyzed.

Results: Preliminary data highlights the importance of several key coaching behaviors that could enhance clinical teacher effectiveness and resident learning experiences. Participants stressed the importance of demonstrating vulnerability to effectively foster feelings of mutual safety and trust with the residents. Furthermore, clinical teachers emphasized that having shared expectations with their residents enabled them to appropriately challenge residents based on their stage of development. Clinical teachers also encouraged residents to actively seek out their own learning opportunities to further develop residents' autonomy and responsibility.

Conclusions: Clinical teachers identified a variety of behaviors that contribute to effective coaching relationships between clinical teachers and residents. These findings may be valuable for informing the design and implementation of a coaching-based educational intervention to enhance clinical teaching behaviors, and in turn, resident learning experiences.

031

Perceptions of Near-Peer Feedback in Internal Medicine: Entrustable Professional Activities as a Model

J. C. Rassos[1], S. Ginsburg[1], R. Stalmeijer[2], L. J. Melvin[3]

[1]University of Toronto, Toronto, ON; [2]Maastricht University, Maastricht, Netherlands; [3]McMaster University, Hamilton, ON

Introduction: Within competency-based medical education, it is known that meaningful formative feedback has a critical role in trainee development. There has been a push to divert and expand the definition of the feedback provider in the feedback relationship. As such, this study explored the gap in the literature regarding internal medicine residents' perceptions of near-peer feedback in the context of entrustable professional activities (EPAs).

Methods: Semi-structured interviews were conducted with 6 internal medicine junior residents (PGY-1), and 6 senior residents (PGY-2–3) at the University of Toronto. Purposive sampling was used. Interviews were conducted and coded iteratively within a constructivist grounded theory approach until saturation was reached.

Results: Residents recognized that near-peer feedback is frequently occurring, especially since there was a sense of comradery among residents to have EPAs completed. Junior residents felt senior residents provided level appropriate feedback as they possessed a solid understanding of what EPAs are supposed to capture. Despite this, some senior residents did not feel they had enough experience to provide feedback. Even though most EPAs were assessed in the moment, usually on call, documentation often occurred after the fact, leading to a potential discrepancy between verbal and written feedback.

Conclusions: Near-peer feedback offers a unique glimpse into the daily activities of residents, often providing feedback on acts that may go unnoticed to supervisors, especially on call. Moreover, junior residents felt senior feedback was valuable in progressing to the next stage of training. This is reassuring as feedback has an essential role in workplace-based assessment and promotion.

032

Data Source Prioritization Among Novice Raters in Competence Committee Decision-Making

R. Mann[1], A. Acai[1], R. Sonnadara[1]

[1]McMaster University, Hamilton, ON

Introduction: Competence committees (CCs) make judgments about trainees' progression toward competence using different data sources. However, the relative weighting of these data sources remains unclear, making member training and data curation a challenge. This study investigated data source prioritization in CC decision making using a sample of novice raters.

Methods: Fifty-eight undergraduate students were presented with 32 simulated resident portfolios and made decisions about whether or not to promote each resident based on their portfolio. Each portfolio was composed of 5 data sources indicating strong or weak performance in various combinations: numeric entrustable professional activity (EPA) data, narrative EPA data, numeric multisource feedback (MSF) data, narrative MSF data, and numeric examination data. To determine the relative weight of each source, the promotion rate of each resident was compared with the positive control portfolio, where all data sources were strong.

Results: Participants weighted EPA and MSF numeric scores more heavily than EPA and MSF narrative comments. Only 29% of participants promoted a resident whose EPA and MSF numeric scores were weak but whose other data indicated strong performance. Conversely, 90% of participants chose to promote a resident with a similar portfolio except with weak narrative EPA and MSF data.

Conclusions: Novice raters prioritized numeric data over narrative comments, potentially reflecting their perceived "objectivity" and ease of interpretation. This may have implications for understanding the decision-making processes of new CC members and member training, although further study using a sample of clinicians is required in order to build on these exploratory findings.

033

Differences Between Staff and Resident EPA Observer Feedback

S. Katz[1], T. Cocchio[1]

[1]University of Alberta, Edmonton, AB

Introduction: Competence by Design (CBD) began July 1, 2019 for PGY-1 Canadian core internal medicine residents. Many entrustable professional activity (EPA) observations allow for documentation by either a staff physician or senior resident. This study aims to determine if differences exist in the EPA entrustability scores based on the observer, as well as the quantity and quality of documented written feedback.

Methods: The scores and comments of each EPA completed during the Transition to Discipline stage for all core internal medicine PGY-1 residents were extracted anonymously from the University of Alberta CBD platform. Observations from simulation and OSCEs were excluded. Aggregate entrustability scores were calculated comparing staff and senior residents EPA observers. Average word counts were calculated for positive and constructive comments. A search to identify common phrases was completed.

Results: A total of 378 EPAs were observed (staff 194, residents 184). Entrustibility scores were 4.33/5 and 4.65/5 respectively ($P < .0001$). Resident scores were never lower than 3/5, compared to staff (N = 25). Staff and resident comments had a median of 13 words for positive and 9 words for constructive comments. Common positive resident phrasing included variations on “good job,” while “able to” was most common for staff. Common constructive staff phrasing included “remember to…” and “no concerns,” whereas it was variations of “remember to” for residents.

Conclusions: EPA scores are higher when observed by residents, with the same quantity of comments. While one may infer that residents score easier for their near-peer colleagues, further study is necessary to determine the meaning and significance of these results.

034

Evaluating Workplace Culture and Resilience: Implications for the Implementation of Competence by Design

A. Saxena[1], L. Desanghere[1], T. Robertson-Frey[1], M. Raazi[1], R. Woods[1]

[1]University of Saskatchewan, Saskatoon, SK

Introduction: Organizational culture can be defined as the shared beliefs, values, and practices of a group. This is linked to resilience which is an organization's ability to anticipate, prepare for, respond, and adapt to incremental change and sudden disruptions in order to prosper. The purpose of this project was to explore how culture and resilience impacts the implementation of an organizational change initiative such as Competence by Design (CBD).

Methods: An online survey was distributed to individuals in 2 programs who had transitioned to CBD (n = 38). The survey measured cultural norms, values, organizational resilience, and retrospective pre–post program changes for 4 key areas of CBD. Descriptive statistics, within group comparisons, and correlations were carried out. Document analysis of accreditation reports, CBD readiness, and learning environment survey results were used to help establish the setting/culture of the programs prior to CBD implementation.

Results: Prior to CBD implementation both programs were fully accredited, identified strengths included leadership, administrative support, teaching, collaborative initiatives, and learning environment. Participants in both programs reported high levels of resilience. Significant positive relationships (Ps < .001) between resilience and various cultural norms and values emerged. T-tests showed positive change post-CBD within the programs for learner empowerment and time as a resource (Ps < .05).

Conclusions: Postgraduate medical education in Canada has been undergoing rapid restructuring. The success of such large-scale organizational change will depend on both organizational culture and resilience. Results from this project will elucidate cultural and resilience factors of both success and resistance to organizational change.

035

An Evaluation of the Implementation of CBME in Diagnostic Radiology at Queen's University

B. Kwan[1], A. Chung[1], N. Wagner[1], T. Hanmore[1], H. Braund[1], N. Dalgarno[1], L. A. McEwen[1], A. K. Hall[1], D. Dagnone[1]

[1]Queen's University, Kingston, ON

Introduction: As part of an institution-wide transition, the radiology program at Queen's University implemented competency-based medical education (CBME) in July 2017. This study aimed to conduct a program evaluation of radiology's implementation of CBME.

Methods: Using rapid evaluation methodology, the intended implementation of CBME in the Queen's radiology program was explicitly described. Focus groups and interviews were then conducted with trainees, faculty, and program leaders, on their experiences in the first 2 years of implementation. Analyses were abductive, using the CBME core components framework and thematic analysis to understand stakeholders' experiences, and compare planned versus enacted implementation, with the aim of informing adaptations.

Results: Overall, stakeholders felt "the concept [of CBME] makes sense," but it is unclear "whether or not it will produce better physicians." A more structured curriculum, as well as frequent and timely assessments, were identified as benefits of CBME. However, a reduction in time off-service generated mixed reviews; residents were supportive, while staff had reservations. Increased workload, case availability, creating faculty buy-in, and understanding stage-specific entrustment were cited as major challenges. Concerns about the compatibility of CBME with diagnostic specialties and fee-for-service compensation models were also raised.

Conclusions: This study provides critical insights into the successes and challenges of implementing CBME in radiology. While the CBME culture is slowly changing in the program, these results highlight areas for discussion and optimization. These findings will be used to support continued change to the Queen's radiology program and provide other programs with valuable information about CBME implementation.

036

Developing a Competency Framework for Communication Skills in Psychiatry Residency Education

N. Snelgrove[1], R. McCabe[1], J. Sherbino[2], M. Zaccagnini[3], M. McConell[4]

[1]McMaster University, Burlington, ON; [2]Royal College, Ancaster, ON; [3]McGill University, Montreal, QC; [4]University of Ottawa, Ottawa, ON

Introduction: Communication is a core competency for physicians and for psychiatrists in particular. Currently, robust literature exists on teaching communication skills to medical students, while research in advanced communication skills for psychiatry residents is lacking. Given the transition to competency-based education in Canadian psychiatry postgraduate education, improved understanding of progressive communication skills development is critical. We designed this project to understand this progression in psychiatry residents as a first step in developing a competency framework for communication skills.

Methods: We used a constructivist grounded theory approach to interview 14 faculty educators from the disciplines of psychiatry (10) and psychology (4) who regularly supervise psychiatry residents at 2 sites affiliated with one university-based residency program. We used purposive sampling. Constant comparative analysis occurred concurrently with iterative data collection to identify themes/relationships.

Results: We identified 5 themes outlining the progressive development of communication skills. Three themes served as foundational, and relate to skill development, including developing and refining relational skill, developing a skills toolbox of specific communication strategies such as de-escalation techniques, and learning to reflect upon and manage internal reactions. These competencies served as foundational pillars for the final 2 themes, in which residents develop the critical personalized art of flexible psychiatric interviewing. This then allows psychiatrists to skillfully partner with patients in co-creating care plans.

Conclusions: This research represents a first step in defining a communication competency framework for psychiatry residents, including the stages required for progression to unsupervised practice. Future research should explore teaching and assessment methods.

037

Next Generation of Residency Education: Resident Leadership in CBME Implementation

L. Flynn[1], D. Stockley[1], A. Hussain[1], A. Hastings Truelove[2], J. Railer[2]

[1]Queen's University, Kingston, ON; [2]Office of Professional Development and Educational Scholarship, Kingston, ON

Introduction: When Queen's University first proposed a systems model for transitioning its specialty and subspecialty residency programs to competency-based medical education (CBME), there were some expected outcomes for the implementation, including the creation of a community of practice. However, there were also some unintended outcomes, particularly for our residents, that we will share during this presentation.

Methods: We used Wilson-Grau's Outcome Harvesting as a key aspect of our program evaluation to (1) design the harvest, (2) review documentation from our implementation and draft outcomes, (3) engage with change agents, (4) substantiate our findings, (5) analyze and interpret our data, and (6) support the use of our findings. We analyzed 443 documents for our harvest.

Results: Unintended outcomes included, the engagement of residents through faculty development sessions, resident participation in the Faculty of Health Sciences scholarship and CBME projects in general, residents becoming change agents, the creation of a CBME resident subcommittee, the formal appointment of residents to the CBME executive committee, residents as national leaders in co-creating CBME, and the development of a framework for acknowledging resident participation in scholarly work through a certificate program.

Conclusions: Queen's systems approach to CBME implementation anticipated the creation of a community of practice among faculty members. The unintended outcomes related to resident involvement in the leadership of CBME implementation reinforced the message that resident opinions were valued as empowered partners in the transition, that their feedback was vital to successful implementation, and encouraged educational scholarship among residents.

038

Curriculum Renewal: The Road Is Paved With Good Intentions

J. Binnendyk[1], R. Pack[1], C. Watling[1]

[1]Western University, London, ON

Introduction: Part of the formidable process of developing the Competence by Design (CBD) curriculum has been the design of entrustable professional activities (EPAs). While EPA coverage is extensive, additional content is needed to ensure trainees develop all CanMEDS roles. To inform the development of complementary content, we need to understand the extent to which these competencies are integrated.

Methods: A content analysis approach was used to systematically evaluate national curricula for 19 residency training programs who transitioned to CBD from 2017 to 2019, and determine the number of times each enabling competency (ie, Medical Expert 1.1) was represented. Enabling competencies were coded as mapped with a clear plan for assessment, mapped without a clear plan for assessment, or absent.

Results: Clear trends persisted across all programs. Medical Expert and Collaborator competencies were well integrated into curriculum (81% and 86%, respectively, mapped with a clear plan for assessment), while competencies related to the Leader, Professional, and Health Advocate roles were less frequently mapped within the curriculum (41%, 36%, and 40%), and were often absent altogether (45%, 47%, and 42%).

Conclusions: A deliberate curriculum plan is a key feature of CBD, and the value of deliberate planning is the help it affords in the early identification of gaps. These gaps can inform current assessment practice and future curricular development by providing clear targets and direction for innovation. If we are to ensure that CBD meaningfully addresses all CanMEDS roles, we need to think carefully about how to best teach and assess underrepresented competencies.

039

Developing a Dashboard to Meet the Needs of Residents in Competency-Based Training Program: A Design-Based Research Project

R. Carey[1], G. Wilson[1], B. Thoma[1], V. Bandi[1], D. Mondal[1], R. Woods[1], L. Martin[1], T. M. Chan[2]

[1]University of Saskatchewan, Saskatoon, SK; [7]McMaster University, Hamilton, ON

Introduction: Competency-based medical education (CBME) is being integrated into training programs around the world. Canadian specialty programs are implementing Competence by Design, a CBME program that requires frequent assessments of entrustable professional activities. Little has been written regarding how residents' use of CBME assessment data can be supported. We aimed to identify resident needs for the presentation of their assessment data through the creation of a web-based dashboard.

Methods: We utilized an iterative design-based research process to identify and address resident needs surrounding the presentation of their assessment data through the development of a CBME dashboard. Data was collected within the emergency medicine residency program at the University of Saskatchewan via 4 resident focus groups over 10 months. Focus group discussions were transcribed and analyzed using a grounded theory approach and constant comparative technique to identify resident needs. This analysis guided the development and refinement of dashboard elements (data, analytics, and visualizations).

Results: Resident needs were classified under 3 themes: (1) Provide guidance through the assessment program; (2) Present workplace-based assessment data; and (3) Present other assessment data. Seventeen elements were developed and refined to address these needs that were incorporated into an easily accessible online dashboard.

Conclusions: Our design-based research process identified what residents need from their assessment data and developed dashboard elements to meet them. This work will inform the creation and evolution of CBME assessment dashboards designed to support resident learning.

040

Competency-Based Programmatic Assessment in Canadian Family Medicine Postgraduate Residency Education: Trends in Resident Perspectives From the Family Medicine Longitudinal Survey (2015–2018)

I. Oandasan[1], L. Nardi[1], M. Haghighi[2]

[1]College of Family Physicians of Canada, Mississauga, ON; [2]College of Family Physicians of Canada, Toronto, ON

Introduction: In 2010 CFPC implemented Triple C, its competency-based medical education (CBME) approach across all FM residency programs in Canada. A program evaluation approach including the Family Medicine Longitudinal Survey (FMLS) provides data to inform postgraduate training and ongoing quality improvement.

Methods: Aggregate results from FMLS data examined pan-Canadian trends and program variability to which family medicine residents experienced elements of competency-based programmatic assessment described in the survey. Secondary analysis of deidentified self-report survey data from exiting (T2) family medicine residents at participating residency programs between 2015 and 2018 was conducted. Completed surveys returned: 2015 N = 632, 15 schools; 2016 N = 785, 16 schools; 2017 N = 895, 17 schools; and 2018 N = 924, 17 schools. Average response rate over 4 years was 60.4%.

Results: Over the 4 years studied, 87% to 93% of respondents consistently "agree" or "strongly agree" that during residency they received the competency-based programmatic assessment elements specified in the survey. A positive shift toward "strongly agree" was observed for most elements included. Program variability specifically in 2015 was found where program results ranged by 24% for "actively aware of own progress" and 31% for "active understanding of program expectations."

Conclusions: Canadian family medicine residents experience key competency-based programmatic assessment elements at the national level during residency; however, variability remains at the program level. Despite national uptake of CBME, residency program context can influence the consistency of competency-based assessment measures experienced by family medicine residents. FMLS data can inform residency programs continuous quality improvement activities and when providing evidence related to accreditation standards for quality improvement.

041

Evaluating Competency-Based Medical Education Implementation in Medical Oncology

N. Hammad[1], A. Tomiak[1], H. Braund[1], N. Dalgarno[1], N. Tang[1]

[1]Queen's University, Kingston, ON

Introduction: The division of medical oncology transitioned to competency-based medical education (CBME) in July 2017 alongside 29 programs at Queen's University. This study evaluated CBME in the division almost 3 years post-implementation.

Methods: Residents (n = 3) enrolled in CBME participated in a focus group and faculty (n = 4) completed interviews. The focus group and interviews concentrated on evaluating participants' experiences with CBME and identifying areas for improvement within the program. The data collected were analyzed using a thematic design.

Results: *Resident experiences*: Residents were knowledgeable about CBME and understood the assessment process. They perceived that verbal feedback contained more constructive feedback than written. *Resident and faculty experiences*: Both groups identified the benefits of formalizing the assessment process and increasing documentation on resident learning. They similarly perceived the assessments as "coaching" rather than high-stakes, in alignment with the CBME framework. Both highlighted the importance of narrative comment boxes on workplace-based assessment tools to elaborate on the clinical encounter. *Challenges and concerns*: Both groups highlighted delayed triggering, completion of assessments, and high administrative burden as challenges. Residents identified alignment of EPAs with practice as a challenge given that some skills were developed earlier than the stage in which the EPA was assigned.

Conclusions: The findings describe the major strengths and challenges of CBME implementation in medical oncology at Queen's. The results will inform ongoing program improvement and offer insight into the implementation process of CBME for other programs adopting this model.

042

Discordance Between Competency-Based Assessment Using a Global Versus Reductionist Approach for Medical Students

H. Caretta-Weyer[1]

[1]Stanford University School of Medicine, Palo Alto, CA

Introduction: The advent of competency-based education has led to concerns regarding reductionism in the assessment of clinical competence. This apprehension stems from a frequently utilized approach using the assessment of isolated competencies to build a complete picture of clinical competence. Others argue that the entrustable professional activity (EPA) framework complements the construct of competencies, as EPAs describe a unit of work and require a global approach to the assessment of the activities of a physician.

Methods: We designed a simulation-based workshop to discern whether the assessment of separate competencies subsequently aggregated is equivalent to the global assessment of EPAs. We assessed each student using individual competencies mapped to the core EPAs, a modified supervision scale, and a global statement regarding entrustment and readiness for residency. These assessments were compared to aggregate workplace-based assessment data on the various individual competencies from the core clerkships.

Results: Assessment data obtained using the individual competencies mapped to the EPAs were highly correlated with the assessment of individual competencies obtained in the workplace during core clerkships. However, these individual competency-based assessments did not correlate with EPA-based global supervision scale ratings, entrustment decisions, or perceived readiness for residency.

Conclusions: The global assessment of EPAs and the judgement of entrustment appear to be separate processes from aggregating the assessment of individual competencies. This may reflect variations in the approach to global assessment when compared to the assessment of individual competencies and the need to consider the construct of trustworthiness in addition to the learner's ability to perform the individual activities.

043

Residents as Research Subjects: Balancing Resident Education With Contribution to Advancing Educational Innovations

L. Thibault[1], T. Luu[1], G. Cardinal[1], B. Carriere[1], A. Dupont-Thibodeau[1], C. H. Huot[2], A. Moussa[3]

[1]CHU Sainte-Justine, Montreal, QC; [2]Canadian Society of Endocrinology and Metabolism, Montreal, QC; [3]Université de Montréal, Montréal, QC

Introduction: Research in education is essential to advance knowledge and improve learning. Medical residents can be solicited as subjects for studies; however, no literature defines how to protect their rights as participants and limit the impact of their participation on their clinical training.

Objective: Provide a framework to better protect residents as research subjects.

Methods: Through a modified Delphi method, 8 experts in pediatrics at the University of Montreal (clinical educators, education researchers, residents, and IRB president) reached consensus. The group developed recommendations to guide how the inclusion of residents as subjects in medical education research can take place, with the dual goal of protecting residents' rights while promoting contribution of researchers' work to medical education literature.

Results: Five issues and recommendations were described: (1) freedom of participation: participation, non-participation or withdrawal from a study should not interfere with teacher-learner relationship (recommendations on procedures for recruitment and consent); (2) over-solicitation (limiting the number of ongoing studies); (3) management of time dedicated to participation (schedule and proportion of time for study participation); (4) educational security: data collected should not influence clinical assessment of the resident (role of the researcher as a clinical supervisor); and (5) emotional security of the learner (requirement for debriefing during simulation-based studies).

Conclusions: This guide is an essential tool to ensure respect of residents' rights and completion of a robust training program, but also to support high-quality research in education that will enrich medical education literature.

044

Graduate Medical Education Trainees' Perceptions of Survey Participation and Methodology: A Focus Group Study

C. Y. Colbert[1], A. Brateanu[1], J. French[1], A. Nowacki[1]

[1]Cleveland Clinic, Cleveland, OH

Introduction: Survey response rates have been declining for the past 20 years, especially for physicians, who are often perceived as a challenging population. Yet, it's unclear which factors are implicated in declining response rates, beyond time constraints and increasing clinical pressures. While response rates of at least 60% are recommended, response rates under 40% are common in medical education research. The purpose of this study was to examine postgraduate medical education (PGME) trainees' perspectives on survey participation and methodology.

Methods: Thirty-three trainees (PGY-1–4 residents) from 3 training programs were recruited to participate in 1-hour focus groups at a Midwest academic health center. Seven focus groups and 2 structured interviews were held in 2019. Focus group discussions were recorded via digital voice recorder. Data collection was halted when no new thematic categories were identified. Focus groups were transcribed and all identifiers removed.

Results: A content analysis generated 7 themes: emotions, impact, professionalism, survey fatigue, survey design/implementation, trustworthiness of process, and biases. Trainees commented on the need for brevity. Several trainees noted they accepted invitations because they felt for their peers (empathy), who were conducting survey research. Wanting to help patients and society (altruism) influenced others to participate.

Conclusions: Results from this qualitative study indicate that while time conflicts and survey length were factors in resident participation, emotions and perceptions of impact appeared to play significant roles in invitation acceptance, likelihood of breakoffs, and satisficing. Trainees mentioned the need for efforts to be meaningful, given clinical, education, and research priorities.

045

Egalitarianism in Surgical Training: Let Equity Prevail

D. Robinson[1], L. Hopkins[1], O. P. James[1], C. Brown[1], A. Powell[1], T. Abdelrahman[1], S. Hemington-Gorse[1], L. Walsh[1], R. Egan[1], W. Lewis[1]

[1]Health Education and Improvement Wales, Nantgarw, Wales

Introduction: Differential attainment (DA) refers to differences in outcomes related to protected characteristics with UK black and minority ethnic (BME) and international medical graduates (IMG) affected irrespective of specialty. This study aimed to quantify core surgical trainee DA in a UK deanery related to the 3 cohorts of White UK graduate (White UKG) vs BME UK graduate (BME UKG) vs IMG.

Methods: Intercollegiate surgical curriculum program portfolios of 264 consecutive core surgical trainees (2010–2017, 234 UK graduate, 175 White, 89 BME, 30 IMG) were examined, and primary outcome measures were ARCP outcome, iMRCS examination pass, and higher National Training Number (NTN) selection.

Results: ARCP outcomes were similar irrespective of ethnicity or nationality (ARCP outcome 1, White UKG 60.7% vs BME UKG 62.1% vs IMG 53.3%, $P = .39$). iMRCS pass rates for White UKG vs BME UKG vs IMG were 71.4% vs 71.2% vs 50.0% ($P < .042$), respectively. NTN success rates for White UKG vs BME UKG vs IMG were 36.9% vs 36.4% vs 6.7% ($P = .023$), respectively. On multivariable analysis being a UK graduate was independently associated with NTN selection (OR 7.081; 95% CI 1.556–32.230, $P = .011$).

Conclusions: Although the data related to BME DA was reassuring, important DA variation was apparent among IMGs; MRCS pass 21.4% lower and NTN success 6-fold less likely. Targeted support measures are required to let equity prevail among trainees in UK core surgery programs.

046

In-Training Assessments for Australian Orthopaedic Residents: Gender Differences

I. W. Incoll[1], J. Green[1], J. N. Atkin[2], I. Harris[3]

[1]Australian Orthopaedic Association, Erina Fair, NSW; [2]Nikta Projects, Sydney, NSW; [3]UNSW Sydney, Sydney, NSW

Introduction: The Australian Orthopaedic Association (AOA) is responsible for educating and training orthopaedic surgeons in Australia. The new training curriculum (AOA 21) involves advanced technological support for assessment of resident's performance, including 4 types of workplace-based assessment (WBA), brief feedback episodes, and a national electronic logbook of procedures. Differences in performance on in-training assessments based on the resident and supervisor gender is demonstrated in the surgical, medical, and non-medical education literature.

Methods: Over 15,000 WBAs, 10 000 feedback episodes and almost 300,000 elogbook entries for approximately 270 Australian orthopaedic residents over a 3-year period (2017–2019) were analyzed. Our primary outcome variable was the performance rating of trainees, as provided by their supervisors. We performed a regression analysis of the association between trainee gender and trainee rating, and the association between supervisor gender and trainee rating. We also performed a stratified analysis to test for interaction between supervisor gender and trainee gender.

Results: Regression analyses adjusted for region, year, and case complexity showed that male trainees received higher ratings than female trainees, and that male supervisors rated trainees lower than female supervisors. There were some differences in the stratified analyses but formal tests for interaction were not statistically significant. eLogbook differences reduced as the resident progressed through the AOA 21 training program. However, WBA and feedback episode differences did not reduce with resident seniority.

Conclusions: Gender differences in assessment, predicted by the current literature, are confirmed to occur in Australian orthopaedic surgery training. Possible causes and management strategies are discussed.

047

Divergent Experiences: An Analysis of Gender Differences in Feedback During EPAs Internal Medicine

M. J. Billick[1], J. C. Rassos[1], S. Ginsburg[1]

[1]University of Toronto, Toronto, ON

Introduction: Assessment of residents is reported to differ by gender, yet little is known about the potential effects of these variations. We sought to understand if male and female internal medicine (IM) residents perceive differences in their experiences of being assessed and receiving feedback.

Methods: We used constructivist grounded theory as an approach to data collection and interpretation, which occurred iteratively and simultaneously. We conducted semi-structured focus groups and interviews with IM residents, divided by gender and by training level. Twenty-two residents participated (8 male, 14 female).

Results: We found a profound difference in the experience of receiving feedback and assessments between male and female residents. Themes of power, authority, display of confidence, and clothing/appearance diverged between male and female residents. For example, in contrast to their male counterparts, women relied on symbols such as a white coat, stethoscope, and demure clothing to establish and justify their physicianship. Women also encountered conflicting feedback from supervisors regarding confidence and assertiveness (eg, told to be more or less assertive), often resulting in self-censorship, whereas men rarely received similar feedback.

Conclusions: Gendered differences in the experiences of working and being assessed on IM wards may not be easily captured by standard assessments. Our findings present opportunities for hypothesis generation and further study. We plan to triangulate these findings with scores and comments from postgraduate year 1 entrustable professional activities. Future directions include formally recognizing gender inequities in assessment and feedback and putting in place measures to address such biases.

048

Screening for Potential Gender Bias in Narrative Evaluations of Emergency Medicine Residents: A Keyword Analysis

S. N. Pilieci[1], I. N. Colmers-Gray[1], A. Gauri[1], B. Stauffer[1], D. Ha[1]

[1]University of Alberta, Edmonton, AB

Introduction: Studies across multiple specialties have demonstrated gender bias in narrative resident evaluations, with evaluations for female residents containing fewer agentic (eg, "confident," "efficient") and more communal (eg, "warm," "compassionate") terms. The goal of this study is to screen for gender bias in the evaluations of female and male emergency medicine (EM) residents at our institution.

Methods: We analyzed the narrative evaluations of Royal College EM residents from July 2018 to December 2019 for agentic, communal, ability (eg, capable, proficient); grindstone (eg, methodical, industrious); and standout (eg, exceptional, superb) keywords. We used the exact sets of word groups for these categories published in previous gender bias studies. Using the Linguistic Inquiry and Word Count text analysis program, we calculated the frequency of each of the keyword sets in the evaluations of female and male EM residents and utilized the Mann-Whitney U test to compare these frequencies.

Results: We analyzed evaluations from 24 female (word count 154,833) and 14 male (word count 90,299) residents. There was a significant difference in the frequency of some agentic (favored female residents) and communal (favored male residents) keyword sets, but no gender-based differences in the usage of any ability, grindstone, and standout keyword sets.

Conclusions: Two of 5 keyword categories occurred at different frequencies in narrative evaluations of female and male EM residents, though our specific pattern of findings diverged somewhat from previous studies. Future qualitative analyses will be performed to better assess if these findings represent potential gender bias in our evaluation content.

049

A Royal College of Physicians Initiative to Address the Underrepresentation of Women in Medical Leadership

J. Boylan[1], T. J. Baker[2], E. Vaux[2]

[1]University Hospitals Bristol, Bristol, UK; [2]Royal College of Physicians of London, London, UK

Introduction: Gender parity at senior levels in health care organizations correlates with better outcomes across a range of measures including culture, behavior, and patient care. In order to be gender balanced, NHS Boards in England need another 500 women (Sealey 2016). This report advocates gender-specific learning in NHS training programs. What is unknown is how women who have achieved significant leadership roles in medicine defined their enablers for leadership development. In 2017, we carried out 14 in depth semi-structured interviews with female medical leaders of national organizations. Key emergent themes were the importance of role modeling and mentorship. This data underpinned our development of a program to address women's underrepresentation in medical leadership.

Methods: We set up the Emerging Women Leaders Program (EWLP) at the RCP in 2018 providing fellowships for 12 early career physician consultants. This program included leadership training, mentoring, and networking opportunities. Program evaluation measured relevancy, satisfaction, and future recommendations through mixed methods including thematic analysis.

Results: After 9 months many of the fellows have undertaken enhanced leadership roles as a result of the support they have received. An end of program yearbook and showcase event highlighted the leadership journey of the fellows. Program evaluation commended the interactive content that improved confidence levels.

Conclusions: EWLP blends original research with adult learning principles and provides a framework for the development of other programs to address leadership underrepresentation. Its unprecedented demand and success have led the RCP to develop the Springboard to Leadership Program for all physicians with any protected characteristic.

050

Gender-Based Differences in Mistreatment by Faculty, Trainees, Interprofessional Team Members, and Patients

M. Cullen[1], T. Mustapha[1], J. Hane[1], B. Seltzer[1], S. Culican[1], J. Andrews[2]

[1]University of Minnesota, Minneapolis, MN; [2]American Medical Association, Chicago, IL

Introduction: Mistreatment of trainees is a pressing problem in graduate medical education. In this study, we explored whether there are gender-based differences in how trainees experience multiple types of discrimination and harassment from multiple sources.

Methods: This study involved trainees who graduated from one of 132 residency programs at a large midwestern medical school in academic year 2017–2018 and 2018–2019. We administered a set of modified questions from the Association of American Medical Colleges Graduation Questionnaire to track 6 types of mistreatment from 6 potential sources. Categories of mistreatment included: (1) humiliation/shame, (2) microaggressions, (3) offensive remarks toward trainees, (4) offensive remarks towards non-present others, (5) threats of physical harm, and (6) sexual harassment. Mistreatment sources included: (1) trainees inside or outside specialty programs, (2) faculty inside or outside specialty programs, (3) interprofessional team members, and (4) patients.

Results: Female trainees experienced higher rates of mistreatment than male trainees from patients for *all* categories of mistreatment (chi-square between 5.0 and 82.0, all $P < .05$). Female trainees also experienced higher rates of mistreatment than male trainees from faculty *within* programs for categories 1–4, from faculty *outside* programs for categories 2–4, from interprofessional team members for categories 1–3, from trainees outside their program for categories 1 and 2, and from trainees in their program for category 1.

Conclusions: The results demonstrate the need for active monitoring of discrimination and sexual harassment of trainees from multiple sources, and for interventions that are tailored to address the pervasive problem of gender-based differences in these experiences.

051

Exploring How #WomenInMedicine Use Twitter to Identify and Address Workplace Discrimination

K. LaDonna[1], K. Chien[1], L. Madrazo[2], R. Pack[2], C. Watling[2], E. Field[2], S. Ginsburg[3]

[1]University of Ottawa, Ottawa, ON; [2]Western University, London, ON; [3]University of Toronto, Toronto, ON

Introduction: Women in medicine report alarming rates of discrimination based on their gender, race, ethnicity, or sexual orientation. While formally reporting these events may be stigmatizing, the #MeToo movement empowered women physicians and physicians-in-training to share their experiences on Twitter. We explored these discussions to understand how women describe and grapple with discriminatory forces in the workplace.

Methods: We conducted a content analysis of approximately 10 000 Tweets linked with hashtags including, but not limited to, #WomenInMedicine, #BlackWomenInMedicine, and #LGBTQInMedicine. Tweets were systematically analyzed to identify thematic patterns.

Results: Tweets contained instances of being mistaken for support staff, being overlooked for—or discouraged from pursuing—professional opportunities and feeling marginalized within medicine. Women also sought and provided support about experiences such as motherhood, infertility, and work-life integration. More commonly, however, women seemed to use Twitter to challenge stereotypes by sharing photographs representing the diversity of women working in medicine, to demand change, to seek allies to address discrimination, and to work to advance women's careers by both promoting their peers and recognizing their achievements.

Conclusions: Twitter appears to provide a space for women in medicine to not only share discriminatory work experiences but also to collaborate and develop strategies to resist discrimination. Given the potential risks to women's careers when they identify workplace discrimination, Twitter may be an important venue for both creating support networks and advocating for change. Future research will explore connections between emerging findings and known impediments to personal and professional well-being such as inaccurate self-assessment and burnout.

052

Athletic Coaching: A Model for Residency Education Programs

J. Ashby[1], H. Chow[1]

[1]University of British Columbia, Abbotsford, BC

Introduction: Research indicates that investing in faculty development improves preceptors' communication and teaching skills in addition to resident assessment. Furthermore, faculty development is key in building social capital and facilitating knowledge mobilization leading to greater collaboration and innovation. Coaching is a term that has recently emerged in medical education literature and often applied in the context of working with medical students and residents. Early indications of employing coaching methods include lower resident burnout rates, perceived ability to improve patient care, and increased awareness regarding the importance of physician-patient communication. When implemented in faculty development, coaches were key in promoting preceptors' understanding of a safe learning environment, in assisting the preceptors with goal setting, and in resident reflection.

Methods: In 2015, the University of British Columbia Family Practice Residency Program implemented a coach with a sports and education background to nurture faculty development, provide individualized support, and connect clinical educators to the site program. Running coaches have been identified as models for clinical teaching because the role encourages knowing your learner through observation, modeling qualities that reinforce continuous learning, communicating with intention, and teambuilding.

Conclusions: Over the past 4 years, the novel role of the program coach has expanded to include facilitating faculty development workshops, retreats, and research projects; networking and collaborating with professional bodies and community organizations; encouraging clinical faculty in the development of their teaching, curriculum, and evaluation of learners; and sharing educational resources with fellow colleagues and the general public.

053

Asynchronous, Multichannel, Digital Faculty Development to Improve Clinical Teaching

A. Nagji[1], K. Dowhos[1], T. M. Chan[1], J. Sherbino[2]

[1]McMaster University, Hamilton, ON; [2]Royal College, Ancaster, ON

Introduction: The introduction of entrustable professional activities (EPAs) have re-emphasized the need for optimal bedside teaching and real-time feedback. Asynchronous, multichannel, digital faculty development can be an effective way of introducing novel teaching techniques to experienced clinical teachers, while avoiding the logistics of traditional faculty development workshops.

Methods: We used infographics to introduce evidence-based teaching skills to attending emergency physicians for real-time application in the emergency department. Through a 6-part series, these infographics discussed setting expectations for shifts, tagging specific teaching moments, delivering clear feedback, and how to assess EPAs. The infographics were designed by a team of education experts and residents to reflect pivotal papers and frameworks in medical education that had relevance to clinical teaching. The infographic series was then distributed by posting in all affiliated McMaster Division of Emergency Medicine (DEM) teaching hospitals, integrating into the McMaster DEM podcast and serialized via a series of posts on the International Clinical Educators (ICEnet) and CanadiEM blogs. To measure engagement, we report aggregated data analytics from downloads.

Conclusions: We had 10 local EDs with posters, 193 podcast downloads and 750 pageviews on CanadiEM and 833 views on ICEnet Blog. The top 5 countries were: United States, Canada, United Kingdom, Australia, and the Philippines. We also had uptake from pediatrics and internal medicine. Infographics can be an effective and efficient faculty development tool. They combine technology and asynchronous learning and act as a bedside resource for clinical educators.

054

Narrative Medicine Workshop for Faculty: Empathic Clinical Narrative

O. Valencia Urrea[1], F. Leal Garza[1], S. Arreguin[1], M. Ana. Cordero[1], J. Claro García-Atance[2]

[1]Tecnologico de Monterrey, Monterrey, Mexico; [2]Pontificia Universidad Católica de Chile, Santiago de Chile, Chile

Introduction: Narrative medicine is a model for humane and effective medical practice with narrative competence (Charon, 2001). Narrative medicine provides a set of tools to understand the patient's context and history to recognize, absorb, interpret, and be moved into action by the stories that patients tell us (Childress, 2017).

Methods: In 2019, the Tecnológico de Monterrey´s School of Medicine invited an international expert to offer the Narrative Medicine Workshop. The objective is to start a sustainable program of Empathic Clinical Narrative as a tool that promotes empathy through active listening and reflective writing about elements such as life, illness, pain, death, family, and daily life of the patient and health professionals.

Results: Twenty-eight faculty professors attended the 3-day workshop that included topics, such as attentive and humble listening, oral and written narrative, clinical empathy, patient as person not data, and capture the patient story in writing or graphic material that incorporates what the professional understands about the patient. The workshop strategies were literature review, plenary discussion, and individual and collaborative exercises. Positive feedback was given by 21 participants that the workshop was innovative and had a practical impact teaching and professional practices.

Conclusions: Narrative medicine provides tools to meet the objectives of humanism, empathy and a patient-centered education and a professional practice model. The workshop was a first experience for faculty to start a sustainable program of Empathic Clinical Narrative, it had an active participation of the attendees and positive feedback.

055

On Call: The Perspective of Junior and Senior Internal Medicine Residents

J. Cygler[1], A. Page[1], S. Ginsburg[1]

[1]University of Toronto, Toronto, ON

Introduction: 24-hour in-house call currently represents a seminal part of residents' training in Internal Medicine (IM) at many academic centers, but little data exists regarding residents' perceptions of their on-call experiences. Our aim was to understand what residents perceive to be the benefits and drawbacks of 24-hour in-house call, which could then inform future change to call systems.

Methods: Using constructivist grounded theory we conducted semi-structured interviews and focus groups with 17 IM residents from PGY-1 to PGY-3 at the University of Toronto, asking about positive and negative aspects of being on-call overnight. Analysis was iterative, using constant comparison to identify recurrent themes in the data.

Results: We identified 7 themes that captured residents' positive and negative experiences on-call. Residents perceived that their daytime and nighttime roles were substantially different. Overnight call contributed to increased autonomy and decision-making skills, and provided preparation for future careers as independent internists. Residents described developing camaraderie and a sense of team belonging with co-residents overnight. These benefits, however, were in tension with reported multidimensional fatigue related to call, including decision fatigue, emotional fragility, and adverse effects to their personal lives due to call demands. These tensions were not easily resolved.

Conclusions: Our study highlights some unexpected perceived benefits of 24-hour call, in addition to expected reports of fatigue and impact on personal life. The implementation of new call models should ensure that the benefits are not lost; they should emphasize resident autonomy and preparation for future work, while protecting against fatigue.

056

Prospective Quantification of Radiation Exposure in Orthopaedic Residents

L. Morrison[1], P. Schneider[1], C. Kwong[1], S. Kooner[1], J. Kubik[1], A. Meldrum[1], S. Montgomery[1], J. Bourget-Murray[1], E. Gusnowski[1], K. Thomas[1], L. Fruson[1], J. Kendall[1], M. Litowski[1], S. Sridharan[1], D. You[1], M. James[1], T. Ludwig[1], J. Purnell[1], M. Wong[1], A. Abbott[1], B. Benavides[1], J. Lukenchuk[1], E. Davison[1], B. Heard[1], C. Hewison[1], T. Flanagan[1], K. Rondeau[2], A. Akbari[2], L. Schultz[2], S. Yee[2]

[1]Calgary Orthopaedic Resident Research Group, Calgary, AB; [2]University of Calgary, Calgary, AB

Introduction: Radiation exposure has been linked to adverse health effects in orthopaedic surgeons. The purpose of this study was to quantify the amount of radiation exposure throughout orthopaedic residency training and determine the variability of radiation exposure in different postgraduate years (PGYs) of training.

Methods: Monthly radiation was measured over a 12-month period for 21 orthopaedic residents using dosimeters. The primary outcome measure was the absolute value of the difference between protected (below-lead) and unprotected (above-lead) radiation exposure in mSV. Linear regression and multiple regression analyses were utilized.

Results: Three residents were removed from analysis secondary to non-compliance, leaving 18 residents' data available for analysis. Mean yearly radiation was 3.30 ± 0.64 mSv with a mean number of 107 ± 38 days spent in the operating room. There was a significant difference in mean yearly radiation exposure by year of training (PGY-1, 2.95 ± 0.72 mSv; PGY-2, 3.70 ± 0.28 mSv; PGY-3, 4.03 ± 0.48 mSv; PGY-4, 3.35 ± 0.17 mSv; PGY-5, 2.73 ± 0.51 mSv). Residents in PGY-5 had the highest mean exposure per operating room day (0.044 ± 0.009 mSv/day).

Conclusions: Residents in PGY-2 and PGY-3 were exposed to significantly higher cumulative amounts of radiation compared to other residency years. Residents in PGY-5 had the highest mean radiation exposure per operating room day, which may reflect transition of senior residents to a primary surgeon position during operative cases. An opportunity exists to provide residents with knowledge about radiation safety and clinical practices early in their training.

057

Improving Resident Education and Patient Care Through National Physician Licensure

B. Tang[1], B. Ho[2], H. Roth[2], L. Abraham[2], L. Zuccaro[2], M. Benusic[2], A. Zygmunt[3]

[1]University of British Columbia, Vancouver, BC; [2]Resident Doctors of Canada, Ottawa, ON; [3]University of Ottawa, Ottawa, ON

Introduction: The lack of a unified national physician licensure in Canada restricts physician mobility and negatively impacts patient care. Currently, working in a different province/territory requires a separate medical license for each of the thirteen medical regulatory authorities, despite similarities in licensure processes and required documentation. These barriers limit the exposure of early career physicians, including residents, while restricting access to physician care, especially in rural communities.

Methods: Resident Doctors of Canada (RDoC) has been advocating for a unified licensure process through several avenues. Firstly, our 2018 national resident survey demonstrated that while only 18.5% of residents plan to locum outside the province/territory of their primary practice, 52% would pursue locum experiences if no additional license applications were required. Secondly, RDoC published a Collaborative Statement on Canadian Portable Locum Licensure in 2017 with the support of national organizations. Finally, RDoC has continued to advocate for improved physician mobility and support the Fast Track and License Portability Agreements that are currently in development by the Federation of Medical Regulatory Authorities of Canada. However, these preliminary agreements do not include residents, as they require a license for independent practice. Advocating for resident physician mobility continues to remain an important priority for RDoC.

Conclusions: Our national survey identified residents' desires to practice in jurisdictions outside their primary province/territory. National processes to facilitate a unified or fast-track licensure would enrich resident education by facilitating exposure to diverse practice settings and would help address health care needs in underserved communities by encouraging resident mobility.

058

Assessment of Radiation Safety Training and Awareness Among Canadian Orthopaedic Surgery Residents

P. Schneider[1], C. Kwong[1], S. Kooner[1], J. Kubik[1], S. Montgomery[1], A. Meldrum[1], E. Gusnowski[1], K. Thomas[1], J. Bourget-Murray[1], D. You[1], J. Kendall[1], L. Fruson[1], S. Sridharan[1], M. Litowski[1], M. Wong[1], J. Purnell[1], T. Ludwig[1], M. James[1], L. Morrison[1], A. Abbott[1], B. Benavides[1], J. Lukenchuk[1], E. Davison[1], B. Heard[1], C. Hewison[1], K. Rondeau[1], S. Yee[1], C. Flanagan[1]

[1]Calgary Orthopaedic Resident Research Group, Calgary, AB

Introduction: The negative effects of radiation exposure on orthopedic surgeons have been well documented in the literature. This study aims to assess current radiation safety knowledge and training practices in Canadian orthopaedic residency programs.

Methods: This study utilized a quantitative online single submission survey administered to orthopaedic surgery residents in Canada. The survey questions addressed current resident knowledge on radiation safety and experience with radiation safety training and practice in their home program. Descriptive statistics were used to analyze the data.

Results: There were 116 out of 284 respondents to the survey, resulting in a 41% response rate. Almost every respondent (94%) was concerned about the effects of radiation; however, only 11% felt confident with their radiation safety knowledge. Fifty-eight percent of respondents had never received formal radiation safety training. In terms of safety practice, compliance with protective lead was high among residents at 93%; however, 32% of respondents cited access to properly fitting lead as a barrier to safety. Forty-three percent of respondents did not feel comfortable advocating for radiation safety in the operating room.

Conclusions: Radiation exposure is a concern for the majority of Canadian orthopaedic residents; however, there is currently a lack of safety training in residency resulting in a lack of knowledge. Although residents are compliant with wearing lead when it is available, there is often difficulty accessing lead that fits properly resulting in residents being unprotected. Our results suggest that residents would benefit from program-based radiation safety training to improve confidence and decrease exposure.

059

Half-Life of Surgical Truth in British General Surgery

O. P. James[1], L. R. Smith[1], D. Locker[1], L. Hopkins[1], D. BT. Robinson[1], W. G. Lewis[1]

[1]Wales PGMDE School of Surgery, Nantgarw, Wales

Introduction: Karl Popper's hypothetico-deductive model contends that an assertion is true if it agrees with the facts, and that science progresses via paradigms, held to be true until replaced by better approximations of reality. This study aimed to estimate the half-life of surgical dogma.

Methods: The first 15 general surgery articles, at 5-year intervals, were extracted from the *British Journal of Surgery* since its inception in 1913. A statement summarizing each article's conclusion was formatted, with non-conducive articles excluded (n = 22). Article statements numbering 293 were reviewed and marked "true" or "false" by a cohort of 6 senior general surgeons with a majority positive response denoting a true statement. Regression analysis of the relationship between perceived truth and time was performed.

Results: Median true response rate was 47.4% (range 35.8%–54.9%), with responders in total agreement regarding 85 statements (29.0%) with 104 (35.5%) deemed currently true. Publication year correlated with percentage of true responses (rho 0.229, $P < .001$). Linear modeling of true responses related to 5-year intervals ($R^2 = 0.350$, $P = .005$) estimated the annual rate of loss of truth to be 0.23%, equating to a half-life of 217.4 years.

Conclusions: Contrary to popular belief, it appears surgical dogma does not lose its luster for some 7 generations. Regression line extrapolation is contentious but would suggest that the current era of surgical knowledge extends from 1766; the days of John Hunter, the father of "modern" surgery, to 2194, though relative rates of innovation may accelerate and move the nexus point.

060

Preparing Tomorrow's Leaders: A Novel Approach to an Emergency Medicine Administration Rotation

S. Krzyzaniak[1], J. Hafner[1]

[1]University of Illinois College of Medicine at Peoria, Peoria, IL

Introduction: Residency programs lack clearly defined guidelines for how to prepare residents for future administrative responsibilities. Studies show that while program leadership values inclusion of these topics in residency curricula, there is variability in how this content is delivered. Our emergency medicine (EM) residency curriculum includes an administration rotation. However, it was largely unstructured and dependent on the engagement of our emergency department (ED) leadership, resulting in a variable experience. We aimed to create a curriculum to (1) prepare residents for basic administrative duties; (2) expose residents to advanced administrative roles; and (3) empower residents to develop leadership skills within education, hospital administration, and pre-hospital settings.

Methods: We utilized a humanist approach to emphasize an individual's values in order to promote autonomy and foster intrinsic motivation (self-determination theory). Residents are required to complete 15 mandatory and 5 selective activities. The mandatory activities were chosen to provide a broad overview of EM administration. Learners choose 5 selective activities they feel are important to their professional development. By encouraging autonomy in designing their specific rotation, we promoted internalization of motivation. Engagement was tracked using a sign-in sheet that was required for successful completion of the rotation.

Conclusions: The structure of this curriculum and autonomy granted by allowing residents to select rotation components improved engagement. Our residents participated in a wide variety of selective opportunities, reflecting the diverse interests of today's residents. Of the 51 selectives chosen, 49% were educational, 12% were EMS, 6% were research-related, and 33% were outside of these categories.

061

Anchoring Postgraduate Trainee Leadership Needs in Existing Leadership Frameworks—Toward Development of a Longitudinal Leadership Certificate Program

H. Retrouvey[1], A. Matlow[1], L. Bahrey[2], M. Gardam[3]

[1]University of Toronto, Toronto, ON; [2]University Health Network, Toronto, ON; [3]Humber River Hospital, Toronto, ON

Introduction: Physicians require leadership competencies to improve health care delivery at all levels. Both the CanMEDS 2015 and the LEADS in a Caring Environment Framework outline competencies all physicians need to be effective leaders.

Methods: In 2019, the University of Toronto postgraduate medical education program committed to developing a comprehensive longitudinal leadership certificate program. A needs assessment sent electronically to 63 chief residents asked them to identify 3 topics and 3 skills they would like to learn more about/acquire through leadership training. Suggestions were assigned to the LEADS framework pillars (L, Lead self; E, Engage others; A, Achieve results; D, Develop coalitions; S, Systems transformation) with residual ones matched to CanMEDS competencies. A leadership certificate curriculum was developed from these results.

Results: Fourteen trainees responded to the survey (22.2% response rate), offering a total of 41 suggestions for leadership topics and 38 leadership skills. While all pillars of LEADS were represented, most frequent were E (44% and 47% of topics and skills, respectively) and A (10% and 13%, respectively). Sixteen suggestions (20%) related to management and best aligned with key competency 4 of CanMEDS (Manage their practice and career). The resultant curriculum combined elements of both LEADS and CanMEDS.

Conclusions: Based on trainees' identified needs, the leadership curriculum primarily founded in the LEADS framework and enhanced by CanMEDS competencies. The next steps include curriculum evaluation and refinement by the 2019–2020 University of Toronto cohort.

062

Establishing an Evaluation Framework for Leadership in Medical Trainees Based on 7 Core Competencies

K. Chan[1], S. Jones[2], A. Bharwani[2], J. Bourdage[2]

[1]University of British Columbia, Richmond, BC; [2]University of Calgary, Calgary, AB

Introduction: Leadership is a core CanMEDS role and a recommendation from the Future of Medical Education of Canada. However, there is no well-defined framework for evaluating trainees in this competency. We seek to develop one and to determine the behaviors and traits currently utilized by supervisors to evaluate leadership.

Methods: Based on previous phases of this study involving subject experts, 7 core leadership competencies were identified: ethical/social responsibility, civility, self-leadership, team management, vision/strategy, innovation, and communication/interpersonal influence. Junior trainees (64 medical students, 117 residents) in Calgary were invited to undertake a self-report leadership assessment. This was developed based on well-established scales of behaviors and traits used to appraise each of the competencies from the literature. The results were compared to a preceptor's or senior resident's evaluation of the trainee based on a visual analog scale (VSA) of each competency.

Results: There is good convergent validity between the VSA measures and the behaviors (r 0.18–0.45) and traits (r 0.15–0.53) scales. There are significant ($P < .05$) positive correlations between trainees' self-report and their supervisor's evaluation for being socially bold with vision/strategy and innovation/creativity (r 0.267 and 0.331), organized with self-leadership (r 0.246), and patient with civility (r 0.307). Trainees who identify as socially/ethically responsible score are negatively correlated ($P < .05$) with team management (r -0.176), innovation/creativity (r -0.222), civility (r -0.235), and overall leadership (r -0.175).

Conclusions: A 7-competency framework can be used to assess medical leadership. However, we need to better recognize all the competencies in clinical training.

063

The Erosion of Ambiguity Tolerance and Sustainment of Perfectionism in Undergraduate Medical Training: A Study of Clerkship Training Effects

S. Ndoja[1], S. Chahine[2], D. Saklofske[2], B. Lanting[2]

[1]Schulich School of Medicine & Dentistry, London, ON; [2]Western University, London, ON

Introduction: Medicine is a field that is simultaneously factual and ambiguous. While studies have examined medical trainees' tolerance of ambiguity (TOA), the extent to which TOA is affected by clinical experiences and its association with other psychological factors such as perfectionism is unknown. Thus, the purpose of this study is to test the change in self-reported levels of TOA and perfectionism throughout clinical experience.

Methods: This was a longitudinal cohort study: 175 students in the first and last 12 weeks of their third year comprising of 6 core rotations were invited to participate in an online anonymous survey. The survey comprised of demographic information along with published and validated TOA and perfectionism scales. Tolerance of Ambiguity in Medical Students and Doctors (Hanckock et al, 2015) and The Big Three perfectionism scale-short form (Feher et al, 2019) were used to assess TOA and perfectionism, respectively. Pre-post mean comparisons and correlations were used to detect the effect of clerkship on TOA, perfectionism, and their relationship.

Results: Fifty-one students responded to pre-survey, 62 responded to post-survey. Clerkship was found to decrease TOA ($P < .001$) with pre-TOA scores at m = 59.57 and post TOA at m = 43.89. There was a moderate inverse correlation between TOA and perfectionism before clerkship (r = 0.32) that increased slightly after clerkship (r = 0.39). Clerkship did not affect levels of perfectionism ($P > .05$).

Conclusions: Clerkship does appear to influence student's tolerance of ambiguity. However, perfectionism remained unchanged. Further work needs to be done exploring tailoring educational interventions to extremes of TOA and perfectionism.

064

Why Assessors Don't Complete Work-Based Assessments: What Elentra Data Tell Us

L. A. McEwen[1], D. Dagnone[1], A. Dos Santos[1], M. V. Bouchard[1]

[1]Queen's University, Kingston, ON

Introduction: On December 31, 2019, 43,594 CBME assessments had been initiated in the Elentra learning management system at Queen's University since the launch of CBME July 1, 2017. Of those, 37 553 were completed, 3402 deleted, with 2939 pending. Although Elentra requires users to indicate reasons for non-completion, the dropdown menu offers only 4 options (did not work with the target, completed all relevant tasks on relevant targets, did not attend event, and "other"). System users who indicate "other" are prompted to enter a reason. In October 2019 we analyzed user-provided reasons for non-completion with the goal of informing revisions to our dropdown menu.

Methods: A sample of 1585 user-provided reasons for assessment non-completion was inductively coded for similarity. Codes were then grouped thematically into major categories and organized by frequency.

Results: We identified 18 types of reasons users indicated "other" when not completing an assessment. One additional code was added for instances when users failed to indicate their reason (eg, string of letters). Upon further analysis 6 major themes emerged in the data, including: wrong EPA/form/assessor/learner (n = 449), stale (received late or just too old; n = 389), duplication (n = 210), testing/previewing/training (n = 194), deleted by program (n = 121), and no assessor cue/don't recall case (n = 106). These 6 themes accounted for 1469 of the total 1585 user-provided reasons.

Conclusions: Interestingly, many of the prevalent responses actually aligned with available dropdown items, yet users did not select these. This suggests they may not interpret them as intended. Future work will focus on developing a shared language.

065

Spotting Potential Opportunities for Teachable Moments (SPOT)

S. Sample[1], H. Alrimawi[1], T. M. Chan[1]

[1]McMaster University, Hamilton, ON

Introduction: With competency-based medical education (CBME), entrustable professional activities (EPAs) are used to evaluate residents on performed clinical duties. This study aimed to determine if implementing a case-based discussion, designed to increase recognition of available EPAs, into CBME orientation would help residents increase the number of EPAs completed.

Methods: We designed an intervention consisting of clinical cases that were reviewed by national EPA experts who identified which EPAs could be assessed from each case. A case-based session was incorporated into the 2019 CBME orientation where postgraduate year (PGY)-1 residents read the cases and discussed which EPAs could be obtained with PGY-2/faculty facilitators. The number of EPAs completed in the first 2 blocks of PGY-1 was determined from local program data. Student's *t* test was used to compare averages between cohorts.

Results: We analyzed data from 22 trainees (7 in 2017, 8 in 2018, and 7 in 2019). In the first 2 blocks of PGY-1, the intervention cohort (2019) had a significantly higher average number of EPAs completed per trainee (47.4 [SD 11.8]) than the pre-intervention cohort (25.3 [SD 6.7]; $P < .001$; Cohen's d = 2.3). No significant difference existed in the number EPAs obtained between the 2017 and 2018 cohorts, with averages of 24.3 (SD 6.8) and 26.1 (SD 7.0) per trainee, respectively ($P = 0.60$).

Conclusions: A case-based orientation led by CBME-experienced facilitators nearly doubled the EPA acquisition rate of our PGY-1s. The constant EPA acquisition rate between the 2017 and 2018 cohorts suggests this post-intervention increase was not solely based on user familiarity with EPAs.

066

Clinical Teaching Unit Design: A Realist Systematic Review of Evidence-Based Practices for Clinical Education and Health Service Delivery

R. V. Sandarage[1], B. Tang[1], I. Mccormick[1], B. Kassen[1], J. Chai[1], K. Dawson[1], R. Hatala[2], K. Dutkiewicz[2], S. Saad[3], V. Kitchin[4]

[1]University of British Columbia, Vancouver, BC; [2]Division of General Internal Medicine, Vancouver, BC; [3]Division of Infectious Diseases, Vancouver, BC; [4]Vancouver Fraser Medical Program and Woodward Library, Vancouver, BC

Introduction: The Clinical Teaching Unit (CTU) has emerged as a near-ubiquitous model of clinical education internationally since its inception over 50 years ago. However, while health care has changed dramatically over this period, the CTU model has remained largely unchanged. We thus aimed to systematically review principles of CTU design that contribute to improved outcomes in clinical education and health service delivery.

Methods: We performed a realist systematic review in accordance with the RAMESES II protocol for realist reviews. Databases, including MEDLINE, Embase, Cochrane Database of Systematic Reviews, and CINAHL, were searched to find primary research articles published from 1993 to 2019 involving clinical teaching units or other teaching wards, and outcomes related to either trainee education or health service delivery.

Results: After full-text review, studies meeting inclusion criteria were analyzed according to the Star Model, which views health systems as a collection of interdependent subsystems, including strategy, structure, human resources, incentives, information and decision support, and culture. Most existing evidence focuses on the strategy and structure subsystems, including approaches to ward rounds, optimal call structures, and novel educational strategies. Our realist review approach generated context-mechanism-outcome statements in which certain aspects of CTU design are more likely to be successful.

Conclusions: Efforts should be made to generate higher-quality evidence on the design of clinical teaching units as a dual model for both clinical education and health service delivery. Further knowledge translation efforts may be necessary to ensure that known best practice in CTU design becomes common practice.

067

Better Than Nothing: Study Guilt and the Use of Internal Medicine Podcasts in Early Years Residency

C. S. Leurer[1], J. Fu[1], A. Lai[1], L. Melvin[2]

[1]University of Toronto, Toronto, ON; [2]Toronto Western Hospital, Toronto, ON

Introduction: Podcasts are used as educational tools by physicians across multiple subspecialties and levels of training. However, there has been limited research understanding the ways in which trainees incorporate podcasts into informal medical education. In this study, we examine the motivation behind the use of internal medicine (IM) podcasts in the early years of postgraduate medical education.

Methods: We conducted semi-structured interviews (n = 8) with internal medicine residents in the PGY-1 and PGY-2 level. Interpretive description methodology was applied to identify pertinent themes across interviews. Data collection is ongoing.

Results: Early thematic analysis has revealed that "study guilt" is a main motivator for using IM podcasts. Participants endorse factors driving motivation to use podcasts, including the desire for productivity, maximizing efficiency in spare time, remaining up-to-date in their knowledge, and the desire to expand their knowledge for both patient care and clinical performance.

Conclusions: Residents identify "study guilt" as a main motivator to use internal medicine podcasts in the informal medical education. Our participants used IM podcasts as a method to increase their overall productivity and assuage "study guilt." Podcasts are uniquely positioned to target study guilt given the easy access to abundant sources and the requirement only for auditory attention, which allows them to be used for learning while multitasking. Understanding how and why residents reach for podcasts in their medical education will allow for the development of future medical resources designed specifically to meet these needs.

068

Strategic Organizational Skills Predict Surgical Training Success

O. P. James[1], D. BT. Robinson[1], L. Hopkins[1], C. Bowman[1], R. Egan[1], W. G. Lewis[1]

[1]Wales PGMDE School of Surgery, Nantgarw, Wales

Introduction: Early years surgical career progression is determined by examination success and ARCP outcome. Academic and non-academic factors have been identified as predicting examination outcome, but data on organization skills (OS) are thin. This study aimed to determine whether OS relate to operative experience, publications, ARCP outcome, and MRCS pass, among core surgical trainees (CSTs).

Methods: The study was conducted prospectively at 3 consecutive CST induction bootcamp courses providing clinical and simulation training for 126 CSTs. Arrival time at course registration was the selected surrogate for OS. CSTs were advised to arrive promptly at 8:45 AM for registration and that the course would start at 9:00 AM. CSTs were subsequently grouped as "early" (before 8:45 AM), "on time" (8:45–8:59 AM), or "late" (later than 9:00 AM or non-attendees). Times of arrival (ToA) were compared with Intercollegiate Surgical Curriculum Programme portfolios for the first 2 cohorts (n = 79).

Results: Median ToA was 8:55 AM (range 7.55–10.03), with 15 CSTs (19.0%) arriving early, 38 (48.1%) on time, and 26 (32.9%) late. ToA was associated with operative logbook experience (rho -0.356; *P* = .001; early vs late 220 vs 184 cases), peer-reviewed publication (-0.269; *P* = .017; 46.7% vs 11.5%), MRCS pass (-0.241; *P* = .032; 53.3% vs 19.2%), but not ARCP outcome (0.173; *P* = .13; 73.3% vs 50.0% Outcome 1).

Conclusions: Better-prepared CSTs achieved a fifth more operative experience, 4-fold greater academic output, 3-fold greater MRCS success, with 50% more achieving ARCP 1 outcomes. Timely arrival at training events represents a skills-composite of travel planning and is a valid marker of strategic organization skill.

069

Implementation of a Longitudinal POCUS Curriculum in the Core Internal Medicine Residency Program at Dalhousie University

W. Faiella[1], A. Tran[1], S. Houston[1], A. Miller[1], A. Nelson[1], B. Culligan[1], C. MacIntyre[1], J. Styles[1], S. Ramer[1], I. Epstein[1], S. Mulvagh[1], C. Gray[2]

[1]Dalhousie University, Halifax, NS; [2]Nova Scotia Health Authority, Halifax, NS

Introduction: Bedside point-of-care ultrasound (POCUS) has become a useful diagnostic tool across multiple specialties over the last decade. Despite this, no formal curriculum currently exists for internal medicine (IM) residency programs across Canada. This report aims to outline the longitudinal POCUS curriculum developed at Dalhousie University and provide an assessment of residents' knowledge, confidence, and perceived clinical utility of POCUS.

Methods: Residents in the core IM program were invited to complete a survey and knowledge test in December 2019. The survey evaluated self-reported confidence in acquired POCUS skills and clinical use in practice using a 5-point Likert scale. The knowledge test evaluated image interpretation skills. Scores were compared between postgraduate year (PGY)-1 and PGY-3 residents using an unpaired *t* test.

Results: A total of 34 of 45 (75.6%) residents (PGY-1–3) participated in this study. Residents agreed that POCUS training should be a formal component of residency (4.56 ± 0.56). Most residents (97.1%, 33 of 34) use POCUS outside of formal learning sessions, approximately 3.78 ± 2.39 times per month. Scores on the 30-item knowledge test improved based on time spent in the curriculum, with PGY-1s scoring an average of 70% (21 of 30) and PGY-3s 82.8% (24.9 of 30, $P = .02$). Increased confidence in POCUS skills was reported across all applications, with strongest confidence in lung imaging for A/B lines (4.1 ± 0.79), pleural effusions (3.92 ± 0.90), and lung sliding (3.89 ± 0.92).

Conclusions: Dalhousie University is one of the first IM programs in Canada to implement a formal longitudinal POCUS curriculum into their training program. The curriculum has enabled an augmentation in POCUS knowledge, confidence, and clinical utility among residents.

070

Found in Translation: What Really Happens at a Surgical Bootcamp?

C. Lewis[1], V. Balachander[1], P. Harwood[1], K. Wembridge[1], P. Renwick[1], J. Tomlinson[1]

[1]Health Education England, Leeds, UK

Introduction: The role of educational bootcamps is well described, usually focusing on skill and knowledge acquisition, with an intensive exposure to clinical conditions in that specialty. In 2019 we piloted and evaluated a pioneering orthopaedic bootcamp format with a much greater focus on non-technical skills and relationship building.

Methods: A 2-day bootcamp was delivered for 11 trainees new to our orthopaedic training program, designed with an emphasis on peer-to-peer teaching wherever possible, with senior (consultant) faculty excluded at specified times. A mixed-methods evaluation study followed the bootcamp. An independent interviewer with relevant specialty expertise did not participate in the bootcamp and undertook the qualitative evaluation using semi-structured interviews approximately 3 weeks after the event. Interviews were recorded, transcribed verbatim, and anonymized. Inductive analysis was used to identify key themes.

Results: Feedback on the new bootcamp was overwhelmingly positive with multiple themes. Themes identified included the development of peer networks with both year-group peers and senior trainees, establishment of valued informal relationships with program directors, clear definitions of curriculum and faculty expectations, and the acquisition of "inside information" from experienced peers to maximize success in training. The bootcamp also radically shaped perceptions of self and the program: "It's about stepping up, you are expected to lead," and "They are invested in shaping my future."

Conclusions: A specialty bootcamp offers critical learning over and above clinical matters—to engage trainees, develop networks, build psychological safety, and a sense of belonging and professional identity at a critical early stage.

071

Implementation and Evaluation of a Transition to Discipline Longitudinal Bootcamp for First Year of Pediatric Residents

J. Bird[1], T. Martimianakis[1], A. Atkinson[2], S. B. Schwartz[2]

[1]University of Toronto, Toronto, ON; [2]The Hospital for Sick Children, Toronto, ON

Introduction: To aid in the transition from clerkship to residency, the University of Toronto Pediatric Residency Program implemented a mandatory bootcamp in the 2019–2020 academic year. Following implementation of the bootcamp, we aimed to evaluate the program using a participant questionnaire, in order to iteratively redesign the program for future years.

Methods: The bootcamp consisted of 12 × 4-hour sessions spanning the first 3 months of the PGY-1 Transition to Discipline (TTD). After finishing the bootcamp, participants were asked to complete a questionnaire to evaluate their experience.

Results: Overall, all residents that completed the questionnaire felt the bootcamp significantly contributed to their learning experience during PGY-1/TTD. The sessions most highly rated (rated as "the most useful sessions" by > 60% of residents) covered the following topics: neonatal resuscitation program, ward and on-call issues, lumbar punctures, IV insertion, growth/nutrition, pharmacy 101, and history/physical examination skills. The sessions rated lower (rated as "less useful sessions" by > 40% of residents) covered the following topics: caring safely (patient safety, error prevention, and handoff), half-day shadowing a nurse, quality improvement, resource stewardship, and research primer.

Conclusions: Our preliminary data suggests that the implementation of a bootcamp is perceived to be an effective way of enhancing PGY-1/TTD residency education. Residents identified that topics centered around procedural skills and clinical duties are most suited to the bootcamp model. Topics that were rated less useful centered around areas that residents traditionally feel are important but are perceived as less pressing for executing their day to day work.

072

Australian Orthopaedic Trainee Procedural Entrustment and AOA National Joint Replacement Registry Long-Term Outcomes

I. W. Incoll[1], I. Harris[2]

[1]Australian Orthopaedic Association, Erina Fair, NSW, Australia; [2]UNSW Sydney, Sydney, NSW, Australia

Introduction: The AOA is responsible for education and training and ongoing professional development for orthopaedic surgeons in Australia. The AOA National Joint Replacement Registry (AOANJRR) has tracked almost 1.5 million joint replacement procedure outcomes since 1997.

Methods: Hip and knee replacement outcomes over a 14-year period (2003–2016) from hospitals which participate in AOA residency training were analyzed. The electronic logbook using a self-reported, 5-level scale of entrustment for procedures was analyzed for variation across the training cycle and for any association with rates of revision.

Results: AOA residents' level of entrustment was subdivided according to calendar month in which the procedure was performed. This demonstrated a 6-month cycle of increasing graduated responsibility, which correlated with the resident's rotation to a new hospital training post. A total of 97 895 hip replacements and 169 387 total knee replacements were included in the AOANJRR analysis. Outcomes (2-year cumulative percent revision [CPR] and 5-year CPR) were subdivided according to the calendar month in which they were performed for hospitals with orthopaedic trainees. Both hip and new long-term joint replacement revision rates did not correlate with these changing levels of entrustment.

Conclusions: Graduated responsibility is an essential part of training in any procedural specialty. It enables professional identity development and development of proficiency but must occur within a framework of safety and should not compromise patient outcomes. These results are reassuring in that Australian orthopaedic joint replacement patient outcomes are not compromised by the graduated responsibility entrusted by their orthopaedic surgeon supervisors.

073

Evaluation of Student Progress and Competence After the Self-Directed Acute Abdomen Simulation Skill Course

R. Gudaityte[1], Z. Dambrauskas[1], P. Dobozinskas[1], D. Vaitkaitis[1]

[1]Lithuanian University of Health Sciences, Kaunas, Lithuanian

Introduction: HybridLab is a fusion of distance learning and self-directed medical simulation that allows learners to train 24/7 at their workplace without direct presence of the instructor and/or technician. The aim of this study was to assess the satisfaction of participants and the course utility.

Methods: One hundred one fifth-year medical students of LSMU were enrolled in the simulation-based course focusing on clinical examination of the abdomen, the sequence of initial assessment and treatment for suspected sepsis, and initial assessment of trauma patient. Objective assessment was followed by post-course survey of the participants and the estimation of self-perceived ability to carry out the crucial clinical tasks and skills.

Results: Students required approximately 7 hours to achieve 87% performance score according to the set standard. During the post-course survey 94% of the participants stated that the acquired knowledge and skills were clinically relevant and applicable (46% very useful, 48% useful). After the course 93% of the respondents were confident that they were capable of safely applying the acquired skills in the clinical setting (38% felt proficient, 55% skilled).

Conclusions: Evaluations of students' opinion and acceptance can be seen as first step when establishing a new learning program. Our study revealed a high approval of the participants for the offered blended (hybrid) learning environment and contents. Broad acceptance is crucial for successful program implementation, but it is also important to evaluate its influence on participants' gain of practical skills.

074

How to Build a System for Successful Self-Directed Peer-to-Peer Simulation Training in Your Residency Program

Z. Dambrauskas[1], R. Gudaityte[1], P. Dobozinskas[1], D. Vaitkaitis[1]

[1]Lithuanian University of Health Sciences, Kaunas, Lithuanuan

Introduction: Higher public and patient expectations have both encouraged the development and use of innovative educational methods. Simulation training enables practice and error without risking patient safety. However, medical simulation is very expensive and requires a lot of human resources. With financial pressures facing health care, there is a demand to provide equivalent standards of education at lower costs. Traditional medical simulation gradually is replaced by the technology-enhanced simulation training, which is associated with beneficial effects for outcomes of knowledge, skills, behaviors, and patient-related outcomes.

Methods: HybridLab is a fusion of distance learning and self-directed peer-to-peer medical simulation that allows learners to train 24/7 at their workplace without direct presence of the instructor and/or technician, while the training sessions are reviewed online by the experienced instructors online to give feedback and evaluation. The system allows for effective development and assessment of several CanMEDS Roles/competencies, including but not limited to professionalism, communication, collaboration, leadership teamwork, and peer-to-peer teaching. The workshop covers different topics that allow learners to acquire necessary knowledge and skills to build an effective system for self-directed peer-to-peer simulation training in their residency program.

Results: Lithuanian University of Health Sciences successfully adopted this method of training in several residency programs. The experience of the last 5 years demonstrates the viability and utility of this system.

Conclusions: Self-directed collaborative simulation in residency proves to be more effective, is less labor intensive, more versatile, more targeted, and user friendly and more accessible.

075

Implementation of a Resident-Led Committee to Increase Resident Engagement in Program Development

H. Geddie[1], R. Mackin[2], A. Latchman[3], Q. Ngo[4]

[1]McMaster Children's Hospital, Burlington, ON; [2]Western University, London, ON; [3]McMaster University, Hamilton, ON; [4]McMaster University, Oakville, ON

Introduction: There is growing awareness of resident burnout in medical education, which threatens the wellness, growth, and success of postgraduate trainees. Transparency and input in program decisions are important protective factors. However, in large residency programs it is challenging to represent and effectively advocate for all residents. The purpose of this project was to improve engagement by establishing a "Resident Affairs" group, a resident-facilitated committee.

Methods: Resident Affairs was implemented in the McMaster pediatric residency program in 2018–2019. There were 54 residents from postgraduate years (PGYs) 1–4. The committee included chief residents (3), satellite site chief (1), PGY representatives (4), wellness reps (2), pool C rep (1), fellow rep (1), and a faculty rep (1). Other residents were invited to meetings when the discussion pertained to their leadership role as representative for a specific rotation. The committee met bimonthly. Minutes were distributed to the resident body and a quarterly newsletter was issued.

Conclusions: Resident Affairs committee meetings increased the effectiveness of advocacy on behalf of the resident body. It provided an avenue for residents to bring forward ideas for a more structured review and discussion. On average, 6 to 8 discussion items were addressed at each meeting with about half moving forward to the resident programmatic committee. Collaboration led to several resident initiatives with direct impact on program decisions. The chief residents indicated that having the input of the Resident Affairs committee allowed for more effective advocacy. At the annual review, the resident body elected to keep the committee for 2019–2020.

076

Perceptions of Health and Wellness Impacts on Residents in their Certification Examination Year

K. Pardhan[1], N. Snelgrove[2], T. Riddell[2], M. Onlock[3], L. Nasser[4]

[1]Sunnybrook Health Sciences Centre, Toronto, ON; [2]McMaster University, Burlington, ON; [3]University of Toronto, Toronto, ON; [4]McMaster University, Hamilton, ON

Introduction: Residency training in Canada includes a certification examination administered by the Royal College of Physicians and Surgeons of Canada or the College of Family Physicians of Canada. Residents continue clinical work while studying. The study period may impact residents' health and wellness.

Objectives: Our objectives were to explore (1) residents' certification examination year experiences, (2) mitigating strategies used to enhance health and education, (3) retrospective perceptions of faculty on their certification examination year, and (4) faculty perceptions of certification examination year experiences of current residents.

Methods: Qualitative description methodology was used for this study. Participants were residents and supervisors from McMaster University and the University of Toronto. In depth, semi-structured one-on-one interviews were conducted by one of the investigators. Each was transcribed, reviewed and coded using content analysis by 2 members of the investigating team.

Results: Stressors were identified in residents' personal and professional lives including finances, career planning, and relationships. Health impacts included heightened anxiety, loss of interest, weight gain, and poor eating habits. Negative impacts were exacerbated by observing predecessors' stress, the high-stakes nature of the examination, and expectation of peak clinical performance while studying. Mitigating factors included supportive personal and professional networks, norming of the examination as creating knowledge foundation for practice and shared community goal of resident success.

Conclusions: This study has identified unique challenges that residents face in their examination year. A focus on mitigating factors will be helpful to ensure physician wellness during transition to practice.

077

Afterhours: A Resident-Led Innovation in Peer Support

J. D. Himelfarb[1], A. Agarwal[1], M. Gewarges[1], T. Abdelhalim[1], R. Stovel[1]

[1]University of Toronto, Toronto, ON

Introduction: Rising levels of burnout, and the recognition of its far-reaching effects, have generated an impetus for better support for health care providers. Junior residents represent a population at risk of struggling with their new roles within the health care system. To address this, we launched a resident-moderated, peer-support group to promote reflection through narrative medicine. A cross between Balint groups and Ice Cream Rounds, "Afterhours" is designed to destigmatize challenges faced by trainees.

Methods: The program format was developed in iterations with input from residents and faculty. Monthly sessions were held over the course of the academic year and promoted to junior residents within the internal medicine residency program. Each session was approximately 2 hours in length and began with a resident facilitator discussing ground rules, such as confidentiality. Following this, residents were encouraged to reflect on interactions that affected them involving patients, colleagues, friends/family, and the health care system as a whole. After each reflection, a resident facilitator led a discussion about lessons that were learned. Each session ended with a statement highlighting the support services provided by the university.

Conclusions: Attendance at sessions ranged from 4 to 8 residents and feedback was consistently very positive. Through these meetings, residents develop strategies to build resilience while establishing meaningful connections with other trainees. Given this initiative's success, other residency programs have expressed interest in piloting sessions of their own. Future directions involve quantitatively measuring the impact of the sessions on trainee well-being.

078

Prevalence of Resident Burnout Remains Unchanged Worldwide Despite Efforts in the Last 20 Years: Are We Missing the Point?

L. Naji[1], B. Singh[1], A. Shah[1], F. Naji[1], B. Dennis[1], O. Kavanagh[1], L. Banfield[1], A. Alyass[1], Z. Samaan[1], J. Profetto[1], L. Thabane[1], F. Razak[2], Z. Sohani[3]

[1]McMaster University, Hamilton, ON; [2]Li Ka Shing Knowledge Institute, Toronto, ON; [3]McGill University, Montreal, QC

Introduction: Burnout is increasingly recognized as a crisis in the medical profession. Our primary objective was to establish the prevalence of burnout globally among medical residents. Additionally, we sought to identify factors associated with burnout and trends over decades.

Methods: We conducted a systematic review and meta-regression. We searched 6 databases from inception. Reviewers screened 8505 studies in duplicates for inclusion and risk of bias. We estimated pooled prevalence using a random effects model and employed a random effects meta-regression for secondary analyses.

Results: Data from 197 studies, encompassing over 44,000 residents across 47 countries, between 1987 and 2018 were analyzed. The pooled global prevalence of burnout was 47.3% (95% CI 43.1–51.5). Contrary to common belief, most literature does not support the association between age, sex, relationship status, work hours, or level of training with burnout. Rather, our meta-regression uncovered 3 novel findings: firstly, despite changes in duty hours and a focus on wellness, the burnout rates have remained unchanged over the past 2 decades (beta-coefficient 0.002; 95% CI -0.009, 0.013; $P = .72$). Secondly, burnout rates varied significantly by region ($P = .0002$), with European residents being least affected (30.8%). Lastly, specialty of training did not affect burnout rates (beta-coefficient -0.005; 95% CI -0.110, 0.099; $P = .92$).

Conclusions: Approximately half of resident physicians experience burnout worldwide, and this is largely attributed to systemic rather than individual factors. Further research to guide policy makers should aim to uncover systemic differences between European training programs and those elsewhere in the world.

079

5C's of Understanding Resident Well-Being on Call: A Quality Improvement Perspective in Emergency Psychiatry

S. Westcott[1], C. Clarkstone[1], N. Kates[1], T. Riddell[2]

[1]McMaster University, Hamilton, ON; [2]McMaster University, Burlington, ON

Introduction: Major changes occurred in the training model for emergency psychiatry at McMaster University in 2019. Concerns from multiple educational stakeholders catalyzed changes in the policies, processes, and staffing at our local Psychiatric Emergency Services (PES). We sought to understand, through quality improvement, factors impacting resident wellness related to PES during this transformation, and to identify areas for ongoing improvement.

Methods: A working model of factors that may impact resident well-being in PES before, during, and post-call was developed. This was translated into a mixed-methods survey that was distributed to postgraduate year 2–5 residents in October 2019. Results were analyzed for themes, which were then compared with data from various education committee meetings and additional wellness surveys. From this, a list of recommendations was generated and distributed to residents, who then rated the perceived impact of each on their well-being.

Results: We identified 5 major themes impacting resident wellness related to PES: competing demands, communication, comfort and environment, case management, and connectedness. This informs specific recommendations that can be implemented with sequential PDSA cycles.

Conclusions: The results of this quality improvement initiative will help inform hospital, department, and education leadership as changes in PES continue to unfold. Although McMaster residents' experience in PES was the primary focus, the 5C model of understanding resident well-being on call may be generalizable to learners in other settings, including but not limited to emergency psychiatry. We provide examples of recommendations and interventions related to each theme that participants can apply to their own settings.

080

Caring for Doctors, Caring for Patients: Building Supportive Cultures and Environments to Enable Better Patient Care

A. R. Thomas[1], G. McLachlan[2], A. Blohm[2], A. Rutter[3], C. Walton[4]

[1]General Medical Council, Manchester, UK; [2]General Medical Council, London, UK; [3]General Medical Council, Edinburgh, UK; [4]General Medical Council, Cardiff Bay, UK

Introduction: Doctor well-being is a vital factor in high-quality patient care, with high levels of stress impacting patient experience and outcomes. In 2018, the General Medical Council commissioned a UK-wide review into factors impacting doctors' mental health and well-being. Michael West and Dame Denise Coia considered core issues affecting well-being, their consequences, and practical solutions.

Methods: A literature review established the scope and impact of poor well-being in health care staff, and collated evidence around primary interventions to support well-being. In 2018 questions on burnout and wellbeing were introduced in the annual National Training Survey, providing prevalence and severity data on burnout for all UK trainees. UK doctors and medical students were interviewed, investigating:

- The impact of poor well-being on individuals and quality of care
- Factors influencing well-being
- Effective primary interventions
- Examples of good practice across the UK were explored.

Results: Three essential core needs were identified: **A**utonomy–empowering voice and control within doctors' work lives; **B**elonging–feeling connected to colleagues, valued, and supported; and **C**ompetence–enabling delivery of effective and high-quality care. Eight recommendations were proposed to facilitate these.

Conclusion: Our aim is that the UK's health services are a model for the world in creating compassionate workplaces that promote well-being. Burnout and stress affect all doctors globally. This review offers a practical approach to prioritizing the "ABC" core needs, which may be transferrable beyond the UK. We hope by addressing the "ABC" we will better serve the needs of patients and communities.

081

Next Generation of Physician Wellness: Changing the Culture Game

L. Flynn[1], E. Dance[2], C. Gérin-Lajoie[3], S. Smith[4], M. Sen[5], C. Simon[6], A. Hastings Truelove[7]

[1]Queen's University, Kingston, ON; [2]University of Alberta, Edmonton, AB; [3]Canadian Medical Association, Ottawa, ON; [4]University of Toronto, Toronto, ON; [5]Schulich School of Medicine and Dentistry, London, ON; [6]Canadian Medical Association, Kanata, ON; [7]Office of Professional Development and Educational Scholarship, Kingston, ON

Introduction: The Task Force on Physician Wellness from the Royal College of Physicians and Surgeons of Canada (RCPSC) has developed its recommendations for fostering physician wellness in Canadian clinical learning environments. Further a need to redress the current rates of burnout among our trainees, in discussions around the issue of physician wellness it has become clear that a cultural shift is needed to enable systemic, sustainable change in the way that we prepare physicians for practice. This presentation will address ways that postgraduate communities can start to identify and shift the cultures of their residency programs.

Methods: This presentation is based on outputs from a 2-year project of the RCPSC Task Force, comprised of national stakeholders and experts. Their work was informed by an environmental scan of wellness offerings at Canadian medical schools, a scoping literature review, consultation with experts, and stakeholder crowd sourcing at the International Conference on Residency Education 2018 and the International Conference on Physician Health 2018.

Results: As the recommendations from the Task Force become Royal College policy, it will be important for postgraduate medical education programs to understand how these recommendations can be operationalized in ways that both complement and challenge their existing cultures. This presentation will provide evidence-based suggestions for culture change related to physician wellness.

Conclusions: Acknowledging that every aspect of the health care system impacts physician wellness, and vice versa, we must understand how we can begin to change the systems in which we learn and practice.

082

Evaluation of Internal Medicine Residents' Knowledge, Skills, and Attitudes Related to Quality Improvement and Patient Safety Education: Informing a Curriculum and Competency-Based Assessment

S. FM. Awad[1], R. Egan[1], M. Mullin[1], A. Wilkinson[1], J. Baumhour[1], N. Dalgarno[1], J. M. Murphy[1], G. C. Digby[1]

[1]Queens University, Kingston, ON

Introduction: A lack of evaluation has made the needs and efficacy of resident training in quality improvement and patient safety (QIPS) unclear. We sought to inform curriculum redesign by evaluating the perceived needs and effectiveness of an existing internal medicine (IM) resident QIPS curriculum

Methods: IM residents at Queen's University participated in a formal 1-year, repeating, QIPS curriculum consisting of 6 mandatory modules and rounds. A written knowledge test and Quality Improvement Knowledge Application Tool (QIKAT) survey was completed by residents in July 2019. Semi-structured interviews and qualitative thematic analysis was conducted with residents and faculty using a concurrent triangulated approach.

Results: Postgraduate year (PGY)-2 and -3 knowledge test responses were blinded and scored by 2 residents (average interclass correlation coefficient = 0.83), with an average score of 51% (n = 26, SD = 25.4). Of the 38 PGY-2/-3 residents' respondents, 28.9% were involved in a QI project; 63.2% and 28.9% felt proficient at identifying and improving care quality problems, respectively; 13.2% believed they could implement change. Fifteen residents and 6 faculty interviews were conducted. Interview data analysis identified time as a key barrier to QIPS engagement. Barriers included a lack of knowledge, an overly complicated safe report process, and a lack of feedback from non-critical reports. There was uncertainty about how to negotiate QIPS standardization versus specialization.

Conclusions: Our results demonstrate that residents have limited perceived and measured formal QIPS knowledge and prefer active QIPS learning. Active learning, standardization of QIPS requirements, and improved reporting efficiency were identified as next steps to redesigning residency QIPS curriculum.

083

Are Residents Practicing Safe Medical Care: A Retrospective Analysis of Civil Legal Cases

A. McDougall[1], C. Zhang[1], H. Neilson[1], Q. Yang[1], J. Nuth[1], E. Tsai[1], S. Lee[1], G. Lefebvre[1], L. Calder[1]

[1]Canadian Medical Protective Association, Ottawa, ON

Introduction: Research has demonstrated a relationship between measures of health care quality and rates of civil legal actions against physicians. To understand the educational implications of these findings, we analyzed rates of civil legal actions involving resident physicians over time.

Methods: Retrospective analysis of closed civil legal cases involving ≥ 1 resident member of the Canadian Medical Protective Association (CMPA), a national not-for-profit medico-legal defense organization with over 100,000 physician members. We performed a 25-year trend analysis (1993–2017) and a 10-year descriptive analysis (2008–2017).

Results: The proportion of residents named in civil legal cases decreased significantly from 31 per 1000 in 1993 to 23 per 1000 in 2017 ($P < .0001$). Between 2008 and 2017, 1901 residents were named in 1107 civil legal cases. In a subgroup analysis of residents whose specialty and training level were available (n = 951), surgical specialties were named most frequently (n = 531), followed by medical specialties (n = 353) and family medicine (n = 84). At the time of the index encounter that lead to being named in a civil legal case, 76.2% of residents were working on-service (n = 725) and 52.8% were on-call (n = 502).

Conclusions: This study is the first of its kind from Canada. Our findings reveal opportunities for educators and residents to better understand and manage medico-legal risk in the postgraduate training environment, and potentially enhance safe medical care in Canada.

084

High-Value, Cost-Conscious Care Attitudes in the Graduate Medical Education Learning Environment: A Variation of Views That Residents Misjudge

S. Mordang[1], F. Smeenk[1], L. Stassen[1], K. Könings[1], A. Leep Hunderfund[2]

[1]Maastricht University, Maastricht, Netherlands; [2]Mayo Clinic, Rochester, MIN

Introduction: Training residents in delivering high-value, cost-conscious care (HVCCC) is crucial for a sustainable health care. A supportive learning environment is key. Yet, stakeholders' attitudes toward HVCCC in residents' learning environment are unknown. We aimed to measure stakeholders' HVCCC-attitudes in residents' learning environment, compare these with resident perceptions of their attitudes, and identify factors associated with attitudinal differences among each stakeholder group.

Methods: We conducted a survey of 312 residents, 305 staff physicians, 53 administrators, and 1049 patients from 66 hospitals across the Netherlands between June 2017 and December 2018. Respondents answered the Maastricht HVCCC Attitude Questionnaire, an adaptation of the Rochester Questionnaire, consisting of 3 subscales: high-value care, cost-incorporation, and perceived drawbacks. Residents estimated HVCCC attitudes of other stakeholders. We used multilevel analyses to analyze our data.

Results: HVCCC attitudes differed on all subscales: staff physicians and administrators reported more positive HVCCC attitudes than residents ($P \leq .05$), while patients' HVCCC-attitudes were less positive ($P \leq .05$). Residents underrated staff physicians' ($P < .001$) and overrated patients' HVCCC-attitudes ($P < .001$). Residents' and staff physicians' increasing age was associated with more positive HVCCC attitudes ($P \leq .05$). Residents perceiving more autonomy had more positive HVCCC attitudes ($P \leq .05$). Patients experiencing lower health quality associated with having less positive HVCCC attitudes ($P < .001$).

Conclusions: Attitudes toward HVCCC vary among stakeholders in residents' learning environment, and residents misjudge HVCCC attitudes of staff physicians and patients. Staff physicians and administrators can support residents' insight by sharing and displaying their positive views on HVCCC, teaching them patient-centered communication, and granting them autonomy in clinical practice. Older staff physicians are the best role models.

085

Curriculum Needs for Teaching Quality Improvement and Patient Safety to Residents

T. Beesley[1], M. Daly[1], J. Alfieri[1]

[1]McGill University, Montreal, QC

Introduction: Understanding and developing programs that foster quality improvement and patient safety (QIPS) is a key factor in enhancing the field of QIPS. This study aimed to identify: (1) QIPS topics and teaching methods, (2) QIPS curriculum gaps, and (3) the anticipated needs of our postgraduate residency training programs.

Methods: A participatory approach was used to develop the needs assessment questionnaire. The questionnaire was divided into 10 sections. Seventy-six postgraduate medical education (PGME) program directors (PDs) were invited to complete the questionnaire.

Results: Thirty-nine PDs completed the questionnaire (10 CFPC, 29 RCPSC). Sixty-two types of teaching activities were identified (48 formal and 14 informal). The most common QIPS training topics were identified as general patient safety (documentation and safe handover strategies) and quality improvement models (systems to identify and mitigate risks to patients). Participants described 4 factors that affected the delivery of QIPS training. These were organized into 4 main categories: resources, educational context, content knowledge, and learning environment. While several different needs were identified, there was consensus for faculty-wide QIPS needs such as quality improvement, medication choice, prescribing, dosing, and disclosure.

Conclusions: This needs assessment revealed a variety of QIPS topics and teaching methods occurring in the PGME programs. Several of the QIPS topics currently delivered by residency programs were recognized as high priority learning needs and gaps by other residency programs. Findings will inform the development and implementation of a PGME-wide QIPS curriculum. Further investigation is needed to explore the effectiveness of current teaching methods and how to optimally teach QIPS to address learners' needs.

086

Weighed and Found Wanting: An Assessment of Inpatient Electronic Sign-Out List Quality

P. Farag[1], R. Cavalcanti[1], T. Jamieson[1]

[1]University of Toronto, Toronto, ON

Introduction: Electronic sign-out lists (ESOLs) are important tools for handover and continuity of care. However, without appropriate training, their utility may be compromised. To identify areas for improvement in tool design and resident education, this study examined the quality of internal medicine ESOLs.

Methods: Between June and December 2019, we prospectively examined random samples of patient summaries contained within ESOLs of 9 internal medicine subspecialties at 3 academic hospitals. Descriptive statistics summarized whether ESOLs were updated in time for handover and included literature-based handover criteria (eg, code status). Chi-square testing allowed for bivariate analysis.

Results: A total of 566 patient summaries were evaluated. Of those not designated as "Alternate Level of Care," 76% were not updated on the weekends. Between Monday and Thursday, 64% were not updated, compared to 31% on Friday ($P <$ .0001). Code status was 3 times more likely to be reported when the ESOL template included a designated "Code Status" section (65% vs 21%, $P <$ .0001). All templates lacked sections for allergies, current clinical status, and contingency plans. These items were reported in 1%, 8%, and 16% of summaries, respectively.

Conclusions: Internal medicine sign-out lists are often not updated and lacking in key handover criteria. Interestingly, ESOLs were more likely to be (1) updated on Friday and (2) inclusive of handover items that are denoted by the template. To optimize ESOL utility for handover, trainee input should be sought to further investigate why the identified deficits exist and how sign-out tool design may be leveraged for a solution.

087

Quality Improvement and Patient Safety: Development and Implementation of a Postgraduate Medical Education–Wide Initiative

D. Bowes[1], C. Shearer[1], J. Dornan[2], A. Lynk[1], J. Parker[1], R. Romao[1], S. Stevens[1], A. Warren[1], S. Ackroyd[1], T. Daigle-Maloney[2], J. Dornan[2]

[1]Dalhousie University, Halifax, NS; [2]Dalhousie University, Saint John, NB

Introduction: Quality improvement and patient safety (QIPS) have been assigned a higher profile in CanMEDS 2015, CanMEDS-FM 2017, and in new accreditation standards. This prompted efforts at Dalhousie University to create a vision for integrating QIPS into postgraduate medical education (PGME). The purpose of this study is to report on a needs assessment survey of program directors and to describe the implementation of a PGME-wide QIPS program.

Methods: A QIPS task force was formed, and a literature review performed. An electronic survey was distributed to all Dalhousie PGME program directors. Twelve program directors were interviewed individually to collect additional feedback. The results were used to develop a "road map" of recommendations with a graduated timeline.

Results: Forty-three participants responded to the program director survey. The most frequently reported barriers to delivering QIPS content were "limited/lack of faculty expertise" (64.3%), "competing demands for faculty" (57.1%), and "competing educational demands for residents" (57.1%). The top 3 content areas identified as being high priority to meet learning needs of residents were "patient safety incident analysis/root cause analysis," "quality improvement methodologies," and "culture of patient safety." A common theme from narrative comments suggested improving integration of QIPS teaching into daily clinical care. The task force released recommendations in February 2018; the structure of subsequent interventions and the evaluation strategy will be described.

Conclusions: A PGME-wide initiative for QIPS has been successfully developed and implemented. The recommendations made and ongoing evaluation of work in QIPS will be described.

088

In Situ Simulation on the Medicine Wards—An Interprofessional Approach to Teach Patient Safety in the Clinical Environment

A. Abulaban[1], Z. Khalid[2], A. Kalani[2]

[1]McMaster University, Burlington, ON; [2]McMaster University, Ancaster, ON

Introduction: Internal medicine wards can be a busy place but also a gold mine for teaching in real time. Sometimes these teaching opportunities are lost with the chaos of daily clinical life. In situ simulation can provide opportunities for protected time for teaching in the clinical environment.

Methods: We describe a curriculum involving in situ simulation which was carried out at a teaching hospital in Hamilton, Ontario, Canada. A collaboration between nurse educators and physician educators was established. Clinical cases were screened on the wards for patient safety events, critical incidents, communication concerns, or patient/staff complaints related to patient care. Case scenarios were then restructured to be carried out in a simulated environment on the wards. Residents, nurses, and other clinicians who were working on the wards at that time were asked to participate as learners in the scenario. The scenario would run for 15 minutes and then debriefing would be provided by the nurse educators and physician educators over the next 30 minutes. Latent safety threats were identified, discussed, and then plans were established for mitigating them.

Results: Over 3 months, 12 simulations have been carried out with positive feedback from the nurses and residents. System, knowledge, environment, and personnel issues have been identified and this has led to an interprofessional team–based approach to addressing these concerns and following up on them.

Conclusions: In situ simulation is a powerful modality to teach a systems-based approach to patient safety in an interprofessional clinical environment.

089

Mode of Delivery: Development and Implementation of an Obstetrical in Situ Simulation Program

V. Bloomfield[1], M. Morais[1], S. Ellis[2]

[1]McMaster University, Hamilton, ON; [2]St Joseph's Healthcare, Hamilton, ON

Introduction: Simulation is valued as a teaching and learning tool in obstetrics. In situ simulation assesses the hands-on and critical thinking skills of a team within their clinical setting. We aimed to create an in situ simulation program to promote skill acquisition, enhance team work, and identify underlying system limitations.

Methods: Key obstetrical emergencies were identified through a needs assessment. In situ simulations were developed to address these clinical presentations. Latent safety threats were identified by organizers and participants. Medical management was evaluated through comprehensive emergency specific checklists. Leadership attitudes were assessed using the modified Perinatal Emergency Team Response Assessment tool. Following each simulation, team members were debriefed and qualitative and quantitative feedback was solicited and aggregated by specialty and discipline.

Results: Simulations were conducted monthly at 2 academic centers over 14 months. Multidisciplinary participation included medical learners, staff physicians, nursing, and allied health from obstetrics, anesthesiology and neonatology. Overall, participants reported their involvement was enjoyable. Participants reported improved communication skills, content knowledge, and procedural knowledge. Participants rated the spontaneity of simulations, clinically relevant scenarios, safe learning environment, and use of realistic equipment favorably. Latent safety threats were identified relating to equipment, medication, personnel, resources, and technical skills.

Conclusions: We present the successful implementation of a comprehensive in situ simulation program in 2 busy academic centers. In situ simulation allows for deliberate practice of obstetrical emergencies and promotes a culture of patient safety and collaborative care. The lessons learned serve as valuable data to identify limitations within current practices and inform future policy change.

090

Effectiveness of Laparoscopic Skills Workshop on Enhancing Knowledge and Skills of Surgical Residents and Its Comparison With DOPS (Direct Observation Of Procedural Skills) Scores—Prospective Cohort Study

M. Khan[1], S. Pinjani[1], A. H[2]

[1]Aga Khan University, Karachi, Pakistan; [2]Shariff, Karachi, Pakistan

Introduction: Simulation-based surgical skills workshops are commonly used in the surgical training programs to enhance the knowledge and psychomotor skills of the residents, but there is scarcity of objective data on their effectiveness. The aim of our study was to explore if a 1-day laparoscopic skills workshop enhanced the knowledge and skills of surgical residents in minimal access surgery and if it had any correlation with the Direct Observation of Procedural Skills (DOPS) scores.

Methods: This was a quasi-experimental, single arm, repeat measure, prospective cohort study design. Thirty-three residents from general surgery and obstetrics–gynecology programs of Aga Khan University participated in the study. A daylong laparoscopic skills workshop consisting of lectures, videos, and hands-on practice was offered. The pre-workshop knowledge and skills scores of residents were assessed and compared with immediate post-workshop scores and scores of repeat assessment at 2 months. The scores of DOPS on laparoscopic procedures before and after the workshop were also compared.

Results: The results of our study indicated that mean post-workshop ($P \leq .000$) and interval scores ($P \leq 0.000$) for both cognitive and psychomotor skills were significantly higher as compared to mean pre-workshop scores. Similarly, post-workshop DOPS scores were significantly higher ($P = .011$) as compared to pre-workshop DOPS scores.

Conclusions: One-day laparoscopic skills workshop resulted in significant improvement in knowledge and psychomotor skills of the surgical residents. The skills gained from the workshop also resulted in improvement of DOPS scores reflecting the transfer of skills to real-life performance.

091

Using a Biometric Measure of Cognitive Load to Identify Physician Resuscitation Expertise in a Simulated Pulmonary Embolism Exercise

N. Cofie[1], E. Bruder[1], A. Belyea[1], N. Dalgarno[1]

[1]Queen's University, Kingston, ON

Introduction: As physicians gain expertise in clinical settings, they are able to handle progressively more information, in both complexity and magnitude, as an organized schema. Expert physicians then will utilize less cognitive load or mental effort compared to a novice in the same situation. Using galvanic skin response (GSR) as a surrogate measure of cognitive load, we assess whether average cognitive load differs significantly between expert and novice physicians during resuscitation.

Methods: We analyzed GSR data (n = 39) from a 10-minute simulated pulmonary embolism exercise among 18 faculty physicians and 21 residents. Cluster and factor analyses were used to identify resuscitation expertise based on participants' GRS scores. Descriptive statistics and ANOVA were used to analyze group differences.

Results: Contrary to expectation, we found 4 groups, rather than the traditional 2 groups of resuscitation expertise. We identified novice (7.7%), intermediate (35.9%), advanced (35.9%), and expert (20.5%) resuscitation expertise. All the novice physicians identified were found to be postgraduate year (PGY)-1 and PGY-2 residents. A third (33.3%) of faculty physicians and 9.5% of residents were identified as experts. Average GSR score for experts ($\bar{x}$ = 0.60μS) was significantly (F = 137.6, P < .001) lower than the average GSR for novices ($\bar{x}$ = 5.55μS), intermediate ($\bar{x}$ = 2.84μS), and advanced ($\bar{x}$ = 1.57μS) physicians.

Conclusions: To our knowledge, this is the first study to identify 4 categorical levels of expertise using biometric data. GSR measures may be useful in quantifying a learner's progression from novice to expert.

092

The Development and Validation of 3-Dimensional Printed and Silicone Based Intrapartum Cervical Models

K. Chow[1], D. Murphy[1], J. Fiset[1]

[1]Memorial University, St. John's, NL

Introduction: Traditionally, intrapartum cervical examinations are taught by having trainees examine patients and then verified by an experienced health care provider. There have been increasing concerns around patient discomfort and medicolegal issues with this approach. To ameliorate these shortcomings, 3D-printed and silicone-based cervical models were developed as a novel teaching modality. The aim of this study is to demonstrate the construct, face, and content validity of these models.

Methods: Using silicone and polylactic acid materials, 10 cervices, 2 stands, and 2 fetal skull models were printed. Forty-one participants were divided into experts (n = 19) and novices (n = 22) based on years of experience in labor and delivery. Each participant assessed the cervical dilation, effacement, and fetal position of the cervical models and were scored based on accuracy of measurements. Construct validity was evaluated by comparing the mean scores between experts and novices using an independent samples *t* test. Face and content validity were assessed using a 5-item questionnaire.

Results: There was statistical significance between the mean total scores of novices and experts ($P < .05$) such that experts scored higher on each component of the exam. Realism and training capacities of the cervical models were rated equally favorable across groups.

Conclusions: This study demonstrated construct, face, and content validity of the 3D-printed and silicone-based intrapartum cervical models. This is a low-cost, risk-free, and high-fidelity teaching tool for medical trainees. Future studies should aim to determine its effectiveness in increasing trainee confidence and performance in labor and delivery rotations.

093

Experiences of Developing In-Situ Palliative Simulations in the Emergency Department

S. L. Edwards[1], L. Keillor[1], R. Singh[1], K. Murray[1], S. Krauze[1], J. Grant[1]

[1]University Hospitals Leicester, Leicester, UK

Introduction: Emergency medicine (EM) is a unique specialty, often meeting people at the worse moments of their life. Death is an everyday occurrence, and with that comes the skills needed to talk to patients and families about when their end of life may be nearing. These conversations can be very challenging for all concerned. The Royal College of Emergency Medicine's guidelines suggest doctors need to have the skills to talk to these patients. Therefore, we felt we created a series of realistic EM in situ simulations for our staff to learn and practice on.

Methods: We created 3 simulations designed to enable junior doctors to have difficult conversations with patients who are approaching the end of life in the emergency department (ED). Scenario 1 was the end of life patient with COPD. Scenario 2 is of a very frail patient with multiple comorbidities. Scenario 3 revolved around a massive upper gastrointestinal bleed with known esophageal cancer. These simulations were tested in situ in the ED over several months and the feedback collected from all team members.

Results: Twenty health care professionals took part. Feedback data was pooled from all the simulation sessions: 80% of people moved from being not confident or lacking in confidence to fairly confident or confident after doing the simulations. All participants felt their knowledge had increased significantly following the simulations.

Conclusions: Written comments suggest that participants feel they would benefit from more teaching and exposure of this.

094

SimPall: An in Situ Simulation Course on Palliative Care for the Emergency Department

S. L. Edwards[1], L. Keillor[1], R. Singh[1], K. Murray[1], S. Krauze[1], J. Grant[1]

[1]University Hospitals Leicester, Leicester, UK

Introduction: Emergency medicine (EM) is a unique specialty, often meeting people at the worse moments of their life. The Royal College of Emergency Medicine's guideline suggests doctors need to have the skills to talk to these patients. We developed a full-day course called SimPall, which is incorporates some lecture-based teaching and then in situ simulation within the emergency department. Our aim was to gather feedback to see what educational benefit this brought to our EM staff.

Methods: Following some teaching around difficult conversations, do not attempt cardiopulmonary resuscitation, and managing palliative emergencies, we then gave the participants all 3 of our in situ simulations in 2 groups. The participants were not aware of what simulations they got. The 3 simulations based on real ED patients were: Scenario 1 was the end stage COPD; Scenario 2 is of a very frail patient; and Scenario 3 was a massive upper gastrointestinal bleed with known esophageal cancer. All participants were debriefed, and feedback recorded.

Results: This teaching day was in April 2019. Thirteen people including doctors and advanced nurse practitioners attended the day. All were involved in each of the scenarios and their feedback was collated. Overall, the feedback for all the simulations was positive: 76% of participants felt their knowledge had improved from lacking confidence to being fairly or very confident after the simulations.

Conclusions: Written comments suggest that participants feel they would benefit from more teaching and exposure of this. We are looking at repeating this day.

095

Physicians First: Simulating Medical Emergencies in Psychiatric Settings

S. Westcott[1], S. Harms[1], A. Pardhan[1], M. Brown[1], K. Pardhan[2], N. Snelgrove[3]

[1]McMaster University, Hamilton, ON; [2]Sunnybrook Health Sciences Centre, Toronto, ON; [3]McMaster University, Burlington, ON

Introduction: Simulation is widespread in medical education yet remains underutilized in psychiatry. This technique may be particularly useful for practice managing infrequent and emergent events, such as medical emergencies in psychiatric settings. Psychiatry residents at McMaster University expressed a desire to increase their knowledge and skills in encounters where acute medical management is required. In response, an innovative interdisciplinary simulation curriculum addressing these needs was developed.

Methods: An interdisciplinary group of educators from psychiatry and emergency medicine developed a novel medical psychiatry curriculum for first-year psychiatry residents. This involved 2 simulations of common medical emergencies in psychiatric settings, including seizures and undifferentiated tachycardia. The focus was on medical expertise, communication, and collaboration skills necessary for initial management. A standardized format for communicating with consultants was introduced, similar to those used in emergency medicine training. A unique feature of these simulations is that sessions were co-facilitated by educators from psychiatry and emergency medicine and included interprofessional staff as partners in the learning experience.

Conclusions: Psychiatrists need to be prepared to manage medical comorbidities in psychiatric settings and simulation provides an opportunity to safely practice and enhance these skills. This is the first use of simulation in our psychiatry training program. Our work contributes to a small but growing body of literature on the use of simulation in psychiatry, with an emphasis on medical psychiatry and the unique opportunities this presents for interdisciplinary collaboration. This presentation will give educators insights into our development process, which they can then apply to their local curricula.

096

Building a Residency Simulation Curriculum in a Community Hospital

A. Nagji[1], G. Higgins[1], J. Balakumaran[1], B. Forestell[1], K. Dowhos[1], M. Podrebarac[2]

[1]McMaster University, Hamilton, ON; [2]Joseph Brant Hospital, Burlington, ON

Introduction: Resident simulation curricula have largely been the purview of academic centers. Joseph Brant Hospital is a community hospital with 16 residents in a family medicine training program. The introduction of a weekly, in situ simulation curriculum allows for a more structured learning exposure for residents while also serving staff development by integrated clinical experiences.

Methods: We conducted a needs analysis of 11 family medicine residents, 14 emergency department nurses, and 15 staff physician residents via an online survey with subsequent focus groups. Based on feedback, we developed 4 sentinel scenarios: pediatric respiratory distress, trauma, toxicology, and cardiac arrest. We ran weekly in situ simulations for 1 year in the community emergency department and collected data on attendance, feedback on case structure, and latent safety threats. We reran focus groups with residents, nurses, and staff physicians to determine the utility and effectiveness of these simulations.

Conclusions: As residents rotated through their objectives remained static, focusing on early recognition and treatment of ill patients, while staff desired varied objectives with an opportunity to carry cases to later stages of resuscitation. Learners wanted to focus on common presentations while staff wanted rare cases. Staff commented that learners present in simulation shifted the focus to teaching, but interestingly did not find they detracted from their own learning. Community emergency departments may be able to integrate resident and staff in situ simulation to mutual benefit. This project was funded by the MacPherson Teaching & Learning Fellowship.

097

Active Retrieval and Procedural Learning in Orthopaedics

C. Dion[1], M. LeBel[1], A. Ahmadi Pirshahid[1], S. Ndoja[1], A. McCarton[1], B. Charron[1], A. Durocher[1]

[1]Western University, London, ON

Introduction: "Active retrieval" is the act of recalling stored knowledge and has been shown to be effective at promoting long-term retention of content material. It has never been studied in the setting of orthopaedic procedural learning. The purpose of this study was to evaluate if "active retrieval" can improve procedural learning of simple fracture fixation versus "passive learning."

Methods: Fifty participants watched an instructional video of an open reduction internal fixation of a Sawbones femur. Participants performed the procedure under guided supervision. After randomization, they had 15 minutes to either read the steps (passive learning) or write down the steps from memory (active retrieval group). After a washout period, all participants performed the procedure without guidance (immediate assessment) and then once more 1 week after the initial testing (delayed assessment). The participants were assessed using the Objective Structured Assessment of Technical Skills (OSATS).

Results: Participants in the passive learning group had significantly higher OSATS scores during immediate assessment in comparison to the active retrieval group *(P*= .001), especially when remembering the correct order of the steps (*P* = .002). The percentage of information forgotten (difference in OSATS scores between immediate testing and delayed assessment) was significantly less in the active retrieval group (*P* = .02).

Conclusions: This study demonstrated that orthopaedic procedural learning could benefit from a combination of active retrieval and passive learning. Future studies are needed to determine the effects of different types of active retrieval such as verbal retrieval practice (eg, dictating) commonly seen in surgical practice.

098

How Are Postgraduate Medical Educators Using Reflective Writing to Remediate Professionalism? A Constructivist Grounded Theory Study

T. Moniz[1], C. Gaspar[2], A. Warren[2], C. Watling[3]

[1]Mount Saint Vincent University, Halifax, NS; [2]Dalhousie University, Halifax, NS; [3]Western University, London, ON

Introduction: Underperformance in the professional role has high stakes for learners and educators. Problems with professionalism, unless appropriately and effectively remediated, may portend serious problems in practice. Yet, such remediation is particularly challenging. Increasingly, educators turn to reflective writing (RW) as a remediation strategy in residency, yet little is known about what educators expect RW to accomplish, how they choose RW tasks, why they use RW, or how RW is evaluated. In this study, we aimed to understand how and why postgraduate medical educators use RW as an educational intervention to remediate professionalism.

Methods: We interviewed 10 medical education professionals across 8 Canadian medical schools. Data was analyzed iteratively for themes using coding principles from constructivist grounded theory.

Results: We identified 5 dominant themes: (1) Professionalism is widely perceived as difficult to remediate, owing to lack of guidance regarding effective strategies and insufficient learner insight; (2) RW is part of multipronged yet variable approaches to remediating professionalism; (3) RW is expected to demonstrate or, less frequently, to help develop learner insight into the issue; (4) Standards for quality vary, and educators struggle with subjectivity in evaluating RW; and (5) Educators and learners are challenged by inexperience with RW and impacted by issues of learner vulnerability and confidentiality.

Conclusions: Educators often express ambivalence about using RW as a tool to navigate remediation around the professional role in residency. Understanding of the potential and pitfalls of RW may inform more tailored and effective approaches to professionalism remediation.

099

Internal Medicine Enrichment & Development: Early Exposure to Medicine Subspecialties and Its Influence on Students' Perceptions of a Career as an Internist

A. Kobza[1], K. M. Endres[1], K. Zheng[1], S. Elias[1], M. Dheng[1], A. Li[1]

[1]University of Ottawa, Ottawa, ON

Introduction: There are limited pre-residency opportunities for students to experience the breadth of internal medicine. Internal Medicine Enrichment & Development (IMED) is a 2-week program involving observerships, career talks, and hands-on workshops in 9 medicine subspecialties. Our objectives were to investigate whether the current IMED structure appropriately altered documented biases regarding a career in IM and which aspect of IMED students found most helpful in exploring these misconceptions.

Methods: Surveys were administered to 3 groups (n = 16): IMED participants who completed pre- and post-program surveys; "General Control" participants who did not apply to IMED; and "Applied Control" participants who unsuccessfully applied. Scores were compared using Wilcoxon signed-rank and rank-sum tests.

Results: Most participants (81%) reported a change in perception about the hours, work-life balance, and job prospects as an internist, while 63% of participants reported a change in perception regarding procedural skill required; 81% of IMED participants reported that they were more likely to pursue internal medicine following IMED. When students reported a change in their bias toward a career as an internist, 79% of the time this change was attributed to career talks. However, despite these self-reported results, there were no significant differences in misconception scores between groups.

Conclusions: IMED successfully improved pre-clerkship students' self-perceived understanding of a career as an internist. Career talks were the most valuable resource for students in altering misconceptions. In the future, our questionnaire requires adjusting. Participants felt that they had a change in perception; however, due to the way questions were posed and scored, our objective data was not consistent with participants' opinions.

100

Moving the Royal College Examination to PGY-3: A Qualitative Analysis of the Lived Experience of Third-Year Internal Medicine Residents

L. Panamsky[1], H. Braund[1], N. Dalgarno[1], D. Taylor[1]

[1]Queen's University, Kingston, ON

Introduction: In 2019, the Royal College of Physicians and Surgeons of Canada moved the internal medicine examination from the fourth to the third year of residency training. This was a major change for internal medicine programs and trainees, with unknown effects on the resident learning experience.

Methods: We conducted a survey (n = 13 residents; response rate 56.5%) and semi-structured interviews (n = 4 residents and 4 faculty members) at Queen's University to explore the unique experience of taking the Royal College examination in third year residency using a phenomenological approach. Participants were asked open-ended questions about their experiences preparing for and taking the examination to capture their lived experiences. An emergent thematic design was used to document patterns across the data.

Results: Residents identified that study groups provided them support and a sense of belonging, but also perpetuated stress. They believed their clinical competence improved significantly. Some expressed a loss of empathy toward their patients in the surveys, although these feelings did not emerge from the interviews. Overall, residents endorsed high levels of stress, anxiety, and negativity during the year, but their outlooks became more positive after the examination. Faculty viewed the novelty of the experience and lack of mentorship as the main contributors to the stressors experienced by residents.

Conclusions: Third-year residents experienced their examination year as highly stressful, with negative impacts on wellness; however, perspectives evolved positively after the examination. This study suggests there is a need for clearer communication and increased mentorship within internal medicine programs during this challenging year.

101

Straight From the Source: A Qualitative Study Discovering the Skills and Habits of Masters Adaptive Learners in Graduate Medical Education

L. Regan[1], L. Hopson[2], M. Gisondi[3], J. B. Branzetti[4]

[1]Johns Hopkins University School of Medicine, Baltimore, MD; [2]University of Michigan Medical School, Ann Arbor, MI; [3]Stanford University, Palo Alto, CA; [4]Emergency Medicine Residency, New York, NY

Introduction: The Master Adaptive Learner (MAL) framework describes 4 interconnected phases in the acquisition of expertise. Authors have postulated the conceptual skills and characteristics of MALs, but only limited data exists. We sought to understand how master learners structure their learning and factors that influenced their development.

Methods: Using a constructivist paradigm, we conducted multispecialty resident trainee focus groups from 4 academic medical centers. We employed purposeful sampling to identify learners who exhibited characteristics of the MAL framework. Transcripts were coded using a constant comparison analysis until saturation was achieved. These codes were grouped into themes and refined iteratively

Results: A total of 204 codes were identified from 7 focus groups with 38 participants. Seven key themes emerged. MALs: (1) see patients as the primary source of, and purpose for, learning; (2) socially structure their learning; (3) foster intrinsic motivation by managing their emotional responses to learning; (4) view learning as an infinite process; and (5) create organizing frameworks to manage information. Their learning is challenged by (6) transitions in learning environment that must be overcome before learning can occur and (7) an unstructured, complex clinical learning environment with multiple system-level barriers.

Conclusions: We conclude that MALs similarly enhance their learning processes despite systemic barriers experienced across specialty training programs. Our findings have implications for educators seeking to optimize clinical learning environments and for trainees seeking to improve their own learning process. Future studies will address the limitations of this study, including selection bias and limited generalizability beyond academic US health care systems.

102

Analysis of the Physical Learning Spaces in a Clinical Medicine Training Site: A Case Study

M. Sanchez-Mendiola[1], A. Flores-Sánchez[2], C. Gutiérrez-Cirlos Madrid[2]

[1]Universidad Nacional Autónoma de México, Mexico City, Mexico; [2]UNAM Faculty of Medicine, Mexico City, Mexico

Introduction: Formal and informal physical spaces have a major role in medical education. The attributes of these spaces can facilitate or hinder educational activities in hospital settings. The study objective was to explore the characteristics of physical learning spaces in a university hospital.

Methods: The setting was the National Institute of Nutrition and Medical Sciences "Salvador Zubirán" in Mexico City, one of National Autonomous University of Mexico Faculty of Medicine clinical training sites. The methodology used was the intrinsic case study approach (Crowe et al; https://doi.org/10.1186/1471-2288-11-100), with site visits, architectural documentation review, a questionnaire application to medical students and internal medicine residents, and application of the Learning Space Rating System instrument (LSRS; https://www.educause.edu/eli/initiatives/learning-space-rating-system). Nordquist's "networked learning landscape" conceptual framework was used.

Results: A total of 109 students answered the survey (49 medical students, 60 internal medicine residents). The 6 most frequently used learning spaces were evaluated. The formal resident discussion area in the wards fulfilled 74% of the attributes evaluated with the LSRS instrument, followed by the outpatient unit area (73%), general auditorium (70%), classroom (68%), library (66%), and hospitalization ward (61%). Some relevant learning spaces attributes were illumination, silence, furniture comfort, and internet access.

Conclusions: Different learning spaces have intrinsic characteristics with diverse pedagogical implications. Medical students and residents have different opinions regarding learning spaces. There is ample room for improvement in the design and use of formal and informal spaces in our university sites.

103

Remediation That Works

M. Nayer[1], M. Hynes[1], A. Fung[1]

[1]University of Toronto, Toronto, ON

Introduction: There is little feedback on how remediation programs work. This project evaluated the utility of a program that has been running for 20 years. Approximately 2% of the resident population at our university are placed on formal Board of Examiners–Postgraduate remediation (~30 cases per year).

Methods: This program evaluation followed a Kirkpatrick model focusing on Reaction, with exploration of Learning and Behavior. We distributed a survey to residents (N = 33), program directors (PDs; N=25), postgraduate medical education coaches (N = 5), and program non-evaluative mentors (N = 19).

Results: Respondents included 12 of 33 (36%) residents, 15 of 25 (64%) PDs, 5 of 5 (100%) coaches, and 10 of 19 (53%) non-evaluative mentors. Respondents had mostly positive comments about the remediation process. The most commonly cited challenge identified by all respondent was time commitment. Residents reported needing 1 day of release time a week for remediation activities. One negative finding was that the non-evaluative mentors were sometimes asked to assess the residents. Most of the residents, 12 (83%), reported that remediation provided a supportive learning environment and that they have applied their learning in practice.

Conclusions: A team approach is central to resident success. Key factors include open communication, transparency, collaboration, mentorship, and teamwork. Limitations of this study include the inclusion/exclusion criteria for residents. Unsuccessful residents and residents who had already graduated were not included. Additionally, the sample size of all groups was small. Future work includes exploration of participant views related to the specialty (eg, medical vs surgical) and the resident perception based on elapsed time since the end of remediation.

104

Sorry to Bother You: Requesting and Providing Clinical Support on Clinical Teaching Units

T. Gilchrist[1], R. Hatala[1], A. Gingerich[2]

[1]University of British Columbia, Vancouver, BC; [2]Northern Medical Program, Prince George, BC

Introduction: Competency-based medical education propelled entrustable professional activities into the spotlight. While research has highlighted factors influencing supervisor entrustment of trainees, there has been less focus on how residents influence their own entrustment. We explored how residents request clinical support and how those requests impact provision of clinical support and subsequent levels of supervision.

Methods: We observed and interviewed four attending-resident dyads on internal medicine Clinical Teaching Units (CTUs) at the University of British Columbia once per week for 2 weeks. Employing case study methodology, we first analyzed the dyadic relationships through a narrative lens. We then identified sentinel incidents to examine requests for and provision of clinical support. Finally, we used help-seeking and entrustment as sensitizing concepts to analyze data within-case, between-case, and cross-case to develop themes.

Results: When residents directly requested clinical support, it was provided. When they indirectly asked for support using body language or texting updates about patients, attendings often failed to recognize it as a request for support. The requests did not affect attending's judgment of the resident's competence. Provision of clinical support did not impact subsequent supervision. In fact, evidence of competence judgments impacting assignment of activities or level of supervision was lacking.

Conclusions: Residents use various strategies for requesting clinical support with some resulting in miscommunication. Seeking help did not adversely impact judgments of competence or subsequent levels of supervision. However, the link between resident competence and supervision was not obvious and requires further study if entrustment scales are to be used to assess residents on CTUs.

105

Identifying Learning Needs in Medical Assistance in Dying: From the Perspective of Internal Medicine Residents

K. Reich[1], A. Tan[1], J. Hui[2]

[1]University of Calgary, Calgary, AB; [2]Alberta Health Services, Calgary, AB

Introduction: Medical Assistance in Dying (MAiD) was legalized in Canada in 2016, allowing for 6749 medically assisted deaths since legislative enactment to October 2018. Integration of MAiD into the medical curriculum is important to provide trainees with the skills to care for patients requesting assistance in dying. To date, there is no literature available to direct educational content in MAiD. Our study aimed to determine the learning needs in MAiD for internal medicine (IM) residents.

Methods: IM residents were recruited during an academic half day. Demographic information and data on prior teaching in MAiD was obtained. Residents completed 3 patient cases created to test knowledge in MAiD. This was followed by a seminar on MAiD content. An inductive thematic analysis was performed on responses to identify learner gaps in MAiD knowledge.

Results: Twenty residents participated (54% response rate), of which 55% were in their first year of IM training. Despite 40% of residents having received prior teaching in MAiD, 75% reported to be “not very confident” in responding to a MAiD request. All residents wanted more education in MAiD incorporated into their training. A high-level thematic analysis revealed “resident discomfort with discussing MAiD, lack of understanding of MAiD policy, and perceptions that MAiD is only an option when symptoms are controlled.”

Conclusions: IM residents have knowledge gaps in MAiD eligibility, policy and procedures, and understanding their role and obligations in the request process. There is a need for more residency training in this specialized area of end-of-life care.

106

Direct Observation Patterns in General Practice Residency: Unpredictability, Lack of Control by Residents, Lack of Dialogue

C. BT. Rietmeijer[1], A. Blankenstein[1], H. van der Horst[1], H. de Vries[1], D. Huisman[1], F. Scheele[2], A. Kramer[3], P. Teunissen[4]

[1]Amsterdamumc, Amsterdam, Netherlands; [2]OLVG Teaching Hospital, Amsterdam, Netherlands; [3]LUMC, Leiden, Netherlands; [4]Maastricht University, Maastricht, Netherlands

Introduction: The literature shows a poor implementation of direct observation (DO) in residency. Longitudinal training relationships seem promising to improve the use of DO, but evidence is lacking. Therefore, we explored the manifestations, meanings, and effects of DO, according to residents, in a context of 1-year-long training relationships.

Methods: Following a constructivist grounded theory approach, we conducted 4 focus group sessions with a total of 31 general practice residents in their first or last year of training. Experiences with various manifestations of DO of technical skills were discussed. Through open coding of the transcripts, memo writing, and constant comparison, a model describing distinct DO patterns that led to various effects on residents was constructed and refined until theoretical sufficiency had been reached.

Results: DO was challenging for residents, in terms of preserving their autonomy, authenticity, and credibility. Regularly planned, preferably bidirectional, DO sessions were highly valued by residents, but scarce. Ad hoc DO brought along supervisor-induced unpredictable, sometimes unwanted, scenarios. In this, residents exerted little control. Residents hesitated to discuss unwanted scenarios with their supervisors, and instead could refrain from future requests for DO.

Conclusions: Residents found DO challenging, including in longitudinal training relationships. Combining our findings with the literature, we conclude that residents' agency in initiating DO as well as in conducting a critical dialogue about DO, although crucial, cannot be expected in the absence of workplace affordances such as a supervisor who actively welcomes critical feedback and who initiates regular, preferably bidirectional, DO sessions.

107

Barriers to Learning in the Intensive Care Unit: A Qualitative Analysis of Internal Medicine Residents' and Supervisors' Perspectives

N. Robillard[1], C. Vincellette[2]

[1]Centre Hospitalier de l'Université de Montréal, Montréal, QC; [2]Université de Sherbrooke, Sherbrooke, QC

Introduction: Caring for acutely ill patients requires a complex set of knowledge and skills. Several residency programs leverage the acquisition of critical care competencies through off-service clinical rotations in the intensive care unit (ICU). However, recent literature questions their effectiveness. This study explores potential barriers to learning in the ICU from the perspectives of stakeholders.

Methods: The study applies a constructivist grounded theory approach. Internal medicine residents and intensivists were purposively selected for focus groups. Verbatims of semi-structured interviews underwent open coding through constant comparative analysis and then axial coding to assess interactions between themes.

Results: Many barriers to ICU work-based learning were identified. The most frequently elicited barriers were related to the stakeholders (ie, learner, faculty) and their interactions. However, both the system (ie, ICU) in which residents provided care and the learning curriculum, influenced learning opportunities. Indeed, most stakeholders had a shared vision of work-based barriers, such as reduced time for teaching driven by system-based issues (eg, workload). Yet, some insights had stronger resonances for some. For instance, residents described the ICU environment as a new world to which acclimation was required before learning could take place. Conversely, this theme was infrequent in supervisors' discourse and may have led to misaligned performance expectations and resulted in stakeholders being lost in translation.

Conclusions: This study has several implications for work-based education. It provides a framework for the potential domains of an ICU rotation where educational barriers may be nested. Acknowledging these barriers, may help educators adapt and improve their trainees' educational experience.

108

Consultants' Perceptions of the Quality of Feedback Given to Residents

V. Singaram[1], C. Bagwandeen[1]

[1]University of KwaZulu-Natal, Durban, South Africa

Introduction: Effective supervision by consultants in postgraduate medical education involves the process of feedback. Giving feedback may be challenging for consultants who have no formal training in this process, which may be further compounded in heterogeneous diverse settings.

Objective: To explore consultants' perceptions of feedback to residents in a multicultural, multilingual diverse academic hospital setting in South Africa.

Methods: Thirty-seven consultants consented to completing a questionnaire on what, when, where, how often, and how feedback was provided, as well as on the type and effect of feedback to residents. Descriptive statistics were used to analyze the data. Differences between groups were calculated using Pearson's χ^2 test for independent variables, with a *P* value of < .05 regarded as being statistically significant.

Results: Only 40% of consultants reported that they provided feedback often or always and 62.2% reported that standards were not predetermined and communicated to residents. When feedback was provided, it was based on concrete observations of performance (78.4%), it incorporated a plan for improvement (72.9%), and it supplied information on techniques performed incorrectly (72.9%). Only 40.5% of consultants provided feedback on procedures performed correctly. Moreover, only half of the consultants believed they were proficient at giving feedback.

Conclusions: Consultants need to develop the art of giving feedback through appropriate training so that they are more comfortable and proficient with the various aspects of feedback, leading to a positive effect on enhancing residency training.

109

Hospital Compound Level Surgical Training Quality Performance Metrics: More Than a Score?

L. Hopkins[1], D. Robinson[1], C. Brown[1], T. Abdelrahman[1], W. Lewis[1], A. Powell[2], M. Pollitt[3], R. Egan[4]

[1]Health Education and Improvement Wales, Cardiff, Wales; [2]Cardiff University, Cardiff, Wales; [3]Cwm Taf University Health Board, Llantrisant, Wales; [4]Morriston Hospital, Swansea, Wales

Introduction: This study aimed to assess training quality, related to individual hospital units, by means of trainee performance analysis.

Methods: Consecutively, 52 general surgery higher specialty trainees recorded 353 consecutive 6-month placements in 11 hospitals (2 tertiary, 9 district general). Data included hospital status, subspecialty, operative logbook number, workplace-based assessment (WBA) completion, learned society communications, scientific publications, and Annual Review of Competence Progression (ARCP) outcomes.

Results: Operative logbook activity varied by hospital in 3 regards: total logbook caseload (1st quartile median [IQR] 135 [53] vs 4th quartile 163 [58], $P < .001$), number of procedures with trainee as primary operator (1st quartile 86 [34] vs 4th 126 [69], $P < .001$), and total number of index procedures (1st quartile 33 [20] vs 4th quartile 45 [22], $P = .001$. Total operative activity varied by subspecialty: 1st quartile (LQ) Vascular, Transplant, and Hepato-Pancreatico-Biliary (median 133) vs 4th quartile (UQ) Breast, and Endocrine (median 175, $P < .001$). WBA completion varied by subspecialty (Upper GI, median 10 vs Vascular, median 7, $P = .002$), but not by hospital status. Publication profile varied by hospital (median 0(1), $P = .001$), but not by hospital status. Five hospital units were associated with a greater number of adverse ARCP outcomes (41/200 placements vs 7/153 placements, $P = .003$).

Conclusions: Important performance training metric variation related to 6-month hospital placements were apparent, trainees in UQ units achieved 20% more operations, 40% more WBAs, and one more publication, compared with LQ units. Trainees, trainers, and program directors alike, should be aware of unit level comparative data when planning educational programs.

110

Challenges of the Dual Role: Perceptions of the New Resident Teacher

E. Amari[1], W. Luong[1], J. McKay[1], S. Doucet[1], H. Broekhuyse[1], C. Wallace[1], K. Veerapen[1]

[1]University of British Columbia, Vancouver, BC

Introduction: Incoming medical residents' transition to being both learners and teachers over a short time period marked by increased responsibilities and opportunities for reflection on their educational experience. To equip incoming residents with basic teaching skills and encourage reflection, the Office of Faculty Development provides a mandatory interactive online module for all incoming residents. Reflections gathered from this module allows analysis of residents' first perceptions of their new dual role and its challenges.

Methods: The module forms the introduction to a longitudinal Resident-as-Teacher (RaT) program. Reflective exercises about the qualities of memorable resident teachers and questions about their expectations of their teaching role are embedded within the module. In 2019, all residents (N = 395, 100%) completed the module within the first 6 weeks of residency. We conducted a thematic analysis of their reflections using Braun & Clarke's framework.

Results: The most commonly identified challenges that incoming residents expected to experience ranked by prevalence were: (1) adapting to the different learning styles of medical students; (2) lack of confidence in their teaching ability; (3) lack of teaching experience; (4) unfamiliarity with the content they are to teach; and (5) lack of time to teach due to other responsibilities.

Conclusions: Residents expectations of potentially stressful challenges have informed the emphasis of topics in the RaT curriculum and program directors' implementation of teaching responsibilities for incoming residents. A planned follow-up survey after 6 months of residency will gather impressions on whether or not the anticipated challenges materialized and whether any unanticipated challenges were experienced.

111

Understanding Resident Perspectives of Critical Events During Training

K. Venus[1], N. Abdullah[1], L. Melvin[1]

[1]University of Toronto, Toronto, ON

Introduction: During training, residents experience "critical events" that may be associated with positive or negative emotions and have lasting impact and are consolidated through reflection. We sought to understand (1) the types of critical events residents experience; (2) if these events are recognized by their supervisors and, if so, how this modulates residents' reflection; and (3) how these events relate to residents' development of professional identity.

Methods: Participants were recruited via email advertisements and purposeful sampling. Data was collected via transcribed guided interviews of senior internal medicine residents. Fifteen interviews were analyzed using utilizing constructivist grounded theory after being conducted to thematic saturation.

Results: All events related to at least one of the following themes: unexpectedness, uncertainty, a transition point, identification with the patient, and resident autonomy. Seven of 15 (47%) of the critical events were positive and characterized by responsibility, transition points and were grounded in the patient relationship. Negative events were characterized by isolation, dismissal, and perceived lack of support. All events are incompletely recognized by supervisors. Residents describing positive events did not explicitly desire supervisor recognition; however, those who experienced negative events did. Critical events actively informed residents' future practice by relating to core values of physicianship or ideals.

Conclusions: Positive and negative events are experienced and reflected upon differently. These experiences may be better understood utilizing transformative learning theory and/or Schön's models of reflective practice. Residents' desire for critical event recognition by supervisors has important implications for faculty development with respect to direct observation and competency-based medical education.

112

Engagement and Learning in a Novel Spaced Repetition Intervention for a Pediatrics Academic Half-Day Curriculum

J. R. McConnery[1], E. Bassilious[2], Q. Ngo[2]

[1]McMaster University, Mississauga, ON; [2]McMaster University, Hamilton, ON

Introduction: Postgraduate residencies utilize academic half-days (AHD) to supplement clinical learning. Spaced repetition (SR) reinforces previously learned information to improve retention. We leveraged technology to deliver a SR-based intervention for a pediatric residency program's AHD.

Methods: We enrolled 39 residents and invited them to participate weekly for 17 weeks. We chose one lecture weekly on AHD (day 0) for reinforcement. We emailed participants 3 key points on day 1 and a multiple-choice question (MCQ) on day 8. On day 29, we sent 2 challenge MCQs to test reinforced and unreinforced content from the same day 0. We tracked participation and satisfaction with SR. We analyzed pooled performance on challenge questions using unpaired *t* test.

Results: Thirty-one (79%) residents participated at least once, and 13 (33%) completed more than half of weekly quizzes; 37.4% of all quizzes were completed, with an average weekly engagement of 5.5 minutes. Helpfulness to learning was rated as 7.89/10 on a Likert-type scale. Reported barriers were missing related half-days or emails, and limited time. There was no significant difference ($P = .38$) in performance between reinforced (62.7%) and unreinforced (61.4%) questions.

Discussion: Despite a high level of satisfaction with the intervention, only 42% of residents who piloted the tool participated over half the time. Reinforcement required a brief amount of time per week. Reinforcement was not shown to significantly improve test scores, but results were underpowered, making interpretation difficult.

Conclusions: SR is a proven strategy for learning. Its implementation must consider practical barriers to facilitate success.

113

Pathology Residents' Perceptions of How Expert Development Can Be Fostered During Residency

K. Roland[1], L. Jones[2]

[1]Vancouver Coastal Health, Vancouver, BC; [2]University of Dundee, Dundee, Scotland

Introduction: Medical expert is the foundation of the CanMEDs competencies on which training programs in Canada are based. There are few studies examining the nature of medical expertise in pathology specialties. In this study we sought to elicit from hematopathology residents their conceptions of medical expert development during residency to elucidate training gaps in our program.

Methods: This was a qualitative study using a grounded theory approach. All 7 residents in the hematopathology residency program at the University of British Columbia consented to participate. We conducted 2 focus groups in which the residents responded to semi-structured questions. These sessions were audio-recorded and verbatim transcripts were made. We also performed 5 naturalistic observations of the residents at work over eight months and made field notes. The transcripts and field notes were analyzed inductively for emergent themes relating to expert development.

Results: Residents elaborated a sophisticated concept of medical expertise that incorporates pattern recognition, problem-solving, and trustworthiness. Since residents as non-experts are not trusted to make a diagnosis independently, they feel their expert development during residency is constrained. Residents value feedback and assessment when it is aligned with assessment for learning rather than based on a right/wrong model.

Conclusions: This study has implications for curriculum development in pathology training programs. Graduated responsibility is desired by residents and training programs might benefit from more optimal incorporation. Staff may benefit from an educational program to explore alternate methods of feedback other than a traditional right/wrong approach.

114

Understanding the Optimal Composition of Learners on Pediatric Hospital Medicine Teams: A Survey-Based Study

G. Barak[1], S. Kumar[1], G. Singhal[1]

[1]Baylor College of Medicine, Houston, TX

Introduction: Although pediatric hospital medicine (PHM) teams have a variety of learners, limited research has been conducted regarding the number and composition of learners that best facilitates resident education. The purpose of this study was to identify the optimal number and composition of learners on PHM teams.

Methods: Pediatric residents and PHM faculty at an academic children's hospital were anonymously surveyed about current and optimal PHM team size and the impact of a PHM fellow on learning experience. Linear regression was used to identify trends between resident satisfaction and team size.

Results: A total of 53 residents and 18 PHM faculty members completed the survey. The mean team size was reported to be 7 (SD = 1.5) by residents and 6.3 (SD = 1.8) by faculty, with mean optimal team sizes of 5.2 (SD = 1) and 4.8 (SD = 1) learners reported by residents and faculty respectively. There was a moderate negative correlation between resident satisfaction and team size (r = -0.35). In addition, 46% of residents compared to 88% of faculty (P = .0232) rated the fellow's impact as positive/very positive, and 35% of residents compared to 93% of faculty (P = .0006) would want a fellow on their team again.

Conclusions: This study suggests a need to reduce the size of PHM teams at this institution. Residents perceive PHM fellows' impact on learning as less positive than faculty and are less inclined to work with a fellow again. Future research is required to optimize both resident and fellow experiences within PHM, especially in light of the anticipated growth of PHM fellowships.

115

Surgical Skills Bootcamps: Comparing a Longitudinal vs 1-Week Intensive Program

A. Ponton-Carss[1], J. LeBlanc[1], N. Wagner[2]

[1]University of Calgary, Calgary, AB; [2]Queen's University, Kingston, ON

Introduction: Many training programs are now implementing skills courses, or "bootcamps" at the onset of residency (Blackmore et al, 2014). However, there is large variability in the format and delivery of those bootcamps, and little evidence supporting one format over another. This study aimed to explore whether a longitudinal program or 1-week intensive bootcamp is more effective for teaching surgical skills to novice trainees.

Methods: Prior to 2018, all incoming surgical trainees at the University of Calgary completed a 9-week surgical skills program as part of Surgical Foundations. In 2018, the program was condensed into a 1-week intensive bootcamp in July. Repeated measures analysis of variance (ANOVAs) were used to compare Objective Structured Performance-Related Examination (OSPRE) scores from the 2016 and 2017 longitudinal cohorts with the 2018 and 2019 bootcamp cohorts. All trainees (n = 100) completed the OSPRE in September of their first year.

Results: Our analyses suggest the bootcamp cohorts scored significantly higher than the longitudinal cohorts across all surgical skills (P = .03). However, no significant differences in the 4 CanMEDS roles (communicator, professional, leader, and collaborator) or interaction effects were identified (Ps = .25–.45).

Conclusions: These findings suggest that the format in which content is delivered to trainees at the onset of residency can significantly impact their subsequent performance of surgical skills, yet has little impact on other CanMEDS roles. While further work is needed to investigate why these differences exist, these findings may have major implications for how we conceptualize and structure surgical training.

116

Understanding Physician Discharge Practices in Ambulatory Internal Medicine—An Educational Framework

S. Halani[1], R. Cavalcanti[1], L. Melvin[2]

[1]University of Toronto, Toronto, ON; [2]Toronto Western Hospital, Toronto, ON

Introduction: There is an increasing emphasis on ambulatory care in Canadian general internal medicine programs. However, outpatient training opportunities are often limited. To maximize trainee educational experiences, we must define the competencies of ambulatory practice, including discharging patients from ambulatory clinics. We sought to understand how practicing physicians engage in discharge decision-making to patients' primary care providers in the outpatient setting.

Methods: We purposively sampled general internists who attend in the ambulatory clinic from 6 academic hospitals in Toronto. Twenty-three semi-structured interviews were conducted from October 2019 to January 2020. Data collection and analysis were iterative with constant comparison according to constructivist grounded theory.

Results: Several themes were identified that illuminate the decision to discharge a patient from the ambulatory clinic centered around the value added to the patient's care. These include: (1) stability of the medical condition and/or diagnostic closure; (2) accessibility of appropriate care; (3) individual physician factors including risk tolerance and self-identified scope; and (4) individual patient factors including frailty, comorbidity burden, and vulnerability. Trainee education around these decisions is informal and often relies on role modeling and supporting trainee independent decision-making under guidance.

Conclusions: Our study describes the physician-, patient-, and systems-related factors that influence general internists' discharge practices from ambulatory clinic. We believe these factors can be used as a framework for educating trainees regarding transitions of care decisions in ambulatory internal medicine. Explicitly defining important components of practice in the ambulatory setting will enhance internal medicine trainees' competencies in ambulatory practice.

117

Development of a Teaching Centered Junior Attending Rotation in a General Internal Medicine Ambulatory Clinic: Bridge to an Entrustable Professional Activity

C. Cuncic[1], H. Nagi[1], J. Tessaro[1], A. Nijjar[1]

[1]University of British Colombia, Vancouver, BC

Introduction: Historically, residents have taught internal medicine on well-established inpatient clinical teaching units. Teaching medical students in the ambulatory setting is less well-described but just as necessary, given the scope of ambulatory care. After an initial pilot study, we created a junior attending rotation where a PGY-4/-5 resident was added to the medical students' 2-week clinical rotation.

Method: Nine residents completed a 4-week junior attending rotation at an internal medicine outpatient clinic between February 2018 and June 2019. They provided the bulk of student teaching and clinical supervision with 2 faculty members serving as preceptors. Semi-structured interviews were conducted with both preceptors, all 9 fellows, and 13 medical student focus groups. Interviews were analyzed in an iterative manner to explore the educational implications.

Results: The major themes identified included: (1) increased time, focus, and individualized attention to the students' learning compared to the inpatient setting; (2) unique skills acquired by residents in planning the structure of an ambulatory education clinic; and (3) the importance of the "near-peer" relationship between fellow and student. Preceptors focused on the significance of this rotation being an entrustable professional activity, as in allowing a resident to teach was an act of entrustment.

Conclusions: Teaching and providing clinical supervision in the ambulatory clinic offers a unique learning experience for residents and an opportunity for preceptors to enact entrustment. This model is applicable to all specialties with an ambulatory component. Further analysis will determine whether this experience informs residents' future careers regarding the education of medical students.

118

"Correct Diagnosis, Best Treatment": Residents' Views on the Process of Decision Making in Medical Consultations

P. LP. Brand[1]

[1]Isala Hospital, Zwolle, Netherlands

Introduction: Although patients, physician organizations, and policy makers prefer shared decision-making (SDM) in medical consultations, it has been implemented in clinical practice to a limited degree only. We previously showed that residents more often prefer and practice paternalistic decision making than medical specialists do. The aim of this qualitative study was to explore residents' reasons for this paternalism preference.

Methods: We conducted individual semi-structured interviews with 12 residents from different medical and surgical specialties, to obtain an in-depth understanding of their view on the process of decision-making in medical consultations. Transcripts were analyzed using grounded theory methodology. Concepts and themes were identified by iterative constant comparison.

Results: Residents described decision-making as the process of reaching the optimal treatment or outcome for the patient, based either on practice guidelines or on patient preference if evidence supporting a preferred option was absent. They described barriers to SDM related to the patient (eg, their intellect, disease complexity, and decision-making preference) and the supervisor (prescribing a course of action to be taken). All participants expressed a strong sense of being responsible to make the "correct diagnosis" and provide the "best treatment," as a matter of course, related to their professional identity. They expected patients, without asking them, to agree with this decision.

Conclusions: The strong paternalism preference expressed by residents stems from their professional identity, which makes them feel responsible for finding the "correct diagnosis" and "best treatment." This major barrier to learning SDM skills has not been reported previously.

119

How Senior Residents Teach in the Morning Rounds: An Ethnographic Study

K. Liao[1], C. Peng[1], C. Huang[1], C. Jenq[1]

[1]Chang Gung Memorial Hospital, Taoyuan, Taiwan

Introduction: Morning rounds are established teaching activities for workplace learning. It constitutes a main arena in which senior residents learn and practice how to teach medical knowledge and skills, and also role model professional attitudes, values, and behaviors. Literature on resident-as-teachers has centered on teaching strategies, assessment, and feedback skills. However, how senior residents authentically orchestrate their practices in the morning rounds is scarcely investigated.

Methods: This ethnography study consisted of 51 hours of morning rounds observation and field conversation with senior residents and medical trainees at 4 internal medicine wards in a tertiary medical center in Northern Taiwan. Field notes were taken and analyzed by adopting Kemmis et al's theoretical and methodological framework of practice theories.

Results: Senior residents orchestrated their teaching practice in the morning rounds by engaging trainees in a dialogue, in which they asked questions, explained reasoning logics, modeled professional skills, narrated personal experiences, and managed ward resources. These identified semantic, physical, and social architectures of practice either enabled or constrained the *sayings*, *doings*, and *relatings* of senior residents' teaching practices and role modeling in morning rounds.

Conclusions: By perceiving senior resident teaching as a process of being stirred into practice and applying an analytic lens from practice theory, we provided an illustration of the morning round environments that influence senior residents' practices. These findings can inform future development of strategies to support senior residents as teachers and as role models.

120

Observing Others Suture: Do Novices Benefit From Observing Errors?

B. Sideris[1], P. Kalun[1], J. Zering[1], R. Sonnadara[1]

[1]McMaster University, Hamilton, ON

Introduction: Surgical trainees spend a large portion of their time observing others, but the value of observing imperfect performances is unclear. Evidence suggests that observation of error-free performances provides learners with a correct guide for performing skills, while observing errors helps learners detect and then correct errors in their own performances. The purpose of this study was to determine if observing errors improves suturing performance and makes individuals better at recognizing good performance.

Methods: Undergraduate students observed a video of an expert performing 3 simple interrupted sutures and then attempted the task. Participants then observed and rated an expert (no errors), intermediate (few errors), or novice (many errors) performing the task. Participants attempted the task a second time, observing the same type of performance as previously, and then attempted the task a third time.

Results: The influence of observed performance type (ie, expert, intermediate, or novice) on participants' suturing performance and performance rating ability were explored through 2-way mixed ANOVAs. Only task performance of participants who observed expert and intermediate performances improved ($F(2,74) = 16.1$, $P < .001$). Further, those who observed the expert were significantly more accurate at rating performance compared with those who observed the novice ($P < .05$).

Conclusions: Observing an expert or intermediate performance led to improvements in performance, while observation of a novice did not. Observing errors in intermediate and novice performances did not help learners recognize good performances. When surgical trainees learn novel tasks, we suggest they observe expert performances (ie, surgeons, fellows) to learn a correct guide for performance.

121

Australian Resident Perspectives on Informed Consent for Surgical Procedures: Confidence Does Not Equate to Best Practice

J. N. Atkin[1], I. W. Incoll[2], J. Owen[3], C. Conyard[4]

[1]Nikta Projects, Sydney, NSW, Australia; [2]Australian Orthopaedic Association, Erina Fair, NSW, Australia; [3]Australian Orthopaedic Association, Melbourne, Australia; [4]Australian Orthopaedic Association, Brisbane, Australia

Introduction: Informed consent (IC) is an essential component of optimal patient care. The importance of shared decision-making, the ethical imperative and concerns about patient complaints and litigation have highlighted the process, or lack thereof, by which IC is obtained. The aim of this study was to explore the knowledge, perceptions, and habits of orthopaedic surgical residents in Australia to determine whether there is a gap in the explicit teaching of IC and to further understand their learning needs.

Methods: Australian orthopaedic surgery residents were invited to participate in a 9-item anonymous electronic survey on their experiences and teaching of IC.

Results: A total of 102 residents participated in the survey (42%). While trainees report they are able to describe the process of IC (99%) and are confident that they can obtain legally and ethically valid consent (99%), when asked about important steps in the IC process, these are not addressed. For example, only 62% always check that the patient understands their condition, only 30% ask patients about their goals, and only 21% advise the patient which who will be performing the procedure.

Conclusions: Our findings indicate that, while residents have confidence in their knowledge of and ability to obtain valid IC, residents often omit key aspects of the IC process. This potentially jeopardizes patient care and increases the risk of litigation against themselves and their supervisors. It is vital that best practice IC is incorporated into surgical training via a formal education package and reinforced through assessment and targeted feedback.

122

Understanding Diagnostic Radiology Residency Case Volumes From a Canadian Perspective: A Marker of Resident Knowledge

B. Kwan[1], N. Cofie[1], N. Dalgarno[1]

[1]Queen's University, Kingston, ON

Introduction: New guidelines from the Accreditation Council for Graduate Medical Education (ACGME) have proposed minimum case volumes to be obtained during residency but there are currently no minimum case volumes standards for radiology residency training in Canada. Using data from a pilot study, we examine radiology resident case volumes among recently graduated cohorts of residents and determines if there is a link between case volumes and measures of resident success.

Method: Resident case volumes for 3 cohorts of graduated residents (2016–2018) were extracted from the institutional database. Achievement of minimum case volumes based on the ACGME guidelines was performed for each resident. Pearson correlation analysis (n = 9) was performed to examine the relationships between resident case volumes and markers of resident success including residents' relative knowledge ranking and their American College of Radiology (ACR) in-training examination scores.

Results: A statistically significant positive and strong correlation was observed between residents' case volume and their relative knowledge ranking ($r = 0.682$, $P < .05$). Residents' relative knowledge ranking was also strongly and positively correlated with their ACR in-training percentile score ($r = 0.715$, $P < .05$).

Conclusions: This study suggests that residents who interpret more cases are more likely to demonstrate higher knowledge. This highlights the utility of case volumes as a prognostic marker of resident success. The results also underscore the potential use of ACGME minimum case volumes as a prognostic marker. These findings can inform future curriculum planning and development in radiology residency training programs.

123

Perception of the Influence of a Humanities Curriculum on the Development of Patient-Centered Skills in Family Medicine Residents

N. Nguyen[1]

[1]University of Ottawa, Ottawa, ON

Introduction: The Family Medicine residency program at the University of Ottawa offers a humanities curriculum to strengthen the CanMEDS-FM competencies of their trainees. This study assesses its impact on the residents' perception of the development of patient-centered skills.

Methods: Thematic analysis was done on anonymous written activity evaluations from 2007 to 2018 and on 11 anonymized peer interviews of resident physicians who attended at least one educational activity between 2016 and 2018. Both the NVivo software and a paper-based approach were used for analysis. Initial coding was done following the competencies listed in the CanMEDS-FM framework. In addition to descriptive quantitative statistics obtained through NVivo, CmapTools was used to produce 2 thematic maps: one for the written evaluations and the other for the interviews.

Results: Although all CanMEDS-FM competencies were covered by the curriculum, there was a strong dominance of the communicator, collaborator, professional, and health advocate ones. The communicator competency was more prominent in the written evaluations, as opposed to the professionalism one in the interviews. Ancillary themes were the value of the contents, the time constraints surrounding involvement in the curriculum, and the initiation of personal reflection about one's practice.

Conclusions: The existing humanities curriculum is perceived by participating residents to have a positive impact on the development of CanMEDS-FM competencies, especially the ones required for a sustainable clinical practice. Updates of the material used during educational activities and protected academic time could further the impact of the curriculum among residents.

124

The PULSES-2 Project: A Comparison of Teaching Formats for Code Status Communication Training in a Postgraduate Internal Medicine Program

O. Levine[1], S. Parpia[1], G. Kazemi[1], S. Dhesy-Thind[1], S. Dave. Mukherjee[1], N. Kodous[2], K. Xu[3]

[1]McMaster University, Hamilton, ON; [2]University of Toronto, Toronto, ON; [3]University of Waterloo, Waterloo, ON

Introduction: Competency in code status communication is important for internal medicine (IM) residents. Teaching the PULSES framework to oncology residents through a workshop improved communication skills. An electronic learning module (ELM) is more easily disseminated. Whether electronic learning is effective for communication training is unknown. We aimed to compare 2 learning formats.

Methods: An ELM covering PULSES was developed and validated. We carried out a randomized non-inferiority trial with residents in postgraduate years 1–4 of IM and medical subspecialty programs at McMaster University. Residents were randomized to the ELM (experimental group) or workshop (control group). The primary outcome was quality of code status communication in an objective structured clinical examination (OSCE), rated by experts with validated scales. Secondary outcomes included change in self-efficacy pre-/post-intervention and satisfaction with the learning format. Multiple imputation accounted for missing data.

Results: Seventy-five residents were randomized and completed training. Sixty-nine residents completed the OSCE. Mean OSCE score in the experimental group (19.84 [SD = 5.74]) was non-inferior to the control group (18.56 [SD = 6.53]) using an item-based checklist with maximum score of 32 (difference -1.28, 95% CI -4.07, 1.51), and distribution of scores on a global rating scale did not differ. On average, self-efficacy rating improved post-intervention, but no difference was detected between groups. Satisfaction ratings were higher for the workshop, although differences were not significant.

Conclusions: The PULSES framework can be used for code status communication training in IM, and electronic learning is effective. An ELM may facilitate uptake and standardization of education on this topic.

125

How Does Patient Inclusion in the Medical Learning Environment Affect Medical Education and Patient Care?

M. Li[1], E. Amari[1], H. Buckley[1], C. Canfield[1], B. Cheema[1], C. Cuncic[1], D. Ho[1], L. Nimmon[1], K. Veerapen[1], A. van Enk[1], K. Wisener[1], C. Holmes[1]

[1]University of British Columbia, Vancouver, BC

Introduction: Inclusion of patients in the medical educational environment can increase professional behavior, mitigate demeaning language, increase humanistic care, and demonstrate role modeling opportunities—all components of a positive learning environment (Branch et al, 2001; Weissman et al, 2006). However, the patient, who is the focus of our care, has often been systematically excluded from discourse in the learning environment. In this study, we explored the ways in which patient inclusion affected dynamics of the educational and clinical environment.

Methods: This study took place in the Outpatient Internal Medicine Clinic at Vancouver General Hospital in British Columbia. Previously, trainees (residents and medical students) often reviewed their cases with staff physicians outside the patient room. In this study, all case review occurred in the room with the patient present. The preliminary sample included 9 staff physicians, 12 trainees, 9 patients, and 1 family member. One-on-one semi-structured interviews were then used to understand the experiences of the learner, the faculty, and most importantly, the patient.

Results: Descriptive thematic analysis revealed 3 themes: (1) Traditional teaching opportunities on medical knowledge were perceived to be limited; (2) Other teaching opportunities, especially on clinical skills and professionalism, were more apparent; and (3) Patients felt more comfortable, respected, and informed about their care.

Conclusions: This study showed that although inclusion of the patient in the medical learning environment may reduce traditional teaching opportunities, it can also enhance medical education by introducing other teaching opportunities and reinforcing positive professional values that importantly contributes to patient centeredness.

126

A Qualitative Study of Medical Trainee Perspectives on The Role of Empathy in Medical Education

L. Zhou[1]

[1]University of British Columbia, Vancouver, BC

Introduction: In an effort to improve the physician-patient relationship, the role of empathy in medical education has been extensively studied. Empathy has been linked with higher-quality patient care, increased physician satisfaction, and even superior health outcomes. In this study, we provide a detailed account of Chinese medical trainee perspectives on their role of empathy in health care.

Methods: Two focus group sessions, consisting of 16 medical trainees from the Shanghai Jiao Tong School of Medicine were conducted in a semi-structured interview style. Thematic data analysis[5] was applied and visual thematic data maps were constructed with Leximancer.

Results: Four main themes were found, as presented: (1) defining empathy; (2) establishing the role of empathy in medicine; (3) empathy erosion; and (4) empathy training. Empathy was defined as understanding others, emulating emotions, with a desire to help. The perceived benefits of empathy in medicine included improved communication, superior patient care, and physician self-fulfillment. Factors associated with empathy erosion were identified as workplace constraints, emotional guilt and burden, and distrust in the physician-patient relationship. Finally, trainees discussed their preferences for reflection, role playing, practical-based learning, and experience-sharing in empathy training medical curricula.

Conclusions: As the physician-patient relationship becomes increasingly strained in many countries worldwide, an exploration of the role of empathy in medical education in relation to sociocultural factors is of paramount importance. This study expands the current body of literature examining the role of empathy in medicine, from a unique cultural and student-focused perspective.

127

Operating Room Learning Environment in Canada: Perception of Surgical Residents

L. Luo[1], Y. Marwan[1], T. Benaroch[1], L. Snell[1], A. Toobaie[2]

[1]McGill University, Montreal, QC; [2]Western University, London, ON

Introduction: The educational experience in operating rooms (ORs) plays a central role in the transformation of a trainee into a surgeon. As Canadian residency programs transition to competency-based medical education (CBME), and since most surgical competencies are attained in the OR, we investigated the perception of Canadian surgical residents about their OR learning environment.

Methods: An online questionnaire, including the validated 40-item Operating Room Educational Environment Measure (OREEM) inventory, was sent to all surgical residency programs in Canada. The OREEM assesses the trainees' perceptions of the teaching surgeon, learning opportunities, operating room atmosphere, and workload. Each question is ranked from 1 (strongly disagree) to 5 (strongly agree).

Results: A total of 430 residents were included for final analysis. The overall mean OREEM score was 3.72±0.4. "Atmosphere in the OR" was the subscale with the highest mean score (3.87 ± 0.5), while "supervision, workload, and support" had the lowest subscale mean score (3.49 ± 0.5). "I get paged during operations" was the item with the lowest score (1.98 ± 1.0), while "I feel discriminated against in the OR because of my race" was the item with the highest score (4.47 ± 0.8).The overall OREEM mean score for junior and senior residents was 3.67 ± 0.4 and 3.80 ± 0.4, respectively (P = .001). No significant differences were seen in the mean OREEM score between men and women or different surgical programs. Nevertheless, general surgery had the lowest "supervision, workload, and support" subscale score (3.27 ± 0.5, P < .001).

Conclusions: Residents' perception of overall learning environment in operating rooms may be considered satisfactory; however, several areas for potential improvement are identified.

128

The Effect of a 3D Instructional Video on Performance of a Spatially Complex Surgical Procedure: A Randomized Controlled Trial

K. Bogomolova[1], J. van der Hage[1], J. Sluimers[1], J. van Merriënboer[2], T. Wiggers[3], S. Hovius[4]

[1]Leiden University Medical Center, Leiden, Netherlands; [2]Maastricht University, Maastricht, Netherlands; [3]Incision Academy, Amsterdam, Netherlands; [4]Radboud University Medical Center, Nijmegen, Netherlands

Introduction: Surgical residents experience difficulties in understanding and executing spatially complex procedures regardless of optimal preparation. Additionally, individual levels of visual-spatial abilities may have an impact on performance. This study aimed to evaluate the effect of a 3D instructional video on performance of an advanced Z-plasty and perceived cognitive load among novices in relation to their visual-spatial abilities.

Methods: A total of 109 first-year surgical residents from various teaching hospitals in the Netherlands participated in a randomized controlled trial. Visual-spatial abilities were measured by Mental Rotation Test (MRT). Participants performed an advanced Z-plasty on a low fidelity model after watching either 2D or 3D instructional video. Performance, as defined by an Observational Clinical Human Reliability Analysis (OCHRA) checklist score and optimal surgical outcome (lengthening and deepening), was blindly assessed by two experts. Perceived cognitive load was measured by NASA-TLX questionnaire. Independent *t* tests were performed to assess differences between groups.

Results: No significant differences were found between 2D and 3D teaching modality on performance (OCHRA: 8.1 ± 1.6 vs 7.7 ± 1.9, $P = .48$; lengthening: 28.4 ± 17.4 vs 25.3 ± 11.2, $P = .29$; deepening: 16.4 ± 5.8 vs 16.7 ± 4.8, $P = .78$) and cognitive load (video: 6.1 ± 1.1 vs 6.0 ± 1.4, $P = .75$; task: 6.1 ± 1.8 vs 5.9 ± 1.6, $P = .64$). Regardless of study group, MRT scores showed a significant positive correlation with performance among individuals with lower visual-spatial abilities ($r = 0.33$, $P = .017$).

Conclusions: 3D instructional video did not show a beneficial effect over 2D modality on performing an advanced Z-plasty among novices. Training of visual-spatial abilities could be considered for novices with lower levels of visual-spatial abilities to improve surgical performance.

129

Playing the Game: Strategies of Preoperative Preparation n Senior Surgical Residents

D. C. Cadieux[1], A. Mishra[2], M. Goldszmidt[3]

[1]Dalhousie University, Halifax, NS; [2]Department of Ophthalmology & Visual Sciences, Halifax, NS; [3]University of Western Ontario, London, ON

Introduction: Preparing for a surgical case is a fundamental component of surgical education. "Being prepared" for the operating room (OR) is an ill-defined statement representing an expectation of surgical residents when participating in the care of patients. Attending surgeons and residents alike recognize the importance of preoperative preparation; however, ambiguity exists in regard to what this looks like in practice. The purpose of this study was to map the variation in preoperative preparation strategies utilized by senior surgical residents and explore the forces that shape them.

Methods: Using constructivist grounded theory (CGT) methodology, we conducted 17 semi-structured interviews with residents in postgraduate years 3–5 across 7 surgical disciplines. In keeping with CGT, data collection and analysis proceeded iteratively to identify and refine themes. Purposeful sampling continued until sufficiency was reached.

Results: A resident's approach to preoperative preparation involved 4 areas of focus: technical skills, procedural knowledge, patient context, and surgeon preference. Residents utilized short-game and long-game strategies to *be ready* to operate and *demonstrate readiness* to operate. Sociomaterial influences were prevalent that enabled or constrained these strategies.

Conclusions: A resident's approach to preoperative preparation is highly variable and shaped by sociomaterial forces. We highlight considerations for residents, attending surgeons, and residency programs to support preoperative preparation strategies and overcome potential barriers.

130

Implementation and Assessment of a Resident-Led Leadership Training Workshop in a Pediatric Residency Intern Retreat

N. Alawa[1], A. Tatem[1], E. Fielder[1], T. Turner[2]

[1]Baylor College of Medicine, Houston, TX; [2]Texas Children's Hospital, Houston, TX

Introduction: Physicians are expected to be leaders of multidisciplinary teams without formal training. A recent research and development report found a direct relationship between teamwork behaviors and patient outcomes. Introducing leadership training early in residency can help to refine trainees' strengths and build teams supporting patient care.

Objective: To examine the perceived benefit of leadership training for pediatric interns on teamwork and communication via formalized leadership and team building training.

Methods: Using Kolb's Theory of Experiential Learning, a 90-minute trainee-developed workshop covered topics useful for teambuilding and leadership in patient care. A Myers–Briggs Type Indicator test was administered to determine leadership styles. Cases, reviewed and edited by experienced educators, were discussed in faculty-led small groups. An anonymous survey was conducted to evaluate the perceived benefit of the training.

Results: Fifty-four of 63 (85%) interns participated and completed the survey. The results revealed: 89% identified their unique leadership style; 78% understood how leadership styles affects conflict resolution; 89% appreciated the nuance of leadership styles in team-based settings; 91% acknowledged the applicability to daily practice; 59% gained new skills to enhance communication; and 80% increased knowledge for decision-making in practice.

Conclusions: Teamwork and leadership are an integral part of a safe, effective, and efficient health care system. The overall perceived benefit of leadership training for pediatric interns shows significant promise for shaping tomorrow's leaders of health care. Our workshop demonstrates identifying and understanding leadership style is important early in residency. Future endeavors should incorporate longitudinal leadership training in graduate medical education.

131

"See One, Teach One, Do One"—Experience of a Student-Led Project to Write a New Undergraduate Surgical Textbook

R. A. Fisher[1], A. Ahmad[2]

[1]King's College London, London, UK; [2]South Thames Deanery, London, UK

Introduction: Surgical teaching resources for medical students are limited by a mismatch between learner needs and expert author content, which has led to an increase in popularity of near-peer resources. We used a publishing model where residents and attendings supervised students to write a new undergraduate surgical textbook, *Introduction to Surgery for Students*. We examined the feasibility of facilitating students to write chapters.

Methods: Student and supervising authors completed online questionnaires. Student questionnaires explored experience and confidence, and communication with supervisors. Supervisors rated student performance and team workload distribution. Questions were formatted in 10-point Likert scales, single best answer questions and open text answers.

Results: Responses were received from 36 of 37 student authors and 10 of 15 supervising surgeons. All supervisors found their students sufficiently competent to write under supervision. Student pre-project average confidence in chapter writing ability was 6.3/10, rising to 8.7 afterward. Student pre-project average knowledge of the chapter topic was 6.5/10, rising to 8.1 afterward. Of 21 students directly supervised by attendings, 4 reported inadequate supervision due to unanswered emails. Thirty-five students agreed that the project would not have been better run by a resident/attending editor than by a student.

Conclusions: Students coped with the demands of writing chapters and benefit from increased confidence in their writing. The editors found that students were excellent team members as they were motivated and produced high-quality work, and had opportunities for focused writing in university vacations. To succeed they require active input from supervisors.

132

Resident Peer Mentorship at the University of British Columbia

T. Plyley[1], J. Cory[1], A. Flexman[1]

[1]University of British Columbia, Vancouver, BC

Introduction: Mentorship plays an essential role in academic success, professional growth, and development. The typical model of resident mentorship involves pairing medical residents with faculty mentors. A peer mentorship model is an emerging strategy, in which senior residents are partnered with junior resident mentees. In our program, we implemented a resident led formalized peer mentorship model in which incoming residents were partnered with R2 level resident mentors. We explored resident satisfaction with these changes, compared to the previous system consisting solely of faculty mentors.

Methods: Residents were surveyed regarding their experience with the mentorship program. We targeted the domains of ease of transition to residency, comfort in asking for advice, and overall satisfaction using a 5-point Likert scale. We compared the results using a Mann–Whitney U test.

Results: The residents who participated in the survey indicated that a peer mentorship model more effectively eased their transition to residency. Moreover, residents felt more comfortable asking for advice in all domains (academic, professional, and personal), compared to their faculty mentored colleagues.

Conclusions: Our survey demonstrated that a peer mentorship model may facilitate a smoother transition to residency. Peer mentors may be able to better relate to the challenges of junior mentees, and may be in a better position to support their mentees. Additionally, residents were more comfortable approaching their peer mentors for advice. This is especially prudent considering the high stress environments experienced in anesthesia, and residency in general.

133

The Efficacy and Usefulness of Online Web Application–Based Logbook for Ophthalmology Residents

N. Kanchanaranya[1], C. Wibhusanawit[1], T. Kupakanchana[1]

[1]Thammasat University Hospital, Pathum Thani, Thailand

Introduction: Clinical logbooks are an important aspect of ophthalmology training. To overcome the inherent limitations of accessibility, adherence, lack of data validation, and monitoring in physical logbooks, the authors developed electronic logbook available for multiple platforms and tested its efficacy and usefulness.

Methods: The authors collaborated with professional mobile application developers to create an electronic logbook according to a preestablished set of goals of ensuring a standardized training program, permits supervisors monitoring of trainee's progress and performance throughout the duration of training, applicable to educational settings with multiple sites, and is adequately integrated into the user's training program. The logbook was tested during October 2017–2018, and then distributed for practical use between October 2018–March 2019.

Results: Forty-two volunteer logbook users were enrolled in this study, of which 28 users (66.7%) are residents, 11 users (26.2%) are ophthalmology staff, and 3 users (7.1%) are educational administrators. At the end of the testing time, all participants responded to a 12-component satisfaction questionnaire which was based on a checklist for successfully implementing logbooks into clinical training. All the results were included the overall satisfaction of the logbook where 13 participants (30.9%) satisfied logbook the most, 18 participants (42.8%) were quite satisfied, 10 participants (23.8%) were in between, and 1 participant (2.3%) had the least satisfied into the logbook.

Conclusions: A web application–based logbook has the advantages of ease of access and usage, monitoring and data presentation, and a communication platform between residents and educational supervisor.

134

Knowledge Translation and Utilization of Social Media Medical Education to Clinical Practice

S. L. Edwards[1]

[1]University Hospitals Leicester, Leicester, UK

Introduction: We have seen an explosion of free open access medical education resources (FOAMed) on social media. With this, there is increasing use of these FOAMed resources to inform clinical practice. There is little work around how and if this occurs. This work will specifically talk about the knowledge translation from FOAMed into clinical practice.

Methods: Twenty emergency medicine (EM) doctors from all grades were recruited from one hospital. Semi-structured interviews were undertaken to explore reasons behind the use of social media (SM) for learning and if they used the knowledge gained in clinical practice. Following this, interviews were transcribed and then thematically analyzed.

Results: Of the 20 participants, 6 were consultants, 7 were registrars, and 7 were SHO level. Thirteen of the 20 (65%) participants found that SM had influenced their clinical practice. This was from all grades from foundation year 2 doctors through to consultants. The resources utilized into clinical practice included management options of different conditions, guideline changes, and human factors.

Conclusions: With the rapid growth and uptake in SM use for educational purposes, it has become even more important we understand how this knowledge is being used and implemented. This work is one of the first studies looking at trying to understand this knowledge translation into clinical practice from FOAMed.

135

Consumer-Grade Biosensor Validation for Stress Response Measurement in Surgical Trainees

L. Hopkins[1], D. Robinson[1], C. Brown[1], W. Lewis[1], D. Bailey[2], B. Stacey[2], O. P. James[3], R. Egan[4]

[1]Health Education and Improvement Wales, Cardiff, Wales; [2]University of South Wales, Pontypridd, Wales; [3]Wales PGMDE School of Surgery, Nantgarw, Wales; [4]Morriston Hospital, Swansea, Wales

Introduction: Competitive athletic performance is routinely monitored by wearable technology (biosensors), yet health care professional performance is not, despite the potential life and death risk associated with the same. Significant stress and burnout have been reported in health care settings, and biosensors offer opportunities to monitor stress response in live clinical scenarios, but consumer-grade technology accuracy, compared with gold standard validated laboratory techniques is unknown.

Methods: Twelve healthy, male (median age 29) volunteers completed a standardized incremental exercise protocol, and physiological stress was assessed using Cardio-Pulmonary Exercise Testing (CPET, Medigraphics Optima) and a consumer-grade wearable Vital Scout Patch (VivaLNK Inc, Campbell, CA). Correlation between measures of exercise-related stress (HR, RR, Kcal vs VO_2) and measures of psychological stress (stress index, recovery index vs VO_2), were assessed using Pearson's correlation coefficient.

Results: Vital Scout data correlated with laboratory gold standard CPET (peak VO_2 ml/kg/min) as follows: heart rate ($r = 0.786$, $P < .001$), respiratory rate ($r = 0.769$, $P < .001$), and Kcal ($r = 0.783$, $P < .0001$). Measures of autonomic system activation did not correlate with exercise induced stress: stress index ($r = -0.198$, $p = .012$) and recovery index ($r = -0.323$, $P < .001$).

Conclusions: Wearable consumer-grade technology provided an accurate assessment of physiological parameters of exercise-related stress. The technology was able to differentiate between exercise-related physiological stress and psychological stress. Further algorithmic research is justified to facilitate ways of assessing stress response with the potential for clinician and commensurate patient safety benefits.

136

‘hARTbeat’: Transcribing Heart Sounds Into Musical Notation

J. Gencher[1], H. Haghbayan[1]

[1]Western University, London, ON

Introduction: A storied relationship exists between medicine and music, exemplified by the basic proficiency in musical interpretation that many physicians carry. The traditional method of teaching heart sounds to trainees invariably capitalizes on auditory recognition. Methods of facilitating this process include simulation dolls such as Harvey, sound libraries, and non-acoustic methods for displaying sound like phonocardiograms. These diverse methods suggest that, given the inherent rhythmicity of the cardiac cycle, applying principles of musical interpretation into medical education may serve as a valuable tool for comprehending cardiac physiology.

Methods/Results: We created a library of transcribed heart sounds using traditional musical notation for percussion. Only requiring basic musical training, these transcriptions combine pedagogic techniques in the field of composition into a synthesized audiovisual representation of cardiac physiology. Much like practicing a musical fragment repeatedly alongside a metronome, the anticipated goal is that the “musician-physician” will key-in to techniques used in musical training to consolidate new medical information. The precision of musical notation allows the subtle findings of heart sounds to be reinforced. As an example, the placement of crescendo-decrescendo components in aortic stenosis are represented by placement of dynamic markings visually in notation and can be rehearsed with particular attention to initiation and attenuation of each component respectively.

Conclusions: hARTbeat applies the long tradition of medicine and music to facilitate the contemporary instruction of cardiac physiology. Its future directions include designing a program which allows the learner to create “loops,” control volume, speed, and overlap different rhythms not unlike DJ software.

137

Factors Influencing Uptake of Electronic Learning by Medical Oncology Trainees and Recent Graduates

T. Hsu[1], K. LaDonna[1], C. Touchie[2]

[1]University of Ottawa, Ottawa, ON; [2]Medical Council of Canada, Ottawa, ON

Introduction: Electronic learning is increasingly popular but some e-resources are more widely utilized than others. There is a limited understanding about factors that influence health professionals to engage in e-learning. The objective of this study is to explore factors related to the uptake of e-learning resources.

Methods: Canadian medical oncology residents and recent graduates were electronically surveyed about the following domains: demographics, self-directed learning practices, use of electronic resources, and perceived facilitators and barriers to e-learning. Descriptive statistics were used to analyze the data.

Results: Most respondents (n = 47) were aged < 35 (66%) and in residency training (47%). While most respondents (92%) had used an e-learning resource previously, the preferred methods of addressing gaps in knowledge was to consult an expert (85%), use UpToDate (68%), or Pubmed (62%). Accessibility/availability (40%), credibility/content quality (30%), usability of the resource (15%), and type of question (15%) were the most important factors when deciding how to address a gap in knowledge. Accessibility (39%), credibility/content quality (20%), and advantages related to electronic delivery (eg, convenience, interactive, media, etc; 21%) were the most common reasons reported for using e-learning resources. Choice of e-learning resource was influenced by usability and design of the resource (32%), credibility/content quality (32%), and accessibility (23%). The most common barriers to use of e-learning resources included cost (21%) and time required (19%).

Conclusions: Common factors influence how trainees choose to fill gaps in learning and choice of e-learning resource. These should be considered when developing e-learning resources to help optimize utilization.

Author Index

Keyword Index