

The International Conference on Residency Education

La Conférence internationale sur la formation des résidents

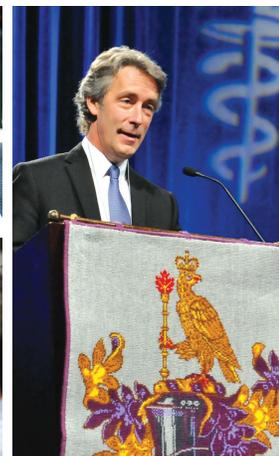
2013



Educational Outcomes: Inspiring Residents, Improving Care

Les résultats pédagogiques : comment
inspirer les résidents et améliorer les soins

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Can the Medical Council of Canada Evaluating Examination scores predict resident performance?

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Background: Successful completion of the Medical Council of Canada Evaluating Examination (MCCEE) is a requirement for the medical licensure of international medical graduates (IMGs) and admission to residency. Residency selection committees often regard MCCEE scores as a predictor of performance.

Objectives: To determine whether data exists to support the use of MCCEE scores as a predictor of performance in postgraduate training.

Methods: Our sample included IMG residents accepted at the PGY-1 level at the University of Toronto between 2007 and 2012 for whom we had an MCCEE score. We used linear regression to describe how variation in MCCEE scores predicted variation in average In-Training Evaluation Report (ITER) scores. Since the MCCEE scoring changed in January 2007, we divided our sample into 2 groups—MCCEE scores pre-January 2007 ($n = 145$) and post-January 2007 ($n = 193$). We further divided our sample to understand whether any differences existed between Visa trainees and Canadian citizens/permanent residents (CCs/PRs).

Results: For all IMGs, we found the strongest positive association ($r^2 = 0.151$, $P = .00$) between post-2007 MCCEE scores and average PGY-2 ITERs and no association between MCCEE scores written pre-2007 with ITERs from any PGY. Once we divided the sample between Visa trainees and CCs/PRs, we found the strongest associations existed for post-2007 MCCEE scores for the Visa trainee group, in particular the association with PGY-1 ITERs ($r^2 = 0.355$, $P = .00$), but also with PGY-2 ITERs ($r^2 = 0.294$, $P = .00$).

Conclusions: Approximately 36% of the variation in PGY-1 ITERs and 30% of the variation in PGY-2 ITERs can be explained by post-2007 MCCEE scores among Visa trainees. These were the strongest associations among the 4 groups we analyzed. Further research with a more robust sample size of Visa trainees is required to understand why the scores for the Visa trainees were more predictive than for those of CC/PR IMGs and to see whether the predictability continues through upper year PGYs.

**Reliable preinterview selection of domestic and international postgraduate candidates:
Computer-based situational judgment testing**

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Background: Most postgraduate training candidates are excluded at the preinterview stage without benefit of personal/professional qualities assessment. Can Computer-based Assessment for Sampling Personal Characteristics (CASPer), successful in undergraduate admissions, be a useful preinterview screen for domestic and international (IMG) postgraduate applicants on intrinsic CanMEDS roles?

Methods: All Canadian and IMG orthopaedic surgery (Ortho) applicants and all IMG pediatrics (Peds) applicants at McMaster completed CASPer as part of their preinterview process. CASPer, completed online, consists of 12 sections (8 video-based and 4 self-descriptive) on various intrinsic roles. Applicants have 5 minutes to type responses to 3 follow-up questions/section.

Results: One hundred sixty-two of 178 Ortho and 213 of 281 Peds completed CASPer as part of the process for interview selection. Mean CASPer scores for Ortho applicants differed significantly between domestic (3.85) and IMG (2.7, $P < .001$) applicants. Scores for IMG applicants were similar ($x = 3.0$). However, there was considerable overlap in CASPer scores with similar maximum average scores for IMGs (5.25) and domestic (5.08) applicants. The overall test reliability for CASPer was 0.84. Overall reliability for Canadian applicants was lower ($G = 0.65$), compared to international applicants ($G = 0.85, 0.77$ the orthopaedics and pediatrics programs, respectively).

Conclusions: While overall test reliability is very good for CASPer in general, results in the more homogeneous domestic applicant pool were lower. Long-term predictive validity and diversity issues need to be addressed. Initial results indicate that CASPer demonstrates potential as a feasible and reliable measure of personal/professional characteristics in the preinterview assessment of postgraduate applicants.

003

A personality trait analysis of surgeons and nonsurgeons at different career points

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Background: Previous studies have shown that there are correlations between personality traits and job performance and satisfaction. We believe that there are personality differences between surgeons and nonsurgeons, and that some of these may develop during surgical training. Furthermore, understanding the cohort differences between medical and surgical specialties may help to identify students and residents who will be successful in surgery, or who may require particular attention during their training.

Objectives: The purpose of the study was to evaluate personality traits of surgeons and nonsurgeons at different phases of their careers in order to determine whether there were differences.

Methods: The Five Factor Model (FFM) was used to examine the distribution of FFM personality traits among surgeon and nonsurgeon house staff and faculty. A total of 192 trainees and faculty in surgery and medicine at a large tertiary care teaching hospital completed the Big Five Inventory, a 44-item measure of the FFM. The significance of differences in personality traits between physician type and level of training was evaluated using the student *t* test.

Results: Surgeons obtained greater scores for conscientiousness, extraversion, and agreeableness as compared to nonsurgeons (all $P < .05$). Evaluating surgery faculty against surgery house staff revealed that surgery house staff obtained greater scores in agreeableness ($P = .001$).

Conclusions: There appear to be inherent personality differences between surgical and medical subspecialties. The specialty-related differences may allow us to use personality testing as an aid to the surgery resident selection process and to help identify students who will be successful in their surgical training.

004

Resident selection: Aptitude for the profession

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Background/Objectives: The selection procedure of suitable residents for a postgraduate medical program has been topic of much debate. At our university, final year graduate students are offered 2 periods of 3-week internships in a postgraduate hospital program, where they are observed by clinical teachers who are member of the selection committee. Following this, candidates apply by means of a comprehensive application form, followed by an interview with a selection committee.

Methods: Starting from the theory of social constructivism, an anthropologist conducted nonparticipant observations of 58 student interviews with 8 different selection committees. Main focus was given to verbal content. Field notes were digitalized, and we used NVivo 10 for inductive analysis.

Results: Recurrent themes in all 58 interviews were grades, research interest, postgraduate training abroad, internship experience, and aptitude for the profession. Each selection committee had its own operating procedure. All committees considered aptitude for the profession, based on the observations during the 3-week internship programs, of overriding importance. Criteria for aptitude, however, were implicit in all interviews and not elaborated in any written motivation. Selection committee members agreed easily whether a student was a good candidate or not in terms of aptitude.

Conclusions: As aptitude for profession is a decisive factor in the selection process for postgraduate residents, research has to be done on what this aptitude means as it is a decisive factor in future physicians' selection.

005

The impact of exchange clinical rotations on specialty preferences of Indian medical students

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Objectives: Purpose of this study was to evaluate the influence of clinical rotation in the United States on specialty preference for Indian medical students.

Methods: A survey questionnaire was mailed to about 191 Indian medical students who participated in clinical clerkships and clinical observerships in various hospitals in the United States in 2007 and 2009. The questionnaire asked the students to evaluate various aspects of US clinical rotation that influenced their specialty preferences.

Results: A total of 168 Indian medical students responded. Most clinical rotations (94%) had impact on specialty preference for Indian medical students. Many medical students felt that having clinical experience in the United States is worth for all the expenditure, and they were satisfied with the rotation. However, the greatest influence on specialty choice came first from the experiences of the clinical rotation (90%), second from the challenge and intellectual content of the specialty, followed by the influence of faculty members and technological advances in the specialty. For a large majority of them, who had made the decision prior to start of clinical rotation, experiences of the rotation strengthened their decision.

Conclusions: These findings suggest that the medical student's experiences in the clinical rotations in the United States have a significant impact on their specialty choice.

Documenting the cognitive performance of family medicine practicing outpatient medicine

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Background: Development of the cognitive skills required for competent medical practice is not a general ability but must be developed for many different clinical situations. We developed the Resident Cognitive Skills Documentation ("CogDoc"), a method of capturing faculty members' expert, real-time assessment of residents' cognitive performance as they provide care in a family medicine office. Our aim was to document our experience with its use, and evaluate its reliability and feasibility.

Methods: A CogDoc assessment is completed following each resident-faculty discussion of a specific patient. Faculty members assess residents in the care of individual patients on 3 rubrics, "knowledge," "understanding," and "application," rating demonstrated performance as below, at, or above competence. We introduced CogDoc assessments at a single training site, collecting all completed forms for 14 months.

Results: Thirty-eight faculty members completed 5330 CogDoc forms, documenting 27% of patient visits among 33 residents. Competence was statistically different among residents of different residency years on all 3 rubrics and progressively increased within all residency classes over time. Reliability scores were high, 0.9204 for the medical knowledge domain, 0.9405 for understanding, and 0.9414 for application. Almost every resident reported accessing the individual forms or summaries of their documented performance.

Conclusions: The CogDoc approach allows for ongoing assessment and documentation of resident competence. This approach meets the criteria for a good tool of cognitive competence assessment.

Resident Practice Audit in Gastroenterology: An innovative approach to Gastroenterology trainee evaluation and professional development

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Background/Objectives: Traditional mechanisms of endoscopic skill assessment are inherently subjective and do not support objective comparative analysis. A mobile information technology (IT)-based colonoscopy evaluation instrument has been found to be an effective mechanism of administering practice audit to gastroenterologists in independent practice. We have developed Resident Practice Audit in Gastroenterology (RPAGE) as a novel, comprehensive, and objective instrument to evaluate GI trainees' endoscopic skill.

Methods: RPAGE instruments for endoscopic procedures have been designed from relevant quality indicators adopted from current endoscopy guidelines. Features include web-based, real-time, point-of-care collection of procedural data, comprehensive professionalism/performance evaluation with peer-comparator function. Full evaluations will be undertaken for > 500 procedures over a 2-year validation study, with multi-dimensional validity/reliability and qualitative assessment of trainee performance thresholds.

Results: Review of 330 recorded procedures (239 PGY-4, 91 PGY-5) from the recently initiated validation study involving 12 GI trainees at McMaster University has demonstrated robust data capture architecture. Preliminary data have demonstrated that complete (unassisted) upper GI endoscopy was performed more often by PGY-5 (75%) than PGY-4 (59%) trainees ($P = .01$), and for colonoscopy by PGY-5 (12%) than PGY-4 (7%) trainees ($P = .01$, 95% CI = 0.04–0.28). Highly skilled performance global assessment scores for upper GI endoscopy were more common among PGY-5 (40%) than PGY-4 (7%) trainees ($P = .001$), and for colonoscopy among PGY-5 (61%) than PGY-4 (12%) trainees ($P < .001$, 95% CI = 0.17–0.50).

Conclusions: RPAGE is a versatile and comprehensive data capture and feedback mechanism supporting competency-based education in endoscopy. Although evaluation is ongoing, it possesses much potential for benchmarking skill development and practice audit within GI training programs across Canada.

Assessment of the intrinsic CanMEDS roles in orthopaedic surgery residents using an objective structured clinical examination

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Background/Objectives: Defining competence and assessing the 6 CanMEDS Intrinsic Roles continues to be a challenge for postgraduate medical educators. We sought to evaluate the validity, reliability, and feasibility of assessing the CanMEDS Intrinsic Roles in orthopedic residents using an objective structured clinical examination (OSCE).

Methods: The Postgraduate Medical Education Office and the Division of Orthopaedic Surgery at the University of Toronto designed and administered a CanMEDS OSCE using role-specific rating scales. The CanMEDS OSCE development was facilitated by an examination blueprint and case development guides. Five-point performance rating scales were developed for each of the Intrinsic Roles. The OSCE was 1 hour long and composed of six 10-minute stations, each testing at least 2 Intrinsic Roles through case-based scenarios (with or without the use of standardized patients). Twenty-five residents from PGY-0 (pre-entry to resident training), PGY-3, and PGY-5 took part in the OSCE. Residents were evaluated independently by a different orthopaedic surgeon at each station with a series of CanMEDS rating scales as well as an overall rating of performance.

Results: The interstation alpha coefficient was 0.87 for 6 stations. The alpha coefficients for Communicator, Collaborator, Manager, and Health Advocate were all greater than 0.83. The effect of PGY on the individual station scores was statistically significant (stations 1, 5, and 6 $P < .01$; stations 2 and 4 $P < .05$) with the exception of station 3 (nonaccidental injury $P = .68$). Analysis of variance testing for the effect of PGY on each of the Role scores was statistically significant (communicator, collaborator, manager, profession $P < .001$; advocate, scholar $P < .05$).

Conclusions: This OSCE has proved to be sufficient reliability and validity to be used to test the 6 CanMEDS Intrinsic Roles in orthopaedic residents.

009

Is an objective structured clinical examination a suitable tool to assess in-training competency after an orthopaedic sports medicine rotation?

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Background/Objectives: The development of competency-based curriculum in Canadian orthopaedic resident training requires an objective means of assessing in-training competence after a module. We hypothesized that a sports medicine objective structured clinical examination (OSCE) would demonstrate sufficient reliability and validity to be used as a measure of resident in-training assessment.

Methods: An OSCE made up of six 10-minute stations was written for orthopaedic residents at the University of Toronto, assessing resident competencies in the management of common sports medicine conditions. Each station covered domains of history taking, examination, imaging, clinical decision making, consent, and surgical technique. A combination of binary checklists and overall global ratings were used. Results were analyzed for overall reliability and construct validity.

Results: A total of 43 residents sat the OSCE. Cronbach's alpha was 0.91 for the 6 stations, with each station having acceptable corrected item-total correlation coefficients. Excellent correlation was seen between the binary checklists and the global rating. A significant effect of year of training was seen on both total checklist scores and global ratings, as well as on all individual domains except history. Final year trainees performed particularly well in clinical decision making and surgical technique. Overall, the number of previous sports medicine rotations correlated with significant increases in checklist scores, whilst recent exposure to a competency-based sports rotation did not.

Conclusions: An orthopaedic sports medicine OSCE has shown sufficient validity and reliability to be used as an in-training assessment tool. Issues of standard setting must now be addressed in order to determine competency.

010

Development and validation of a novel tool to quantitatively assess clinical clerk consultation notes: The improving resident feedback skills and medicine clerk communication (IMPRESS-ME) prospective cohort trial

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Background: Producing clear and effective documentation is a key competency of the CanMEDS communicator role. There is little agreement regarding the necessary components of a consultation note (CN) and no standardized method to assess quality. We have developed and validated a CN assessment checklist (AC) for use in assessment and educational research.

Objectives: We developed and validated a CN-AC and validated it using a prospective cohort trial.

Methods: A literature review was undertaken and theme analysis was extracted. Resident opinion leaders developed the checklist which was vetted by expert clinical educators to ensure face validity. Ten reviewers (faculty or senior residents) assessed 50 randomly selected CNs from clinical clerks on internal medicine rotations using the checklist. Reviewers were surveyed to assess the ease of use and acceptability of the tool. Interrater reliability was calculated for the global assessment score between pairs using a quadratic-weighted kappa score. Cronbach's alpha was used to evaluate internal consistency.

Results: The tool consists of 45 questions, taking an average of 5 minutes to complete. It includes marks for specific characteristics as well as global ratings assigned to each major category. Using global ratings for each section, the internal consistency was 0.79, 95% CI 0.73–0.85]. Interrater reliability between pairs of residents and staff was 0.57, 95% CI 0.28–0.84; between pairs of residents 0.74, 95% CI 0.53–0.95; and between pairs of staff 0.76, 95% CI 0.57–0.95]. Ninety percent of the reviewers found the tool easy to use, and 86% found it useful to assess CN quality.

Conclusions: We have developed and validated a CN-AC to assess quality of consultation documentation that demonstrates face validity and internal consistency. Interrater reliability was strong among pairs of assessors. Our novel checklist holds promise as a robust tool in the evaluation of educational interventions within the CanMEDS communicator role.

L'évaluation en ligne des résidents: Résultats d'un projet pilote

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But: Offrir une évaluation de fin de stage ciblée sur les compétences à acquérir en fonction du niveau de formation du résident et du stage.

Méthodologie: Le programme d'urologie a accepté de collaborer à tester les conditions d'implantation. La première étape consistait à ajuster les compétences à la formation et au niveau de formation du résident et une place importante a été réservée au recueil des commentaires. Consécutivement, les droits d'accès ont été associés selon le stage, le milieu de stage et les responsables assignés. Puis, l'évaluation du milieu de stage a été rendue dépendante de l'évaluation en ligne, de telle sorte à ce que même si le contenu de l'évaluation du milieu de stage demeure confidentiel, il est devenu impératif d'être complété avant que le résident obtienne son évaluation de fin de stage.

Résultats: Les résidents et les enseignants ont rapporté une amélioration de la rétroaction en fin de stage. Nous avons obtenu un taux de réponse de 100% pour l'évaluation de milieu de stage. La séquence « soumission – validation – autorisation » est parfaitement intégrée dans des mécanismes sécuritaires et automatisés, incluant un système de rappel. En raison de la traçabilité, nous avons noté un raccourcissement des délais de la transmission des formulaires d'évaluation ainsi qu'une confidentialité accrue de l'information.

Conclusion: Cette expérience très positive nous permet de poursuivre l'amélioration du projet et son déploiement en l'étendant à d'autres programmes post-gradués. Nous avons également bonifié le processus et inclus des fenêtres surgissantes lorsqu'il semble avoir incongruité entre certains éléments de l'évaluation et le résultat global du stage. D'autres projets pour bonifier l'évaluation en ligne sont en cours. Parmi les facteurs de réussite, la capacité de donner suite aux requêtes d'amélioration rapidement est primordiale.

Assessment of surgical skills and 4 CanMEDS Roles simultaneously: A psychometric study

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Background: The present study examines the development of residents' skills following a surgical skills course that incorporates the CanMEDS roles of Communicator, Professional, Collaborator, and Manager. Residents' performance was also assessed 8 months after completion of the course as the reliability and validity of the instruments.

Methods: After delivering a surgical skills Course that integrates the CanMEDS roles of Communicator, Professional, Collaborator, and Manager, in which 24 residents from the Departments of Surgery and Obstetrics-Gynecology at the University of Calgary participated, 2 assessments were conducted in an OSPRE format to evaluate the residents' performance. In Test 1, 22 of the 24 surgical residents were assessed using 4 simulated stations 1 week after the course. Each station had a surgical task and 2 CanMEDS roles. Test 2 conducted 8 months later with the participation of 20 of the 24 residents had 7 surgical simulation stations and 2 CanMEDS roles per station.

Results: The reliability for Test 1 using checklists in surgical skills was $\alpha = 0.23-0.83$, while using checklists and global rating scales combined resulted in reliabilities of: Communication ($\alpha = 0.71-0.85$); Professionalism ($\alpha = 0.83-0.86$); Collaborator ($\alpha = 0.79-0.87$); and Manager ($\alpha = 0.74-0.86$). The reliability for Test 2 using checklists and global rating scales combined was as follow: Surgical Skills ($\alpha = 0.84-0.93$); Communication ($\alpha = 0.71-0.92$); Professionalism ($\alpha = 0.43-0.91$); Collaborator ($\alpha = 0.56-0.92$); and Manager ($\alpha = 0.76-0.92$). Both assessments demonstrated significant correlations between surgical skills and all of the CanMEDS roles, indicating construct validity of the multi-competencies assessment. The residents' performance, calculated by paired *t* tests, indicated that there was good performance of the acquired skills 8 months after the course was delivered in the CanMEDS roles.

Conclusions: Surgical skills and 4 CanMEDs competencies can be simultaneously assessed following a PGY-1 surgical skills curriculum utilizing an OSPRE format, which has proven to be a valid and reliable method.

The Orthopaedic In-Training Examination: Perspectives of program directors and residents from the United States and Canada

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Background: Objective assessment of resident performance continues to challenge program directors. The validity and utility of the Orthopaedic In-Training Examination (OITE) have not been established. Attitudes about the role of the OITE in resident education seem variable.

Objectives: We evaluated attitudes toward the OITE, compared its value between countries, assessed its value against other metrics of resident performance, and examined program and resident factors predictive of high achievement.

Methods: We contacted 166 program directors (PDs) and 945 residents from orthopaedic surgery programs across the United States and Canada.

Results: Eighty-eight PDs and 331 residents completed the surveys (response rates 54% and 35% respectively). PDs and residents in the United States assigned greater importance to the OITE than did those in Canada. Reported OITE scores from the United States were significantly higher. PDs in the United States reported greater consequences for residents with poor scores, including remediation and reprimand. Observed structured clinical examinations, internal examinations, and In-Training Evaluation Reports were assigned greater importance by PDs and residents in Canada. Residents strongly favored prior OITE and American Academy of Orthopaedic Surgeons self-assessment questions and an OITE-based multiple choice question website. Regression analysis identified resident and program emphasis on OITE studying and higher level of training as positive predictors for higher OITE scores.

Conclusions: The OITE is more important to PDs and residents in the United States than Canada, and reported OITE scores reflect these attitudes. PDs in Canada employ a greater diversity of evaluative tools, a practice in keeping with recent advances toward competency-based medical education. The findings of this report may help program directors be aware of alternative methods of formative resident evaluation and ultimately improve the training of future independent surgeons.

014

Milestone-based evaluation

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Background/Objectives: In 2007, the American Board of Internal Medicine (ABIM) and the Accreditation Council for Graduate Medical Education (ACGME) charged a taskforce of educators to develop competency-based behavioral milestones. Milestones make explicit a "developmental progression of observable behaviors." They enable residency programs to identify resident progress in achieving competence in the 6 ACGME competencies in order to advance to the next level in their training.

Intervention: We revised our evaluation forms to incorporate the milestones as a means to make explicit to faculty evaluators the skills and behaviors required of trainees at specific levels of training. Key milestones were selected and at times modified for each competency. The evaluation forms were training level specific. Further, evaluations were refined for the various rotational experiences. The rating scales were condensed to 4 points to clearly articulate the ABIM definitions of a superior, satisfactory, marginal, and unsatisfactory score. A section for comments on strengths and areas for improvement allowed for formative feedback. To ensure proper implementation, faculty development through a program-wide workshop as well as individual guidance was provided.

Conclusions: It is imperative for programs to have specific, objective data in monitoring resident performance in a competency-based manner. By being explicit, milestone-based evaluation provides a mechanism for programs to assist faculty comprehension with respect to expectations for trainees based on their level of training. For future direction, we intend to compare our revised evaluation system with our prior forms to determine if there is normalization of trainee evaluation and improved information regarding potential gaps in knowledge, skills, and attitudes. Additionally, we will add descriptors to our rating scales to mirror ACGME's milestone-based narratives.

Developing physicians as managers of care: A systematic review of assessment methods

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Background: The increasing demands for effective and efficient health care delivery systems worldwide have resulted in an expansion of the desired competencies that physicians need to possess upon graduation. Presently, medical residents require additional professional competencies that can prepare them to practice adequately in a continuously changing. Recent studies show that despite the importance of competency-based training, the development and evaluation of management competencies in residents during the residency training is inadequate.

Objectives: The aim of this systematic literature review was to find out which assessment methods are currently being used to evaluate trainees' management competencies, and which, if any, of these methods make use of valid and reliable instruments.

Methods: In September 2012, a systematic search of the literature was performed using the PubMed, Cochrane, Embase, Medline, and ERIC databases. Additional searches included scanning the references of relevant articles and sifting the "related topics" displayed by the databases.

Results: Twenty-five out of 178 articles were selected for final review. Four broad themes emerged after analysis that best reflected their content. Category 1 encompassed assessment tools used to evaluate the effect of implemented curricular interventions; category 2 included assessment tools based on recommendations from consensus surveys or expert conventions; category 3 consisted of assessment tools for assessing general competencies; and category 4 included assessment tools that focused exclusively on systems-based practice or management competencies.

Conclusions: Little information was found about validated assessment tools being used to measure management competence in practice. Our findings suggest that a combination of assessment tools should be used when evaluating residents' management competencies.

Toward a reliable assessment of management competencies in postgraduate medical education: A Delphi study

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Background: Recent research has shown that current postgraduate training programs do not prepare trainees adequately in the field of health management. It is also thought that the key to the development of successful management-training programs is when valid and reliable assessment tools are used to test specific domains of management competencies in residents. A recent review of the literature, however, revealed that there was little evidence supporting the validity and reliability of the assessment tools currently in use. We therefore decided to explore the current methods of assessments of management competency in the Dutch residency-training program and investigate the benefits and shortcomings of the assessment tools.

Methods: In November 2012, a Delphi survey among an expert panel group in medical management and leadership in the Netherlands was conducted. The panel composed of clinical educators, care management stakeholders, and residents with special interest in care management.

Results: The respondents agreed that current assessment tools were inadequate for measuring the management competencies of residents. Although they agreed with the feasibility of the tools in use, they disagreed with the validity and agreed that there was a need for reliable assessment tools. The panel expressed that the current assessment tools were not reproducible, did not provide a clear reflection of performance, were not capable of assessing all domains of the management competency, and were not useful for differentiating residents' level of competency.

Conclusions: Of the current assessment tools in use, a combination of 360-degree feedback forms, portfolios, self-designed projects, and clinical observations were recommended for assessing management competencies in residents.

Establishing content validity and standards for the McMaster Modular Assessment Program

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Objectives: To set standards for achievement and establish content validity for a large assessment program.

Methods: Our developers created 54 clinically based assessment instruments for junior and intermediate level residents. To establish content validity, we sent the instruments to 6 international reviewers (3 Canadian and 3 American) to sort by CanMEDs Role/Accreditation Council for Graduate Medical Education (ACGME) Competency and expected level of achievement (junior, intermediate, senior). Intraclass correlations were calculated to generate rater agreement indices.

Results: While all reviewers found our portfolio comprehensively covered all CanMEDs Roles and ACGME Competencies, mapping instruments to specific Roles or Competencies led to disagreement. The overall intraclass correlations (ICCs) for CanMEDS and ACGME frameworks were 0.68 and 0.44, respectively. Some ACGME domains had low ICC: Patient Care (ICC = 0.27), Teaching (Practice-Based Learning and Improvement; ICC = 0.26), and Professionalism (ICC = 0.21). Using a modified Angoff method, we identified expected levels of achievement for the instruments. Postreview, the majority of instruments remained at their original levels of achievement (93%). Additionally, nearly half (46%) of those instruments were deemed useful at other levels.

Conclusions: We present a novel method to establish content validity for an assessment program that incorporates a large number of instruments. Our findings suggest that physicians are consistent in sorting clinical assessment instruments to expected levels of achievement but have difficulty mapping assessment instruments to the CanMEDs or ACGME frameworks with consistency. Our findings may inform areas for faculty development.

The role of continuity in developing competency and physician identity

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Background/Objectives: It is suggested that continuity in clinical learning fosters the progressive development of physicians-in-training. We explored the quality and impact of continuity in 3 different family medicine residency training sites.

Methods: Using a multiple case study approach we gathered data to compare and contrast different elements contributing to continuity. Focus groups with graduating residents provided data on the quality of learning experiences.

Results: The 3 sites differed with respect to their ability to implement continuity as a key feature of resident learning experiences. For example, in 1 program learning from specialists was fully integrated into the daily participation of residents in a family medicine practice. These residents described themselves as always being "on service" with respect to their area of practice. At another site, however, block rotations tended to be used for specialty learning. Indeed, residents described this as going "off service." These differing experiences of continuity appeared to be associated with residents' descriptions of their "readiness to practice." Those fully immersed in practice described themselves as "having a plan in place" and seeing the time after graduation simply as an extension of their current practice. Residents experiencing less continuity, however, described still being "a resident in my eyes" and still "practicing in the model of their preceptors." All residents, however, understood the importance of continuity with respect to developing their identity as family practitioners. As stated by 1 resident, "Continuity is probably the most important thing to have that identity developing for feeling like a family doctor."

Conclusions: Continuity appears to equip residents with the skills required to transition into practice. Further research is required to elucidate the specific learning experiences that facilitate this transition and contribute to identity formation.

Making competencies make sense for workplace-based assessment: The Sentinel Habits

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Background/Objectives: In the current climate of competency-based assessment, much work has been done in defining competency frameworks variously as roles (CanMEDS) and areas of competence (Accreditation Council for Graduate Medical Education and ABMS). Within these frameworks, competencies as a physician are further detailed or described. The language of these competencies remains abstract, particularly for direct observation in the workplace. While frameworks such as CanMEDS are very useful for curriculum design and as references to guide resident learning, clinical teachers and residents find it difficult to use the language of CanMEDS naturally in the workplace.

Methods: Using a modified Delphi method, we asked an expert panel (n = 7) to describe competent residents and physicians in natural terms. The threshold for consensus was set at 85%. The panel generated 8 key (or Sentinel) habits of a successful physician, stated in everyday language. At 2 subsequent faculty development sessions (n = 11 and n = 7), we repeated the exercise and compared the results to the Sentinel Habits generated by the expert panel.

Results: The 8 central Sentinel Habits generated by the expert panel were duplicated at each session, with closely approximate language. The Sentinel Habits were triangulated with the CanMEDS roles, resulting in everyday language to describe the competencies that each resident needed to demonstrate repeatedly (habitually) during residency training (for example, the Sentinel Habit of "Demonstrates respect and/or responsibility" aligns with the CanMEDS role of Professionalism). Survey evaluation of the Sentinel Habits in residency training shows that residents and clinicians find the Sentinel Habits to be useful for assessment, and a useful organizational framework for describing what is seen in the workplace.

Conclusions: Sentinel Habits offers a "missing link" between the language of competency frameworks and the reality of workplace-based assessment.

Exploring Clinician Investigator Program educational benchmarks: Competency is as competency does

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Background/Objectives: The University of Manitoba is establishing a Royal College (RCPSC) Clinician Investigator Program (CIP). CIP trainees are residents in either graduate degree or postdoctoral fellowship streams enrolled in various training pathways (continuous, distributed curriculum, fractionated) across all health research themes (biomedical, clinical, health services, population health, medical education, and medical ethics). As Canadian postgraduate medical education progresses to competency-based educational assessment, CIP residencies must examine educational benchmarks for new clinician scientists.

Methods: Canadian CIP statements of goals and objectives and in-training evaluation report (ITER) documents were analyzed for behaviorally based competencies, benchmarks, and milestones using evaluative inquiry and situational assessment theories.

Results: Documents were available for 5 of 13 accredited programs. Preliminary findings include (1) variability in mapping objectives to CanMEDS roles and (2) lack of differentiation of goals, objectives, and benchmarks for the different program streams, pathways, and research themes.

Conclusions: Based on existing goals and objectives and ITER documents, significant development work is required for CIP residencies to create and define competency-based outcomes with corresponding benchmarks and milestones. Appropriate, clearly defined benchmarks for each stream, pathway, and theme must be considered.

The impact of varying levels of implementation fidelity on resident perceptions of an assessment innovation

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Background/Objectives: Medical education researchers regularly develop excellent, evidence-based innovations. Often, these innovations are implemented, yet fail. In our program, we witnessed varying levels of success with an assessment innovation. In this study we explored the reasons for varying levels of success with an innovation that was solidly grounded in evidence and theory.

Methods: A multiple methods design was used. Using a grounded theory approach, we conducted focus groups with family medicine residents. Thirty-two first-year and second-year residents across 5 different teaching sites responded to a set of semi-structured questions. An "implementation fidelity" (the degree to which the innovation in action resembles the innovation in theory) inventory was also conducted, with data collected through quantitative analysis of use of the innovation at individual teaching sites.

Results: Many residents who participated in our focus groups perceived substantial problems with the assessment innovation, which stem predominantly from (1) technical issues with the web-based portfolio and (2) varying levels of preceptor involvement. In some instances, where preceptors sounded highly involved, residents voiced satisfaction with the innovation. Value was seen for learning and for guided self-assessment in sites where implementation fidelity was highest. Sites where champions of the innovation could be identified showed highest implementation fidelity and highest degree of resident perception of learning benefits from the innovation. Frustration with technical clumsiness of the web-based interface was seen for all sites.

Conclusions: The results demonstrate the need for active preceptor involvement in any medical education innovation in order for the innovation to be effective. Learner-driven innovations will falter when preceptors do not take an active role in effective practice of innovations. Implementation fidelity was a constant factor in the success of the innovation.

Looking back to plan for the future: Role of baseline surveys in residency programs

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Background: Understanding what learning experiences students have had prior to residency is important for competency-based curriculum planners. To be successful, having a baseline understanding of the specialty will enable learners to attain expected outcomes.

Objectives: In 2012, a pilot study for entry level family medicine residents was conducted gaining understanding of their attitudes about the discipline, their exposure to the discipline while in medical school, and their intentions to practice domains of family medicine in future.

Methods: The first of a 3-part longitudinal survey was administered to 6 family medicine departments across the country.

Results: Seventy percent response rate (317 learners). Respondents included graduates from every medical school in Canada. The residency programs, including 1 Francophone, distributed model with rural sites, a large city program, and a couple mid-sized. Of the respondents, 58% agreed/strongly agreed that they had extensive exposure to family medicine in medical school; 50% had no exposure/ limited exposure to palliative care; 10% had no exposure/minimal exposure to chronic disease management; and 24% had no exposure/limited exposure to office-based procedures.

Conclusions: Ensuring better transitions from undergraduate education to postgraduate education has been identified as a key FMEC-PG Project recommendation. It is important for undergraduate and postgraduate education leaders to look toward what is being taught in medical school in order to discern ways to enhance readiness for postgraduate education. This requires all specialties to look at the exposure being provided to medical students in key content domains forging a dialog with medical schools about how to ensure key content is taught and indeed competencies have been attained.

Introducing the Canadian Pediatric Program Directors Research Group: A pediatric postgraduate medical education research collaboration

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Background/Objectives: Seventeen Canadian pediatrics residency programs train a total of 624 residents. During program director meetings it was recognized that several are interested or involved in medical education research, but pursuing scholarly work in silos.

Methods: The Canadian Pediatric Program Directors Research Group (CPPD-RG) was formed in January 2012 with a mission to create, stimulate, and support a community of practice dedicated to advancing research in pediatrics postgraduate medical education (PGME) in Canada.

Intervention: Objectives include (1) the development, promotion, and collaboration regarding educational innovations and research across Canadian pediatrics residency programs; (2) facilitation of resident and faculty participation, as both subjects and authors, in pediatrics PGME research; and (3) development and mentorship of academic careers in medical education in pediatrics. Meetings occur twice yearly with additional communication via website and list serve. CPPD-RG members are invited to present protocols in person to the group. Ad-hoc members are visitors invited by the group to present protocols which may benefit from national pediatric collaboration. CPPD-RG endorsement represents a commitment of this group to provide feedback, mentorship, and collaboration, and to ensure study completion. Combined resident and faculty involvement in projects is strongly encouraged except where examinations are being studied.

Conclusions: Since inception, 3 sponsored (CPPD member-developed) and 6 supported (endorsed nonmember) national projects are in progress, and have generated 7 grant proposals and 3 abstracts to date. There were requests to present 3 new proposals for the June 2013 meeting. This group is expected to prove an effective collaboration to advance the field of pediatric PGME research for both faculty and residents.

The “99 Week” study: Proposal for a cluster randomized controlled trial of an intervention to improve resident performance on the Family Medicine Certification Examination

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Background: Research suggests that spaced online education can improve learning outcomes, such as knowledge acquisition and retention in medical students and residents. However, a strategy of spaced online education has not been tested in the family medicine residency. Prior work has identified 773 key features of 99 priority topics useful to define competence for the purpose of certification by the College of Family Physicians of Canada.

Objectives: To determine the effect of delivering summarized clinical information linked to the key features of 99 priority topics as weekly e-mail, on resident scores on the Certification Examination.

Methods: Quantitative phase: 2-arm, cluster-randomized controlled trial. Qualitative phase: multiple case study focusing on resident participation at 2 universities where participation was lowest and highest (extreme case analysis). Participants are Canadian family medicine residents.

Summarized clinical information from quality knowledge resources will be delivered in a weekly e-mail over 99 weeks, using the key features of each priority topic to address 1 topic each week. To stimulate reflective learning, residents will rate the information within each e-mail using a brief, content-validated questionnaire (the Information Assessment Method). Comparison: weekly e-mail containing the key features of each priority topic, without the summarized clinical information.

Anticipated results: Five percent or greater increase in mean examination score on the short answer management problems section of the Certification Examination.

Conclusions: Spaced online education will improve examination scores by optimizing the volume of clinical information to be absorbed, given the time available to absorb it. This strategy of structured self-learning will augment traditional approaches for examination preparation in residency education.

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Clarity in critical moments: Audio-recorded resuscitation performance

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Background: Methods to improve technical and nontechnical aspects of the performance of resuscitation teams are expensive. Resuscitation technical performance is poor and translation of simulation efforts to improved patient outcomes limited. Quality improvement is predicated on comparisons reliant upon on accurate record keeping. Limitations of the written resuscitation record have led to alternative recording methods such as video recording. Video recording is expensive and may invoke privacy concerns.

Objectives: We evaluated the use of audio recording for acute resuscitation events in a pediatric intensive care unit (PICU).

Methods: With Hospital Ethics Board approval and informed consent from parents and staff, 2 researchers present in the PICU-recorded acute resuscitation events activated by the bedside emergency alarm. Dialogue was transcribed and analyzed for medical content and proficiency, pharmacotherapy, and event documentation. Reasons for nonparticipation by parents were explored.

Results: We recorded 4 clinical events and 1 mock code in a period of 363 hours. The medical treatment was proficient in all events. Pharmacotherapy, communication, and reasons for parental nonparticipation are discussed. Descriptions of medication ordering and delivery were often incomplete. Audio recording provided additional data regarding nontechnical factors unavailable on the written resuscitation record.

Conclusions: Audio recording provides reliable data but is labor intensive. It offers superior information regarding the communication aspects of resuscitation events. Alternative strategies to increase recording opportunities and provide superior event documentation are discussed.

Walking the talk: The utility of a multi-source feedback tool in postgraduate medical education

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Background: Residency program directors (RPDs) get little formal feedback on their leadership. This research evaluates the feasibility and utility of a competency-based multi-source feedback (MSF) instrument and process in providing postgraduate RPDs with comprehensive and constructive feedback on their leadership. The MSF instrument is based on a review of competency inventories and an iterative process involving national and local input.

Methods: One hundred six RPDs were invited to participate and provide contact information for 10 to 20 colleagues (eg, administrators, faculty, residency committee members, chairs, deans) to be invited to provide feedback on their performance. RPDs also completed a self-assessment. The identified participants (IPs) received an e-mail invitation and following their consent, they completed the online MSF instrument.

Results: Seventeen (16%) of University of Toronto program directors identified a total of 389 potential IPs (mean 22 per program director). One hundred sixty-six IPs completed the MSF, with a mean of 9 (response rate 43%) per RPD. In most cases, program director self-ratings were lower than the mean of IP ratings on the 5 key performance domains (ie, Communication and Relationship Management, Leadership, Professionalism and Self-Management, Environmental Engagement, and Management Skills and Knowledge).

Conclusions: The combination of program directors' views of their own performance and the feedback received served as useful tools for feedback on their leadership performance. The interest in participation in this pilot testing was high and the feasibility and utility of the tool was challenged by response rates of assessors. Our findings indicate that formal feedback is welcome, is feasible to collect and share, and can support medical education leaders and provide direction on how to improve practices.

Does teaching make you a better physician?

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Background: Teachers often state “teaching makes them better clinicians.” There is little evidence to support that claim.

Objectives: To examine whether physician and surgeon involvement in teaching activities is associated with higher levels of clinical performance.

Methods: Performance data from a multi-source feedback (MSF) dataset from medical colleagues, coworkers, and patients for medical specialists (eg, internal medicine, pediatrics, and psychiatry, and their subspecialties), and surgeons were examined in relation to information about physician teaching activities including time spent teaching in patient care and in the classroom and academic appointment information. We examined between-group differences employing multivariate analysis of variance (1- and 2-way MANOVAs) with MSF total instrument mean and MSF instrument subscale mean performance scores, and teaching and appointment data.

Results: Data from 1510 medical specialists and 542 surgeons were available for analysis. Higher clinical performance scores were associated with having an academic appointment, and with more time spent teaching in patient care and in the classroom. This was particularly evident for medicine compared with surgery. It was evident for the data provided by medical colleagues and coworkers but not for patients.

Conclusions: This study provides evidence of the association between involvement in teaching activities and higher levels of clinical performance. These results may support revalidation decisions that award study credit for teaching and enable Faculties of Medicine to highlight the importance of teaching to potential recruits and the maintenance of a clinical practice by teachers. It is not clear whether teachers are better clinicians because they teach or whether they chose to teach because they are better clinicians.

“Toward a Common Understanding”: Advancing education scholarship for clinical faculty

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Background/Objectives: Recognition of education scholarship (ES) is required to appropriately transform medical education. The authors explored how Canadian medical schools characterize and support clinicians involved in ES.

Methods: We used an interpretive approach to policy analysis by examining how ES is represented in the promotion policies of 17 Canadian medical schools, through interviews with a key informant at each institution, and a think tank discussion directed by the preliminary analysis of the promotion policies.

Results: All 17 schools indicated that achievements in ES are recognized and counted as part of academic promotion. Only 9 of the promotion documents contain specific reference to ES and there was a wide variation both in focus and level of detail. Barriers included a lack of understanding of what ES is and how it relates to activities such as teaching and leadership. This was manifest in the variability in promotion policies and processes, faculty support systems, and career planning and pathways for education scholarship. Six strategies were identified to advance ES for clinical faculty: creating a national understanding of ES as research and innovation that is peer-reviewed, publicly disseminated and provides a platform for others; developing institutional guidelines to assess the impact of newer forms of ES; developing support systems for an informed leadership and a system of mentors; and creating explicit role descriptions and guides for clinical faculty.

Conclusions: A common understanding of ES is critical to advancing promotion policies and gaining a buy-in from clinical faculty to transform medical education.

Leading educationally effective family-centered bedside ward rounds: It's all about the manager!

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Background/Objectives: Family-centered bedside ward rounds (FCBWR) is the most common rounding format in North American pediatrics hospitals. But without an understanding of potentials, limitations, and strategies to maximize teaching and learning, learners run the risk of being led room to room with little participation, minimal educational value, and poor efficiency. The purpose of this study was to describe the dimensions of family-centered bedside ward rounds within the Canadian CanMEDS context and to develop recommendations for effective teaching and learning.

Methods: In this grounded theory qualitative study, data were collected from focus group meetings of pediatrics residents at the University of Calgary and attending pediatricians on the clinical teaching unit at Alberta Children's Hospital. Data were analyzed using grounded theory methodology.

Results: Rounds were described along a spectrum from successful and highly educational to unsuccessful and of low educational value. Dimensions that impact the rounds experience are the environment (physical, family-centered and team factors); the education that takes place in this environment; and the multiple competing priorities that must be addressed. Strategies for success include planning the teaching and learning experience, collaborating with families, and handling the logistics of patients, learners, and the environment. Maximizing predictability and minimizing vulnerability experienced by team members were key components in creating an educationally effective experience. The ability to create this type of experience was dependent on the "effectiveness of the manager" which is the core variable.

Conclusions: The CanMEDS Manager Role is central to the experience of FCBWR. This is an ideal environment for the teaching and evaluation of this competency. The importance of the Manager Role needs to be made explicit for trainees and attending staff.

Retention of competencies after taking part in an accredited mentoring training scheme

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Background/Objectives: A 4-day accredited module ("Mentoring in Healthcare Organisations") using the Egan Skilled Helper model was established in order to train mentors for residents and their clinical and educational supervisors whereby both clinicians and nonclinicians would provide support to those involved in postgraduate medical education.

Methods: A total of 75 former participants were surveyed electronically several months after they completed the module and invited to take part in a semi-structured interview. The survey investigated the competencies acquired and retained/practiced and in what ways those who were mentored had benefited from the module.

Results: Preliminary results suggest that motivations for doing the course were diverse (having an interest, enhance competencies as appraisers, and a desire for a formal qualification), but that the written assignments required for accreditation were perceived as the least worthwhile part of the module. The level of retention of competencies was high insofar as more than three-quarters had the opportunity to practice, with just under half on residents and just over half on their colleagues. Mentors felt that they and those who had benefited from their newly acquired competencies had better self-knowledge, saw things more clearly, understood better how they impacted on others, had a better understanding of the importance of looking at problems in their context, and of eliciting both short- and long-term goals.

Conclusions: The majority of those who attended the module had the opportunity to practice their newly acquired competencies which were perceived to have been retained and successfully transferred to the workplace.

Assessing barriers to resident-conducted bedside teaching

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Background: Medical trainees consistently indicate that bedside teaching (BST) is the most effective means of learning clinical skills. Despite this preference, there has been a recent shift away from BST, toward didactic teaching in the classroom. This has resulted in lost opportunities for junior learners to practice and receive feedback on physical examination abilities, communication skills, and professionalism. The causes of the decline in BST are unknown.

Objectives: Our study objective was to determine deterrents and barriers to BST from the perspective of internal medicine (IM) residents at McMaster University.

Methods: A literature review of BST and resident teaching barriers was undertaken. We performed theme analysis and composed a qualitative and quantitative survey using key identified domains as the framework. The survey was subsequently vetted by medical education experts and resident opinion leaders. Quantitative questions were scored on a 5-point Likert scale. We distributed surveys to IM residents to elicit self-perceived barriers to BST.

Results: We received responses from 41 postgraduate year (PGY)-1 to PGY-3 residents (response rate = 47%). Seventy-three percent of respondents indicated that they had not received formal training in BST. The majority of residents (66%) viewed insufficient time to be a barrier to BST. While 41% of respondents felt more comfortable teaching in a conference room setting than at the bedside, only 22% of residents felt they lacked the teaching or clinical skills, knowledge or experience to be effective bedside educators. Full survey data will be presented regarding the remaining self-reported perceived BST barriers.

Conclusions: Residents perceive multiple barriers to BST. Survey data can be used to implement environmental changes and targeted educational sessions to overcome the identified barriers to BST with an overarching goal of increasing the quality and quantity of teaching at the bedside.

Can interprofessional workshop design work for clinical trainers?

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Background: Royal College of Physicians Ireland (RCPI) is the largest postgraduate training body in Ireland, with 735 trainers and 25 different specialties and 1200 trainees. Trainers are clinical specialists who have limited knowledge of educational concepts. Role of trainer has increasing responsibility including 2010 introduction of WBA with fewer resources.

Objectives: We studied the use of evidence-based educational theory designed and delivered by clinician-educators and educationalists, as a practical workshop to enhance the teaching skills of trainers.

Methods: A workshop was created by interprofessional clinical educators that included evidence-based presentation of basic educational theory, group discussion, simulated recorded scenarios, case-based discussion, and participation in assessment simulation. A pre- and postquestionnaire on knowledge and abilities was performed. Paired sample *t* test was performed.

Results: A total of 72 trainers participated in a total of 8 workshops thus far. Ninety-three percent said course is relevant to role. One hundred percent could apply learning from course. Free-text comments included: "Should be mandatory for all consultants dealing with juniors." Postquestionnaire demonstrated improved knowledge regarding setting training goals, using internal and external resources to facilitate training and learning, and knowing difference between trainer, mentor, and assessor ($P < .05$). There was also increased confidence in providing feedback, and performing DOPS and mini-CEX ($P < .05$)

Conclusions: Utilizing interprofessional skillsets can potentiate teaching and assessment skills for clinical trainers.

Case review and supervision on the clinical teaching unit: Time to be more explicit

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Background/Objectives: On internal medicine clinical teaching units (CTUs), admission case reviews play an important role in both teaching and patient care. Prior studies have explored teaching strategies for case reviews, but none have considered how attending physicians shape their supervisory role to optimize teaching and patient care simultaneously. The purpose of this study was to explore how attending physicians approach admission case reviews and the supervision of residents in order to respond to the challenges of shifting team membership and patient complexity.

Methods: A constructivist grounded theory approach was used to iteratively collect and analyze the data. Data was collected through 4 focus groups and 18 individual interviews with 24 attending physicians at 2 academic hospitals.

Results: Analysis revealed that attending physicians have strategies for balancing teaching and patient care, but these vary widely from one attending to the next and are largely hidden from the rest of the team. Often strategies required a supervisory role that is omniscient and ever-present, an unrealistic expectation in the complex environment of CTUs. Attendings indicated that they rarely articulate their expectations about team roles during and following review, thus increasing the chances of residents not following up on patient care issues. Few attending physicians had strategies for supporting the team to formally document changes in thinking arising from review. Acknowledging the problem of follow-up, attending physicians described needing to keep personal notes in order to keep track of their patients; the content of these were rarely shared with the team.

Conclusions: This study is a first step in initiating a dialogue and a research agenda regarding how attending physicians can optimize teaching and patient care. Given the wide variation in assumptions associated with individual attending physicians' strategies for conducting admission case reviews and documentation, attending physicians may want to consider making these more explicit for their teams.

The career paths of Canadian pediatrics residency graduates, 2004–2010

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Background: Canadian pediatrics residents can pursue a career in general or subspecialty pediatrics. Graduates can work in community-based settings, hospital-based settings, or a combination thereof. Furthermore, new graduates may work in large urban or rural/remote centers. To date, there has been no study profiling the career paths of Canadian pediatrics residents.

Objectives: To profile the career paths of recent pediatrics residency program graduates in Canada.

Methods: A survey of all pediatrics residency program directors (or designates) was completed in 2010 and updated in 2011. All residency programs in Canada participated. Residents were reported by their core training program (at completion of their postgraduate year 3). Only Visa trainees were excluded.

Results: A total of 699 residents completed their core training in pediatrics in Canada between 2004 and 2010. The annual number of pediatrics residents who completed their core training rose from 83 in 2004 to 122 in 2010. Current practice type was available for 663 residents (95%). Overall, 406 residents (61%) were working as subspecialists or still in training while 243 (37%) were working as general pediatricians. Among the 203 graduates working as subspecialists, 85% were working in tertiary/quaternary centers. Of the 242 graduates working as general pediatricians, 165 (68%) were community-based while 77 (32%) were hospital-based in tertiary/quaternary centers. Of all residents who completed their core training of pediatrics during the study period, only 37 (5%) were currently working in rural/remote or underserved areas.

Conclusions: Approximately 60% of all Canadian pediatrics residents pursue subspecialty careers. Few graduates are practicing in rural/remote or underserved cities. There appears to be a trend toward more subspecialty career paths among residents over the last 3 to 4 years.

Resident-driven QI initiative targeting reduction of emergency department decision to admit time

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Background/Objectives: A delay in emergency department (ED) assessment and disposition decision may lead to increased wait times, length of hospital stay, health care cost, and mortality. Our resident-driven initiative targeted reduction in the “decision to admit” (DTA) time of patients being assessed for admission to internal medicine (IM) at 3 tertiary care teaching hospitals.

Methods: A standardized admission protocol was developed through a consensus process among a focus group of senior IM residents responsible for making admission decisions, and was vetted by both chief medicine residents and medicine division heads. DTA time statistics were tracked over a 6-month period following implementation of the intervention. Residents identified potential barriers to timely DTA. A regular electronic newsletter summarized DTA time trends and reinforced the admission protocol. All data were extracted in aggregate form from a regional health authority database.

Results: There was an overall decline in DTA times for Medical Teaching Unit (MTU) admissions with our intervention. Over the 6-month intervention period, the DTA times at each of our 3 sites decreased from 3.8, 4.0, and 3.5 hours to 2.9, 3.1, and 3.1 hours, respectively. This trend persisted when adjusted for both junior learner numbers and admission volume. Cost effectiveness analysis using a case mix group model yielded an approximate health care cost savings of \$48.42 per admission at site 1, \$43.29 at site 2, and \$21.19 at site 3. Reported barriers to admission included unclear patient disposition, unstable patient status, and high consult volume.

Conclusions: We have shown that this resident-driven QI initiative has been effective in reducing the MTU DTA times in 3 teaching hospitals, and was cost saving to the health care system. Identified barriers to admission may help further inform DTA time targets.

The perception of mentorship by internal medicine residents differs based on anticipated career path

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Background: Delivering and receiving mentorship are key components in the development of a medical career. Benefits to the mentee have been reported in career and research productivity, job satisfaction, career preparation, and psychosocial well-being. However, only 50% to 60% of young physicians have mentors. Males, proactive individuals, those who prioritize professional concerns over personal commitments, and trainees who have a chosen career path are more likely to have mentors. The majority of mentorship programs have lacked measurable objectives. Whether differences lie in the delivery or reception of mentorship of residents interested in different career paths (clinical or academic) remains unknown.

Objectives: This study aims to identify baseline characteristics of internal medicine residents entering into a formal mentorship program in order to inform effective mentoring efforts.

Methods: Academic achievements, professional achievements, and personal development and wellness were measured quantitatively through electronic surveys. Twenty-eight staff and 90 resident physicians were surveyed with response rates of 79% and 61%, respectively.

Results: We found that residents with an interest in academia were more likely to have a high degree of interest in being a mentor, believe that mentorship is a useful tool, and demonstrated effective commitment: $r(55) = 0.389$, $P = .003$, $R^2 = .151$; $r(55) = 0.438$, $P = .001$, $R^2 = 0.192$; $r(55) = 0.318$, $P = .02$, $R^2 = 0.101$. In comparison, those interested in clinical work were more certain they could accomplish their goals: $r(55) = 0.328$, $P = .02$, $R^2 = 0.108$.

Conclusions: These data demonstrate that residents interested in different career paths may not only view mentorship as having varying importance, but also show varying degrees of self-efficacy and effective commitment. Further research is needed to clarify whether mentorship targeted toward clinical- or academic-oriented trainees would be more effective than general mentorship efforts.

Influences on career choice: What factors influence the career choice of medical students?

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Background/Objectives: Over the past decade, the top career choices of Canadian medical graduates (CMG) have been in family medicine, surgery, and internal medicine. The purpose of this study is to uncover what factors influenced graduates' career choices.

Methods: This longitudinal study uses data from CaRMS Post-Match Survey of Canadian Medical Graduates. The goal of the survey is to address issues concerning medical graduates. The survey focuses on the following issues: postgraduate training and career plans, factors that influence their decision to train and practice in a particular discipline and location, and socio-demographic characteristics. This study looks at factors that influence career plans.

Results: Differences in interest and career choice have been found between family medicine, surgery, and internal medicine. From 2003–2012, interest in family medicine increased (9% increase) while interest in surgery decreased (4% decrease), and little change was found in interest for internal medicine (0.2% decrease). Differences in factors that influence career decisions have also been found between specialties. In choosing their career, teaching opportunities were important for CMGs interested in internal medicine (81% of CMGs interested in internal medicine considered teaching opportunities important), compared to CMGs interested in surgery (74%) or family medicine (59%). On the other hand, work-life balance was an important consideration in choosing a career for CMGs going into family medicine (72%) compared to internal medicine (57%) and surgery (47%). Other factors were also explored.

Conclusions: The goal of this study is to look at differences in how medical graduates make their career choices. Graduate discipline choice is an important determinant of the distribution of specialties and associated training locations across the country. Understanding the characteristics associated with career choice can assist residency institutions in determining the characteristics, motivations, and needs of residency applicants.

Examining the relationship between clinical efficiency and education in the departments of Ophthalmology and General Internal Medicine

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Background: Efficiency is a critical target for health policy, and serves as a main determinant of high-quality care. However, striving for efficiency may affect trainees' educational experiences.

Objectives: To investigate health care providers' (HCPs) experiences in managing the dual responsibilities of achieving clinical efficiency and meeting medical residents' educational needs in ophthalmology and general internal medicine (GIM).

Methods: An interview series was conducted with 25 key informants (residents, medical/allied health staff, clinical/educational administrators) in Ophthalmology at Kensington Eye Institute (n = 10) and in GIM at Toronto Western Hospital (n = 15) in Toronto, Canada. We identified key informants through purposive sampling. Interviews were recorded, collated, and themes extracted using grounded theory.

Results: Main themes were consistent across both specialties, and included efficiency is emphasized at institutions where residents work and learn, and a focus on efficiency detracts from educational opportunity. Conflicting goals between the university and health care institution, misaligned expectations between residents and staff, ambiguous accountability, and intangible teaching incentives can offset the balance in favor of efficiency. Furthermore, the focus on efficiency has a greater negative impact on early learners and surgical learners. Future directions that may help achieve greater balance include: introducing greater university presence in operations planning at health care institutions; reiterating to all HCPs the dual responsibility of residents to provide service and learn; creating educational metrics as a way of ensuring accountability; and fostering greater recognition of good teachers.

Conclusions: A current overemphasis on clinical efficiency detracts from educational opportunity. Increased collaboration between appropriate stakeholders and efforts to reprioritize educational needs can help achieve an optimal balance.

E-health outcomes in medical curricula: Recommendations to ensure educators and learners can adapt quickly to major changes in clinical practice catalyzed by e-health technology

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Background: The volume of medical knowledge is increasing exponentially. A Canada Health Infoway study in 2011 found that electronic medical record-based practices were superior in their ability to identify subgroups within a practice population who needed special attention (eg, for drug recalls), when compared to paper-based practices. E-health solutions are uniquely positioned to help physicians synthesize this knowledge with large amounts of patient data, and may be critical in helping physicians fulfill competencies 2.4 "Employ information technology appropriately for patient care" and 4.2 "Lead or implement a change in health care" in the CanMeds Manager role. Currently, however, national outcomes and competencies do not exist for e-health training in medical curriculum.

Objectives: As part of the Clinicians-in-Training program, Infoway and the Association of Faculties of Medicine of Canada (AFMC) partnered on the Physicians-in-Training initiative to investigate this gap, and enhance the integration of e-health into the medical curriculum.

Methods: We conducted an environmental scan involving more than 120 resources was undertaken to ascertain how e-health is represented within undergraduate medical curricula, and how it is integrated into existing curricular structures.

Results: The environmental scan identified: a) the absence of a common language across medical faculties with respect to e-health; b) underdeveloped faculty resources to support e-health; c) that less than 1 quarter of survey respondents agree that students in their programs are being prepared for practice in a technology-driven environment.

Conclusions: This work has provided the impetus for recommendations for improving e-health instruction and integration into medical curriculum, as well as working toward incorporating e-health outcomes and competencies into the national medical education consciousness.

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A night-float curriculum in practice-based learning and improvement and systems-based practice

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Background: Limitation of postgraduate year (PGY)-1 work hours required the implementation of a night-float (NF) rotation for PGY-1 residents in our obstetrics and gynecology residency. Although NF rotations are now common, there are relatively few descriptions of NF-specific curricula.

Objectives: To create a meaningful learning experience in practice-based learning and improvement (PBLI) and SBP that could span NF rotations over PGY-1.

Intervention: PGY-1 residents complete 3 months of NF. The NF curriculum includes 3 major elements: evidence-based medicine (EBM), personal improvement project (PIP), and clinical microsystem knowledge. During the first NF month, senior residents provide the NF resident with a question of interest to the outpatient obstetric team. The NF resident performs a literature review and presents the evidence after the NF month is concluded. In the second NF month, PGY-1 residents develop an aim and measures for a PIP. Processes are mapped and Plan-Do-Study-Act cycles completed between the end of the second NF month and the beginning of the third. Residents submit a brief report on their efforts. In the third NF month, PGY-1s sequentially develop knowledge of the 5Ps (Purpose, Professionals, Patients, Processes, and Patterns) of a clinical microsystem, and then share that with the unit and peers. Evaluation includes pre- and post-QIKAT scores, assessment of the PIP, and feedback on the 5Ps report.

Results: Residents developed skills in EBM, process analysis, and improvement, and became familiar with a frame for understanding clinical microsystems. These activities form the foundation for subsequent work to improve care of their patients.

The McMaster Internal Medicine “CHANGED” model for implementation of reduced resident working hours

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Background/Objectives: The Internal Medicine (IM) Residency Program at McMaster University implemented reduced working hours in the form of a night-float (NF) model for senior medical resident (SMR) call in July 2013. The process undertaken to develop and adopt this model can be summarized with the acronym CHANGED: Catalyst, Historical perspective, Assessment of barriers, Network development, Generating a model, Education and feedback, and Dissemination. We present data from a survey of McMaster IM residents before and after education regarding our proposed NF model.

Intervention: The catalyst for change may be residents, faculty, mandated change, or new initiatives presented at academic forums. Programs must then assess barriers to implementation of change. A surprising barrier was resident perception of NF: our survey demonstrated that despite 77% of IM residents feeling unsafe during or after a 24-hour call shift, only 56% of residents were initially supportive of a NF model.

Recommendations: Network development should involve residents, program directors, administrators, and faculty representatives. Generating a model should address historical perspectives, barriers, system capacity, a feedback mechanism, and an implementation map. Educating residents and faculty and modifying the model based on feedback is crucial. After multiple resident meetings (Dissemination), a follow-up survey demonstrated improved resident understanding of NF and increased resident support of NF implementation from 56% to 80%. With change, there is hesitation. Our postsurvey showed residents have concerns about reduced procedural competence (45% of residents surveyed) and increased handover errors (56%) with NF implementation.

Conclusions: The CHANGED model provides an adaptable approach to the implementation of a NF model in a residency program.

Canadian international medical graduates: The journey back home

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Background/Objectives: Immigrant international medical graduates (IMGs) come to Canada with non-Canadian medical degrees. Canadian-IMGs (CIMGs) are Canadians who go abroad for medical school. These groups may have different needs. One year ago we presented a study of barriers/enablers to integrate immigrant IMGs into residency training. Given the increasing number of CIMGs at our institution, we did a follow-up study to see if CIMGs perceive their needs similarly.

Methods: We performed a needs assessment using semi-structured interviews with 11 CIMG residents in 3 programs at a large Canadian university. We sampled to theoretical saturation. We analyzed transcribed data iteratively looking for themes related to barriers/enablers to CIMG integration and potential interventions. Researchers with different perspectives discussed emergent themes and compared them with data from immigrant IMGs.

Results: Participants identified key differences between the medical culture and knowledge expected in Canada from those in the health systems and curricula in which they were trained. They perceived themselves as treated differently from other residents because of negative labeling as IMGs. The complex process of entering residency was a consistent issue. CIMGs reported a clear disorientation phase during initial months of residency despite comfort in general Canadian culture; they felt the mandatory orientation programs for IMGs focused on immigrant IMGs and didn't address their needs. Most participants noted the importance of mentors for successful transitions and integration.

Conclusions: CIMGs face unique challenges during their training. We recently designed curricular innovations and supports to meet the needs of immigrant IMGs at our institution; we now plan to create structures to meet the unique needs of CIMGs.

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Training in guideline implementation: A CanMEDS perspective

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Background: The CanMEDs initiative has identified the roles of a physician (medical expert, communicator, collaborator, scholar, manager, advocate, and professional) and defined each competency. Studies in guideline implementation have shown skills beyond awareness of the guidelines are important to their application in clinical practice. Resident training strategies that address all roles facilitate this process.

Objectives: To determine whether knowledge of guidelines translates to implementation in practice.

Methods: Surveys and focus groups were conducted with primary care physicians and specialists related to vascular guideline implementation.

Results: Study of practicing physicians revealed that even when knowledge of a guideline (expert) was present only 20% to 42% followed the guideline in practice. As such, training in guideline implementation requires more than a "knowledge translation" model. Understanding of the validity of the guideline and its application to practice (scholar) played a role in the practice and care gaps in 40%. Available resources and clinical demands (manager) impacted on this in 25%. Specific ethical issues, such as self-referral, societal responsibilities, and individual patient's access and freedoms (professional) were noted in 40%. The attitudes of other care providers and how best to address this in practice (communicator, collaborator) also contributed to the care gap.

Conclusions: Skills beyond knowledge of guidelines are required to increase clinical uptake of care guidelines. These skills can be taught during training by using formal presentation of specific guidelines in the training milieu with discussion of case examples specifically related to each role and skill set.

Physician workforce policy in Quebec: Specialist employment issues and their impact on trainees: Results of a province-wide survey

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Background/Objectives: The physician workforce in Quebec is regulated by a government-controlled plan. In this context, many medical specialty trainees expressed concerns about securing a position. No study has addressed the impact of this policy on residents. Our objective was to assess physicians' employment issues in Quebec and their impact on residents training in specialty programs.

Methods: We distributed a web-based self-administrated survey to all Quebec residents training in Royal College programs to capture data about residents' ability to find employment, future career intentions, and perceptions regarding the workforce policy. The following groups were considered: senior residents, which include graduates in their last year of training and nongraduating senior residents, and junior residents.

Results: The overall response rate was 42% (985 of 2372). Forty-seven percent (95% CI 40.5–54.1) of graduates did not have a position 2 months before finishing their training. Among senior residents without a position, graduates are most likely to leave Quebec (27% [18.0–36.2] versus 16% [11.8–20.8]; $P = .02$) or to complete a fellowship to postpone their entry into practice (20% [11.5–27.7] versus 10% [6.3–13.5]; $P < .01$) than nongraduates. Overall, 78% (95% CI 75.1–80.7) of respondents believed there are not enough job opportunities for the number of trainees.

Conclusions: Residents training in specialty programs in Quebec experience significant difficulties obtaining a position in the province and perceive there are not enough job opportunities, which impacts their career intentions and drives them to complete a fellowship or plan to practice outside the province. A current review of the physician workforce management policy in Quebec appears warranted.

Surgical residents' and professors' perception of the impacts of the 16-hour work day restriction on the educational environment, quality of care, and quality of life: The first Canadian implementation

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Background/Objectives: In July 2012, Quebec was the first Canadian province to implement a 16-hour workday restriction. This study's aim was to assess and compare Quebec's surgical residents' and professors' perceptions regarding the impacts on the educational environment, quality of care, and quality of life.

Methods: An anonymous web-based survey was conducted among both professors and residents in Quebec's 4 university departments of surgery between December 4, 2012, and January 7, 2013.

Results: Two hundred eighty questionnaires were analyzed—response rates: 30% and 16% for residents and professors, respectively. Data was coded on a scale from 2 (strong improvement perception) to -2 (strong deterioration perception). Professors perceived a higher negative impact than residents on the educational environment, ie, role of autonomy (-0.399 versus -0.577, $P < .001$), teaching (-0.496 versus -0.540, $P < .001$), social support (-0.345 versus -0.535, $P < .001$) and surgical learning (-0.409 versus -0.626, $P < .001$). Professors also observed a higher negative impact on patients' safety (-0.199 versus -0.595, $P = .003$) and quality of care (-0.077 versus -0.421, $P = .01$). The latter was even perceived as unchanged by residents (-0.077, 95% CI -0.249—0.095). Residents perceived a positive impact on their quality of life, whereas professors believed the contrary (0.500 versus -0.496, $P < .001$). More professors than residents believed residency should be prolonged (81% versus 51%, $P < .001$).

Conclusions: Our findings indicate that residents and professors perceive a mild negative impact of duty hour limits on the educational environment and quality of care, while their perceptions of their impact on quality of life are positive. Professors seem concerned by adequate training to the point of considering increasing training length.

Resident duty hours: Charting the Canadian landscape

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Background/Objectives: With no national legislation or accreditation standards on resident duty hours (RDHs), the Canadian landscape is unique compared to other jurisdictions. Instead, aspects of the working environment for residents are negotiated by provincial house staff organizations (PHOs) and specified in collective agreements. As a component of a consensus-building process to come to a pan-Canadian statement on RDHs, this study compares current and historical policies on regular work hours, duration of call, maximum hours per week, hours of rest between shifts, and call frequency.

Methods: Collective agreements from 1980 to the present were requested from each PHO. A reviewer conducted a comparative analysis outlining the evolution of language and approaches to measuring and limiting RDHs in the agreements.

Results: Seventy-six agreements were reviewed. The agreements have become more detailed and similarities are evident: call frequency is now nearly standard across all PHOs (except 1) at 1 in 4 days for "in-house" call and 1 in 3 days for "out-of-house" call. One hundred percent of PHOs specify that, under normal circumstances, a resident is never to be scheduled for 2 consecutive in-house calls. The collective agreements also demonstrate significant variability: 3 PHOs specify a minimum number of hours between shifts while others only require minimum periods of time off every 3 to 14 days. While all PHOs indicate recourse for assignments in excess of stipulations, specific procedures vary provincially. Approaches to hours worked outside of those formally stipulated in the agreements also vary.

Conclusions: There is tremendous historical and geographic variability as the contracts evolved over time in each jurisdiction. Given the substantial variation in RDHs, a "one-size-fits-all" approach will not likely be appropriate as a panacea to the complicated issues related to RDHs. This study will provide evidence to inform policy decisions that lead to a pan-Canadian statement on RDHs.

16-hour limitation to in-house duty hours: Is Québec on the right path? No improvement in resident or patient safety but decreased trainees satisfaction on general surgery rotations

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Background/Objectives: To improve resident and patient safety, in-house consecutive duty hours in Québec were limited to 16 in July 2012. This study aims to evaluate the effects of Québec duty hour limitations (QDHL) on resident health, training, and patient care in general surgery.

Methods: A weekly web-based survey was distributed to residents taking in-house calls in general surgery during 6 weeks pre- and postimplementation of QDHL. It inquired about sleep and work hours, well-being, and educational experience. We also captured attendance to lectures and morbidity, mortality, and readmissions data from admitted patients' charts. Surgical logbooks were also reviewed.

Results: Response rates were 40% pre- and 53% post-DHL. Although mean daily sleep hours increased (6.4 versus 6.0, $P = .04$), there was no significant change in pre- and post-QDHL mean total weekly sleep hours (37.9 versus 37.3, $P = .89$) or work hours (60.6 versus 63.4, $P = .44$). Residents worked more days and more shifts to reach the same number of working hours. Perceived rest was decreased while perceived lack of attention, lack of energy, and excessive workload was increased. The risk of professional burnout on the Maslach Burnout Inventory was higher post-QDHL. Attendance to lectures was similar. Mean number of surgical procedures per resident was unchanged. Satisfaction with training diminished. Patient outcomes did not change.

Conclusions: After implementing a 16-hour limit to resident consecutive in-house duty hours, the reported amount of sleep did not change but perceived fatigue, attention, and workload worsened. Decreased resident satisfaction with their training was noted. Patient outcomes were not affected. The issue of resident duty hours seems more complex than the number of consecutive hours worked. To improve the delivery of residency education, further studies and interventions should focus on better understanding of the influence of duty hours on residents and patients, and optimization of work organization.

**New resident duty hours limitation in Québec: Have all stakeholders input been considered?
Analysis of a province-wide survey of general surgery physicians**

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Background/Objectives: To improve resident and patient safety, in-house consecutive duty hours in Québec were limited to 16 in July 2012. We designed a survey to understand the attitudes of general surgery physicians toward the new Québec duty hours limitations (QDHL).

Methods: We conducted a cross-sectional study in all general surgeons practicing in teaching hospitals and general surgery residents in Québec. Domains assessed were (1) traditional duty hours evaluation, (2) ideal duty hours organization, (3) anticipated impacts of QDHL, and (4) general appreciation of QDHL.

Results: Our response rate was 25% (81 of 320). Most respondents reported that traditional duty hours provided quality training in general surgery, but agreed that the number (58%) and quality (89%) of sleep hours were insufficient. A majority agreed with the necessity of a limited number of calls (87%) and consecutive work shifts (71%) but not predetermined weekly work hours (40%). Most respondents felt that learning capacity will improve (64%), but clinical exposition will decrease (64%) so that the training standards won't be met (48%), resulting in the need for residency prolongation (45%). According to most, impacts on patient care will be neutral or negative, and negative for residents and work organizations. On a 0-10 scale, the median satisfaction of residents with the QDHL was 2 (IQR 1-4). Finally, a majority were not in favor of QDHL (82%).

Conclusions: Although they recognized the lack of sleep with traditional duty hours, surgeons and residents raised significant concerns regarding the impacts of QDHL in general surgery. Most of them believe the quality of training will suffer without improved patient care or resident safety to compensate. In order to successfully implement new duty hours that meet the educational and organizational needs of various services and improve all stakeholders' experience, these perceptions have to be understood and addressed. To do so, flexibility appears to be key.

Contextualizing the Canadian resident duty hours debate: Results from a national survey

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Background/Objectives: Resident duty hours (RDHs) impact the physician workforce. This study aimed to explore residents', program directors', postgraduate deans', and hospital administrators' current perspectives on RDHs in Canada. Findings are being used to develop a pan-Canadian statement on best practices.

Methods: All 12 672 residents, 764 program directors, 17 postgraduate deans, and a sample of 116 hospital administrators were invited to complete an online survey. To optimize survey response rates, a Tailored Design Method was used. The data were analyzed using descriptive statistics in SPSS.

Results: Overall, 3329 of 13 569 completed 1 of the 4 surveys to date, constituting a response rate of 25% for the interim analysis. When asked what they thought were a reasonable total number of clinical hours for residents to work per week, 29% of residents stated 50-59 hours, 29% of program directors reported 50-59 hours, and 46% of postgraduate deans indicated 60-69 hours. In terms of reforming RDHs, 51% of residents, 77% of program directors, 85% of postgraduate deans, and 74% of hospital administrators said that RDHs should be tailored by type of discipline. 49% of residents, 46% of program directors, 69% of postgraduate deans, and 65% of hospital administrators indicated that they would support a reduction in the number of consecutive RDHs worked.

Conclusions: These preliminary findings suggest the complexity of RDH issues and a divergence of views among stakeholders regarding RDH impacts and some homogeneity in terms of directions for reform of RDH issues. They also demonstrate the importance of exploring this topic from various perspectives as it has implications for resident wellness, patient safety, medical education, and health care delivery.

The prevalence and impact of sleep disturbances in Brazilian residents and their relations with quality of life and burnout

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Background/Objectives: Residency is a period of hard work, challenges, and intense emotional experiences. Adequate residency workload and its impact in medical practice are under debate. In Brazil, residency programs are limited to a 60-hour work week, yet the residents are allowed to work extra shifts in other institutions. Despite the concern about the excessive workload on residents' sleep, quality of life, and burnout, there are few studies performed on this subject in our country.

Methods: Pittsburgh Sleep Quality Index (PSQI), World Health Organization Quality of Life (WHOqol-BREF), and Maslach Burnout Inventory (MBI) questionnaires were applied to 112 residents of Unicamp's University Hospital in 2012. A descriptive statistical analysis was performed and the correlations between the indexes evaluated in the questionnaires were studied.

Results: We observed that 61% of the residents had sleep disorders, 52% had pathological daytime sleepiness, and 13% took sleeping medication. There was a negative and significant correlation among sleep disturbances and WHOqol-BREF quality of life for physical ($r = -0.61, P < .001$), psychological ($r = -0.61, P < .001$), social ($r = -0.46, P < .001$) and environmental ($r = -0.39, P < .001$) dimensions. There was a positive and significant correlation between sleep disturbance and the emotional exhaustion dimension of MBI ($r = 0.355$ and $P < .001$).

Conclusions: Sleep disturbances among medical residents were highly prevalent and associated with burnout and a lower quality of life.

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Home call to address duty hours for neurosurgical residents: Impact on case volume, qualitative education experience, and resource requirements

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Background: Restricted duty hours present a significant challenge to surgical residency training programs. Taking calls from home, with alternate providers supplying in-house coverage, is a potential option to address these challenges

Objectives: We compared resident training experiences before and after the institution of a home call system at 1 of our training sites at the University of Alberta.

Methods: Using operative logs, we analyzed the procedural experience for residents during each period. We also compared their procedural experiences with a contemporary in-house call site. Qualitative interviews and questionnaires were used to gain insight into the overall educational experience.

Results: The home call system resulted in a significant increase in the number of cases logged by each resident (27 versus 17 cases/month, $P = .01$). Analysis of the relative case mix saw a 50% reduction in exposure to index trauma cases. These findings were supported by the qualitative analysis. Resident participation in elective surgical procedures increased, but exposure to emergencies and ward complications diminished. Resident well-being was subjectively enhanced. A significant resource investment was required to support this transition, with clinical associates for overnight and weekend in-house coverage and a hospitalist and nurse practitioner providing daytime continuity.

Conclusions: Home call is a potential option to address restricted duty hours. In our experience, elective procedure exposure increased. Exposure to urgent and emergent care and procedures decreased. There are significant resource implications associated with this system.

An internal medicine resident's educational experience on night float compared to a clinical teaching unit rotation

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Background/Objectives: With an increasing focus on resident duty hours, night float (NF) systems are becoming more common. Yet, the extent to which NF systems impact residents' learning is not well studied. At Queen's University, NF is a 1-month rotation completed by internal medicine senior residents consisting of fourteen 12-hour night shifts with new patients admitted between 10 PM and 8 AM. We sought to determine how the volume and variety of cases seen by a resident on NF compared to that of a clinical teaching unit (CTU) rotation where patients are admitted until 10 PM.

Methods: Qualitative study whereby all patient problems seen by 1 resident on CTU and NF during the R2 year were recorded. Most responsible diagnosis was logged and assigned to the appropriate subspecialty. A secondary diagnosis was logged if significantly contributed to the care of that patient by the R2. Ten weeks of CTU across 3 CTU rotations and 13 NF shifts were logged. Data were summarized descriptively.

Results: A total of 352 patients were managed. On CTU, 111 admissions were managed by the R2 (11/week) and 159 patients were followed by the R2 but admitted by other seniors. On NF, 82 patients were admitted (41/week). The most common primary clinical problems were related to Respiriology (24%), Gastroenterology (20%), and Infectious Diseases (17%) and were seen with similar frequency on CTU and NF. The most frequent diagnoses on both rotations were pneumonia and gastrointestinal bleeding. A secondary diagnosis contributing to hospitalization was identified in 60% of CTU patients, but only in 28% of NF patients at admission.

Conclusions: The NF system at Queen's offers an exposure to a high volume of patients with similar problems as the CTU rotation. The difference in number of secondary diagnoses between CTU and NF suggest that the focus on NF is the acute presentation, while the CTU rotation allows time to focus on additional problems. NF and CTU rotations offer different, but complementary, learning experiences.

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Sleep deprivation on-call causes cognitive impairment: An objective measurement in Irish residents

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Background/Objectives: It is established that prolonged shifts may compromise patient safety, but there have been few objective measures to prove this.

Methods: Resident cognitive function was tested at baseline and again within 4 hours of finishing an on-call shift of at least 24 hours duration. Total sleep in minutes, nutritional intake, and subjective confidence in dealing with an emergency and subjective sharpness were recorded at the end of the post-call test.

Results: 37 residents performed both tests. The range of sleep during shifts was 0 to 330 minutes, with a mean sleep time of 138.7 minutes. The majority was interrupted sleep (mean length of a sleep period: 40 minutes). Nineteen residents showed impaired cognitive function postcall, as determined by a statistically significant change in cognitive function calculated by the CogState software. Cognitively impaired residents (CIR) had mean sleep time of 105 minutes versus 174 minutes for cognitively unimpaired residents (CUR), $P = .01$. There was no difference in ratings of personal ability to manage an emergency by CIR versus CUR. Nutritional intake demonstrated normal calorific intake.

Conclusions: This study is the first to use a validated measurement tool to objectively assess the effect of sleep deprivation during on-call on residents' cognitive function. It shows that 50% of residents have significant impairment in cognition postcall. It indicates that the duration of sleep on-call directly relates to degree of cognitive decline. It also shows that residents with objective cognitive impairment did not recognize their own cognitive deterioration when asked to rate same. These results demonstrate that current on-call practices may seriously impact resident ability to function, and thus patient care.

To stay or not to stay: A grounded theory study of the postcall behaviors and rationalizations of postgraduate medical trainees

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Background/Objectives: While policy to restrict resident duty hours is pervasive, resident adherence to restricted duty hours has proved challenging. This study sought to describe residents' postcall behaviors and understand the dominant rationalizations underpinning their decisions to stay or not to stay after a 24-hour shift.

Methods: Using constructivist grounded theory methodology, we conducted semi-structured interviews with 24 residents across 6 surgical and nonsurgical specialty programs at 1 university during 2012. Transcripts were analyzed iteratively using a constant comparative method of identifying and refining key themes as the data set accrued, and theoretically sampling until theme saturation.

Results: "Abiding by cultural norms" was the dominant rationalization for both choosing to continue to work postcall or to go home and included 3 thematic subcategories: "infrastructure," "values," and "tension." Cutting across these subcategories was the pattern of residents invoking similar values of patient safety and education regardless of the cultural norms of their program, the infrastructure within which they worked, or the tensions they were navigating.

Conclusions: While central to residents' rationalizations, values appear to be versatile, amenable to multiple, even conflicting applications. Residents perceived that they were upholding the values of patient safety and education regardless of which postcall behavior they chose—staying or going. Based on this, we suggest that for duty hour reform initiatives to be successful, the current values-based rhetoric may need to shift in favor of organizational changes that reduce the circumstances in which postcall behavior is an individual, values-based decision.

Comparing the resident experience on past and present CTU structures

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Background/Objectives: The clinical teaching unit (CTU) structure at Queen's University has changed significantly in the last 10 years, but the effect on residents' experience is unclear. In its previous form, senior residents on CTU would work up to 36-hour shifts admitting and following medicine consults from the emergency room. In its present reduced work-hour form, residents work up to 14 hours admitting patients until 10 PM when a resident on night float (NF) begins a 12-hour shift admitting patients to various teams. We sought to compare the educational experience of a senior resident on CTU in its past and present forms.

Methods: Qualitative study comparing R2 experience in 2001 and 2011 academic years. All patient problems seen by 1 resident were recorded during 8 weeks of CTU in 2001 and 10 weeks of CTU and 13 NF shifts in 2011. Most responsible diagnosis was logged and assigned to the appropriate subspecialty. Data were summarized descriptively.

Results: In 2001, 236 patients were admitted and followed by the R2 (29.5/week). Of these, 134 patients (57%) were admitted between 5 PM and 8 AM across 17 nights. In 2011, 270 patients were managed on CTU (27/week); 41% were admitted by the R2 (until 10 PM), while 59% were admitted by other residents (ie, NF) and followed by the R2. In 2011, the R2 saw an additional 82 patients during NF (42% of all R2 admissions). The most common clinical problems on CTU related to Respiriology (21%), Cardiology (13%) and Gastroenterology (GI; 13%) in 2001, and Respiriology (24%), GI (20%), and Infectious Diseases (17%) in 2011.

Conclusions: Despite changes in the CTU structure, the residents' experience in terms of number and nature of patient problems remains similar. A significant proportion of patients continue to be admitted after regular working hours. The addition of a NF system has allowed for a reduction in resident duty hours but preservation in the volume and variety of cases.

Resident sleep associated with overnight duty periods of 12-, 16-, and 24-hour durationsR. Osborne¹, C. S. Parshuram¹, I. Study Group²¹Hospital for Sick Children, Toronto, ON;²University of Toronto, Toronto, ON.

Background/Objectives: Acute and chronic sleep deprivation are associated with fatigue and reduced performance and have provided rationale to modify resident schedules. We evaluated sleep in trainees working in 3 Canadian intensive care units (ICUs) during trials of 3 resident overnight schedules—conventional 24-hour, 16-hour, and sequential 12-hour overnight duty.

Methods: Consenting ICU residents wore wrist Actigraphs. Data were reviewed for completeness and sleep was estimated. Days were classified as on-call, postcall, weekday, or weekend (no duty). Sleep duration (minutes), presented as median (interquartile range [IQR]), was compared using analysis of variance.

Results: The 25 trainees had a median (IQR) of 6 (5–8) complete 24-hour periods of Actigraph data (total 185). Sleep in the 24 hours preceding the end of duty was greatest in sequential 12-hour night schedule (409 [358–447]) versus 16-hour night (145 [112–239]) and conventional 24-hour (118 [38–215]) schedules ($P = .001$). Sleep from 8 PM to 8 AM was similar: 12-hour night 126 (62–174); 16-hour night 85 (40–100) and conventional 24 hours 84 (17–185; $P = .50$). Midway through the 3- or 4-day sequence of 12-hour nights trainees were sleeping for 410 (359–447) minutes per day. Sleep duration was 664 (542–853) minutes postcall, 450 (400–521) minutes on weekdays, and 485 (391–548) minutes on weekends free of duty.

Conclusions: Canadian trainees in ICU are acutely but not chronically sleep deprived, and routinely obtain a median of 1 to 2 hours of sleep when working overnight. However, over the 24 hours ending at morning handover, trainees working sequential nights obtained the most sleep. The median duration of postcall recovery sleep (11 hours) and routine sleep (> 7 hours) suggests that Canadian ICU trainees are not chronically sleep deprived.

Simulation-based training in anesthesiology: A systematic review and meta-analysis

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Background: Simulation has long been integrated in anesthesiology training. Previous reviews regarding anesthesiology simulation literature have had a narrative focus.

Objectives: A systematic review and quantitative summary of the literature would allow educators to make informed decisions regarding optimal instructional design and the role of simulation for anesthesiology training.

Methods: We searched major databases including MEDLINE, ERIC, and SCOPUS through May 2011. We included articles that used simulation for anesthesiology training with health professions learners. Data were abstracted independently and in duplicate. We pooled results using random-effects meta-analysis.

Results: We included 77 studies (6066 participants). Compared to no intervention (52 studies), simulation was associated with moderate to large effect sizes (ES) for all measured outcomes (0.60–1.05) except for patient effects (ES -0.39). Compared to nonsimulation instruction (11 studies), results showed moderate effects favoring simulation or satisfaction and skills (ES range 0.39–0.42), a large effect for behaviors (1.77), and nonsignificant small effects for time, knowledge, and patient effects (-0.18–0.23). Among studies comparing alternative simulation interventions, low technology simulators were comparable to high technology alternatives (4 studies, ES range -0.06–0), clinically relevant simulation scenarios were associated with small effects for knowledge and skills (4 studies, ES range 0.14–0.15), and training with debriefing from multiple information sources versus a single source was associated with negligible effects for time and skills (3 studies, ES range -0.07–0.09).

Conclusions: Simulation in anesthesiology is more effective than no intervention (except for patient outcomes) and noninferior (and perhaps superior) compared to nonsimulation instruction. Researchers must clarify the key instructional designs for simulation in anesthesiology training.

Modulating cognitive load during simulation of central venous catheter insertion

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Background: Hybrid simulation (HS) is useful in training for complex procedural skills. Learning can be enhanced by optimizing difficulty or germane cognitive load (CL).

Objectives: We assessed the cognitive load of 2 HS scenarios for ultrasound (US)-guided central venous catheter (CVC) insertion and their relationship to resident performance, to inform manipulation of this variable in future HS sessions.

Methods: Ten postgraduate year 4 residents in general internal medicine participated in 2 HS in ultrasound-guided CVC insertion. Simulations required residents to insert a CVC under US guidance into a rubber part task trainer affixed to a standardized patient (SP), while interacting with the SP and a standardized nurse, and monitoring the patient's clinical status and ECG. Two scenarios with increasing complexity were designed. Scenario 1 included a minor arrhythmia during CVC insertion, while Scenario 2 included severe hypotension followed by an arrhythmia. CL was measured with the NASA Task Load Index (NASA TLX), and clinical performance was graded using validated checklists.

Results: NASA TLX workload results ranged from 27-87 (of possible 120), increasing on average 16 points (range 5-35) from Scenario 1 to 2, suggesting increases in CL as per scenario design. Differences in CL were similar when Scenario 2 was performed prior to Scenario 1. Major sources of CL were mental demand, temporal demand, effort, and frustration. As in prior studies, NASA TLX workload and procedural performance did not correlate ($r = -0.03$).

Conclusions: NASA TLX can help discriminate CL during HS CVC insertion scenarios and was correlated with scenario difficulty in this study. Measuring CL can help tailor simulation exercises by adjusting scenario difficulty to individual trainees' level of proficiency and comfort.

A prospective evaluation of the utility of simulation to enhance radiology resident knowledge of acute, life-threatening emergencies

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Background/Objectives: Acute, life-threatening emergencies do not occur with sufficient frequency within the radiology department to provide learners with suitable exposure for training. Simulation holds utility, as demonstrated in other areas of medical education, to expose trainees to challenging cases in a safe environment.

Methods: In an academic health institution, second-year radiology residents underwent a 3-hour simulation covering 3 life-threatening emergencies (contrast reaction related [CR], noncontrast related [NCR], seizure [SZ], and cardiac arrest [CA]) followed by 1-hour of didactic teaching. Knowledge was assessed using multiple choice questions (MCQ) and comfort level using a 5-point Likert scale presimulation, postsimulation, and 12 months postsession. Participants also rated the value of the intervention.

Results: Twenty-one residents participated in the simulation session, with 11 completing 12-month follow-up to date. Overall knowledge improved postsimulation (pre 67% versus post 84%), with the greatest benefit seen in NCR (pre 54% versus post 84%). Level of comfort increased across all 3 areas following simulation (mean, SD: CR 3.1 0.9 versus 4.0 0.5; SZ 3.2 1.1 versus 3.9 0.6; CA 2.7 1.0 versus 3.6 0.9). At 12 months, knowledge returned to near preintervention levels (overall 69%; CR 76%; NCR 58%); however, comfort level remained elevated for all 3 areas and proximate to postintervention level (12 months: CR 3.8 0.6; SZ 3.6 0.7; CA 3.3 0.6). High educational value was recognized immediately postsession and at 12 months (CR 4.5 0.6 versus 4.2 0.6; SZ 4.4 0.7 versus 4.3 0.6; CA 4.4 0.6 versus 4.2 0.8).

Conclusions: While the simulation intervention improved radiology residents' knowledge with MCQ and their comfort in managing life-threatening emergencies, especially in those noncontrast related, there was a return to baseline knowledge at 12 months postsimulation, suggesting a need for more frequent exposure to improve retention.

"Building a simulation": A tool to teach communication skills to professionals caring for children with cerebral palsy in a culturally sensitive context

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Background: Recent work has shown that clinicians working with immigrant families in pediatric rehabilitation lacked training in providing culturally sensitive care. Simulation is 1 tool that can be used to address this need, but little is known about the educational value of building a simulation as a learning activity.

Objectives: The aim of this project is to assess whether building and participating in a simulation improves the communication skills of health care professionals more than building or participating in a simulation alone.

Methods: The principles of problem-based learning and simulation design, along with the current literature on culturally sensitive care were reviewed to inform the development of this educational activity.

Results: We created a problem as a primer to a "build a simulation" educational activity, accompanied by a facilitator and patient representative. The focus of the simulation is to communicate information about the inability to walk independently to a child with cerebral palsy from an immigrant family in a culturally sensitive manner. Groups include professionals that build and participate in a simulation, build only and participate only. All participants complete a baseline questionnaire and are evaluated using the Consultation and Relational Empathy measure in a postintervention skills assessment encounter with a standardized patient.

Conclusions: This project allows us to explore the effect of building a simulation on the development of communication skills among health care professionals caring for children with disabilities in a culturally sensitive context. It provides us with insight into what aspects of simulation are effective in bringing about changes in skills in cultural competency.

Learning analytics in screen-based simulation of radiograph interpretation

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Background: Radiology simulations allow deliberate practice using hundreds of image-based clinical cases. Learning analytics can be defined as "the use of learner-produced data and analysis models for predicting and advising people's learning." In this study, we apply learning analytics to a screen-based simulation of radiograph interpretation.

Objectives: To investigate candidate learning analytic parameters for radiograph interpretation using an expert-novice comparison.

Methods: We recruited low experience (LE) medical learners including 20 medical students and 18 residents, and a high experience (HE) group which included 5 attending emergency physicians and 3 radiologists. Using a web-based program that simulated the clinical presentation of 234 ankle radiographs in an emergency department, participants classified cases as normal or abnormal; if "abnormal" was selected, they specified the location of the abnormality. Immediate feedback on the diagnosis was provided. The system recorded the following process measures: total time on case, time on each radiograph view, number of radiograph views examined, and frequency of re-review of the case history.

Results: The mean time on each case for the LE and HE groups were 35.8 (0.45) and 52.6 (1.3) seconds, respectively ($P < .001$). The LE spent an average of 4.0 (0.09) seconds on each view, while the HE group spent 7.2 (0.23) seconds ($P = .02$). The LE aggregate toggled among the views an average of 4.00 (0.02) times per case, while the HE group performed this 4.9 (0.05) times per case ($P = .04$). The HE group was 1.7 times as likely as the LE group to re-review a case, although this was not found to be statistically significant ($P = .13$).

Conclusions: Simulation environments have the advantage of providing rich process information which, when combined with performance measures, can provide insight into the learner's interpretation process. This information could be used to enhance simulations by adjusting instructional designs according to either developmental level or known markers of expert level performance.

"Post factum": What if you could change the terms? Initial experiences with ultrasound-guided lines

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Background: Ultrasound (U/S)-guided central venous line (CVL) insertion is currently the standard of care. Randomized controlled trials show that simulation is superior to apprenticeship training.

Objectives: To explore from the perspectives of participants in a U/S-guided CVL simulation program the role of simulation training and other factors that impact real life performance.

Methods: Purposeful sampling with 7 novice trainees and theoretical sampling with 6 faculty physicians was used to investigate the experience of novice learners after they had completed simulation training and then performed real life procedures. Semi-structured interviews were used as the data source. In the constructivist grounded theory tradition, constant comparative analysis was conducted to identify emerging themes. Analysis was presented to participants for member checking.

Results: The novices had no prior knowledge or skills related to U/S-guided CVL insertion. The transfer of skills from simulation to the actual bedside was not the only determinant of these novices' performance. There were supportive factors (eg, supervision and further real life experiences) and challenging factors (eg, concern for patient welfare, complexity of the case, inability to troubleshoot in the moment) present at the bedside that further impacted the outcome. While some of those challenges could have been anticipated and taught using simulation, some could not. Novices also made suggestions for improving the simulation program (eg, right timing, right refreshers, increasing the fidelity and complexity of scenarios with time).

Conclusions: Reflections of learners and faculty on real life experiences gave insight into utility of simulation training. While simulation augmented their clinical experiences, there were other influencing factors. As we strive to perfect our simulation training, we should also aim to perfect the clinical learning environment to appropriately support and challenge the learner.

Sepsis module

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Background/Objectives: Severe sepsis and septic shock remain the highest causes of mortality in intensive care units. Early recognition and treatment of sepsis have clearly been shown to improve outcomes. Our aim was to design an innovative, interdisciplinary, simulation-based educational tool on management of sepsis to improve practice of physicians during the critical early hours of sepsis.

Methods: This pilot study was a concurrent mixed method single-center design to test objective improvements in knowledge and qualitative results of participant feedback. Fifteen residents of the emergency medicine and internal medicine programs of McMaster University were recruited to take part in this study. The 3-hour module consisted of a lecture, high-fidelity simulation with interdisciplinary participation, RCSim (software virtual), and a personal feedback.

Primary outcome was a measurement of knowledge transfer by usage of pre- and postmodule testing. Secondary outcome was a qualitative self-evaluation in improvement of clinical preparedness, collaboration, and communication skills. Responses were examined and evaluated by thematic clusters. Other secondary outcomes included an 8-month follow-up on knowledge retention and feedback of the module's clinical utility over the previous 8 months.

Results: There was a 10% absolute increase in the posttest scores, which was highly significant ($P = .001$). This improvement was consistent in subgroup analysis by specialty or by year of training. Qualitative analysis showed majority (14 of 15) found the program to be appropriate for their field and level of training. Responses were strongly positive overall with recurring themes of improved clinical preparedness and confidence, communication, and collaboration abilities. These results were consistent in the 8-month follow-up.

Conclusions: This pilot study demonstrated that the sepsis module is an effective educational tool to deliver knowledge. Participants found positive learning experience in improving confidence, communication, and interdisciplinary collaboration in sepsis management.

Restructuring a simulation-based educational module to teach residents how to teach procedures

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Background: Teaching medical procedures requires an understanding of both the cognitive and psychomotor components of performing a procedure, as well as strategies for how to teach these components effectively. In 2011, the McMaster Internal Medicine Residency Program introduced a novel procedural resident-as-teacher curriculum using task-trainer models to educate senior residents how to effectively teach medical procedures to junior learners. Faculty-observed procedural teaching and structured feedback were provided to the resident teacher.

Objectives: To describe the process of modifying and enhancing a simulation-based, resident-as-teacher curriculum in response to trainee feedback, and to examine resident satisfaction with the curriculum changes.

Intervention: Structured feedback was elicited from participants via postintervention surveys. After resident concerns were identified, an updated review of the literature was performed and a modified curriculum developed with feedback from medical education experts and resident opinion leaders. Modifications included a change in curriculum timing from postgraduate year (PGY)-3 to the end of PGY-2, and a focus on a single procedural skill as a template for learning to teach any procedure rather than a variety of medical procedures. Each teaching station was designed to have residents teach a specific cognitive or psychomotor component of central line insertion. Teaching domains included: (1) procedural environment, (2) procedural landmarking, and (3) psychomotor skills. We will present data on the impact of the restructured program on resident satisfaction and engagement.

Conclusions: New curricula in residency education require continuous evaluation and modification in the context of a continuous feedback loop to meet the needs of residents. We are assessing the effect of changes made to a new procedural teaching curriculum at McMaster University on resident satisfaction.

Communication as a Medical Skill (ComMS): Validation of a communication curriculum to enable medical professionals to develop rapport and therapeutic relationships in acute care environments

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Background: Effective communication is fundamental to every interaction between a physician and a patient and/or family. Physicians practicing in acute care environments have learning needs unique to these environments.

Objectives: To determine if a multi-modal educational intervention, focusing on establishing rapport and therapeutic relationships in an acute care context, leads to an increase in knowledge and skills in postgraduate medical trainees.

Methods: A randomized control trial compared an educational intervention that included didactic methods, guided practice, and simulation with the current standard of training. The primary outcome was improvement in ability to establish rapport and a therapeutic relationship with patients as measured by pre-post assessment of recorded encounters with standardized patients using a novel communication skills checklist. Secondary outcomes include the ability to express empathy and the effect of executive coaching on retention of skills.

Results: Eighteen postgraduate year 1 trainees enrolled. We found a statistically significant improvement in scores in the intervention group from pretest to posttest ($P = .02$) in their ability to establish rapport and a therapeutic relationship. Similarly, the intervention group improved in their ability to recognize empathic opportunities ($P = .07$) and construct empathic responses ($P = .005$). The interrater reliability was 0.71. We did not observe significant differences between the groups in terms of the effect of executive coaching on retention of skills.

Conclusions: This study demonstrates the ability to train and measure the complex, "soft" communication skills of establishing a therapeutic relationship and empathic expression. Simulation using short (7-minute) acute care scenarios may improve the transferability of this work to acute care medical practice where time pressures and a lack of pre-existing relationships are seen as barriers to effective physician-patient communication.

Uncovering the hidden curriculum: Qualitative analysis of trainee and staff perceptions of medical training

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Background: The hidden curriculum refers to learning in response to unarticulated processes and constraints which fall outside the formal medical education curriculum. Although this has been identified across Canadian medical schools as an item requiring attention, it remains largely unknown to teachers and learners.

Objectives: This pilot study sought to assess the current state of knowledge and perceptions of the hidden curriculum among University of Ottawa learners and faculty.

Methods: Focus group interviews were held with undergraduate and postgraduate learners and faculty to explore themes. Qualitative analysis was conducted using a grounded theory approach.

Results: Participants reflected on their own teaching and learning experiences and highlighted several key interconnected themes related to the presence of the hidden curriculum in medical training and clinical practice. These included the following: (1) the privileging of some specialties over others, (2) the reinforcement of hierarchies within medicine, and (3) the propagation of a culture of tolerance toward unprofessional behaviors. Participants also acknowledged the importance of role modeling in the development of professional identities and discussed the deterioration in idealism that occurs during transitional stages in medicine.

Conclusions: Key themes regarding hidden curricular learning emerge and overlap between teachers and learners. Further study is required to explore hidden learning in a multi-disciplinary team environment as well as solutions to minimize negative learning experiences.

Scholar role of the CanMEDS curriculum in Canadian internal medicine programs: Predictors of resident research success

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Background/Objectives: The scholar CanMEDS role is 1 of the pillars of medical education in Canada. Scholar curricula and formal requirements for scholarly activities are variable among internal medicine (IM) residency training programs. Program-specific factors and resident qualities were correlated to resident research success, as defined by publication or presentation at a local, national, or international meeting.

Methods: We surveyed IM program directors (PDs) and residents in English-speaking medical schools across Canada. A validated electronic questionnaire, which was developed as part of a similar American study, was used to assess scholarly requirements of each IM residency program and resident research activities. Data was analyzed using logistic regression.

Results: Ten of 14 PDs (71%) and 308 of 1119 residents (28%) responded. Of 10 evaluable programs, 6 had a formal research curriculum and 8 had a mechanism to help residents identify research mentors. Seventy-six percent of residents completed a research project during core IM training; 27% were published in peer-review journals; and 49% were presented at a scientific meeting.

A mechanism to link residents with a research mentor was associated with presentation at a national or international meeting ($P = .01$). Instruction on medical writing (OR 4.4; 95% CI 1.2–15.9; $P = .03$) and data analysis (OR 3.7; 95% CI 1.4–10.0; $P = .01$) during the research curriculum were associated with research success. Resident factors included self-motivation for research and choice of gastroenterology, cardiology, or intensive care as a subspecialty.

Conclusions: We found significant variability in scholarly activities and research curricula across Canadian IM programs. Based on our findings we recommend that IM programs include a scholar curriculum with instruction on medical writing and statistics, and provide a mechanism for linking residents with suitable research mentors.

Effect of distributed and interleaved practice on acquisition of ECG interpretation skills

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Background/Objectives: Studies report improved testing performance when teaching sessions are separated over a defined period of time (distributed instruction) and practice compares and contrasts differences (interleaved practice) compared to continuous instructional sessions (mass instruction) and practicing topics in isolation (blocked practice). Our objective was to establish an evidence-based approach to ECG instruction by assessing the impact of combining distributed or massed instruction with blocked or interleaved practice.

Methods: Eighty first-year McMaster University medical students were randomized to 1 of 4 conditions: Distributed-Blocked, Distributed-Interleaved, Mass-Blocked, and Mass-Interleaved. The curriculum, designed by study authors, was divided into 3 modules and instructed by 2 third-year internal medicine residents. Distributed groups were taught 1 module weekly for 3 weeks, while Mass groups received all modules at once. In Blocked practice groups, ECGs were grouped by diagnosis. In Interleaved groups, ECGs were combined to contrast the differences. Immediate testing was completed after each module. Delayed testing was completed 2 weeks after the final instructional sessions.

Results: Eighty students enrolled in the study, 72 attended all sessions, and 51 completed the delayed evaluation. On immediate testing, Distributed instruction was superior to Massed instruction ($F = 7.2, P = .009$) with no difference in Interleaved versus Blocked practice and no interactions between teaching method and practice. Delayed testing demonstrated superiority for Blocked practice ($F = 5.8, P = .02$) and for Distributed instruction ($F = 5.9, P = .02$).

Conclusions: Our study supports Distributed over Mass instruction of ECGs. Contrary to some literature, we found an advantage for Blocked over Interleaved practice on delayed testing. We hypothesize that the complex nature of learning ECGs may contribute to the variation seen in this study.

Assessing the verbal methods currently used to teach endoscopy

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Background/Objectives: Endoscopy does not lend itself well to assisting or exposure by the teacher, and therefore most of the teaching is, by necessity, done verbally. The purpose of our study is to develop a framework to assess the verbal methods currently used to teach endoscopy.

Methods: The verbal teaching occurring during 18 colonoscopies and 13 gastroscopies was recorded by Dictaphone and later transcribed. The resultant 53-page transcript was then analyzed using the Grounded Theory method of Glaser and Strauss.

Results: Iterative review and repeated testing yielded 6 types of verbal teaching: demonstration by the teacher, motor instructions, broad tips/tricks/pointers, verbal feedback, questioning, and nonprocedural information. The interrater agreement was excellent (Fleiss's kappa = 0.76) when teaching moments were classified by the resident (D.M.), the nonmedical educator (M.P.), and the medical teacher (M.M.). Overall, there was less nonprocedural teaching (7% versus 24%, $P = .01$) and a trend toward more teaching moments per case (13% versus 8%, $P = .07$) in the first month of the rotation compared to the later months. A greater proportion of the teaching for colonoscopy involved demonstration (14% versus 3%, $P = .04$) and tips/tricks/pointers (27% versus 12%, $P = .01$) compared to gastroscopy.

Conclusions: We describe a means of quantifying how endoscopy is currently being taught through methodologically categorizing verbal teaching that is simple, has construct validity, and shows strong interrater agreement. This framework has the potential to be used to determine which of the types of verbal teaching are most effective at different stages in learning and encourages teachers to reflect upon improvements that can be made to their own teaching practices.

The effect of surgical “boot camps” in improving confidence, skills, and knowledge during transition periods: A meta-analysis

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Background: Throughout surgical training, learners are faced with multiple stressful career transitions. In addition to increased burnout among learners, these transitions are associated with increased patient morbidity. In surgical training, the first transition is from clerkship to residency.

Objectives: In this study, we evaluate the effectiveness of surgical “boot camps” in improving confidence, skills, and knowledge during this career transition.

Methods: We performed a search of MEDLINE, CINAHL, PSYCinfo, EMBASE, and ERIC using “boot camp,” “transition course,” or “capstone course” as the focus of our search. The search was further limited to the MESH headings “fellowships and scholarships,” “internship and residency,” and “clinical competence.” Our inclusion criteria for the meta-analysis included surgical boot camps, participants transitioning to junior residents, North American studies, and studies providing sufficient data for statistical analysis. The search returned 109 articles with 15 additional articles included from review of references. In total, 15 articles met all inclusion criteria. Meta-analysis was performed using STATA software with Cohen’s *d* for effect size while applying the random effects model.

Results: Meta-analytic combined effect size estimates showed that learners who completed surgical boot camp training showed significantly improved confidence ($d = 1.80$; 95% CI 1.55–2.04; $P < .001$), surgical knowledge ($d = 1.86$; 95% CI 0.96–2.76; $P < .001$), and procedural skills ($d = 1.27$; 95% CI 0.95–1.58; $P < .001$) on their post-boot camp evaluations.

Conclusions: In this meta-analysis, surgical boot camps have been shown effective at improving confidence, skills, and knowledge for learners making the transition into surgical residencies.

Ready to lead? Assessing leadership in senior surgical residents: A pilot study

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Background: The Royal College of Physicians and Surgeons of Canada identifies 7 CanMEDS competencies that must be taught during residency training. Demonstration of mastery of each of these roles is paramount; in addition, residents should help mentor and lead others to develop competency in these areas.

Objectives: This project sought to compare senior surgical residents self-assessed leadership skills with the assessments provided by junior residents.

Methods: In fall 2012, postgraduate year 5 surgical residents at McMaster University were invited to participate in a pilot online survey for validation of study assessment tools. Surveys assessed the following areas identified in the leadership literature: transformational leadership (TFL), management by exception (MBE), laissez-faire leadership, commitment, safety climate, empathy, sleepiness, liking of the leader, trust of the leader, organizational support, demographics, and work hours. Senior residents provided e-mail addresses of junior residents with whom they had worked. Junior residents were asked to complete a similar survey. Research ethics board approval was obtained.

Results: Nine senior surgical residents and 8 junior residents completed the survey. Most scales were above the Cronbach's alpha = 0.7 threshold for reliability. Senior ratings of their own TFL were negatively correlated with junior ratings of TFL, but positively related to junior ratings of MBE. This suggests that while senior residents believe they are exhibiting TFL, they are most likely manifesting a transactional leadership style. TFL among senior residents was related to higher professional satisfaction, organizational support, and empathy among junior residents. Further correlates are reported.

Conclusions: This study is the first to investigate leadership behaviors in senior surgical residents and correlate their self-assessments with assessments by junior residents. A randomized controlled trial for leadership training is currently underway.

The impact of massed versus spaced teaching on knowledge and skill retention in pediatric resuscitation

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Background/Objectives: Health care providers demonstrate limited retention of knowledge and skills in the months following resuscitation courses. Residents in particular feel unprepared to provide these life-saving interventions. Our study explored the impact of spaced instruction, compared to traditional massed instruction, on learner knowledge and performance of pediatric resuscitation skills.

Methods: We delivered a pediatric resuscitation course to medical students in either a spaced (four 75-minute sessions spaced over 4 weeks) or massed (one 5-hour session) format. Four weeks following course completion students completed a 57-question multiple choice question (MCQ) examination and trained, blinded observers used expert-developed checklists to assess student performance on 3 skills (bag valve mask ventilation [BVMV], intra-osseous insertion [IOI] and chest compressions [CC]). From the total of 32 checklist elements, 10 were deemed critical.

Results: Forty-five out of 48 students completed the study protocol. Students in both groups had similar scores on the MCQ examination (spaced 44.2 ± 4.1 versus massed 41.6 ± 5.4 , $P < .07$) and overall checklist scores for IOI and CC; however, students in the spaced group performed significantly better on BVMV (6.9 ± 1.4 points out of 10) versus 5.8 ± 1.9 points out of 10, $P = .04$). Students in the spaced group performed critical elements more frequently than those in the massed group for 4 of the 10 critical elements: administering oxygen (OR 47.2; 95% CI 5.2–423; $P < .001$), adhering to the target ventilation rate (OR 4.9; 95% CI 1.1–21; $P < .03$), appropriate landmarking for IOI (OR 5.4; 95% CI 1.3–24.3; $P < .02$), and using a stool when necessary for performing chest compressions (OR 8.3; 95% CI 1.2–59; $P < .03$).

Conclusions: Learner knowledge of pediatric resuscitation taught in a spaced format is at least as good as learning in a massed format. Procedures learned in a spaced format may result in better retention of skills when compared to massed training.

Curricular reform of radiology residency education enhances coherence and residents' perception of the impact of their training

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Background: Converging factors potentially limiting radiology residency programs' ability to inspire residents and improve patient care include competing demands on faculty to increase overall productivity and the complexity of radiology readings, radiology's relative lack of continuity of care compared to other areas of medicine, and restrictions associated with work hour and supervisory requirements for residents' participation in patient care. In addition, residency programs have been challenged to move from more micro-level descriptions of explicit objectives for discrete curriculum components to outcomes more transparently linked to practice and patient care outcomes.

Objectives: Increase the coherence and impact of the radiology residency curriculum by restructuring the curriculum to more explicit focus on entrustable professional activities within defined scopes of practice and associated explicit instructional objectives.

Methods: Curricular revision leading faculty to organize radiology residency curriculum in terms of explicit scopes of practice (eg, approach to soft tissue tumors) and associated explicit learning objectives. The revision also involved moving instruction from sessions distributed over time to a sequential 6-day instructional sequence. A confidential survey of residents elicited their perceptions of the impact of restructuring their curriculum to a common focus on defined professional activities and explicit training objectives, within a sequential 6-day instructional period.

Results: Twenty (50% response rate) radiology residents completed the curriculum reform survey. Most residents characterized the coherence (80%) and practice-scope focus (87%) of the curricular reform as contributing to its positive impact on their learning. A majority (67%) characterized consistent incorporation of explicit objectives as contributing to the program's impact on their learning.

Conclusions: This study provides encouraging support for the feasibility and impact of residency curricular reform efforts that promote coherency and explicit communication of the scope of practice and expectations for learning.

Differences in resident performance across CanMEDS competencies

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Background/Objectives: Learners in Canadian residency programs include Canadian medical graduates (CMGs) and international medical graduates (IMGs). The purpose of this study was to determine which CanMEDS roles were most challenging for our residents and factors that might contribute to those challenges.

Methods: Review of narrative data in 6-month assessments of 415 residents at the University of Saskatchewan (2009–2012) in 6 residency training programs identified 62 residents with deficiencies in at least 1 CanMEDS role. Subsequently, 154 six-month assessments (a single assessment/resident) were randomly selected to quantitatively evaluate the numerical ratings.

Results: Chi-square analysis of the 62 assessments showed that IMGs had significant differences in the frequency of deficiencies across the CanMEDS roles ($\chi^2(6) = 15.5, P = .02$), with the highest concerns in the medical expert (ME), followed by the communicator role. No significant differences were found for the Saskatchewan medical graduates (SMGs), Canadians studying abroad (CSAs), and CMGs. Numerical ratings showed that 19% of residents had unsatisfactory performance in at least 1 CanMEDS role, with most residents (79%) having deficiencies in more than 1 role. Most deficiencies were observed in the IMGs (39%), followed by CSAs (33%), CMGs (15%), and SMGs (10%). Contributing factors included differences in undergraduate training, geo-cultural backgrounds, familiarity with Canadian context, language proficiency, admissions processes, quality of orientation, perceptions of being welcomed, quality of feedback, timely and effective remediation plans, and mental models of residents and supervisors.

Conclusions: Both learner-specific and system-wide issues contribute to resident performance. Resident success, in addition to resident-specific interventions, requires an honest appraisal of system issues and effective steps to improve admissions, robust orientation programs, nurturing learning environments, and fair and timely formative feedback.

Prescribing errors and error reporting in Irish residents: A knowledge or behavioral problem?

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Background: Medication errors can cause significant morbidity and mortality. Studies indicate that resident prescribing is suboptimal. But what element of the prescribing process is most commonly the error source?

Objectives: This study examined the prescribing of frequently charted medications by Irish residents in a national tertiary referral center.

Methods: Reportable errors were cross-referenced with the Medication Safety Coordinator to determine reporting compliance. An educational intervention strategy is being developed, based on the results, and will be delivered to residents. It will include presentation of the data, online tutorials, facilitated remediation and supervised prescribing. A re-audit will be performed to assess the impact of this intervention.

Results: Sixty-two percent of medication orders (n = 1569) contained at least 1 error. Technical errors in prescription writing were more common than errors in clinical judgment (90% versus 10%). Cardiovascular drugs, analgesics, and antimicrobials were most commonly implicated in error. Twenty-seven (2%, n = 1593) reportable errors were detected, of which none were reported at time of analysis.

Conclusions: Residents are the most frequent prescribers in our hospitals. They make errors regularly when prescribing, most commonly in the physical act of writing a prescription. Error reporting is also poor. The planned intervention will educate residents on human error theory, good prescription writing practices, the importance of documentation, and the hospital's error reporting system. The aim of such education will be to inspire residents to improve prescribing practices and adherence to error reporting.

Changing conversations: Improvement in resident error disclosure skills over time

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Background: Despite general agreement among residents about the importance of disclosing medical errors to patients, studies have revealed deficiencies in resident disclosure skills.

Objectives: Our study aimed to determine whether resident error disclosure skills have improved over time.

Methods: We compared the error disclosure skills of internal medicine residents in 1 Canadian residency program in 2005 (postgraduate year (PGY)-2) to residents in 2012 (PGY-1 to PGY-3) using the same validated rating scale. Each resident disclosed an error to a standardized patient (SP), and SPs used the scale to assess residents' global error disclosure skills, as well as the degree to which they included key elements of an error disclosure (eg, explanation of facts, honesty, apology, discussing prevention of future errors). We used simple *t* tests to determine the change in resident performance over time, and conducted 1-way analyses of variance (ANOVAs) to determine whether prior training or experience correlated with improved performance.

Results: Resident error disclosure skills improved significantly from 2005 (42 residents) to 2012 (66 residents). Overall scores improved from 3.50 of 5 to 4.34 of 5 ($P < .001$). The effect was consistent across all subdomains of error disclosure skills, with the greatest absolute increase seen in residents' discussion of preventing future errors (increase from 1.76 of 3 to 2.55 of 3, $P < .001$). In addition, a significantly greater proportion of residents in the 2012 cohort reported having received feedback on their error disclosure skills (53% versus 17%, $P < .001$) and having had formal training in error disclosure (86% versus 51%, $P < .001$). From the ANOVA, trainees that reported having prior training had higher scores on 4 of the 5 error disclosure skill domains ($P < .01$ for all).

Conclusions: Resident error disclosure skills have improved over time. This finding may relate to increased emphasis on error disclosure training and advances in safety culture both locally and externally.

Are junior physician rotations into general practice equivalent to tertiary hospital placements in terms of acquisition of skill and knowledge for junior physicians?

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Background: The training environment for junior physicians early in their career has been traditionally within a tertiary hospital environment. Recently, junior physician training in Australia has expanded to include rotations into community settings such as general practice where the training model is different in terms of supervision and patient care. There is currently a paucity of literature evaluating the effectiveness of junior physician rotations in general practice and their contribution to the development of generalist skills for all physicians-in-training.

Objectives: To compare the quality of the educational experiences provided by general practice rotations with those provided by tertiary hospital rotations.

Methods: Postgraduate year (PGY)-1, PGY-2, and PGY-3 junior physicians completed a voluntary anonymous online survey based on the validated Postgraduate Hospital Educational Environment Measure at the end of their training year and commented on all their hospital rotations over the year. General practice rotation responses were compared with other hospital rotation responses in surgery, medicine, and emergency to assess junior physicians' acquisition of skill and knowledge within each rotation. The study was conducted over 4 years with a response rate of 60%.

Results: In all 4 subscales of role autonomy, teaching, social support, and clinical skills training the general practice rotations performed as well as or better than hospital rotations.

Conclusions: Expansion of training into the community environment has great educational benefit for all junior physicians in terms of acquiring skills and knowledge no matter their future career plans. The generalist medical competencies acquired in the primary care setting are a potential way in which to enhance the training experiences of all junior physicians not just those aimed at general practice careers.

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Are residents mistreating medical students rotating through obstetrics and gynecology?

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Objectives: To describe the nature and sources of mistreatment reported by students on the Ob-Gyn clerkship rotation.

Methods: An anonymous, electronic, postrotation survey was administered to third-year medical students over 2 years. Respondents were asked whether or not they had been personally mistreated or witnessed mistreatment and what was the source. Written comments were invited. Themes were identified by qualitative analysis and responses before and after departmental interventions were compared.

Results: In 2010–2011, 93 students reported 38 instances of mistreatment on Ob-Gyn with 12% personally mistreated and 29% witnessing mistreatment. Nurses were most frequently cited for personal mistreatment, residents for witnessed mistreatment. Comments reflected a sense of being undervalued or excluded. Residents were perceived as lacking interest in or respect for learners and for each other.

Interventions were initiated by the Department in response to the 2010–2011 survey. The rotation structure was simplified into 2-week blocks for each of obstetrics, gynecology, and clinics. A high-fidelity simulation curriculum was introduced to teach students about interprofessional collaboration. Residents participated in 3 interactive teaching sessions on professionalism. The Department Chair met with nursing to showcase the importance of the nurse's role as teacher.

The prevalence of mistreatment decreased dramatically in 2011–2012, with 13 instances of mistreatment reported by 104 respondents. Only 3% of students reported having been personally mistreated and 10% reported having witnessed mistreatment. Residents were still identified most frequently as the sources of mistreatment.

Conclusions: Mistreatment reported by medical students rotating through Ob-Gyn reflects dissatisfaction with the learning environment. Residents are identified as the most common sources. Interventions that value students' contributions and enhance collaboration appear to have a positive impact.

Vertical integration: An innovative way to meet the needs of students, junior physicians and general practice trainees in the community environment

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Background: The Australian health care system has seen an influx of new medical graduates as medical school places are increased to meet the local physician shortage. This has led to a need for innovation in the way physicians are trained. Vertical integration (VI) involves multi-level learning and is becoming a core part of general practice (GP; family medicine) training in Australia. There is currently little evidence on the impact on learners of such arrangements.

Objectives: This project aimed to explore the impact on learners of vertically integrated GP education and training models in the clinical community context.

Methods: Seven general practices experienced in VI teaching participated, with interviews (n = 50) conducted with learners of all levels (medical student, junior physician, GP trainee, and GP supervisor).

Results: Learners identified a number of factors that had a positive impact on their learning, including the teaching culture of a practice, the physical environment, and the teaching methods employed. Strong teaching culture, enjoyment of learning, and flexible teaching arrangements were positive contributors to learning. Learners viewed positively a variety of teaching methods and supervision, such as multi-level learner group tutorials and parallel consulting. Being taught by a range of different teachers, including GP vocational trainees and junior physicians, enhances learning across the continuum.

Conclusions: VI of GP training enhances the experience of all learners. Identifying the components of VI that meet the needs of the learner allows general practices to incorporate these components into their teaching environment. With the increasing numbers of medical students and junior physicians training in the community environment, innovative models that enhance teaching capacity and quality are crucial.

Effective intraprofessional ED consultations for collaboration, patient safety, and quality care: Qualitative needs assessment

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Background/Objectives: Effective consultation and intraprofessional collaboration are key domains of competence required for all physicians that impact patient safety, Emergency Department (ED) wait times, and length of stay. However, little literature exists on the characteristics of effective consultations, and there is no validated gold standard. This study was designed to identify enabling and impeding characteristics that were perceived to impact the effectiveness of ED consultations at 2 large teaching hospitals.

Methods: We conducted a series of 1-hour focus group sessions to discuss specific characteristics that make ED consultations effective and promote patient care as well as identifying characteristics that impede care. Each focus group consisted of a mix of ED and off-service residents. The conversations were recorded, transcribed verbatim, then coded into recurrent themes by 2 research team members. This resulted in the development of thematic categories that describe the enabling and impeding characteristics of an effective ED consultation.

Results: Data saturation was obtained after analysis of the first 2 transcripts, and confirmed with a third session. Seven thematic categories emerged from the focus group sessions, including appropriateness of consult, effective communication, patient treatment, professional conduct, reasoning for consult, required information, and timing. Proposed recommendations included being knowledgeable of local admission policies, introducing yourself, asking a clear question, telling the truth, continuing to treat the patient until the consultant arrives, as well as respecting and helping the consultant if needed.

Conclusions: This needs assessment study identified 7 enabling/impeding characteristics of an effective ED consultation. A model of effective ED consultation can be developed using these elements that may improve disposition times, decrease time spent in the ED, enhance patient safety, and improve physician satisfaction with ED-consultant interactions.

Standardized admission order sets: Friend or foe?

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Background: Standardized admission order sets are used increasingly to optimize care by presenting physicians with a template for care orders based on best evidence. These decision support tools may bridge care gaps and improve quality by providing point-of-care education. However, their impact on postgraduate medical trainee knowledge remains unknown.

Objectives: To evaluate the impact of admission order sets for acute exacerbation of cystic fibrosis and of chronic obstructive pulmonary disease on resident knowledge, order-writing skills, and self-reported learning.

Methods: The authors prospectively recruited residents at a quaternary-care hospital 6 months before and 12 months after order set introduction. Each resident completed a standard questionnaire pre- and postrotation, assessing knowledge, order-writing skill, and self-reported impact of order sets on learning. Changes in pre- and postrotation knowledge scores were compared between the usual care and order set cohorts.

Results: From 2009 to 2010, investigators consecutively recruited 11 subjects before and 28 subjects after order set introduction. Thirteen of 28 subjects (46%) used both order sets. There was greater improvement in test scores in the order set cohort but after adjustment for baseline scores this was not significant. A majority of residents (88%) reported that order sets improved their knowledge and skills and successfully provided a systematic approach to care.

Conclusions: Order sets may improve resident education and are viewed as useful educational and clinical tools by a majority of residents. Future studies should explore strategies to increase order set uptake, and whether educational benefits extend to other health care professionals who interact with order sets.

Teaching Improvement Project Systems (TIPS) for residents: Program evaluation of workshop effectiveness

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Background/Objectives: The 2-day TIPS workshops are designed to improve the teaching skills of our residents. The purpose of this evaluation is to determine the extent to which teaching improves after each day of TIPS and after TIPS when residents are "at work."

Methods: Microteaching sessions for both days ($N = 83$) as well as pre-TIPS sessions were rated by blinded raters on the following areas: objectives, motivational set, body (main content), and closure (conclusion). Work-related teaching sessions, completed an average of 34 weeks after attending TIPS, have been rated for 29 residents thus far. Paired samples t tests and effect sizes were conducted to determine the extent to which residents implemented learned skills.

Results: Residents improved significantly in all areas after attending the first day of TIPS ($P < .001$). Raters identified statistically significant improvements from Day 1 to Day 2 for objectives ($P = .006$, $d = .37$) and body ($P = .01$, $d = .31$). However, preliminary analyses revealed statistically significant decreases from Day 2 to post-TIPS work-related sessions for objectives ($P = .02$, $d = .81$) and closure ($P < .001$, $d = 1.88$).

Conclusions: Residents' teaching improves after taking TIPS and from Day 1 to Day 2. However, some of the learned skills are not applied to work-related teaching. Initial observations indicate that the use of TIPS teaching skills may vary by department and therefore may reflect departmental expectations for presentations. Qualitative research may provide insights into reasons for this decline.

Nutrition education for pediatrics residents: A survey of Canadian training programs

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Background/Objectives: Nutrition is central to the optimal health and growth of children; however, nutrition instruction is often limited. We assessed formal nutrition instruction at pediatrics residency training programs in Canada through a survey of program directors.

Methods: A short online survey was sent to all pediatrics residency program directors in Canada addressing nutrition instruction both within and outside the scheduled academic half-day curriculum. The degree to which Royal College of Physicians and Surgeons of Canada (RCPSC) training objectives in nutrition were covered was also assessed.

Results: The response rate was 71%. Half of the respondents reported half-day curricula spanning a 2-year cycle; the other half used a 3-year cycle. Total duration of nutrition education within and outside the academic half-day curriculum was 5.6 (range 2–12) and 1.9 (range 0–10) hours, respectively. Over half of the programs had increased the number of hours spent in nutrition instruction within the past 5 years. Most (9 of 12) programs used both physicians and registered dietitians to provide nutrition instruction. Only 2 programs identified RCPSC training objectives not addressed through formal instruction or clinical exposure; however, half-day curriculum content varied significantly between programs. The most common barrier identified to increasing nutrition instruction was insufficient time in the academic half-day curriculum.

Conclusions: Nutrition instruction has recently increased in many pediatrics training programs in Canada in order to meet RCPSC training objectives. Despite this, many programs continue to devote relatively few formal teaching hours to this critical topic area. Inadequate time in the curriculum was the most cited reason. Novel strategies to provide nutrition education outside the half-day curriculum, such as online teaching modules, may address these gaps.

Study habits of high score achievers in the American College of Radiology In-Training Examination

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Background/Objectives: Residency training programs must ensure that candidates have attained certain benchmarks before they take a board certification examination. The American College of Radiology Diagnostic Radiology In-Training Examination (DXIT) is widely used by many programs across Canada for this purpose. Radiology residents, on the other hand, use different study habits to acquire radiology material. We aim to identify these habits and investigate which ones, if any, correlate with higher DXIT scores.

Methods: A questionnaire-based cross-sectional survey focused on 7 aspects of study-related habits. The study population was second- to fourth-year radiology residents at McGill University. Responses were correlated with participants' 2012 DXIT scores. Fisher's Exact test, Spearman's Rho and Pearson chi-square tests were used.

Results: Twenty-three residents completed the questionnaire (79% response rate). Almost half of the responders (52%) reported studying 5 or less hours per week. Reference textbooks were the top ranked source for radiology reading, followed by case-based format books. All residents consider the journal *Radiographics* an important source for their reading. A significant correlation exists between higher DXIT scores and (1) higher residency levels ($P = .048$); (2) reading from textbooks ($P = .006$); (3) less reading from the radiological journal *Radiology* ($P = .004$); and (4) less frequent use of highlighter pens ($P = .04$). A nearly significant correlation was found between higher scores and (1) spending more money on textbooks ($P = .05$) and (2) less preference for the differential diagnosis-based lecturing format ($P = .07$).

Conclusions: Radiology residents use different study habits, some of which correlate with higher In-Training Examination scores. The results could inform both low-performing residents and residency programs with the aim of improving examination scores and performance.

Balance in residency: Understanding how residents conceptualize balance

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Background: Physician wellness and the desire for personal professional balance are gaining increasing attention. Well-being has been described as a balance between multiple spheres and is thought to affect relationships with patients and colleagues, performance and motivation. Residency is a time period that requires significant duty hours for education and service and has been described as a time for temporary imbalance.

Objectives: We aimed to describe how pediatrics resident physicians at the Hospital for Sick Children conceptualize personal-professional balance and to understand the factors that inform their thinking. Resident supports were also explored.

Methods: The study was based in a qualitative phenomenological methodology. Core pediatrics resident physicians at the University of Toronto were recruited for participation. Semi-structured individual interviews were conducted by a research assistant. Data analysis proceeded alongside data collection until a saturation of themes was reached.

Results: Themes identified include the role of family, residency as a distinct time period, the concept of normalcy, perceived expectations, and the hidden curriculum. Residents struggle to obtain balance in a time period filled with conflicting priorities. Perceived expectations from family, friends, society, and colleagues are difficult to balance. The importance of balance explicitly communicated by supervisors may be different than implicit expectations.

Conclusions: Pediatrics resident physicians strive to balance personal and professional obligations. The concept of balance has unique meaning and implications for each individual. Themes identified will be used to examine educational practice and support within the pediatrics residency program at the University of Toronto and may provide guidance for institutional change.

Managing personal relationships: How residents perceive their personal life and relationships during residency

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Background/Objectives: Developing the “manager” role is a core component of residency training. This involves learning to coordinate care with other health professionals and allocating health care resources. It also includes balancing these demands with personal obligations. Residency programs provide formal training to help residents develop the former 2 skills. However, residents have little training in managing the complicated interplay between their medical career and personal life. Thus far, residents’ personal lives have been explored mainly in relation to resident stress. This study explores residents’ experiences and perceptions of their relationships with friends, family, and partners during their residency training.

Methods: A constructivist grounded theory approach was used. Purposive sampling of University of Toronto residents was conducted and continued until saturation was reached at 9 interviews. Data analysis was conducted in tandem with data collection using the constant comparative method. NVivo was used in transcript analysis.

Results: Residents had difficulty fulfilling social obligations and maintaining many relationships due to the commitments of residency, particularly the long and unpredictable hours. Residents also found work-related stress created tension with their loved ones. Due to time constraints, residents prioritized some of their relationships at the expense of others. Some relationships, particularly with those also in health care, helped residents cope with stress, while those with nonmedical fields provided limited support.

Conclusions: This study explores how residents’ personal relationships may be impacted by residency experiences. Ways to help maintain such relationships include increasing control over scheduling and providing lifestyle mentorship. This information is useful to design programs aimed at developing residents’ managerial skills, particularly in achieving a balance between professional and personal lives.

“What have I gotten myself into?” General surgery blogs provide insight into the positive and negative realities of a surgical career

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Background/Objectives: Burnout and attrition of residents from surgical residencies contributes to a declining pool of practicing general surgeons. Attrition may be caused by the choice of a career in surgery without an understanding of the realities; subsequent recognition may cause residents to re-examine the opportunity costs of a surgical career. Qualitative analysis of the reflective content of blogs authored by general surgeons may provide insight into the positive and negative realities of a surgical career. These insights may better prepare residents for the reality of what is to come, identify targets for improving the culture of surgery, and mitigate sources of career dissatisfaction.

Methods: This is a qualitative analysis of entries on blogs authored by practicing general surgeons. A systematic approach was used to identify a sample of blog posts. These posts were analyzed using a constant comparative analysis method associated with constructivist grounded theory.

Results: Thirty-five posts drawn from 9 blogs were analyzed. Overall, 104 comments were positive, 74 were neutral, and 147 were negative. Five main themes were identified: rewards of being a surgeon (96), practice environment (88), educational environment (57), tolls of being a surgeon (54), and nostalgia (30). The most commonly identified subthemes focused on the training experience, personal fulfillment, the culture of surgery, and financial concerns. A conceptual framework focused on balance was used to explain how the themes relate to each other.

Conclusions: The considerable rewards of being a surgeon were outweighed by the challenges encountered in day-to-day practice. Meeting societal needs for more general surgeons will require efforts to minimize the tolls, to the extent possible, while encouraging individuals drawn to the rewarding work of being a surgeon.

The high performance physician program: Including sport psychology in emergency medicine training

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Background/Objectives: Emergency physicians are routinely required to make difficult decisions under intense time pressure, often with limited information. Burnout, a constellation of emotional exhaustion, apathy toward patients, and a reduced sense of personal accomplishment, is common. The High Performance Physician (HPP) program is an intervention that consists of 10 hours of small group interactive discussions on perspective and recovery, strategies for emotional processing, as well as decision making under pressure. Multimedia testimonials by elite athletes, performers, and physicians serve to facilitate discussion.

Methods: Eighteen emergency medicine residents participated in the HPP program. The HPP intervention was assessed using a follow-up survey as well as the Maslach Burnout Inventory (MBI), a validated questionnaire for evaluating burnout among professionals. The MBI is composed of 22 questions about the frequency of burnout symptoms, separated into 3 subsections: emotional exhaustion, depersonalization, and personal accomplishment. Residents participating in the HPP program, all of whom provided voluntary consent, completed the MBI before the program. Six months after the intervention, participants completed the follow-up survey and repeated the MBI.

Results: Fourteen residents completed the follow-up survey and repeat MBI. Six months after completion of the program, residents had, on average, lower scores in emotional exhaustion (19.9 versus 16.6, $P = .28$) and depersonalization (12.0 versus 9.2, $P = .15$), and higher scores in personal accomplishment (39.7 versus 42.3, $P = .24$). Most residents used strategies from the intervention at least weekly, and all felt the program should be offered during residency.

Conclusions: In this small study, a brief intervention from sport psychologists resulted in a statistically nonsignificant trend toward decreased frequency of burnout symptoms. Given the high toll of burnout and the participants' perception of the intervention's utility, it seems reasonable to evaluate such an intervention on a broader scale.

“This is an important topic that we don't often address”: Resident evaluations of a wellness curriculum in postgraduate medical education

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Background: There are few curricular programs that assist postgraduate medical education (PGME) trainees in sustaining well-being and performance. As a result, little is known about educational interventions that best meet the needs of trainees.

Intervention: The Office of Resident Wellness (ORW) at the University of Toronto developed and delivered a wellness curriculum to 25 training programs during the 2011–2013 academic years. A research project evaluated trainee responses to the curriculum. The objective was to increase our understanding of the educational needs of trainees and improve workshop effectiveness.

At the end of each workshop in the 2012–2013 year (to date), participants were asked to complete an evaluation form consisting of quantitative and qualitative questions. Participants identified what was most and least valuable, whether or not the workshop met their expectations, and what they hoped to do differently afterwards. We performed descriptive statistical and thematic analyses of the evaluation data.

Results: The workshops were very well received by residents with a large majority (88%) indicating that they were satisfied or very satisfied with the sessions. A thematic analysis identified group reflection, knowledge acquisition, and practical skills development as the most valuable characteristics of the workshops. The opportunity to discuss common experiences of challenges and adaptations to training was seen as a unique circumstance. Insufficient time was the most commonly identified barrier to implementing knowledge acquired in the workshops, followed by lack of faculty support and rare wellness training opportunities. Suggestions for workshop improvements were for earlier integration into the curriculum, smaller groups, and more interactive experiences.

Conclusions: Overall, the workshops have been very well received by residents and their programs. The evaluation data has provided an opportunity for an iterative process of workshop improvement.

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