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001

What competencies are best addressed in community rotations?A. Millar¹, J. Malcolm², A. Cheng¹, R. Fine³, R. Wong¹¹University of Toronto, Toronto, ON;²University of Ottawa, Ottawa, ON;³Toronto East General Hospital, Toronto, ON.

The Royal College of Physicians and Surgeons of Canada mandates that community experiences should be incorporated into all medicine-based specialties. At present, there is wide variability in community endocrine experiences across Canadian training programs. This is further complicated by the paucity of literature providing guidance on what constitutes a 'community' rotation.

The Delphi technique is a qualitative-research method that uses a series of questionnaires sent to a group of experts with controlled feedback provided by the researchers after each round of questions. The experts in this study included endocrinology program directors, community endocrinologists, endocrinology residents and recent endocrinology graduates. A modified Delphi technique was used to determine the competencies required for a community endocrinology curriculum based on the CanMEDS roles.

45 competencies were rated by the panel, of which 35 were deemed essential. The competencies that reached consensus earliest and were most likely to be considered essential to include in community endocrinology rotations were from the "Manager" CanMEDS role. "Medical Expert" competencies were least likely to be considered as being essential elements to include in community rotations.

To our knowledge this is the first time a Delphi-process has been used to determine the content of a community-based subspecialty curriculum in Canada. The results from this study will be used to aid program directors in designing competency-based community endocrinology rotations. These results could also be extrapolated towards the design of competency-based community rotations in other ambulatory medical training programs.

002

The competency-based curriculum through the lens of the residentM. Kennedy-Hynes¹, M. Nousiainen¹, P. Ferguson¹, S. Glover-Takahashi¹

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Research shows that understanding the 'student experience' of learning and teaching improves educational practice. In Canada, the topic of residents' views on which roles and tasks are effective to their growth and development to becoming a competent physician is not yet part of the research discourse. Ensuring that the competency-based curriculum (CBC) objectives are aligned with well-defined competencies and evaluation methods is critical to building a curriculum that will produce competent physicians. This research reports on the residents' views of the current Orthopaedic Surgery 'experiment' in delivery of a curriculum which is solely competency-based. The residents' views were specifically explored about which CanMEDS Roles and Entrustable Professional Activities (EPA's) would be important to track and develop in order for them to become competent physicians.

This study employed a mixed methodology of individual resident interviews and a survey. The individual interviews were volunteers from the CBC Orthopaedic Surgery program. The survey was sent to the Orthopaedic residents in the regular time-based program and the competency-based program. Using grounded theory the data sets were explored iteratively to show what residents view as important to their training.

The data is rich in illustrating what resident's value. While residents noted that medical expertise is very highly valued, they also indicated an understanding for developing the need for a broad base of intrinsic role competencies. This research provides a better understanding of the resident experience so that educational practice and residency education can influence decisions around the curriculum design in postgraduate competency-based medical education programs.

003

Validity study of workplace portfolios using a Delphi-developed validated inventory (VIP-A): An interim analysis

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Portfolios, aimed at mentoring and assessing students at the workplace, are often based on competencies. The purpose of a validity study is to investigate whether the intended competencies are actually measured. To assess content validity of a portfolio, we previously used a Delphi methodology to construct an extensive and analytic inventory based on the CanMEDS Roles Framework.

In a first part of the current study the inventory was transformed into a feasible and compact instrument by using the information obtained in audio-taped semi-structured interviews with an at random selection of the Delphi experts. Data were transcribed and analysed following the principles of thematic analysis. After 9 semi-structured interviews, saturation was reached and the process resulted in the Validating Inventory for Portfolio Assessment/Antwerp (VIP-A), a more global and practical instrument for the validation of workplace portfolios.

In the second part of the current study the instrument was applied to validate 120 workplace portfolios. The portfolios originated from medical schools at the University of Antwerp, the Maastricht University and the University of Utrecht. Portfolios were rated by 3 independent researchers. Frequency statistics were obtained, calculating the percentages of portfolios representing the 7 roles and their key competencies, and in addition interrater reliabilities were calculated.

Preliminary data from the Antwerp portfolios indicate that the key competencies of manager and medical expert are most often represented (80% and 77%, respectively), while the key competencies of collaborator are less frequently represented (48%). We conclude that the VIP-A is a feasible and valid instrument to investigate the coverage of key competencies and roles in portfolios.

004

Implementing the Internal Medicine Milestones in US residency training

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Introduction: In 2009, a group of Internal Medicine (IM) stakeholders helped to publish a set of developmental milestones to aid in the assessment of Internal Medicine residents in each of the ACGME Core Competencies. These milestones represented a critical step forward in the quest for achieving the goals of competency-based education. IM residency programs in the United States are now charged with developing strategies to implement these milestones. In this work, faculty from Rush University Medical Center (RUMC) in the United States, demonstrate how milestones-based evaluation forms were developed to enhance assessment of residents in the continuity clinic setting.

Objective: Utilize the Internal Medicine milestones to enhance the assessment of the ACGME Core Competencies

Methods: Those milestones pertaining to outpatient practice were incorporated into three level-specific assessments, one for each year of training or (R1, R2 and R3). The R1 form contains those milestones, across all competencies; residents are expected to demonstrate prior to the end of their first year of training. Likewise, the R2 form contains the R1 and R2 milestones while the R3 form contains all of the milestones. On a semi-annual basis, residents use these forms to perform a self-assessment. The ambulatory preceptors so complete the same assessment for each assigned resident. Faculty and residents have one-on-one feedback sessions during which these completed forms are reviewed and an action plan is documented.

Results: At RUMC, we created milestones-based assessments in our continuity clinic which can easily be adopted by other programs. These assessments have enhanced the quality of the feedback obtained from the residents about their learning while providing them with concrete learning goals to accomplish.

005

Competency-based supervised practicum training in Occupational Medicine

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The Institute of Medicine (IOM) has indicated a shortage of board certified occupational and environmental medicine specialists. The University of Pennsylvania Medical Center (UPENN) Occupational Medicine (OM) Residency Training Program, a highly innovative, supervised practicum in OM whose purpose is to produce outstanding OM physicians, has been helping to address this shortage for the past decade.

This “external” program using on-job, on-campus techniques is designed for physicians with substantial clinical training interested in making a mid-career shift to OM. Residents undertake an intensive 3-day per month didactic program in Philadelphia arranged around 2-month long competency training rotations: workplace; worker; hazard identification; risk assessment and communication; population occupational medicine; and organizational management. They also undertake courses in Occupational Medicine; Toxicology, Occupational Epidemiology, Industrial Hygiene, Safety and Ergonomics and Risk/Hazard Control. Clinical work is completed at approved clinical training sites (CTS) where board certified preventive medicine physicians serve as CTS supervisors, responsible for monitoring resident training activities. Core UPENN faculty visit CTS quarterly to observe the resident and meet with CTS supervisor ensuring achievement of training objectives, responsibilities, and supervision. Each resident completes an educational plan individualizing training to meet resident unique needs.

The program has produced 93 graduates to date, all of whom have remained in the field. Trainees report that the program met their needs. Other trainee output is superior performance on the National Board examination, acquisition of competencies, and service to underserved populations.

006

Le schéma tutoriel : pour favoriser le changement vers une approche par compétences au sein des programmes de résidenceD. Saucier¹, I. Savard¹

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Contexte : Face aux défis que représentent le développement et l'évaluation des compétences CanMEDS dans les programmes de résidences, l'Université Laval a mis sur pied un processus et des outils qui encouragent ce virage vers une approche par compétence, dans une cohérence d'ensemble.

Interventions : Le Schéma Tutoriel (ST) est un processus qui permet une représentation systématique et systémique d'un programme et de ses composantes. Nous avons produit un document d'information le décrivant ainsi que son utilité, notamment pour planifier ou évaluer l'ensemble des activités. Six étapes clairement définies sont proposées et différents exemples, puisés dans le milieu, sont présentés. Le matériel, préalablement présenté aux responsables des programmes de résidence, est disponible sur l'intranet facultaire.

Observations : Depuis un an, six programmes ont entamé une démarche de planification d'ensemble à l'aide du ST. Le processus leur a permis d'identifier des forces, des redondances et des lacunes dans l'enseignement/apprentissage des compétences, d'élaborer un plan d'action visant l'amélioration et d'établir des priorités de travail. À l'aide de leur ST, les programmes ont pu brillamment faire état de leurs réalisations et projets lors de la récente visite d'agrément. Les fruits de cette démarche incitent leurs collègues d'autres programmes à l'entreprendre à leur tour.

Discussion : En incitant ses programmes de résidence à se doter d'un ST, l'Université Laval a favorisé le processus de changement. Cet exercice a permis de mettre en valeur l'apport d'occasions d'apprentissage existantes au développement des compétences CanMEDS mais aussi de développer des activités pédagogiques pertinentes, identifiées comme manquantes.

Schéma tutoriel : A systemic and systematic evaluation of a residency program using the competencies

Background: Facing challenges in developing and assessing CanMEDS competencies within its residency programs, Laval University implemented a process as well as tools to promote the shift to a competency-based approach in an overall sense of consistency.

Measures: The so-called Schéma Tutoriel (ST) is a process that allows for a systematic and systemic representation of a program and its components. We produced an information document describing the process as well as its usefulness, particularly in order to plan or assess all activities therein. Six clearly defined steps are proposed, and various examples in the field are shown. The material, previously presented to heads of residency programs, is available on the faculty's intranet site.

Observations: For the past year, six programs have started an overall planning procedure using the ST process. The latter allowed them to identify the strengths, redundancies and shortfalls in competency teaching and learning, develop an action plan aiming at improvement, and set work priorities. With their ST, programs could dramatically demonstrate their projects and accomplishments at a recent accreditation survey visit. The outcomes of this procedure stimulate participation from colleagues of other programs eager to try it out as well.

Discussion: While promoting the use of an ST among its residency programs, Laval University has facilitated change. This exercise made it possible to emphasize on the use of existing learning opportunities to develop CanMEDS competencies as well as create relevant educational activities, previously identified as missing.

007

Societal stakeholders' perspective on the applicability of CanMEDS outside Canada

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The CanMEDS framework has been incorporated into postgraduate curricula in Canada and several other countries, but its applicability to education outside Canada has been sparsely explored. Curricular content is known to be bound to contextual circumstances and thus can be expected to vary between countries. The aim of this study was to explore the applicability of the CanMEDS framework to postgraduate medical education in the Netherlands.

In 2009, we conducted a qualitative study with a two-step approach exploring the views on current gynecologists' performance of Dutch patients, nurses, midwives, general practitioners and hospital boards (societal stakeholders of Obstetrics & Gynecology). Thematic qualitative data analysis resulted in a desired performance profile of the gynecologist. The fit of the profile with the roles of the CanMEDS framework was examined.

The desired performance profile of gynecologists comprised six themes: clinical expertise and skills, reflective practice, partnership, holistic view, continuity of care, and practice management. For all themes, except for clinical expertise and skills, improvement was deemed necessary by the participants. The CanMEDS framework was found to cover the content of the desired performance profile. Based on the views of societal stakeholders, the CanMEDS framework appears to be applicable to postgraduate training programmes in Obstetrics & Gynecology in the Netherlands. Exploring the societal perspective on physician performance is likely to contribute to a better alignment of medical practice and medical curricula. Our approach and the results may be of interest to other countries.

008

Determining the impact of competency-based education - A national program evaluation approachI. Oandasan¹, E. Wong¹, R. Zorzi², M. McGuire²

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Background: Competency Based Education is being advanced in Canada by the FMEC-PG Recommendations launched in the spring of 2012. The College of Family Physicians of Canada (CFPC) formally launched its Triple C Competency Based Curriculum (Triple C) for family medicine residents in 2011. As a national approach, with collaboration with its university partners, the need to develop a mechanism to determine impact of the Triple C was considered essential. The CFPC put forth a plan to create a logic model to evaluate the short term, long term and end goal outcomes of the Triple C with patient care and broad health system impact factored in.

Objective: The purpose of this presentation is to share the process and tools to be used for the CFPC's plan to evaluate the Triple C.

Methods: Based upon the review of the literature, one-one interviews with key stakeholders involved with family medicine curriculum within the CFPC, the universities and leadership in the healthcare system, the development of process and outcome indicators were iteratively tested amongst CFPC education committee members and family medicine program directors across the country and embedded within a logic model. The logic model, approved for use, has subsequently provided the basis for the creation of outcome surveys planned to be distributed with learners upon entrance of the family medicine residency program, exit, and two years post-residency and a process inventory to consider program adoption of Triple C.

Results: During this presentation, we will share the evaluation framework and the tools created along with learned lessons for those embarking upon advancing competency based curriculum approaches nationally. **Conclusion:** As competency based education focuses on outcomes, it is important for programs to measure their outcomes. The products of residency programs in Canada are physicians ready to begin practice in their specialty areas providing care to Canadians. With the social accountability mandate of residency education, it is important that we provide information that the products developed (physicians), meet the needs of Canadians and our healthcare system. The CFPC's program evaluation approach provides an attempt to provide this type of information in a comprehensive manner.

009

An innovative framework for curriculum development: A triangulated approach to investigating learners' needs

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Competency-based education is a functional approach to education that aims to equip learners with the skills, knowledge, attitudes, and behaviors required for effective real world performance. In developing competency-based educational programs it is essential to match curricular content with practice requirements. However, rigorous approaches to assess learners' needs are lacking.

This study outlines an innovative framework for curriculum development that employs triangulation of data sources, methods and researchers in the needs assessment process. Use of this framework in the development of a transplant e-learning curriculum, aimed at enhancing the on-call performance of pediatric residents, is outlined. First, in data source triangulation, we sought input from multiple sources including resident learners, to whom the modules are targeted, as well as nurses, fellows and staff physicians involved in both resident education and transplant patient care. Second, triangulation of qualitative and quantitative methods helped to provide complementary data. Resident, fellow and nurse focus groups, in-depth one-on-one resident interviews (qualitative), staff physician surveys and a resident practice audit (quantitative) were used to identify key learning gaps. Third, triangulation of researchers (2 or more researchers being employed to carry out data collection and analysis) was employed to help reduce bias and increase reliability.

Triangulation of needs assessment data from multiple input sources, research methods and researchers allowed for a comprehensive view of learners' needs. This study may serve as a model for curriculum development in other areas of postgraduate medical education to guide outcomes-based instruction, reflective of all stakeholders' needs.

011

Residents provide their supervisors with feedback about their teaching competencies: the impact of face-to-face meetingsC. Fluit¹, T. Klaassen¹, M. de Visser¹, S. Bolhuis¹, R. Grol¹, M. Wensing¹, R. Laan¹

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Feedback can be a powerful for supervisors to improve their teaching. We developed the EFFECT-system for evaluating supervisors by their residents. A validated questionnaire (EFFECT: Evaluation and Feedback for Effective Clinical Teaching) is filled in by residents and supervisors. EFFECT incorporates characteristics of workplace learning and the CanMEDS competencies. Supervisors receive an individual feedback report. As written feedback alone has limited power to foster improvement, we organize feedback sessions where 2 residents, guided by a facilitator, discuss the feedback report with their supervisor.

We investigated how the EFFECT system is perceived by supervisors and residents, and what conditions should be fulfilled for organizing the feedback sessions.

Supervisors from pediatrics, pulmonary diseases, radiology, psychiatry and orthopedic surgery of 5 teaching hospitals were evaluated. Feedback sessions with each supervisor (n=33) were conducted by 2 residents and a facilitator. Residents received feedback training. We conducted focus group interviews with supervisors (n=32) and residents (n=11). Data were analyzed using ATLAS Ti.

Residents and supervisors appreciated the EFFECT system, the feedback session being the most valuable. It created deeper understanding of the data, and supervisors received practical tips. Residents learned how to provide feedback, and could observe how to receive feedback. Anonymous evaluation created safety for residents, but made it feel less safe for supervisors. Honesty and clarity of the goals of the evaluation created safety for supervisors. Honesty of residents during the feedback sessions was encouraged by the facilitator who helped to raise difficult points that came out during the evaluation. We conclude that residents providing feedback to their supervisors is feasible, highly appreciated, and perceived essential in the evaluation procedure. Feedback was accepted easily and residents learned a lot from these sessions. Safety for both participants needs attention.

012

Implementing the CanMEDS competency framework in Saudi Arabia: A needs assessmentM. Al Harbi¹, L. Flynn², E. Banyan¹, A. Al Fayed¹, A. Oswald³, D. Dath⁴, S. Al Khateeb¹, A. Bin Ahmed¹

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In 21st Century health care, there is an international move towards improved quality of care. This is reflected in a shift to competency-based residency education. The CanMEDS Framework, established by the Royal College of Physicians and Surgeons of Canada (RCPSC), is presently used in 16 countries.

King Saud Bin Abdulaziz University for Health Sciences, supported by the Saudi Commission for Health Specialties, is the first university in the Middle East to adopt this framework as its standard for residency programs. In collaboration with the RCPSC, the CanMEDS Collaborative Centre (CCC) has been established in Riyadh. Clinician Educators (CE) have been recruited to provide leadership to implement resident education using the CanMEDS Framework.

Employing an iterative process, we designed a questionnaire to determine the needs for faculty development. A questionnaire was developed at the CCC and edited by RCPSC CE colleagues. It was field tested for content and comprehension, further edited by 13 CEs from Saudi Arabia and distributed to 84 faculty members in Riyadh and Jeddah.

Eighty responses (95%) were received from 33 Program Directors (PD), 15 Deputy PDs, 9 Previous PDs, 15 Consultants and 7 Residents. Seventy-three had previously heard of CanMEDS. Fifty-eight respondents don't believe there are sufficient numbers of clinical teachers able to teach CanMEDS. The need for education in all roles was identified; the frequency was greatest for Health Advocate and Manager. Seventy-three reported a 75-90% chance they would attend a CanMEDS workshop offered by the CCC. The vast majority of respondents hope the CCC will assist to improve the quality of resident education. This questionnaire highlights the need for CanMEDS faculty development and a desire to participate in CCC programs.

013

Transfer to workplace of competencies learnt in a program for educational supervisors training offered by the East Midlands Healthcare Workforce Deanery

C. Matheson¹, D. Matheson¹

¹University of Nottingham / East Midlands Deanery, Nottingham, United Kingdom.

Aims: To gain a better knowledge and understanding of the transfer to the workplace of the impact of competencies learnt in a program for educational supervisors training.

Methods: A total of 400 consultants who attended a two day Program for Educational Supervisors Training (PEST) were surveyed in the form a pre-PEST questionnaire asking them to rate themselves against each of competencies taught on the course and of what they most wanted to learn. At the end of the course they were surveyed by way of an identical post-PEST questionnaire. They were also surveyed in relation to how much they had learnt from the course. Between 4 and 6 months after the course participants were sent a follow up identical post-PEST questionnaire and asked open ended questions about how PEST changed their practice.

Results: Data are still being analyzed but preliminary results show highly significant improvement in all the competencies in both the post-PEST and the follow-up PEST survey.

Conclusions: It appears the participants have benefitted from the PEST course and significantly increased their competencies both in the short and in the longer term.

014

Greatest challenges faced by educational supervisors in postgraduate medical educationD. Matheson¹, C. Matheson¹

¹University of Nottingham/East Midlands Deanery, Nottingham, United Kingdom.

Aim: To gain a better knowledge and understanding of the transfer to the workplace of the impact of competencies learnt in a program for educational supervisors training.

Method: We surveyed 400 consultants who attended a two-day Program for Educational Supervisors Training (PEST) using a pre-PEST questionnaire asking them to rate themselves against each of competencies taught on the course and of what they most wanted to learn. At the end of the course they were surveyed by way of an identical post-PEST questionnaire. They were also surveyed in relation to how much they had learnt from the course. Between 4 and 6 months after the course participants were sent a follow up post-PEST questionnaire and asked open-ended questions about how PEST changed their practice.

Results: A total of 243 of 400 responded to the follow-up questionnaire. Comparing pre/post and pre/follow-up questionnaires showed highly significant improvement [$p < .0005$]. Effect size [eta-squared] was large to very large in all cases.¹ Typical comments in the free-text in the follow-up included "Tried out new feedback on our Registrar", "I was able to use the information to provide a structural framework for the educational supervisor's meeting", "I am more knowledgeable myself now about education supervision" and "Better equipped to supervise." In comparing post and follow-up, there were no significant differences except in 5/26 cases and in these the effect size was small to very small.¹ The greatest improvements between pre and follow-up questionnaires concerned "Demonstrating the generic competencies required for educational supervision", "Formulating a conceptual framework for educational supervision" and "Optimizing the educational impact of feedback" where eta-squared was .37, .37 and .35 respectively.

Conclusions: It appears the participants have benefitted from the PEST course and significantly increased their competencies both in the short and in the longer term.

¹ Cohen, J. *Statistical Power Analysis for the Behavioral Sciences* (second ed.). 1988. Mahwah, NJ: Lawrence Erlbaum Associates.

015

The internal review as a vehicle for program improvement, faculty development and career advancementM. Lypson¹, P. Ross², U. Committee³

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Background: In the US, the Accreditation Council for Graduate Medical Education (ACGME) mandates that each institution have an internal review committee as part of the formal accreditation process for the oversight of postgraduate medicine programs. This process is in place for program improvement at the midpoint of the accreditation cycle. The University of Michigan Health System Institutional Internal Review Committee is comprised of a standing committee of ~10 faculty and residents. This standing committee model provides participating faculty and residents with a unique opportunity to play an active role in the oversight of the more than 95 accredited post-graduate medical educational programs. It may provide career opportunities and faculty development for its members.

Objective: Measure the impact and opportunities for faculty development as part of participating in a standing internal review committee

Methods: Committee members participated in either one focus group or one face-to-face interview in which they were asked a series of open-ended questions. Sessions were audio taped and transcribed verbatim and evaluated according to thematic content. Data were analyzed using grounded theory methodology.

Results: Several themes emerged regarding committee membership; it was noted that participation led to:

- Further solidification of career goals/objectives as well as Career Advancement
- Resident exposure to faculty as peers
- Improved awareness of the educational rationale of program objectives
- And Improved advocacy for resources on behalf of residents

Conclusion: There are great advantages to having a standing internal review committee, which includes trainees. The members become very knowledgeable and gain educational expertise. This model may serve as an ideal vehicle for both faculty development and program improvement.

016

Building capacity for quality: An experiential co-learning quality improvement curriculum for faculty and residentsB. Wong¹, J. Goguen², K. Shojania¹,

¹Sunnybrook Health Sciences Centre, University of Toronto, Toronto, ON;²St. Michael's Hospital, University of Toronto, Toronto, ON.

Residency programs should teach their trainees quality improvement (QI) concepts, but often lack adequate faculty capacity to deliver a QI curriculum. We piloted a new co-learning QI curriculum in 3 medical sub-specialty programs that have limited faculty to teach QI. Three key design principles guided curriculum development: 1) Faculty leads and program directors as co-learners with residents; 2) Team-based QI projects with faculty and resident team members; and 3) Close alignment of projects with divisional QI activities.

The curriculum includes 2 half-day workshops, a longitudinal QI project, and final project presentations. We measured impact on learner knowledge, skills and attitudes using self-reported surveys, and plan to conduct focus-group interviews to assess impact on faculty's readiness to perform and teach QI.

Fourteen residents and 6 faculty from Endocrine, Oncology and Nephrology programs participated in the pilot curriculum; ten residents completed post-workshop evaluations (response rate = 71%). Self-reported assessments of knowledge (4.6- 4.8 out of 5), skills (4.1 - 4.5 out of 5), and attitude (4.5 - 4.6 out of 5) were high among residents. QI projects are currently underway, and the impact on clinical processes is being evaluated. We will conduct faculty focus groups to determine readiness for QI at the end of the curriculum. An additional 6 subspecialty training programs have already enrolled to participate in the upcoming academic year.

A pilot curriculum targeting faculty and residents as co-learners effectively taught QI principles and engaged teams in carrying out QI initiatives. Given the early findings, this is a promising model for programs who have limited faculty to teach QI to educate residents and build faculty capacity concurrently.

017

Duty Hours: Where have all the residents gone?

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¹Queen's University, Kingston, ON.

Background: IM residents have traditionally worked long hours during training. To promote the well-being of residents, regulations limiting duty hours have materialized. Training programs will be expected to monitor duty hours accurately to ensure compliance with regulations.

Objective: To design and implement an online tool (Resident Calendar) that accurately reports duty hours worked per resident when on an Internal Medicine (IM) Rotation.

Methods: A tool was created to apply duty hour rules to schedule on-call shifts (excluding ICU residents) and time off requests for 156 residents (IM and rotating) per year. The tool records demographic data and home program information. With this information, chief residents and administration staff are able to effectively prepare call schedules, approve requests and monitor duty hours. We also compiled data on work days missed due to post-call, vacation, professional or lieu days.

Results: We present data from July 2011 to March 2012. Residents are working long hours each week: On average PGY1 63hrs; PGY2 58hrs; PGY3 54hrs (range for all 46.5-87). A PGY2 night float system instituted in our hospital has shown a lower duty hour burden and fewer missed clinic/educational days. The percentage of hours in hospital from 8am - 5pm is as follows: PGY1 59% (63hrs x 59% = 37hrs); PGY2 80% (58hrs x 80% = 46hrs); PGY3 75% (54hrs x 75% = 41hrs). Residents missed an average of 46 days (range 23-60), of which 18 days is related to post-call.

Conclusion: Resident Calendar provides important information regarding resident duty hours. IM residents in our institution are working an average of 58 hours per week. The number of working days missed by residents is significant and has implications for their education. The night float system shows to have an educational benefit for our PGY2s.

018

Bridging the gap: An assessment of international medical graduates' learning needs at the start of a Canadian residency training programA. Duncan¹, M. Poddar¹, S. Haider¹

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International medical graduates (IMGs) comprise a growing proportion of residents in the Canadian medical system and bring with them a unique set of experiences and skill-sets. Assimilation in to post graduate Canadian training programs can be a stressful period.

We designed a survey to better understand the challenges that IMG residents face at the start of a Canadian residency program. We electronically distributed a 13-question survey to both IMG (n=40) and Canadian medical graduates (CMGs) (n=30) across various post graduate training programs at McMaster.

The IMG and CMG cohorts reported similar comfort levels with respect to medical knowledge, patient communication, procedural and clinical skills at the start of their residency training. Significant differences were seen in the comfort level of daily resident responsibilities, including order writing, computer navigation, dictations and discharge summaries. 90% of IMGs surveyed, compared to 13% of surveyed CMGs, felt it would have been beneficial to receive additional training with respect to these responsibilities. Further, over 78% of IMG residents felt they would have benefitted from a brief shadowing period in order to better understand the expectations of their residency program, in comparison to just 20% of the CMG cohort.

Though a pre-residency training program is mandatory for incoming Ontario IMGs through the Centre for the Evaluation of Health Professionals Educated Abroad (CEHPEA), only 19% felt it adequately prepared them for the daily responsibilities of a Canadian resident in their early days of training. This survey identifies a significant gap between the comfort level of incoming IMG residents and the expectations of a Canadian residency program, specifically with respect to daily responsibilities. It would be important to consider bridging this gap for IMG residents prior to starting their residency program.

019

Selection of future medical practice: Using the Australian Medical Schools Outcomes Database to inform national workforce planningD. A. Kandiah¹

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In order to plan for medical specialty training positions and placements, there needs to be knowledge of likely demand from graduates. While it is recognized that more recent graduates are keen on work-life balance and would tend to choose areas of specialization that would facilitate this, the impact of this hypothesis needs to be tested.

Australian medical students are invited to complete standard questionnaires at completion of medical school and at the end of their first postgraduate year. This study was to investigate final year medical student and recent graduate choices for future specialization and to compare with previous research in this area. The sample ($n=892$) consists of participants from 8 Australian medical schools who completed the exit questionnaire (EQ) in 2008-09 and the internship (PGY1) questionnaire in 2009-10. Respondents were asked to either select one specialty for their chosen future medical practice (decided) or three areas of interest if they were undecided.

Comparing the final year medical students' responses with their responses as recent graduates, there was a 3.2% increase in selection of Adult Medicine including medical subspecialties. Comparisons to other popular disciplines suggest a similar rise in percentages in General Practice and Anaesthetics. In 1989, a similar study was performed in one Australian medical school. The percentage change over time observed reflects alternative specialties available that can facilitate good work-life balances like Anaesthetics and more in favor of General Practice and Emergency Medicine with sessional work. This has implications for workforce planning and scope for exposure to other specialties in early postgraduate training programs.

020

Entente Québec-France: Résultats et suiviE. Prigent¹, S. Leboeuf¹, A. MacLellan¹

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L'arrangement de reconnaissance mutuelle (ARM) des qualifications professionnelles, entre le Québec et la France pour les médecins, est entré en vigueur en novembre 2009. Cette présentation fera l'état de la situation pour les médecins français qui désirent pratiquer au Québec pour les 28 spécialités visées, incluant la médecine de famille.

Un résumé des conditions de l'entente sera présenté. L'analyse des données, incluant les résultats du stage d'adaptation (stage d'évaluation), sera présentée par spécialité de façon quantitative et qualitative. Les défis et enjeux liés à l'adaptation à la pratique au Québec seront explorés ainsi que les impacts sur les milieux de formation agréés des résidents.

En date du 29 février 2012, 131 demandes écrites ont été reçues et traitées. Certains candidats sont en stage ou en attente du stage et d'autres l'ont complété. 37 permis ont été délivrés. Selon les champs de pratique, plusieurs personnes ont échoué le stage.

La réussite d'un stage d'adaptation à caractère évaluatif est nécessaire avant la délivrance d'un permis. La pratique et l'organisation des soins au Québec diffèrent de ce qui prévaut en France.

The Quebec-France agreement: Outcomes and follow-up

The mutual recognition arrangement (MRA) between Quebec and France regarding physicians' qualifications came into effect in November 2009. This presentation will report on the current situation facing physicians from France who wish to practise in Quebec in the 28 MRA-affected specialties, including family medicine.

A summary of the MRA's terms and conditions will be provided. The data analysis, including the outcomes of the adaptation traineeship (assessment traineeship), will be presented by specialty in a qualitative and quantitative manner. Both challenges and issues related to adaptation capacity to practise in Quebec will be explored as well as the impacts on the accredited residency training environments.

Since February 29, 2012, 131 written applications have been received and processed. Some applicants are completing a traineeship while others have already done it. Thirty-seven licenses were issued. Depending on the scope of practice, several people failed in completing successfully the traineeship.

It is required to pass an assessment-based adaptation traineeship prior to be issued a license. The organization and practice of care in Quebec vary from those in France.

The mutual recognition arrangement (MRA) between Quebec and France regarding physicians' qualifications came into effect in November 2009. This presentation will report on the current situation facing physicians from France who wish to practise in Quebec in the 28 MRA-affected specialties, including family medicine.

021

How SARS changed residency education in TaiwanS. Liao¹, T. Chu², C. Chan³, M. Chen⁴

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SARS erupted in Taiwan in 2003 and revealed the problem of over specialization in medical training and the lack of public and community health care training in residency education. This medical crisis helped Taiwan to realize how the national health care system, which encouraged medical specialization, had led to the ignorance of general practice.

Taiwan launched a brand-new post graduate year (PGY) medical training program as part of the residency education for the purpose of enhancing physicians' general practice competency. This program was carried out in 3 steps because, first, teaching hospitals needed time to train clinical teachers and develop curriculum. Second, these hospitals also needed time to gradually balance out the new manpower demand brought by the PGY program. Third, a gradual approach decreased possible resistance to a new program among residents. In stage 1 (2003-2005), residents were required to take a 3-month PGY training that included medicine, surgery and community medicine. In stage 2 (2006-2010), the PGY program lasted for 6 months and included medicine, surgery, pediatrics, emergency medicine, community medicine and a specification of personal choice. Beginning in 2011 in stage 3, PGY training became yearlong and OB/GYN was added to the program.

This change in residency education in Taiwan is a good demonstration of how medical education should fulfill the needs of the people. Therefore, the quality of the new PGY program and its effectiveness on the promotion of healthcare should be carefully monitored and evaluated.

022

Careers in Surgery: Concerns, expectations and residents' post residency plans

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Although progress has been made in creating forecasting models to predict physician supply and demand, health human resources planning is an inexact science and dependent on broader trends. Data collected in 2011 as part of a yearly exiting resident survey at the University of Toronto indicate a growing concern among residents over a lack of career opportunities. Specifically, greatest concern was voiced by residents in the surgery specialties.

To further investigate future career plans we conducted an online survey with Surgery residents (n=142), excluding international sponsored residents, and followed-up with two focus groups (n=24). The majority of surgery residents (80%) expressed concerns about securing a position in their chosen specialty or subspecialty and almost 85% plan to pursue post residency fellowships rather than independent practice. "It's not a question of *if* we're doing a fellowship; it's *how many* fellowships are we going to do?"

Potential causes of lack of employment opportunities for surgeons in Ontario include a general decline in retirement rates among older physicians, new graduates' desire to remain in a large urban area rather than pursue employment opportunities in smaller communities for personal and professional reasons, and a perceived value attached to increased subspecialty training. Implications may include a future dearth of available fellowship positions and mass migration of newly trained surgeons to the US.

These results underscore a need for careful planning to ensure new graduates are well prepared and have an interest in practicing in areas of high population need and to ensure we have systems in place to maximize the public investment in educating and training doctors in Canada.

023

A financial accountability map for residency training

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In an environment of increasing financial accountability for investments in postgraduate medical education, the Postgraduate Deans in Ontario prepared a business case to support expansion of RCPSC specialty positions in both established and distributed training sites.

A working group developed a methodology which segmented the costing exercise into four steps: (1) Identification of 10 cost categories for specified education activities such as clinical skill development, evaluation, research etc. (2) describing each of the cost categories in detail and linking the activities to the existing RCPSC accreditation standards (A and B standards); (3) working with medical school finance experts to develop cost estimates for each category and (4) attributing both variable and fixed costs to a single resident for purposes of expansion costing. The cost per resident was validated through a detailed review by each Ontario PGME office, compared to an average cost estimate developed independently by each Ontario medical school and compared to other cost estimates used across Canada.

The methodology provided medical schools, government and other stakeholders clear accountability for investments required to introduce and sustain an educational infrastructure needed for the increasing distribution of learners outside Academic Health Science Centres. The creation of a financial accountability map using the accreditation requirements demystifies the component costs of developing and sustaining RCPSC residency training programs. The use of a business case model to estimate the resource requirements of specialty expansion, in the context of accreditation, proved a successful approach in securing necessary funding for 75 additional specialty PGY1 positions in Ontario.

024

Education, patient care and trainee wellbeing in Ontario teaching hospitals: A survey of traineesR. Osborne¹, N. Tackey¹, J. Johnstone¹, R. Schneider¹, A. Atkinson¹, C. S. Parshuram¹

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Background: Service and education in teaching hospitals are time-sensitive and compete for the limited time of residents.

Objective: To evaluate responses to a survey describing service and education in residents in two Royal College training programs.

Methods: A cross-sectional survey was designed, pre-tested and administered on 5 occasions from August 2010 to October 2011. We report the duty periods worked, educational opportunities and attendance, staff supervision, and self-reported learning. Respondent ratings included 10-point Likert Scales. Lower numbers indicate less of the attribute described. Data are reported as percentages or median (Interquartile range).

Results: The 87 respondents from Critical Care 27(50%) and Pediatric Medicine 60(45%) described 85 resident-months preceding, and 65 duty-periods that began on the day of the survey. In the 1-month before the survey residents had a 6(4-9) days free of duty and worked 6(5-7) overnight duty periods. In the week before the survey formal teaching was scheduled for 6(3.5-8) hours and residents attended sessions for 4(3-6) hours. 45(69%) of the 65 duty-periods included scheduled education sessions, 8(22%) residents did not attend; 5(11%) because of clinical responsibilities.

The 65 duty-periods included 53(82%) handovers that took 30(15-60) minutes and were rated 7(0-9) for staff involvement and 3(0-1) for learning. Over each duty period staff physicians supervised residents for 60(25-180) minutes. The overall rating of the usefulness of the duty period for practice as a physician was 6(5-7).

Conclusion: In this cross-sectional analysis of critical care and pediatric medicine trainees we found attendance at 2/3 of the scheduled education sessions including missed teaching due to clinical responsibilities in 1/9 of duty-periods surveyed. Staff supervision of was noted for most duty periods, and the utility of duty-periods for professional practice was reflected in overall ratings by residents.

025

What's old is new: discourses of generalism and specialization in medical training since 1910

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The recent Future of Medical Education in Canada postgraduate (FMEC-PG) environmental scan report highlights the importance of generalism in postgraduate medical education. There has long been a perceived tension between generalist values and expertise and a trend towards ever-more specialization. Understanding the discourses that underpin these themes can assist medical educators to better design balanced programs.

Using a critical social science theoretical framework, the objective of this research was to identify discourses of generalism and specialization in the medical education literature since 1910.

The authors assembled an archive of texts from the Flexner report of 1910 to the recent FMEC-PG report which included a purposive sampling of relevant articles in the journal *Academic Medicine*. The authors conducted a Foucauldian critical discourse analysis of the texts, looking for key words, statements and metaphors associated with generalism and specialization. These were used to identify and describe key discursive elements.

Results of the analysis revealed a prominent and persistent discourse of 'new' that permeated recurrent statements of a need for generalism and a concerning trend towards over-specialization. Effects of this discourse of 'new' include a lack of historical recognition of the chronicity of the concerns, and a tendency to propose modest solutions for change focused on individual trainees. The discourse further functions to divert attention away from institutional or systemic issues.

Identification of this discourse allows medical educators the opportunity to incorporate more robust and systematic approaches to balancing generalism and specialization in residency training programs, so that we may train the best possible practitioners to serve the needs of society.

026

From arsenic to corticosteroid: How treatment has transformed Dermatology residency

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This paper explores how advances in the treatment of cutaneous diseases have transformed dermatology residency in the 20th century with a particular emphasis on measuring competency. Personal memoirs and oral histories, alongside contemporary studies of residency are used to trace the evolution of dermatology from its alchemic origins to evidence-based practice.

While the old adage of “if it’s wet, dry it; if it’s dry, wet it” might simplify the modern approach to dermatology, when the specialty began to take shape in the early 20th century, residents were inundated with multi-component compounded prescriptions. Treatments ranged from tar and 3% ichthammol in zinc oxide paste for eczema to the more controversial use of oral hydrochloric acid for urticaria.

Today, increased emphasis on procedural treatments and advances in technology demand a different set of skills from dermatology residents. How competencies are evaluated has also changed with a greater emphasis on disease resolution as opposed to improvement. The analysis of this transformation parallels changes observed in other residency programs but also highlights the unique nature of dermatology.

027

Perceived versus actual competitiveness by specialtyA. Bilbily¹, R. Bleakney²

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Deciding which medical discipline to pursue can be a challenging task for medical students. Many factors play a role but a particularly important component of the decision-making would be the perceived competitiveness of a specialty.

The purpose of this study was to correlate the competitiveness of entry into the different specialties as perceived by medical students versus statistics published by the Canadian Residency Matching Service (CaRMS).

A survey was administered to the four classes of undergraduate medicine at the University of Toronto asking them to rank what they perceived to be the top five most competitive disciplines. Information regarding the percentage likelihood of matching to a particular specialty was also gathered from the CaRMS website for 2006 to 2011, acting as a guide to the actual competitiveness.

Of the students surveyed (n=401) the perceived most competitive specialties were in order: Dermatology, Ophthalmology, Plastic Surgery and Diagnostic Radiology. According to CaRMS data the most competitive specialties were in order Dermatology, Plastic Surgery, Ophthalmology, and Medical Microbiology. The Pearson coefficient of correlation between perceived and actual competitiveness was 0.66 (a moderately positive correlation). The disciplines most overestimated in competitiveness by the students were cardiac surgery, neurosurgery, internal medicine, and anesthesiology. The most underestimated were microbiology, community medicine, and nuclear medicine.

There is imperfect perception of discipline competitiveness by medical students. The divergence is most pronounced in cardiac surgery, neurosurgery, internal medicine, anesthesiology, microbiology, community medicine, and nuclear medicine.

028

Publications misrepresentation: evaluating honesty among Otolaryngology residency applicants in CanadaL. Sater¹, S. Coupland¹, X. Zhang², L. Nguyen³

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Erroneous claims on curricula vitae have been documented in the literature. Medical graduates do not seem immune to this misdemeanor as authorship misrepresentation has been described for residency applications to various medical specialties in the states.

In this study we evaluate the prevalence of research citations misrepresentation amongst Canadian Resident Matching Service (CaRMS) applicants to Otolaryngology (OTL) residency programs.

CaRMS application forms to all OTL Canadian residency programs, from 2006 through 2008, were reviewed for journal publications and articles reported as "accepted/in press". Citations were verified by searching PubMed, Google Scholar, and electronic journals. Misrepresentations were defined as either 1) non-authorship of an existing article 2) claimed authorship of a non-existing article or 3) self-promotion of the applicant's name on the author list. Outcomes included descriptive statistics as well as sub-analyses pertaining to age, gender, affiliated medical school, academic degree, as well as the number of publications per application.

One hundred and eighty two applications were reviewed. There were 427 publications reported by 124 applicants (68.1%). Of the 385 verifiable publications, 47 (12.2%) were misrepresented by 29 applicants (23.4%). Univariate analysis showed that being from a Canadian medical school was associated with misrepresentation ($P=0.049$). However, age, gender, academic degree, as well as the number of citations per applicant did not correlate with the rate of misrepresentation ($P>0.1$).

Misrepresentation of research publications occurs among Canadian otolaryngology residency applicants. Guidelines should be developed to lessen its incidence.

Available data during resident selection and predicting physician performance: A meta-analysis

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Selection of residents is often based on the premise that applicant data is predictive of who will become excellent physicians. Although there is abundant literature analyzing predictors of physician success in residency and beyond, there is little consensus as to their validity.

The purpose of this study is to use systematic review and meta-analysis to identify which, if any, data available to the resident selection committee are predictors of physician performance.

Electronic databases were searched through June 2011. Two reviewers independently selected studies meeting the inclusion criteria and study data were extracted in duplicate with disagreement resolved by consensus. Risk of bias was assessed using a customized bias assessment tool. Meta-analysis was done using a random-effects model. Ninety-one studies met the inclusion criteria (53932 subjects).

Medical school marks in pre-clerkship and clerkship were most strongly predictive of physician performance; 9/13 studies (96% of subjects) and 29/43 studies (94% of subjects), respectively, found a positive correlation. Interview scores were weakly predictive; 7/26 studies (28% of subjects) had a positive correlation. Research publications were least predictive (1/15 studies positively correlated; 8% of subjects).

Our meta-analysis found the Dean's letter was the poorest predictor of performance on in-training evaluation reports (ITERs) ($r=0.08$; $p=0.203$). Surprisingly, the strongest predictor of ITER score was medical school reputation ($r=0.478$; $p=0.008$). In summary, much of the data used to select applicants for residency is poorly predictive of physician performance. Resident selection criteria may need to be revised based on this new evidence.

030

A national competency-based surgical trainee selection process: The Australian Orthopaedic Association experience

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Our Association nationally selects to its Surgical Education and Training (SET) Program. Our selection process aims to appoint the highest caliber trainees, on the basis of merit, through fair, open and accountable methods. Continuous review is undertaken to ensure that his aim is achieved, and maintain the validity and objectiveness of the process.

Eligible applications follow a multi-step progression through 3 core selection tools:

1. Structured Curriculum Vitae (20%) – applicants are scored on their prior education and experience;
2. In Depth Referee Reports (40%) –referees rate the applicant against the 9 SET Competencies. Information is collected in confidence from surgeons and non-surgeons who have worked with the applicant in the past 4 years; and
3. Semi-Structured Panel Interview (40%) – interviews are conducted by a series of 6 panels asking clinical, scenario based questions. Questions address a number of key attributes and are designed to assess the suitability of the applicant.

Results in tools 1 and 2 combine to determine progression to tool 3. Successful applicants are then offered positions based on their national ranking, which is the cumulative total of all 3 tools, and regional preferences.

An external statistician has been employed to analyze the effectiveness of each tool. Investigation confirms that the 3 tools are unique, measuring different aspects of the applicant's competence and suitability for the specialty. Entry into our specialty in Australia remains highly competitive as we work towards producing competent specialist surgeons.

031

A comparison of two parallel selection systems at the PUC residency programs

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Background: The Pontificia Universidad Catolica de Chile has trained medical residents since 1962. Currently the selection process is made in two different ways depending on the financial support the resident receives. Students who are paid by PUC funds are selected using a three step method which includes evaluation of quantitative as well as qualitative parameters (Chilean National examination scores, Medical School grading, recommendation letters, personal letter, psychological evaluation, two personal interviews)(System A). Residents who are funded by the Ministry of Health System are selected by method that includes quantitative parameters defined by that institution (System B); in this latter case the PUC can only accept or refuse the applicants.

Methods: We compare the failures rates of both systems during years 2008, 2009 and 2010, defined by the number of residents that have left the program for whatever reason, mostly academic or related to professional behavior problems.

Results: During the period analyzed, System A selected a total number of 174 residents, while system B selected 158. The number of failures were 5 for System A (2.9% of the residents admitted) and 11 for System B (7% of the admitted residents) (p=).

Discussion: There is a significant difference in the number of failures between the Systems A and B. Since the residents follow the same program, both groups are exposed essentially to the same educational environment and requirements and therefore we hypothesized that selection system might explain this finding. The use of qualitative parameters in the selection process is advisable.

032

The Multiple Mini Interview for selection of residents into a postgraduate Otolaryngology-Head and Neck Surgery programL. Nguyen¹, M. Campagna-Vaillancourt¹, J. Manoukian¹, S. Razack¹

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The Multiple Mini Interview (MMI) has been used commonly in the admission process for medical school given its proven validity and advantages over traditional interviews. However, there is a paucity of literature on the implementation of MMIs at the postgraduate level. The goal of this study was assess the acceptability of the MMI in the selection of residents into an Otolaryngology-Head and Neck Surgery (OTL-HNS) program.

Canadian medical graduates applying to OTL-HNS residency program underwent MMIs in 2011 and 2012. The MMI comprised of 7 stations, each evaluating unique candidate attributes, including surgical skills assessment and two simulation scenarios with standardized actors for non-cognitive traits. Upon completion, stakeholders rated various aspects of the MMI using a 7-point Likert scale.

Data was collected from 45 applicants and 19 evaluators. The majority of applicants (>80%) felt that MMI helped them present their strengths and that there was no gender, cultural or age bias. Assessors (>85%) felt that the MMI evaluated a valid range of competencies and that it tested more aspects of an applicant than traditional interviews. Both applicants and assessors (>70%) agreed that the MMI was a fair process and both preferred the MMI over the traditional interview. The use of simulation scenarios allowed the program to assess aspects of candidates not normally evaluated with traditional interviews all the while keeping the process fair and standard for them.

The MMI was well accepted by both applicants and assessors during the selection of residents into an OTL-HNS program. The majority of stakeholders preferred the MMI over traditional interviews, demonstrating that the MMI can be adapted at postgraduate level with good results.

033

The case for and against CASPer for screening IMG personal characteristicsH. Reiter¹, K. Dore¹¹McMaster University, Hamilton, ON.

Background: Canadian doctor shortages forced development of international medical graduate (IMG) entryways, resulting in high IMG numbers (23% of licensed physicians),¹ equivalent quality of care,^{2,3} and positive annual rate of return.⁴ Nevertheless, challenges exist. IMGs describe personal,^{5,6} and financial costs of a labyrinthine application process via Medical Council of Canada Evaluating Examination (MCCEE), multiplicity of provincial assessment centers, written/clinical exams, resident matching process and MCC qualifying exams. Residency program director survey identified CanMEDS roles of communication and collaboration as the sources of four of the five greatest IMG challenges.⁷ Those roles are not presently screened, despite the 2002 Canadian Task Force recommendation to increase the capacity to assess and prepare IMGs for licensure.

Objective: Provide a feasible, globally accessible, reliable, valid measure screening prospective IMG personal characteristics.

Methods: Computer-based Assessment for Sampling Personal characteristics (CASPer) is an online video-based situational judgment test used to screen thousands of medical school applicants in 2010 and 2011.

Results: CASPer had high generalizability (>0.8) and inter-rater reliability (>0.8) and good correlation with future personal characteristics measures (0.5, Multiple Mini-Interview⁸). With local software/helpdesk improvements and global internet enhancements, minimal baseline feasibility targets were met in 2010 and markedly exceeded in 2011. CASPer as an early screen of IMG applicants' personal characteristics might shift the IMG pool to one less challenged in communication/collaboration roles for a cost fractional to present fees.

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034

Assessment in a competency based surgical training programW. Crebbin¹, S. Beasley²

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The Royal Australasian College of Surgeons (RACS) is the accredited organization that oversees training and assessment across all nine surgical specialties for specialist registration in Australia and New Zealand. Introduction of the nine RACS competencies in 2003 exposed two problems: that previous assessment processes inadequately covered the full range of competencies; and they did not enable early identification of trainees in difficulty.

The new Surgical Education and Training (SET) program, introduced in 2007 is competency-based. Assessments ensure that trainees are assessed across all nine RACS competencies and increase the frequency, variety and validity of formative assessment. This has necessitated revision of some former assessment processes and introduction of new ones.

All specialties have modified their in-training assessment methods to cover the full range of competencies, and use multiple work-based formative assessment tools. These are graded to require higher levels of performance with progression through the program. Summative assessments (generic and specialty-specific clinical and sciences examination and the Fellowship Examination) graduate from assessing basic surgical knowledge with some clinical application, to detailed clinical understanding and professional judgement. Each exam assesses specific competencies.

In general, the new SET assessments have achieved their aims, but not without some degree of difficulty. The increase in work-based assessment has required supervisors to learn additional assessment skills. Early identification of trainees in difficulty has been enhanced, enabling remedial support. Higher expectations for assessing applied knowledge and skills have brought new challenges to both examiners and examinees.

035

Self-confidence scale for surgical trainees: A valid tool

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Self-confidence is a feeling of trust in one's abilities, qualities and judgment. It is one of the cognitive mechanisms underlying behavioral change. A survey of surgical residents revealed that 27.5% worry they will not feel confident performing procedures independently. Variations in self-confidence influence motivation and predict performance success.

We sought to validate a new tool for measuring self-confidence in surgical residents. A self-confidence rating scale was developed and consisted of six questions referring to gynecology resident attitudes during the performance of a vaginal hysterectomy (VH).

Residents were part of a prospective randomized controlled trial (2008-11) of a new educational intervention and performed a VH before and after this intervention. They rated their own surgical performance on a validated global rating scale (GRS) of surgical skill and their self-confidence on the new rating scale. Supervising surgeons concurrently rated their performance via GRS. Face and content validity of the self-confidence scale were established by consensus of the gynecologic surgeons involved in planning the educational trial.

There was no difference in self-confidence scores between intervention and control residents at baseline. Number of VH performed prior to the educational intervention significantly improved confidence level ($p=0.04$). Internal consistency between the individual scale items was good (Cronbach's $\alpha=0.85$). Test retest reliability was good (Spearman coefficient = 0.695). Criterion validity was established by comparison with GRS score and was good (Spearman coefficient = 0.598 and 0.793 for intervention and control groups respectively).

In conclusion, the self-confidence scale is a psychometrically valid tool to measure residents' self-confidence during the acquisition of a new surgical procedure.

036

Use of the Multiple-Mini Interview to assess non-medical expert roles with current residentsK. Dore¹, K. Kulasegaram¹, S. Kreuger¹, H. Reiter¹, M. Ladhani¹, V. Mueller¹

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Assessment of non-medical expert CanMEDS roles is a challenge for all post-graduate programs. Existing measures do not meet acceptable psychometric criteria, limiting the possibilities for reliable and valid assessment, which in turn limits useful feedback and learning. The Multiple-Mini Interview (MMI) has proven to be a reliable and valid measure of professional characteristics at the undergraduate and postgraduate admission level. However, there has been no evaluation of the use of MMI with currently matriculating residents. This study sought to determine if the MMI could reliably assess this more homogeneous group.

Prior to using MMI stations for CaRMS interviews 16 Obstetrics & Gynecology and 33 Pediatric residents completed a MMI.

A10-station MMI was run in the evening for each residency program; residents were not informed it would be an MMI. Most were familiar with the format MMI having participated in as applicant or assessor. All novel stations were used. Overall reliability of the MMI was 0.74 and 0.67, for Obstetrics & Gynecology and Pediatrics, respectively. In addition, a small sub-set of the residents (n=19) had completed an MMI for their CaRMS interview and the scores for these MMIs were correlated with performance on this in-program MMI. Despite the restriction in range (as programs ranking of CaRMS applicants was based on MMI scores) a non-significant but positive correlation of 0.42 was found. After correction for range restriction the correlation rose to 0.51. Finally there was no significant difference in MMI scores across level of trainee.

The results indicate some potential benefit to including MMI stations on their own or within a residency OSCE or at time of admission for the assessment of non-medical expert CanMEDS roles.

037

Workplace-based assessment in Canadian Anesthesiology residenciesN. Riem¹, M. Bould², W. Tavares³, M. Levine⁴, S. Boet⁵

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Workplace-based assessment (WBA) is defined as the evaluation of demonstrated professional practice in a real work setting by an assessor, and it is considered cornerstone of the theory of competency-based education. WBA tools include: portfolios, case-based discussions, the mini-clinical evaluation exercise (mini-CEX) and the direct observation of procedural skills (DOPS). In Canadian anaesthesiology residency programs, the use of WBA tools and training of faculty with WBA tools is unknown.

This study aimed to evaluate the use of WBA tools in Canadian anaesthesiology resident programs and to identify the current state of faculty development with respect to these tools.

Anaesthesia Residency Program Coordinators of all 17 University Departments of Anaesthesiology in Canada were included for an online survey.

The response rate was high with 68% (44 of 64 Resident Program Coordinators) representing 88% of the University Departments of Anaesthesia. The most widely used tools were locally designed assessment tools (25/64), DOPS (28/64), multisource feedback (20/64) and case-based discussions (24/64). Both oral and written feedback is indicated in 88.6% of responses with immediate feedback occurring in 61.8%. In most cases (65.5%), the Resident Coordinator gives delayed feedback and 31.8% feedback is given directly by the daily supervisor. The large majority of assessors (88.7%) did not receive training before the use of WBA tools.

WBA tools are widely implemented in all Canadian postgraduate Anaesthesia Programs, but the tools vary among teaching hospitals. Locally designed WBA tools are predominantly used raising the question of whether validity has been established. Faculty development appears to be underdeveloped and improvement may increase the educational benefit of WBA.

038

Assessing the utility of a modified Objective Structured Clinical Examination (OSCE) in the assessment of Orthopedic residentsV. Gavranic¹, B. Petrisor¹, M. Ghert¹, C. Stroud¹, M. Bhandari¹, K. Dore¹

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Assessment of competence at the post-graduate (PG) level relies heavily OSCE performance. While traditional OSCEs assess the performance of clinical skills (via interviews, simulations), they can conceivably assess other learning outcomes including clinical knowledge through stations consisting of multiple choice and short answer questions.

We conducted an OSCE consisting of performance and knowledge stations with Orthopedic residents at McMaster University with the aim of assessing utility of the OSCE (defined as reliability, validity, impact, acceptability, and feasibility). Three administrations to 20 senior (PGY 4-5) residents, and one administration to 20 junior (PGY 1-3) residents, took place between October 2010 and October 2011. The OSCEs consisted of 8 to 10 stations; half of the stations tested clinical knowledge and the other half tested clinical performance.

We used urGENOVA to calculate generalizability coefficients to determine the reliability of the examination. Rankings of the residents were compared to the OSCE results as a concurrent validation test. Exit surveys were administered to assess the acceptability and educational impact. Feasibility was assessed by calculating the cost of the OSCE per resident. The overall reliability ranged from 0.536 to 0.818 for the OSCE, 0.510 to 0.729 for knowledge stations, and 0.404 to 0.821 for performance stations.

The correlation between knowledge and performance stations was 0.662 ($p < 0.005$). This suggests that knowledge stations can be incorporated in the OSCE format without decreasing overall reliability. This also suggests that programs with resource constraints limiting their ability to run an OSCE could incorporate knowledge stations, to the advantage of students, allowing a broader assessment of topics.

039

Towards contextualized performance assessments: The influence of environmental factors on work-based assessments

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Context is critically important in shaping behaviours, yet the environment trainees and faculty work in is not taken into account in their evaluations.

Our objective was to explore trainees' and faculty's perceptions of the environment on the Clinical Teaching Units (CTU) in Internal Medicine to determine what aspects of the environment are thought to affect behaviour, and therefore evaluations; and to use this information to develop a tool to measure the presence and impact of contextual factors on work-based performance.

Using a grounded theory approach we conducted 7 focus groups with trainees (3 senior resident, 2 junior resident, and 2 student groups) and 2 focus groups with faculty. Analysis proceeded in an iterative fashion to identify contextual factors as well as the particular CanMEDs roles perceived to be most affected.

Workload and busyness emerged as the most important factors thought to affect evaluations. Other influences included residents' perception that they wore multiple hats that were not apparent to others; issues with the physical structure, policies, processes, and resources of the hospital; team and other educational issues; and importantly, the impact of other people such as the particular attending physician and allied health professionals. The roles most affected were Manager and Scholar, followed by Expert and Collaborator. Trainees felt their environment shaped their behaviours, yet had some faith that faculty take this into consideration on their evaluations.

Based on our qualitative results, we have developed and are piloting an environmental survey that may supplement current wards assessments.

040

Defining standards for a competency based surgical training program

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Background: While specialist medical competencies have been clearly defined, the stages and standards for acquiring the competencies have not been described within the clinical context of the workplace.

Objective: The Royal Australasian College of Surgeons (RACS) set out to define such a framework to provide performance markers for supervisors and trainees.

Method: A working party consisting of Fellows and College staff defined the structure and sequence of the standards. The working party chose to identify progressive development through five stages of increasing complexity (from pre-vocational to novice, to intermediate, to competent to proficient). Key performance markers were described for the nine RACS competencies and their three major patterns of behaviour.

Results: The resultant document, 'Becoming a competent and proficient surgeon: Training Standards for the Nine RACS Competencies' was distributed to the training boards of all of the surgical specialties in January 2012. After receiving positive feedback, the RACS Education Board and College Council approved it for use. The distribution of this work marks a significant step in meeting the challenge towards defining progressive standards of competence throughout training, not just in surgery, but across all post-graduate medical training. Since the RACS competencies are closely aligned to the original seven of CanMEDs, these competency standards could be adopted and adapted by medical disciplines other than surgery.

Conclusion: We have developed a framework that is aligned to the nine RACS competencies and which describes performance markers for different levels progressing from novice to Fellowship.

041

Developing a model of clinical decision making: A collaborative project

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Background: There is extensive literature on clinical decision making - how experts think, and the differences between thinking of novices and experts, however high level cognitive skills of decision making are frequently not well taught. Within the context of a meeting between Fellows and staff from the Royal Australasian College of Physicians, the Royal College of Physicians and Surgeons of Canada, and the Royal Australasian College of Surgeons, in March 2011, it was quickly recognized that clinical decision making can be defined as a fundamental competency which underpins the effective clinical performance of trainees and Fellows across the disciplines and geographic spaces.

Objective: To develop a model that captures the complexity of clinical decision making which encompasses the initial patient encounter and throughout the subsequent intervention and management. The model is intended to make explicit the dynamic, and often unconscious, thinking processes that enable an expert to be so efficient and effective.

Method: A literature review, along with consideration of their own thinking processes across a range of clinical environments, lead the working party to discussions about the many inter-related thinking process that underpin each phase of a clinical encounter.

Results: The resultant model identifies both the key elements and the continuous / simultaneous iterative thinking processes across the conscious and unconscious continuum.

Conclusion: The model appears to have face validity for physicians and surgeons in Australasia and Canada. It offers a specific framework for improved teaching and learning in judgment and decision making and effective identification of problems in decision making processes across a wide range of clinical environments.

042

A strategy for preparing residents for research and scholarly activityK. Miller¹, M. Ostapchuk¹, P. Patel¹

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The ACGME Common Program Requirements (IV.B.1., IV.B.2., and IV.B.3.) specify that institutions must encourage and support residents' scholarly activity. In large or geographically dispersed institutions, this support is often relegated to the program level.

Residents & Scholarly Activity is a full-day workshop introduced in 2011 by the University of Louisville to 2nd year residents in all specialties (N = 136) to help them prepare for scholarly activity. A 2010 needs assessment revealed wide variation in how departments prepared and supported residents in scholarly activity. The workshop was designed to equalize this instruction and introduce residents to research support services and training requirements necessary for their success. The course utilizes the expertise of faculty involved in the research process including library science, the Institutional Review Board, the Research Integrity Program, and faculty who taught research preparation within their own departments.

The program evaluation (exempted by the IRB) used a pre-post content quiz and opinion survey, a faculty/facilitator survey, independent observers, and a 6-month follow-up survey.

The pre-post content quiz and opinion survey found significant differences ($p < .05$) on 10 of the 15 items measured. Open ended comments were positive in regard to the instructional content and small group activities, but more negative on the length and level of detail offered in sessions on statistical processes. Faculty survey results ran parallel to residents' with an appreciation of the event in general, the learning activities and materials, but awareness that sessions on statistics and data management needed redesign. The team is now revising the 2012 curriculum with new activities and breakout sessions.

043

Professional culture influences how learners value feedback: variations on themes of constructiveness and credibility

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Background/Objective: Feedback is widely considered essential to learning, but its actual influence on learners is variable. We explored the influence of professional culture on learners' valuing of feedback.

Method: Using constructivist grounded theory, we conducted 12 focus groups and 6 interviews across 3 professional training cultures – music, education, and medicine. Constant comparative analysis for emerging themes was conducted.

Results: “Constructiveness” and “credibility” were valued characteristics of feedback in all 3 professional domains, but each culture defined these differently. The type of feedback considered constructive varied: negative/corrective feedback was considered constructive in music; positive/reinforcing feedback was favoured in education; both positive and negative feedback were considered constructive in medicine. The role of direct observation of performance as a determinant of feedback credibility varied: while implicit in music and important in education, observation was often absent in medical training. Determinants of teacher credibility varied: music students valued teachers' instructional skills over their performance skills, while medical learners valued supervisors' clinical skills over their instructional skills. Variations emerged in the credibility learners assigned to self-assessment relative to external feedback: music students valued teacher feedback and distrusted self-assessment, student teachers valued reflection but privileged supervisor assessment, and medical learners embraced self-assessment as a professional responsibility, sometimes trusting it above supervisor feedback.

Conclusion: Professional cultures define the constructiveness and credibility of feedback, shaping how learners value that feedback. Approaches to providing feedback must consider professional context; a 'one-size-fits-all' approach where generic feedback strategies are shared across professional domains may be inadequate.

044

Understanding communication between emergency and consulting physicians: Manifestations of conflict, conflict-prevention and conflict-resolution

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Introduction: This study examines physician insight into inter-physician conflict during the referral process, and suggests a model for better understanding it.

Methods: From March to September 2010, 61 physicians (21 in Emergency Medicine [EM], 20 in General Surgery [GS], and 20 in Internal Medicine [IM]) were interviewed. Two investigators independently reviewed transcripts using inductive methods associated with grounded theory to generate themes until saturation was reached. Disagreements were resolved by consensus, yielding an inventory of themes and qualifiers. Measures for ensuring trustworthiness included an external audit of the material by investigators not involved with the initial analysis.

Results: Our analysis suggests physicians are able to retrospectively describe both sources and prevention of conflict in the Emergency Department(ED) referral-consultation process. They are less able to describe steps they use to resolve conflict once it has already arisen during the referral-consultation process. We present a classification of conflict, and its prevention and resolution, based on the building and breaching of trust. We compare previously established models for understanding conflict as a breach of trust to create a framework for analyzing problems that arise during referral-consultation process.

Conclusion: Both Emergency and Consulting physicians and residents encounter conflict during the ED referral-consultation process. Our model may help physicians conceptualize conflict as breaching and building of trust. Our findings suggest re-building of trust may require a skill set currently not well optimized in both resident and attending physicians. More research is required to determine how to optimize physicians' ability to handle conflict of this nature.

045

Room for improvement: Learner and faculty perspectives on feedback and assessment

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The problems with feedback and assessment in Pediatrics, University of Manitoba are mirrored in the literature including:

- insufficient/ ineffective feedback;
- lack of/ incomplete data collection;
- fragmented/ incomplete assessments;
- avoidance of communicating negative messages;
- a need for faculty development on effective feedback.

While these issues have been well documented in the literature, few have looked at the perspectives of multiple stakeholders. Our objective was to determine the perceptions of medical students, pediatric residents and faculty regarding the effectiveness and efficiency of the feedback and assessment system.

Through focus groups/interviews or surveys (students only), perceptions about the assessment process were obtained. A grounded theory approach to data analysis was utilized. Themes were identified using a constant comparative method. Survey and focus group data were examined for triangulation and results were reviewed with selected participants, methods used to establish the trustworthiness of qualitative analysis.

The experiences described echoed the perspectives found in the literature as outlined above. Other themes included a) factors affecting receptivity to feedback including learner-preceptor relationships, self-assessment's congruence with feedback and perceived validity of feedback b) need for learner development regarding effective feedback skills.

Our stakeholder (learners and faculty) perspectives have contributed to the development of an enhanced feedback/assessment process. Rich narrative has been provided to illuminate the qualities of effective feedback and provided impetus for the further curriculum review and development of educational programs to teach learners effective feedback skills.

046

Factors contributing to medication errors in discharge summariesC. Dargavel¹, J. Ostro¹, P. Wasi¹, J. You¹, E. Pullenayegum¹

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Discharge summaries are critically important in communicating information and follow-up plans to physicians in the outpatient setting. However, these summaries frequently provide incomplete or erroneous medication information.

A review of the literature revealed a paucity of identified factors contributing to discharge summary medication errors. Given that almost 67% of adverse events post-discharge are the result of medication errors, we sought to determine 1) what type of errors are occurring, 2) which medications are commonly implicated in errors and 3) factors which contribute to medication errors in discharge summaries.

Retrospective chart reviews identified 249 consecutive Internal Medicine (IM) PGY-1 discharge summaries dictated during the clinical teaching unit (CTU) rotation. Two independent reviewers compiled factors potentially contributing to discharge summary medication errors into a standardized report developed a priori. 43.6% of discharge summaries did not contain an accurate medication list.

The most common type of medication error was a medication omission. Cardiovascular drugs were the most common class of drugs implicated in discharge summary medication errors. When dictated by a resident not routinely following the patient, medication errors occurred in 54.9% of discharge summaries as compared to 36.7% when dictated by a resident routinely following the patient ($p < 0.019$). This finding is particularly relevant given the increasing frequency of handover of care on clinical wards.

In conclusion, we identified a factor that may contribute to medication errors in discharge summaries. In order to improve patient safety, house staff education on obtaining accurate medication lists on discharge is essential.

047

Evaluation of a Surgical Research Methodology course in the Surgical Foundations Program: Preliminary resultsF. Farrokhyar¹, N. Amin¹, D. Dath¹, J. Bain¹, C. Gill Pottruff¹, J. Klie¹, C. Mitchell¹, S. Reid¹

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Evidence-based medicine (EBM) uses best scientific evidence for clinical decision making. Application and development of EBM requires a good understanding of the research methodology and clinical epidemiology. There are currently no published methods to guide teaching the research methodology to residents. We introduced a new progressive research program for surgical residents at McMaster University.

We compared the research performance of the surgical residents who attended the two-year surgical research methodology (SRM) segment of the Surgical Foundations Program with those who attended the Research Seminar Series (RSS) of the CORE program at McMaster University.

SRM program replaced the RSS in 2009. Year 1 of the SRM includes of 10 teaching sessions on the principles of clinical epidemiology focusing on the surgical examples and Year 2 involves individual training on the development of a research project. RSS included 15-20 lectures on research methodology over a 2-year period. For each resident, objective evaluations and grades were assigned for quizzes (SRM=9-10 and RSS=2) and for a one-time research presentation. Percentages with 95% confidence intervals are reported and compared.

A total of 59 surgical residents who took the SRM were compared with 124 RSS surgical residents with similar demographics. The overall evaluation grade was 83% (82%,-85%) for residents who attended the SRM Program significantly and it was 73% (71%-75.5%) for those who attended RSS with p-value of <.001. The quiz and presentation grades were also significantly higher (P<.001) for SRM Program (84% (82%, 85%) and 83% (81%, 85%)) compared to RRS (66% (63%, 69%) and 79% (77%, 81%)), respectively.

Understanding of the research methodology and research performance of the surgical residents significantly improved after attending one-year progressive sessions on the clinical epidemiology and research methodology followed by one-year focus on the development of a research project. Proper understanding of research methodology and undertaking high quality research projects would benefit surgical residents in the application, practice and development of EBM.

048

A Canadian survey of Obstetrics & Gynecology faculty and residents on current surgical teaching and evaluation

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Currently, there is no standardized surgical skills curriculum or evaluation tool to guide surgical technical skills education in Obstetrics & Gynecology residency programs across Canada.

Following Research Ethics Board approval, we created a survey using Survey Monkey to gain an understanding of current surgical evaluation practices in Obstetrics & Gynecology residency programs across Canada and describe any differences in surgical evaluation between faculty and resident perspectives. The survey was electronically distributed to Canadian Obstetrics & Gynecology residents and faculty. Three separate requests were sent to maximize response rates. Descriptive analysis was performed.

The survey was completed by 82 faculty and 153 residents between April and September 2011. 44% of faculty and 33% of residents felt their programs current form of evaluation was the best method of evaluating surgical skills. More than 95% of respondents agreed that direct observation in the operating room was used for evaluation, with 81% of faculty feeling comfortable evaluating residents. Despite faculty feeling comfortable evaluating residents, there was a high rate of inter-observer variation. In addition, 58% of faculty felt the program identified residents in need of remediation but only 27% felt their program was properly able to remediate identified residents. The majority of residents (77%) felt they would benefit from more formal evaluation. Lastly, only 46% of residents felt prepared for independent surgical practice at the end of residency; however, 81% of faculty felt the residents were prepared.

Overall, the survey supports that both residents and faculty feel the need for more formal surgical evaluation tools for Obstetrics & Gynecology residency programs across Canada to enhance resident surgical evaluation.

049

Teaching Improvement Project Systems for residents: Program evaluation of goals and objectivesS. Polreis¹, K. Trinder¹, M. D'Eon¹, K. Premkumar¹, D. Bonnycastle¹

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Objective: Teaching Improvement Project Systems (TIPS) workshops are aimed at improving teaching skills. The purpose of this study is to determine the extent to which teaching improves after each day of TIPS, using resident self-assessments of and objective coders' ratings of short practice "microteaching" at the end of Day1, and at the end of Day 2. As well, work-related teaching sessions, both before and after TIPS attendance are being recorded and rated by coders to identify the extent to which residents use the skills taught in their professional teaching.

Methods: Residents (N=90) provided self-assessments of microteaching sessions and trained coders gave objective ratings on the following areas: objectives, motivational set, body (main content), and closure (conclusion). Paired samples t-tests were conducted to determine the extent to which residents learned skills taught at TIPS.

Results: Residents improved significantly in all areas after attending the first day of TIPS, as evidenced through self-assessments and objective ratings ($p < .001$). Residents perceived that their teaching improved significantly from Day 1 to Day 2 for body ($p = .006$, $d = .33$) and closure ($p < .001$, $d = .45$). Coders rated statistically significant improvements on objectives ($p = .032$, $d = .29$), body ($p = .014$, $d = .35$), and closure ($p = .024$, $d = .39$). Results pertaining to work-related teaching sessions will be reported. The initial results show that the use of TIPS teaching skills vary by department, but not necessarily by the learned skills of residents.

Conclusions: Results indicate that residents' teaching abilities improve in all areas after attending the first day of TIPS. However, fewer improvements were found from the first to second day.

050

First steps in the development of a novel CanMEDS Health Advocate portfolio for Pediatric residents

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Learning and evaluating the role of Health Advocate has been described as challenging by learners and teachers. Our objectives were to explore pediatric residents' and program directors' understanding and experiences of learning and teaching this role, their experiences using portfolios, and ideas for design of a portfolio related to health advocacy experiences.

Focus groups and interviews were conducted with pediatric residents and program directors, to explore their experiences of portfolio use, and of the advocacy role. Their thoughts on portfolio design, utility, and feasibility was also collected. Anonymous transcripts from focus groups and interviews were independently analyzed by each investigator. Major themes and sub-themes were generated and then discussed to generate final themes by consensus.

Residents and program directors were able to identify the key components of the Health Advocate CanMEDS role. Residents identified lack of adequate teaching and feedback around this role, and program directors expressed feelings of discomfort in evaluating it. Both groups had some experience with portfolios and there were varied opinions on the best design and format. Portfolios were seen by residents as most helpful when they received regular feedback and guidance about content.

In conclusion, there is a gap in pediatric residents' teaching and evaluation experience on the role of Health Advocate. A portfolio on health advocacy may improve residents' skills as advocates. Regular feedback and mentorship will be important components to ensuring success. Our findings will guide development and evaluation of a portfolio used to enhance resident education and evaluation in relation to the role of Health Advocate.

051

A sequential mixed methods approach to understanding the teaching and assessment of the CanMEDs Professional Role

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Purpose: To understand the interpretation and integration of the CanMEDs Professional Role in residency teaching and assessment.

Methods: Using a sequential mixed methods design, RCPSC residency program directors (PDs) from 7 specialties completed a survey on knowledge of elements of the Professional Role and teaching and assessment practices. Analysis was performed using SPSS and statistical significance was set at 0.05. Individual interviews were conducted to clarify and explore survey responses, including barriers to teaching and assessment and strategies for improvement. Qualitative analysis was guided by grounded theory.

Results: Survey response rate was 48% (n=46), 78% of which were medical specialty PDs. Informal teaching methods and assessment by direct feedback by clinical faculty were used the most frequently (94%, 98% respectively). Portfolios and written assessments were felt to stimulate resident self-assessment. Integrity and honesty were identified most frequently as key elements of the Role (96%). There was a positive correlation between PD experience and satisfaction with how the Role was taught ($R=.36$, $p=.03$), but not evaluated ($R=-.64$, $p=.67$). Interviews with 10 PDs invited personal reflection on teaching and assessing professionalism, and reached thematic saturation. Findings suggest that generational differences, institutional and regulatory influences, overlap with other roles, and congruence with PDs views of professionalism moderated understanding and teaching of the Role.

Conclusion: Challenges to teaching and assessing the Professional Role were confirmed by survey and clarified using interviews. Understanding these complexities and barriers may inform new strategies for accreditation and optimization of curriculum development and assessment.

052

Constructing theoretical frameworks: The role of theory in educational research

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Theoretical frameworks are the backbone of educational research and serve three principle functions. First, they situate a study within the boarder research landscape and make explicit both the linkages between theories in use and the assumptions that underpin them. Second, they serve as cognitive tools to scaffold understandings about how things fit and work together. Finally, they inform design and data collection choices, and shape analyses and the interpretation of results.

Achieving theoretical harmony in educational research often requires the threading together of multiple theories (e.g., learning, assessment, and feedback) to inform the development of a broader theoretical framework to guide a research endeavor. Constructing a framework of this nature can be challenging.

This process is explored in reference to a theoretical framework constructed to study assessment in residency education. The author shares how theories of self-regulation and formative and sustainable assessment were used to construct conceptual models of how physician and resident learning unfolds in the clinical context. An examination of how these models were then used to inform the development of a responsive assessment system follows. How the theoretical framework shaped research about the impact of the assessment system in terms of what research questions needed to be asked and which methods were most appropriate to address those questions is then explored.

The session provides a practical example of how theory is used to both inform educational innovation and shape the research process once the innovation is in place.

053

Looking back to inform the future: Using curriculum inquiry to take online teaching of intrinsic CanMEDS Roles to the next levelT. J. Bahr¹, M. Kennedy-Hynes¹, S. Glover-Takahashi¹

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This case report illustrates how systematic program evaluation using deliberative inquiry can inform and guide the revision of residency program curricula. In this case, an online program called PGCorEd™, implemented in 2008, teaches foundational aspects of the intrinsic CanMEDS Roles to 1st and 2nd year residents. A self-moderated, self-directed, online delivery model for the PGCorEd™ curriculum was selected to meet the challenges of teaching 1800 geographically dispersed learners with competing demands on time.

Deliberative curriculum inquiry, over 4 years, included qualitative feedback from Program Directors and residents that explored the curricular strengths and problems for the learners, faculty, content and context; and analysis of learners' PGCorEd™ Pre and Post Test results.

The program evaluation has demonstrated the power of online learning to provide high quality 'just in time' foundational curricular content on the intrinsic CanMEDS Roles with strong evidence of learning by participants. Additionally, the results indicated the learners' strong appetite for mobile resources and desire for faculty to take a more active role and engagement in the curriculum.

The program evaluation points clearly to solutions to improve the utility and impact of PGCorEd™. Solutions include: integration and linking of content to each residency program, improved platform to deliver content and materials as a searchable repository of teaching resources, reformatting of materials for mobile platforms, and enhanced faculty development support for program directors. This case report illustrates that systematic program evaluation using deliberative inquiry offered useful solutions, which informs the further development and refinement of the PGCorEd™ curriculum.

054

At the point of care: Point-of-care ultrasound in core Internal Medicine and General Internal Medicine residency programs in CanadaJ. Ailon¹, O. Mourad²

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Point-of-care ultrasound (PCUS) is ultrasonography performed in real-time at the patient's bedside. PCUS has the potential to improve the diagnostic certainty of the physical exam and to improve procedural success rates for procedures commonly performed by Internists such as paracentesis, thoracentesis, and lumbar punctures.

To the best of our knowledge, there are no published curricula, or guidelines for the use of PCUS in Core Internal Medicine (CIM) and General Internal Medicine (GIM) Training Programs. We conducted a national survey to assess the climate of attitudes and opinions regarding PCUS as well as its present usage in the field of CIM and GIM. We also sought to understand potential barriers to the implementation of ultrasound curricula in these programs.

GIM Program Directors, GIM Site Directors, and CIM Program Directors from across Canada were invited to participate in a survey over a 2 month period in 2011. The survey consisted of 8 multiple choice questions with one short answer response.

Seventeen of 32 (53%) programs responded representing CIM Program Directors (18%), GIM Division Heads (47%), GIM Fellowship Program Directors (24%) and 2 participants that held dual appointment (12%). One quarter of the programs surveyed offered formal training in PCUS. Seven programs (47%) own a dedicated ultrasound machine for GIM. All agreed (100%) that PCUS should be used by Resident Trainees and Staff Physicians on the General Medicine Clinical Teaching Units. Lack of Faculty trained in PCUS (87%), lack of access to PCUS machine (47%), and lack of financial resources (40%) were cited as the barriers to the implementation of PCUS in these programs.

As there is mounting evidence to support the use of PCUS in internal medicine to improve both diagnostic and procedural accuracy, and enhance patient safety, we believe that the time has come to implement and study a PCUS curriculum in CIM and GIM. A properly structured curriculum could lend itself well to a competency based, rather than a traditional time-based, assessment.

055

Orthopedic Boot Camp III: Examining the efficacy of student-regulated learning during an intensive laboratory-based surgical skills course

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We have previously presented compelling data that a boot camp course was highly effective at teaching and developing targeted technical skills. In the current study, we examine whether performance of these skills is improved when residents are trained using directed, student-regulated learning (SRL) compared with traditional instructional methods (IRL).

Twelve first-year orthopedic residents began their training with a one-month intensive skills course. Six were taught basic surgical skills using a format that focused on deliberate, self-regulated practice under instructor supervision. The remaining residents were taught the same surgical skills using more traditional methods that included an extended period of instruction. Performance on four targeted technical skills was tested using an objective structured assessment of technical skills for the two groups at the beginning and the end of the skills course.

Prior to the start of the skills course, there were no differences in performance scores between the two groups. On completion of the skills course, mean global rating scores for the four surgical skills tasks were significantly higher for the SRL group compared with the IRL group (SRL = 3.95 (0.1), IRL = 3.42 (0.1); $F(1,10) = 7.66, p < 0.02$). A similar pattern of results was revealed by the checklists scores, with the SRL group outperforming the IRL group (SRL = 94.9 (2.1), IRL = 86.4 (2.1); $[F(1,10) = 8.512, p < 0.02]$).

Previous work demonstrated the effectiveness of teaching basic surgical skills through an intensive course at the onset of residency. The present study shows that allowing surgical trainees to take a directed, student-regulated approach to learning basic surgical skills can further improve acquisition of these skills.

056

The gap between ultrasound use and training in General Internal MedicineM. Nadjafi¹, R. Cavalcanti²

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Background: Ultrasound technology is increasingly being used on general medicine wards for diagnostic purposes and guidance of bedside procedures. This contrasts with a relative lack of formal training offered to trainees.

Objective: We aimed to evaluate the gap between the clinical use of ultrasound and extent of training among residents and attending physicians on internal medicine clinical teaching units (CTUs). We also solicited recommendations about the best modality and venue for teaching ultrasound to internal medicine residents.

Methods: We conducted an anonymous electronic survey of 194 general internal medicine residents (PGY1-PGY4), and 58 staff internists at the University of Toronto regarding their experiences with using bedside ultrasound and their training.

Results: 117 (60%) residents and 29 (50%) staff responded. The majority of residents (75%) used ultrasound in a clinical setting, although most (95%) had not received formal training. Many (32%) had informal training by other residents. Results were similar for staff physicians. Majority of respondents stated that ultrasound training should be incorporated into internal medicine curricula and were interested in receiving formal instruction. Staff and residents agreed that procedural guidance (e.g. for central lines, thoracentesis, and paracentesis) is the most relevant ultrasound skill for internal medicine trainees. Staff and residents concurred that ultrasound training should start in PGY1.

Conclusion: There is a large discrepancy between clinical use of ultrasound and extent of formal training among internal medicine residents at our centre. Given the improved safety of procedures with ultrasound and its utility for bedside diagnosis we propose the identified competencies be incorporated into formal internal medicine curricula.

057

Teaching transvenous pacemaker insertion: YouTube, mannequins, and cardboardS. Akhtari¹, R. Husa²

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Cardiology residents are expected to be competent in placement of transvenous pacemakers (TVP). Currently, they learn through apprenticeship, but exposure is variable and often suboptimal. In the era of simulation-based education, it may no longer be acceptable to rely on apprenticeship as the sole method of training.

We designed a course for new cardiology residents (R4). They watched a video outlining the technique and practiced insertion of central lines on a simulator torso. Because our simulator does not allow for Cordis insertion, residents practiced TVP insertion without a mannequin, using only the pacemaker equipment. To enhance the experience, during the insertion of the pacing catheter, mock rhythm and hemodynamic tracings were displayed on cardboards alongside to teach rhythm interpretation and troubleshoot common problems.

A pre-test of 10 questions addressed both theoretical and technical aspects of the procedure. The same test was repeated at the end of the course to assess knowledge translation, and at 3 and 6 months to assess maintenance of knowledge. The same tests were administered to senior trainees (R5/R6, N = 8) who did not participate in the course at 0, 3, and 6 months.

Junior and senior resident scores were similar at baseline (R4, N = 9 mean score 6.89 /- 0.93; R5/6, N = 8, mean score 7.25 /- 1.16; p = 0.10). R4 knowledge improved after the course (mean pre-test score 6.89 /- 0.78, post-test 8.89 /- 0.93; p = 0.0001). R4 knowledge remained higher than baseline throughout the 6 months. At 6 months, R4 outperformed their more senior colleagues (mean score 8.14 /- 1.07 vs. 7.25 /- 1.58, p = 0.004).

Our findings suggest that simulation exposure enhances traditional apprenticeship-based learning and should be incorporated into cardiology curricula.

058

Improving the safety of vascular catheter insertion in high-risk newborns through standardized teachingA. Jefferies¹, M. Dunn², K. Lee³

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Umbilical and percutaneous central catheter placements in high-risk newborns are common NICU procedures with high complication rates, especially when inserter experience varies.

Our aim was to develop, implement and evaluate the effectiveness of a standardized catheter insertion teaching program for Neonatal-Perinatal Medicine residents and fellows in 3 NICUs to improve patient safety.

A survey of 71 inserters assessed learning needs. Results were used to develop a teaching program that included a manual; didactic seminars; self-study using an electronic module; pocket cards; and a low-fidelity simulation session at which trainees practiced and received feedback. Effectiveness of the curriculum was assessed by a pre- and post-training multiple choice knowledge test and X-ray quiz focused on recognition and management of catheter malposition, plus a post-training simulation performance test. Malposition of catheters inserted in the NICU was considered a complication indicator.

Residents and fellows considered real-life practice and simulation the highest rated teaching methods. Thirty-one trainees completed at least one training component over a 3-month period. Post-training knowledge scores (65.6±11.3% vs. 85.5±8.8%, n=24, mean±sd) and X-ray quiz scores (62.5±13.0% vs. 72.8±12.5%, n=23) improved significantly compared to pre-training (p <0.01). Performance checklist score was 85.4±8.6% (n=21). Learner satisfaction was high. The rate of catheter malposition decreased from 66% (n=292) to 61% (n=374), (p>0.05), with the largest change for umbilical arterial catheters.

We conclude that a standardized teaching program was successfully implemented and resulted in improved knowledge and recognition of malposition but not a significant decrease in catheter malposition rate in the NICU. Clinical training may have improved this outcome.

059

What makes a great resident teacher: A multi-center assessment of senior medical students' perceptionsL. J. Melvin¹, A. Burke¹, Z. Kassam¹, I. Mazzetti¹, L. Pitre¹, J. Neary¹, P. Wasi¹

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Residents are expected to play a critical role in the education of medical students. In fact, residents have a unique teaching relationship due to their close proximity in professional development and opportunities for direct supervision. Although there is emerging literature on instructional systems to prepare residents to be effective teachers, there is a paucity of supporting data on what medical students believe are the most important attributes of successful resident-teachers.

To address this question, we conducted a resident-as-teacher traits survey to undergraduate senior medical students from 6 medical schools attending a resident-facilitated clinical skills conference at McMaster University. The survey collected data on demographics, year of study, medical school, usefulness of techniques employed by resident teacher and qualities of a successful resident teacher.

The results of the survey (n=80) demonstrate that medical students found both the use of clinical examples (78%) and repetition of core concepts (71%) as highly useful for their learning. In contrast, the majority of medical students did not perceive giving or receiving feedback from residents was useful for their learning nor was the recommendation of additional resources considered particularly helpful. With respect to resident qualities, medical students felt tailoring teaching to the learner's level (83%) and a strong knowledge base (80%) to be highly important, whereas high expectations and being very serious was not valued.

This multi-center survey provides interesting insight into learners' perceptions on what techniques and qualities form a successful resident teacher, and may be of use in the development of Resident-as-Teacher curricula in the future.

060

Operating room hierarchy and trainees' ability to challenge authorityD. Sydor¹, M. Bould², V. Naik², J. Burjorjee¹, C. Arzola³, M. Hayter³, Z. Friedman³

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Operating room (OR) communication is important for team function and patient safety. Status asymmetry between team members contributes to communication breakdown and threatens patient safety.

We investigated how hierarchy in the OR team influences an anesthesia resident's ability to challenge an unethical decision by a staff anesthesiologist in a simulated crisis scenario.

After gaining local research ethics board approvals and voluntary informed consent we prospectively randomized 60 postgraduate years (PGY) 2-5 anesthesia residents at 2 academic hospitals to a videotaped simulated crisis scenario with a confederate OR team practicing a hierarchical team structure (group H) versus a nonhierarchical team structure (group NH). The scenario allowed residents several opportunities to challenge their staff anesthesiologist when administering blood to a Jehovah's Witness. Three independent, blinded raters scored the performances using the modified Advocacy-Inquiry Score (AIS).

The primary outcome was comparison of the best-response AIS between groups H vs. NH. Secondary outcomes included comparison of best AIS by PGY and the percentage in each group that checked and administered blood.

The AIS did not differ between groups ($p=0.832$) but significantly improved from PGY 2-5 ($p=0.026$). The rates of checking blood (92% vs. 76%, $p=0.082$) and administering blood (62% vs. 57%, $p=0.721$) were not significantly different between groups.

In conclusion, this study did not show a significant effect of OR team hierarchical structure on residents' ability to challenging authority, however the median best-response AIS were only moderate in quality. The concerning high rates of blood checking and administration in both groups may reflect lack of training in challenging authority with implications for patient safety.

061

Igniting resident research at the institutional level

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The institutional requirement to stimulate resident scholarly activity prompted our GME Office to implement initiatives that aligned our values, benchmarks, resources and infrastructure toward improving research productivity.

We implemented a series of initiatives in 2008-9 designed to significantly increase the number of resident and fellow peer-reviewed publications and research presentations at national meetings.

With the endorsement of the Dean, department chairs, and program directors, we established core values specific to scholarly work, institutional benchmarks and tracking methods to measure research productivity, and restricted resident travel funds to this purpose. We also implemented a 5-part research design and statistics series into the resident curriculum and became active reviewers in many of the journal clubs.

Fellows now participate in week-long research “boot camp” that concludes with their project proposals. We require each program to present their best work at Resident and Fellow Research Days preceded with on-line submission of structured abstracts and IRB documentation. In 2004-08, residents averaged 22 publications per year compared to 32 in 2008-09 and 40 in 2009-10. In 2004-08 they presented an average of 32 abstracts nationally, compared to 95 in 2009-10 and 111 abstracts in 2010-11.

Our GME initiative that emphasizes, facilitates, rewards, and monitors resident research demonstrated a marked improvement in the amount of resident scholarly activity in the institution.

062

How surgeons think: An exploration of mental practice in surgery

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Objective: Mental practice is the process of systematically imagining objects and movements. Studied and used extensively in sports psychology, mental practice in surgery is still in its infancy. This study explores the ways in which surgeons use mental practice in preparation for surgery.

Methods: Semi-structured interviews were conducted with 14 surgeons (11 general surgeons, 2 plastic surgeons, 1 orthopedic surgeon; 3 females, 11 males) who were purposively sampled for different experience levels and specialties. Data collection and analysis occurred in an iterative manner. Data were coded and analyzed using a constructivist grounded theory methodology. A reflexive approach was adopted throughout.

Results: All 14 surgeons used mental practice techniques. This included rehearsing complete procedures, only practicing pivotal steps in an operation, and imagining the surrounding physical and social environment. Visualization was used at different time-points, including before surgery to plan appropriate steps or to highlight overlooked ones, during surgery to re-orient or to troubleshoot and after surgery to reflect or to improve performance. Mental practice was also used to teach and to interpret radiologic images. Novice surgeons were found to rely more on mental practice for routine procedures, while experienced surgeons used mental practice for complicated or new operations. A common reason for using mental practice was to alleviate anxiety.

Conclusions: This exploratory study suggests that mental practice is an integral component of preparation for surgery. Although surgeons are not formally taught mental practice techniques, the approach might have great potential for learning surgical skills and for improving how experienced surgeons become excellent ones.

063

The effect of mental practice on crisis resource management: A simulation studyM. Hayter¹, D. Bould², M. Afsari³, N. Riem⁴, M. Chiu⁵, S. Boet⁵¹St. Michael's Hospital, University of Toronto, Toronto, ON;²Department of Anesthesia, The Children's Hospital of Eastern Ontario, Ottawa, ON;³Department of Anesthesia, St. Michael's Hospital, Toronto, ON;⁴Kantospital Hospital Liestal; Liestal, Switzerland;⁵The Ottawa Hospital, Ottawa, ON.

Purpose: Mental practice (MP) is defined as the 'symbolic rehearsal of a physical activity in the absence of any gross muscular movements' and has been traditionally used in sport and music to enhance performance. In healthcare, MP has been demonstrated to improve technical skill performance of surgical residents. However, its effect on crisis resource management (CRM) skills in high stakes clinical scenarios has yet to be determined. We aimed to investigate the effect of warm-up with MP on non-technical skill performance during a simulated crisis scenario.

Methods: Following Research Ethics Board approval, 40 anesthesiology residents were randomized. The intervention group participated in 20-minutes of MP based on a CRM script. The control group received a 20-minute didactic teaching session on a topic unrelated to CRM. Each subject then managed a simulated cardiac arrest. Video recordings of each performance were analyzed by two expert anaesthetists using the previously validated Ottawa GRS, time to start chest compressions, to administer epinephrine and blood.

Results: There was no significant difference between the intervention and control groups; total Ottawa GRS score (Median (Inter Quartile Range [Range]) (24.50 (18.63-28.88 [6.50-34.50])) vs. (20.50 (13.00-29.13 [6.50-34.50])) ($P = 0.53$); time to starting chest compressions 146.0 (138.0-231.0 [115.0-323.0]) vs. 162.5 (138.0-231.0 [100.0-460.0]) ($P = 0.27$), time to epinephrine administration 163.0 (151.0-187.0 [111.0-337.0]) vs. 187.0 (164.0-244.0 [115.0-310.0]) ($P = 0.09$), and time to blood administration 220.5 (130.8-309.0 [92.0-485.0]) vs. 252.5 (174.5-398.8 [65.0-527.0]) ($P = 0.48$).

Conclusion: Unlike technical skills, warm up with MP does not seem to improve CRM skills.

064

What do surgical residents learn in the operating room?A. Cope¹, J. Bezemer², S. Mavroveli¹, R. Kneebone¹

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Background: Duty hour limit have been reported to reduce operating room time for surgical trainees. While alternative learning environments such as simulation have been promoted as a potential solution to these challenges it is essential first of all to understand what residents learn in the operating room.

Objective: We conducted an exploratory study to describe what is learnt by surgical residents in the operating room. The subject is timely and important work due to the effect of work time restrictions.

Methods: This was a grounded theory study using in depth one to one interviews as the method. Twenty-two surgeons were purposively sampled, this included both trainers and trainees, and transcripts iteratively analyzed using a constant comparative method using NVivo Software, by a team of four researchers from different academic backgrounds. Emergent themes were developed and further questioning sought to explore areas of interest in more depth.

Results: The dominant theme that arose from the data was 'technical skill' however as described, this research intentionally strove to probe deeply what surgeons mean by this slogan term as the constituent skills may have relevance for other domains. Development of sub-themes and understanding the links between them was therefore a rich area for analysis. Sub-themes identified were - 'Factual knowledge', 'Motor skills', 'Visual interpretation skills', 'Haptic interpretation skills' and 'Contingency strategies'.

Conclusions: Simulation learning in surgical residency education has privileged the motor skills domain. This work suggests that simulation should also address cognitive aspects of surgical learning for example viewing of 'difficult' laparoscopic surgery video clips to promote learning of visual cue interpretation. This could be a cost and time effective pedagogical tool for surgical residents and warrants further exploration.

065

What are the views of surgeons in UK and Canada about learning using simulation within working hour restrictions?

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Background: Learning in simulation is now a core component of the surgical curriculum, with proposals for skills to be assessed in simulation prior to the learner being allowed to perform certain procedural skills on patients. Simulation training necessitates removing learners from the work environment for part of the day. It is not known how this is perceived by trainers and trainees.

Objectives: This study investigates surgeons' perceptions of learning in the simulation environment.

Method: This was an International multi-centre study with data collection in the UK and in Canada. Qualitative interviews were performed with Attendings and Residents - 33 participants in total. Interviews were audio recorded, transcribed and thematically analyzed using NVivo software.

Results: Surgical residents universally found simulation to be an excellent learning environment. Attending Surgeons were more reserved specifically commenting upon usefulness being determined but the fidelity and nature of the simulator. Both groups felt that simulation based learning should not count towards working hours and there were concerns about missing opportunities in the operating room due to compulsory simulation based teaching sessions.

Conclusions: Simulation based learning is perceived to be a useful tool for surgical residents however concerns were expressed about whether this should count towards work hours and whether the rigidity of compulsory sessions was in fact detrimental to workplace based learning.

066

A fresh look at simulation: Reconsidering fidelityS. J. Hamstra¹, R. Brydges², R. Hatala³, B. Zendejas⁴, D. Cook⁴

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In healthcare education, the concept of simulator fidelity is usually understood as the degree to which a simulator looks feels and acts like a human patient. While these sensory and physical attributes can be a useful guide in designing simulators, true educational effectiveness in simulation arises more from design features of the scenarios and their interaction with contextual and learner characteristics. In fact, several empirical studies have shown that the degree of fidelity appears to be independent of educational effectiveness.

We conducted a comprehensive systematic review and meta-analysis of the literature on technology-enhanced simulation, including virtual reality, mannequins, plastic models, animal models, and human cadavers.

From an initial pool of 10,904 articles published from 1966 to May 2011, we identified 985 original comparative studies of simulation-based medical education. One of the issues that arose as we tried to code for fidelity was the definition of high-fidelity vs. low-fidelity. Both occurred in terms of structural and functional aspects.

Our review concerning the definition of fidelity suggests it is much more multi-faceted and complex than a simple distinction of low- vs. high-fidelity would suggest. Several concepts that are typically associated with fidelity can be used to explain educational effectiveness, such as learner engagement, sensory augmentation and suspension of disbelief.

Given that these concepts more directly influence properties of the learning experience, we recommend abandonment of the term fidelity altogether.

067

Evaluating a practice-based learning and improvement curriculum focusing on the development of system level quality improvement skillsA. Tabatabaee¹

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Objective: The aim of this research was evaluated the impact of our curriculum on resident a practice-based learning (PBLI) and Improvement knowledge, self-efficacy, and application skills.

Method: Using a quasi-experimental design, we assessed the impact of a curriculum (PBLI quality improvement systems compared with non-PBLI) on heart medicine residents' learning during a 3-week ambulatory block. We measured application skills, self-efficacy, and knowledge by using the Systems Quality Improvement Training and Assessment Tool. Participants were heart medicine residents, postgraduate year 2 through 3, training at Medical University of Mashhad. Data were collected from residents during 6 intervention (PBLI QI systems curriculum) blocks (n = 26) and 5 comparison blocks (n = 20). Questionnaires were completed by residents at the outset of the first session (pre-test), prior to any discussion, and at the conclusion of the last session of the block (post-test). We evaluated the curriculum's impact using t tests, followed by multiple regression analysis to evaluate the intervention's impact after adjusting for prior experience.

Results: The groups did not differ significantly on any pretest items. Overall levels of PBLI knowledge and application skills were low. Groups were not different regarding distribution of post-graduate year ($P = 0.72$) and previous exposure to a PBLI curriculum ($P = 0.22$) (χ^2 analysis). The 2 groups showed differences in change scores. Relative to the comparison group, residents in the PBLI curriculum demonstrated a significant increase in the belief about their ability to implement a continuous quality improvement project ($P = 0.02$), comfort level in developing data collection plans ($P = 0.01$), and total knowledge scores ($P < 0.001$), after adjusting for prior PBLI experience. Participants in the PBLI curriculum also demonstrated significant improvement in providing a more complete aim statement for a proposed project after adjusting for prior PBLI experience ($P = 0.001$). Exit evaluations were completed by 90% of PBLI curriculum participants who reported high satisfaction with team performance.

Conclusion: Compared to the control group, residents participating in our PBLI curriculum demonstrated an increased understanding of key improvement concepts and tools, such as "change concept," "improvement model," "cause-effect diagram," "special cause variation," and increased ability to develop a complete aim statement. The observed improvements were related to fundamental quality improvement knowledge, with limited gain in application skills. This suggests that while heading in the right direction, we need to conceptualize and structure PBLI training in a way that integrates it throughout the residency program and fosters the application of this knowledge and these skills. Our findings will encourage residency programs to pursue a dialogue about challenges and opportunities for creating a developmental approach to teaching and assessing PBLI.

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Weighing the influences: Advice seeking during residency training

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Background: Observational data and “ad hoc” opinions suggest that advice-seeking as a response to clinical uncertainty is central to residency culture however, little is documented regarding this behavior or its impact upon patient care.

Objective: We sought to examine how medical residents seek advice when faced with clinical uncertainty in the inpatient setting.

Methods: We conducted audio-taped, semi-structured focus group interviews with internal medicine resident physicians to discuss facilitators and barriers to advice-seeking. Transcribed interviews were analyzed using grounded theory methodology with text coded via the constant comparative method. Trustworthiness and reliability of findings were addressed using ATLAS.ti qualitative data management software and an iterative process of code development. Six focus groups were conducted with 28 residents.

Results: Analysis of the focus group data revealed that residents’ advice-seeking is dependent upon situation specific balances of facilitators and barriers. Three themes emerged as primary influences: formal and informal social networks, the active versus passive availability of an advisor, and perceptions of risk and benefit. Throughout discussion was an undercurrent of residents weighing potential risks and benefits associated with advice seeking.

Conclusions: Our findings suggest the need to re-examine the infrastructure of support and supervision for trainees in the inpatient academic setting. Positive correlation between team relationships and seeking advice indicates the importance of establishing interdisciplinary teams on ward rotations. The influence of availability and the physical presence of an advisor highlight the vulnerability of clinical decision making during duty periods such as night float and weekends.

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