Leadership and Change in Residency Training:
A Call to Action

Le leadership et le changement dans la formation des résidents : un appel à l’action
Since 2012, the Journal of Graduate Medical Education (JGME) and the Royal College of Physicians and Surgeons of Canada have jointly selected the Top 3 Research in Residency Education papers from abstracts submitted to the annual International Conference on Residency Education (ICRE).

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

Each year, more than 200 abstracts are submitted and undergo peer review. Three winning abstracts are announced prior to ICRE, and are presented at a juried session during the conference. A Top Research in Medical Education Award and 2 runner-up certificates are given out. Commencing with ICRE 2014, the selection of the Top 5 Resident Papers was included in the award process.

Winning abstracts are published in the December issue of JGME, and are available online to readers via the Journal’s website (www.jgme.org).
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*Author names are underlined to indicate presenters.*
Challenging causality in community-based training

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Introduction: Although there has been a widespread move to community-based placements in Canadian residency training, there is some uncertainty regarding the educational affordances of doing so, and conflicting beliefs regarding the outcomes of such placements.

Objective: We conducted a study to explore residents’ experiences of community-based placements.

Methods: We conducted an interpretive phenomenological study based on interviews with residents in rural family practice training programs from 3 university-affiliated programs in Western Canada. Participants were asked to describe their current rural training site, and to compare it to their experiences of other rural training sites. Interview transcripts were thematically analyzed for issues related to training context.

Results: A total of 26 residents were interviewed from 9 regional and 28 rural placement sites. They described differences in patient mix, geography, educational experiences and opportunities, health care systems, medical culture, and community culture. Residents at the same training site often observed or noticed different things than their peers.

Conclusions: Our study challenges generic assumptions regarding the affordances of community placements, as we found that not only were no 2 rural sites the same, different trainees experienced the same site in different ways. Better understanding of the variant dynamics and opportunities afforded by different learners in different community-based placements can inform postgraduate medical education program planning, evaluation, and appraisal of program outcomes and individual trainee competencies.
How changing quality management influenced PGME accreditation: A focus on decentralization and quality improvement

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Introduction: Evaluating quality of postgraduate medical education (PGME) through accreditation is common practice worldwide. An appropriate accreditation system is important, since accreditation may have substantial consequences.

Objective: This study aims to map out how changing views on educational quality and quality management have affected the design of the Dutch PGME accreditation system.

Methods: To chart the historical development of the Dutch PGME accreditation system we conducted a document analysis of accreditation documents spanning the past 50 years, and a vision document outlining the future system. Template analysis technique was used to identify the main elements of the accreditation system.

Results: Four themes in the Dutch PGME accreditation system were identified: (1) objectives of accreditation; (2) PGME quality domains; (3) quality management approach; and (4) actors’ responsibilities. The major shifts have taken place in decentralization of actors’ responsibilities, and quality improvement in the quality management approach. Quality improvement originated in the current system, and the emphasis on quality improvement will further increase in the future. The formal accreditation documents of the past 50 years expanded enormously, which led to increased bureaucracy. Therefore, the future system is intended to decrease the amount of standards, and to focus on measurable quality output.

Conclusions: The 4 themes could enhance international comparison and exchange of ideas for the design of accreditation systems. There is an urgent need for international perspectives and evidence about the effectiveness of the distinct elements of accreditation.
The role of letters of recommendation in the selection process of surgical residents in Canada: A national survey of program directors

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Introduction: Letters of recommendation (LOR) provide valuable information that help in selecting new residents.

Objective: In this study, we aim to investigate the perceptions of surgical residency program directors (PDs) in Canada on the elements that can affect the strength and value of LOR.

Methods: A national survey was carried out using an online questionnaire consisting of 2 main sections to collect data from PDs in all surgical subspecialties. The first section included basic background questions about the participant, such as the specialty and experience in selecting resident candidates, while the second section was about the elements and characteristics of LOR. Participants were asked to rate the importance of 34 different variables using a Likert scale.

Results: Out of 122 PD, 65 (53%) participated in the survey. Work ethic (57, 88%), interpersonal skills (52, 80%), and teamwork (49, 75%) were considered very important parts of the LOR by more than 3 quarters of PDs. Thirty-three (51%) PDs reported that a familiar author of LOR would always affect their impression regarding the letter. Additionally, 57 (88%) and 35 (54%) PDs thought that LOR are important in evaluating the candidates, and can help in predicting residents’ performance during their residency training, respectively.

Conclusions: LOR are important for the selection of new surgical residents in Canada. Information about a candidate’s work ethic, interpersonal skills, and teamwork is essential for a good LOR. Familiarity of PDs with the author of the LOR could increases the value of the letter.
Communications skills of residents applying in the PGY-4 Canadian Medicine Subspecialty Match: What do reference letters actually tell us?

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Introduction: Having strong communication skills is an important quality in prospective subspecialty trainees. Referees for applicants in the Canadian Medicine Subspecialty Match (MSM) for internal medicine residents are specifically asked to comment on a candidate’s communication skills. Our research has demonstrated that reference letters are indiscriminate, and do not provide accurate portrayals of candidates.

Objective: We sought to determine what exactly referees were commenting on when they wrote about communication skills. To do this, we qualitatively analyzed the comments related to communication skills from 730 reference letters.

Methods: An independent research assistant reviewed 730 reference letters from Canadian Resident Matching Service (CaRMS) MSM (identifying information redacted), and extracted comments related to communication skills. A thematic analysis of these comments was performed to look for themes, patterns, and gaps.

Results: In the 730 letters, 575 comments regarding communication skills were found. Two researchers examined these comments for themes with very good agreement. Referees referred to the following areas (in descending order of frequency): interactions with patients (41%), clinical presentations (37%), personal qualities (29%), formal presentations (9%), and ability to be concise (8%).

Conclusions: Our examination of comments related to communication skills demonstrated a significant variation in the areas emphasized by referees. Interestingly, emphasis on interactions with patients was not universal, and even fewer focused on the ability to synthesize information. This reiterates that further guidance should be given to physicians writing letters for candidates, especially when commenting on communication skills.
Attracting residents to rural FMUs lasting benefits

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Recruiting residents to practice in rural areas is a challenge. It is important to raise students’ awareness about the competencies and skills needed to practice family medicine in rural areas, in order to recruit applicants with a suitable profile, and encourage them to set up their practice in a rural community.

According to 1 study, the opportunity to visit a potential workplace and to meet with peers, as well as the opinion of the resident’s own circle of family and friends, are decisive factors in the decision to pursue training in a rural FMU.

The Faculty of Medicine joined forces with its rural FMUs, the CISSSs [integrated university health and social services centers] and Place aux jeunes en région, an organization that encourages young professionals to settle in rural areas, to organize exploratory visits of 24 or 48 hours to rural areas for future residents.

Visits were organized to 5 rural communities within the clinical teaching territory, which gave 22 senior clerks and 7 spouses an opportunity to meet with potential employers in their professional field.

The feedback received from those who collaborated in this initiative suggests that they considered this an experience worth repeating. A qualitative evaluation completed by the participants confirmed that they found these visits very helpful in their decision-making process. The participants’ expectations were met: they particularly appreciated having the opportunity to learn more about the training sites and the local environment, and to meet with stakeholders in the community (residents, physicians, employers).

Knowing more about the community is crucial in the decision to settle and stay in a rural area. Students who are interested in practicing in a community setting tend to be more attuned to the humanistic approach, a profile that fits rural practice. From a perspective of social responsibility, this is a win-win situation for both the community and the physician.

Attractir les résidents en UMF-région: des avantages durables

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Le recrutement de résidents en région est un défi. Il est important de sensibiliser les étudiants aux compétences et aptitudes nécessaires à la pratique de la médecine familiale en région, afin de recruter des candidats ayant un profil correspondant et que ceux-ci s’y établissent.

Selon une étude, la visite du lieu de travail potentiel, la rencontre de pairs et l'opinion de l'entourage immédiat sont déterminantes dans le choix d’une formation dans une UMF-région.

La Faculté de médecine a collaboré avec ses UMF-région, les CISSS et Place aux jeunes en région, organisme favorisant la migration des jeunes professionnels en région, pour organiser des séjours exploratoires de 24 ou 48 heures en région pour les futurs résidents.

Des séjours organisés dans cinq régions du territoire d’enseignement clinique ont permis à 22 externes seniors et sept conjoints de rencontrer des employeurs potentiels selon leur champ professionnel.

Le bilan des collaborateurs montre un intérêt pour renouveler l’expérience. Une évaluation qualitative auprès des participants souligne l’apport positif des séjours dans leur réflexion. Les attentes des participants ont été comblées: ils ont particulièrement apprécié pouvoir découvrir les milieux de formation, l’environnement et rencontrer les acteurs régionaux (résidents, médecins, employeurs).

Une meilleure connaissance du milieu de vie est cruciale dans le choix de s’établir en région et facilite un recrutement durable. Les étudiants voulant s’impliquer dans une communauté sont plus sensibles à l’approche humaniste, un profil qui correspond à la pratique en région. En termes de responsabilité sociale, tant la communauté que le médecin y gagnent.
Developing and implementing competency-based assessment tools in otolaryngology–head and neck surgery

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Introduction: Otolaryngology–head and neck surgery (OTL-HNS) is the first surgical specialty to adopt Competence by Design. As there is currently no way of formally assessing performance in the chosen entrustable professional activities (EPAs), while simultaneously providing detailed and meaningful feedback to the learners, McMaster University has developed and implemented a unique set of competency-based assessment tools to address this need.

Objective: The purpose of this study was to investigate the reliability and validity of these assessment tools.

Methods: Nine residents and all OTL-HNS staff from McMaster participated in this study. Since June 2016, residents have been asked to complete 1 assessment per week. The first phase of the study investigated interrater reliability, where 2 staff members simultaneously evaluated resident performance. The second phase investigated construct validity, comparing performance levels across different stages of training. The third phase evaluated whether the assessment tools captured an accurate reflection of trainees’ competence through an interview study.

Results: Our data suggest the assessment tools are able to distinguish between stage of training ($F_{(1,7)} = 18.83, P > .01$). Furthermore, thematic analysis suggests these tools are effective in rating competence, providing trainees with valuable feedback, and have caused a culture shift among residents, where high scores are not expected before they feel confident in their ability to perform independently.

Conclusions: These assessment tools are able to evaluate competence on EPAs, and give residents meaningful feedback in a valid and reliable manner. Further work should examine whether these findings can be generalized to other OTL-HNS programs.
Calibrating emergency medicine residents’ self-assessment and investigating the effectiveness of assessment rationales within the self-regulated predicted response approach

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Introduction: Competency-based medical education has changed the residency assessment conversation from inputs (eg, years) to outputs (eg, workplace assessment). Accurate resident self-assessment is an essential output that spans all clinical activities, and has the potential to improve patient safety and care quality. Unfortunately, there has been a mixed record of residents’ self-assessment accuracy.

Objective: In the current study, we explore a self-assessment system designed to promote and explore determinants of self-assessment accuracy.

Methods: Twenty-two emergency medicine (EM) residents, prior and subsequent to 2 EM objective standardized clinical examinations, assessed themselves on a descriptive rubric across 5 levels of practice (ie, primary assessment, diagnostic action, therapeutic action, communication, and overall entrustment). In addition, both prior and subsequent to each treatment stage, residents were asked to justify their rating.

Results: Residents pre- and postscores were significantly different across scenarios and rubric levels. The external (blinded) rater and residents were significantly different at rubric levels (especially primary assessment) and across scenarios. There was also a significant difference between the internal rater and residents for therapeutic actions. Qualitative rationales both written on the rubric and obtained through think-aloud protocols indicate that fixations, inaccurate anticipation, and failure to dismiss irrelevant information may account for some inaccuracies.

Conclusions: Residents’ self-assessment accuracy can be differentiated by treatment stage, and potential causes of inaccuracy may be identifiable. As our longitudinal study proceeds, we suggest that self-assessment accuracy may not be a trait, but rather an unstable state that can improve through specific forms of practice and feedback.
An untapped resource: Can electronic health record (EHR) data support formative assessment and feedback for residents?

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Introduction: Novel methods of assessment are needed to meet the demands of programmatic assessment and cultivate authentic feedback in competency-based medical education (CBME).

Objective: This study represents the first step in exploring how electronic health records (EHRs) might be utilized to monitor residents’ clinical performance and encourage formative feedback discussions.

Methods: Following constructivist grounded theory, individual semistructured interviews were conducted with 10 faculty and 8 residents across multiple postgraduate specialties. Data analysis employed constant comparative inductive methods throughout data collection.

Results: The analysis identified key issues, including the opportunities and challenges of decoupling resident performance from faculty and team; the nature and quality of EHR data related to resident performance; and the ethics and acceptability of using EHR data for formative assessment. These findings will support the development of a preliminary catalogue of resident performances, which can be meaningfully decoupled and captured within EHR data. The catalogue will inform the next step in this research—to explore the accessibility and interpretability of these data in the local EHR, and to develop a prototype of a resident clinical performance snapshot to support formative feedback conversations.

Conclusions: This study represents the first attempt in field to understand the affordances and constraints of using the EHR as a source of assessment data regarding resident clinical performance. Others can use our emerging catalogue as a starting point for their own local explorations of EHR data as an untapped resource for supporting programmatic assessment and augmenting feedback with residents.
Assessing competence in central line insertion during residency training: A dependability study of 4 assessment tools

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Introduction: Successful competency-based training requires high-quality assessment tools to inform decisions about residents’ skills. These tools must be tested to ensure that judgments regarding performance are defensible. Collection and demonstration of dependability and validity evidence must be provided to defend their use in making decisions about competence and entrustment.

Objectives: To compare the dependability of scores, and develop validity evidence for 4 performance assessment tools to measure competency in central venous catheterization (CVC).

Methods: A total of 55 residents completing their first ICU rotation were included. CVC competence was evaluated by 3 expert raters via review of a recorded CVC procedure using 4 scoring tools. A 2-facet, fully crossed Generalizability study was conducted to compare the dependability of the scores derived from these tools. Validity evidence for the study was provided according to Kane’s framework (scoring, extrapolation, generalization, and implication).

Results: The OSAT and O-SCORE tools demonstrated the highest dependability coefficients. Validity evidence was derived from scoring (item response option selection, scoring rubric, rater selection, rater training, data integrity), extrapolation (construct definition, authenticity of simulation fidelity, correlation with surrogate performance measure), generalization (generalizability analysis), and implication (pass/fail standard).

Conclusions: Our study demonstrates that scores derived from global rating scales such as the OSAT or O-SCORE are reliable when assessing CVC competence. Validity evidence is provided to support the results of our study. Kane’s framework for validation could be applied more broadly to obtain validity evidence for other medical procedures.
Health advocacy assessment in a medical microbiology residency training program using a clinical scenario and objective structured clinical examination (OSCE)

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Introduction: The CanMEDS role of health advocate remains an ongoing challenge to evaluate. This is particularly true in laboratory medicine since physicians are not directly involved in patient care.

Objective: We present a unique approach to advocacy assessment using a clinical scenario and an objective structured clinical examination (OSCE).

Methods: We developed a scenario about an elderly patient with repeated fractures, haematomas, and methicillin resistant Staphylococcus aureus cellulitis. Questions were asked to elicit a consultation, intent on assessing if the trainee could see beyond the acute issue and recognize elder abuse in the care home. The scenario was administered to medical microbiology residents (postgraduate year [PGY] 2 through 5) during a routine planned oral examination.

Results: Four residents (1 PGY-2, 1 PGY-3, and 2 PGY-5s) provided independent responses to this scenario, valued at a total of 14 points. The average grade was 6.75 (48%; ± 2.3 points; 95% CI 3.09–10.41 points). The highest grade was achieved by a PGY-2 trainee.

Conclusions: This scenario highlighted that residents were not able to adequately use knowledge acquired through contextualized learning into a new reasoning task. It also raises concern that the skill of health advocacy in certain situations may be overlooked as residents advance through their lab-based training. We recognize the need to collect larger volumes of data but believe that a similar approach can be used for other residency programs.
Introducing diagnostic-workplace based assessments: A novel competency-based assessment approach

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Introduction: A divide exists between meeting programmatic needs for summative judgements and learners’ needs for feedback. A novel method of diagnostic workplace-based assessment (D-WBA) may mend this divide.

Objective: In this presentation, we will share our initial blueprints of a D-WBA to assess the senior medical resident (SMR) overnight call in internal medicine (IM).

Methods: The development of a D-WBA assessment tool requires detailed analysis of the SMR call role and the variations observed in practice. Constructivist grounded theory shaped the collection and analysis of data. A total of 10 junior trainees, 5 IM consultants, 5 emergency department (ED) consultants, and 5 ED nurses conducted observations of their on-call interactions with SMRs and were subsequently interviewed. An iterative coding process followed to collate the range of SMR practices and their effectiveness.

Results: SMR call involves expertise across 9 key areas. Taking practice variation across each into account, we designed 12 distinct profiles. Each profile is intended to describe a trainee’s developmental strengths and areas for improvement. Assessors would then be required to select a profile that best matches the trainees’ demonstrated competencies.

Conclusions: The profiles are currently being piloted, and will be integrated into the IM online assessment system to evaluate their effectiveness at measuring each of the competencies associated with the SMR overnight call. This novel approach to assessment has the potential to reshape how we provide trainees with meaningful feedback in the clinical workplace.
Anesthesia residents’ experiences with standardized feedback to assess clinical competencies

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Introduction: With Competence by Design residency programs, introducing standardized evaluation methods will be necessary to demonstrate resident competency, and provide formative feedback. Educational simulations have valuable, structured debriefs, which we emulated for anesthesia residents in routine clinical training. Currently, Dalhousie University residents receive daily semistructured and variable feedback from staff. There has been no published research investigating residents’ opinions on what constitutes useful feedback.

Objective: Our study explores the value residents place on structured feedback in routine operating room settings.

Methods: Preintervention focus groups explored Dalhousie anesthesia residents’ (n = 14) opinions on feedback received from staff anesthesiologists. They then participated in receiving feedback from supervisors using structured feedback tools (Anesthetist’s Non-Technical Skills and/or Direct Observed Procedural Skills). Postintervention, residents expressed their experiences of these tools in focus groups. We conducted an inductive constant-comparative analysis of data, rooted in phenomenology.

Results: Face-to-face, timely, and constructive feedback was reported to be meaningful and uncommon. Residents often found online evaluation to be nonspecific and delayed, but important to document performance issues. Learners described “evaluation fatigue” with too many online evaluations. Two independent raters coded all data and had high (above 90%) agreement on coding decisions.

Conclusions: Residents considered good feedback to be essential to learning, and wanted improved quality of feedback rather than quantity. Although considered too involved for everyday use, residents felt the greatest strength of structured feedback tools was that they encouraged supervisors to devote closer attention to resident performance, and make time for face-to-face feedback.
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Implementation of the Ottawa Clinic Assessment Tool (OCAT) in internal medicine

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Introduction: Competency-based medical education requires more attention to workplace-based assessments. The majority of health care is delivered in the ambulatory setting, making the ability to run a clinic in its entirety a crucial core competency for internal medicine (IM) trainees. Entrustment anchored scales may help raters make more intuitive judgments.

Objective: The aim of this study was to implement the Ottawa Clinic Assessment Tool (OCAT), developed for surgical residents, in an IM program and gather validity evidence in a different context.

Methods: Descriptive statistics and effect sizes were calculated. Scores were compared between levels of training—juniors (postgraduate year 1 [PGY-1]), seniors (PGY-2 and PGY-3), and fellows (PGY-4 and PGY-5) using a 1-way analysis of variance. Independence scores using a dichotomous rating were analyzed. A generalizability analysis was performed.

Results: A total of 452 OCATs were completed over 52 weeks by 86 physicians assessing 44 residents. Item means were high (3.93 to 4.42), with a range of ratings from 2 to 5 for most items. Mean scores differed by level \( (P < .001) \), with juniors having lower ratings \( (M = 3.80, SD = 0.49) \) than seniors \( (M = 4.22, SD = –0.47) \) who had lower ratings than fellows \( (4.70, SD = 0.36) \). Trainees deemed independent to run the clinic had significantly higher mean scores than those deemed not independent \( (P < .001) \). The G coefficient that corresponds to internal consistency is 0.92. Sources of variance were mainly between training levels and within individual residents.

Conclusions: In IM, as in surgery, the OCAT differentiates between levels of training. This study demonstrates the feasibility of applying the OCAT to different workplace environments.
Can practice make perfect? Learning curves inform assessment of electrocardiogram competency

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Introduction: Learning curves can provide a competency-based approach to learner assessment.

Methods: We developed an online electrocardiogram (ECG) learning program based on 293 ECGs collected from an electronic patient database. After diagnosing each ECG, participants reviewed the computer interpretation, cardiologist’s annotation, and correct diagnosis. In 2015, participants across a range of ECG competency diagnosed at least 60 ECGs. We calculated individual and group learning curves. We used a mixed-effects logistic regression on completed ECGs to derive a predictive model.

Results: The predictive model showed a statistically significant effect of number of ECGs read (log odds = 0.181, SE = 0.025) and expertise (log odds cardiology fellows = 0.738, SE = 0.169) on accurate diagnosis (TABLE).

Conclusions: We were able to establish baseline levels of diagnostic accuracy, predict the trajectory of learning, and estimate the volume of ECGs required to achieve a competency threshold while learners were practicing and improving their ECG skills.

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<th>Expertise</th>
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<th>Median Number of ECGs Read (25% to 75%)</th>
<th>Median Time per ECG (25% to 75%)</th>
<th>Average Baseline Accuracy</th>
<th>Average Absolute Increase in Percent Correct</th>
<th>Average Predicted 100th Case Accuracy</th>
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<td>Medical students (years 1–4)</td>
<td>63</td>
<td>93 (73.5–134.5)</td>
<td>41.5 sec (32.5–66.5)</td>
<td>48.5%/–12.5%</td>
<td>19.8%/–6.9%</td>
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<td>PGY-1 internal medicine residents</td>
<td>10</td>
<td>85.5 (73.5–93)</td>
<td>68.25 sec (32.63–92)</td>
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<td>18.6%/–6.7%</td>
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<td>214 (189–283)</td>
<td>14 sec (12–15)</td>
<td>68.9%/–14.5%</td>
<td>14.0%/–9.5%</td>
<td>82.9%/–5.0%</td>
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Abbreviations: ECG, electrocardiogram; PGY, postgraduate year.
Association between milestone assignments and recommended supervision categorizations among Clinical Competency Committee members

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Introduction: Since the advent of milestones-based assessment, no study has considered the relationship between milestone assignments made by Clinical Competency Committee (CCC) members and the summative recommendations those CCC members would make for the work that residents are allowed to do.

Methods: In conjunction with both performance review and milestone assignment periods for the 2015–2016 academic year, categorical pediatrics residents in 14 US programs had CCC members assign milestones, and recommended supervisory roles the resident would be allowed to serve in. For the latter, CCC members were asked to categorize residents as follows: (1) may serve as a supervisory resident in all settings; (2) may serve in a supervisory role as a resident in all settings, just above borderline/marginal mark; (3) may serve in a supervisory role as a resident in some settings; (4) may serve in a supervisory role as a resident in some settings, just above borderline/marginal mark; or (5) may not serve in a supervisory role.

Results: A total of 68 CCC members completed milestone assignments and supervision categorizations for 465 residents across all 3 training years. The correlation coefficient for all milestones combined (summative milestones profile) and supervision categorization was 0.56. For individual competencies, correlation coefficients ranged between 0.44 and 0.56 with the exception of 2 professionalism competencies (both 0.34).

Conclusions: This study found a moderately positive relationship between summative milestones profiles, as well as most individual milestones, and recommended supervision categorizations. These findings offer validity evidence for using milestones to inform decisions around entrusting residents to serve in supervisory roles.
Key factors for recommending a resident may serve as a supervisor: A national study of Clinical Competency Committee members

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Introduction: Given the central role of CCC members in reviewing performance data, understanding how they consider resident readiness for serving as a supervisor could be beneficial.

Methods: Across 14 US pediatrics residency programs, CCC members assigned residents supervision categorizations at the time of both semiannual performance review periods in the 2015–2016 academic year. CCC members were asked to place residents into 1 of 5 categories, the highest being “may serve as a supervisory resident in all settings.” After categorization, CCC members were asked to provide the key factors driving their decision (free text response). Free text responses were categorized by topic.

Results: A total of 86 CCC members completed 806 resident forms. The majority of forms categorized residents as being able to supervise in all settings (n = 531). CCC members provided several key factors for making this decision. The most common justifications were milestone levels assigned (n = 127); clinical experience (n = 104); demonstrated development/growth (n = 92); clinical skills/performance (n = 90); and clinical judgment (n = 75).

Conclusions: CCC members cited key factors leading to their decision that a resident was ready to serve as a supervisor that were largely competency based (ie, based on the performance of the resident). This is reassuring as the education community strives to make a meaningful shift toward criterion-based assessment with milestones. However, CCC members cited level of experience as their second most common key factor. This is not consistent with a competency-based framework and provides an area of focus for future improvements in the work CCC members complete.
Concordance of Clinical Competency Committee and program director recommended supervision categorization


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Introduction: The relationship between Clinical Competency Committee (CCC) member and program director (PD) recommendations for resident supervisory capacity is unknown. This relationship between those who often perform more extensive performance reviews (CCC members) and those who ultimately make decisions (PDs) is important to understand.

Methods: Categorical pediatrics residents in 14 US programs had CCC member and PD supervision categorizations made in conjunction with both performance review and milestone assignment periods for the 2015–2016 academic year. Both groups were asked to categorize residents as follows: (1) may serve as a supervisory resident in all settings; (2) may serve in a supervisory role as a resident in all settings, just above borderline/marginal mark; (3) may serve in a supervisory role as a resident in some settings; (4) may serve in a supervisory role as a resident in some settings, just above borderline/marginal mark; or (5) may not serve in a supervisory role. PDs were asked for justification when differing from CCC member.

Results: A total of 801 supervision categorizations were made by both CCC members and PDs. Concordance between CCC members and PDs across all categorizations was strong (Krippendorff’s alpha = 0.81). In 118 non-concordant instances, PDs assigned a lower level (n = 73) more often than a higher level (n = 45) compared with CCC members, citing insufficient experience most often in moving residents down.

Conclusions: Concordance between CCC member and PD supervision categorization is strong, supporting the validity of these decisions. Where not concordant, PDs often moved residents down based on experience level, not consistent with a competency-based approach.
Remediation of postgraduate medical trainees: A qualitative literature review

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Introduction: Competency-based medical education calls for increased assessment in order to identify deficiencies among trainees at an early stage. As residents are identified as deficient, it will become increasingly important to provide effective remediation.

Objective: The present work aimed to review existing literature on the remediation of residents to further guide the development of an evidence-based remediation plan.

Methods: A literature search was performed on EMBASE, MEDLINE, and ERIC for all articles with the keywords “remediation” and “graduate medical education.” We included studies that focused on trainees at the resident level, clearly identified the problem area being remediated, outlined what remediation techniques were pursue, and provided remediation success rates.

Results: A total of 175 records were identified in literature; 10 met our inclusion criteria and were reviewed in this study. We identified broad categories of remediation as cognitive, behavioral, procedural, and communication. Four studies exclusively addressed the remediation of cognitive deficits, 2 studies addressed the remediation of procedural skills, and 4 studies addressed cognitive, behavioral, and communication skills simultaneously. All studies included in our review used the assignment of a faculty mentor and independent learning in their remediation plan. Several studies used individual education plans that were tailored to the individual resident and their specific deficit areas.

Conclusions: Although we have identified several studies, there is little literature describing remediation. We have identified several elements of successful remediation plans that may be used to develop an evidence-based remediation framework to ensure a smooth transition to competency-based medical education.
Development and evaluation of a PGY-1 competency-based anatomy rotation for radiology residents

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Introduction: As medical schools reduce the hours of anatomy teaching, residents in anatomy-intensive residency programs, like radiology, must independently acquire the anatomy knowledge they need to achieve competency as early as possible in their training.

Objective: The purpose of this educational initiative was to develop and evaluate a 4-week competency-based, self-directed anatomy rotation for junior residents.

Methods: Seven postgraduate year 1 (PGY-1) radiology residents completed a 4-week rotation of radiological anatomy. The objectives were developed from standards, senior residents, and expert opinion; the competency-based curriculum included self-directed modules. Pre- and postcourse tests were administered and test scores were compared using an unpaired t test. In addition, PGY-1 residents completed a course evaluation and survey regarding their anatomy knowledge and anatomy exposure prior to completing the course.

Results: Out of the 25 points available, the average pretest score was 10.79 ± 2.78 (range, 8–16.5) and the average posttest score was 21.64 ± 2.23 (range, 18.5–25). This difference was statistically significant (P < .0001). On average, PGY-1 residents reported receiving less than 10% of dedicated radiological anatomy teaching prior to residency, and felt unprepared for the anatomy required in residency. Overall, residents felt more confident in looking at images after completing the self-directed radiological anatomy course.

Conclusions: This study demonstrates the need for dedicated radiology training for radiology residents beyond what is offered in medical school. In addition, this study reveals how it is possible to create a simple self-directed course for radiology residents that significantly improves their anatomy knowledge.
Are they ready? Organizational readiness for change in clinical teaching teams analyzed by multilevel modeling

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Introduction: The field of postgraduate medical education (PGME) is continuously changing as a result of social demands and advancing educational insights. Change experts contend that organizational readiness for change is a critical precursor for successful implementation of change initiatives.

Objective: Our aim was to assess readiness for change in clinical teaching teams in regards to a recent curriculum change, the implementation of competency-based medical education.

Methods: Specialty Training’s Organizational Readiness for curriculum Change (STORC), a questionnaire to measure organizational readiness for change in educational teams was administered among hospitals in the Netherlands. Additionally, change-related behavior was measured using the “behavioral support-for-change” measure. Results were analyzed using multi-level modeling.

Results: In total, 836 clinical teaching team members were included in this study: 288 (34%) trainees, 307 (37%) clinical staff members, and 241 (29%) program directors. Of all respondents, program directors generally had the highest scores on readiness for change, and showed more supportive behavior (P < .05). Overall, items regarding whether the program director had the authority to lead scored higher compared to the other scales. On the other end, the subscales “management support and leadership,” “project resources,” and “implementation plan” showed the lowest scores in all respondent groups.

Conclusions: Change in PGME is mainly coordinated by the program director with relatively little guidance from an appropriate change model and implementation strategies. The results of this study reinforce the need for change management support in change processes in PGME in order to enhance efficiency in the process itself as well as to improve chances for success.
Resource stewardship among medical trainees through Choosing Wisely Canada: Cutting down on dollars and patient harms when deciding on the fly

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**Introduction:** The Choosing Wisely Canada (CWC) campaign is essential for improving care quality while preventing harm to patients from unnecessary testing. Currently, there is a lack of resource stewardship training in postgraduate medical programs to guide future decision making of medical trainees.

**Objective:** Our objective was to assess first-, second-, and third-year internal medicine (IM) residents’ knowledge of common CWC recommendations in a simulated environment to guide the design of educational interventions.

**Methods:** A cross-sectional study on educational needs assessment of IM residents who participated in simulation objective structured clinical examination sessions that included a standard case scenario in addition to separate telephone consultations that tested decision-making around CWC recommendations. The indications and costs of treatment/tests were discussed during the facilitated reflection by simulation educators.

**Results:** Among the first-year resident cohort, 2 out of 6 times (33%) blood products were given when not indicated to reverse a high international normalized ratio, and 4 out of 6 times (67%) antibiotics were given despite sufficient drainage of a simple cutaneous abscess. Two out of 6 times (33%) carotid doppler was ordered when not indicated for syncope. Among the second-year residents, 1 out of 6 times (16%) intravenous immunoglobulin was administered when not indicated to treat thrombocytopenia, and 3 out of 6 times (50%) antibiotics were administered in mild asthma. Results from the third-year resident cohort are currently pending.

**Conclusions:** This initiative highlights existing knowledge gaps around cost-effective care delivery. Results will guide future curriculum design interventions and evaluation of effective teaching strategies and retention of knowledge.
Co-creation of a national patient safety curriculum for postgraduate trainees in Canada

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Introduction: When targeting patient safety, it is important to focus on learners, who are developing what will become lifelong skills. The Canadian Medical Protective Association (CMPA) has long recognized the value of investing in medical trainees. With the eventual goal of reaching all postgraduate residents before they enter practice, a novel educational symposium is being piloted in 2017.

Methods: Using the CanMEDS 2015 Framework, curriculum development was initiated by identifying topics relevant to CMPA expertise and amenable to resident intervention. Further refinement occurred through direct consultation with residents. A focus group was conducted with 12 residents from different years and programs at the pilot site. These residents included (1) representatives from the Professional Association of Residents of Ontario (PARO); (2) members of Resident Doctors of Canada (RDoC); and (3) key informants identified by resident stakeholders. We subsequently collaborated with 12 RDoC volunteers to co-create specific content for the interactive workshops.

Results: The focus group validated the proposed curriculum, and suggested additional topics and ideas to sustain improvements postsymposium. The co-creation partners provided valuable input to develop content for the 4 workshops (informed consent, documentation, teamwork, and disclosure of harm), including identifying issues germane to the training environment.

Conclusions: The focus group and co-creation process resulted in an educational curriculum that is highly relevant to the intended audience. The residents involved were engaged and enthusiastic about the opportunity to directly influence what their peers will learn. The longer-term impact of this consultation process will be evaluated following the pilot symposia.
Implementation of a resource stewardship curriculum for residents in obstetrics and gynecology

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Introduction: Resource stewardship is an integral component of the CanMEDS competencies following the introduction of the “Leader” domain in 2015, but was not previously a formal part of the obstetrics and gynecology postgraduate curriculum.

Methods: A multi-faceted curriculum was designed in resource stewardship incorporating didactic lectures, case-based learning, reflective exercises, and small group discussion over 4 academic half-days for postgraduate year 2 (PGY-2) and PGY-5 residents in obstetrics and gynecology at the University of Toronto in 2017. The sessions included (1) introduction to resource stewardship; (2) interactive workshop on quality improvement strategies including small group case-based discussion; (3) interactive lecture and role-play on communicating with patients about unnecessary tests; and (4) facilitated group work designing quality improvement resource stewardship projects. A baseline survey was given prior to the first session, and an evaluation survey was given to all residents at the final session.

Results: Out of 17 students who attended the first session, 53% (n = 9) completed the baseline survey, and only 4 (44%) stated that they had received prior training in resource stewardship. Out of 14 residents who completed the final evaluation after the last session (93% response rate), 86% agreed that the sessions had increased their knowledge about resource stewardship, and 79% agreed that the sessions provided them with enough skills to effectively communicate with a patient about unnecessary care.

Conclusions: Formal teaching in resource stewardship increased self-reported knowledge and skills among residents in obstetrics and gynecology. Plans to expand this curriculum to all University of Toronto residents in obstetrics and gynecology are underway.
Measurement and collaboration to inform progress on Choosing Wisely Canada recommendations

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Introduction: Choosing Wisely Canada (CWC) is a grassroots initiative that encourages physicians and patients to reduce low value tests and procedures.

Objective: Using administrative data and working with a coalition of partners, we set out to measure the magnitude of unnecessary care and detail improvement initiatives of partner organizations.

Methods: Our analyses of 8 CWC recommendations uses administrative data from acute care hospitalizations, emergency departments, physician billing data, drug use, and community health data. Provinces, regions, and years included vary by recommendation based on data availability. Through stakeholder engagement, we were able to profile innovative initiatives, approaches, and process changes that are being implemented across the country.

Results: We analyzed CWC recommendations spanning the health care continuum, and found that 5% to 30% of tests and procedures covered by these 8 recommendations are potentially unnecessary. For example, 22% of Canadian women aged 40–49 received a screening mammogram despite being of average risk for breast cancer, and 30% of patients with low back pain had an avoidable imaging scan. Variation between jurisdictions, regions, and facilities was as much as 5-fold, suggesting that there are opportunities for improvement, and reinforces the concerns over resource stewardship.

Conclusions: The process for engagement in this large, multi-faceted project has been successful as well as faced challenges. We intend to discuss our leadership role to set a baseline for CWC work across the country from profiling initiatives to our pan-Canadian findings.
Standardization of oncology resident handover notes in order to improve patient safety
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Introduction: Communication errors are a leading cause of adverse events in health care. Resident handover notes are not standardized.

Objective: This resident-led quality improvement project aimed to produce a standardized patient handover note with goal of 100% compliance at 12 months.

Methods: We implemented a standardized handover note using Advancing Safety for Patients in Residency Education (ASPIRE) sessions. In the first session, the residents reviewed sample weekend and holiday handover notes with the ASPIRE attending. This was followed by a take-home project where the residents reviewed data elements that are crucial to a safe handover note. In the following ASPIRE session, the residents used consensus-based recommendations regarding data elements that were deemed essential in a handover document. The standardized handover document was distributed to all staff and off-service residents. The intervention was evaluated by reviewing compliance over the first 10 months.

Results: Compliance with the standardized handover note was 75% in the first 3 months of implementation. Compliance was 100% in the most recent 3 months. The average compliance is 90% in the first 10 months. Patient code status was addressed on average 48% of the time. Patient location was stated on average 79% of the time.

Conclusions: Using ASPIRE sessions we were able to produce a standardized handover note to reduce communication errors and improve patient safety. Compliance increased in the first 10 months. Code status and patient location can be further optimized. This project can be adapted at other programs to improve patient safety.
Development of an opioid prescribing education curriculum for residents

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Introduction: The opioid epidemic has raised questions regarding physician preparedness for appropriate opioid prescribing.

Objective: To ensure optimal prescribing education in postgraduate medical education (PGME) we evaluated the current level of opioid prescribing education at Dalhousie University.

Methods: A task force was formed to develop an educational curriculum consistent with Canadian guidelines on best practice in opioid prescribing. Three data-gathering strategies were employed to inform this project: (1) a literature search on opioid prescribing education in residency; (2) a survey of Dalhousie program directors and residents; and (3) review of data from the Nova Scotia Prescription Monitoring Plan (NSPMP) on current narcotic-prescribing behaviors of physicians across all specialties.

Results: The literature revealed no specific publications on curricula for opioid prescribing in PGME. Survey results suggested that there was a lack of formal training in all subspecialty programs except for family medicine and anesthesiology. Although opioid prescribing education was regarded as highly important for all physicians, it was recommended that educational curricula should be program specific. NSPMP data revealed that most opioid prescriptions are written by family physicians. Taken together, these results suggested that there should be 3 levels of mandatory opioid prescribing education for residents, with the level required dependent on program.

Conclusions: Using current literature, resident and faculty input, and provincial prescribing data, along with existing Canadian practice guidelines and expert input and consensus, we have created a tiered centralized curriculum on opioid prescribing that serves local needs but is adaptable for residents in any training program in Canada.
An empirical examination of consistency in programs’ milestones rating over time using a novel random coefficients model

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Introduction: Since December 2013, the ACGME has accumulated milestones data on residents’ performance from programs. Programs must include Clinical Competency Committee (CCC) judgement as part of the assessment process. The validity of the longitudinal data depends on how consistently programs apply their rating standards over time.

Objective: This study investigated the consistency of milestone judgements.

Methods: We examined December milestone ratings of first-year residents from a single specialty (for illustrative purposes). Radiology data from 2013 (1170 residents from 179 programs), 2014 (1185 from 182), 2015 (1228 from 185), and 2016 (1228 from 191) were used. The program-level average milestone rating was regressed on year of assessment (TIME) using a random coefficients model for each of the 12 subcompetencies. The TIME coefficient was considered an indicator of whether programs maintained consistency in rating or became more lenient (positive coefficient)/stringent (negative coefficient) over years.

Results: No significant positive TIME slope was found for any subcompetency. The TIME slope values were significantly negative for 6 of the 12 subcompetencies (50%).

Conclusions: The findings indicate that, overall, programs maintain their rating consistency or tend to become more stringent in rating the first-year residents over time. This could be an indication that programs and CCCs become more comfortable in making milestone ratings with experience (ie, no evidence of “grade inflation”). The analytic model developed in this study could be used to (1) provide information for improving rating processes; (2) modify any subcompetencies with problematic language; and (3) investigate the consistency in CCCs’ ratings in other specialties.
Leadership and change in residency training: Using qualitative methods to explore appraisal, guidance, and supervision in postgraduate medical education

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Introduction: Danish residents have a formal supervisor responsible for appraisal and guidance in postgraduate medical education. Little is known about the actual character and quality of the appraisal in formal meetings and in clinical practice. A PhD project was initiated to explore the content of the formal and informal appraisal and guidance of residents across specialties from the perspectives of both residents and supervisors.

Methods: Using a qualitative phenomenological and ethnographical approach, we conducted 8 in-depth interviews with residents, 8 open-ended expert interviews with their supervisors, combined with observations of formal meetings between the residents and their supervisors, and ethnographical field notes focusing on the everyday experiences with supervision in a bottom-up perspective exploring meaning and experiences.

Results: Residents experienced insecurities in relation to the work and their level of competence. They deeply lacked support, feedback, and supervision. They felt isolated and uneasy addressing insecurities in the formal setting of the meetings and in the clinical departments. Overall, residents expressed little use of the formal supervision, appraisal, and guidance. Some supervisors spend relatively more time handling the formal documentation during the meetings rather than providing a space for reflection, and guidance of the resident related to the progression of competencies.

Conclusions: Results demonstrate a need for rethinking and modernizing the role of the formal appraisal and guidance. Overall, appraisal is time consuming, and has relatively little meaning for residents and supervisors. However, the residents lack feedback, supervision, and a legitimate space in the clinical departments for discussing educational problems and concerns.
Mentee and mentor perceptions of mentorship in an academic Canadian internal medicine program

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Introduction: Formal mentorship programs for physicians have considerable benefits, including greater salary, promotions, research productivity, and job satisfaction for mentees, and improved staff retention for program developers. Despite these advantages, there remains a paucity of research regarding mentee and mentor perceptions of mentorship in internal medicine, leading to suboptimal design and evaluation of formal mentorship programs in internal medicine.

Methods: Internal medicine resident physicians, who were previously not exposed to formal mentorship (mentees), and internal medicine subspecialty academic physicians (mentors) participated in a single academic center survey study to determine perceptions of the role of mentorship in academic medicine.

Results: There were 37 mentees and 33 mentors who responded to the survey (response rate = 73% for each group). Mentors were more likely to agree or to strongly agree that mentors should facilitate creation of mentee’s personal goals (85% versus 49%, \( P = .010 \)), more likely to disagree or to strongly disagree that mentors are important to teach scientific knowledge (64% versus 28%, \( P = .015 \)), and less likely to agree or to strongly agree that mentors should cultivate skills, such as grant writing, research design, manuscript writing, and publishing (27% versus 68%, \( P = .001 \)).

Conclusions: There are significant differences in mentee and mentor perceptions regarding the role of mentorship in academic medicine. These differences are critical to the design and evaluation of formal mentorship programs in academic medicine.
The CBME resident subcommittee: Engaging residents in the co-production of CBD at Queen’s University

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Introduction: Queen’s University was granted approval by the Royal College of Physicians and Surgeons to implement Competence by Design (CBD) curricula for all incoming residents in July 2017. Resident engagement and leadership, as key stakeholders in this change, is of the upmost importance for successful implementation of CBD.

Methods: The CBME Resident Subcommittee was formed by Queen’s University residents with interest in medical education to represent the interests of the greater Queen’s resident body through the transition and continued integration of CBD at the postgraduate medical education (PGME) administrative level. It is comprised of resident representatives from a breadth of specialty programs, including family medicine, with additional PARO and RDoC representation allowing provincial and national collaboration.

Results: Using change management strategies such as co-production, diffusion of innovations, and the SCARF Model the committee has been successful in contributing to Queen’s University resident engagement in preparation for the CBD launch. The committee’s work has emphasized peer-to-peer communication strategies to inform current residents about the CBD transition. Some of these strategies include in-person committee member visits to academic half-days, infographics, and use of social media. In addition, given the emphasis on learner centeredness in CBD, the committee advocates for, and facilitates, parallel faculty and resident CBD development.

Conclusions: Engagement of current residents is paramount to the successful implementation of CBD. Creation of the Queen’s CBME Resident Subcommittee has effectively bridged the gap between PGME and current residents encouraging resident buy in and co-production of CBD at Queen’s University.
Resident’s ownership of their future career: The merit of a development center during residency

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Introduction: Self-reflection and continuous development are essential abilities of contemporary physicians engaged in lifelong learning. However, the busy workplace leaves little time for self-reflection, and often refrains residents to actively engage and take the lead in their own development. A development center was designed as “time-out-tool” to facilitate residents to reflect on strengths and weaknesses, and upcoming career choices. It was conducted by an external psychologist assessor and focused on formative assessment of generic competencies.

Objective: This study aimed to evaluate residents and program director (PD) perceptions of the added value of the development center.

Methods: We performed a qualitative study using semistructured interviews with 16 residents and 4 program directors from 4 medical specialties. Interviews were conducted 6 months after the development center. We analyzed transcripts using the framework method for qualitative analysis.

Results: The following themes emerged from the data: the development center (1) provided eye-openers; (2) confirmed individual capabilities and boosted self-confidence; and (3) empowered residents to take the lead in their own development. PDs appreciated that the development center confirmed and deepened their impression of the resident. To effectively implement the development center, 4 important factors should be considered: (1) residents’ openness to feedback; (2) PDs’ commitment and trustworthiness; (3) assessors’ expertise (eg, familiar with medical domain, giving credible feedback); and (4) timing prior to a transition phase.

Conclusions: PDs and residents perceived the development center as a valuable tool being different from other assessment instruments. They appreciated its content (thorough assessment of generic competencies), objectivity, personalized focus, and feasibility. Overall, they supported the idea of implementing a development center on a voluntary basis.
Enhanced self-perceptions of professionalism following a professionalism education program in general surgery residents

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Introduction: Despite professionalism being demanded of physicians, there is a paucity of formal education and program development surrounding professional behavior in medicine. It was postulated that general surgery residents’ self-perceptions of professionalism would be improved following the implementation of a program designed to educate and develop professionalism.

Methods: A total of 26 general surgery residents took part in a 6-month Professionalism Education Program. A previously validated survey quantifying self-perceptions of professionalism was administered pre- and postprogram to residents who consented to participate. Extraction of common themes related to self-perceptions of professionalism was achieved through assessment by qualitative surveys and standardized interviews.

Results: A total of 24 of 26 presurvey, 16 of 26 postsurvey, and 12 of 26 qualitative surveys were collected. Four residents participated in standardized interviews. Improvement in self-perceptions of professionalism were demonstrated in each of the 7 core principles, with significance in the areas of social responsibility and integrity. Thematic analysis of the qualitative data revealed improved awareness of professionalism issues, self-perceptions of behavior, and ability to utilize strategies learned in the Professionalism Education Program to improve professional behavior.

Conclusions: Our program demonstrated improvements in self-perceptions of professionalism, an increased awareness of unprofessional behavior, and the ability to utilize skills and strategies that improve professionalism. Our innovative program can be used to successfully improve residents’ self-perceptions of professionalism. It should be considered in other medical specialties and allied health care programs.
Introducing a resident academic promotion structure

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Introduction: Residents pursuing academic careers often undertake research, teaching, and leadership endeavors beyond that of program requirements. However, there is little opportunity for residents to formally log this work, gain experience in application for academic promotion required of faculty, or receive recognition for exceptional commitment to these pursuits.

Objective: It is our objective to develop and implement a resident academic promotion structure that will recognize residents for their achievements and provide practice in application for promotion.

Methods: A literature review yielded no published resident academic promotion structures, despite evidence to support the pursuit of research, teaching, and leadership opportunities in residency. The current Queen’s University senate policy on academic promotion was modified to develop the resident academic promotion structure. This was done collaboratively with the Faculty of Health Sciences’ Office of Postgraduate Medical Education.

Results: Our resident academic promotion structure criteria are divided into 3 streams: leadership, teaching/education, and scholarship. Each stream consists of 3 levels of achievement: early academic, developing academic, and established academic. Early academic reflects baseline residency requirements, whereas higher levels require additional efforts. To achieve promotion a resident must show advancing proficiency in at least 1 stream, in addition to submitting an application inclusive of reference letters, a written reflection, and a portfolio. Applications will be reviewed by a promotions committee for advancement decisions. This structure will also allow for documentation of often difficult to capture competencies such as scholarship and leadership.

Conclusions: This proof of concept approach will be implemented at Queen’s University for the 2017-2018 academic year.
SIM C5: A communication crises curriculum for pediatricians

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Introduction: We define “Communication Crises” (CC) as communication experiences between parents and pediatricians characterized by unexpected, intense emotions, resulting in obstruction of care and negatively affected therapeutic relationships. Navigating “difficult conversations” is a known topic; however, curricula to support navigation of CC is lacking.

Objective: In this study, we designed, piloted, and evaluated a CC curriculum (SIM C5) to increase pediatricians’ competency, confidence, and coping (C3) in CC.

Methods: Needs and content emerged from qualitative data from health care providers and parents. Curriculum was further informed by literature and communication courses. SIM C5 was delivered via a 1-day course, which included a workshop, video-based observation/reflection, and practice with improvisation actor-based simulation. Tools to assess SIM C5 quality, efficacy, and self-assessment of C3 were developed.

Results: SIM C5 is rooted in an explicit CC approach illustrated by a communication tool, emphasis on relationship-centered care and building a trusting relationship. Pre-post pilot comparison (n = 4) showed that participants: (1) changed their responses from not having to having an “explicit approach” to CC; (2) reported changes in their emotional states (on entering a simulated CC) from “uncertain,” “intimidated,” and “anxious” to “curious,” “interested,” and “empathetic”; (3) improved in their competency in CC strategies; and (4) valued the safe but realistic environment of the simulation.

Conclusions: Results demonstrate that SIM C5 is an effective way to increase C3 regarding CC. Further research will aim to understand curriculum impact on larger cohorts of physicians and residents, third party assessment of C3, and how skills translate to clinical practice.
Developing academic advisors and competency committee members competencies: A grassroots community approach

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Introduction: New faculty in medicine may have had extensive training in their residency, but they may have received very little training in being an effective teacher. Specifically, Queen’s University with its ambitious goal of a complete turnaround to competency-based medical education by July 2017 requires the development of teaching competencies that are aligned with the changing roles of academic advisors and Clinical Competency Committee (CCC) members.

Methods: This project followed a grassroots, multiphasic grounded theory approach concluding with a Delphi process of international competency-based medical education experts. As a first step, a systematic literature review of competencies for medical education was conducted. The competencies were gleaned from 37 articles that met the eligibility criteria. Competencies were then distilled into winnowed lists for academic advisors and CCC members. A questionnaire was delivered to stakeholder groups throughout the Queen’s University School of Medicine (n = 23), who ranked the competencies they thought were most important, and proposed their own.

Results: Our developed competencies were well received with an overwhelmingly positive reception from all types of stakeholders. Respondents to the survey reported varied levels of approval. Assessment, as well as mentoring competencies, were the most positively received. From the Delphi process, the validated competencies are the main product of this investigation.

Conclusions: These varied perspectives provided a comprehensive, grassroots perspective on what the faculty in these positions needed to be able to do as informed by literature, molded by expert consensus, yet still uniquely aligned to Queen’s University medical structures.
Teaching and assessing the CanMEDS Roles: Utilization of resources and the medical education literature by Canadian program directors

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Introduction: Research has shown that clinical educators feel insufficiently informed about how to teach and assess the CanMEDS roles, despite the existence of strategies and tools to assist with same.

Objective: Our objective was to examine the extent to which program directors utilize evidence-based tools and the medical education literature in teaching and assessing the CanMEDS roles, and the potential aids and barriers to their use.

Methods: Online survey of 747 residency program directors of Royal College of Physicians and Surgeons of Canada programs across Canada.

Results: A total of 186 program directors completed the survey (25%). Approximately one-third (37%) did not know whether the teaching strategies they used were evidence-based, and another third (32%) believed they were "not at all" or "to a small extent" evidence-based. Similarly, approximately one-third (32%) did not know whether the assessment tools they used were evidence-based, and another third (40%) believed they were "not at all" or "to a small extent" evidence-based. While program directors were aware of research on teaching strategies (62%) and assessment tools (52%), most believed they did not have sufficient time to review the relevant literature (72% for teaching and 64% for assessment).

Conclusions: Canadian program directors reported low utilization of evidence-based methods for teaching and assessment, implying a potential knowledge translation gap in medical education research. We are further exploring the aids and barriers to the use of this evidence in a subsequent qualitative study.
Introduction: Queen’s University is on an accelerated path to competency-based medical education (CBME), with over 1000 faculty dispersed across multiple sites supporting this initiative. Based on work from Holmboe et al (2011) we know that faculty development is “the missing link” to a successful transition.

Objective: Our specific challenge is how to deliver effective and efficient faculty development across the region.

Methods: To determine faculty development needs across the sites we used a needs assessment questionnaire protocol, which was sent to program leaders, academic advisors, competency committee members, residents, and other stakeholders, at various times during the transition to CBME. This data were analyzed using a thematic-based analysis.

Results: Key themes were identified as topics for faculty development to address, as were common challenges such as busy schedules. To address these key issues identified in our research in a time efficient but learning effective manner, an online module program was developed. Each module was created by a different preceptor, spanning across the specialty programs. These modules provide faculty with a breadth of knowledge related to CBME that will enable them to have more effective conversations with program leaders and CBME champions to ultimately help facilitate wider buy-in for the transition to CBME.

Conclusions: The successful transition to a CBME curriculum requires faculty development that is delivered through a variety of contexts. Online modules provide the opportunity to reach more frontline faculty, but it is essential that program leaders and CBME champions be utilized in module development and promotion.
What is the plan? Improving ED patient discharge communication through patient-centered discharge handouts

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Introduction: Discharge from the emergency department (ED) is a potential high-risk period for communication failures. Discharge instructions at patient-level health literacy are fundamental to a high-quality discharge.

Objective: This quality improvement project sought to determine if the introduction of preprinted discharge handouts increased the proportion of patients who received written discharge instructions, and understood which symptoms to monitor after leaving an academic ED.

Methods: The Model for Improvement was used with multidisciplinary collaboration, including stakeholder engagement and process mapping to understand ED workflow; patient co-design of discharge handouts based on the 10 most common historical ED diagnoses; installation of physical storage units; implementation of medication teaching pamphlets; integration of discharge handouts into physician order-entry program; and staff education and training. Patient telephone surveys to every 25th patient (aged 16 and older, English-speaking, valid telephone number, capacity to consent) discharged from the ED were conducted preimplementation (June–September 2016) and postimplementation (September–December 2016) of the handouts to evaluate the discharge process.

Results: A total of 25,600 patients met inclusion: 2074 calls were made and 1001 telephone surveys were completed (response rate = 48%). The proportion of patients receiving printed discharge handouts increased from 9.2% to 46% ($P < .0001$), while the proportion of patients who understood symptoms to look for after leaving the ED and when to return increased from 71% to 84% ($P < .0001$).

Conclusions: Through the introduction of patient-centered discharge handouts, an increased number of patients had a high-quality, safer discharge process. Future efforts will focus on optimizing discharge communication and ensuring long-term sustainability of the enhanced discharge process.
Improving emergency department pain management: A quality improvement project

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Introduction: In 2015 the UK Care Quality Commission (CQC) inspected Gloucestershire Hospitals and identified pain management as requiring action, stating patients within the emergency department should have an assessment of their pain and prompt pain relief administered where necessary—a statement matching set national standards of the Royal College of Emergency Medicine (RCEM).

Objective: Using quality improvement methodology, this project aimed to improve pain management within the Gloucestershire emergency departments, such that treatment of 75% of patients would meet RCEM, and thus CQC, criteria within 12 months.

Methods: After an initial audit established baseline data, we created a driver diagram with background literature review and a staff questionnaire. Change ideas of education, available prescribers, non-pharmacological methods, and documentation were identified. Using the RCEM standards as outcome measures, over 7 months of plan-do-study-act (PDSA) cycles were used to test and implement a staged education program, new documentation, and resource packages. Run charts were used to identify whether the changes resulted in improvement.

Results: PDSA cycles demonstrated cumulative improvement with the education program and the documentation. Comparison of final data with baseline showed improvement in pain management, with 99% patients having pain assessed on arrival and 73% in moderate-severe pain being given an analgesic, compared to 57% initially.

Conclusions: Using these methods significant improvement was shown, although the aim of 75% patients was not achieved within all the target areas, within the time scale of this project. Persistence and creative repetition is required to embed the change ideas, and further improve the patient outcomes of this quality improvement project.
Reducing repetitive “routine” blood testing among hospitalized patients

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Introduction: Repetitive, routine blood tests (RBTs) are associated with anemia and increased hospital mortality. Choosing Wisely Canada recommends against repetitive testing in hospitalized patients. At St. Michael’s Hospital (SMH), we have documented high rates of repetitive RBTs and have confirmed an association with worsening anemia at our hospital. In a preliminary multivariate analysis at SMH, for every 100 mL of blood drawn for routine blood work, the odds ratio for transfusion was 2.16.

Objective: Our aim is to reduce repetitive RBTs in the general internal medicine unit by 15% by December 2017.

Methods: Our strategy involved increasing awareness of local repetitive RBT rates, educating clinicians around the harms of repetitive RBTs through posters, targeted e-mail reminders, and revising order sets to remove unnecessary tests and open-ended RBT orders.

Results: Prior to the intervention, the average volume of blood collected for RBTs per patient-day-admitted was 6.97ml/pt-day in the general medicine unit. Following an education and awareness effort, RBTs decreased to 6.40 ml/pt-day. After order set changes were introduced, RBT rates decreased further to 5.62 ml/pt-day, representing a total decrease of 19% from the baseline period. This equates to an average cost savings of $1,214 a month. No change in balance measures (length of stay and proportion of tests sent stat) was observed.

Conclusions: Preliminary results suggest that it is possible to substantially reduce repetitive blood draws among hospitalized patients without negatively affecting care. Limitations included non-universal utilization of order sets by physicians. Future directions will include expanding our intervention to other inpatient wards to determine its feasibility on a larger scale.
Using the Canadian Primary Care Sentinel Surveillance Network (CPCSSN) database to measure patient outcomes for graduates of the University of Calgary family medicine residency program: A pilot study

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**Introduction:** There is limited information about how family medicine (FM) residency training in Canada affects the quality of care provided by graduates once in practice. Studies in US obstetrics and gynecology have shown graduates from better quality programs have lower maternal mortality rates. Similar studies have not been possible thus far in FM. The Canadian Primary Care Surveillance Network (CPCSSN) gathers quality of care data for more than 700 “sentinel” family physicians across Canada. These data are a potential source of information about the care provided by FM graduates of programs after completion of training. Tracking the quality of care provided by graduates is an underexplored way for programs to ensure that they are accountable for training competent physicians.

**Methods:** As a test of feasibility, the residency for each sentinel physician in southern Alberta was identified. Quality indicator data were collected via CPCSSN for sentinel patients with diabetes and/or hypertension. Treatment targets from Canadian clinical practice guidelines were used as quality indicators. The data were compared based on residency training program (Calgary versus non-Calgary).

**Results:** A total of 44 FM sentinels participated (22 Calgary and 22 non-Calgary graduates). Data from 8726 patients was used. This included 27,101 hemoglobin A1C levels and 119,179 blood pressure measurements over the preceding 5 years. No significant differences were found in meeting quality of care indicators between the 2 groups.

**Conclusions:** This pilot study confirms the feasibility of using CPCSSN data in measuring quality of patient care based on residency training program. A larger pan-Canadian study would be possible using similar methodology.
Preventability of 28-day hospital readmissions in general internal medicine patients: A retrospective analysis at a Canadian quaternary hospital

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Introduction: Unplanned hospital readmissions are associated with increases in patient mortality, patient dissatisfaction, and health care costs. In Canada, about 13.5% of medical admissions undergo unplanned hospital readmission within 28 days, yet only a fraction are likely to be preventable.

Objective: The purpose of our study was to identify preventable hospital readmissions and their common causes to inform readmission prevention interventions.

Methods: We performed a retrospective cohort analysis of 28-day hospital readmissions to the general internal medicine teaching service at Vancouver General Hospital, a quaternary care Canadian hospital. From September 2015 to January 2016, patients 18 years and older were recruited following readmission for at least 24 hours, and readmission was identified via the hospital electronic health record (EHR) system. Data were gathered via structured review of hospital charts and EHRs, along with standardized patient interviews. Unique to our study, a multidisciplinary panel of physicians, nurses, and hospital administrators adjudicated preventability, and identified common causes of readmission.

Results: Fifty-five hospital readmissions were identified; 53% were adjudicated to be preventable. There was no difference in any variable analyzed between preventable and non-preventable readmissions. The LACE index and the HOSPITAL score did not correlate with preventability. The most common causes of preventable readmissions were inadequate coordination of community services upon discharge, insufficient clinical postdischarge follow-up, and suboptimal end-of-life care.

Conclusions: This study identified a higher proportion of preventable 28-day hospital readmissions when compared to prior research. Increased involvement of palliative care during initial hospitalization for appropriate conditions and improvements in care after discharge may reduce unplanned hospital readmissions.
A continuous quality improvement initiative to reduce imaging utilization for minor head injuries in the emergency department

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Introduction: More than 90% of head injuries presenting to emergency departments (EDs) are minor. Recommendations by the Choosing Wisely Campaign (CWC) to reduce computed tomography (CT) scan utilization for head injuries aim to reduce the radiation burden, and improve health care resource utilization.

Objective: Our resident-lead quality improvement (QI) initiative aims to reduce the CT scan rate by 40% in a 6-month period at an academic ED.

Methods: Baseline CT scan rates for patients with head injuries were determined through a 27-month retrospective cohort study. We used provider surveys to develop our driver diagram and plan-do-study-act (PDSA), which include: (1) improving provider knowledge about the CWC recommendations; (2) implementation of a modified Canadian CT head rule checklist in the ED; (3) giving patients head injury handouts; and (4) bimonthly reporting of CT scan rates to providers. Our primary outcome measure is the number of CT scans performed for patients with head injuries. Process measures include number of checklists completed and handouts given. Balance measures are return visits within 72 hours.

Results: Overall, 49% of head injury patients received a CT scan in the ED. There was no significant difference in the rate of CT scans before and after the CWC (50% versus 48%, \( P = .07 \)). A majority (90%) of clinicians routinely use the CT head rule but 85% of clinicians still believe that we over-CT patients. Results and suggestions for improvement were used to develop PDSA cycles currently in progress.

Conclusions: Despite recommendations of the CWC, imaging overutilization remains an issue. Our quality improvement approach highlights local barriers that are being targeted to reduce CT scan rates for head injuries.
Development of an emergency physician handover template

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Introduction: A handover refers to a transfer of patient care, involving both a transfer of information and responsibility. This complex procedure is fraught with difficulty, contributing to poor patient outcomes. Common strategies identified in previous emergency department literature are difficult to operationalize.

Objective: The objective of this study is to develop a handover template of high local utility, and to describe a process for handover template development that can be used at other centers.

Methods: The first iteration of a handover template was created using a literature search identifying essential information for an emergency physician-to-physician handover. A consensus panel of senior emergency medicine residents and emergency physicians was created to represent a variety of clinical experience and practice patterns. Each iteration of the template was evaluated via a modified Delphi protocol. Subsequent versions were altered by the authors based on feedback provided, and the iterative process was continued until consensus was reached. The consensus threshold was decided a priori.

Results: Following several iterative trials, a handover template was finalized. This was made available to all physicians through the electronic health record program already in use in the emergency department.

Conclusions: We were successful in creating a handover template of high local utility; this aims to improve the structure of patient handover in our emergency department. An identical modification process can be used in other departments to create templates of value, accounting for local culture and practice.
Gaps in clinic attendance in young adults with type 1 diabetes: Need for quality improvement

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Introduction: The transition from pediatric to adult type 1 diabetes (T1DM) care is associated with decreased medical follow-up, lost opportunities for counseling, and increased diabetes-related hospitalizations.

Objective: Using the Model for Improvement framework, we aimed to reduce non-attendance (no-show and cancellation within 24 hours) rates at a dedicated clinic for young adults (YA) with T1DM in Toronto, Canada.

Methods: Non-attendance in the ambulatory clinic between February 2015 and September 2016 was audited and plotted on a Statistical Process Control chart. Consecutive new patient charts were reviewed for demographic data, metabolic control, and counseling rates. A patient survey was administered (October 2016 to January 2017) to identify root causes of non-attendance. Continuous variables were reported as median (interquartile range) and categorical variables in percentages.

Results: There were 450 scheduled visits for 150 patients. Mean non-attendance rate (P chart) was 32% with no special-cause variation. Chart review (n = 30, 84% female, age 18.7 [18.2–19.7], duration of T1DM 8 years [6, 14], and A1C 8.8% [8.0, 10.1]) showed 9.7% of referred patients were never seen, 18% were lost to follow up, 39% were seen less than 3 times a year, and 74% had at least 1 non-attendance. Documented counselling rates for hypoglycemia, preconception, and sick day management were 68%, 68%, and 14%, respectively. Patients highlighted fear of judgment (6/16) as a root cause for non-attendance, and preferred reminders as an intervention.

Conclusions: Non-attendance is a significant issue in the YA T1DM clinic. Using plan-do-study-act cycles, a reminder system and patient-centered conversation guide have been implemented, and its impact on non-attendance and clinical outcomes will be examined.
Resident-driven multidisciplinary initiative for optimum inpatient management, discharge planning, and readmission reduction of patients with chronic obstructive pulmonary disease (COPD) exacerbations


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Introduction: The Global Initiative for Chronic Obstructive Lung Disease (GOLD) provides valuable guidelines for both inpatient management and discharge planning for patients admitted with COPD exacerbations. To see if patient care could be improved, a unique initiative under the leadership of a select group of internal medicine residents was developed consisting of a multidisciplinary team including the chair of internal medicine, nursing, case management, respiratory therapy, pharmacy, hospital administration, and internal medicine residents. With the assistance of the GOLD guidelines, several tools were created to foster collaboration to provide optimized clinical care and discharge management in this multidisciplinary quality improvement project.

Methods: Over a period of 12 months, the resident leaders were tasked with coordinating management of patients admitted with chronic obstructive pulmonary disease (COPD) exacerbations. Collaboration was accomplished using 2 unique tools including a COPD admission order set and a COPD discharge checklist. Additionally, a computer-based training module to provide instruction on these tools was developed. Each discipline involved in patient care was charged to complete individualized tasks on the discharge checklist. Key metrics included 30-day readmission rates and discharge checklist compliance rates.

Results: Over a period of 12 months, readmission rates had dropped from the previous year from 21.9% to 13.6%. The composite compliance rate for checklist completion was 64.2%.

Conclusions: Under the leadership of internal medicine residents, this quality improvement project utilizing a multidisciplinary approach to manage COPD exacerbations provided comprehensive tools that resulted in an observable reduction in 30-day readmissions and improved overall patient care.
Improving documentation for “treat and release” patients in the emergency department

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Introduction: “Treat and release” (T&R) patients are discharged home from the emergency department but asked to return within 12 to 72 hours for follow-up care (eg, imaging test). Handover of care for T&R patients—done through charting and therefore dependent on adequacy/completeness—is crucial to the safety and quality of care they receive. Our 2 academic teaching hospitals see 2000 T&R patients a year.

Objective: Our aim is to improve the adequacy of documented plans of care and follow-up plans to at least 90% within 6 months.

Methods: Baseline documentation practices and identification of quality gaps were obtained through an 18-month retrospective chart audit utilizing a modified version of QNOTE, a validated tool used to assess the quality of health care documentation. Ongoing plan-do-study-act (PDSA) cycles include: (1) education of providers; (2) creation of an improved T&R handover tool to encourage improved documentation; and (3) modifications to logistical processes for T&R patients. Our primary outcome measure is the quality of documentation using QNOTE, and our process measures are the number of missing charts and the completion rate of the T&R tool.

Results: Chart audits identified that 50% of plans of care and 67% of follow-up plans were missing, illegible, and/or incompletely documented. A run chart of the adequacy of chart documentation (using QNOTE scores) is currently being updated weekly with each PDSA cycle, monitoring for shifts and trends.

Conclusion: This project identified gaps in the quality of documentation for T&R patients. Using iterative PDSA cycles, we are improving the quality of care delivered through improved communication between health care providers.
Improving appropriateness of RBC transfusion for iron deficiency anemia patients presenting to the emergency department

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Introduction: Patients presenting to the emergency department (ED) with iron deficiency anemia (IDA) are under recognized and over transfused. A 3-month audit of RBC transfusions at Sunnybrook Health Sciences Centre (SHSC) ED in 2013 showed that 58% of transfusions for IDA were appropriate. The aim of this quality improvement (QI) project was to increase the rate of appropriate transfusion to greater than 80%.

Methods: Since November 2013, several QI interventions were instituted including presentations, a podcast, access to a transfusion specialist for guidance, development of an algorithm on IDA management in ED, and development of an ED IDA toolkit. Appropriateness was determined using an algorithm developed by 2 transfusion specialists and ED staff at SHSC. The process measure was monthly IV iron use in IDA patients managed exclusively by ED staff. Balancing measures included IV iron use according to the algorithm and under transfusion.

Results: Assessment of 168 units transfused by ED over the 2-year study period showed an improvement of RBC appropriateness to 91% (range 50%-100%). IV iron use increased from 1 dose between August and October 2013 to an average of 2.4 per month in 2014 and 4.8 per month in 2015. IV iron use did not follow the algorithm in 22% of cases. Undertransfusion occurred in only 1 patient.

Conclusions: An improvement in RBC transfusion appropriateness for IDA in the ED can be achieved and maintained with the implementation of simple educational and practical interventions. These interventions can be adapted for implementation in other hospitals.
From the classroom to clinic: A resident quality improvement project for accurate medication histories in outpatient physical medicine and rehabilitation (PM&R) clinics

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Introduction: Accurate medication histories are critical for appropriate and safe management plans. As part of a resident and staff co-learning curriculum, a resident-led quality improvement project was implemented in Sunnybrook Prosthetic & Orthotic clinics to address inadequate patient medication lists.

Objective: The project aim was to increase the percentage of patients attending this clinic with accurate medication lists to 80% by May 2017.

Methods: A gap analysis via clinician surveys was initially performed to determine the severity of the issue. An Ishikawa diagram identified factors contributing to absent medication lists. Site visits and process mapping helped understand clinic flow and areas for intervention. Subsequently, patient reminder systems were implemented within a rapid plan-do-study-act (PDSA) framework. Reminders were added at the time of appointment booking, 48 hours prior to appointment via automated voicemail, and on an online referral form. The primary outcome measure was the percentage of patients who brought accurate medication lists to clinic. Short surveys completed during clinic visits by clinicians were used for data collection.

Results: A gap analysis revealed only 41% of patients provided medication lists at clinic visits. Clinicians identified that in 70% of those lacking medication lists, there was suboptimal patient care, frequently related to pain management.

Conclusions: Ishikawa diagram and process mapping effectively identified sources of intervention to improve clinic medication histories. Rapid PDSA resulted in a multi-modal approach to improve patient reminders. Run chart analysis will be presented to determine the long-term impact of the cycles on attaining accurate medication lists.
Optimizing the process of reporting stroke rehabilitation inpatients’ driver status at Toronto Rehabilitation Institute: A LEAN quality improvement project

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Introduction: Ontario physicians are legally obligated to report patients who may be medically unfit to drive to the Ministry of Transportation (MTO). Prompted by previous patient complaints, an institutional review revealed significant variability in reporting processes, resulting in inconsistent communication regarding driving between patients and health care providers.

Objective: The project aim was to optimize and standardize the driving status reporting process at an academic inpatient stroke rehabilitation unit, using LEAN process improvement methodology.

Methods: Individual physician interviews confirmed baseline variability in reporting practices. LEAN process tools were employed, including value stream mapping, gap analysis, and development of a standard work form, followed by implementation of recommended changes. Outcome measures evaluated by chart review and analyzed using run charts included (1) percentage of charts using the standardized MTO reporting form; (2) percentage of patients with driver status documented in the physiatry consultation note; and (3) percentage of drivers with MTO reporting status documented in the hospitalist’s discharge summary.

Results: Following introduction of standard work processes, use of the standardized MTO form increased from 0% to 100%, indication of driver status in physiatry consultations increased from 55% to 83%, and communicating reported drivers in the discharge summary increased from 0% to 86%.

Conclusions: LEAN methodology was effective for increasing the usage of the MTO Medical Conditions Report Form, documenting driver status in the initial consultation, and indicating MTO reporting status in the discharge summary. The new standard work will now be spread to 2 acquired brain injury inpatient units at our institution.
The game of gowns, gloves, and masks: Why don’t we teach it right?

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**Introduction:** Personal protective equipment (PPE) is used by health care workers to prevent direct contact with body fluids and potentially infectious substances in clinical settings. Studies show poor PPE use can lead to self-contamination and spread of pathogens. Simulation-based education has been used to provide training for medical trainees in various aspects of clinical care. To date, the use of this modality for PPE training among medical trainees has been limited.

**Methods:** Simulated clinical cases requiring additional precautions were incorporated during an objective structured clinical examination (OSCE) for postgraduate year 1 (PGY-1), PGY-2, and PGY-3 internal medicine (IM) residents at the University of Calgary. A paper observation tool was completed by Infection Prevention and Control personnel to evaluate consistent and correct PPE application. A breach was defined as any incorrect technique or missed opportunity that could lead to potential contamination.

**Results:** Breaches by all 34 PGY-1 IM residents were noted. There was potential for self-contamination (residents’ person and resources by 94% of the residents) and potential for contamination of hospital PPE supplies by 29% of residents. Proper technique of hand hygiene was performed by 58% of residents. Analysis of PGY-2 and PGY-3 IM residents’ data is pending.

**Conclusions:** Among IM residents participating in a simulated OSCE, a breach in PPE protocol was common. Our assessment indicates that greater emphasis on PPE and hand hygiene practice is required by residency programs.
Discontinuing docusate: Promoting best practice of constipation management in hospital

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Introduction: Systematic reviews do not support the use of docusate to prevent or improve symptoms of constipation in hospitalized patients. However, it remains available on hospital order sets. This increases patient pill burden, and may delay appropriate management of constipation.

Objective: We aimed to reduce inappropriate prescribing of this medication through removal of docusate from the standard order set on a single ward in a quality improvement initiative.

Methods: On January 1, 2016, St. Michael’s Hospital removed docusate from admission order sets for hematology/oncology inpatients. We collaborated with hospital pharmacy to develop new unit order sets, which retained evidence-based alternatives for constipation management and prevention. A 1-year pre-post intervention analysis was designed to determine the initiative impact. Primary outcomes include incident constipation (balancing measure) and constipation management strategies. Secondary outcomes include duration of constipation, opioid use, and laxative costs.

Results: To date, 210 charts have been reviewed: 142 preintervention, and 78 postintervention. Preliminary findings show constipation is more common since the removal of docusate (38% preintervention, 45% postintervention, \( P = .32 \)). Docusate was used among 49% of patients prior to intervention and 9% following intervention. Interestingly, constipation treatment has declined from 63% to 46% of patients.

Conclusions: Preliminary data suggest removal of docusate from a standardized hospital order set is an effective intervention to reduce use of this medication. Future goals include ongoing advocacy to remove docusate from hospital order sets throughout our institution; however, this must be done alongside efforts to promote best practices in the management of constipation to ensure it is not left untreated.
Aiming high with high-intensity statin: Improving statin therapy in diabetic patients in a resident-run clinic

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Introduction: Appropriate statin therapy is recommended for primary prevention of atherosclerotic cerebrovascular disease (ASCVD).

Objective: We implemented an educational intervention program to improve adherence with the 2013 ACC/AHA guidelines in a resident-run outpatient clinic.

Methods: We collected baseline data for all diabetic patients seen in the clinic between January and June 2014, followed by a 10-week multimodal educational intervention program for the residents to increase awareness about atherosclerotic cardiovascular disease (ASCVD) risk calculation, and new guidelines for statin therapy. Postintervention, we collected data for diabetic patients who had at least 2 clinic visits between January and March 2016. The appropriateness of statin therapy between preintervention and postintervention periods was compared.

Results: A total of 204 preintervention and 131 postintervention qualified diabetic patients were included. Mean patient age was 56 years. Most patients were African-American (91% and 94%) with female predominance (56% and 53%). Among patients with ASCVD risk ≥ 7.5%, 36% received high-intensity statin, and 2% received moderate-intensity statin during the preintervention period. This significantly improved to 64% receiving high-intensity statin and 17% receiving moderate intensity statin after the intervention. Use of high-intensity statin therapy increased 28% ($P = .031$).

Conclusions: Our educational intervention program resulted in notable improvement of appropriate statin therapy in qualified patients. Ongoing educational programs are required to improve and sustain changes in clinical practice.
Sondage sur la formation en radiologie diagnostique reçue dans les universités québécoises telle que perçue par les radiologistes en début de carrière et leur chef de département

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Introduction: Peu d’outils sont disponibles afin d’évaluer la perception de la préparation des résidents à la pratique autonome en début de carrière.

Méthodologie: Nous avons créé deux sondages comportant des questions à choix multiples et questions ouvertes pour recueillir les avis et commentaires des radiologistes ayant débuté leur pratique au Québec dans les onze dernières années et des directeurs de département de radiologie des hôpitaux et cliniques québécois quant à la qualité de la préparation à la pratique dans 8 grands secteurs de la radiologie, séparés en volets diagnostique et interventionnel. Nous avons obtenu anonymement les réponses de 40/98 (41%) chefs de départements et de 81/239 (34%) des radiologistes en début de carrière.

Résultats: Les radiologistes en début de carrière ont souligné les lacunes suivantes dans leur formation: formation insuffisante en échographie musculo-squelettique, pour plusieurs techniques (dont biopsies trans-thoraciques, hépatiques, rénales, osseuses et blocs foraminaux), ainsi que pour les volets de gestion administrative et du débit de lecture. Pour leur part, une majorité des chefs de département a jugé que le débit de travail ainsi que la lecture des examens de radiographies simples, la réalisation des échographies obstétricales et des interventions vasculaires et non-vasculaires étaient sous-optimales.

Conclusions: Ce sondage nous a permis de cibler des faiblesses dans l’enseignement de la radiologie et d’initier un processus d’amélioration des programmes de résidence. La répétition d’un tel sondage quelques années plus tard permettra d’observer si un progrès a eu lieu suite aux améliorations apportées.

Survey on the diagnostic radiology training received in Quebec universities as perceived by early-career radiologists and their department heads

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Introduction: There are few tools available for evaluating perceptions concerning how well residents are prepared for autonomous practice at the beginning of their career.

Methods: We developed 2 surveys consisting of multiple-choice and open-ended questions to solicit the opinions and comments of radiologists who began their practice in Quebec in the last 11 years. We also surveyed heads of radiology departments of Quebec hospitals and clinics concerning the quality of preparation for practice in 8 major areas of radiology, broken down into diagnostic and interventional components. Anonymous responses were obtained from 40 of 98 (41%) department heads and from 81 of 239 (34%) early-career radiologists.

Results: The early-career radiologists reported the following deficiencies in their training: insufficient training in musculoskeletal ultrasound for a number of procedures (including transthoracic, liver, renal and bone biopsies, and foraminal blocks), as well as for the administrative management and reading speed components. For their part, a majority of the department heads considered the work pace as well as the reading of plain radiographs, and the performance of obstetrical ultrasounds as well as vascular and non-vascular interventional procedures to be suboptimal.

Conclusions: This survey enabled us to identify weaknesses in the teaching of radiology, and to initiate a process aimed at improving residency programs. By repeating this type of survey in a few years’ time, we will be able to determine whether the improvements made have produced positive results.
Mise en place d’un groupe d’intérêt portant sur la sécurité des patients et l’amélioration de la qualité à la faculté de médecine de l’Université Laval

J. Poitras
Université Laval, Québec, QC

La formation ASPIRE du Collège royal des médecins et chirurgiens du Canada et de l’Institut canadien en sécurité des patients offerte depuis 2013 a permis de former plusieurs enseignants de nos facultés à l’enseignement des compétences en sécurité des patients et en amélioration de la qualité, conformément au cadre de référence CanMEDS 2015.

La formation ayant comme objet entre autres l’amorce d’un projet en sécurité des patients et en amélioration de la qualité, elle génère dans nos facultés des enseignants formés, adhérents aux principes de sécurité des patients et d’amélioration de la qualité et partageant comme enjeu la réalisation de leur projet.

En octobre 2016, sous la gouvernance de la Direction de la sécurité des patients et du professionnalisme, un groupe d’intérêt en sécurité des patients et en amélioration de la qualité (GISPAQ) a été créé à la Faculté de médecine de l’Université Laval. Celui-ci réunit les enseignants qui ont suivi la formation ASPIRE. Il a comme mandat de partager l’avancement des projets des participant et de provoquer des collaborations constructives et une émulation. La résolution des problèmes rencontrés en cours d’exécution des projets est également au menu.

La vingtaine de participants provenant des milieux urbains surtout mais également des régions représentante 14 spécialités différentes. Une cadre chargée de l’amélioration de la qualité au CHU - Université Laval et ayant suivi la formation participe également. Les deux rencontres tenues jusqu’à présent sont prometteuses et les participants ont souligné leur appréciation eut égard aux discussions et aux enjeux abordés.

Establishment of a patient safety and quality improvement interest group at the Université Laval Faculty of Medicine

J. Poitras
Université Laval, Quebec City, QC

The ASPIRE training, offered by the Royal College of Physicians and Surgeons of Canada and the Canadian Patient Safety Institute since 2013, has enabled many of our faculty members to receive training on how to teach competencies in patient safety and quality improvement, in accordance with the CanMEDS 2015 framework.

Since 1 of the purposes of this training is to initiate a patient safety and quality improvement project, it helps our faculties develop a corps of trained educators who uphold the principles of patient safety and quality improvement, and who share the challenge of making this project a reality.

In October 2016, under the auspices of the Office of Patient Safety and Professionalism, a patient safety and quality improvement interest group was established in the Université Laval Faculty of Medicine. All the members of this group have completed the ASPIRE training. Its mandate is to share information on the advancement of the participants’ projects, promote constructive collaborations and emulation, and help solve any problems encountered during project implementation.

The participants, who number about 20, are mainly from urban institutions, but also include some from rural/community centers, and represent 14 different specialties. An executive responsible for quality improvement at the CHU de Québec–Université Laval who has taken the ASPIRE training is also a member of the group. The 2 meetings held to date have been promising, and feedback from the participants on discussions and issues addressed has been positive.
An assessment of residents’ perceived acquisition of leadership and management competencies in Canadian emergency medicine residency programs

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Introduction: Although leadership and management (L&M) are emphasized within the CanMEDS Framework, evidence suggests a gap between the competencies expected of physicians and their development during residency training. Emergency medicine (EM) is a specialty in which L&M are particularly emphasized. However, little data exist to assess acquisition of these competencies during EM training.

Objective: This study sought to identify the perceived ability in L&M competencies among final-year EM residents, and to identify formal and informal residency experiences that fostered development of these competencies.

Methods: A concurrent nested mixed-methods design was used. Participants were final-year residents from Canadian EM training programs registered for the 2016 National Review Course in EM. Participants completed a web-based questionnaire that assessed their perceived knowledge and ability in 17 L&M competencies. A subset of respondents participated in a semistructured interview that explored the development of these competencies during their residency training.

Results: Of 66 residents invited, 22 (33%), representing 12 residency programs, completed the questionnaire. Six residents participated in an interview. Perceived ability in each of the 17 competencies was low (consolidated mean score 3.64 out of 5, SD = 0.33). Interviews suggest that formal training in L&M is limited in residency programs. Much of residents’ learning results from informal mentorship as opposed to structured curricula. Existing formal curricula emphasize management more than leadership competencies.

Conclusions: EM residents perceive deficiencies in their development of L&M competencies. Our results suggest that EM residency programs should include more formal curricula and learning opportunities for residents to develop these competencies.
Early detection of residents at risk of failure using a keyword specific algorithm

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**Introduction:** Literature suggests that specific keywords included in summative rotation assessments might be an early indicator of abnormal progression or failure.

**Objective:** This study aims to determine the possible relationship between specific keywords in rotation assessment forms and subsequent failure or abnormal progression. The ultimate goal was to create a functional algorithm to identify residents at risk.

**Methods:** A database of 41,618 rotation assessment forms from 3292 residents was used. Since the database contained low occurrence of residents with training difficulties, a classification rule was constructed by recursive partitioning using CART methods, and a loss function to optimize sensitivity. Family medicine residents (1129) were analyzed separately from specialties (2163).

**Results:** The 2 analyses yielded similar results. Sensitivity specificity, positive predictive value, and negative predictive value were approximately 75%, 95%, 50%, and 99%, respectively, for both analyses. Approximately 75% of residents with failure to progress were detected for both family medicine and medical specialties.

**Conclusions:** Rotation evaluation keywords can be used to identify residents with training difficulties. The low positive predictive values may be a reflection of supervisors documenting poor performance but unwilling to mark the end-of-rotation assessment either as “difficult progression” or “failure.” Classification and regression trees were helpful to identify pertinent keywords, and the algorithm from the CART model can be implemented in our electronic assessment system to detect future residents at risk. A prospective analysis will be needed to test the validity of the algorithm in our current resident cohort.
Learning path in bronchoscopy simulation before transition to real life: Do trainees maximize their learning?

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Introduction: Virtual reality (VR) simulators have been advocated for similarity to real life, haptic feedback, automatic scoring guiding learning, and unrestricted availability.

Objective: The goal of this study was to describe learning curves of novices in VR bronchoscopy, and explore when and how learners decide to transition to performing procedures in real life.

Methods: Twenty-four novice learners were included in a bronchoscopy simulation curriculum using VR. An instructor supervised and explained the strategy and goals (speed, dexterity, accuracy) of training. The automatic scores from the VR were plotted to describe learning curves. Trainees were interviewed to explore when and why they decided to stop training.

Results: Only 2 out of 24 trainees plateaued their performance in 1 of the components: speed, dexterity, or accuracy, and none of the trainees reached the goal (an expert’s score in VR). Reasons for stopping simulation training and wanting to transition to real life were diminishing returns, good enough score, other demands, and bedside practice more effective.

Conclusions: Learning curves demonstrate the path of learning, and have important information for learners and educators. An interaction of the task, context, and individual produces a learning curve. While mastery learning has been advocated in simulation, learners give up before reaching a plateau when they have other demands and time constraints. Learners quickly make a decision whether simulation training is the most effective training, and what competency level is good enough. The discontinuity and non-monotonicity of learning curves may discourage learners’ trials or make them stop with a false “high” score.
Hawks, doves, and those in between: Pragmatic phenotyping of raters

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Introduction: There is increasing literature showing rater characteristics have a substantive effect on learner assessments. Our program tracks resident performance on a daily basis, but this also enables us to examine faculty-level trends.

Methods: We analyzed the data from our daily ratings of first-year residents. We used a 5-point scale to score medical expertise within 3 subdomains: (1) ability to take a history and physical examination; (2) ability to generate a differential diagnosis; and (3) ability to generate a management plan. A multi-level regression model was developed to examine scoring differences between raters and subdomains. Next, we calculated the mean subscore for each rater. A z-score was then calculated to determine which raters deviated significantly from the average. “Hawks” and “Doves” were those with z-scores > 1 standard deviation from the mean. We also quantified the proportion of the 5-point scale use by each rater.

Results: We analyzed 4716 assessments from 77 raters. The regression model demonstrated significant interrater variation. After adjustment for raters, the highest scores were given for history and physical, followed by the differential diagnosis, and then the management plan. The majority of ratings were a “4,” which also was the mean. For history, 8 raters we identified as Hawks, and 10 as Doves (11 Hawks and 8 Doves for differential; 12 Hawks and 7 Doves for management). Six raters were Hawks on all 3 subscores, and 6 others were Doves.

Conclusions: We propose an easy way to determine rater categories based on quantitative metrics. Next steps will be to determine how decision-makers (eg, competency committees) incorporate such data into their decisions.
Activity metrics: Measuring what learners do, not what they say they do

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Introduction: Preceptors are skilled observers of learner behaviors, but many biases compromise their ability to judge learner performance. We fail to fail. As competency-based medical education becomes the norm in many areas, we need better ways of measuring what learners actually do, not what they say they do, or what teachers are able to document.

Methods: Our group has been closely involved in the development of Medbiq Learning Experience API Profiles for simulation and scenario-based learning. This affords data capture from simultaneous sources in educational and clinical environments.

Results: We have developed some useful applications of simple, cheap technologies that, for example, allow us to closely monitor learner physiology as well as their actions in stressful situations such as clinical decision-making. Collecting data from multiple sources in a Learning Records Store allows us to employ a variety of learning analytic approaches to model learner performance.

Conclusions: The ability to capture and analyze this kind of data affords novel opportunities for educational scholarship as well as addressing some of the more practical if thorny problems in competency-based medical education, such as the early detection of learners in difficulty.
Online learning of radiograph interpretation using deliberate practice: Analytics of knowledge retention

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Introduction: While there has been research on designing effective online radiology education, knowledge retention after these interventions is relatively unknown.

Objective: In this study, we analyzed how knowledge retention was affected by retesting and refresher education.

Methods: We enrolled 106 emergency/pediatrics residents into a randomized control, 4-arm trial. All groups interpreted a common set of 80 pediatric elbow radiograph cases using an online learning platform (https://imagesim.com/course-information/demo), and then completed a posttest (T0). Group 1 received no additional testing until the 12 months (T12). Groups 2, 3, and 4 received retesting every 2 months. Refresher education was also provided to group 3 at 6 months and group 4 at 2, 6, and 10 months. Testing cases included 20 cases with no feedback, while refresher education test cases included feedback. The primary outcome measure was mean percent accuracy on the T12 test, controlling for T0 scores.

Results:

<table>
<thead>
<tr>
<th></th>
<th>All Participants N = 106</th>
<th>Group 1 N = 42</th>
<th>Group 2 N = 22</th>
<th>Group 3 N = 22</th>
<th>Group 4 N = 20</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-education intervention score, mean % accuracy (SD)</td>
<td>60.5 (15.0)</td>
<td>62.1 (13.3)</td>
<td>61.6 (16.9)</td>
<td>57.7 (16.7)</td>
<td>58.8 (14.6)</td>
<td>.38</td>
</tr>
<tr>
<td>T0 score, mean % accuracy (SD)</td>
<td>72.4 (14.2)</td>
<td>72.1 (14.9)</td>
<td>74.1 (15.8)</td>
<td>73.4 (9.8)</td>
<td>69.8 (15.7)</td>
<td>.52</td>
</tr>
<tr>
<td>T12 score, % accuracy (SD)</td>
<td>66.9 (16.7)</td>
<td>61.9 (14.9)</td>
<td>71.8 (17.8)</td>
<td>70.7 (14.3)</td>
<td>67.8 (19.4)</td>
<td>.0015</td>
</tr>
</tbody>
</table>

Conclusions: After an online pediatric elbow radiograph education intervention, knowledge was retained in groups with retesting every 2 months relative to the group with no retesting; however, refresher education did not have a significant effect above retesting.
Introduction: Whether teachers are assessing learners, or learners are assessing their programs, surveys often used to answer the critical question: “How well am I doing?”

Objective: We undertook primary research to systematically explore how different Likert scales affect survey responses. Likert scales are symmetrical in their positive and negative response options.

Methods: We included 3 questions with 2 different Likert scales each included in a 2016 online survey of University of Toronto residents (n = 966). One question asked respondents how satisfied they are with their future career path. Half were randomly assigned a 5-point verbal scale (very satisfied, somewhat satisfied, neither satisfied nor dissatisfied, somewhat dissatisfied, very dissatisfied), while the other half were randomly assigned a 6-point verbal scale with a little satisfied and a little dissatisfied options, but no midpoint.

Results: Among residents shown the 5-point Likert scale, 65% report being satisfied with their future career path, while 83% of residents shown the 6-point Likert scale report being satisfied with their future career path—an 18 percentage point difference. The level of dissatisfaction was the same for both scale options (17% versus 18%). It appears then that the midpoint of neither agree nor disagree on the 5-point scale contains almost exclusively residents who are a little satisfied with their future career path, rather than a mix of those who are a little satisfied and a little dissatisfied.

Conclusions: Given the impact of Likert scale choice on information provided to decision-makers, greater up front consideration of assessment scales may support improved decision-making.
R2C2 in action: Testing an evidence-based model for feedback and coaching

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Introduction: Within the context of CBME, feedback can be seen as a collaborative conversation between supervisors and residents with the goal of helping residents improve. Earlier research with practicing physicians had developed an evidence and theory-informed, 4-phase model for facilitating feedback and coaching, the R2C2 model (relationship, reaction, content, coaching).

Objective: Our purpose was to explore the utility and acceptability of the R2C2 model in residency education, specifically for engaging residents in their feedback and implementing improvements and the factors influencing its use.

Methods: This qualitative study used the principles of design research. We recruited residents and their supervisors in 2 programs, internal medicine and pediatrics. We prepared supervisors to use the R2C2 model during their regular mid-rotation and/or end-of-rotation feedback sessions with participating residents to discuss their progress and assessment reports. We conducted debriefing interviews with supervisors and residents after each session. We transcribed feedback and debriefing sessions, and analyzed them iteratively as a team using template and content analysis, meeting regularly to compare and confirm results.

Results: Seven residents and 5 supervisors participated. Schedules and the sensitivity of feedback prevented broader enrolment. Supervisors found the structured R2C2 format useful. Residents and supervisors reported that the coaching phase was most novel and helpful, and that the R2C2 model engaged them both in collaborative, reflective, goal-oriented feedback discussions.

Conclusions: Participants found that using the R2C2 model enabled meaningful feedback conversations, identification of goals for improvement, and development of strategies to meet those goals.
Sharing and shifting responsibility: Clinician educators’ strategies for coping with underperformance and failure

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Introduction: Moments of underperformance or failure are inherent in medical practice: sustaining a career in medicine relies on being resilient. To promote wellness, we need to understand how resiliency develops in medical education and practice. If we can understand what enables seasoned clinicians to successfully navigate struggle, we may reveal strategies for supporting struggling learners.

Methods: Using constructivist grounded theory, we interviewed 28 specialist consultants about their experiences with underperformance or failure. We used constant comparative analysis to identify themes.

Results: Participants’ experiences with struggle ranged from catastrophic patient errors and academic failures to frequent, smaller moments of interpersonal conflict and work-life imbalance. In telling their stories, participants sometimes either shared personal responsibility for underperformance with external factors or shifted accountability to patients or institutions. In some instances, sharing and shifting seemed to deflect blame. More often, however, participants seemed to accept personal responsibility while simultaneously sharing and shifting accountability to make sense of underperformance or failure. Paradoxically, participants perceived learners who used this strategy as lacking in insight.

Conclusions: Participants demonstrated the protective and functional value of distributing responsibility for underperformance and failure. Sharing and shifting may be an element of reflection and resilience; recognizing external factors may provide a way to gain perspective and to preserve the self. However, this strategy challenges educators’ assumptions that learners who deflect are avoiding personal responsibility. Our findings raise questions about what it means to be resilient, and how assumptions about learners’ responses to failure may affect remediation for underperforming learners.
Transitions across contexts and building resident resilience

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Introduction: Little is known about how residents moving between distributed placements adjust to their new site. Stress and challenging situations, when properly managed, can build resilience. Understanding resident responses to new environments may assist training programs in preparing residents for earlier, more effective integration.

Methods: We interviewed 26 rural family medicine residents from 3 western Canadian universities, rotating through different communities. Participants reflected on their community experiences, describing challenges and coping strategies. Recordings were transcribed and thematically analyzed, exploring perceptions of, and responses to, changing contexts.

Results: Participants experienced multiple differences between sites, and both anticipated and unexpected challenges. They described multiple approaches to establishing, sustaining, and extending resilience in response to moving between contexts. Some approaches were encouraged or formalized; others were intuitive or serendipitous. Participants described how they drew on previous successful adaptations in new settings to maintain feelings of competence and resilience.

Conclusions: Participants experienced personal and professional chaos and disorganization when starting rotations. Some anticipated and planned for this; others did not and struggled. Successful residents maintained connection with existing networks, and quickly constructed local support. By understanding challenges faced in moving between distributed placements, program directors can develop educational strategies to reduce transitional stress, enhance resilience and confidence, and help residents engage more effectively in new learning contexts.
Reviewing reviews of burnout in trainees: What do we know, where do we go?

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Introduction: Understanding physician burnout is essential, as a “burnt-out” workforce may compromise quality and compassionate patient care. Studying burnout among trainees (medical students and residents) is particularly important, as the roots of burnout may sprout during training, when future physicians are acculturated into medical practice.

Objective: We sought to understand what is (and is not) known about trainee burnout, and propose new ways to address this phenomenon.

Methods: This critical narrative review was conducted with an English language search of PubMed, Medline, and Google Scholar, using combinations of the MeSH terms medical, student, resident, and burnout for articles published between 1990 and 2016. Articles were excluded if they pertained to other health professions, fellows, and practicing physicians.

Results: A total of 113 articles met inclusion criteria, including 10 review articles and 71 empirical studies. Empirical studies were categorized as (1) burnout prevalence; (2) validating or testing instruments; (3) association of burnout and dependent variables including mistreatment, quality of life, and work-life balance; and (4) intervention studies. This literature reveals that while trainees experience high rates of burnout during training that continues through the educational life course, existing interventions promoting mindfulness and resiliency have limited success, scalability, and generalizability. Research on educational and health care systems factors that affect trainee burnout is lacking, as are qualitative studies that examine “why” burnout persists and how it operates.

Conclusions: It is imperative that future research tries to understand the organizational culture within which trainee burnout exists, and develop interventions that seek to address systemic factors that propagate its existence.
Trainee perceptions of and responses to contextual change

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Introduction: Medical training involves multiple transitions including moving between different training contexts. This is exacerbated when programs expand to include regional and distributed training sites.

Objective: We conducted a study to examine and describe what individual trainees do to maintain or reestablish competence when moving between training contexts.

Methods: We conducted a study using constructivist grounded theory techniques based on interviews with residents in rural family practice training programs from 3 university-affiliated programs in Western Canada. We asked participants to describe how they experienced change, and how they adjusted their practice to fit new training contexts.

Results: Twenty-six respondents described differences between sites, and the ways in which they adjusted their practice. There were notable differences in what aspects of contextual change participants were aware of, and how they adjusted their practice, even within the same community. Adaptation mechanisms included seeking information and guidance from peers, preceptors, and others; reflecting on how and what to change; and by trialing different approaches. Some were more adept at recognizing and adapting to contextual change than others.

Conclusions: Enabled by previous experience, information, motivation, and agency, residents gradually perceived differences in practice context. Accessing information from a variety of sources, residents engaged in critical reflection on how they could, and should, respond to new contexts. Although we know contextual change can be disruptive to learning, this study demonstrates how learners have to develop skills in recognizing and responding to contextual change, both in their training and in their emerging clinical practice.
Resident duty hours: Family members’ knowledge and perceptions in the PICU

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Introduction: Resident duty hour recommendations were made to improve health care quality for patients and families. However, their perspectives on duty hours have received limited attention. Families in pediatric intensive care units (PICUs) interact regularly with residents, and thus, their knowledge and perceptions of duty hours may influence their health care experiences.

Objective: We examined their perspectives on duty hours to inform future recommendations.

Methods: We surveyed family members in the PICU at a Canadian pediatric academic health science center. We analyzed the data using descriptive statistics.

Results: In total, 101 family members participated. On average, family members thought that residents worked 55.3 (19.7) hours per week and should work a maximum of 49.1 (13.8) hours. They also thought that, on average, residents worked 16.4 (6.6) hours per call shift, but should work a maximum of 12.5 (4.2) hours. Most reported moderate to great concern about residents providing care (69%) and resident fatigue (79%) after 16 hours. Further, most reported moderate to great concern about errors occurring due to fatigue (81%) and inadequate handover (65%). That said, half (53%) preferred a resident working an extended shift (> 16h) who was familiar with them and their child, as compared to a resident who had just started their shift but was unfamiliar with them.

Conclusions: Families thought that residents should work fewer shift hours than what they thought residents currently work, and reported concerns related to extended duty hours. However, they also reported concerns related to handover. These results provide preliminary insight into families’ perspectives on resident duty hours.
24-hour call versus night float: A comparison of call systems in a Canadian obstetrics and gynecology residency program

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McMaster University, Hamilton, ON

Introduction: To combat the issue of restricted resident duty hours, several Canadian residency programs have adopted variations of a night float call system. One obstetrics and gynecology program attempted to do so, unsuccessfully, in the 2014–2015 academic year.

Objective: The purpose of this study was to understand the differences in the perceptions and opinions of residents, staff physicians, and nurses who experienced the night float system, and why implementation was not successful.

Methods: Two surveys were completed by residents and staff in 2014–2015, addressing areas including patient safety, educational experiences, and resident well-being. They were analyzed using frequencies, descriptives, and ANOVAs. Once the call system reverted from night float to 24-hour call, resident focus groups and staff and nursing interviews were completed and interpreted using grounded theory analysis.

Results: Surveys showed residents to be in favor of night float, feeling their quality of life improved. Staff physicians did not feel this system prepared residents for future careers. The focus groups and interviews revealed many concerns with night float, including preparation for staff roles, technical skill development, and scheduling difficulties. Junior and senior residents described different needs for a call system. Nurses were largely unaffected by the different call structures.

Conclusions: The themes that arose through the focus groups and interviews can be applied across different medical specialties when developing an ideal call system. This will be especially relevant if duty hour restrictions are mandated by Canadian resident bodies and if night float call systems are required.
Making the implicit explicit: Residents’ rich explanations of decision-making processes underlying critical behaviors observed while viewing first person eye-tracking videos

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**Introduction:** A ubiquitous yet poorly defined truism across medical specialties is that residents’ clinical decisions are, in part, dependent on expertise. Though recognized to be important, there has been a dearth of investigation into the psychological, motivational, and cognitive precursors to expert decision-making. Medical education has not focused on integrating expert decision-making techniques into overarching clinical approaches.

**Objective:** This study explores the thinking processes of emergency medicine residents along a continuum of expertise using a novel think-aloud protocol augmented with first-person eye-tracking video.

**Methods:** We used a phenomenological lens and thematic analysis to analyze the transcripts of 19 emergency medicine residents who completed a think-aloud protocol while debriefing a first-person video (with a superimposed eye-tracking marker) of their resuscitation-based objective structured clinical examination. Residents were instructed to delineate their decision-making processes.

**Results:** Experienced residents exhibited more clinically relevant anticipatory behaviors, appropriate prioritization and deprioritization of clinical stimuli, and moved quickly from the diagnostic to therapeutic stage of patient management. All residents were critical of their prioritization, identified areas for growth, and demonstrated strong metacognitive thinking. Residents highlighted the helpful nature of the debrief with an expert resuscitation physician using this novel think-aloud protocol augmented by eye tracking.

**Conclusions:** These results provide insight into cognitive and metacognitive functions implicit to expert behavior, and illustrate a promising new method to enhance debriefing and to improve self-awareness. Future research should examine how think-aloud protocols and eye-tracking data from expert physicians can be used to support residents as they work toward developing competency.
Improving the efficiency and effectiveness of a simulation program to meet the demands of CBD: The use of a multi-level, multi-learner, multi-competency approach

V. Mueller

McMaster University, Hamilton, ON

Introduction: Competence by design forces residency programs to increase breadth of assessment despite challenges of monetary costs, faculty time, and maintenance of a positive learning environment. A multi-learner, multi-level, multi-competency (Multi-LLC) obstetrical simulation curriculum was developed with the hypothesis of increased number of competencies assessed with reduced costs and faculty time.

Methods: Multiple levels of learners participated (31 residents at McMaster University) in multiple roles in obstetrical simulations (postpartum hemorrhage, eclampsia, bradycardia, shoulder dystocia). CanMEDS competencies (Medical Expert, Communicator, Collaborator, Health Advocate, Leader, Scholar) were assessed. A Context-Input-Process-Product program evaluation was completed: Context–needs assessment, resident survey, faculty survey, and previous simulation scores; Input–monetary costs and faculty time associated with previous simulation curriculum; Process–assessor survey, reflections of developers, and resident and faculty focus groups; and Product–resident survey, simulation scores, and determination of actuals.

Results: A significant improvement in learning environment occurred ($P < .001$). The qualitative analysis demonstrated that the curriculum provided a valuable learning opportunity for all aforementioned competencies. Residents valued the teamwork, developed insight into communication, collaboration, and health advocacy, and improved skills in assessment and debriefing. We were able to reduce costs (by $6,000), reduce faculty time (by half), and increase competencies assessed (from 2 to 6).

Conclusions: This Multi-LLC simulation provided a more positive learning environment and assessment opportunities for an increased number of CanMEDS competencies while reducing costs and time. It has the potential to be used across a variety of specialties.
Abandoning the checklist: Exploring how trainees use self-monitoring to navigate difficult conversations in the NICU

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Introduction: Traditionally, how to engage in difficult conversations has been taught through protocols and assessed by objective structured clinical examinations, encouraging trainees to favor memorizing checklists of information rather than reflectively engaging in compassionate conversations. When formulaic approaches fall short in actual practice, trainees need to self-monitor, to assess their actions in real time, navigating unexpected complexities. By exploring the process trainees engage within difficult conversations, we can inform education efforts for teaching compassionate communication skills.

Methods: We used constructivist grounded theory and visual methods. Residents and fellows (n = 15) drew rich pictures of their experiences of difficult conversations in the neonatal intensive care unit, informing semistructured interviews. We analyzed the interview data through the constant comparative method, and used the drawings to elicit and illustrate responses.

Results: Complex situations triggered seeing differently as trainees realized empathy and admiration for families, and they began pausing to understand the problem anew. They responded by observing actively when senior staff stepped in, noting what behaviors to emulate or avoid, and were negotiating their roles in deciding when to step in or out of engagement with families. Ultimately, they abandoned the checklist approach to be able to compassionately care for families.

Conclusions: Our study offers empirical data that richly describe the process of self-monitoring in difficult conversations. There is compelling evidence for deemphasizing teaching a checklist approach, and building value for self-monitoring as a key strategy for effectively navigating complexities. Strategies such as role modeling and dedicating time for reflective activities are important in fostering trainees to be flexible and compassionate communicators.
Making the right impression: Trainee perspectives on the oral case presentation in workplace-based learning and assessment

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Introduction: Formulation and delivery of the oral case presentation (OCP) is a key competency, essential for intra-physician communication. Though the literature supports the use of OCPs in trainee assessment, there is a paucity of information on trainee perspectives of the encounter.

Objective: Our qualitative study explored how trainees perceive the OCP in internal medicine workplace-based learning and assessment.

Methods: A total of 18 semistructured interviews were held with clinically based trainees (n = 5 clinical clerks, n = 13 residents) who have completed Internal Medicine Clinical Teaching Unit rotations at the University of Toronto. We purposively sampled participants varying in age, sex, and experience. Interviews were analyzed using constant comparative techniques from constructivist grounded theory to develop a framework to understand how trainees approach OCPs.

Results: The overarching theme of “awareness of assessment” underlies the educational encounter and captures how trainees approach OCPs. Three major subthemes emerged that affect trainee experiences with OCPs: (1) the OCP as a learned skill: developed through role modeling, senior resident guidance, and implicit feedback; (2) the OCP as a performance that demonstrates competence: that constructs and controls a shared understanding of the patient; and (3) the need for trainees to navigate supervisor preferences throughout OCPs.

Conclusions: Trainees experiences with OCPs are heavily influenced by informal assessment. Preoccupied with faculty assessment of the activity, trainees often lose sight of the educational value of workplace-based learning. Our results demonstrate that more systematic use of OCPs in assessment necessitates optimization of the educational activity for trainees, through explicitly defining supervisor expectations and delivery of targeted feedback.
Unearthing trainee perspectives of feedback in internal medicine: The oral case presentation as a guide

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Introduction: The oral case presentation (OCP) is a fundamental patient care activity with a dual role in trainee education, partly due to feedback from supervisor to trainee. Though feedback in medical education is well studied, little is known about internal medicine trainees’ perceptions of feedback as it relates to specific clinical activities, like the OCP.

Methods: A total of 18 semistructured interviews were conducted with internal medicine trainees at the University of Toronto (5 medical students, 13 residents), purposively sampled to vary in age, sex, and location of medical school. Interviews were iteratively analyzed using a constructivist grounded theory approach.

Results: Trainees perceived that not enough feedback occurs around the OCP, yet were keenly aware of non-verbal feedback and role modeling from their supervisors, as sources of implicit feedback. However, trainees often experienced the receipt of explicit constructive feedback negatively. Interestingly, the same feedback from senior residents was highly regarded as 1 of the most educational aspects of their rotations, as it was uncoupled from assessment.

Conclusions: Our results illustrate that several forms of feedback occur during the OCP, and even though under-recognized, trainees identify and utilize implicit feedback from supervisors, and coaching from senior residents, to develop learned behaviors. As we enter competency-based medical education, it is crucial to acknowledge, and at times, explicitly label implicit feedback to ensure it is regularly provided as part of formative, low-stakes assessment. Further research is needed to understand the impact of senior residents on junior learners to optimize their potential for coaching around clinical activities.
Walking a tightrope: Patients’ and physicians’ perspectives about the Health Advocate Role

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Introduction: Competently enacting the Health Advocate role is intrinsic to patient-centered care. This role is challenging to enact, teach, and assess—in part because we know little about how advocacy efforts affect patients.

Objective: To inform teaching and assessment, we explored perspectives that patients and physicians hold about the Health Advocate role.

Methods: Constructivist grounded theory guided data collection and analysis. To understand multiple perspectives about health advocacy, we interviewed patients (n = 7) with diverse health conditions and physicians (n = 9) across specialties. Photographs were used to elicit participants’ perspectives of, and engagement in, health advocacy.

Results: Physicians’ role in health advocacy existed on a spectrum, ranging from limited involvement to active engagement in health promotion and political activism. More commonly, the “little things” physicians did (eg, listening and rearranging appointments) resonated with patients’ definitions of patient centeredness. Patients also participated in advocacy by managing their symptoms, researching their condition, and expressing their needs. However, patients described walking a tight rope between self-initiating advocacy, and suppressing their efforts to avoid being perceived as burdensome or “difficult.”

Conclusions: Approaches to health advocacy cannot be conceptualized as a “one-size-fits-all” activity. Moreover, patients have a key role in health advocacy; patients’ concerns about being perceived as burdensome or difficult problematize notions of patient centeredness. The Health Advocate role needs to be reconceptualized as a shared effort with, rather than for, patients. Developing opportunities to incorporate patient perspectives into the teaching and assessment of the Health Advocate role is a critical first step.
How family medicine residents learn: Understanding the role of cues in self-regulated learning

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Introduction: Research suggests that resident learning is self-regulated and needs driven. Work-related activities are pivotal for resident learning. Little is known regarding the range of cues that drive learning, the resources used to address self-identified gaps in clinical knowledge and skills, and how learning effectiveness is perceived by residents.

Objective: The purpose of this study is to identify cues that drive family medicine (FM) residents’ self-directed learning (SDL).

Methods: This is a qualitative, systematic self-observation study. Over 1 month, through purposive sampling, 12 FM residents used their smartphones to audio-record a series of 120 voice notes about their in-training experiences and learning processes. Data analysis employed a thematic design.

Results: Resident uncertainty drove learning. Uncertainties included prescribing, diagnosing, ordering investigations, non-clinical demands, and differing opinions. SDL occurred with prompted searching for information during clinical encounters through published material and consultations. Obstacles to learning included time, inability to find information, and the perception that preceptors were unable to provide sufficient information.

Conclusions: This study expands our understanding of the cues and processes that FM residents use to engage in SDL. Residents are prompted to learn from uncertainties arising in clinical work. They enact SDL through accessing internal and external resources to alleviate their uncertainty, regardless of the challenges faced to resolve the uncertainties. Evidence of the cues prompting residents to feel uncertain will help us design innovations and supports to purposefully promote SDL in practice that may include needs-based rotations, additional access to point-of-care tools, and faculty development on prompting, questioning, and providing feedback.
Exploring anesthesiologists’ understanding of situational awareness: A qualitative study

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Introduction: Situational awareness (SA), or “knowing what is going on around you,” is considered an important patient safety concept. Despite its acknowledged importance as a non-technical skill in medicine, little is known about how practicing anesthesiologists understand SA.

Objective: The purpose of this study was to explore how anesthesiologists understand the concept of SA, how they feel they learned it, and how they teach and assess SA in trainees.

Methods: Semistructured interviews with anesthesiologists were performed. Using methods from constructivist grounded theory (line-by-line coding, constant comparison, and memo-ing); a thematic analysis of anonymized transcripts was undertaken. Themes emerging from the data were discussed regularly in research group meetings.

Results: A total of 18 anesthesiologists were interviewed. Respondents displayed an understanding of SA using a mixture of clinical and everyday life examples. Despite agreeing on the importance of SA, formal definitions of SA were lacking, and the topic of SA was not discussed explicitly. SA was learned informally through increasing independence in the clinical context, role modeling, and reflection on errors, and formally through simulation. Respondents taught SA through modeling and discussing scanning behaviors, checklists, verbalization of thought processes, and debriefings. Although trainees’ SA was assessed primarily as part of decision-making processes about granting clinical independence, respondents found it difficult to give meaningful feedback to their trainees.

Conclusions: SA is a crucial but tacit concept for anesthesiologists. Discussion and teaching of SA must be made more explicit in anesthesiology training as assessment of SA is being used to make entrustment decisions in the clinical setting.
Enhancing surgical education using video playback: A case study on the influence of video playback on the nature of feedback between supervising surgeons and surgical residents

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Introduction: Feedback about intraoperative performance remains a cornerstone of surgical training, and yet the perceptions of feedback quality by supervising surgeons and surgical residents continue to differ. Video playback offers 1 potential method for more effective feedback to surgical residents; however, more research is needed to better understand this tool for optimal utilization.

Objective: This study explores the nature of instructional interactions and feedback in the operating room and when using video playback during postoperative review.

Methods: Three surgical residents (postgraduate year 2 [PGY-2] to PGY-5) and 5 supervising surgeons were involved in 6 laparoscopic cases. Intraoperative dialogue was analyzed deductively using a priori codes from the literature. Conversation during video playback review of 2 participant-identified key OR moments was analyzed deductively using the same a priori codes, and inductively using a more holistic, hermeneutic-like approach.

Results: A total of 1090 intraoperative interactions were deductively identified for 376 minutes of the 6 cases. The majority (48%) were instrumental and didactic in nature, followed by corrective instrumental (11%), and didactic instrumental with teaching (11%). 146 interactions were identified during 155 minutes of video playback. By contrast, during the video review most interactions were didactic and purely teaching in nature (65%), followed by non-specific praise (19%), and corrective teaching (15%). The video playback sessions also appeared more dialogic, with more resident initiated questions and reflection.

Conclusions: The nature of instruction and feedback during video playback is fundamentally different from that in the operating room, offering a greater potential for collaborative and improved learning.
Powerless and lost: The experience of new-to-practice physicians working in the health care system

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Introduction: Studies have highlighted the unpreparedness of new physicians to set up and manage a practice. What remains poorly explored is the emotional journey physicians experience during their transition to independent practice.

Objective: We embarked on this research to explore the emotional component of this juncture.

Methods: We used case study methodology to explore the transition to practice experience of physicians who had graduated from a medical residency program at 1 university within the past 5 years. We conducted 3 semistructured focus groups, each with 8 participants, and employed thematic content analysis to identify recurring themes.

Results: The transition to independent practice triggered 2 distinct patterns of emotional responses: (1) feelings of powerlessness, linked to the challenges of navigating medical politics and hierarchy, and (2) feelings of being lost and overwhelmed by multiple and sometimes overlapping roles and responsibilities. For many, the emotional toll of transitioning to practice was unanticipated, and challenged them more than any lack of practice management knowledge.

Conclusions: Existing approaches to transition to practice curriculum development have primarily focused on the pragmatic skills of practice management. A more fulsome approach that includes attention to the emotional aspects of this transition is needed to view the transition in its entirety, and comprehensively prepare residents for practice. The role of workplace culture and organization in supporting these transitions must be considered.
Developing and implementing a medical assistance in dying curriculum in a family medicine residency training program

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Introduction: In 2016, medical assistance in dying (MAID) was legalized in Canada. Medical educators are presently challenged with determining how to integrate MAID into residency curricula.

Objective: The purpose of this study was to determine family medicine (FM) resident and faculty perceptions of MAID, willingness/readiness to learn and teach about MAID, and recommendations for curricular content and faculty development.

Methods: Using mixed methods and purposive sampling, an anonymous online survey was distributed to FM physicians and residents (N = 351). Data analysis included thematic design, and descriptive and inferential statistics.

Results: Survey response rates were 45% for faculty and 33% for residents. Faculty were significantly more confident, competent, and comfortable than residents in explaining and discussing MAID with colleagues and patients (P < .05). Residents, however, were more willing to participate in administering MAID than faculty (P < .05). Seventy-two percent of respondents believe it important to integrate MAID into core curriculum, with faculty who were non–conscientious objectors (COs) being more likely to believe it should be included in curriculum (P < .05). The curricular elements deemed most important included advanced care/end-of-life planning (76%), technical aspects (73%), and regulations/ethical issues (56%).

Conclusions: Developing a MAID curriculum will bridge the competency gap self-identified by participants. Patients’ access to compassionate end-of-life care can be improved through training that increases both faculty and residents’ comfort, confidence, and competence in the topic of MAID. Of importance is developing faculty development sessions to educate and support both COs and non-COs, allowing residents to learn about care for patients requesting MAID.
Evaluation and enhancement of learning environment at postgraduate training sites

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Introduction: Learning environments in medical education are linked to effective learning, achievements, satisfaction of learners, and quality of teaching.

Objective: The purpose of this project was to identify resident perceptions of their learning environment and factors affecting satisfaction. Also explored was the relationship between the learning environment, burnout, and mental health, along with deficiencies, strengths and best practices for an optimal learning environment.

Methods: A total of 257 residents completed an online survey (58% response rate), which asked them to assess the learning environment of their last rotation. The survey included measures of learning environments across 3 domains (content, atmosphere, organization), burnout, mental health, experiences of intimidation or harassment, various demographic variables, and open-ended questions exploring strengths and challenges of their last learning environment. Quantitative results were explored using analyses of variance and Spearman’s correlations. Qualitative data were analyzed by content analysis.

Results: Ratings of the overall learning environment were favorable across the domains. Several independent variables (eg, program type, location, sex) showed a significant impact on learning environment ratings (all $P < .05$). Additionally, the learning environment was rated less positive by residents who experienced/witnessed intimidation or harassment ($P < .05$), and by those reporting more burnout or mental health concerns (all $P < .001$). Finally, the most significant challenges residents identified within the learning environment was intense clinical duties (balancing duties, long hours, and workload), with the most significant strength being a positive work and learning environment.

Conclusions: Explicit attention and deliberate improvement efforts to address the link between the learning environment, resident learning, and outcomes are essential to identify and cross-pollinate practices that will enhance the learning environment in postgraduate medical education.
Changing learning and teaching in the operating room: Cognitive task analysis, a tool to identify expertise gaps and prepare residents and supervisors for complex tasks of specific surgical procedures

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Introduction: Disparities between experts and residents in how to prepare, learn, and teach surgical procedures are demonstrated by various authors. However, these papers focus on surgical procedures in general. Learning in the operating room (OR) depends largely on how much autonomy the resident is granted. One of the variables of this entrustment might be the complexity of specific tasks of a procedure.

Objective: In our study, we were interested in which tasks were complex according to experts or residents and for what reason. We expected residents to exceed experts in rating tasks as complex.

Methods: We identified 55 tasks in a total hip replacement procedure. Subsequently we asked 17 orthopaedic surgeons and 21 residents to rate (5-point scale) how much mental effort (attention) they invest in each task. They were asked to explain ratings above average (> 3).

Results: Overall, residents and supervisors rated normal attention in the majority of tasks. Supervisors rated 12 tasks and residents rated 8 tasks as high attention. These tasks require predominantly decision-making skills. Residents associated high ratings with effort, while supervisors associated high ratings with important in relation with outcome and preventing complications.

Conclusions: Unexpectedly, residents did not outscore supervisors in rating complex tasks. However, their different motivations underline the expertise gap, and clarify the fundamental contradiction during OR training as well. In high complex tasks, residents need more guidance, whereas supervisors shift from being a teacher toward their commitment to the patient. This cognitive task analysis is a promising tool for individual and task specific training.
Teaching in the operation theatre: Recruitment of expert information from supervisors during real-time surgical task execution

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Introduction: Effective training in the surgical theatre is pushing residents toward the limits of their individual experience, the area where residents need the expertise of others to continue. Although operation theatre communication is a growing topic in literature, the focus on when and how surgeons elicit expert knowledge from other team members has not been extensively investigated.

Objective: The purpose of our study is to identify and classify clues surgeons use in “real-time surgery” to recruit expertise.

Methods: Based on the transcription of 3 videotaped total hip replacement procedures all verbal and non-verbal recruitments of expertise were identified, analyzed, and coded using conversation analysis. In order to investigate the variety of clues, we investigated teams consisting of members with different expertise levels.

Results: Surgeons use a wide range of practices to recruit expertise from other team members, ranging from implicit hints to explicit recruitments. We identified 4 major categories:

1. Online commentary, stand-alone assessments of the present situation;
2. Assessments of the present situation, a request for confirmation;
3. Assessments of the present situation, an explicit invitation to offer a second opinion; and
4. Explicit recruitment of help.

Conclusions: Despite our expectations, surgeons show a preference for the implicit recruitments of expertise rather than using explicit recruitments of help. Awareness of these implicit clues is of vital importance for supervisors to provide proper guidance at the appropriate time during real-time surgery. These findings can be used in the training of expert surgeons to supervise residents.
The transformative process of residency education: Results from a qualitative study and connections to learning theories

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Introduction: Residency has been described in the literature as a transformative process, and most physicians would attest to this being true. The application of learning theory, including transformative learning theories, is currently encouraged in medical education.

Objective: We performed a qualitative exploration of resident experiences to look for themes and connections to learning theories.

Methods: Semistructured interviews were conducted with 18 residents from various postgraduate training programs at Queen’s University. Residents were asked to describe personal and professional transformation that had occurred during their residency education. Narratives were transcribed and analyzed using grounded theory methodology.

Results: Analysis of the data revealed 6 themes related to transformation in residency, 3 related to factors promoting transformation, and 3 related to areas of transformation. Themes related to promoting transformation included: (1) critical incidents; (2) supervisor support; and (3) self-awareness. These factors correlate with elements of transformative learning theory as described by Jack Mezirow. Themes related to areas of transformation included: (1) empathy for patients; (2) communication skills; and (3) triage/management skills.

Conclusions: This qualitative study suggests that residency training has the natural potential to promote empathy, communication skills, and management skills. Transformation in residency is facilitated by critical incidents, support and self-awareness. Educators should maximize the utility of such factors, which are supported by transformative learning theory, to promote positive personal and professional transformation during residency.
Work hour regulations complicate residency education: Lessons about the social construct of fatigue in Europe

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Introduction: Although work hour regulations have been posed as a solution to the problem of fatigued medical trainees, there is growing concern about their effectiveness. Canada remains 1 of the few Western jurisdictions without legislated regulation. Recent research in this particular context suggests that fatigue is a complex social construct, rather than simply a lack of sleep.

Objective: This study set out to explore how regulations and fatigue are understood in countries with established work hour frameworks, to better inform other jurisdictions looking to address trainee fatigue.

Methods: The authors employed a constructivist grounded theory approach to data collection and analysis. From 2015–2016 they conducted individual semistructured interviews with 13 postgraduate trainees from 4 European countries with established work hour regulations

Results: Trainees reported that they were commonly fatigued. They also violated the work hour restrictions for various reasons. Although they understood the regulations were explicitly meant to ensure safe patient care and optimize trainee well-being, they described implicit meanings (eg, monitoring for trainee efficiency) and unintended consequences (eg, losing a sense of vocation) as well.

Conclusions: Work hour regulations carry multiple conflicting meanings for trainees that are captured by 3 predominant rhetorics: the rhetoric of patient safety, the rhetoric of well-being, and the rhetoric of efficiency. Tensions exist within each of those rhetorics, which reveal that managing fatigue within clinical training environments is complex. Our findings suggest that straightforward solutions are unlikely to solve the problem of fatigue, assure patient safety, and improve trainee well-being.
“Why I went into medicine”: Transformative learning and professional identity formation during resident international health electives

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Introduction: Because international health electives (IHEs) have a profound impact on participants, transformative learning may provide insight into resident IHEs.

Objective: This study explores transformative learning during resident IHEs, and characterizes the impact of IHEs on emotions, critical reflection, and professional identity formation.

Methods: We used a constructivist grounded theory approach, with the sensitizing concepts of transformative learning and professional identity, to analyze narrative reflective reports of residents’ IHEs. The Mayo International Health Program supports residents from all specialties across 3 Mayo Clinic sites. We collected 377 narrative reflective reports from participants from 2001 through 2014. Reflections were coded, and themes were organized into a model for transformative learning on IHEs, focusing on professional identity.

Results: We identified 5 steps in the transformative process on IHEs: (1) disorienting experience; (2) emotional response; (3) critical reflection; (4) perspective change; and (5) commitment to future action. The disorienting experience was a stark contrast between host and home institutions, including difficult and positive experiences. Expressions of emotion were central to residents’ reflections on disorienting experiences. We identified 3 domains of professional identity within residents’ critical reflections: (1) making a difference; (2) doctor-patient relationship; and (3) medicine in its “purest form.” Residents made a commitment to future action, including being a better physician, cultural awareness, continued service, education, and development.

Conclusions: IHEs provide rich experiences for transformative learning and professional identity formation. By paying attention to components of transformative learning within both IHEs and the normal training environment, educators have the opportunity to foster professional identity transformation.
Where do I belong? How residents negotiate membership in multiple communities through videoconferencing

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Introduction: Canadian postgraduate programs place residents in regional community rotations, distancing them from the academic center. Residents connect for academic half-day through videoconferencing. Videoconferencing is effective for knowledge transmission, but little is known about participants’ other experience. How does videoconferencing enable residents to belong to geographically separate communities?

Methods: We took a phenomenological approach, drawing on Wenger’s theories of membership in landscapes of practice. We interviewed 15 Royal College of Physicians and Surgeons of Canada residents (9 women, 6 men), with R3–6 drawn from 4 specialties. Seven participants were training at regional sites; 8 residents were training at the central site but completing distributed rotations. All connected through videoconferencing for academic half-days. Interview transcripts were anonymized and reviewed. Coding structures and meaning were developed by the full team.

Results: All residents valued membership provided by videoconferencing in an academic community. Belonging was enabled by instructor and participant techniques, and by previous face-to-face interaction. Belonging was impeded by some pedagogical activities, lack of previous videoconferencing experience, and assuming a passive role. Residents yearned for more opportunity for social engagement with their peers, citing the significant personal support derived from social interactions during in-person academic half-day experiences. Some trainees engaged in multiple IT processes to network with peers during videoconferencing in order to enhance social interaction.

Conclusions: Videoconferencing plays an important role in knowledge transmission, but its potential for connecting residents training at a distance to a network of peers, reducing social isolation, and enhancing identity formation has not yet been reached.
High-quality graduate clinical learning environments in challenging times

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Introduction: High-quality clinical learning environments (CLEs) are critical to the mission of graduate medical education (GME).

Objective: This study aimed to use novel methodology to develop a national expert group consensus among stakeholders in GME, allowing us to: (1) map key domains within CLEs; (2) identify important barriers and facilitators of learning in CLEs; and (3) indicate priority areas for improvement. Our objective was to provide information to focus efforts to provide high-quality CLEs in challenging times.

Methods: Group Concept Mapping is an integrated mixed methods approach to generating expert group consensus. Experts (n = 206) were invited to participate via an online platform. Participants entered statements regarding facilitators and barriers to learning in CLEs. Subsequently, participants sorted these statements into clusters on similarity, and rated each statement on importance and ease to address. Multi-dimensional scaling and hierarchical cluster analysis were completed. Mean importance and ease to address ratings were calculated for statements and for clusters.

Results: Participants identified 10 distinct domains within CLEs. Domains rated most important were those related to residents’ connection to, and engagement with, senior physicians. Organization and conditions of work and time to learn with senior physicians during patient care were rated the most difficult areas in which to make improvements.

Conclusions: High-quality GME requires that residents engage and connect with senior physicians during patient care, and that they are valued and supported as both learners and service providers. Academic medicine and health service managers must work together to protect these elements of CLEs.
Exploring the use of academic coaching on residents in remediation

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Introduction: Academic coaches can observe a performance, and break it down into components that can be improved. Postgraduate medical training at the University of Toronto has a formal remediation process for residents in academic difficulty that often includes academic coaching in the CanMEDS areas of Communicator, Professional, Collaborator, and Leader/Manager. The role of the coach is to provide the resident with one-on-one teaching and learning outside of the clinical setting to help the resident develop the skills and strategies to overcome identified weaknesses.

Objective: This study explores the effectiveness of academic coaching on resident progress through remediation.

Methods: This retrospective study employed an exploratory review of remediation plans and accompanying coaching reports. Eighty-seven case files between 2010 and 2016 were reviewed for common themes and patterns with respect to how coaching contributed to resident progress in remediation.

Results: Frequency of coaching sessions varied by individual remediation cases; however, teaching and learning strategies were consistent across CanMEDS Roles. The majority of session encounter forms indicate a steady progression in areas pertaining to level of participation, reflection on practice, self-awareness, and response to feedback.

Conclusions: Early review of remediation plans and coaching reports demonstrated that the use of academic coaches is an effective resource for increased resident engagement during the remediation process. Further, the use of coaching reports and session encounter forms is an effective tool for summarizing resident success as they move through a remediation program. Further research to explore resident views on coaching is warranted to triangulate these findings.
Introduction: Pediatric training in the United Kingdom requires all residents to complete the membership of the Royal College of Paediatrics and Child Health (MRCPCH) clinical examination. Wales had the lowest MRCPCH clinical examination pass rate among residents when compared with other regions in the United Kingdom.

Objective: This resident-led quality improvement project sought to establish a structured, sustainable program for residents undertaking the MRCPCH clinical examination. Outcome measures included residents’ self-reported learning experience and a successful outcome in the examination.

Methods: The program was implemented in September 2012, coordinated in each round (3 per year) by a lead resident. PDSA #1: 6-week consultant-led teaching program developed. PDSA #2: Senior residents invited to teach on the program. PDSA #3: Number of teaching sessions increased from 12 to 25. PDSA #4: WhatsApp messaging set up to communicate with residents. An evaluation questionnaire was sent to all residents who attended teaching in each examination sitting.

Results: A total of 218 teaching sessions were delivered by 32 residents and 30 consultants between September 2012 and October 2016. Qualitative analysis of participants’ comments showed that all residents found the teaching useful, and that it effectively met their learning needs. Following the introduction of the program, pass rates for the MRCPCH clinical examination in Wales improved dramatically: from 37% in 2013, 47% in 2014, 74% in 2015, and 64% in 2016. Pass rates for residents in Wales are now above the national average.

Conclusions: Coordinated resident-led teaching programs represent a powerful quality improvement tool for residents undertaking postgraduate clinical examinations.
Évaluation des impacts de l’enseignement médical (externes et résidents) dans les campus cliniques et unités de médecine familiale à l’extérieur de la zone urbaine du campus principal de l’Université Laval

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Contexte: La Faculté de médecine a à cœur sa responsabilité sociale, soit de former des médecins aptes à pratiquer principalement dans l’Est du Québec en zones rurales et semi-urbaines, notamment grâce à ses 2 campus cliniques et 6 UMFs région. Quels impacts a la formation décentralisée sur ces équipes ?

Méthodologie: En 2015, la réflexion sur les impacts des campus cliniques s’amorce, en collaboration avec les communautés et les équipes des sites de formation en région. On priorise les impacts de l’enseignement sur la communauté médicale, un aspect moins évalué. L’analytique des politiques publiques de Morestin sert de modèle. L’approche repose sur des éléments interreliés : un volet effets (efficacité, équité, effets non désirés) et un volet applications (coût, faisabilité, acceptabilité). Un sondage en ligne s’inspirant des variables du modèle est adressé aux professionnels et cadres des 6 établissements. 1 200 participants sont invités à compléter le questionnaire.

Résultats: Sur un total de 303 répondants, 45% sont directement impliqués dans l’enseignement, 25% indirectement, 25% n’ont pas d’implication, 37% sont médecins. L’analyse préliminaire ne démontre aucun effet négatif de l’enseignement sur les dimensions évaluées. Des dimensions comme la mobilisation, l’humanisation, la satisfaction, la confiance interprofessionnelle tirent avantage de l’enseignement.

Conclusion: Cette collaboration entre les milieux régionaux et la Faculté amène une meilleure connaissance des impacts, tout en s’inscrivant dans une démarche de responsabilité sociale.

Assessment of the impacts of medical teaching (clerks and residents) in the clinical campuses and family medicine units outside the urban area of the main campus of Université Laval

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Background: The Université Laval Faculty of Medicine is committed to social responsibility (ie, training physicians who are competent to practice primarily in rural and semi-urban areas of eastern Quebec, in particular through its 2 clinical campuses and 6 rural FMUs). What impact does decentralized training have on these teams?

Methods: In 2015, a process aimed at studying and discussing the impacts of the clinical campuses was initiated, in collaboration with the communities and the teams of the training sites based in rural areas. Priority was given to the impacts of the teaching on the medical community, an aspect that has received less attention. Morestin’s framework for analyzing public policies was used as the model. The approach was based on various interrelated elements: an effects component (effectiveness, equity, unintended effects), and an implementation component (cost, feasibility, acceptability). An online survey based on the model’s variables was sent to professionals and executives of 6 institutions; 1200 participants were invited to complete the questionnaire.

Results: Out of a total of 303 respondents, 45% were directly involved in teaching, 25% were indirectly involved, 25% had no involvement, and 37% were physicians. The preliminary analysis did not show any negative effects of the teaching on the dimensions assessed. The teaching appeared to have a positive impact on dimensions such as mobilization, humanization, satisfaction, and interprofessional trust.

Conclusions: This collaboration between rural sites and the faculty has given us a better understanding of the impacts, in a manner consistent with a social responsibility initiative.
Perceptions des internistes sur les méthodes pédagogiques présentes dans les unités d’enseignement clinique de médecine interne du Centre Hospitalier de l’Université de Montréal
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Contexte: Le Centre Hospitalier de l’Université de Montréal (CHUM) comprend trois sites géographiques. Chaque site comporte une à deux unités d’enseignement clinique (UEC) de médecine interne, ayant fonctionné parallèlement jusqu’ici, qui seront regroupées en 2017.


But: Le but de la présente recherche était d’explorer les perceptions des internistes sur les méthodes pédagogiques utilisées dans les UEC du CHUM.

Méthodes: Des entrevues semi-structurées de 10 à 25 minutes ont été tenues au cours de l’été 2016 auprès de cinq internistes pratiquant dans trois UEC de médecine interne du CHUM. Chaque entrevue a été enregistrée, transcrite puis analysée.

Résultats: Selon la perception des internistes, les méthodes pédagogiques se distinguent des occasions d’apprentissage. La tournée de groupe est grandement favorisée et répandue. Les questions et discussions sont les méthodes privilégiées. L’enseignement prend aussi la forme de démonstration de sémiologie, révision d’admissions et présentation de cas cliniques.

Conclusion: Les méthodes pédagogiques et les occasions d’apprentissage sont nombreuses dans les UEC du CHUM. Les perceptions convergent suffisamment pour entrevoir une cohabitation fonctionnelle. Dans un éventuel regroupement, une mise en commun des méthodes pourrait bonifier les approches individuelles. La tournée avec les résidents gagnerait à être plus connue, la préparation du congé, valorisée, et l’utilisation de la rétroaction, systématisée.

Internists’ perceptions about the teaching methods used in the internal medicine clinical teaching units of the Centre Hospitalier de l’Université de Montréal
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Background: The Centre Hospitalier de l’Université de Montréal (CHUM) has 3 geographic sites, each of which has 1 or 2 internal medicine clinical teaching units (CTUs), which until now have operated in parallel, but which will be consolidated under a single structure in 2017.

Issue: In a CTU, the clerks and residents acquire new knowledge, and develop medical skills and competencies. The teaching methods available and used vary somewhat depending on the site and the internist. It seems likely that consolidating the CTUs will lead to a standardization of practices.

Purpose: The purpose of this research project was to explore internists’ perceptions about the teaching methods used in the CTUs of the CHUM.

Methods: Semistructured interviews of 10 to 25 minutes were conducted during the summer of 2016 with 5 internists practicing in 3 internal medicine CTUs of the CHUM. Each interview was recorded, transcribed, and analyzed.

Results: According to the internists’ perceptions, teaching methods must be distinguished from learning opportunities. Group rounds are a preferred and very commonly used teaching method. Questions and discussions are strongly encouraged. Other teaching methods include demonstration of signs and symptoms, review of admissions, and clinical case presentations.

Conclusion: There are many teaching methods and learning opportunities in the CTUs of CHUM. The perceptions concerning these methods are sufficiently similar to allow us to conclude that they can coexist harmoniously. Following an organizational consolidation, the sharing of methods could enhance individual approaches. The following changes would be beneficial: greater familiarity with the process of rounds with the residents, greater emphasis on preparation for discharge, and more systematic use of feedback.
Understanding point-of-care resource use among emergency medicine providers

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Introduction: Little is known about physician knowledge-seeking behavior at the point-of-care (POC). Technological advances, Free Open-Access Medical education (FOAM) and social media have increased access to clinician-oriented medical education resources; yet how, when, and why medical providers use these resources remains unclear. In order to facilitate POC resource use and design it is imperative that we expand our understanding of physician knowledge-seeking behavior.

Methods: We conducted semistructured interviews of medical providers (students, residents, and staff) to explore how POC resources are used in the emergency department. Interpretive description was used with continuous recruitment and constant comparative analysis until thematic saturation was achieved. Themes were identified and a coding system was developed by 2 investigators and merged by consensus. The analysis was audited by a third investigator.

Results: Twelve participants were interviewed (3 medical students, 3 residents, and 6 attending physicians). Medical students use POC resources to facilitate broader learning from patient encounters and routinely perform a “deep dive” directly at the POC. Residents perform the occasional deep dive; however, their queries are more focused, and over time their use is more heavily weighted toward advanced clinical decision-making: quick reference/memory-check, calculations. Attending staff use POC resources for advanced clinical decision-making and teaching learners and patients. Consistently cited factors for POC resource choice is familiarity and habit of use.

Conclusions: Physician knowledge-seeking behavior at the POC evolves predictably throughout training, knowledge of which should be used to facilitate resource design and educational strategies to promote learning of this skill.
The rise of social media in medical education: A systematic review

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Introduction: The role of social media in society has progressively become more prominent in the last 5 years and medical education is no exception to this.

Objective: The aims of this systematic review were: (1) how social media interventions affected outcomes regarding satisfaction, knowledge, attitudes, and skills for physicians, trainees, and medical students, and (2) what benefits and difficulties of social media interventions have educators dealt with. This is an up-to-date systematic review in this field.

Methods: A search of the following databases was conducted: AMED, BNI, CINAHL, EMBASE, HBE, HMIC, Medline, and PsyINFO from September 2011 to February 2017. Keywords related to social media and medical education were used for the search, and further analysis was carried out on selected English-language, peer-reviewed articles that explored social media interventions in medical education. The quality of the articles were evaluated by the Medical Education Research Study Quality Instrument.

Results: Nine studies met the inclusion criteria. Social media interventions were related to an increase in knowledge to changes in attitudes. The commonest benefit of social media was engaging learners (77% of studies), with feedback and professional development also being reported. Technical and privacy issues were the difficulties encountered (56% and 44%, respectively).

Conclusions: The use of social media for medical education is constantly rising. Although there are drawbacks working with this ever-changing technology, educators are fortunate to have an array of social media tools that they can utilize to further enhance the education of physicians, trainees, and medical students.
3D segmentation as a surgical planning tool for residents in liver resection surgery

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Introduction: Liver surgery requires identification of tumor(s) in relation to key vessels to preserve healthy tissue, while obtaining negative margins. Current planning is mentally strenuous for residents as it relies on mental 3D reconstruction, anatomical knowledge, and experience.

Objective: The purpose of this study is to determine if 3D segmentation improves resident ability to devise appropriate liver resection plans.

Methods: Senior general surgery residents were recruited. Preoperative CT/MR images were selected if they reflected actual surgeries performed. Images were segmented to create interactive 3D models. Residents devised surgical plans for case-matched 2D and 3D models in an alternating, randomly generated order. Primary outcome was correct preoperative plan. Secondary outcome was time(s) to devise plan. Planning data were analyzed using Wilcoxon test; time was analyzed using paired t test.

Results: A total of 14 senior residents participated. The average correct response was 1.7 of 5 (34%; range, 1 to 4) for the 2D group, and 3.1 of 5 (62%; range, 0 to 4) for the 3D group (P < .01). The average time to complete each plan was 156 ± 107s for the 2D group, and 84 ± 73s for the 3D group (P < .01).

Conclusions: 3D segmentation increases accuracy of surgical planning and decreases time required. 3D segmentation is a useful teaching tool as it reduces cognitive load required to mentally reconstruct 2D images, allowing the resident to focus on planning. It improves understanding of spatial liver anatomy and serves as an adjunct to current 2D planning methods. This has the potential to be developed into a module for teaching liver surgery in a competency-based curriculum.
A qualitative evaluation of “The Rounds Table,” a novel educational podcast in medicine

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Introduction: Podcasts are increasingly produced in medical education, yet their utility is poorly studied. “The Rounds Table” is a free weekly podcast produced by residents and staff at the University of Toronto summarizing new clinical research in internal medicine, and has been downloaded over 100,000 times by users in 100 countries.

Objective: Our purpose was to explore how and why physicians and medical learners listen to The Rounds Table, and the perceived impact it has on individual learning and clinical practice.

Methods: Using a constructivist grounded theory approach, we conducted 16 semistructured interviews with listeners of the podcast, using a combination of purposive and convenience sampling to recruit diverse participants. Iterative, constant comparative analysis was performed to develop a framework to understand podcast use in medical education.

Results: Four themes from the data were integrated to form a conceptual framework for answering our research questions: Podcasts are used for (1) “edutainment” and (2) efficiency in (3) keeping up to date, largely during otherwise wasted time such as a daily commute, and listening impacts clinical practice (4) indirectly through increasing overall knowledge.

Conclusions: Studying The Rounds Table as a medical education podcast facilitated the development of a conceptual framework of the use of podcasts for continuing professional development in medicine. The unsolicited use of medical podcasts appears to compliment both conventional and continuing medical education by indirectly influencing clinical practice through the provision of novel platforms to deliver current research in an efficient and entertaining format.
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