Clinical Librarian Service Search Results

Request: The effect of trainees/students on theatre or clinic efficiency

Summary
I have searched the evidence-based resources listed at the end of this document and have retrieved a number of articles concerning your question. I have limited the results to articles published from 2015 to the present and have organised the results into the following sections: Systematic Reviews and Other Study Types. There seem to be a number of articles which are from the ophthalmological surgical field.

The following articles may be of particular interest:

- Maintaining operative efficiency while allowing sufficient time for residents to learn (Sutkin, Littleton & Kanter, 2019)[13]
- Association of the Presence of Trainees With Outpatient Appointment Times in an Ophthalmology Clinic (Goldstein, et al. 2018)[14]
- Impact of fellow training level on adverse events and operative time for common pediatric GI endoscopic procedures (Mark & Kramer, 2018)[18]
- The impact of trainees on theatre efficiency-an anaesthetists' perspective (Grailey, et al. 2017)[23]
- Prolonged patient emergence time among clinical anesthesia resident trainees (House et al. 2016)[24]
- Effect of cataract surgery training on operating room productivity: How long trainees take (Park, Walkden & De Klerk. 2016)[27]
- Surgical assessment value enforcement: A model of increasing operative efficiency and productivity (Steinberg, et al. 2015)[29]
- Twelve tips for medical students to maximise learning in theatre (Weinberg, Saleh & Sinha, 2015)[30]

I hope that I have interpreted your request correctly. Please let me know if you would like me to search further.

Accessing Articles
Links are provided where online access to the full-text is available. An OpenAthens username and password may be required for online access to articles. You can register for one here: https://openathens.nice.org.uk/

Unfortunately there may occasionally be some problems accessing the links provided. In this case the items can be accessed via the Library Journals link: http://journals.nice.org.uk/. [Log in to OpenAthens via the link in the top tight-hand corner].

If the full-text is not available, you can request an Inter-Library Loan freely and directly via our Inter-Library Loans system: CLIO. Register for CLIO (using your library membership number) at: https://derbyill.cliohosting.co.uk. Further information can be found at: http://www.uhdblibrary.co.uk/ills.

Feedback
Once you have read this report, I would appreciate it if you would complete our online literature search feedback form at:

https://www.smartsurvey.co.uk/s/LiteratureSearchFeedback20202021/

This relates to this specific search and will help us to monitor and improve our service. Many Thanks.

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Burton ext. 2104

Current at: 16 February 2021

Time taken for search: 4 hours

Please acknowledge this work in any resulting paper or presentation as:
Evidence Search: The effect of trainees/students on theatre or clinic efficiency. Suzanne Toft. (16 February 2021). Derby, UK: University Hospitals of Derby & Burton NHS Foundation Trust Library and Knowledge Service.

Systematic Reviews

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1. **Virtual reality training compared with apprenticeship training in laparoscopic surgery: a meta-analysis**

Source: M. Portelli, S. F. Bianco, T. Bezzina and J. E. Abela.(2020).*Annals of the Royal College of Surgeons of England*.102(9).p.672-684.

http://search.ebscohost.com/login.aspx?direct=true&scope=site&site=ehost-live&db=mdc&AN=32820649
INTRODUCTION: Since its inception, laparoscopic surgery has evolved and new techniques have been developed due to technological advances. This requires a different and more complex skill set in comparison with open surgery. Reduced working hours, less training time and patient safety factors demand that such skills need to be achieved outside the operating theatre environment. Several studies have been published and have determined the effectiveness of virtual reality training. We aimed to compare virtual reality training with the traditional apprenticeship method of training and determine whether it can supplement or replace the traditional apprenticeship model. We also aimed to perform a meta-analysis of the literature and develop conclusions with respect to the benefits achieved by adding virtual reality training on a regular basis to surgical training programmes. METHODS: A literature search was carried out on PubMed, MEDLINE, EMBASE and Google Scholar academic search engines using the MESH terms 'randomised controlled trials', 'virtual reality', 'laparoscopy', 'surgical education' and 'surgical training'. All randomised controlled trials published to January 2018 comparing virtual reality training to apprenticeship training were included. Data were collected on improved dexterity, operative performance and operating times. Each outcome was calculated with 95% confidence intervals and with intention-to-treat analysis; 24 randomised controlled trials were analysed. FINDINGS: Meta-analytical data were extracted for time, path length, instrument handling, tissue handling, error scores and objective structure assessment of technical skills scoring. There was significant improvement in individual trainee skill in all meta-analyses ($p < 0.0002$). CONCLUSION: This meta-analysis shows that virtual reality not only improves efficiency in the trainee's surgical practice but also improves quality with reduced error rates and improved tissue handling.
Database: Medline

2. **Processes of Health Care Delivery, Education, and Provider Satisfaction in Acute Care Surgery: A Systematic Review**

Source: K. DeGirolamo, P. B. Murphy, K. D'Souza, J. X. Zhang, N. Parry, E. Haut, W. R. Leeper, K. Leslie, K. N. Vogt and S. M. Hameed.(2017).*The American surgeon*.83(12).p.1438-1446.
http://search.ebscohost.com/login.aspx?direct=true&scope=site&site=ehost-live&db=mdc&AN=29336769
https://gateway.proquest.com/openurl?ctx_ver=Z39.88-2004&res_id=xri:pqm&req_dat=xri:pqil:pq_clntid=145298&rft_val_fmt=ori/fmt:kev:mtx:journal&genre=article&issn=0003-1348&volume=83&issue=12&spage=1438
In recent years, significant workload, high acuity, and complexity of emergency general surgery conditions have led hospitals to replace the traditional on-call model with dedicated acute care surgery (ACS) service models. A systematic search of Ovid, EMBASE, and MEDLINE was undertaken to examine the impact of ACS services on health-care delivery processes and cost, education, and provider satisfaction. From 1827 papers, reviewers identified 22 studies that met inclusion criteria and subsequently used The Evidence-Based Practice for Improving Quality method and Newcastle-Ottawa Scale to score quality and level of evidence. Most studies found an increase in daytime operating, improved patient transit from emergency department to operating room to home, and decreased length of stay. Higher and more diverse case volumes improved resident education and operative experience. ACS services enhanced the educational experience of residents on subspecialty services by offloading emergency work from those services. Finally,

surgeons generally felt that ACS services improved job satisfaction, productivity, and billing. The ACS model has demonstrated improvement in timeliness of care, diversified case mix, decreased costs, improved trainee learning, and increased surgeon job satisfaction.
Database: Medline

Other Study Types

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3. **Using Lean Six Sigma techniques to improve efficiency in outpatient ophthalmology clinics**

Source: A. W. Kam, S. Collins, T. Park, M. Mihail, F. F. Stanaway, N. L. Lewis, D. Polya, S. Fraser-Bell, T. V. Roberts and J. E. H. Smith.(2021).*BMC health services research*.21(1).p.38.
https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-020-06034-3
http://europepmc.org/search?query=(DOI:10.1186/s12913-020-06034-3
https://gateway.proquest.com/openurl?ctx_ver=Z39.88-2004&res_id=xri:pqm&req_dat=xri:pqil:pq_clntid=145298&rft_val_fmt=ori/fmt:kev:mtx:journal&genre=article&issn=1472-6963&volume=21&issue=1&spage=38
http://search.ebscohost.com/login.aspx?direct=true&scope=site&site=ehost-live&db=mdc&AN=33413381
https://bmchealthservres.biomedcentral.com/track/pdf/10.1186/s12913-020-06034-3
BACKGROUND: Increasing patient numbers, complexity of patient management, and healthcare resource limitations have resulted in prolonged patient wait times, decreased quality of service, and decreased patient satisfaction in many outpatient services worldwide. This study investigated the impact of Lean Six Sigma, a service improvement methodology originally from manufacturing, in reducing patient wait times and increasing service capacity in a publicly-funded, tertiary referral outpatient ophthalmology clinic. METHODS: This quality improvement study compared results from two five-months audits of operational data pre- and post-implementation of Lean Six Sigma. A baseline audit was conducted to determine duration and variability of patient in-clinic time and number of patients seen per clinic session. Staff interviews and a time-in-motion study were conducted to identify issues reducing clinic service efficiency. Solutions were developed to address these root causes including: clinic schedule amendments, creation of dedicated postoperative clinics, and clear documentation templates. A post-implementation audit was conducted, and the results compared with baseline audit data. Significant differences in patient in-clinic time pre- and post-solution implementation were assessed using Mann-Whitney test. Differences in variability of patient in-clinic times were assessed using Brown-Forsythe test. Differences in numbers of patients seen per clinic session were assessed using Student's t-test. RESULTS: During the baseline audit period, 19.4 patients were seen per 240-minute clinic session. Median patient in-clinic time was 131 minutes with an interquartile range of 133 minutes (84-217 minutes, quartile 1- quartile 3). Targeted low/negligible cost solutions were implemented to reduce in-clinic times. During the post-implementation audit period, the number of patients seen per session increased 9% to 21.1 ($p = 0.016$). There was significant reduction in duration ($p < 0.001$) and variability ($p < 0.001$) of patient in-clinic time (median 107 minutes, interquartile range 91 minutes [71-162 minutes]). CONCLUSIONS: Lean Six Sigma techniques may be used to reduce duration and

variability of patient in-clinic time and increase service capacity in outpatient ophthalmology clinics without additional resource input.
Database: Medline

4. **Patient Perceptions of Trust in Trainees During Delivery of Surgical Care: A Thematic Analysis**

Source: L. A. Kana, J. I. Firn, A. G. Shuman and N. D. Hogikyan.(2020).*Journal of surgical education*.
https://go.openathens.net/redirector/nhs?url=https%3A%2F%2Fwww.clinicalkey.com%2Fcontent%2FplayBy%2Fdoi%2F%3Fv%3D10.1016%2Fj.jsurg.2020.08.021
OBJECTIVE: Trust is an essential element of an effective physician-patient relationship. There is limited literature examining trust between trainees and patients in the surgical setting. The goal of this study was to investigate how otolaryngology patients perceive trust in trainees during delivery of surgical care. DESIGN: We extracted trainee-specific data from a larger, qualitative interview study examining trust in the surgeon-patient relationship. We then used realist thematic analysis to explore preoperative otolaryngology patients' perceptions of trust in trainees during delivery of surgical care. SETTING: Department of Otolaryngology-Head and Neck Surgery at Michigan Medicine in Ann Arbor, MI, a tertiary academic medical center. PARTICIPANTS: Using convenience sampling, adults 18 years or older scheduled to undergo elective otolaryngologic surgery between February and June 2019 were invited, and 12 agreed to participate in the study.RESULTSAll participants (n = 12) self-identified as White/Caucasian with a mean age of 60 years (range, 28-82). Participants were 50% (n = 6) female and 50% (n = 6) male. Thematic analysis of participants' perspectives about trust in trainees during delivery of surgical care revealed 3 themes. Trust in trainees is conditional based on (i) level of trainee involvement; (ii) trust in the attending surgeon; and, (iii) trust in the institution. CONCLUSION: Trust in trainees during delivery of surgical care is conditional on types of tasks trainees perform, bounded by trust in their attending surgeon, and positively influenced by institutional trust. Trainees and surgical educators must look to innovative methods to engender trust more efficiently in the clinic and immediate pre-operative setting. Such approaches can have a positive impact on patient outcomes, facilitate stronger trainee-attending interpersonal relationships, and empower surgeons to practice the professional values integral to surgical care.
Database: Medline

5. **Improving training opportunities in the orthopaedics department: The Cambridge experience**

Source: M. Al-uzri, S. Karim and N. Kang.(2020).*British Journal of Surgery*.107(172).
https://go.openathens.net/redirector/nhs?url=https%3A%2F%2Fonlinelibrary.wiley.com%2Fdoi%2Ffull%2F10.1002%2Fbjs.11642
https://bjssjournals.onlinelibrary.wiley.com/doi/pdfdirect/10.1002/bjs.11642
Introduction: Despite the introduction of the IST Pilot, a recent study by ASiT expressed trainee dissatisfaction at the imbalance of training and service provision. The GMC National Trainee Survey 2019 identified poor rota design as impacting on the quality of training.Within our department, we aimed to redistribute the inpatient workload and increase scheduled training opportunities. Method(s): We prospectively collected data over a 2-month period regarding the number of scheduled training opportunities (clinic/theatre sessions), as well as, the number of in-patients managed by each team. A questionnaire was distributed amongst junior doctors asking them about their subjective impression of training and workload. The

teams were then redistributed and training sessions were introduced into the rota with data collected over another 2-month period. Result(s): The initial results identified a lack of scheduled training opportunities and an imbalance in workload between teams. Following implementation, there was a 300% increase in scheduled training and equal distribution of in-patient workload. 70% of doctors felt that training had improved and workload was more manageable. Conclusion(s): It is vital that there is more equal distribution of the workforce using efficient redesign of rotas to allow trainees to receive scheduled training opportunities and manage workload.
Database: Embase

6. **Towards near real-time assessment of surgical skills: A comparison of feature extraction techniques**

Source: N. X. Anh, S. Chauhan and R. M. Nataraja.(2020).*Computer Methods and Programs in Biomedicine*.187
https://go.openathens.net/redirector/nhs?url=https%3A%2F%2Fwww.clinicalkey.com%2Fcontent%2FplayBy%2Fdoi%2F%3Fv%3D10.1016%2Fj.cmpb.2019.105234
Background and Objective: Surgical skill assessment aims to objectively evaluate and provide constructive feedback for trainee surgeons. Conventional methods require direct observation with assessment from surgical experts which are both unscalable and subjective. The recent involvement of surgical robotic systems in the operating room has facilitated the ability of automated evaluation of the expertise level of trainees for certain representative maneuvers by using machine learning for motion analysis. The features extraction technique plays a critical role in such an automated surgical skill assessment system. Method(s): We present a direct comparison of nine well-known feature extraction techniques which are statistical features, principal component analysis, discrete Fourier/Cosine transform, codebook, deep learning models and auto-encoder for automated surgical skills evaluation. Towards near real-time evaluation, we also investigate the effect of time interval on the classification accuracy and efficiency. Result(s): We validate the study on the benchmark robotic surgical training JIGSAWS dataset. An accuracy of 95.63, 90.17 and 90.26% by the Principal Component Analysis and 96.84, 92.75 and 95.36% by the deep Convolutional Neural Network for suturing, knot tying and needle passing, respectively, highlighted the effectiveness of these two techniques in extracting the most discriminative features among different surgical skill levels. Conclusion(s): This study contributes toward the development of an online automated and efficient surgical skills assessment technique. Copyright © 2019
Database: Embase

7. **The effect of COVID-19 on the trauma burden, theatre efficiency and training opportunities in a district general hospital: planning for a future outbreak**

Source: M. Karia, V. Gupta, W. Zahra, J. Dixon and E. Tayton.(2020).*Bone & joint open*.1(8).p.494-499.
https://doi.org/10.1302/2633-1462.18.bjo-2020-0074.r1
Aims: The aim of this study is to determine the effects of the UK lockdown during the COVID-19 pandemic on the orthopaedic admissions, operations, training opportunities, and theatre efficiency in a large district general hospital. Methods: The number of patients referred to the orthopaedic team between 1 April 2020 and 30 April 2020 were collected. Other data collected included patient demographics, number of admissions, number and type of operations performed, and seniority of primary surgeon. Theatre time was collected consisting of anaesthetic time, surgical time, time to leave theatre, and turnaround time. Data were compared to the same

period in 2019. Results: There was a significant increase in median age of admitted patients during lockdown (70.5 (interquartile range (IQR) 46.25 to 84) vs 57 (IQR 27 to 79.75); p = 0.017) with a 26% decrease in referrals from 303 to 224 patients and 37% decrease in admissions from 177 to 112 patients, with a significantly higher proportion of hip fracture admissions (33% (n = 37) vs 19% (n = 34); p = 0.011). Paediatric admissions decreased by 72% from 32 to nine patients making up 8% of admissions during lockdown compared to 18.1% the preceding year (p = 0.002) with 66.7% reduction in paediatric operations, from 18 to 6. There was a significant increase in median turnaround time (13 minutes (IQR 12 to 33) vs 60 minutes (IQR 41 to 71); p < 0.001) although there was no significant difference in the anaesthetic time or surgical time. There was a 38% (61 vs 38) decrease in trainee-led operations. Discussion: The lockdown resulted in large decreases in referrals and admissions. Despite this, hip fracture admissions were unaffected and should remain a priority for trauma service planning in future lockdowns. As plans to resume normal elective and trauma services begin, hospitals should focus on minimising theatre turnaround time to maximize theatre efficiency while prioritizing training opportunities.Clinical relevanceLockdown has resulted in decreases in the trauma burden although hip fractures remain unaffected requiring priority Theatre turnaround times and training opportunities are affected and should be optimised prior to the resumption of normal services.
Database: Medline

8. The Effect of Resident Participation on Appendectomy Operative Times
Source: J. Mack, C. Turner, D. Carter, L. Hallagan, J. Whiting, C. Falank and J. Sawhney.(2020).*Journal of surgical education*.77(6).p.e196.
https://go.openathens.net/redirector/nhs?url=https%3A%2F%2Fwww.clinicalkey.com%2Fcontent%2FplayBy%2Fdoi%2F%3Fv%3D10.1016%2Fj.jsurg.2020.06.022
OBJECTIVE: To assess the association between level of resident autonomy and operative times for appendectomies. DESIGN: A single center retrospective analysis of electronic medical record data of patients who underwent an appendectomy from 1/1/2017 to 12/31/2018. Medical record numbers s were matched with cases entered in the ACGME Resident Case Log system. Cases were stratified by resident role ("First Assistant," "Surgeon Junior," "Surgeon Chief," or "Teaching Assistant") and operative times were compared to cases without resident participation using student's t test. SETTING: Maine Medical Center, Department of Surgery, Portland, Maine. PARTICIPANTS: Inclusion criteria: ≥5 years old, underwent appendectomy at a tertiary medical center during the study duration, and either had corresponding Case-log data or had no resident involvement. Patients who underwent appendectomy as part of a larger procedure were excluded. RESULTS: Six hundred eighty-eight patients met inclusion criteria, with residents participating in 574 (83.5%) cases. Overall mean operating time was 51 ± 21.5 minutes. Attending physicians without resident participation had the shortest OR times (43 ± 19.1 minutes). There was no difference in operating time between chief resident involvement and attending physicians without resident participation (45 ± 21; p = 0.43). Cases with residents involved as "First Assistant" (53 ± 18.6 minutes; p = 0.04) "Surgeon Junior" (52 ± 24.0 minutes; p < 0.001), or "Teaching Assistant" (57 ± 21.6 minutes; p < 0.001) were found to have longer operating times as compared to attending physicians operating without a resident. CONCLUSIONS: Operative times for appendectomies are impacted by resident role. Chief residents' operative times approach that of attendings when operating as Surgeon Chief, however they are significantly longer when operating as Teaching Assistant. Involvement of junior

residents in any role lengthen operating times. This suggests that surgical education influences operating room efficiency.
Database: Medline

9. **Competence in using the arthroscopy stack system: a national survey of orthopaedic trainees in the UK**

Source: G. Manoharan, N. Sharma and P. Gallacher.(2020).*Annals of the Royal College of Surgeons of England*.102(2).p.149-152.
http://europepmc.org/search?query=(DOI:10.1308/rcsann.2019.0131)
http://search.ebscohost.com/login.aspx?direct=true&scope=site&site=ehost-live&db=mdc&AN=31538799
https://gateway.proquest.com/openurl?ctx_ver=Z39.88-2004&res_id=xri:pqm&req_dat=xri:pqil:pq_clntid=145298&rft_val_fmt=ori/fmt:kev:mtx:journal&genre=article&issn=0035-8843&volume=102&issue=2&spage=149
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6996438
INTRODUCTION: Surgeons are required to have a sound knowledge regarding all operating theatre equipment they wish to use. This is important to ensure patient safety and theatre efficiency. Arthroscopy forms a significant part of all orthopaedic subspecialty practice. Proficiency in performing arthroscopic procedures is assessed during registrar training. The aim of this survey was to determine the competence of orthopaedic trainee registrars in setting up the arthroscopy stack system and managing intraoperative problems. MATERIALS AND METHODS: Electronic survey forms were sent to all orthopaedic training programme directors in the UK to be forwarded to trainees in their deanery. The electronic survey contained 13 questions aimed at determining trainee experience and competence level with working with the arthroscopy stack system. RESULT(S): A total of 138 responses were received from 14 deaneries in the UK. Almost all registrars had experienced intraoperative delays because of equipment malfunction that required addressing by more competent staff. However, 82% of respondents had not received any formal training for operating the arthroscopy stack system. Some 82% of registrars of ST7 grade or above, who had performed over 50 arthroscopic procedures and achieved a level 4 PBA competence, were unable to set up the stack system and successfully address these delays. CONCLUSION(S): Inadequate training is delivered to orthopaedic registrars from both the training programme and arthroscopy-themed courses with regards to set-up and operation of the arthroscopy tower system. This training should be part of the curriculum to ensure patient safety and efficient theatre practice.
Database: Embase

10. **Use of a Secure Web-Based Data Management Platform to Track Resident Operative Performance and Program Educational Quality Over Time**

Source: A. L. Meholick, J. L. Jesneck, R. M. Thanawala and N. E. Seymour.(2020).*Journal of surgical education*.77(6).p.e187.
https://go.openathens.net/redirector/nhs?url=https%3A%2F%2Fwww.clinicalkey.com%2Fcontent%2FplayBy%2Fdoi%2F%3Fv%3D10.1016%2Fj.jsurg.2020.05.022
OBJECTIVE: In surgery residency programs, Accreditation Council for Graduate Medical Education mandated performance assessment can include assessment in the operating room to demonstrate that necessary quality and autonomy goals are achieved by the conclusion of training. For the past 3 years, our institution has used The Ottawa Surgical Competency Operating Room Evaluation (O-SCORE) instrument to assess and track operative skills. Evaluation is accomplished in near real-time using a secure web-based platform for data management and analytics

(Firefly). Simultaneous to access of the platform's case logging function, the O-SCORE instrument is delivered to faculty members for rapid completion, facilitating quality, and timeliness of feedback. We sought to demonstrate the platform's utility in detecting operative performance changes over time in response to focused educational interventions based on stored case log and O-SCORE data. DESIGN: Stored resident performance assessments for the most frequently performed laparoscopic procedures (cholecystectomy, appendectomy, inguinal hernia repair, ventral hernia repair) were examined for 3 successive academic years (2016-2019). During this time, 4 of 36 residents had received program-assigned supplemental simulation training to improve laparoscopic skills. O-SCORE data for these residents were extracted from peer data, which were used for comparisons. Assigned training consisted of a range of videoscopic and virtual reality skills drills with performance objectives. O-SCORE responses were converted to integers and autonomy scores for items pertaining to technical skill were compared before and after educational interventions (Student's t-tests). These scores were also compared to aggregate scores in the nonintervention group. Bayesian-modeled learning curves were used to characterize patterns of improvement over time. SETTING: University of Massachusetts Medical School-Baystate Surgery Residency and Baystate Medical Center. PARTICIPANTS: General surgery residents (n = 36). RESULTS: During the period of review, 3325 resident cases were identified meeting the case type criteria. As expected, overall autonomy increased with the number of cases performed. The 4 residents who had been assigned supplemental training (6-18 months) had preintervention score averages that were lower than that of the nonintervention group (2.25 ± 0.43 vs 3.57 ± 1.02; $p < 0.0001$). During the respective intervention periods, all 4 residents improved autonomy scores (increase to 3.40 ± 0.61; $p < 0.0001$). Similar improvements were observed for tissue handling, instrument handling, bimanual dexterity, visuospatial skill, and operative efficiency component skills. Post-intervention scores were not significantly different compared to scores for the non-intervention group. Bayesian-modeled learning curves showed a similar pattern of postintervention performance improvement. CONCLUSIONS: The data management platform proved to be an effective tool to track responses to supplemental training that was deemed necessary to close defined skills gaps in laparoscopic surgery. This could be seen both in individual and in aggregated data. We were gratified that at the conclusion of the supplemental training, O-SCORE results for the intervention group were not different than those seen in the non-intervention group.
Database: Medline

11. Impact of resident involvement on cervical and lumbar spine surgery outcomes

Source: K. Phan, P. Phan, A. Stratton, S. Kingwell, M. Hoda and E. Wai.(2019).*The spine journal: official journal of the North American Spine Society*.19(12).p.1905-1910.
https://go.openathens.net/redirector/nhs?url=https%3A%2F%2Fwww.clinicalkey.com%2Fcontent%2FplayBy%2Fdoi%2F%3Fv%3D10.1016%2Fj.spinee.2019.07.006
BACKGROUND CONTEXT: Resident involvement in the operating room is a vital component of their medical education. Conflicting and limited research exists regarding the effects of surgical resident participation on spine surgery patient outcomes. PURPOSE: To determine the effect of resident involvement on surgery duration, length of hospital stay and 30-day postoperative complication rates in common spinal surgery using the American College of Surgeons' National Surgical Quality Improvement Program (ACS-NSQIP) database. STUDY DESIGN:

Multicenter retrospective cohort study. PATIENT SAMPLE: A total of 1,441 patients met the inclusion criteria: 1,142 patients had surgeries with an attending physician alone and 299 patients had surgeries with trainee involvement. All anterior cervical or posterior lumbar surgery patients were identified. Patients who had missing trainee involvement information, surgery for cancer, preoperative infection or dirty wound classification, spine fractures, traumatic spinal cord injury, intradural surgery, thoracic surgery, and emergency surgery were excluded. OUTCOME MEASURES: The main outcomes of interest analyzed from the ACS-NSQIP database included surgical complications, medical complications, length of hospital stay, and surgery duration. METHODS: Propensity score for risk of any complication was calculated to account for baseline characteristic differences between the attending alone and trainee present group. Multivariate logistic regression was used to investigate the impact of resident involvement on surgery duration, length of hospital stay, and 30-day postoperative complication rates. RESULTS: After adjusting using the calculated propensity score, the multivariate analysis demonstrated that there was no significant difference in any complication rates between surgeries involving trainees compared to surgeries with attending surgeons alone. Surgery times were found to be significantly longer for surgeries involving trainees. To further explore this relationship, separate analyses were performed for tertiles of predicted surgery duration, cervical or lumbar surgery, fusion or nonfusion, and inpatient or outpatient surgery. The effect of trainee involvement on increasing surgery time remained significant for medium predicted surgery duration, longer predicted surgery duration, cervical surgery, lumbar surgery, fusion surgery, and inpatient surgery. There were no significant differences reported for any other factors. CONCLUSIONS: After adjusting for confounding, we demonstrated in a national database that resident involvement in surgeries did not increase complication rates. We demonstrated that surgeries with more complex features may lead to an increase in operative time when trainees are involved. Further study is required to determine how to efficiently integrate resident involvement in surgeries without affecting their medical education.
Database: Medline

12. Supervision and autonomy of ophthalmology residents in the outpatient clinic in the United States II: a survey of senior residents

Source: E. L. Singman, M. V. Boland, J. Tian, L. K. Green, D. Srikumaran and G. Writing Committee of the Ophthalmology Program Directors' Study.(2019).*BMC medical education*.19(1).p.202.
https://bmcmededuc.biomedcentral.com/articles/10.1186/s12909-019-1620-0
http://europepmc.org/search?query=(DOI:10.1186/s12909-019-1620-0)
https://gateway.proquest.com/openurl?ctx_ver=Z39.88-2004&res_id=xri:pqm&req_dat=xri:pqil:pq_clntid=145298&rft_val_fmt=ori/fmt:kev:mtx:journal&genre=article&issn=1472-6920&volume=19&issue=1&spage=202
http://search.ebscohost.com/login.aspx?direct=true&scope=site&site=ehost-live&db=mdc&AN=31196084
https://bmcmededuc.biomedcentral.com/track/pdf/10.1186/s12909-019-1620-0
BACKGROUND: A balance between autonomy and supervision can be difficult to obtain in medical education. In this study, we sought to determine whether the presence and level of supervision of ophthalmology resident outpatient clinic correlates with metrics of resident success, professionalism and stress. METHODS: A survey was emailed to all US ophthalmology program directors requesting it be forwarded to PGY4 residents. Questions included whether their program provided a resident-hosted outpatient clinic, and if so, whether residents were mandated to discuss every patient with faculty. Residents were assigned to three categories

based on this question (0: no clinic, 1: mandated faculty input, 2: discretionary faculty input). Success metrics included numbers of manuscripts submitted, OKAP scores and success in obtaining fellowships. Professionalism metrics included rating comfort obtaining informed consent, breaking bad news, managing time in clinic, and confidence in providing care in various settings. Residents affirming participation in a continuity clinic also provided perceptions of the level of supervision and how the clinic affected stress. RESULTS: Category 1 residents perceived somewhat too much supervision, while category 2 residents felt that they had somewhat insufficient supervision. The majority of residents in either category did not feel that the continuity clinic affected their overall stress, although those who reported a change in stress usually indicated that the presence of the clinic increased stress. There were no other statistically significant differences between the responses from any category. CONCLUSIONS: The presence of a resident-hosted continuity clinic neither adds nor detracts from the success or sense of professionalism of ophthalmology residents. However, when such a clinic is present, the degree of supervision appears to correlate inversely with resident perception of autonomy. These results suggest that the decision of a training program to offer a clinic hosted by residents offering comprehensive continuity care can be informed primarily by faculty and trainee philosophy and personal preferences without comprising education quality, clinical efficiency, residents' perception of stress or their success in fellowship matching.
Database: Medline

13. **Maintaining operative efficiency while allowing sufficient time for residents to learn**

Source: G. Sutkin, E. B. Littleton and S. L. Kanter.(2019).*American journal of surgery*.218(1).p.211-217.
https://go.openathens.net/redirector/nhs?url=https%3A%2F%2Fwww.clinicalkey.com%2Fcontent%2FplayBy%2Fdoi%2F%3Fv%3D10.1016%2Fj.amjsurg.2018.11.035
https://gateway.proquest.com/openurl?ctx_ver=Z39.88-2004&res_id=xri:pqm&req_dat=xri:pqil:pq_clntid=145298&rft_val_fmt=ori/fmt:kev:mtx:journal&genre=article&issn=0002-9610&volume=218&issue=1&spage=211
BACKGROUND: Surgical residents desire independent operating experience but recognize that attendings have a responsibility to keep cases as short as possible. METHODS: We analyzed video and interviews of attending surgeons related to more than 400 moments in which the resident was the primary operator. We examined these moments for themes related to timing and pace. RESULTS: Our surgeons encouraged the residents to speed up when patient safety could be jeopardized by the case moving too slowly. In contrast, they encouraged the residents to slow down when performing a crucial step or granting independence. Attending surgeons encouraged speed through economical language, by substituting physical actions for words, and through the use of Intelligent Cooperation. Conversely, they encouraged slowing down via just-in-time mini-lectures and by questioning the trainee. CONCLUSIONS: We present recommendations for safe teaching in the operating room while simultaneously maintaining overall surgical flow. Teaching residents to operate quickly can save time and is likely based on an automaticity in teaching. Slowing a resident down is vital for trainee skill development and patient safety.
Database: Medline

14. **Association of the Presence of Trainees With Outpatient Appointment Times in an Ophthalmology Clinic**

Source: I. H. Goldstein, M. R. Hribar, S. Read-Brown and M. F. Chiang.(2018).*JAMA ophthalmology*.136(1).p.20-26.
http://search.ebscohost.com/login.aspx?direct=true&scope=site&site=ehost-live&db=mdc&AN=29121175
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5766373
Importance: Physicians face pressure to improve clinical efficiency, particularly with electronic health record (EHR) adoption and gradual shifts toward value-based reimbursement models. These pressures are especially pronounced in academic medical centers, where delivery of care must be balanced with medical education. However, the association of the presence of trainees with clinical efficiency in outpatient ophthalmology clinics is not known.ObjectiveTo quantify the association of the presence of trainees (residents and fellows) and efficiency in an outpatient ophthalmology clinic. Design, Setting, and Participants: This single-center cohort study was conducted from January 1 through December 31, 2014, at an academic department of ophthalmology. Participants included 49 448 patient appointments with 33 attending physicians and 40 trainees. Exposures: Presence vs absence of trainees in an appointment or clinic session, as determined by review of the EHR audit log. Main Outcomes and Measures: Patient appointment time, as determined by time stamps in the EHR clinical data warehouse. Linear mixed models were developed to analyze variability among clinicians and patients.ResultsAmong the 33 study physicians (13 women [39%] and 20 men [61%]; median age, 44 years [interquartile range, 39-53 years]), appointments with trainees were significantly longer than appointments in clinic sessions without trainees (mean [SD], 105.0 [55.7] vs 80.3 [45.4] minutes; P < .001). The presence of a trainee in a clinic session was associated with longer mean appointment time, even in appointments for which the trainee was not present (mean [SD], 87.2 [49.2] vs 80.3 [45.4] minutes; P < .001). Among 33 study physicians, 3 (9%) had shorter mean appointment times when a trainee was present, 1 (3%) had no change, and 29 (88%) had longer mean appointment times when a trainee was present. Linear mixed models showed the presence of a resident was associated with a lengthening of appointment time of 17.0 minutes (95% CI, 15.6-18.5 minutes; P < .001), and the presence of a fellow was associated with a lengthening of appointment time of 13.5 minutes (95% CI, 12.3-14.8 minutes; P < .001). Conclusions and Relevance: Presence of trainees was associated with longer appointment times, even for patients not seen by a trainee. Although numerous limitations to this study design might affect the interpretation of the findings, these results highlight a potential challenge of maintaining clinical efficiency in academic medical centers and raise questions about physician reimbursement models.
Database: Medline

15. **Using operating room turnover time by anesthesia trainee level to assess improving systems-based practice milestones**

Source: C. R. Hoffman, M. S. Green, J. Liu, U. Iqbal and K. Voralu.(2018).*BMC medical education*.18(1).p.295.
https://doi.org/10.1186/s12909-018-1409-6
http://europepmc.org/search?query=(DOI:10.1186/s12909-018-1409-6)
https://gateway.proquest.com/openurl?ctx_ver=Z39.88-2004&res_id=xri:pqm&req_dat=xri:pqil:pq_clntid=145298&rft_val_fmt=ori/fmt:kev:mtx:journal&genre=article&issn=1472-6920&volume=18&issue=1&spage=295
http://search.ebscohost.com/login.aspx?direct=true&scope=site&site=ehost-live&db=mdc&AN=30518428
https://bmcmededuc.biomedcentral.com/track/pdf/10.1186/s12909-018-1409-6

BACKGROUND: Operating room (OR) metrics are frequently cited when optimizing cost efficacy and quality of care (Weiss et al, Characteristics of operating room procedures in U.S. hospitals, 2011: Statistical brief #170, 2013; Macario A, Anesthesiology 105:237-240, 2006; Childers et al, JAMA Surg 153:e176233, 2018). Little has been reported to evaluate how anesthesia trainees change anesthesia-related efficiencies in the OR. Statistical correlation may demonstrate awareness and implementation of efficient systems-based practice. METHODS: Utilizing computerized OR information systems, specific data regarding anesthesia controlled turnover times were collected (546 data points) over the course of 4 months. The type of surgery performed, patient's American Society of Anesthesiologists (ASA) physical status and OR turnover times were compared for clinical anesthesia (CA) trainee levels CA1, CA2, CA3 and CRNAs. Standard descriptive statistics were computed. Analysis of variance (ANOVA) was performed to compare the average turnover time. RESULTS: Average OR turnover time was 31 min ranging from 8 to 60 min. There was a significant difference between the OR turnover time of CA-1 (32 min) compared to CA-3 (29 min) ($p = 0.017$) and CA-1 compared to CRNA (30 min) ($p = 0.016$). OR turnover time was significantly shorter in CA-3 and CRNA. The analysis showed no differences between OR turnover time of ASA categories. CONCLUSIONS: These findings posit that trainees improve efficiency over time, but that education may for a time come at the expense of productivity. This trend may demonstrate a more profound understanding and mastery of a learner progressing in the graduate medical education system. This interplay plays a key role in clinical and academic shared success.
Database: Medline

16. **Improved utilization of operating room time for trainee cataract surgery in a public hospital setting**

Source: J. M. Kang, S. P. Padmanabhan, J. Schallhorn, N. Parikh and S. Ramanathan.(2018).*Journal of cataract and refractive surgery*.44(2).p.186-189.
https://go.openathens.net/redirector/nhs?url=https%3A%2F%2Fwww.clinicalkey.com%2Fcontent%2FplayBy%2Fdoi%2F%3Fv%3D10.1016%2Fj.jcrs.2017.11.014
PURPOSE: To examine the effect of group goal and group performance theories on operating room efficiency in resident-performed cataract surgery. SETTING: Zuckerberg San Francisco General Hospital and Trauma Center, Department of Ophthalmology, University of California, San Francisco, California, USA. DESIGN: Prospective case series. METHODS: This study assessed 4 specific segments of operating room utilization identified as room-to-incision time, incision-to-close time, close-to-exit time, and room turnover time. The time segments were measured for resident-performed cataract cases before the proposed intervention. Then, group goals were set for ideal times of each utilization segment. Behaviors of the surgery, anesthesia, nursing, pharmacy, and housekeeping teams that would improve group performance were identified. Utilization segments were measured again after the intervention. RESULTS: The time segments were measured for 134 resident-performed cataract cases before the proposed intervention and again after the intervention for 136 resident-performed cataract cases. Before the intervention, the mean overall case time was 55 minutes, allowing for 10 cases in a 10-hour day. After the intervention, the mean overall case time was 46 minutes, allowing for 13 cases in a 10-hour day. The decrease in postintervention times for overall case time, room-to-incision time, and close-to-exit time were statistically significant. CONCLUSIONS: Operating room utilization for resident-performed cataract surgery was enhanced by setting group goals. A multidisciplinary effort to enhance group performance through

behavior modification can be implemented immediately and improve efficiency without compromising patient safety or resident teaching.
Database: Medline

17. **Troubleshooting common endoscopic malfunctions: a study integrating a preoperative checklist and troubleshooting guide into surgical resident training**

Source: J. Lam, K. Grimes, A. Mohsin and S. Tsuda.(2017).*Surgical endoscopy*.31(11).p.4597-4602.
http://search.ebscohost.com/login.aspx?direct=true&scope=site&site=ehost-live&db=mdc&AN=28409365
https://gateway.proquest.com/openurl?ctx_ver=Z39.88-2004&res_id=xri:pqm&req_dat=xri:pqil:pq_clntid=145298&rft_val_fmt=ori/fmt:kev:mtx:journal&genre=article&issn=0930-2794&volume=31&issue=11&spage=4597
INTRODUCTION: This study assessed the utility of a checklist in troubleshooting endoscopic equipment. Prior studies have demonstrated that performance in simulated tasks translates into completion of similar tasks in the operating room. Checklists have been shown to decrease error and improve patient safety. There is currently limited experience with the use of simulation and checklists to improve troubleshooting of endoscopic equipment. We propose the use of a checklist during a simulated colonoscopy to improve performance during endoscopic troubleshooting. METHODS: This study randomized 20 surgical residents (PGY1-3) who were blinded to the purpose of the simulation. Participants were asked to complete two consecutive colonoscopies in a mock endoscopy suite. Prior to each trial, a standard set of equipment malfunctions were created; the equipment was returned to working order if the subjects were unable to successfully troubleshoot the equipment within the first 3 min of the simulation. Between trials, the intervention group was provided a troubleshooting checklist, which they were permitted to utilize during the second trial. The control group had no intervention. Scores were calculated for each task by subtracting time to completion from total time allowed (180 s), with 0 indicating the task was not completed. Groups were compared utilizing unpaired Student's t-test with $p < 0.05$ threshold for significance. RESULTS: Average scores were compared for 5 tasks in the first trial and 6 tasks in the second trial. During the first trial, there were no significant differences. However, during the second trial, there was a significant improvement with the checklist for 5/6 tasks. CONCLUSION: Use of a checklist, with no further intervention, significantly improves the ability of novice endoscopists to identify and remedy common equipment malfunctions. Introduction of a troubleshooting checklist may represent a simple and low-cost way to improve both efficiency and safety in the endoscopy suite.
Database: Medline

18. **Impact of fellow training level on adverse events and operative time for common pediatric GI endoscopic procedures**

Source: J. A. Mark and R. E. Kramer.(2018).*Gastrointestinal endoscopy*.88(5).p.787-794.
https://go.openathens.net/redirector/nhs?url=https%3A%2F%2Fwww.clinicalkey.com%2Fcontent%2FplayBy%2Fdoi%2F%3Fv%3D10.1016%2Fj.gie.2018.07.010
BACKGROUND AND AIMS: Previous studies on pediatric endoscopic training have not examined in detail if adverse events (AEs) are affected by the fellow's training level. We aimed to determine whether trainee presence and educational level increase AEs or operative time (OT) for pediatric intestinal endoscopy. METHODS: This was a prospective observational study of AEs for all endoscopic procedures and

retrospective analysis of OT (time of endoscope insertion until removal) for a sample of specified procedures at a tertiary children's hospital. AEs were categorized by severity grades: 1, home management; 2, outpatient evaluation; 3, hospitalization and/or repeat endoscopy; 4, surgery and/or intensive care unit admission; and 5, death. RESULTS: A total of 15,886 procedures (6257 with trainee) including 1627 therapeutic procedures (733 with trainee) were analyzed for AEs. Four hundred thirteen total AEs (2.60%) and 213 AEs grade 2 to 4 (1.34%) were identified. Fellow presence at any training level did not increase AE rates for any procedures. Median OT for 3762 EGDs decreased from 17 to 11 minutes from the first quarter to the fourth quarter of first-year fellowship and then remained stable. EGDs without fellows were shorter (9 minutes, P < .0001) compared with any training level. Median times of 1291 colonoscopies with EGD decreased from 55 to 51 to 47 minutes for fellows in the first half, second half of first-year fellowship, and second and third year, respectively. Attendings alone were faster (37 minutes, P < .0001). CONCLUSIONS: Current pediatric endoscopic training for is safe regardless of fellow training level. Trainee efficiency improves during and after fellowship.
Database: Medline

19. **How Should Trainee Autonomy and Oversight Be Managed in the Setting of Overlapping Surgery?**

Source: J.-N. Gallant and A. Langerman.(2018).*AMA journal of ethics*.20(4).p.342-348.
http://search.ebscohost.com/login.aspx?direct=true&scope=site&site=ehost-live&db=mdc&AN=29671727
https://journalofethics.ama-assn.org/sites/journalofethics.ama-assn.org/files/2018-06/ecas3-1804.pdf
This case highlights an attending surgeon's conflicts between duty to care for individual patients, train independent surgeons, and serve a patient population in an efficient manner. Although oversight of surgical residents and multiple operating room scenarios can be conducted in an ethical manner, patients might not understand the realities of surgical training and clinical logistics without explicit disclosure. Central to the ethical concerns of the case are the attending surgeon's obfuscation of resident involvement and her insufficient oversight of two concurrent procedures. Full and proper informed consent, increased transparency, better planning, and improved communication could have prevented this difficult situation.
Database: Medline

20. **Improving Efficiency While Improving Patient Care in a Student-Run Free Clinic**

Source: J. S. Lee, K. Combs, K. R. Group and M. Pasarica.(2017).*Journal of the American Board of Family Medicine: JABFM*.30(4).p.513-519.
http://www.jabfm.org/lookup/doi/10.3122/jabfm.2017.04.170044
https://www.jabfm.org/content/jabfp/30/4/513.full.pdf
INTRODUCTION: Student-run free clinics (SRFCs) have the capacity to decrease health care inequity in underserved populations. These facilities can benefit from improved patient experience and outcomes. We implemented a series of quality improvement interventions with the objectives to decrease patient wait times and to increase the variety of services provided. METHODS: A needs assessment was performed. Problems related to time management, communication between staff and providers, clinic resources, and methods for assessing clinic performance were identified as targets to reduce wait times and improve the variety of services provided. Seventeen interventions were designed and implemented over a 2-month

period. RESULTS: The interventions resulted in improved efficiency for clinic operations and reduced patient wait times. The number of specialty providers, patient visits for specialty care, lifestyle education visits for disease prevention and treatment, free medications, and free laboratory investigations increased to achieve the goal of improving the availability and the variety of services provided. CONCLUSIONS: We demonstrated that it is feasible to implement successful quality improvement interventions in SRFCs to decrease patient wait times and to increase the variety of services provided. We believe that the changes we implemented can serve as a model for other SRFCs to improve their performance.:
Database: Medline

21. **Precepting Medical Students in the Patient's Presence: An Educational Randomized Trial in Family Medicine Clinic**

Source: D. V. Power, M. E. Rosenbaum, L. Hanson, I. R. Reynolds, D. Brink, S. Prasad and C. D. Kreiter.(2017).*Family medicine*.49(2).p.97-105.
http://search.ebscohost.com/login.aspx?direct=true&scope=site&site=ehost-live&db=mdc&AN=28218934
BACKGROUND AND OBJECTIVES: Many medical student-patient encounters occur in the outpatient setting. Conference room staffing (CRS) of student presentations has been the norm in the United States in recent decades. However, this method may not be suitable for outpatient precepting, being inefficient and reducing valuable direct face time between physician and patient. Precepting in the Presence of the Patient (PIPP) has previously been found to be an effective educational model in the outpatient setting but has never been studied in family medicine clinics, nor with non-English speaking patients, nor patients from lower socioeconomic backgrounds with low literacy. METHODS: We used a randomized controlled trial of educational models comparing time spent using PIPP with CRS in two family medicine clinics. Patient, student, and physician satisfaction were also measured using a 5-point Likert scale; total encounter time and time spent precepting were also recorded. RESULTS: PIPP is strongly preferred by attending physicians while patients and students were equally satisfied with either precepting method. PIPP provides an additional 3 minutes of physician-patient face time (17.39 versus 14.08 minutes) in an encounter that is overall shortened by 2 minutes (17.39 versus 19.71 minutes). CONCLUSIONS: PIPP is an effective method for precepting medical students in family medicine clinics, even with non-English speaking patients and those with low literacy. Given the time constraints of family physicians, PIPP should be considered as a preferred, time-efficient method for training medical students that is well received by patients, students, and particularly by physicians.
Database: Medline

22. **Quantifying the Impact of Trainee Providers on Outpatient Clinic Workflow using Secondary EHR Data**

Source: I. H. Goldstein, M. R. Hribar, R.-B. Sarah and M. F. Chiang.(2017).*AMIA ... Annual Symposium proceedings. AMIA Symposium*.2017(760-769).
Providers today face productivity challenges including increased patient loads, increased clerical burdens from new government regulations and workflow impacts of electronic health records (EHR). Given these factors, methods to study and improve clinical workflow continue to grow in importance. Despite the ubiquitous presence of trainees in academic outpatient clinics, little is known about the impact of trainees on academic workflow. The purpose of this study is to demonstrate that secondary EHR data can be used to quantify that impact, with potentially important results for clinic efficiency and provider reimbursement models. Key findings from

this study are that (1) Secondary EHR data can be used to reflect in clinic trainee activity, (2) presence of trainees, particularly in high-volume clinic sessions, is associated with longer session lengths, and (3) The timing of trainee appointments within clinic sessions impacts the session length.
Database: Medline

23. **The impact of trainees on theatre efficiency-an anaesthetists' perspective**

Source: K. Grailey, M. Gooneratne, A. Visram and J. O'Carroll.(2017).*Anaesthesia*.72(81).
https://onlinelibrary.wiley.com/doi/full/10.1111/anae.13789
https://onlinelibrary.wiley.com/doi/pdfdirect/10.1111/anae.13789
Efficient theatre list management is essential for patient satisfaction, patient safety and optimal resource use [1], yet the impact of training is uncertain. Our aim was to evaluate the effect of both educational activities and anaesthetic trainee presence on efficiency. Methods: The Pan London Peri-operative Audit and Research Network prospectively reviewed theatre efficiency across 39 sites in south-east England. Anaesthetists running elective operating lists (excluding obstetrics) were surveyed over 5 days within a 2-week period in January 2016. This explored perceived causes of operating list inefficiency and whether the presence of a trainee anaesthetist positively improved theatre efficiency or had a negative impact. Electronic theatre databases were reviewed to extract information on utilisation of theatre time, identifying documented causes for delays. All sites obtained clinical governance approval. Results: Electronic records were contributed from 28 sites, within which no educational or training reasons were cited as contributory to delays or cancellations. Across 39 sites, 1396 anaesthetists completed surveys, each corresponding to a separate theatre list. Anaesthetic trainees were allocated to 695 (49.8%) lists. Of this subset, 589 (84.7%) reported the impact of the trainee as positive, 35 (5.0%) reported a negative impact, and 71 (10.3%) entries were not completed. Where trainees were reported to negatively impact theatre efficiency, core trainees were implicated to a similar degree as intermediate or non-consultant grades (12 lists (34%), 11 lists (31%) and 10 lists (28%), respectively). Educational reasons were cited as contributing to inefficiency in 72 lists; as anaesthetic teaching (43%), surgical training (40%), departmental teaching (11%) and audit meetings (6%). Discussion: Subjectively our review demonstrated that anaesthetic trainees are perceived to have a positive impact on theatre efficiency. There appears to be disparity between electronically reported data and the view held by anaesthetists with respect to trainee presence. This may reflect a mismatch in perceived causes of theatre inefficiency between different healthcare professionals, or a lack of ability to code electronically for these causes. Educational activities were deemed to impact only 5% of lists, with less than half relating specifically to anaesthetic trainees. Training grade did not appear to influence the small proportion of lists professed to be negatively influenced by trainees. This regional survey provides the first step into exploring the role of anaesthetic trainees within the efficient operating theatre.
Database: Embase

24. **Prolonged patient emergence time among clinical anesthesia resident trainees**

Source: L. M. House, N. H. Calloway, W. S. Sandberg and J. M. Ehrenfeld.(2016).*Journal of anaesthesiology, clinical pharmacology*.32(4).p.446-452.
http://europepmc.org/search?query=(DOI:10.4103/0970-9185.194776)
https://doi.org/10.4103/0970-9185.194776

BACKGROUND AND AIMS: Emergence time, or the duration between incision closure and extubation, is costly nonoperative time. Efforts to improve operating room efficiency and identify trainee progress make such time intervals of interest. We sought to calculate the incidence of prolonged emergence (i.e. >15 min) for patients under the care of clinical anesthesia (CA) residents. We also sought to identify factors from resident training, medical history, anesthetic use, and anesthesia staffing, which affect emergence. MATERIAL AND METHODS: In this single-center, historical cohort study, perioperative information management systems provided data for surgical cases under resident care at a tertiary care center in the United States from 2006 to 2008. Using multiple logistic regression, the effects of variables on emergence was analyzed. RESULTS: Of 7687 cases under the care of 27 residents, the incidence of prolonged emergence was 13.9%. Emergence prolongation decreased by month in training for 1st-year (CA-1) residents ($r2 = 0.7$, $P < 0.001$), but not for CA-2 and CA-3 residents. Mean patient emergence time differed among 27 residents ($P < 0.01$ for 58.4% or 205/351 paired comparisons). In a model restricted to 1st-year residents, patient male gender, American Society of Anesthesiologists (ASA) physical status >II, emergency surgical case, operative duration ≥2 h, and paralytic agent use were associated with higher frequency of prolonged emergence, while sevoflurane or desflurane use was associated with lower frequency. Attending anesthesiologist handoff was not associated with longer emergence. CONCLUSION: Incidence of prolonged emergence from general anesthesia differed significantly among trainees, by resident training duration, and for patients with ASA >II.
Database: Medline

25. How we used a patient visit tracker tool to advance experiential learning in systems-based practice and quality improvement in a medical student clinic

Source: C. A. Chen, R. J. Park, J. V. Hegde, T. Jun, M. P. Christman, S. M. Yoo, A. Yamasaki, A. Berhanu, P. Vohra-Khullar, K. Remus, R. M. Schwartzstein and A. R. Weinstein.(2016).*Medical teacher*.38(1).p.36-40.
http://search.ebscohost.com/login.aspx?direct=true&scope=site&site=ehost-live&db=mdc&AN=25401409
Poorly designed healthcare systems increase costs and preventable medical errors. To address these issues, systems-based practice (SBP) education provides future physicians with the tools to identify systemic errors and implement quality improvement (QI) initiatives to enhance the delivery of cost-effective, safe and multi-disciplinary care. Although SBP education is being implemented in residency programs and is mandated by the Accreditation Council for Graduate Medical Education (ACGME) as one of its core competencies, it has largely not been integrated into undergraduate medical education. We propose that Medical Student-Faculty Collaborative Clinics (MSFCCs) may be the ideal environment in which to train medical students in SBPs and QI initiatives, as they allow students to play pivotal roles in project development, administration, and management. Here we describe a process of experiential learning that was developed within a newly established MSFCC, which challenged students to identify inefficiencies, implement interventions, and track the results. After identifying bottlenecks in clinic operations, our students designed a patient visit tracker tool to monitor clinic flow and implemented solutions to decrease patient visit times. Our model allowed students to drive their own active learning in a practical clinical setting, providing early and unique training in crucial QI skills.
Database: Medline

26. A novel interactive educational system in the operating room--the IE system

Source: T. Nakayama, N. Numao, S. Yoshida, J. Ishioka, Y. Matsuoka, K. Saito, Y. Fujii and K. Kihara.(2016).*BMC medical education*.16(44).
http://bmcmededuc.biomedcentral.com/articles/10.1186/s12909-016-0561-0
http://europepmc.org/search?query=(DOI:10.1186/s12909-016-0561-0)
http://search.ebscohost.com/login.aspx?direct=true&scope=site&site=ehost-live&db=mdc&AN=26842063
https://bmcmededuc.biomedcentral.com/track/pdf/10.1186/s12909-016-0561-0
BACKGROUND: The shortage of surgeon is one of the serious problems in Japan. To solve the problem, various efforts have been undertaken to improve surgical education and training. However, appropriate teaching methods in the operating room have not been well established. The aim of this study is to assess the utility of a novel interactive educational (IE) system for surgical education on urologic surgeries in the operating room. METHODS: A total of 20 Japanese medical students were educated on urologic surgery using the IE system in the operating room. The IE system consists of two parts. The first is three-dimensional (3D) magnified vision of the operative field using a 3D head-mounted display and a 3D endoscope. The second is interactive educative communication between medical students and surgeons using a small-sized wireless communication device. The satisfaction level with the IE system and the physical burden on medical students was examined via questionnaire. RESULTS: All students utilized the IE system in urologic surgery and responded to the survey. Most students were satisfied with the IE system. They also felt more welcomed by the surgeon when using the IE system than when not using it. No major unpleasant symptoms were observed but five students (25 %) experienced mild eye fatigue as a result of viewing the medical images. CONCLUSIONS: The IE system has the potential to motivate students to become interested in surgery and could be an efficient method of surgical education in the operating room.
Database: Medline

27. Effect of cataract surgery training on operating room productivity: How long trainees take

Source: D. Y. Park, A. Walkden and T. A. De Klerk.(2016).*Journal of cataract and refractive surgery*.42(9).p.1297-1301.
https://go.openathens.net/redirector/nhs?url=https%3A%2F%2Fwww.clinicalkey.com%2Fcontent%2FplayBy%2Fdoi%2F%3Fv%3D10.1016%2Fj.jcrs.2016.07.029
PURPOSE: To determine the effect of specialty training on cataract operation times and operating room efficiency. SETTING: Manchester Royal Eye Hospital, Manchester, United Kingdom. DESIGN: Retrospective consecutive case series. METHODS: Specialty training and consultant case times with preparation times were recorded between August 2014 and May 2015. Cases with posterior capsule rupture requiring anterior vitrectomy or iris hook insertion were analyzed. RESULTS: The study reviewed 1904 cases (906 consultant cases, 797 specialty training cases). Trainees' case time was significantly longer than consultants' (mean 24.25 minutes ± 12.36 [SD] versus 19.59 ± 10.05 minutes) ($P < .0001$). The difference between the 1- to 3-year trainees' mean surgical time and 4- to 7-year trainees' mean surgical time was statistically significant ($P < .0001$). Mean case time decreased from 27.63 ± 12.57 minutes (1- to 3-year trainees) to 22.55 ± 11.90 minutes (4- to 7-year trainees). The mean posterior capsule rupture rate was 2.76% for trainees and 1.77% for consultants. When posterior capsule rupture occurred, the

mean surgical time increased to 49.81 ± 18.69 minutes for the consultant group and 67.00 ± 26.26 minutes for the trainee group (P = .024). When iris hooks were required, the mean case time was 26.41 ± 11.28 minutes and 34.11 ± 15.06 minutes, respectively (P = .026). CONCLUSIONS: Specialty training cases had a longer duration than consultant cases, although the mean surgical time decreased with increased trainee experience. After 3 years of training, trainees did not have a significant effect on operating room efficiency. FINANCIAL DISCLOSURE: None of the authors has a financial or proprietary interest in any material or method mentioned.
Database: Medline

28. The Action Research Program: Experiential Learning in Systems-Based Practice for First-Year Medical Students

Source: S. L. Ackerman, C. Boscardin, L. Karliner, M. A. Handley, S. Cheng, T. W. Gaither, J. Hagey, L. Hennein, F. Malik, B. Shaw, N. Trinidad, G. Zahner and R. Gonzales.(2016).*Teaching and learning in medicine*.28(2).p.183-191.
http://europepmc.org/articles/pmc4916837?pdf=render
PROBLEM: Systems-based practice focuses on the organization, financing, and delivery of medical services. The American Association of Medical Colleges has recommended that systems-based practice be incorporated into medical schools' curricula. However, experiential learning in systems-based practice, including practical strategies to improve the quality and efficiency of clinical care, is often absent from or inconsistently included in medical education. INTERVENTION: A multidisciplinary clinician and nonclinician faculty team partnered with a cardiology outpatient clinic to design a 9-month clerkship for 1st-year medical students focused on systems-based practice, delivery of clinical care, and strategies to improve the quality and efficiency of clinical operations. The clerkship was called the Action Research Program. In 2013-2014, 8 trainees participated in educational seminars, research activities, and 9-week clinic rotations. A qualitative process and outcome evaluation drew on interviews with students, clinic staff, and supervising physicians, as well as students' detailed field notes. CONTEXT: The Action Research Program was developed and implemented at the University of California, San Francisco, an academic medical center in the United States. All educational activities took place at the university's medical school and at the medical center's cardiology outpatient clinic. OUTCOME: Students reported and demonstrated increased understanding of how care delivery systems work, improved clinical skills, growing confidence in interactions with patients, and appreciation for patients' experiences. Clinicians reported increased efficiency at the clinic level and improved performance and job satisfaction among medical assistants as a result of their unprecedented mentoring role with students. Some clinicians felt burdened when students shadowed them and asked questions during interactions with patients. Most student-led improvement projects were not fully implemented. LESSONS LEARNED: The Action Research Program is a small pilot project that demonstrates an innovative pairing of experiential and didactic training in systems-based practice. Lessons learned include the need for dedicated time and faculty support for students' improvement projects, which were the least successful aspect of the program. We recommend that future projects aiming to combine clinical training and quality improvement projects designate distinct blocks of time for trainees to pursue each of these activities independently. In 2014-2015, the University of California, San Francisco School of Medicine incorporated key features of the Action Research Program into the standard curriculum, with plans to build upon this foundation in future curricular innovations.

Database: Medline

29. **Surgical assessment value enforcement: A model of increasing operative efficiency and productivity**

Source: A. C. Steinberg, C. A. Ficara, D. G. Norman, M. Gilgenbach and S. Shichman.(2015).*Journal of Minimally Invasive Gynecology*.22(3).

Objectives: The economic state of medicine is driving the need for more efficient and productive operating rooms. Currently, there is a perceived excessive turnover time related to many issues on all levels. This model was developed to improve and attempt to change the current culture of our tertiary care operating room. The primary objective was to demonstrate change by decreasing turn over time; Secondary objectives included looking at decreasing total time and potential cost associated with procedures. Material(s) and Method(s): We performed a prospective intervention study with a retrospective control. One FPMRS surgeon's cases were followed for the study period over a two month period in 2014. All cases performed by the same surgeon between Oct 2013 and Jan 2014 made up the control group. Our OR is made up of two parts (6 room same day (SD) surgery unit and 35 room main OR). Procedures performed in both parts were included. The SAVE protocol introduced new concepts which included: having the same surgical team throughout the study, cleaning personnel also performing transport, the entire team informed of patient location by the transporter, all cases performed with a CRNA and anesthesiologist, breaks taken around the timing of the cases, the entire team huddling and agreeing a start time for next case prior to leaving the room. Comparisons were made of pre and post intervention, OR location and procedure type using a Student t-test. Result(s): Prior to the implementation of SAVE, mean turn over time was 30.4 (+/-14.3) min. In looking at different parts of the OR the SD area had a better turnover time when compared with the rest of the OR for all cases 21.1 (+/-9.8) vs 37.7 (+/-13.2), p < 0.001. Looking at the individual case type performed in both areas also demonstrated a difference (p = 0.005) favoring the SD area. SAVE protocol dropped the overall mean turnover time to 17.2 min. SAVE showed a significant improvement of turn over time in all areas of the OR equalizing any difference between the SD area and main OR (p = 0.937). All case types when compared pre and post had a decreasing trend in total OR time not demonstrating statistical significance. Our $/min cost for gynecologic cases is $53.02 ($/min) with the potential savings of 13.2 minutes per case this potentially could save close to $700 per case. Our service performs approximately 650 cases with approximately 300 turnovers, which conservatively could result in 50 hours ($159,060) saved annually. Conclusion(s): These simple changes described were able to significantly reduce turnover time. The engagement of the entire team specifically cleaning and transport personnel proved to be very effective. Rethinking and getting rid of traditional roles in the operating room can prove to be extremely beneficial and produce a positive effect on productivity and efficiency.

Database: Embase

30. **Twelve tips for medical students to maximise learning in theatre**

Source: D. Weinberg, M. Saleh and Y. Sinha.(2015).*Medical teacher*.37(1).p.34-40. http://search.ebscohost.com/login.aspx?direct=true&scope=site&site=ehost-live&db=mdc&AN=24984710

BACKGROUND: Introduction into the clinical environment can be a daunting experience for medical students, especially in the operating theatre. Prior knowledge of how to prepare for theatre and cope with surgical placements is advantageous, as learning opportunities can be maximised from the start. AIM: This article provides

medical students with 12 tips devised to help make the most out of their initial theatre placements. METHODS: Tips were formulated based on the experiences of three senior medical students and a review of the literature. RESULTS: The 12 tips are (1) Know the patient and procedure, (2) Be familiar with your surgical department, (3) Familiarise yourself with different surgical attire, (4) Revise your clinical skills, (5) Be time-efficient, (6) Learn how to work in a sterile environment, (7) Avoiding syncope, (8) Impress the operating surgeon, (9) Be aware of the professional, ethical, and legal issues in surgery, (10) Use mentors to enhance your learning, (11) Embrace extra-curricular activities to enhance your insight into surgery and (12) Be acquainted with relevant support systems. CONCLUSIONS: These 12 tips provide guidance and opportunities to maximise learning for new clinical-phase medical students being introduced to the operating theatre for the first time.
Database: Medline

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Databases searched:

- **Healthcare Databases:** MEDLINE, EMBASE.

Local Guidance: Local guidance has not been searched as part of this literature search. However, local guidelines, policies and procedures are available via the red button on the intranet.

Search Terms:

Subject Headings	***Free Text Words***
exp EFFICIENCY/	clinic
"OPERATING ROOMS"/	clinic efficiency
"OUTPATIENT CLINICS, HOSPITAL"/	efficien*
*PRODUCTIVITY/	"operating room"
exp STUDENTS/	"operating theatre"
"STUDENTS, MEDICAL"/	student
*"SURGICAL TRAINING"/	trainee
	theatre efficiency

Search Limits: English Language; Date Range 2015 to present.

Search Date: 15/02/2021

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