Moderated Poster Session VI: Education
Friday, September 30, 2016
3:00 – 4:30 pm

P87
30-day readmissions: An opportunity for quality improvement and education

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Background: Thirty-day inpatient readmissions are costly, common, and variable across institutions, thus they have become a national quality measure for both medical and surgical services, which impact Medicare reimbursement. Our institution is a large integrated delivery system, with over 284 000 annual inpatient admissions across over 20 hospitals. There is no standard protocol for notifying physicians of readmissions (defined as an admission to a hospital within 30 days of a discharge from the same or another subsection of a hospital system). It is unclear how often and through what manner physicians are made aware that inpatients they have cared for have been readmitted.

Methods: We first identified all patients discharged during the month of August 2015, who were subsequently readmitted within 30 days using The Advisory Board Crimson™ program to extract patient-level data from our electronic medical records. We limited our study to two medicine services lines (general medicine and cardiology) and two surgical service lines (surgical oncology and urology). Thirty-two attending physicians were surveyed: 12 internal medicine, eight cardiology, four urology, and eight surgical oncology. Seventeen resident physicians were surveyed, including six internal medicine, four cardiology, five urology, and two surgical oncology. Surveys were administered to attending and senior resident physicians caring for patients on the day of initial discharge.

- **Part 1** of the survey consisted of multiple choice questions on preferences on modalities of notification of patient readmissions, goals in being notified, and their practices in notifying other physicians.
- **Part 2** of the survey participants were asked if and how they were notified of patient-specific readmissions after discharge from their service in August.

Results: Survey response rate was 65% (32/49) with similar rates between medical (20/30 or 66%) and surgical services (12/19 or 63%). Physicians were aware of only 51% of 30-day readmissions with similar rates between surgical and medical services and between attendings and residents. Two-thirds of physicians expressed a preference to be notified of all readmissions. The majority of residents stated that being notified of readmissions would be educationally valuable (11/13). The majority of physicians preferred to be notified by email from the admitting service or an automated system within 24 hours of admission.

Conclusions: Standardized readmission notifications are desired by physicians for purposes of care delivery and education. In response to this study, our institution's Center for Quality, Safety, and Innovation will be exploring an automated 30-day readmission notification service across all specialties.

P88
Acceptability and feasibility of an advanced simulation-based preclinical surgical skills curriculum for medical students

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Background: Surgical skill training for medical students traditionally occurs in the operating room and can vary greatly in both quality and quantity. Improving meaningful preparation prior to beginning a surgical clerkship should result in enhanced confidence and ability to participate in surgery. Surgical simulation is an effective training platform that is part of most post-graduate surgical education programs. There is a lack of available hands-on surgical simulation models and no studies were found that evaluated the use of advanced surgical simulation for medical student presurgical education.

Methods: We developed a preclinical medical student surgical skills curriculum using advanced polymer hydrogel models to test feasibility and assess usefulness. First- and second-year medical students at our institution completed a survey to determine prior exposure to surgical skills training/simulation and the need for a formal pre-surgical curriculum. Sixteen second-year medical students were randomly selected from a larger pool of volunteers and completed a six-week elective, rotating through open, laparoscopic, endoscopic, and robotic surgical simulations. A final project included a simulated surgery using predeveloped hydrogel simulations (transurethral resection of bladder tumor, robotic partial nephrectomy, robotic myomectomy and open carotid endarterectomy) and a presentation of the indications, techniques and complications. Participants were surveyed weekly and on completion of the elective to assess satisfaction and confidence in the operating room.

Results: A total of seventy-eight first- and second-year medical students completed a needs assessment survey which identified that most students had either limited or no prior exposure to surgical skills training, surgical simulation, instrument handling/knot-tying, and sterile technique. Most students felt that medical schools should offer preparation for the surgical clerkship (93.6%) and that this should be conducted as a formal curriculum in the preclinical years (88.3%). 79.5% would participate in a preclinical surgical elective if available. In a post-elective survey, most participants felt that a hands-on, simulation-based curriculum increased their confidence and familiarity performing a complete simulated procedure requiring advanced surgical skills and increased confidence in skills required for third-year surgical clerkships.

Conclusions: While the role of surgical simulation in postgraduate surgical education is well-established and continues to expand, our study suggests that a simulation-based advanced surgical curriculum is both feasible and desired at the medical student level.

P89
An interview day surgical simulation session: A burden or blessing in disguise?

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Background: While not mandated by the ACGME for urology postgraduate training, surgical simulation is an established training platform that is voluntarily integrated into the curriculum of many programs. Following the establishment of a Simulation Center for Advanced Surgical Training (Sim-CAST) by our department, prospective candidates participated in a surgical simulation workshop incorporated into the interview day. We tested the feasibility of conducting a simulation session during the interview day and assessed our candidates' impressions of partaking in a simulator session.

Methods: Fourteen of 22 urology residency applicants visiting our institution during the 2015 application cycle were scheduled in 30-minute rotating blocks between morning faculty interviews to spend in Sim-CAST. Applicants rotated in groups of two between endoscopic, laparoscopic and robotic simulator stations to complete supervised, standardized, task-based exercises. Applicants responded to a survey upon completion of the interview day requesting information about prior exposure to surgical skills training/simulation, importance of simulation in residency training, influence

of simulation on choice of residency program, and whether the session interrupted the interview day. Additional feedback was obtained from open-ended responses regarding the simulation experience. Applicants were not graded and our data was not used for the purposes of applicant ranking. Admissions committee members were blinded to all data collected.

Results: Our results revealed that half of surveyed applicants had prior exposure to surgical skills training and surgical simulation. All felt that surgical simulation should be an integral part of urology residency training and most agreed that the presence of a simulation lab would influence their choice of residency program. 93% of surveyed applicants felt that the simulator session did not disrupt the interview day. Open-ended responses revealed an unintended effect of reducing stress involved with the interview day.

Conclusions: Urology residency applicants are interested in the availability of surgical simulation as part of a training curriculum. The presence of a dedicated simulation space positively influenced our candidates' selection of a residency program. We acknowledge that the potential for responder bias exists. Our results suggest that a simulation session can be feasibly incorporated into an interview day to highlight a urology program's simulation resources and possibly reduce interview day stress.

P90
Can surgical mentor's mind become the key to trainee performance?

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Background: Cognitive metrics may provide valuable, real-time and objective assessment of surgical training. We used cognitive metrics to evaluate the degree of satisfaction of a mentor surgeon with trainee while performing robot-assisted surgery (RAS).

Methods: We recorded the brain activity of a master robotic surgeon while mentoring trainees during RAS, while simultaneously assessing his satisfaction with their performance using a validated National Aeronautics and Space Administration Task Load Index (NASA-TLX) questionnaire. Technique: electroencephalogram (EEG) recording was done using 24-channel wireless EEG recording equipment. EEG data from each channel was processed at 256 samples/sec. EEG features assessed were: mental

workload, eye-blink duration, frustration, aiming period, and high-level engagement. Statistical analysis: EEG features associated with mentor satisfaction were identified using three SVM classifiers, the linear, the polynomial, and the radial basis function kernel (RBF). Additionally, the leave-one-out cross- validation (LOOCV) method was used to evaluate the accuracy of these parameters in determining mentor's satisfaction. Data was analyzed using matrix laboratory (MATLAB) environment (Math Works Inc., Natick, MA, USA).

Results: Fifteen pelvic lymph node dissections (pLNDs) and 29 urethro-vesical anastomoses (UVAs) were included. Mental workload, eye-blink duration and frustration were the most significant features in discriminating mentor satisfaction of trainee's performance for pLND (93% accuracy) and UVA (93% accuracy) (Fig. 1).

Conclusions: We found that cognitive characteristics of mentor (mental workload, eye-blink duration, and frustration) allowed determining his satisfaction level with the surgical performance. This study opens new horizons for surgical skills assessment in a real-time, objective fashion.

P91
Effective handover and challenges in implementation: A quality improvement project

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Background: Effective handovers are important components of patient care. Numerous studies demonstrate a clear association between the quality and quantity of handover information, and patient care outcomes. Because missing, inaccurate information can result in deleterious outcomes, most handovers include a structured tool to ensure vital information is communicated. Current data have focused on the information and communication in handover. However, few studies address the difficulty implementing a new handover system, in particular, optimizing the framework for successful stakeholder engagement. Herein, we report on the introduction of a pilot handover system.

Methods: A new system for urology resident handover was implemented at two institutions in Toronto, from July 2015 to April 2016. The primary outcome was handover information inclusion rate (IIR) assessed on a nine-item scale prior to, and at two time-points after introducing the structured handover. Handover items were decided through stakeholder meetings, including: patient name, age, responsible physician, postop-
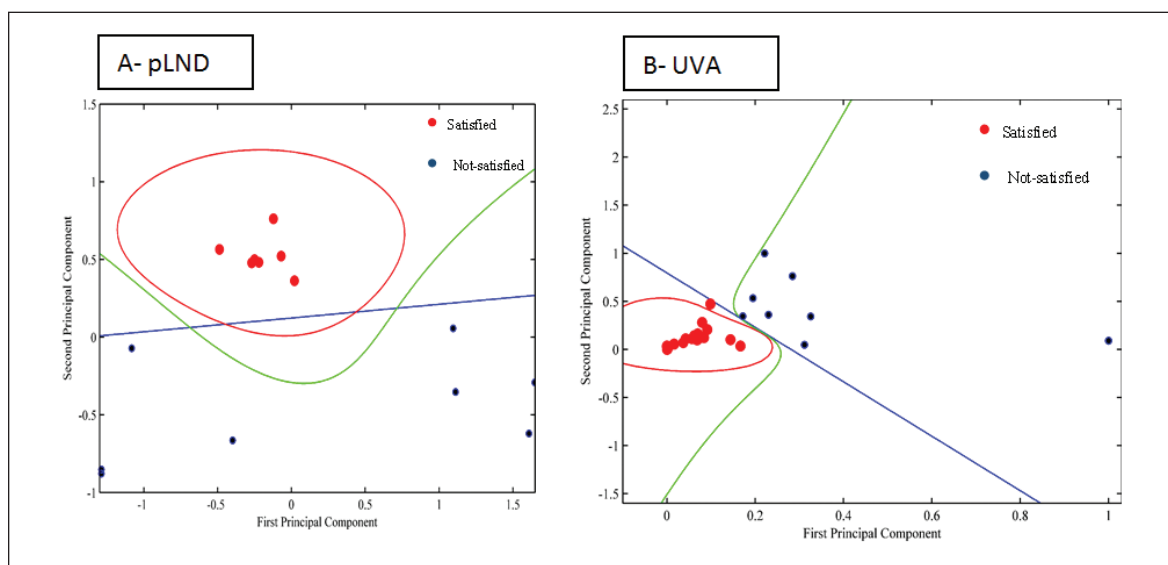
P90. Fig. 1. Linear (blue), polynomial (green), and RBF (red) SVM classifiers applied on first two principal components of all selected features in LND task (Panel A) and UVA (Panel B). LOOCV showed accuracy of 93.3% for pLND and 93.1% for UVA.

P91. Table 1. Information inclusion rate following handover

Patient factor	Institution A – Prior to introduction	Institution A – Following introduction	Institution B
Name	100%	100%	92%
Age	45%	90%	0%
Responsible staff physician	95%	100%	8%
Postoperative/admission day	69%	85%	8%
Diagnosis/procedure	83%	100%	100%
Past medical history	20%	54%	0%
Active issues	76%	100%	83%
Diet	31%	44%	42%
Discharge planning	46%	50%	42%

erative day, diagnosis, medical history, active issues, diet, and discharge planning. Incomplete fields were considered negative responses. Results were analyzed using descriptive statistics. Secondary outcomes assessing satisfaction with handover and subjective improvement of handover communication were anonymously collected and graded on five-point Likert scale to rate handover experience.

Results: At one institution (A), the new handover system had strong uptake and utilization. However, the other institution (B) failed to adopt the handover system. At institution A, the original handover achieved an IIR of 63% of handover items prior to the introduction of the handover by a chief resident. Handover continued to be used throughout the study period, even as residents joined and left the team. By the end of our study, institution A improved to an IIR of 80% (Table 1). Satisfaction with the document was 4.0/5. Most residents felt that the system had improved (4.2/5). The most common area for improvement was handover length to better highlight active issues for a high turnover service (urology). At institution B, the handover system was introduced by a junior resident and had reverted to a verbal, non-documented system within two days of attempted initiation. The IIR at site B remained stagnant at 42%.

Conclusions: Effective handover checklists have been described, but stakeholder buy-in remains a challenge. Handover quality improved with the use of a structured tool, but was subject to its utilization. Further research correlating these findings with patient outcomes is required.

P92
Patients' knowledge of their prostate cancer profile: Do provider communication strategies matter?

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Background: Treatment decisions for localized prostate cancer patients depend on unique clinical factors, such as Gleason score and cancer stage. Prostate cancer patients' knowledge and understanding of their clinical information has not been well-documented in the literature. The current research seeks to explore patient knowledge and understanding of personal Gleason score and cancer stage and to assess the impact of provider communication methods and the use of a treatment decision aid (video).

Methods: Men with localized prostate cancer who received care from 2007–2013 at Dartmouth-Hitchcock Medical Center Oncology clinics were included in the study (N=411). All subjects received an information packet regarding prostate cancer, types of treatment, and a video decision aid. Provider communication methods prior to the initial clinical oncology encounter (ICOE) were identified. One method included both a phone call and a personalized letter with the patient's unique cancer profile, while the second method provided no prior personal communication. As part of standard of care, all patients completed a survey before their ICOE that included questions about demographics, Gleason score, Gleason score meaning, cancer stage, cancer stage meaning, and the video. Chart reviews confirmed clinical pathology. Chi-square tests and

logistic regression were used to compare correctly reported information about Gleason score and cancer stage across groups.

Results: Overall, subjects who correctly reported their Gleason score, Gleason score meaning, cancer stage, and cancer stage meaning were 64.0%, 54.5%, 31.4%, and 32.6%, respectively. Thirty-five percent of subjects received the personalized communication method. Subjects who received personalized communication were more likely to correctly report their Gleason score (p<0.0001), cancer stage (p<0.0001), and cancer stage meaning (p=0.048) compared to those who did not receive personalized communication. In multivariable models, subjects who watched the video were more likely to correctly report their Gleason score (OR 2.11, 95% CI 1.31–3.41) and cancer stage (OR 2.0, 95% CI 1.18–3.37). Subjects who received personalized communication were also more likely to correctly report their Gleason score (OR 2.72, 95% CI 1.61–4.60) and cancer stage (OR 2.84, 95% CI 1.73–4.66).

Conclusions: Subjects who received personalized communication about their clinical profile and those who reported watching the video are more knowledgeable about their Gleason score and cancer stage information. These findings indicate that a more personalized communication method along with a decision aid may help patients better understand the clinical information about their prostate cancer, which may influence patient counseling and have implications for treatment decisions.

P93
Positive vs. negative intraoperative surgeons' leadership: Which behaviors have greatest impact on surgical team performance?

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Background: Most leadership research to date has focused on the effects of a single type of leadership — most commonly transformational leadership — despite the importance of negative effects of passive leadership, abusive supervision, and over-controlling leadership. The purpose of this study was to examine the simultaneous effects of these four different leadership behaviors by surgeons on surgical team performance. We hypothesized that transformational leadership behaviors have a positive influence on surgical team performance and abusive supervision, passive and over-controlling leadership negatively affect team performance.

Methods: Trained observers attended randomly selected operations at a single large teaching hospital and recorded instances of transformational leadership, passive leadership, abusive supervision, and over-controlling leadership behaviors enacted by the surgeon. Postoperatively, all team members — scrub nurses, circulating nurses, anesthesiologists, anesthesiology residents, surgeons, and surgery residents — completed validated questionnaires rating psychological safety and collective efficacy. To test our hypotheses, multiple regression analyses were computed with psychological safety and collective efficacy as separate outcome variables. Potential confounders, such as age, gender, ASA rating, and surgeon-rated complexity were controlled statistically before the effects of the different leadership behaviors were examined. The sample included repeat surgeons, so in order to account for the higher-level variance in all models,

the "complex" modeling option in Mplus was used to control for a possible leader effect.

Results: A total of 150 (126 elective, 24 emergency) operations were studied, including 20 urology cases. Surgeons' abusive supervision was negatively associated with psychological safety (unstandardized b=-0.352; p<0.01). There were no significant associations between the other three leadership types and psychological safety (p>0.05). Both surgeons' abusive supervision (unstandardized b=-0.237; p<0 01), and over-controlling leadership (unstandardized b=-0.230; p<0.05) were negatively associated with collective efficacy. Neither transformational leadership nor passive leadership were linked with collective effective.

Conclusions: Analysis of surgeons' intraoperative leadership behaviors showed that transformational leadership behaviors did not positively influence team performance. Significant effects only surfaced for negative leadership behaviors. Surgeons' intraoperative negative leadership behaviors appear to suppress the effects of transformational leadership behaviors. These findings highlight the need to go beyond an examination of single leadership behaviors in isolation. Since surgeons enact more than one type of leadership, characterization of surgeons in terms of one leadership style (e.g., a "transformational" or "abusive" surgeon) is likely inaccurate. Educating surgeons about both positive and negative leadership behaviors offers the opportunity to enhance intraoperative team performance.

P94
Prospective, comparative evaluation of adult urologic consultation in an American and a Nigerian academic institution

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Background: Urological consultations at academic medical centers can occur at unpredictable times and can cover a variety of urologic problems. Data has previously been reported on urologic consultations in the pediatric population, but there have not been attempts to quantify or qualify adult urologic consultations. This information may impact residency curriculum, call coverage and resource allocation. Lagos, Nigeria is the most populous city in Nigeria, but has a poorly structured healthcare system. Unfortunately, more than 50% of people live below the poverty line. Our primarily goal was to compare consultation patterns between two hospitals that share similar functions in their respective healthcare systems, but differ significantly with regards to location and patient access to resources. Therefore, we analyzed requested consults at two tertiary care teaching hospitals, one in the U.S. and one in Nigeria.

Methods: Prospective, consecutive adult (>18 years old) urologic consult data from May 2015 through the end of September 2015 at both Albany Medical Center in Albany, NY and Lagos State University Teaching Hospital in Lagos, Nigeria were recorded. Identical surveys were completed by the urology resident who received the consultation. Reason for consultation, location of consult (floor, ER, ICU), date and time of consult, and patient demographics were recorded.

Results: Over five months, 499 U.S. (3.3/day) and 145 Nigerian (0.95/day) adult urologic consults were requested. Mean age was similar between populations and majority of consultations were for male patients (Table 1). In both geographic locations, the most common overall reason for consultation was urinary retention. 29% of Nigerian consults were for cancer (only 3% in U.S.). In the U.S., the majority of consults were generated on the floors; in Nigeria the majority came from the emergency room. Almost half of all Nigerian consults were seen by the on call night resident (consult after 5:00 pm).

Conclusions: Overall, urinary retention is the most common reason for consultation, regardless of location. Furthermore, less than half of consults for catheter placement were considered difficult. Therefore, resources for managing retention should be readily available and nurses should receive formal education on catheter insertion. Nigeria sees many more consults for cancer than the U.S. This is largely due to lack of easy access to routine or preventative medical care in this densely populated city.

P95
Quality of administrative studies in urology: A review

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Background: Administrative data is a powerful tool for researchers. Using this data to conduct studies is often rapid, cost-efficient, and population-based. In urology, the use of administrative databases for research has grown substantially over the last several years. However, there are important aspects of these administrative data studies that should be considered in judging their quality and validity. In 2015, the REporting of studies Conducted using Observational Routinely-collected health Data (RECORD) checklist was published as a guideline to improve the reporting of administrative data studies. Using the RECORD checklist as

P94. Table 1.

	Albany, NY, US	Lagos, Nigeria
Total number of consults	499	145
Mena age (years)	59	57
Male:female (%)	71:29	93:7
ER/floor/ICU(%)	39/50/9	63/34/3
Time of day (day:night, %)	70:30	51:49
Overall most common reasons for consult	Urinary retention (17%) Hematuria (15%) Urolithiasis (14%)	Urinary retention (26%) Cancer (17%) Hematuria (14%)
Most common ER consults	Urolithiasis (23%) Trauma (17%) Hematuria (12%)	Urinary retention (33%) Cancer (13%) Trauma (12%)
Most common floor consults	Urinary retention (26%) Hematuria (16%) Hydronephrosis/solid mass (16%)	Cancer (29%) Already placed Foley/stent (18%) Urinary retention (17%)
Consult for catheter placement	48 (10%)	22 (16%)
Attempt before urology called	40 (83%); Nurse 35 (87%)	13 (59%); Nurse 0
Difficult placement per resident	20 (42%)	9 (41%)
Cystoscopy required	6 (12%)	0

a guideline, we assessed the current status of administrative studies in the urologic literature.

Methods: We manually identified all administrative data studies published in *Journal of Urology* (*J Urol*) and *European Urology* (*EU*) in 2014. Data from *J Urol* and *EU* were combined, representing a cross-section of the urologic literature from two well-respected journals. Using the RECORD checklist, we assessed the level of reporting of each administrative data study. Data was summarized using descriptive statistics.

Results: Of 608 articles reviewed, 57 administrative data studies were identified (41 *J Urol*, 16 *EU*). The subject area where the majority of articles were published was cancer (61.4%) and the majority of senior authors were from the U.S. (75.4%). On average, *J Urol* and *EU* articles reported 53.7% of all items on the RECORD checklist. Among all checklist items, *J Urol* and *EU* articles most consistently reported the study time frame (94.7%) and extent to which the authors could access the population database (86.0%). Few articles explained data linkage (0.0%) or discussed data cleaning (1.8%).

Conclusions: To our knowledge, this is the first study to quantify and assess the current status of administrative data studies in the urologic literature. Our review indicates specific areas that should be considered for those reading or reviewing studies based on administrative data.

P96
Reducing same-day OR delays and cancellations using the model for improvement

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Background: Delays and cancellations in the operating room (OR) are both costly and inconvenient. In our institution, >20% of first cases do not start on time or are cancelled. We hypothesized that patient-related factors (PF), rather than systems factors (SF) were primarily responsible for OR delays and cancellations. In an effort to reduce them, we employed the "model for improvement" (MFI) in an attempt to reduce these occurrences.

Methods: The MFI uses plan-do-study-act (PDSA) cycles in order to promote continuous process improvement (CPI). A series of such cycles were instituted, in particular increasing NPO by an additional hour and having the patient arrive one hour earlier than usual protocol to assess their impact on cancellations and on time first case starts.

Results: Delays prior to this initiative were found to be primarily related to SFs, while cancellations were almost always PF in etiology (illness>NPO). After changing NPO and arrival instructions, 13/14 (92%) consecutive days started at or before scheduled starting time, while the last one started within 15 minutes of schedule. 100% of 67 consecutive patients were NPO compliant. Of these patients, three cancelled same day due to a change in their decision, not other factors. Importantly, all 67 families surveyed were satisfied with revised NPO and arrival instructions and nursing touchback identified that they were well-understood. Stakeholder engagement, however, was complex and demonstrated polarity within different components of the care team.

Conclusions: With healthcare costs and value being increasingly scrutinized, Lean/Six sigma and the MFI have been increasingly used to promote CPI. Although CPI in OR start times occurred in our study, this may be due to "Hawthorne effect", as this series involved a single surgeon. As a result, PDSAs are ongoing with expansion of this methodology to all surgeons. In addition, studying changes in OR booking and scheduling, enhancing patient and family education and buy-in, are ongoing in order to further improve OR efficiency and maximize use, and assess whether our interventions are sustainable. Silos and inherent institutional culture represent formidable obstacles.

P97
Robotic surgical skills acquisition in trainees: A randomized comparison of the two robotic trainers and trainees' skills transfer to a 3-D printed simulated surgical task in the operating room

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Background: Technical ability is essential to surgical competency. With competency-based education on the horizon, there is a growing need for more objective evaluation methods for teaching surgical skills. Two virtual reality robotic surgical simulators are currently available, both of which emulate the da Vinci Surgical Robotic system. We developed a rigorous training curriculum using the dV-Trainer and the da Vinci Surgical Skills Simulator (dVSSS), which both use the same software and objective metrics. We aimed to determine whether skills acquired on these two simulators transfer to performing an urethrovesical anastomosis (UVA) on a high-fidelity 3-D printed bladder model in the operating room using the da Vinci robot.

Methods: Medical students (MS) and junior residents (JR) (year 1–3) were recruited at our university through program directors via email. Participants were randomized to conduct their simulator training sessions on either the dV-Trainer or dVSSS. All participants completed the identical curriculum: "Thread the ring," "Knot the ring," and "Tubes." Each participant did warm-up exercises and performed each task three times. They then watched a video of a live UVA and subsequently performed in on the high fidelity model. Pre- and post-training surveys were collected. Scores from the simulators (out of 100) were obtained from the software and three robotic surgeon at our center independently evaluated videos and final end product of the UVA in accordance to previously validated scoring systems (GEARS [/25] and RACE [/25]). All analysts and evaluators were blinded.

Results: A total of 26 participants (11 MS and 15 JR) were recruited and equally randomized to the dV-Trainer and dVSSS. Mean age was 25.5 and 53.8% were females. The average "Tubes" score for the dV-Trainer and dVSSS were 10/100 and 48.5/100 respectively. Scores of MS and JR were similar (p=0.36). GEARS scores of participants who initially used the dVSSS compared to the dV-Trainer were significantly higher (21/25 vs. 17.2/25, p=0.04). Similarly, RACE scores of participants who used the dVSSS were also significantly higher compared to the dV-Trainer (23.2/25 vs. 17.8/25, p=0.02). Scores of MS and JR were similar for GEARS (p=0.50) and RACE score (p=0.57). Intraclass correlation coefficient for the GEARS and RACE scoring were 72.6 and 89.3 respectively.

Conclusions: The dVSSS trainer lead to superior scores in performing UVA in the OR for both MS and JR compared to the dV-Trainer. The dVSSS can be used to improve teaching in surgical trainees in a safe and effective manner.

P98
Simulation-based mastery learning using deliberate practice demonstrates surgical skills resistant to decay

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Background: Many institutions have optimized simulation-based training by incorporating deliberate practice (DP) protocols. We previously demonstrated that, medical student, simulation-based deliberate practice achieved equivalency to senior urology resident real-time training. Such acquired skills, especially if rarely used in clinical practice, may deteriorate over time in the absence of ongoing simulator training, and trainees may lack the appropriate skill when called to perform in the operating room. Mastery learning is a rigorous form of competency-based education where skills are measured against high achievement standards. We report our experience with skill retention following a simulation-based, deliberate practice skills curriculum utilizing expert-based mastery level proficiency benchmarks.

Methods: 13 medical students without prior surgical experience completed a simulation-based, deliberate practice skills curriculum on the da Vinci surgical skills simulator. Students trained with expert feedback to

P98. Table 1. Summary statistics of total score, time, and economy of motion show no significant difference by evaluation time (post-training, 6- and 18-month followup)

Total	Post-training			6-month			18-month		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
Camera & clutch 2	96.0	1.0	13	95.1	2.7	8	95.4	3.0	12
Peg board 2	97.6	4.6	12	97.6	3.3	8	96.6	3.9	12
Ring walk 2	99.4	1.2	13	99.1	1.1	8	98.5	1.8	11
Suture sponge 3	96.7	7.5	13	90.4	6.8	8	87.3	11.4	12
Tubes	84.9	7.4	16	80.2	14.2	8	84.1	15.5	12
Ring rail 3	87.6	7.9	16	90.6	7.7	8	90.2	9.6	12
Time	**Post-training**			**6-month**			**18-month**		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
Camera & clutch 2	65.1	8.4	13	78.9	19.8	8	61.9	13.0	12
Peg board 2	69.0	18.6	12	74.2	8.5	8	73.1	16.5	12
Ring walk 2	80.7	14.1	13	78.2	16.2	8	77.0	18.3	11
Suture sponge 3	211.6	36.2	13	215.8	44.1	8	220.0	66.0	12
Tubes	204.8	30.6	16	226.1	88.8	8	216.1	61.8	12
Ring rail 3	222.6	59.8	16	168.9	36.5	8	172.7	48.4	12
EOM	**Post-training**			**6-month**			**18-month**		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
Camera & clutch 2	216.6	14.9	13	210.4	19.9	8	214.3	25.2	12
Peg board 2	204.5	46.5	12	211.3	27.0	8	217.6	36.6	12
Ring walk 2	161.2	25.6	13	169.4	14.3	8	175.5	48.6	11
Suture sponge 3	251.2	29.8	13	277.6	38.0	8	275.5	49.9	12
Tubes	294.6	74.3	16	366.7	67.9	8	339.5	72.7	12
Ring rail 3	341.0	51.2	16	334.5	39.1	8	340.7	55.5	12

EOM: economy of motion; SD: standard deviation.
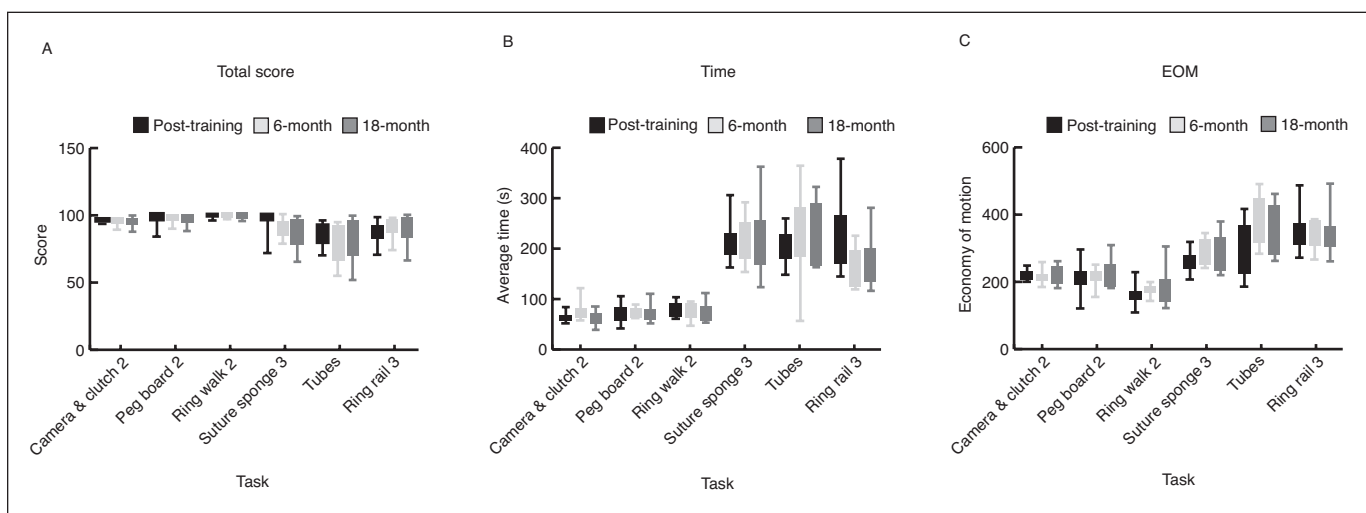
P98. Fig. 1. Summary statistics (mean ± standard deviation) of total score, time, and economy of motion by evaluation time (post-training, 6-, and 18-month followup).

mastery level proficiency benchmarks (average overall score + time and economy of motion scores of four experts + no critical errors). Following training, students were evaluated for retention of mastery levels in four curriculum-based tasks (peg board 2, camera and clutch 2, ring walk 2, and suture sponge 3) and baseline scores in two evaluation tasks (tubes and ring rail 3) at six months, and 18 months post-training.
Results: Mastery learning resulted in 100% skill retention in overall score in three of four curriculum based tasks (camera and clutch 2, peg board 2, and ring walk 2), and 75% retention in the remaining task (suture sponge 3). There was a slight, but statistically insignificant increase in overall score for evaluation-based tasks (tubes, ring rail 3). We found no significant change in overall score (p=0.3157), time (p=0.6970), and economy of motion (p=0.0547) for all six exercises across post-training evaluation, six and 18 months followup assessments [two-way ANOVA].

Training to mastery required an average of 16 hours and 26 repetitions per student. Time on the simulator following training of all 13 students was <5 hours total over the 18-month followup period.

Conclusions: Simulation-based mastery learning using deliberate practice results in effective and durable retention of skills even in the absence of practice for up to 18 months. This is the first report of long-term skill retention following a virtual reality, surgical simulator-based training curriculum in novice learners.

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P99
Streamlining surgical instrumentation-reducing and standardizing for pediatric inguinal hernia repair (PIHR)

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Background: Attempts to reduce costs by reducing waste and maintaining or improving quality are paramount in today's healthcare arena. Unnecessary instruments in surgery have been shown to be costly to the system. Pediatric inguinal hernia repair (PIHR) is one of the most common procedures performed in pediatric urology/surgery (PU/PS) and in our institutional culture, each surgeon had his/her own reference card. Our goal was to create a single preference card for PIHR for 14 surgeons which reduced total instruments in a nine-month period

Methods: Using LEAN methodology, we observed instrument use for PIHR in at least two cases per surgeon, and after doing so, compiled a single instrument tray that comprised only of instruments that were used in >50% of cases. Surveys of operating room (OR) nurses and all PU/PS were performed prior to and then three months after the trays were assembled. Tray weights and sterilizing times (ST) for PU and PS PIHR sets were measured before and after the intervention.

Results: Pre-intervention PS and PU instrument trays for PIHR were comprised of 51 and 96 instruments, with weights of 13.5 and 11.2 lbs, respectively. On average, 16 instruments were used in a single PIHR/surgeon. Final instrument tray contained 28 instruments and weighed 8 lbs. ST
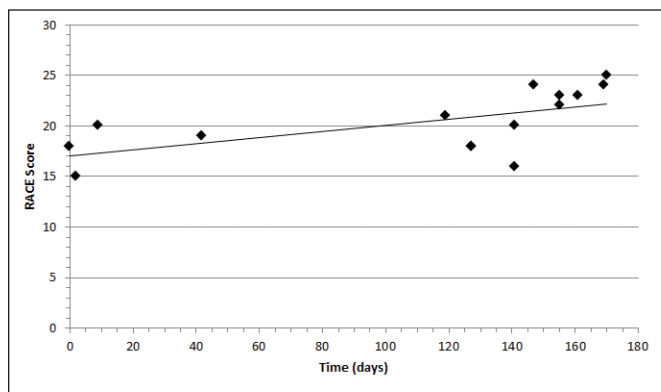
was reduced to five minutes from 11 minutes in PU and 7.67 minutes in PS. There was virtually universal consensus by nursing and surgeons that standardization improves patient care, OR efficiency, reduces cost, does NOT compromise safety, and should be expanded to other procedures.

Conclusions: The concept of instrument standardization can be accomplished using LEAN and is well-accepted by both OR nursing and surgeons. This results in cost and ergonomic benefits due to reduced ST and tray weights.

P100
WITHDRAWN

P101
### Utilization of race for evaluation of surgical competency during UVA

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Background: Urethravesical anastomosis (UVA) is a challenging and critical step during robot-assisted radical prostatectomy (RARP). Robotic anastomosis competency evaluation (RACE) was used to evaluate the progress of a surgical trainee while performing UVA.

Methods: Fifteen UVAs were performed during RARP over one-year fellowship. RACE evaluations in addition to the proportions of the UVA performed were recorded. Patient continence at six weeks and six months (defined as the number of self-reported absorbent pads/day), and UVA-related complications were also recorded for the 15 patients. Effect significance was determined using linear regression analysis.

Results: RACE showed significant improvement over the length of the study (p=0.13) (Fig. 1). There were no reported UVA-related complications and no significant correlation between RACE score and continence (p=0.41) (Fig. 2). The trainee began by performing only the anterior portion of the UVA before eventually advancing to performing the posterior plate of the UVA.

Conclusions: RACE can be used as an objective measure of surgical performance during training. Self-reported urinary continence did not worsen with performance of trainee in UVA.

P101. Fig. 1. RACE scores over time. N=15 surgeries over 170 days.
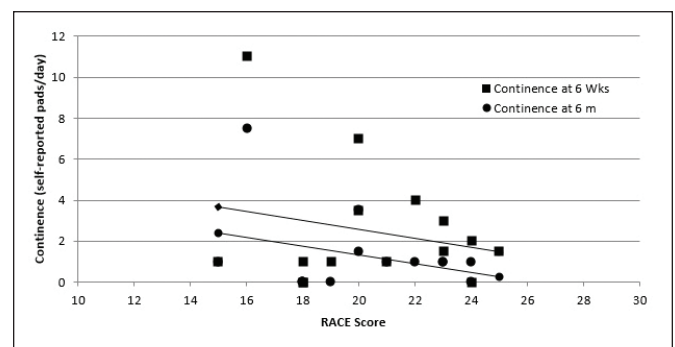
P101. Fig. 2. Continence by RACE scores. N=30 followups. RACE scores are between 0 and 30.