Introduction: The use of electronic medical records in the perioperative setting has provided a wealth of clinical data, however the optimal method of packaging such data into formal performance feedback is ill-defined (1). In 2013, our centre provided its anesthesiologists with a table of individualized performance data extracted from the local electronic medical record system. Performance measures reported were a convenience sample of data mined for research purposes. A post-implementation survey was administered to determine user-acceptability of current measures and to highlight areas of potential improvement for future assessments.

Methods:
Following Research Ethics Board approval an electronic survey was administered to all recipients of a performance assessment. Research participants were identified by departmental email contact list. Questionnaire items were generated by investigator review of quality indicators in anesthesiology and data elements in the electronic medical record. Respondents graded their replies on a five-point Likert scale with higher scores indicating increased acceptability or interest. The survey was pilot tested by five clinical anesthesia fellow volunteers using the Burns Clinical Sensibility tool (2). Eligible participants were sent an email describing the purpose of the study. A copy of the participant’s individual performance assessment followed in one week with a link to the electronic survey. Three email reminders and a paper version were offered to increase response.

Results:
Fifty-eight of 76 (76%) eligible participants responded with 53 complete questionnaires for a completed response rate of 70%. Responses are summarized in Figure 1. Respondents indicated a reasonable level of user acceptability, with the majority agreeing that this type of feedback is respectful of physician autonomy and influential to practice and professional development. Variables which the user group most consistently felt should be included in future assessments trended towards practice
outcome measures such as patient temperature on arrival to PACU, frequency of resident case involvement, and frequency of adverse events such as unplanned re-intubation, cardiovascular events, etc. Areas for improvement trended towards exclusion of specific practice and process of care descriptors - such as patient age and gender data and frequency of ketorolac and ketamine use, however 70% of respondents felt that all existing data should remain in future assessments.

Discussion:
The high survey completion rate suggests that physician performance assessment is an area of significant interest to anesthesiologists at our centre. Preliminary review of the survey results indicates reasonable user-acceptability of the current performance assessment tool and has identified several areas for future improvement. Through annual repetition of this process we aim to establish of a sensitive, specific, and clinically relevant performance assessment that can support professional revalidation and self-reflection for anesthesiologists at our centre.

References:

2. Burns KE. CMAJ 2008;179(3):245-52
Introduction: Frailty is a phenomenon that describes a multidimensional loss of reserve and is differentiated from related concepts, such as multi-morbidity, by focusing not on a count of medical conditions, but on factors that denote physiologic vulnerability to stressors. In the general population frailty is strongly correlated with early mortality and vulnerability to adverse health outcomes. Recent single center studies demonstrate that frailty independently predicts postoperative mortality, morbidity, increased length of stay (LOS), and institutional discharge; the impact of perioperative frailty on population-level mortality and health resource use has not been documented, but is of significant importance to clinicians, patients and health system planners.

Methods: This study was conducted under institutional review board oversight specific to the use of anonymized health administrative data. All community-dwelling Ontarians aged > 65 years at the time of elective, major noncardiac surgery were identified from 2002-2012. Frailty status for each patient was established using the Johns Hopkins ACG® frailty indicator. Our primary objective was not to calculate the independent impact of frailty on resource use, but to estimate the percent of postoperative mortality and resource use attributable to frail patients in general; therefore, our primary analyses were adjusted only for procedure. We compared hospital LOS, institutional discharge, ICU admission, 30-day hospital readmission, 30-day total physician billing, and 30-day ED visits between frail and non-frail patients using appropriate statistical tests. We then calculated the attributable percent of mortality and resource use by frail patients for each outcome (prevalence x ([risk ratio-1]/risk ratio)), and the number of frail patients who would need to have surgery to contribute once excess adverse event (number needed to treat to harm). As a secondary analysis we used multivariable regression to calculate the independent impact of frailty on mortality and resource use.

Results: We identified 202,811 patients, of whom 6,289 (3.1%) were frail. Frail patients were older, more likely to be female, and carried a higher comorbidity burden than non-frail patients. Mortality and all measures of resource utilization were significantly higher in frail patients (Table 1). Adjusting for multi-morbidity and patient demographics, frailty remained an independent predictor of LOS, ICU admission, MD billing, and institutional
Discussion: Although the prevalence of frailty is relatively low in community-dwelling elderly elective surgical patients, frail individuals experience a much higher absolute and relative increase in their risk of adverse postoperative events. Frail patients represent an important target for quality improvement efforts aimed at enhancing the value, efficiency and outcomes of perioperative care.

References:
J Am Col Surg 2010 201: 901-908
Aging in Ontario-2010 ICES: Toronto
Introduction: Recent publications on the impact of a multimodal prehabilitation program for patients undergoing surgical resection for colorectal cancer on functional walking capacity have shown a significant increase of this outcome during a 4-week program. However, not every patient improved to the same extent. The purpose of this subanalysis is to determine which patients would benefit from the multimodal prehabilitation.

Methods: This study involved a reanalysis of data arising from a pilot (1) and a randomized trial (2) with the addition of a new randomized controlled study. All three investigations received ethics approval. The primary outcome measure was functional walking capacity measured by the validated Six-Minute Walk Test (6MWT), which was assessed at baseline when patients were admitted to the study and after an average of 4 weeks of multimodal prehabilitation. The program included a 4-week, home-based unsupervised intervention of moderate aerobic and resistance exercises, nutritional counseling with whey protein supplementation (Immunocal), and relaxation exercises. The patients were divided in two groups: group A included those patients whose baseline 6MWT was below 60% of the predicted value, and group B included patients whose predicted value was above 60%. The change in 6MWT during the prehabilitation period was compared between the two groups.

Results: Data from 106 patients were analyzed. There were 40 patients in group A and 66 in group B. Gender distribution among the two groups and BMI were similar. The average age of group A was 72 ± 16 years compared to group B 66 ± 20 years (p < 0.01). There were more patients with ASA 3 and 4 in group A(p < 0.05). The increase in 6 MWT during the prehabilitation period in group A was 46 ± 50 m while in group B was 22 ± 43 m (p < 0.01). The proportion of patients whose 6MWT improved over 20 m was significantly greater in group A (70%) compared with group B (43%) (p < 0.05).

Discussion: These preliminary data indicated that patients whose predicted 6MWT is below 60% at baseline, tend to be older and with ASA of 3 and 4. When these patients
were enrolled in a multimodal prehabilitation program their functional walking capacity increased by an average 45 m.

References:

1) Surg Endosc 2013 27:1072–82

2) Anesthesiology 2014 121:937-47
**84652 - PRESURGICAL MODIFICATION OF PHYSICAL FITNESS IN COLORECTAL CANCER**

Author(s)
Celena Scheede-Bergdahl
McGill University
Primary Author / Presenting Author

Co-Authors(s)
Rashami Awasthi - Montreal General Hospital
Brian P Chen - McGill University
Andreas Bergdahl - Concordia University
Francesco Carli - Mcgill University
Celena Scheede-Bergdahl - McGill University
Rashami Awasthi - Concordia University
Brian P Chen - McGill University
Andreas Bergdahl - Concordia University
Francesco Carli - Montreal General Hospital

**Introduction:** Poor physical function is associated with an increased risk of post-surgical complications. Not only are many patients sedentary with poor physical function at time of diagnosis but high complication rates following colorectal resection render many patients with poor post-surgical functional capacity and quality of life (1). Prehabilitation is the process of improving physical function prior to a physiological stressor, such as surgery. This study aims to assess if a prehabilitation program (exercise and nutritional supplementation), implemented in the 4 weeks from diagnosis to surgery, is sufficient to modify physical activity levels and functional capacity in elderly colorectal cancer patients.

**Methods:** Patients were assigned to either a prehabilitation (PREHAB; n=50; age 68.2±11.3 years) or a matched time control group (CON; n=49; age 67.2±9.5 years). Patients in PREHAB were prescribed an individualized 4 week home training program and received dietary supplementation with whey protein to ensure adequate protein intake. CON received the same program but only after surgery, as per present hospital protocols. In both PREHAB and CON, the Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire was used to measure physical activity levels, while the six-minute walk test (6MWT) was used for assessment of functional exercise capacity.

**Results:** Measurements were collected at the initial visit and on day prior to surgery. Change in total physical activity during the pre-operative period was significantly greater in PREHAB versus CON (+17.97 vs. -4.26 kcal/kg/week, p=0.01). The shift in levels of moderate and vigorous intensity exercise was significantly greater in PREHAB than CON (+17.52 vs. -3.09 kcal/kg/week, p < 0.01). Compared to CON, patients in PREHAB experienced a significantly greater change in 6MWT during the pre-operative period (+27.7 vs. -1.33 meters, p < 0.01), thus indicating improved functional capacity.
Discussion: These results show that a 4 week prehabilitation program is sufficient to improve both physical activity levels and functional capacity in elderly patients with colorectal cancer. These improvements are critical for post-surgical wellbeing, subsequent treatment strategies and overall quality of life in this surgical population.

References:
1) Anesthesiology 2014 121:937-47
85907 - BLOOD PRODUCT TRANSFUSION AND RISK OF POSTOPERATIVE DELIRIUM.

Author(s)
Joseph E. DeCaria
University of Toronto, Faculty of Medicine
Primary Author / Presenting Author

Co-Authors(s)
Gordon Tait - University Health Network, Toronto General Hospital
Jo Carroll - University Health Network, Toronto General Hospital
Keyvan Karkouti - University Health Network, Toronto General Hospital
George Djaiani - University Health Network, Toronto General Hospital

Introduction: The development of postoperative delirium (POD) may be related to an exaggerated inflammatory reaction caused by an aberrant stress response during surgical trauma (1). The use of intraoperative blood product transfusion can compound this inflammatory response (2), resulting in increased morbidity and mortality. The purpose of this study was to identify an association between different blood product transfusion and the risk of POD after non-cardiac surgery.

Methods: After Research Ethics Board approval, a retrospective review was conducted of all patients who underwent non-cardiac surgery at a large tertiary care hospital from 2003-2013. Delirium codes from the ICD10 were matched with all inpatients undergoing non-cardiac surgery during the same time period. Patients were excluded if they had a history of delirium, dementia, or underwent transplant surgery or neurosurgery. Unadjusted odds ratios (OR), 95% confidence intervals (CI), and p-values were calculated for selected risk factors. P value < 0.05 was considered statistically significant.

Results: The dataset consisted of 100,437 patients. There were 945 (0.94%) patients with ICD10 codes that were consistent with POD. The univariate risk factors for POD included age ≥ 70, male gender, ASA class 3 or 4, emergent/urgent surgery, preoperative anemia, 3 or more Charlson co-morbidities, and transfusion ≥ 1 unit of packed red cells, ≥ 5 units of platelets, and ≥ 1 unit of fresh frozen plasma. (Table)

Discussion: The results from this study have identified several significant risk factors associated with POD, including intraoperative blood transfusion. The multivariate analysis will identify whether blood product transfusion is an independent risk factor associated with POD after non-cardiac surgery. This data will be presented at the conference venue.

References:
Introduction: The distribution of call in a shared practice model poses a significant challenge in terms of logistics and human resource planning. A shared practice setting typically uncouples remuneration provided for a call shift from the amount billed on that shift. Given that switching call is a real and necessary component of any call schedule, this leads to an underlying barter economy, with formal or informal systems of valuing call creating a currency of expected hours worked on a given shift [1, 2]. This study retrospectively reviewed the accuracy of an internal call value system in order to analyze its efficacy at equalizing, and appropriately distributing, workload.

Methods: Local research ethics board approval was obtained. Additionally, all staff members of the department of anesthesia whose billing and cases would be reviewed expressly consented to the study. A complete list of all billings by the department of anesthesia for the fiscal years of 2012-13 and 2013-14 was obtained. This was supplemented by a record of direct billings for patients not covered by a provincial plan. These lists were crosschecked against OR bookings in order to ensure an appropriate capture rate (>95% concordance) [3]. The following data was collected from each case, with all additional information being discarded: attending staff, time in/out, patient age, day and date, service code(s) billed and amount billed. The primary outcome was a measure of total hours worked compared against the maximum possible time worked on that shift. A secondary measure was the number of ‘spill-overs’; cases that started during the day and continued into call shifts. Total amount billed, in-house work and home call work and institutional status of the staff (i.e. academic appointment, full/part-time status) were also evaluated.

Results: When compared with an optimal system of assigning call – i.e. 1 hour assigned carries a consistent expected amount of work associated – the current system was very inefficient, with significant opportunities for improvement. Expected work varied significantly (46% +/- 15%) between shifts assigned during the week and on the weekend. A review of secondary measures revealed a high number of spillover cases (n= 2934) accounting for 48% of total work done during call hours. Using strategies from similar size centers, [4,5] a predictive model of call system distribution with time horizon = 1 year, showed a potential 14% increase in efficiency and a 17% decrease in time on call spent not providing patient care, with no decrease in available call coverage. The
model also showed a marked (59% +/- 7.5%) reduction in handover of daytime cases carrying into on-call hours, with no commensurate increase in individual staff workload.

**Conclusion:** A fair valuation of call shifts is necessary for institutional efficiency and staff morale. Perceived inequalities in the distribution of call can be efficiently evaluated and addressed using retrospective analysis and effectively addressed with dynamic business processes [6]. Solutions from similar industries with complete coverage (i.e. shipping, software support, public utilities) can also be effective at addressing staffing issues in healthcare.

**References:**

6. BMC Health Ser Res 11(1): 26
With surgical and pain management advances, early discharge (EDc) after hip or knee replacement (HA or KA) is now possible. However, after HA or KA, 3.1% experience DVT, or other complications.\(^{(1)}\) Postop myocardial infarctions (45.8%) often occur after post-operative day (POD) \(2.\)\(^{(2)}\) With EDc, therefore, complications may occur as outpatients. Also, more medication errors occur at transition points; i.e. hospital discharge.\(^{(3)}\) We hypothesize that home monitoring allows better transition of care and earlier intervention of post-operative complications at home. This is a preliminary report on home monitoring with wireless connectivity on pain scores and VS (non-invasive blood pressure, heart rate, and pulse oximetry).

**Primary Outcome:** \(\geq 90\%\) of patients with successful transmission of pain assessments and VS, once on evening of surgery (DOSx) and four times a day for 4 days of home monitoring

**Method:** After REB approval of this prospective observational study, patient consent was obtained prior to surgery. Inclusion Criteria were (a) Patients undergoing elective HA or KA; (b) expected LOS \(\leq 1\) day; (c) Age 18 – 80 years; (d) Revised Cardiac Risk Index (RCRI) \(\leq\) Class 2; (e) available and able care-takers at home to assist the patient upon discharge during the early postoperative recovery phase. Exclusion Criteria: (a) ASA IV; (b) COPD with FEV\(_1\) \(\leq 1\); (c) OSA; (d) patient or family reluctance to participate in early discharge; (e) new undiagnosed or unstable medical condition at the time of discharge; (f) previous participation in the study. Management protocols for pain and VS were created for these patients. Sample size was 54.
**Results:** To-date, 55 patients were eligible, 33 enrolled, and 1 withdrawal. Twenty-seven of the 32 patients completed the 30-day follow-up (Table 1): 4 total hips; 2 unipolar hips; 13 total knees; 8 hemi-knees; 23 under spinal anesthesia and 4 under GA. All were discharged on the DOSx. Transmission rates were 100%, 96%, 96%, 85%, 85% on DOSx, POD1, 2, 3, 4 respectively. Overall, 74% (95% CI 57.5 to 90.6%) completed every transmission. On average, 1.34 phone calls were made per patient over 4 days. Twenty-three patients strongly agree or agree to recommend this. At 30-day follow-up, all were at home; no mortality; 1 visited the ED on POD 15 for pain and no re-admissions.

**Discussion:** Although the “all completed” transmission rate was 74%, pain scores and VS were received for all patients every day until POD4 when 2 patients felt the monitoring no longer necessary. Data interaction with all patients every day supports the feasibility of postop home monitoring. Completion of 54 patients is expected by May 2014.

**References:**


