

were more likely to have an advanced directive, have a documented code status, and have a do not resuscitate order if they had a palliative care consult (all, $p < 0.05$). Comparing patients who were alive vs deceased at 1 year, those who died were more likely to be older, male, underweight (BMI $< 18 \text{ kg/m}^2$), or identify as African/African American or other race (all, $p < 0.05$). The procedures with the highest mortality rates (cardiovascular, thoracic, vascular, neurosurgery, and gastrointestinal) did not always translate to those with the highest prevalence of palliative care consult (cardiovascular, thoracic, and gastrointestinal) (Figure).

CONCLUSIONS: Our study suggests that there might be an opportunity for patients to benefit from strategic preoperative palliative care before elective admissions for operation.

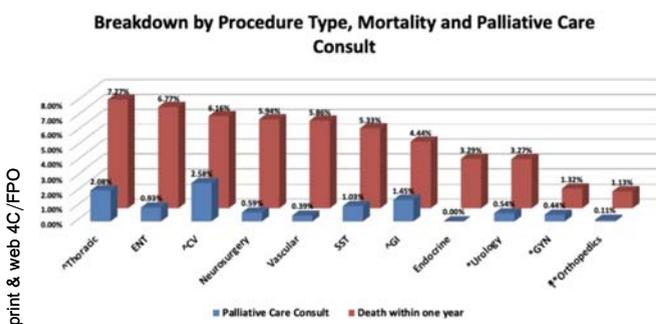


Figure. Breakdown by Procedure Type, Mortality and Palliative Care Consult. ENT, Ear Nose and Throat; CV, Cardiovascular; SST, Skin, Soft Tissue, and Breast; GI, Gastrointestinal; GYN, Gynecology.

*Lower risk of death at one year ($p < 0.05$)

†Low rate of palliative care consult ($p < 0.05$)

‡High rate of palliative care consult ($p < 0.05$)

Prospective Evaluation of Frailty Assessment Compliance in Acute Care Surgery: Changing Trends, Lessons Learned

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INTRODUCTION: Frailty has emerged recently in the surgical literature and is an important prognostication and risk stratification tool. The aim of our study was to review our 7-year experience with frailty and changing trends in its use.

METHODS: We performed a 7-year (2011 to 2017) analysis of our prospectively maintained frailty database. Frail patients were identified using the emergency general surgery (EGS) and trauma-specific frailty indices. Outcomes measures were compliance with frailty assessment, complications, skilled nursing facility/rehabilitation disposition, and mortality during the study

period. Multivariate logistic regression and Cochran-Armitage trend analyses were performed.

RESULTS: We evaluated a total of 1,045 geriatric patients (trauma $n = 587$, EGS $n = 458$). Mean age was 74.5 ± 7.9 years, 74% were males, and 81% were white. Overall, 34% of the patients were frail. Compared with non-frail patients, frail patients had higher adjusted rates of complications (odds ratio [OR] 2.4; 95% CI 1.9 to 2.9), mortality (OR 1.8; 95% CI 1.4 to 2.3), and rehabilitation/skilled nursing facility disposition (OR 3.7; 95% CI 3.1 to 4.3). The compliance rate of measuring frailty increased from 12% in 2011 to 78% in 2017 ($p < 0.001$) (Figure). In addition, the complication rate decreased (33% vs 21%; $p < 0.001$), and the discharge disposition to skilled nursing facility/rehabilitation increased (41% vs 58%; $p < 0.001$). There was no difference in mortality (11% vs 9.8%; $p = 0.48$) during the study period.

CONCLUSIONS: Adherence to frailty measurement and assessment has increased during the study period. This was accompanied by a significant decline in overall in-hospital complications. Frailty can be used to identify high-risk patients and develop postoperative strategies to improve outcomes in acute care surgical procedures.

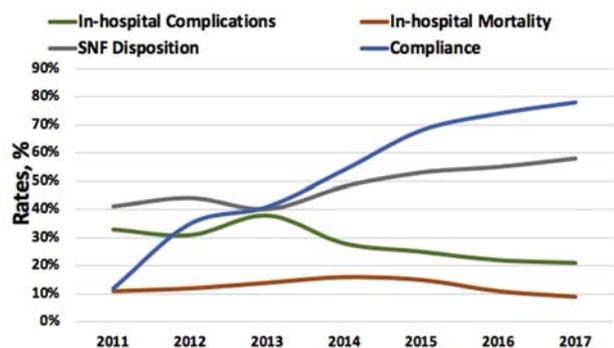


Figure.

Refining the American College of Surgeons NSQIP Surgical Risk Calculator to Include Geriatric Outcomes

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INTRODUCTION: The American College of Surgeons (ACS) NSQIP Surgical Risk Calculator (SRC) plays an important role in risk prediction and shared decision making. We sought to develop functionality unique to older adults with both geriatric-specific predictors and outcomes; and compare performance in

outcomes prediction using the traditional ACS NSQIP SRC vs models that also included geriatric-specific risk factors.

METHODS: Data were collected from 31 ACS NSQIP Geriatric Surgery Pilot Project hospitals between 2014 and 2017. Regression models predicted 4 geriatric-specific outcomes using both the traditional 20-variable ACS NSQIP SRC and 26-variable models, including 6 geriatric variables (living situation, fall history, mobility aid use, cognitive impairment, surrogate-signed consent, and hospice on admission).

RESULTS: Data from 38,048 patients aged 65 years and older undergoing 197 unique operations across 10 surgical subspecialties were used. Stable model discrimination between developmental and validation data sets confirmed predictive validity. Twenty- and 26-variable models predicting pressure ulcer, delirium, new mobility aid use, and functional decline demonstrated excellent performance (c -statistics > 0.8 , Brier scores < 0.2), with inclusion of geriatric risk factors further improving performance (Table). Of the 20 ACS NSQIP variables, COPD, age 85 years or older, sex, functional dependence, disseminated cancer, diabetes, and sepsis were the strongest risk predictors, while fall history, mobility aid use, and cognitive impairment were the leading predictors of the geriatric variables.

CONCLUSIONS: The ACS NSQIP SRC can predict 4 novel outcomes salient to geriatric surgical patients, with improved predictive capability after accounting for geriatric-specific risk factors. Augmentation of the ACS NSQIP SRC can enhance shared decision making to improve quality of surgical care in older adults.

Table. Association of Preoperative Geriatric-Specific Risk Predictors with Postoperative Geriatric Outcomes

Risk predictor	New			
	Postoperative pressure ulcer, OR (95% CI)	Postoperative delirium, OR (95% CI)	postoperative mobility aid, OR (95% CI)	Functional decline, OR (95% CI)
Preoperative living situation				
Not from home vs home alone	0.84 (0.58–1.22)	1.03 (0.85–1.24)	1.03 (0.66–1.60)	1.74 (1.40–2.17)
Home with support vs home alone	0.85 (0.68–1.05)	0.93 (0.85–1.02)	0.87 (0.79–0.96)	0.87 (0.82–0.92)
Fall history within 1 y before operation	1.20 (0.97–1.49)	1.53 (1.38–1.70)	1.84 (1.60–2.12)	1.50 (1.36–1.58)
Use of preoperative mobility aid	1.67 (1.35–2.06)	1.46 (1.34–1.59)	Not applicable	1.67 (1.58–1.77)
Preoperative cognitive impairment	0.94 (0.70–1.25)	2.57 (2.29–2.88)	1.21 (1.02–1.43)	1.79 (1.60–2.00)
Surrogate-signed consent	1.30 (0.96–1.75)	1.82 (1.59–2.08)	1.14 (0.88–1.50)	1.89 (1.61–2.21)
Hospice on admission	1.15 (0.44–3.02)	0.80 (0.46–1.38)	2.58 (0.65–10.26)	2.13 (1.18–3.86)

OR, odds ratio.

Stability of the Modified Frailty Index for Postoperative Mortality and Readmissions over Multiple Calendar Year Cohorts

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INTRODUCTION: Frailty has been associated with a number of adverse events. Rockwood's Accumulating Deficits Model of frailty produces a frailty index (FI) based on 57 health items. This index was modified to be applied to national databases, the modified frailty index (mFI). However, it is unclear whether the mFI would yield stable results from cohort to cohort. Our aim was to assess the stability of mFI for postoperative mortality and readmission for calendar year cohorts.

METHODS: Rockwood's 57-item FI was mapped onto 14,568 ICD-9 diagnosis codes from the Healthcare Cost and Utilization Project, with 962 ICD-9 codes match to 42 items. These match items were then used to determine the mFI of patients for the calendar years 2011 to 2015, inclusive. The mFI of patients who survived or died and were readmitted or not were compared.

RESULTS: Across all databases, 4,796,006 patient observations were compared with the number of diagnoses matched on the 42-item mFI. When comparing mortality, the median mFI of survived and died for all years was 1 and 3, respectively, and for no readmission and readmission was 1 and 2, respectively (Table). There was no variation in the year to year median mFI, and no to little variation in the interquartile range or mean mFI.

CONCLUSIONS: The mFI can discriminate between patients who ultimately experience a postoperative mortality and readmission. The discriminatory ability is stable on a year-to-year basis. Therefore, use of the mFI across time and databases can be done with confidence.

Table. Modified Frailty Index Median Score Comparison between 2011 and 2015 Florida Healthcare Cost and Utilization Project Databases

Year	Survived	Died	No readmission	Readmission
2011	1	3	1	2
2012	1	3	1	2
2013	1	3	1	2
2014	1	3	1	2
2015	1	3	1	2

Surgical Complications Can Bias Surgeons from Timely Recognition of a Patient's Imminent Death

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INTRODUCTION: Despite optimal surgical technique and medical management, poor surgical outcomes do occur. Surgical complications can contribute to poor outcomes and alter the way in which