Introduction / 
- Patients undergoing major surgeries around the world are at risk of developing postoperative complications (PSC). The impact of PSC on hospital cost has been extensively studied, but the impact on hospitals' margins remains controversial.
- This analysis assessed the economic consequences of PSC in medium-to-high risk patients in the United States.
- We estimated the financial benefits from reducing PSC for four categories of procedures, as well as for specific subgroups within these categories.

Methods / Critical Care Procedures
- This study included U.S. Medicare patients who underwent major cardiac, vascular, gastrointestinal and orthopedic surgical procedures.
- Using the CMS Inpatient Standard Analytical Files with 100% of claims for Medicare fee-for-service beneficiaries, patients were identified based on principal ICD-9-CM procedure code on the claim. Overall, 83 procedures codes in four categories (cardiac, gastrointestinal, orthopedic, and vascular) were included in the study. (The complete list of procedures is available from the authors upon request.)

Identification of High Risk Patients (Patient Population under Study)
- To identify those moderate- to high-risk surgical cases that were more likely to develop postoperative complications, we screened for patients with specific complications.
- Comorbidities were identified based on ICD-9-CM diagnosis codes on the claim at the time of admission, and included:
  - chronic obstructive pulmonary disease (COPD)
  - cirrhosis
  - congestive heart failure
  - coronary artery disease
  - diabetes (type 1 or type 2)
  - metastatic cancer
  - stroke
- Only these high risk patients were included in the study, with data for these patients extracted from the Medicare Standard Analytic Files and Hospital Cost Reports in 2011 U.S. dollars.

Definition of Post-Surgical Complications
- PSC were defined as conditions not present on admission but that occurred during the initial hospital stay.
- Seven specific types of PSC were analyzed:
  - cardiovascular
  - gastrointestinal
  - infection
  - neurological
  - renal
  - respiratory
  - wound dehiscence

Financial and Outcome Measures
- For each group of procedures, we compared the following financial and outcome measures between patients with and without complications.

Conclusions /
- In summary, these results show opportunities to reduce costs and improve quality through avoiding preventable postoperative complications. PSC have a dramatic impact on patient experience, hospital costs, and margin.
- A reduction in PSC would result in substantial payer savings and better margins for the hospital.
- Enhanced Recovery Programs have the potential not only to improve quality of care but also to decrease hospital costs and improve hospital margins.

Results /
- Overall, we identified 303,432 high risk patients in the 2011 Medicare claims files. Among these patients, a total of 111,731 had one or more PSC during the initial hospital stay, which represents 37% of the study population.
- Median LOS was 10 days for patients with at least one PSC and 6 without (p<0.0001).
- Readmission rates were 21% for patients with PSC and 16% without (p<0.0001).
- In each surgical category, mean costs were higher for patients with at least one PSC than for those without (Figure 1, p<0.0001 for all).

Limitations:
- Due to our limited access to claims data in the physician office setting, this study included only the complications diagnosed during the initial hospital stay.
- Only the Medicare fee-for-service population was included in the study (not Medicare Advantage or private insurance).

Sources /