

The Health Care Improvement Foundation  
2017 Delaware Valley Patient Safety and Quality Award  
Entry Form

**1. Hospital Name**

Temple University Hospital

**2. Title Of Initiative**

Safer Surgery and RECOVER Improve Postoperative Respiratory Failure

**3. Abstract (Please limit this description to 250 words.)**

Postoperative respiratory failure is an uncommon, but deadly and costly complication. Approximately one-third of patients who suffer this complication die, and the excess cost has been estimated to be \$50,000 per patient. Failures to recognize postoperative sepsis and prevent aspiration are key underlying issues. The Agency for Healthcare Research and Quality (AHRQ) measures postoperative respiratory failure with the Patient Safety Indicator (PSI) 11. The American College of Surgeons-National Surgical Quality Improvement Program (ACS-NSQIP) also reports both elements of PSI-11, unplanned intubation and prolonged ventilation.

In 2014 both AHRQ PSI-11 observed/expected (O/E 1.36) and ACS-NSQIP respiratory outcomes odds ratio (OR 1.52) for prolonged ventilation were unacceptably high at this organization. As a result, the Safety Team developed a Safer Surgery initiative. This multidisciplinary program has focused on pre-, intra- and postoperative best practices emphasizing education for patient engagement, preoperative risk stratification and mitigation where possible to improve patient selection and preparation for surgery as well as standardized postoperative patient management. This program has resulted in dramatic improvement in PSI-11 and NSQIP respiratory outcomes. At least 11 lives and \$1.5M have been saved over a three-year period.

**4. What were the goals of your initiative?**

Reduce post-operative respiratory failure.

**5. What were your initiative's baseline data and the results of your initiative?**

DATA. The Patient Safety Indicator (PSI #11), Postoperative Respiratory Failure data are monitored in the Vizient database. Prior to final data entry, all PSI #11 cases are reviewed by a Performance Improvement Manager for clinical opportunities and to ensure accurate public reporting. Critical care attending physicians were educated to assure that cases which do not meet the AHQR definition are not documented as respiratory failure. The Vizient database is further employed to monitor the following PSI-11 parameters: observed rate per 1,000 cases, expected rate per 1,000 cases, O/E ratio, deaths, early deaths, mortality index, length of stay (LOS) and LOS index. Vizient data are utilized to define aspiration cases, mortality and LOS. Fatal aspiration cases also are monitored via a 100% Mortality Review process.

The ACS-NSQIP data are collected and validated by trained Surgical Clinical Reviewers (SCRs). This organization participates in the NSQIP Procedure Targeted module which focuses on high risk operations. Approximately 60% of the operations which are monitored are general or vascular surgery. However, selected high-risk gynecology, neurosurgery, orthopedic surgery, plastic surgery and urology operations also are monitored. More than 200 variables per patient are collected, and 14 highly risk-adjusted outcomes are reported semiannually. Unplanned intubation and ventilation greater than 48 hours are two of the 14 outcomes which are reported as odds ratios. Outcomes with statistically significantly high odds ratios that rank in the lowest (10th) decile are reported as “Needs Improvement.” Odds ratios that are not statically significant and rank in the 2nd to 9th decile are reported as “As Expected”. In FY 14 and 15, all NSQIP cases including General/Vascular surgery were reported as “Needs Improvement” at our hospital for the categorical outcomes of both unplanned intubation and ventilation greater than 48 hours.

RESULTS. Patient Safety Indicators (PSI)-11, Postoperative Respiratory Failure, O/E ratio at our hospital has decreased progressively from 1.36 in FY 14 to 0.77 in FY 15, to 0.42 in FY 16 and to 0.37 in FY 17 (9 months). Observed PSI-11 mortality decreased from 30% in the first 18 months of this analysis to 15% in the most recent 18 months. These improvements represent 11 lives and \$1.5 million saved. ACS-NSQIP odds ratio for unplanned intubation reduced from a high of 1.47 (Needs Improvement) in FY 15 to 1.12 (As Expected) in FY 16. ACS-NSQIP odds ratio for ventilation greater than 48 hours decreased from a high of 2.01 (Needs Improvement) in FY 15 to 1.08 (As Expected) in FY 16. Fatal aspirations decreased from 22 in 2015 to 14 in 2016. Thus, all postoperative respiratory failure metrics improved as the Safer Surgery initiative was implemented.

**6. Describe the interventions that were instrumental in achieving the results for your initiative.**

The Safer Surgery initiative has three components. The Preoperative phase emphasizes patient selection, optimization and education. The Intraoperative phase focuses on standardization of multiple anesthesia interventions. The Postoperative phase involves bundling of nursing best practices to enhance respiratory function, prevent sepsis and aspiration and shorten hospital length of stay (LOS). Patient education is the foundation of this program. Appropriately educated patients who enthusiastically participate in preoperative conditioning and preparation as well as in postoperative pain management, incentive spirometry and mobility are keys to a successful program

The Safer Surgery initiative has disseminated educational materials in surgery clinics, Preoperative Anesthesia Testing (PAT) and distributed them electronically via the patient portal. The team developed a RECOVER mnemonic which emphasizes key postoperative risk reduction activities. Briefly, R-review materials, E-expand your lungs, C-cough and deep breathe, O-oral care. V-vary activity, E-eat safely and R-rest with the head of the bed up. A related RECOVER video has been produced and is used for patient and family education. Patients are provided an incentive spirometer preoperatively and taught its

use by PAT staff with follow up reinforcement via the RECOVER video. Surgical nursing staff also has undergone rigorous in-service training so that they understand patient RECOVER expectations and are prepared to exceed expectations.

An aspiration prevention algorithm was developed that includes a novel aspiration risk tool that is being statistically validated through a retrospective study and a prospective prevention pilot. Multivariate analysis of retrospective data, a matched dataset and concurrent pilot data is underway.

**7. How can this initiative be replicated through the region? (Please limit this description to 100 words.)**

This organization participates fully in a Pennsylvania NSQIP Collaborative (PANC) that actively seeks to reduce postoperative respiratory failure, sharing experiences, lessons learned and work products. Key factors for the success of this project include a) senior leadership support for systems and care delivery, b) enhancements to facilitate optimal patient care and outcomes, c) team based consensus development of strategies, d) tactics for performance improvement and e) participation of front line staff. Strategies are based on evidence in the literature but adapted to local culture. Commitment to continuous cycles of improvement allows customization of the project to issues identified after implementation.

**8. Explain how the initiative demonstrates innovation (Please limit this description to 100 words.)**

Safer Surgery has encouraged a horizontally integrated project and promotes transforming each discipline's priorities into a comprehensive continuum of care construct, always with a patient focus. The aspiration prevention project is creating a validated, scored assessment tool linked to specific interventions to prevent aspiration. This project emphasizes ongoing assessments and contemporaneous communication among disciplines to ensure awareness of specific risk and prevention strategies. We are unaware of other validated, scored aspiration risk assessments.

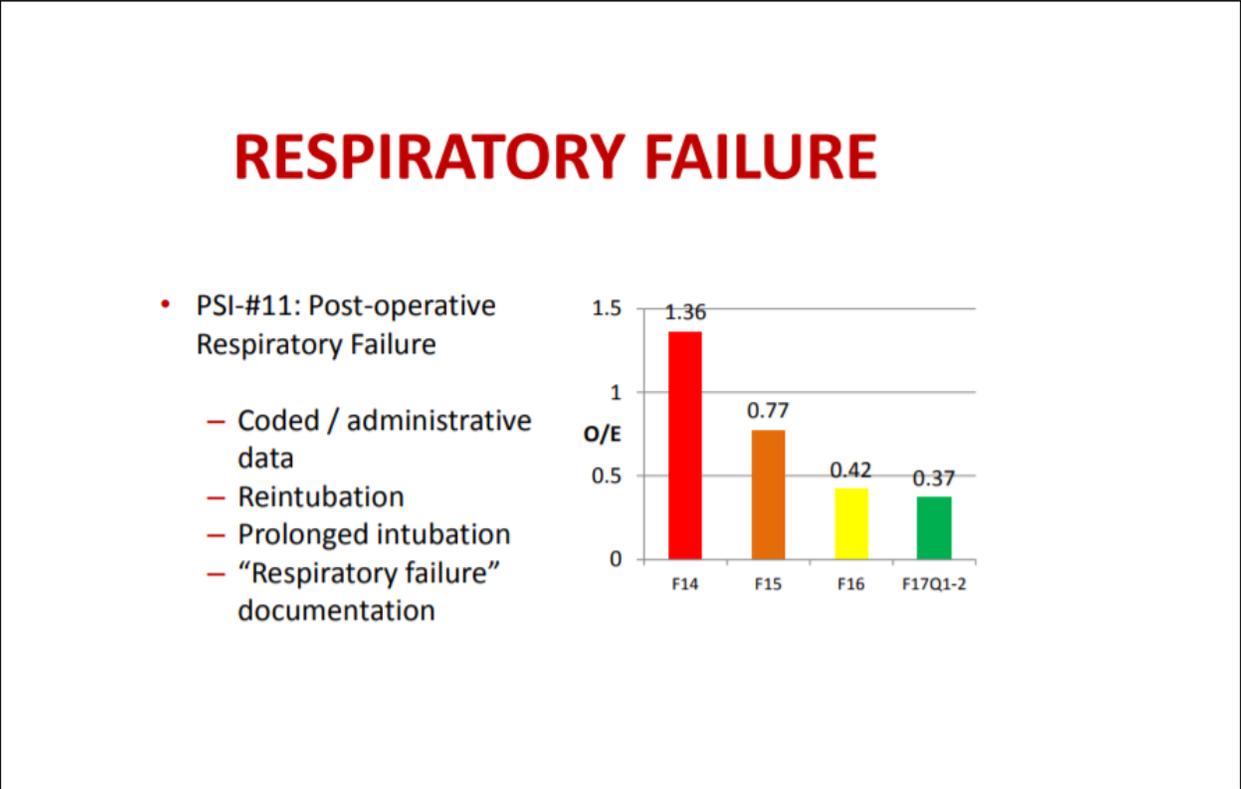
**9. How does this initiative demonstrate collaboration with other providers within the continuum of care? (Please limit this description to 100 words.)**

This initiative promotes leadership and staff working together towards a shared, well-defined goal. Safer Surgery is organized by patient contacts with the continuum of care. Discrete case level and aggregated data are shared transparently to facilitate physician, nursing and all healthcare provider involvement for continuous cycles of improvement. As this organization optimizes its electronic health record, reports are being written so process measures can be audited to make sure we actually do what we intend to accomplish. This feedback will allow staff members to complete continuous cycles of improvement. Pennsylvania NSQIP Collaborative participation facilitates sharing directly with multiple hospitals.

**10. Explain ways in which senior leadership exhibited commitment to the initiative (Please limit this description to 100 words.)**

Key performance indicators from the Vizient administrative database and the ACS-NSQIP clinically abstracted databases are reported to senior leaders as well as hospital and system Board members. They recognized that both sources identified opportunities for improved clinical outcomes around postoperative respiratory failure. Leadership provided the organizational forum for focused performance improvement and the staffing to support participation that resulted in the comprehensive Safer Surgery initiative. They encouraged a focus on long term sustainable improvements rather than short term gains. Leaders have actively facilitated communication of initiatives throughout the organization for a shared understanding of Safer Surgery and optimal patient outcomes.

11. Appendices (i.e., tables and graphs)



## NSQIP DATA

	FY15	FY16
Intubation greater than 48 hours (NSQIP)	2.01 (Needs Improvement)	1.08 (As Expected)
Unplanned intubation (NSQIP)	1.47 (Needs Improvement)	1.12 (As Expected)