

Hospital Harm - Postoperative Respiratory Failure			
eCQM Identifier (Measure Authoring Tool)	1143FHIR	eCQM Version Number	0.0.014
NQF Number	Not Applicable	GUID	b23b7f8b-5eae-406f-85e7-f5816979ee89
Measurement Period	January 1, 2023 through December 31, 2023		
Measure Steward	American Institutes for Research (AIR)		
Population Basis	Encounter		
Experimental	No		
Measure Developer	American Institutes for Research (AIR)		
Endorsed By	None		
Description	<p>This electronic clinical quality measure (eCQM) assesses the proportion of inpatient hospitalizations for elective procedures with postoperative respiratory failure (PRF), defined as (1) intubation occurring any time within 30 days after the conclusion of the first operation or (2) cumulative time of mechanical ventilation more than 48 hours within 30 days after the conclusion of the first operation, among postoperative patients ages 18 years and older with PRF not present on admission (NPOA)</p>		
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Measure Scoring	Proportion		
Measure Type	Outcome		
Stratification	None		
Risk Adjustment	TBD		
Rate Aggregation	None		
Rationale	<p>Postoperative respiratory failure (PRF), defined as unplanned endotracheal reintubation, prolonged inability to wean from mechanical ventilation, or inadequate oxygenation and/or ventilation, is the most common serious postoperative pulmonary complication, with an incidence of up to 7.5% (the incidence of any postoperative pulmonary complication ranges from 10-40%) (Arozullah, et al., 2000; Canet, et al., 2015; Gupta, et al., 2011; Kor, et al., 2014). This measure addresses the prevalence of PRF and the variance between hospitals in the incidence of PRF. PRF is a serious complication that can increase risk of morbidity and mortality, with in-hospital mortality resulting from PRF estimated at 25% to 40% (Arozullah et al., 2000; Canet, et al., 2014). Surgical procedures complicated by PRF have 3.74 times higher adjusted odds of death than those not complicated by respiratory failure, 1.47 times higher odds of 90-day readmission, and 1.86 times higher odds of an outpatient visit with one of 44 postoperative conditions (e.g., bacterial infection, fluid and electrolyte disorder, abdominal hernia) within 90 days of hospital discharge (Miller, et al., 2001; Romano, et al, 2009). PRF is additionally associated with prolonged mechanical ventilation and the need for rehabilitation or skilled nursing facility placement upon discharge (Thompson, et al., 2018).</p>		

Rationale	The incidence of PRF varies by hospital, with higher reported rates of PRF in nonteaching hospitals than teaching hospitals (Rahman, et al., 2013). Additionally, one study found that the odds of developing PRF increased by 6% for each level increase in hospital size from small to large (Rahman, et al., 2013). This suggests that there remains room for improvement in hospitals reporting higher rates of PRF.
Clinical Recommendation Statement	Recent studies and current clinical practice guidelines for PRF have identified enhanced recovery pathways, prophylactic mucolytics, postoperative continuous positive airway pressure ventilation, lung protective intraoperative ventilation, prophylactic respiratory physiotherapy, epidural analgesia, and goal directed hemodynamic therapy as evidence-based interventions to reduce the incidence of PRF. Yet, progress in reducing the incidence of PRF has been stymied by lack of consensus regarding the definition of PRF, which patients are most at-risk, which risk factors are potentially modifiable, and which patients are more likely to benefit from targeted interventions of a health care system's limited resources. This measure would address this gap in data.
Improvement Notation	Decreased score indicates improvement
Reference	Reference Type: CITATION Reference Text: 'Arozullah AM, Daley J, Henderson WG, Khuri SF. Multifactorial risk index for predicting postoperative respiratory failure in men after major noncardiac surgery. The National Veterans Administration Surgical Quality Improvement Program. Annals of surgery. 2000;232(2):242-253.'
Reference	Reference Type: CITATION Reference Text: 'Canet J, Gallart L. Postoperative respiratory failure: Pathogenesis, prediction, and prevention. Current Opinion in Critical Care. 2014;20(1):56-62.'
Reference	Reference Type: CITATION Reference Text: 'Canet J, Sabaté S, Mazo V, et al. Development and validation of a score to predict postoperative respiratory failure in a multicentre European cohort: A prospective, observational study. Eur J Anaesthesiol. 2015;32(7):458-470.'
Reference	Reference Type: CITATION Reference Text: 'Gupta H, Gupta PK, Fang X, et al. Development and validation of a risk calculator predicting postoperative respiratory failure. Chest. 2011;140(5):1207-1215.'
Reference	Reference Type: CITATION Reference Text: 'Kor DJ, Lingineni RK, Gajic O, et al. Predicting risk of postoperative lung injury in high-risk surgical patients: a multicenter cohort study. Anesthesiology. 2014;120(5):1168-1181.'
Reference	Reference Type: CITATION Reference Text: 'Miller MR, Elixhauser A, Zhan C, Meyer GS. Patient Safety Indicators: using administrative data to identify potential patient safety concerns. Health services research. 2001;36(6 Pt 2):110-132.'
Reference	Reference Type: CITATION Reference Text: 'Romano PS, Mull HJ, Rivard PE, et al. Validity of Selected AHRQ Patient Safety Indicators Based on VA National Surgical Quality Improvement Program Data. Health Services Research. 2009;44(1):182-204.'
Definition	Inpatient hospitalizations: Includes time in the emergency department and observation when the transition between these encounters (if they exist) and the inpatient encounter are within an hour or less of each other.

Definition	Post operative respiratory failure is defined as (1) intubation occurring any time within 30 days after the conclusion of the first operating room (OR) procedure or (2) cumulative time of mechanical ventilation more than 48 hours within 30 days after the conclusion of the first OR procedure, among postoperative patients ages 18 years and older with PRF not present on admission (NPOA).
Guidance	This eCQM is an episode-based measure. An episode is defined as each inpatient hospitalization or encounter that ends during the measurement period.
Transmission Format	TBD
Initial Population	Elective inpatient hospitalizations that end during the measurement period, where the patient is 18 years of age or older at the start of the encounter, and at least one surgical procedure was performed within the first 3 days of the encounter
Denominator	Equals Initial Population
Denominator Exclusions	<p>Inpatient hospitalizations for patients:</p> <p>Who have undergone mechanical ventilation for more than one hour duration prior to the start of the first OR procedure</p> <p>With arterial partial pressure of oxygen (PaO₂) < 50 mmHg during the 72 hours prior to the start of the first OR procedure</p> <p>With arterial partial pressure of carbon dioxide (PaCO₂) > 50 mmHg combined with an arterial pH < 7.30 during the 72 hours prior to the start of the first OR procedure</p> <p>With a principal diagnosis (or secondary diagnosis present on admission) for acute respiratory failure</p> <p>With any diagnosis present on admission for the existence of a tracheostomy</p> <p>Where the only procedure during the encounter is a tracheostomy</p> <p>Where a procedure for tracheostomy occurs before the first OR procedure</p> <p>With any diagnosis for neuromuscular disorder or degenerative neurological disorder</p> <p>With any procedure for laryngeal or pharyngeal, nose, mouth, pharynx or facial surgery involving significant risk of airway compromise</p>
Numerator	<p>Elective inpatient hospitalizations for patients with postoperative respiratory failure (PRF).</p> <p>PRF is defined as (1) intubation that occurs any time within 30 days after the conclusion of the first OR procedure and during the same encounter, or (2) cumulative time of mechanical ventilation (i.e., invasive positive pressure ventilation) for more than 48 hours within 30 days after the conclusion of the first OR procedure and during the same encounter.</p>
Numerator Exclusions	Not applicable
Denominator Exceptions	None
Supplemental Data Elements	For every patient evaluated by this measure also identify payer, race, ethnicity and sex

Data Criteria (FHIR Data Requirements)

- "Condition"
- "Coverage: Payer" using "Payer (<http://cts.nlm.nih.gov/fhir/ValueSet/2.16.840.1.114222.4.11.3591>)"
- "Encounter: Elective Hospitalizations" using "Elective Hospitalizations (<http://cts.nlm.nih.gov/fhir/ValueSet/2.16.840.1.113762.1.4.1248.85>)"
- "Encounter: Emergency Department Visit" using "Emergency Department Visit (<http://cts.nlm.nih.gov/fhir/ValueSet/2.16.840.1.113883.3.117.1.7.1.292>)"
- "Encounter: Encounter Inpatient" using "Encounter Inpatient (<http://cts.nlm.nih.gov/fhir/ValueSet/2.16.840.1.113883.3.666.5.307>)"

- "Encounter: Observation Services" using "Observation Services (<http://cts.nlm.nih.gov/fhir/ValueSet/2.16.840.1.113762.1.4.1111.143>)"
- "Encounter: Outpatient Surgery Service" using "Outpatient Surgery Service (<http://cts.nlm.nih.gov/fhir/ValueSet/2.16.840.1.113762.1.4.1110.38>)"
- "Location"
- "Medication"
- "Observation: Arterial Blood pH" using "Arterial Blood pH (<http://cts.nlm.nih.gov/fhir/ValueSet/2.16.840.1.113762.1.4.1248.96>)"
- "Observation: Carbon Dioxide Partial Pressure in Arterial Blood" using "Carbon Dioxide Partial Pressure in Arterial Blood (<http://cts.nlm.nih.gov/fhir/ValueSet/2.16.840.1.113762.1.4.1248.95>)"
- "Observation: Oxygen Partial Pressure in Arterial Blood" using "Oxygen Partial Pressure in Arterial Blood (<http://cts.nlm.nih.gov/fhir/ValueSet/2.16.840.1.113762.1.4.1248.94>)"
- "Procedure: General or Neuraxial Anesthesia" using "General or Neuraxial Anesthesia (<http://cts.nlm.nih.gov/fhir/ValueSet/2.16.840.1.113883.3.666.5.1743>)"
- "Procedure: Head and Neck Surgeries with High Risk Airway Compromise" using "Head and Neck Surgeries with High Risk Airway Compromise (<http://cts.nlm.nih.gov/fhir/ValueSet/2.16.840.1.113762.1.4.1248.183>)"
- "Procedure: Intubation" using "Intubation (<http://cts.nlm.nih.gov/fhir/ValueSet/2.16.840.1.113762.1.4.1248.179>)"
- "Procedure: Mechanical Ventilation" using "Mechanical Ventilation (<http://cts.nlm.nih.gov/fhir/ValueSet/2.16.840.1.113762.1.4.1248.107>)"
- "Procedure: Tracheostomy Procedures" using "Tracheostomy Procedures (<http://cts.nlm.nih.gov/fhir/ValueSet/2.16.840.1.113762.1.4.1248.181>)"