Measure Abbreviation: PUL 01

Data Collection Method: This measure is calculated based on data extracted from the electronic medical record combined with administrative data sources such as professional fee and discharge diagnoses data. This measure is explicitly not based on provider self-attestation.

Description: Percentage of cases with median tidal volumes less than 10ml/kg.

Measure Time Period: Case start to Case End (see other measure build details)

Measure Type: Process

Measure Summary: PUL 01 measures performance in lung protective ventilation techniques. PUL 01 will measure the median tidal volume (in ml/kg predicted body weight) across a case.

Rationale: The use of lung protective ventilation techniques (low tidal volumes and positive end-expiratory pressure) should be part of standard anesthetic practice for most cases that require positive pressure ventilation. Several randomized controlled trials, as well as a meta-analysis in 2015 describe the benefit with low vs high tidal volume techniques.1-6

Inclusions: Patients undergoing endotracheal intubation.

Exclusions:
- ASA 5 and 6 cases
- Patients < 12 years of age
- Patients <20kg.
- Patients ≥ 18 years old with a height ≤121.9cm (48 in) OR ≥213.4cm (84 in)
- Patients 12-17 years old with a height <91.4cm (36 in) or >213.4cm (84 in)
- Cases where Epoprost enol is administered as an inhalational agent
- Cases without a documented sex
- Cases without a documented height
- Cases in which patients are mechanically ventilated for less than 45 cumulative minutes.
- One lung ventilation procedures as indicated by intraoperative notes or note details mapped to one of the following MPOG concepts:
  - 50501: Thoracic: Single-lung ventilation
  - 50202: Thoracic: Single-lung ventilation, side detail
<table>
<thead>
<tr>
<th>Endotracheal Tube MPOG Concept IDs</th>
<th>Tidal Volume MPOG Concept IDs</th>
<th>One-Lung Ventilation MPOG Concept IDs</th>
<th>Predicted Body Weight MPOG Concept IDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>50121 Intubation Endotracheal Tube Stylet Used</td>
<td>3190 Tidal Volume Actual</td>
<td>50501 Thoracic-Single lung ventilation</td>
<td>70251 Physical Exam-Height (cm)</td>
</tr>
<tr>
<td>50122 Intubation Endotracheal Tube Size</td>
<td>3192 Tidal Volume Set</td>
<td>50202 Thoracic-Single lung ventilation side detail</td>
<td>70252 Physical Exam-Height (in)</td>
</tr>
<tr>
<td>50123 Intubation Endotracheal Tube Type</td>
<td>3185 Peak Inspiratory Pressure</td>
<td>10473 Epoprostenol</td>
<td>2006 Inhalational</td>
</tr>
<tr>
<td>50124 Intubation Endotracheal Tube Secured Mechanism</td>
<td>3210 Positive End Expiratory Pressure-Measured</td>
<td></td>
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</tr>
<tr>
<td>50125 Intubation Endotracheal Tube Secured Reference Point</td>
<td>3212 Positive End Expiratory Pressure-Set</td>
<td></td>
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</tr>
<tr>
<td>50126 Intubation Endotracheal Tube Secured Reference Point</td>
<td></td>
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<tr>
<td>50202 Emergence-Patient Extubated</td>
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<tr>
<td>50205 Intubation Tube Note</td>
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<tr>
<td>50501 Intubation-endotracheal tube in situ</td>
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</tr>
</tbody>
</table>
Data Diagnostics Affected:

- Percentage of Cases with Any Physiologic Observation
- Percentage of Physiologic Observations with a Meaningful Type Mapping
- Percentage of Cases with a Tidal Volume Observation
- Percentage of Cases with Patient Height
- Percentage of Cases with Patient Weight
- Percentage of Cases with an Intubation Note
- Percentage of Cases with a Meaningful Admission Type Mapping
- Percentage of Cases with Percentage of Cases with any Staff Tracking
- Percentage of Anesthesia Provider Sign-Ins that are Timed

Phenotypes Used:

- AnesthesiaEnd
- AsaNotes
- Height
- MpogCaseId
- StaffRoles
- Asa5or6
- EndotrachealTube
- ParalyticsUsed
- IdealBodyWeight
- PrimaryProvider
- TidalVolumeActualMedian
- TidalVolumeSetMedian

Other Measure Build Details:

- For a given case, this measure will exclude periods when patients are not under positive pressure ventilation (as defined by Peak Inspiratory Pressure – Positive End Expiratory Pressure ≤ 6).
  - Peak Inspiratory Pressure determined by values mapped to MPOG Concept 3185. If no PIP documented, PIP is considered null and tidal volume is included.
  - PEEP will be determined using values associated with the following variables:
    1. Use Measured PEEP (MPOG Concept: 3210). If not documented,
    2. Use Set PEEP (MPOG Concept: 3212). If not documented,
    3. Assume PEEP = 0.

- For a case to be included for the PUL-01 measure, it must have at least 45 valid values of actual tidal volume or set tidal volume

- In determining median tidal volume, if any value greater than two (2) is documented, it is assumed that tidal volume is documented in milliliters (mL). If all values are less than two (2), tidal volume is assumed to be measured in liters (L).
• For patients ≥18 years old with height>121.9cm (48 in) but <213.4cm (84 in), the following equation is used to determine Predicted Body Weight. For patients less than 5 feet, 5 feet (152.4 cm) will be used for the IBW formula:
  Male patients: 50kg + 0.91kg * (height in cm - 152.4)
  Female patients: 45.5kg + 0.91kg * (height in cm - 152.4)

• For patients 12-17 years old and height > 91.4cm (36 in) but <213.4cm (84 in), the McLaren Method is used to determine Predicted Body Weight. The McLaren Method is the most commonly used method to determine PBW in children and uses growth charts to determine IBW by identifying the 50th percentile height for age, then using that height to determine 50th percentile weight. This weight is the patient’s Predicted Body Weight (PBW).^7

• “Actual tidal volume” trumps “set tidal volume” if there are at least 45 valid “actual tidal volume” measurements. If there are no values for “actual tidal volume”, “set tidal volume” is used.

• Algorithm for determining Case Duration:
  Case Start:
  1. Anesthesia Induction End. If not available, then
  2. Anesthesia Induction Begin. If not available, then
  3. Procedure Start. If not available, then
  4. Patient in Room. If not available, then
  5. Anesthesia Start

  Case End:
  1. Patient Extubated. If not available, then
  2. Procedure End. If not available, then
  3. Patient Out of Room. If not available, then
  4. Anesthesia End.

Success: Median tidal volume < 10 ml/ kg predicted body weight for the time period between Case Start and Case End.

Threshold: 90%.

Responsible Provider: Provider signed in for largest portion of case. See ‘Other Measure Build Details’ section of this specification to view the algorithm used for determining case duration.

Method for determining Responsible Provider:
In the event that two or more providers in the same class are signed in for the same duration, all providers signed in for the longest duration will be attributed.

Risk Adjustment (for outcome measures): Not applicable.
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References:


