## Background
- Accurate temperature measurement is essential in timely care of critically ill patients.
- Current temperature measurement practices within pediatrics
  - Pulmonary Artery Temperature
    - Gold Standard
    - Rarely used in pediatrics
  - Rectal Temperature
    - Considered most accurate
    - Undesirable for certain age groups
    - May lag during rapid temperature change
  - Oral Temperature
    - Patient must be able to follow directions
    - Affected by eating and drinking
  - Axillary Temperature – most variance
- Sites standard practice included oral temperature measurement of orally intubated patients
  - Questions of reliability and validity came forward and unit practice was changed

## Purpose
Determine the efficacy of oral temperature measurement in orally intubated pediatric patients compared to the unit’s standard of axillary temperature measurement.

## Hypothesis
Oral temperature measurement will not be statistically different in comparison to axillary temperature measurement despite the use of ventilator that passes heated gas through the endotracheal tube.

## Methods
### Design
- Quasi-experimental

### Setting
- Midwestern pediatric hospital within academic medical center

### Eligibility Criteria:
- **Inclusion:** Endotracheally intubated and mechanically ventilated pediatric patients admitted to PICU
- **Exclusion Criteria:**
  - Impaired axillary skin integrity
  - Maxillofacial abnormalities

### Procedure
- Six PICU RNs trained as data collectors
- Competencies developed and used to train RNs
- Didactic teaching with teach back to validate data collector competence
- No more than 2 minutes allotted between oral and axillary temperature measurement

- Data collected on Mondays, Wednesdays & Fridays at preset times
- All consecutively intubated patients included from 9/21/16 to 5/10/17
- Patients ventilated with either Maquet Servo-I or Puritan Bennett 980

## Results
### Oral and Axillary Temperatures in Intubated Pediatric Patients
#### Temperature Ranges by Age Category
<table>
<thead>
<tr>
<th>Age Category</th>
<th>Axillary Minimum</th>
<th>Axillary Maximum</th>
<th>Axillary Average</th>
<th>Oral Minimum</th>
<th>Oral Maximum</th>
<th>Oral Average</th>
<th>Oral Correction Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children</td>
<td>95.5</td>
<td>103.5</td>
<td>98.5</td>
<td>97.1</td>
<td>104.3</td>
<td>99.1</td>
<td>0.6</td>
</tr>
<tr>
<td>Infants</td>
<td>94.4</td>
<td>99.1</td>
<td>97.5</td>
<td>95.2</td>
<td>99.8</td>
<td>97.7</td>
<td>0.2</td>
</tr>
<tr>
<td>Neonates</td>
<td>91.5</td>
<td>98.4</td>
<td>95.7</td>
<td>94.3</td>
<td>98.4</td>
<td>96.7</td>
<td>1</td>
</tr>
</tbody>
</table>

- **Conclusion:**
  - High positive correlation between axilla and oral temperatures shows
  - Oral temperature measurement in intubated pediatric patients is viable alternative in these age groups
  - Correction factors allow the prediction of an axillary temperature based on the measured oral temperature.
  - Pilot study comparing oral and axillary temperature measurement in intubated pediatric patients
  - Further study of temperature with inclusion of environmental, diagnostic, and equipment factors is needed

#### Data Sets per Age Category and Correlations
<table>
<thead>
<tr>
<th>Age Category</th>
<th>Age Range</th>
<th># of Data Sets</th>
<th># of Patients</th>
<th>Pearson Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonates</td>
<td>&lt;28 days</td>
<td>25</td>
<td>5</td>
<td>0.921</td>
</tr>
<tr>
<td>Infants</td>
<td>28 days to 12 months</td>
<td>25</td>
<td>3</td>
<td>0.859</td>
</tr>
<tr>
<td>Children</td>
<td>1 to 18 years</td>
<td>25</td>
<td>5</td>
<td>0.932</td>
</tr>
</tbody>
</table>

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