

Heat Check: Comparing Temporal and Axillary Temperatures

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Heat Check: Comparing Temporal and Axillary Temperatures

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BACKGROUND

Temperature is an important part of assessment. There are multiple ways of obtaining a temperature in the hospital, including temporal artery, axillary, oral, and rectal. At Children's Health, for patients between the ages of 3 and 18, Temporal Artery Thermometers (TAT) and axillary thermometers are the most widely used on the Acute Care Services units and are the least invasive. We compared these methods to explore the interchangeability and consistency between them. This study's goal was to determine if the readings varied, and if so, by how much. We compared axillary and temporal temperatures taken on the same patient during routine vital sign assessments throughout our shifts.

PICOT Question

In inpatient pediatric patients ages 3 to 18 years old is temporal or axillary a more accurate and effective temperature taking method?



Title	Summary
Craig, et. al (2000). Temperature measured at the axilla compared with rectum in children and young people: systematic review.	Difference between temperature readings at the axilla and rectum using either mercury or electronic thermometers showed wide variation across studies.
Kiekkas, et. al (2019). Temporal artery thermometry in pediatric patients: Systematic review and meta-analysis.	TA thermometry cannot be recommended for replacing rectal temperature measurement methods in children, due to its high proportion of false negative readings during screening for fever
Gates, et. al. (2018). Temperature measurements: Comparison of different thermometer types for patients with cancer.	Neither tympanic or temporal thermometers accurately represent core temperature in febrile patients. As oral temperature increased, both tympanic and temporal thermometers became less accurate. Oral thermometers were more accurate
Chatproedprai, et al (2016). A Comparative Study of 3 Different Methods of Temperature Measurement in Children.	There was a statistically significant difference between rectal temperature and both forehead and ear temperature. Forehead temperature could be used as a gold standard temperature, instead of axillary temperature, Axillary temperature is not likely to indicate core body temperature as precisely as does rectal temperature

PILOT/ Methods

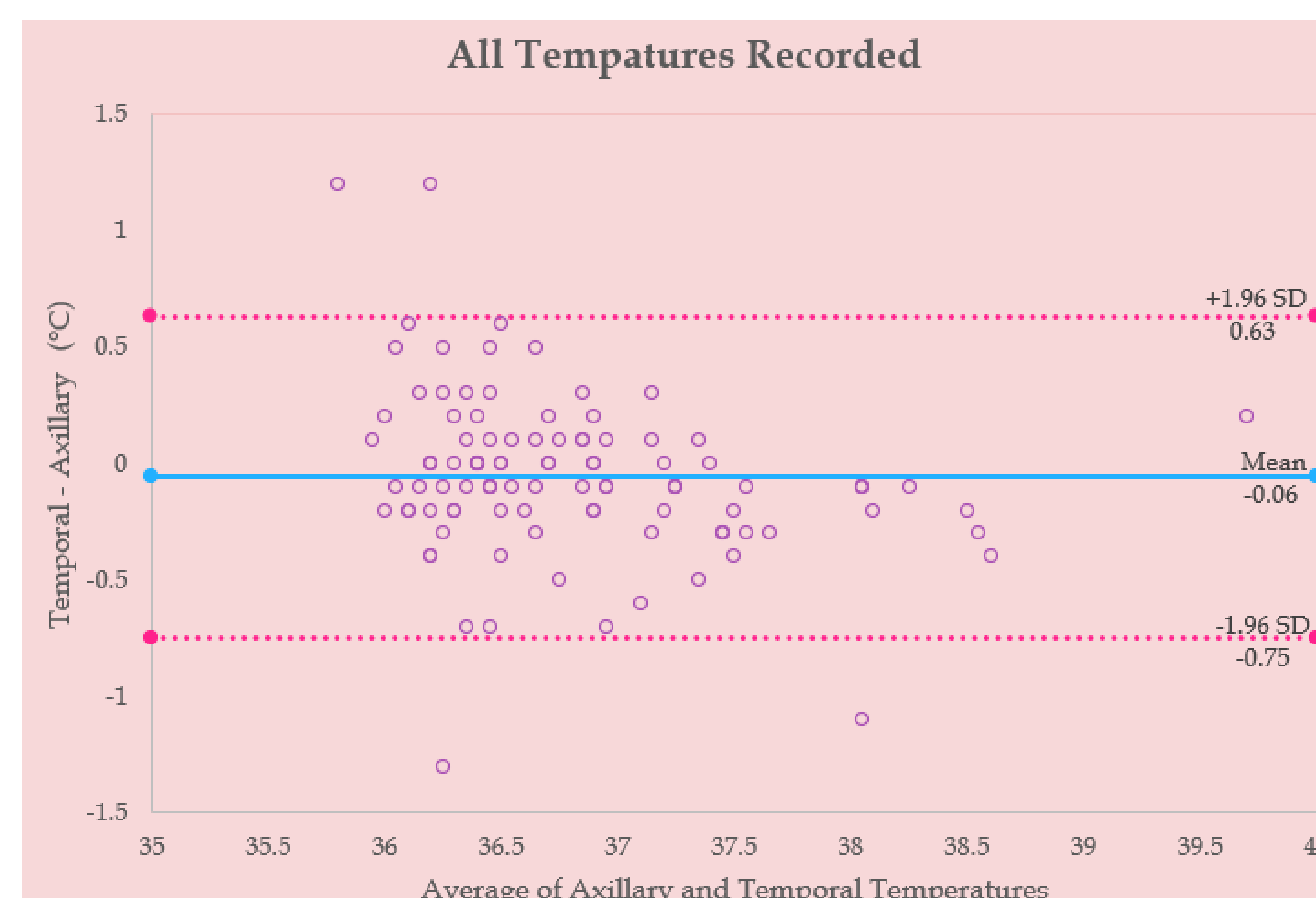
Temporal and axillary temperatures were collected at 0800, 1200, and 1600 on the same patient chosen during a twelve-hour shift to identify any possible discrepancies. Each nurse was given charts to fill the two methods of temperatures acquired. Information collected included the patient gender, age, and if they have been febrile in the last 24 hours. Data was collected over a span of 6 weeks. After data was collected each temp was sorted by times collected and device used (axillary and temporal) and individually averaged while including a calculated statistical difference. From the data was placed on a graph using a Bland-Altman plot. Thus, allowing us to visualize any discrepancies when using two different methods of collecting temperature. Charts for 35 patients were reviewed and there 35 Axillary Temperatures and 35 Temporal Temperatures were compared.

RESULTS

Table 1 Comparison of temperature measurements in children in ACS.

	Axillary n = 35	Temporal n = 35
0800/2000	36.8 ± 0.78	36.7 ± 0.75
1200/0000	36.8 ± 0.66	36.9 ± 0.78
1600/0400	36.8 ± 0.58	36.8 ± 0.73

Data are means ± SD.



The Bland-Altman plot was used to visualize the differences in measurements between temporal and axillary thermometers. The x-axis displays the average measurement between both thermometers and the y-axis displays the difference in measurements between the two.

Outcomes/Results:

- Average of all temperatures taken throughout the shift showed that the temporal thermometer measures patient temperatures were 0.06 degrees Celsius lower than the axillary thermometer.
- Temporal thermometers consistently read patient temperatures lower than axillary thermometers given the evidence from the other three graphs taken at vital signs obtainment.
- Factors to consider when interpreting these results include user error (how each individual nurse or patient-care technician obtained temporal or axillary temperatures), history of patient fevers in the last 24 hours, and activity of the patients when the temperatures were obtained.
- The average difference is objectively clinically insignificant, given that the greatest difference was 0.13 degrees Celsius.

Clinical Practice Implications

- Temporal temperature readings have shown that it provides unparalleled convenience in comparison to axillary temperatures
- Obtaining temporal readings provides rapid and non-invasive readings.
- Temporal thermometer provides infrared technology read the heat that is exuded from the temporal artery, which is the closest to an individual's core body temperature.
- Axillary temperatures have more of a risk of being influenced by certain factors such as sweat, clothing or even having the arm up could affect the results.
- Overall, temporal temperature readings have shown consistency and convenience for different domains.
- Considering the relative agreement between the two methods, the temporal artery thermometer should continue to be the standard at Children's Health given its rapid results, ease of use, low risk to patients, and high tolerability of its use with patients.

Recommendations/ Plan for Implementation:

- Share findings with policy authors of Vital Signs Policy
- Share Findings with Clinical Practice Council (CPC)
- Collaborate with the Policy Authors and CPC to find out if this information can be added to the policy

References



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