Reviewer's report

Title: Accuracy of parents in measuring body temperature with a tympanic thermometer designed for home use

Version: 1 Date: 13 September 2004

Reviewer: Naja E McKenzie

Reviewer's report:

General
This well-written article addresses an important issue related to clinicians’ ability to trust parents’ reported assessments of children’s temperatures. The research question is well-formulated and clear, pointing out that evaluation of temperature measurements must include both consideration of the device used and the operator of the device.

-- Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached) --

The statistical treatment, using the “absolute mean difference” is either an unusual approach or an incorrect term. An absolute mean disregards the sign (+/-) and hence the direction of bias portrayed by the statistic, in this case an important characteristic of the data. The direction of bias tells us whether nurses overall measured higher temperatures than parents. This is important because improper placement or technique can only yield low readings. Good technique will always give a higher reading than less effective technique. This is because correct placement means the probe tip will obtain infrared emissions from deeper parts of the ear, which are warmer. False high temperatures with a properly calibrated thermometer can only be obtained by quickly passing the probe over a much hotter object prior to placement in the ear or by heating the thermometer, for example, on a sunny window sill on by a heating duct or appliance.

The current standard for analyzing data in thermometry comparisons is the Bland and Altman method which looks at agreement as the mean difference between each reading and the mean of both readings. In addition, the limits of agreement are calculated and the analysis is shown as a graphic representation for easier interpretation. The data from the current study will be more relevant to clinicians and researcher if reanalyzed according to the Bland and Altman method. Bland and Altman described their method in the Lancet in 1986. An example can be seen in my article in the April 2003 issue of Pediatric Nursing.

-- Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct) --

This issue is a factor of the relative difficulty of using an ear thermometer properly. Not only is it essential for users to follow manufacturer instructions closely, experience of the user with the device usually improves the quality of the readings they produce.

As such, this study should have included information of the training and length of experience of the nurses and parents who took temperatures. Comparing parents who had owned and used an ear thermometer for some time would have been a fairer comparison that just letting them read a pamphlet. Even nurses who have attended formal training by a manufacturer’s representative take some time to get comfortable and familiar with ear thermometers.

Other information regarding the study design should have been included. Was temperature repeated
in the same ear and how long was the interval between temperatures. This has implications for accuracy. If too short a time (i.e. less than 3 minutes) the ear would still be recovering from being cooled by contact with the thermometer, a phenomenon known as draw-down. If too long a time, the child’s temperature could have changed in the interval, making the comparison irrelevant. Further, home use ear thermometers often feature reusable probe covers. If such were used, they could contribute to incomplete signal acquisition and a low temperature. The authors should state whether probe covers were reused.

Discretionary Revisions (which the author can choose to ignore)

**What next?:** Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No

**Declaration of competing interests:**

I occasionally act as a consultant to Tyco Healthcare which manufactures the Genius infrared ear thermometer, which was not used in this study. It is doubtful whether Tyco will stand to gain or lose from the publication of this study. They do not make a home thermometer.

I do not hold any stock in any thermometer manufacturing company.
I have no other financial or non-financial competing interests.