

# Are all thermometers equal?

## A study of three infrared thermometers to detect fever in an African outpatient clinic



TYMPANIC

### DIFFERENT THERMOMETERS

Thermometers come in various shapes and models and measure temperature using various techniques. Many modern models are non-invasive and only need minimal or no contact with the body surface. This reduces the cost of consumables and chances of infection passing from one patient to another.



TEMPORAL ARTERY

But **thermometers vary widely in their accuracy to measure temperature and detect fever.**



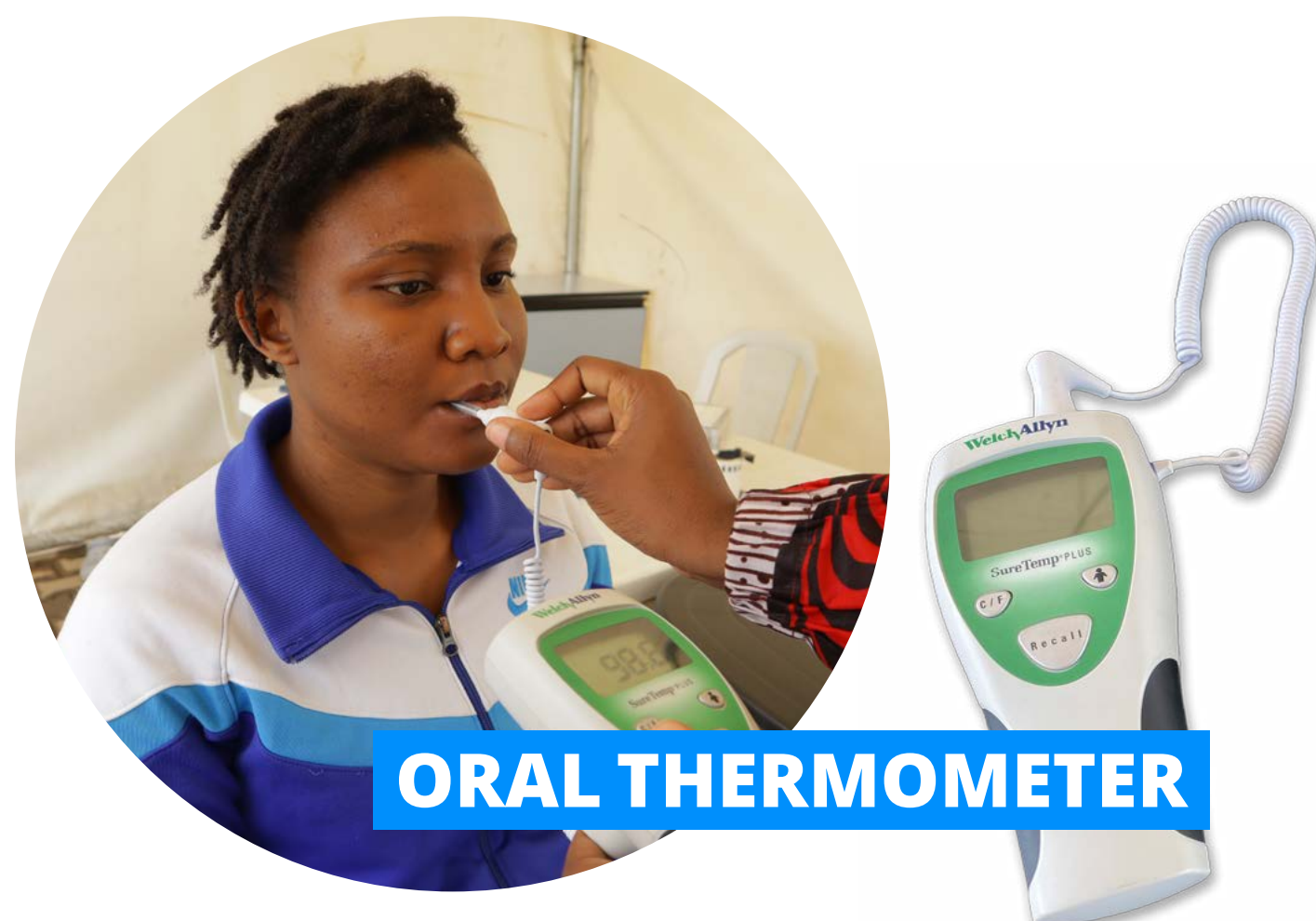
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### OUR STUDY

We studied 3 different types of thermometers:

1. **Tympanic:** placed inside the ear
2. **Temporal artery:** slides on the forehead
3. **Contactless:** held a few centimeters from the forehead

An oral electronic thermometer was used as a control.



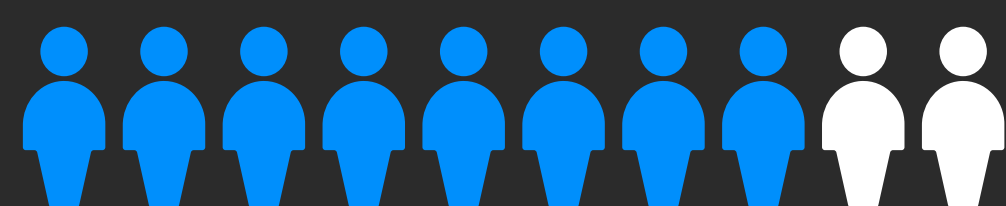
ORAL THERMOMETER

We sampled 200 adult outpatients (100 male and 100 female) over 4 days in a secondary care hospital in Kano, Nigeria.

### RESULTS



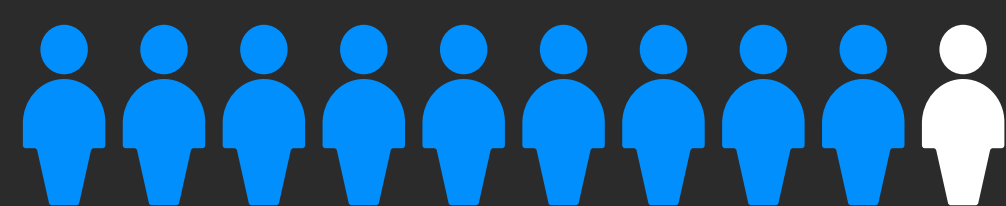
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Diagnosed people with fever: 8 of 10  
Diagnosed people without fever: 8 of 10  
Difference in °C from oral thermometer: +0.24



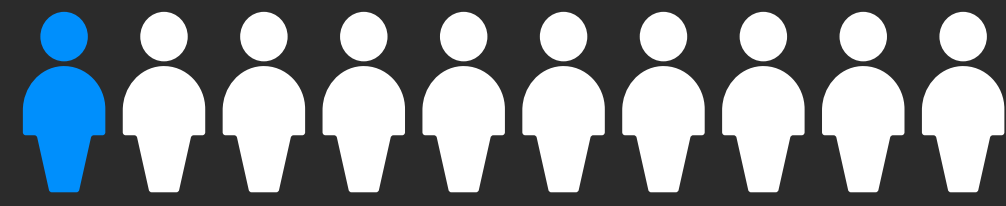
TEMPORAL ARTERY



Diagnosed people with fever: 9 of 10  
Diagnosed people without fever: 9 of 10  
Difference in °C from oral thermometer: +0.23



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Diagnosed people with fever: 1 of 10  
Diagnosed people without fever: 10 of 10  
Difference in °C from oral thermometer: -0.06

### CONCLUSION

Our results show that **choosing an appropriate thermometer should be done with caution by verifying the clinical performance**, and not just the cost and convenience. We recommend that buyers look for independent quality verifications before choosing a model that fits their needs.