

North Carolina
SPICE
Statewide Program for
Infection Control & Epidemiology



North Carolina
Clinical Antibiotic
Stewardship Partners

Infection Management and Antibiotic Stewardship

Hot Topic Session #1



What's a Fever: How To Think About It

September 13, 2023



Conflict of interest Disclosures

- ▶ The views and opinions expressed in this series are those of the speakers and do not reflect the official policy or position of any agency of the U.S. or NC government or UNC.
- ▶ Our speakers have NO financial relationships with manufacturers and/or providers of commercial services discussed in this activity.
 - ▶ Dr. Kistler served as a consultant for Base10, Inc on their UTI embedded clinical support tool and received funding from Pfizer to study pneumococcal carriage.
- ▶ The speakers **do not** intend to discuss an unapproved/investigative use of a commercial product/device in this series, and all COI have been mitigated.
- ▶ These slides contain materials from a variety of colleagues including CDC, WHO, AHRQ, etc.

Today's Team

- ▶ Philip Sloane, MD, MPH - Geriatrics researcher and LTC expert, UNC School of Medicine
- ▶ Marian B. Johnson, MPH - Senior Research Associate and Quality Improvement advisor, Institute for Healthcare Improvement
- ▶ Adrian Austin, MD, MSCR - Geriatric Pulmonary and Critical Care expert, UNC School of Medicine
- ▶ Chrissy Kistler, MD, MASc - Geriatrics researcher and LTC expert, University of Pittsburgh








Session Objectives

1. Identify a practical, evidence-based definition of fever for nursing home residents.
2. Identify practical suggestions for monitoring residents for sepsis risk.
3. Provide a one-pager for QI and staff education





Case Vignette

A.S. is a 78-year-old woman with morbid obesity, diabetes, ischemic cardiomyopathy, severe degenerative joint disease (s/p L knee replacement), immobility, chronic pain (narcotic dependent), and an early stage 2 pressure sore over her sacrum. She was admitted from the hospital 2 weeks ago after treatment for "pneumonia and UTI."

This morning she feels tired and doesn't want to get out of bed. The floor nurse reports that her oral temperature is 99.2°F.

Questions

1. Does she have a fever?
2. How worried should you be about infection or early sepsis?

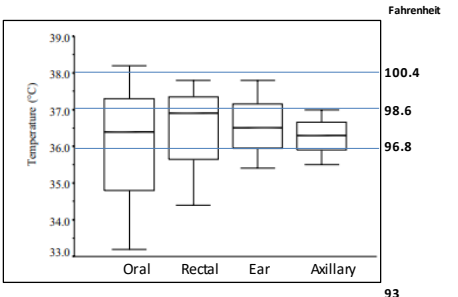


What Temperature Defines Fever?

- The most common definition cited by infectious diseases experts is 100.4°F (38.0°C)
- But the truth is it depends on:
 - The method used (rectal, oral, skin)
 - The time of day (normal tends to be a little higher in afternoon than early morning)
 - Environmental factors
 - What is normal for that person



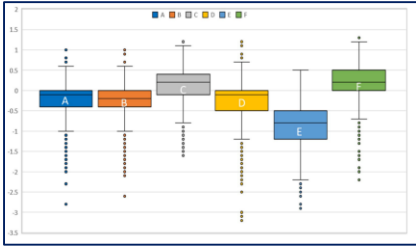
Average Body Temperature by Measurement Method



Source: Sund-Levander M, et al. Normal oral, rectal, tympanic and axillary body temperature in adult men and women: a systematic literature review. Scand J Caring Sci. 2002 Jun;16(2):122-8.

Infrared Forehead Thermometers

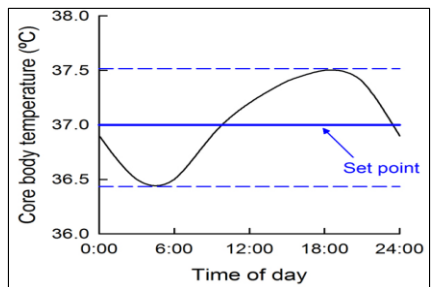
Bottom Line:
Forehead measurement devices seem to average about half a degree Fahrenheit lower than oral temperature, but...
- there's quite a bit of variation between devices (see graph at right, and
- very few studies have been done on older adults
So....these devices are OK but get to know how your device compares.



Comparison of 6 Infrared Forehead vs. Oral Thermometers

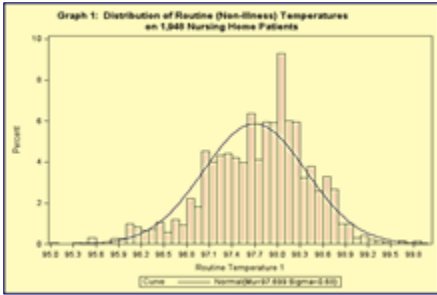


Intra-Daily Temperature Variation in a Normal Young Adult

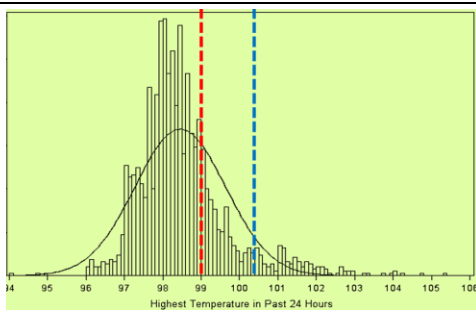


source https://www.physidogweb.com/figures/physidog_graph_16290065603p7k1hr1cuj15b9_circadian_rhythm_of_core_body_temperature.htm

Nursing Home Residents are a Unique Population



Temperature Distribution in Nursing Home Residents with Infection



Fever Definition for Nursing Home Residents

- The best definition of a fever is 1.4 degrees Fahrenheit above the average normal temperature for that resident, measured orally.
- If you don't have enough normal temperatures for the resident to determine their normal, a good threshold for fever is any temperature over 99.0 degrees Fahrenheit.
- Because of variation by time of day, two temperatures 4 hours or so apart is ideal to determine fever.



Back to the Case Vignette

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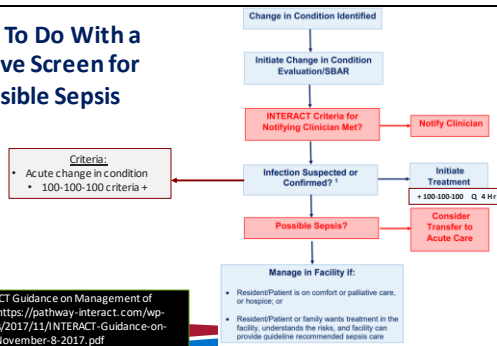
1. Does she have a fever?
2. How worried should you be about infection or early sepsis, and if so what should you do?

Screening for Sepsis in the Nursing Home

Sepsis Screening Tool	Variables	13–72 h Prior to Hospitalization		≤12 h Prior to Hospitalization	
		Nonsepsis	Sepsis	Nonsepsis	Sepsis
SIRS	Met screening criteria	6%	10%	12%	36%
	Sensitivity for sepsis		10%		36%
	Specificity for sepsis		94%		86%
qSOFA	Met screening criteria	4%	7%	13%	27%
	Sensitivity for sepsis		7%		27%
	Specificity for sepsis		96%		88%
100-100-100	Met screening criteria	16%	28%	31%	79%
	Sensitivity for sepsis		28%		79%
	Specificity for sepsis		84%		69%
Temperature ≥99.0 F	Met screening criteria	14%	22%	15%	51%
	Sensitivity for sepsis		22%		51%
	Specificity for sepsis		86%		85%
Temperature ≥100.2 F	Met screening criteria	3%	9%	7%	20%
	Sensitivity for sepsis		9%		40%
	Specificity for sepsis		97%		93%

Source: Sloane PD, et al. Can Sepsis Be Detected in the Nursing Home Prior to the Need for Hospital Transfer? J Am Med Dir Assoc. 2018; 19:492-496.

What To Do With a Positive Screen for Possible Sepsis



Source: INTERACT Guidance on Management of Possible Sepsis <https://pathway-interactive.com/wp-content/uploads/2017/11/INTERACT-Guidance-on-Possible-Sepsis-November-8-2017.pdf>

Downloadable One-Pager for Staff Education and Quality Improvement

Temperature & Fever in Older Adults

What temperature is normal?
"Normal" body temperature usually isn't the 98.6 we grew up thinking, especially as we age. Normal temperatures differ from person to person. The graph at right shows the range of normal in 2,000 nursing home residents.

SO YOU KNOW!
The normal temperature is 97.7 degrees Fahrenheit in nursing home residents.

What's a Fever?

- The best definition of a fever is 1.4 degrees Fahrenheit above the average normal (non-sick) temperature for that individual.
- If a patient's normal is unknown, a rule of thumb for fever is 99.0 and higher.
- Because temperature varies by time of day, two temperatures four hours apart is ideal to determine fever.
- Consider environmental factors: has the person recently had food? Had a hot shower?

For more information, review the 10-minute e-learning on fevers.

Questions and Discussion



► Find session slides at <https://spice.unc.edu> → ncclasp → nursing homes

SAVE THE DATE

Antibiotic Stewardship Conference

11.15.23 | 9 am - 4 pm
The Friday Conference Center
Chapel Hill, NC

North Carolina Clinical Antibiotic Stewardship Partners

More information at spice.unc.edu/ncclasp/

QAPI and QI SUPPORT

Now we'd like to help you! What stewardship projects are you working on and what do you need help with?