2016 Update of the Italian Pediatric Society Guidelines for Management of Fever in Children

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Objective To review new scientific evidence to update the Italian guidelines for managing fever in children as drafted by the panel of the Italian Pediatric Society.

Study design Relevant publications in English and Italian were identified through search of MEDLINE and the Cochrane Database of Systematic Reviews from May 2012 to November 2015.

Results Previous recommendations are substantially reaffirmed. Antipyretics should be administered with the purpose to control the child's discomfort. Antipyretics should be administered orally; rectal administration is discouraged except in the setting of vomiting. Combined use of paracetamol and ibuprofen is discouraged, considering risk and benefit. Antipyretics are not recommended preemptively to reduce the incidence of fever and local reactions in children undergoing vaccination, or in attempt to prevent febrile convulsions in children. Ibuprofen and paracetamol are not contraindicated in children who are febrile with asthma, with the exception of known cases of paracetamol- or non-steroidal anti-inflammatory drug-induced asthma.

Conclusions Recent medical literature leads to reaffirmation of previous recommendations for use of antipyretics in children who are febrile. *(J Pediatr 2017;180:177-83).*

In 2009, national guidelines for healthcare providers and parents/caregivers on management of fever in children were drafted by an expert panel on behalf of the Italian Pediatric Society.[1] A cross-sectional survey was conducted before their publication and 3 years later to investigate their impact on knowledge and behaviors of pediatricians. A reduction of some incorrect attitudes of Italian pediatricians was observed during the study interval, in particular the alternating use of antipyretics and anti-inflammatory drugs (27-11% of pediatricians, $P < .001$) and the rectal administration of antipyretics in absence of vomiting (44-25%, $P < .001$). Moreover, the rate of pediatricians discouraging physical methods for fever reduction increased (19-36%, $P < .001$).[2] A first update of the guidelines of the Italian Pediatric Society was published in 2012.[3] We aimed to review guidelines in light of new scientific evidence.

Methods

We identified relevant publications in English and Italian through search of MEDLINE and the Cochrane Database of Systematic Reviews from May 2012 to November 2015, as previously described.[1,3] Updated recommendations were considered using the previously described methodology.[1,3]

Results

Methods of Temperature Measurement

Methods and devices for body temperature measurement are controversial. There is no consensus on the best method that is relatively easy, safe, and noninvasive, to accurately predict core temperature.[4] Rectal temperature better reflects the central core temperature but is a physically and psychologically invasive method.[5] For this reason, the Italian guidelines recommend that axillary temperature measurement with a digital thermometer be used in school and home settings. In hospital or ambulatory care settings, an infrared thermometer should be used in children >1 year of age only by trained healthcare personnel because the use of these devices is prone to errors when used by untrained persons.[3] In infants <1 year of age, in every setting, for measurements of axillary temperature only the digital thermometer is recommended because evidence regarding other devices in this age group is poor.[5] After the release of the Italian Guidelines, several studies have been published regarding the use and the performance of infrared thermometers in different settings and age groups[5-16] (**Table**). Infrared thermometers can be noncontact or contact

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Table. Comparison of temporal artery scan thermometer and other classic methods used to measure body temperature

Authors	Year	Study design	Objective	Population (n, age)	Sensitivity (%)	Specificity (%)	Other results	Recommend (R) and not recommend (not-R)
Allegaert et al[5]	2014	Observational	To assess the accuracy of tympanic, infrared skin, and temporal artery scan thermometers to rectal measurement	294, 0.02-17 y	RT >37.8°C: • TT: 18 • ISS: 18 • TAT: 34 RT > 38°C: • TT: 22 • ISS: 27 • TAT: 41	37,8°C cut-off RT: • TT: 99.6 • ISS: 99.5 • TAT: 94 38°C cut-off RT: • TT: 100 • ISS: 100 • TAT: 98	Mean temperature difference: • TT vs RT: 0.49°C (95% CI 1.69, –0.71) ($P < .0001$), • ISS vs RT: 0.34°C (95% CI 1.60, –0.92) ($P < .0001$), • TAT vs RT: 0°C,(95% CI 1.33, –1.32) ($P = .9288$).	R
Batra et al[4]	2013	Observational	To compare axillary, temporal artery, and tympanic membrane measurement to rectal measurement in the emergency department	100, 2-12 y	RT >38°C : • AT: 80 • TT: 98 • TAT: 80	RT >38°C : • AT: 100 • TT: 98 • TAT: 98	Correlation coefficient: • TAT vs RT: febrile 0.99 ($P < .0001$) afebrile 0.91 ($P < .0001$) • AT vs RT: febrile 0.95 ($P < .0001$) afebrile 0.94 ($P < .0001$)	R
Hamilton et al[7]	2013	Observational	To compare 2 infrared thermometers (ThermoScan PRO 4000 [Braun GmbH, Kronberg, Germany] prewarmed tip ear thermometer and the Temporal ScannerTM TAT-5000 TAT [Exergen Corp, Watertown, Massachusetts]) to CT	205, 0-18 y	CT ≥38°C : • TT: 91.6 • TAT: 72.6	CT ≥38°C : • TT: 94.5 • TAT: 96.4	Mean temperature difference: • TT vs TAT: 0.17 ± 0.48°C (CI –0.77, 1.11) • TT vs CT: –0.01 ± 0.39°C (CI –0.77, 0.77) • TAT vs CT: –0.17 ± 0.58°C. (CI –1.32, 0.98)	Not-R
Hoffman et al[8]	2013	Observational	To compare temporal artery temperature to RT in febrile children in an emergency department.	147, 0-36 mo	RT ≥38°C, TAT : 53 RT ≥39°C, TAT: 27	RT ≥38°C, TAT : 97 RT ≥39°, TAT: 79	Mean temperature difference • TAT and RT: 1.99°F (1.11°C) (95% CI 1.75°F-2.23°F).	Not-R
Isler et al[9]	2014	Observational	To compare temporal artery or temporal artery scan thermometers to mercury and digital axillary thermometer measurements.	218, 0-18 y	NA	NA	Mean temperature difference: • TAT vs Glass-mercury AT: 0.6°C, SE 0.08, $P = .000$ • TAT vs digital AT: 0.9°C SE 0.08, $P = .001$ • Mercury AT vs digital AT: 0.6°C, SE 0.08 $P = .000$	R
Moore et al[10]	2014	Observational	To compared temporal artery scan thermometers to detect high RT in children in emergency department.	239, 91 d-4 y	All subjects: TAT >38°C : • RT ≥38°C: 56 (95% CI 54, 58) • RT ≥39°C: 75 (95% CI 73,77) Injured subject: TAT > 38°C: • RT ≥38°C: 67 (95% CI 65,69) • RT ≥39°C: 100 (95% CI 98, 102)	All subject: 38°C TA cut-off: • RT ≥38°C: 93 (95% CI 92, 96) • RT ≥39°C: 85 (95% CI 83,87) Injured subject: 38°C TA cut-off: • RT ≥38°C:10 (95% CI 98, 102) • RT ≥39°C: 10 (95% CI 98, 102)	Mean RT (38.05 ± .99°C) vs mean TAT (37.55 ± .8°C) $P < .0001$.	Not-R

(*continued*)