



## Approach to fever in children

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### What I want to tell you:

- What is fever?
- How to measure temperature in children
- Diagnostic approach
- Management
- Sepsis as the most deadly infection
- Conclusions

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### Why we pay special attention to fever?

- Parental concern: “fever phobia”
- **Clinician concern: we don't want to miss a life threatening infection**
- Most common complaint in paediatric visits
- Some of these kids are sick but most do well without intervention
- Need an approach to sort them out

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What is fever?

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### Fever

1. Temperature  $> 38,0^{\circ}\text{C}$  (mouth)
  - Stressfull situation for both parents and doctors
    - Problems with data collection from the small child

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### Fever in a child under 5

- The most common reason for medical visits
- Diagnoses range from minor to life-threatening
- Conflict recommendations & approaches
- The vast majority: benign viral infections

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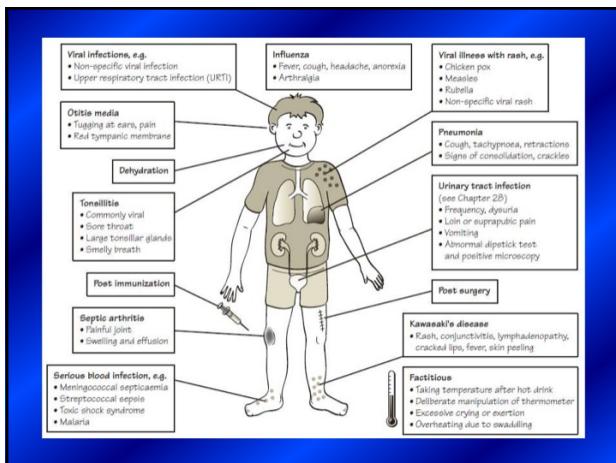
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## Fever – a common problem

- Filogenetically old defensive reaction for infections
    - Upregulates natural immunity
    - Each  $1^{\circ}\text{C}$  up increases lymphocyte production by 10%
  - Favouring factors:
    - Age < 3 years
      - Common respiratory infections: to 12/year
      - Tendency to response with high fever to infections

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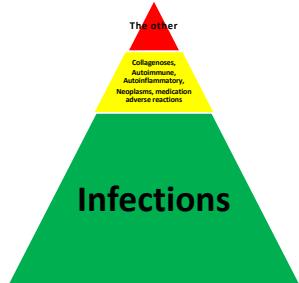


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## Fever ≈ infection

- **Infections**

- Collagenoses & autoimmune disorders
  - Auto-inflammatory diseases (periodic fevers)
  - Neoplasms
  - Allergies
    - Serum sickness
  - Drug-induced fever
  - Hormonal disturbances
  - Regulatory disorders (thalamus)



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## Interpretation of the fever

- The physician's clinical judgement is usually based on the temperature and the general appearance at the time of the examination, not the temperature taken at home.
- This applies to all children except those younger than three months. In the case of normal temperature at the time of the examination but a history of fever, a sepsis examination is indicated for neonates and possibly some infants between the ages of one and three months or if there is the slightest appearance of toxicity
- The degree of temperature is an important but misleading indicator. Bacteremia is more frequent in children with a temperature of 39°C or higher.
- The absence of fever or the presence of a low grade fever does not preclude the possibility of a serious infection

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## Temperature pitfalls

- Antipyretics:
  - No correlation between disease etiology/severity and response to antipyretics (Baker, 1987; numerous others)
- Tactile temperatures
  - Sensitivity 83%
  - Specificity 76% (Hooker, 1996; Graneto, 1996)
- Afebrile on presentation:
  - 6 of 63 infants 0-3 months with bacteremia / meningitis afebrile in clinic after being febrile at home (Pantell, 2004)

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## Important Questions

- How can a fever of viral origin be differentiated from one of bacterial origin?
- Do all febrile children with no obvious infection site need a blood culture?
- Should antibiotics be administered before the results of the blood culture have been received?

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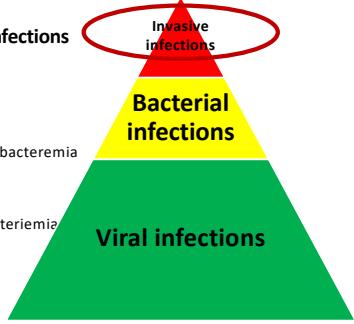


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## Infections in a febrile child

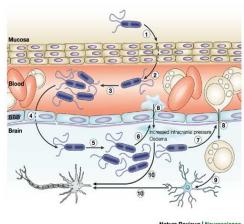
- **Viral infection**
- **Bacterial mucosal infections**
  - Otitis media
  - Pharyngitis
  - Sinusitis
  - UTI
  - Pneumonia without bacteremia
- **Invasive infections**
  - Occult bacteremia
  - Pneumonia with bacteremia
  - Sepsis
  - Meningitis
  - Osteomyelitis
  - Abscess



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## Serious bacterial infections

- **Invasive infections**
  - Occult bacteremia
  - Pneumonia with bacteremia
  - Sepsis
  - Meningitis
  - Osteomyelitis
  - Abscesses in tissues



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## How to identify the child with invasive infection?



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### Main problem

- Neither the medical history, the physical examination, nor complementary tests indicate a bacterial infection that can potentially lead to serious complications

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Diagnostic approach

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„Don't put the cart before the horse”



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## Approach to the fever

- **The primary aim – identification of the cause**
  - At least exclusion of the disease that needs immediate therapy e.g. antibiotics or IVIG
- **The secondary aim – symptomatic treatment**
  - Lowering of the fever = relief of symptoms

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## The importance of age

- Bacteremia appears at all ages; however, it is more frequent in infants between the ages of three and 36 months
- Before the age of three months, the incidence of bacterial disease in febrile infants is about 10% and that of bacteremia is between 2% and 3%
- **As a rule, bacterial infections are more serious and insidious in infants less than three months**
- This group, particularly the neonates, is more vulnerable and is exposed to a greater variety of causal agents; group B streptococcus and E coli being the two main ones
- The main danger during the neonatal period is for UTI or meningitis

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## Take home message

- Fever is sign not a disease
- Response of the fever to treatment has a limited prognostic value
- The primary aim: identification of the cause
  - Fever usually, but not always indicates infection
- We treat symptomatically fever to relieve symptoms not to normalize temperature
- There are no sufficiently reliable markers of bacterial infection

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## References

1. NICE guideline: Fever in under 5s
2. Management of Fever in Children: Summary of the Italian Pediatric Society

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