



Fever in Children

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(almost retired)

Topics

- Definition
- Taking the temp
- Function of fever
- Reasons for treating fever
- How antipyretics work

Fever:

Temperature over...

100.4

38 C

Taking the Temp

Which is the most accurate reflection of core temp?

- Ear
- Rectum
- Axillary
- Under tongue
- Skin probe

Oral Temp

- 94 (34.4C) is not an accurate temp (rare exceptions)
- Very inaccurate if probe just behind front teeth
- Needs to be back by last molars
- Beware the “O” sign (dry mouth)

Ear Thermometer

- Only place it has been shown to be accurate is in-house in a pediatric department

Rectal Temp

- It doesn't matter if the thermometer is buried in poop for the first temp
- But poop doesn't change temp as quickly as the patient does, so may not be accurate for second temp

Skin Probe Temp

- Tends to overestimate temp in afebrile children and underestimate fever in febrile children
- Device works only if it is in normal room temperature

Fever or No Fever

- That is the question
- Presence of fever begs finding the source.
- Level of activity, interaction is much more important vital sign than exact degree of fever.

Fever

- For every degree of temperature rise, the pulse should increase about 10 points
- If it doesn't:
 - Beta or calcium blockers?
 - Faked fever?
 - Diabetes?
 - Hepatitis?
 - Mycoplasma pneumonia?
 - Malaria?
 - Salmonella?

Function of Fever

- WBCs eat more at a temp between 101 and 103 (38.3 – 39.44C)
- Many bacteria and viruses can't survive or replicate well at temperatures higher than 99 (37.2C)
- Fever provides a clue that an inflammatory response has begun – person is sick

Does Treating Fever Slow Healing Process?

- Three old studies
 - 1989 – chicken pox scabs stayed a day longer
 - 1975 – shed more virus in runny nose snot
 - 1990 – shed more virus in snot
- No evidence of delayed healing
- No evidence of quicker healing

Drugs that Increase the Temperature

- Antibiotics
 - After 5 days – allergic reaction
- Cocaine, methamphetamines
- Barbiturates
- Niacin (after 6 weeks)
- Tagamet
- Dilantin

Drugs that Decrease the Temperature

- Calcium channel blockers
- Antipsychotics
- Most drugs do not work well if pt' s temp is less than 95 (35C)

Babies with Fevers

- Fever causes increased heart rate
- Fever causes increased respiratory rate
- Feverish babies are cranky babies



Old Wives' Tale #1

The higher the fever,
the sicker the baby

104 (40C) is no worse than 102 (38.8C)

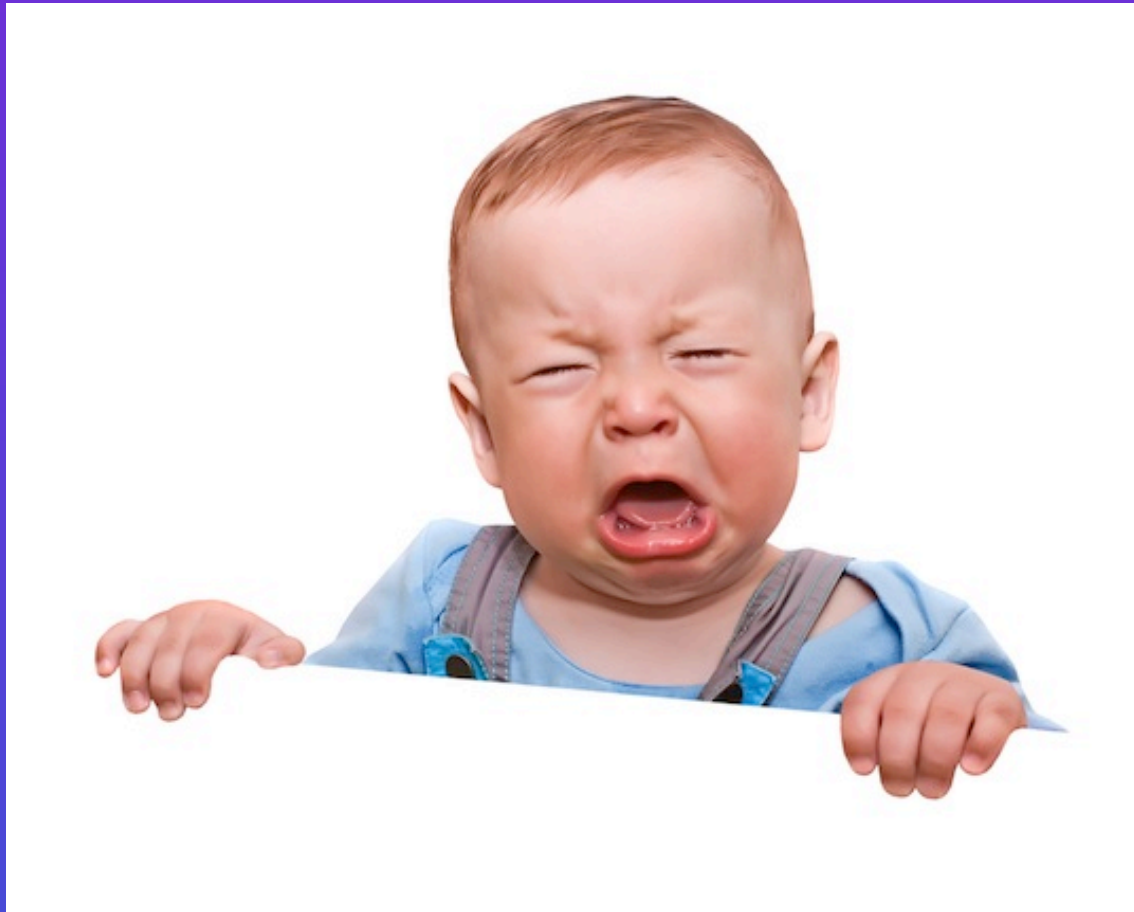
- No difference in WBC count or incidence of bacteremia until get to a temp of 106 (41.1C)
- WBC count over 15,000 is significant – and a baby can have a high white count at a temp of 101 (38.3C)
- Bacteremia MAY NOT be significant
- Presence or absence of fever matters
- Level of consciousness after antipyretic matters

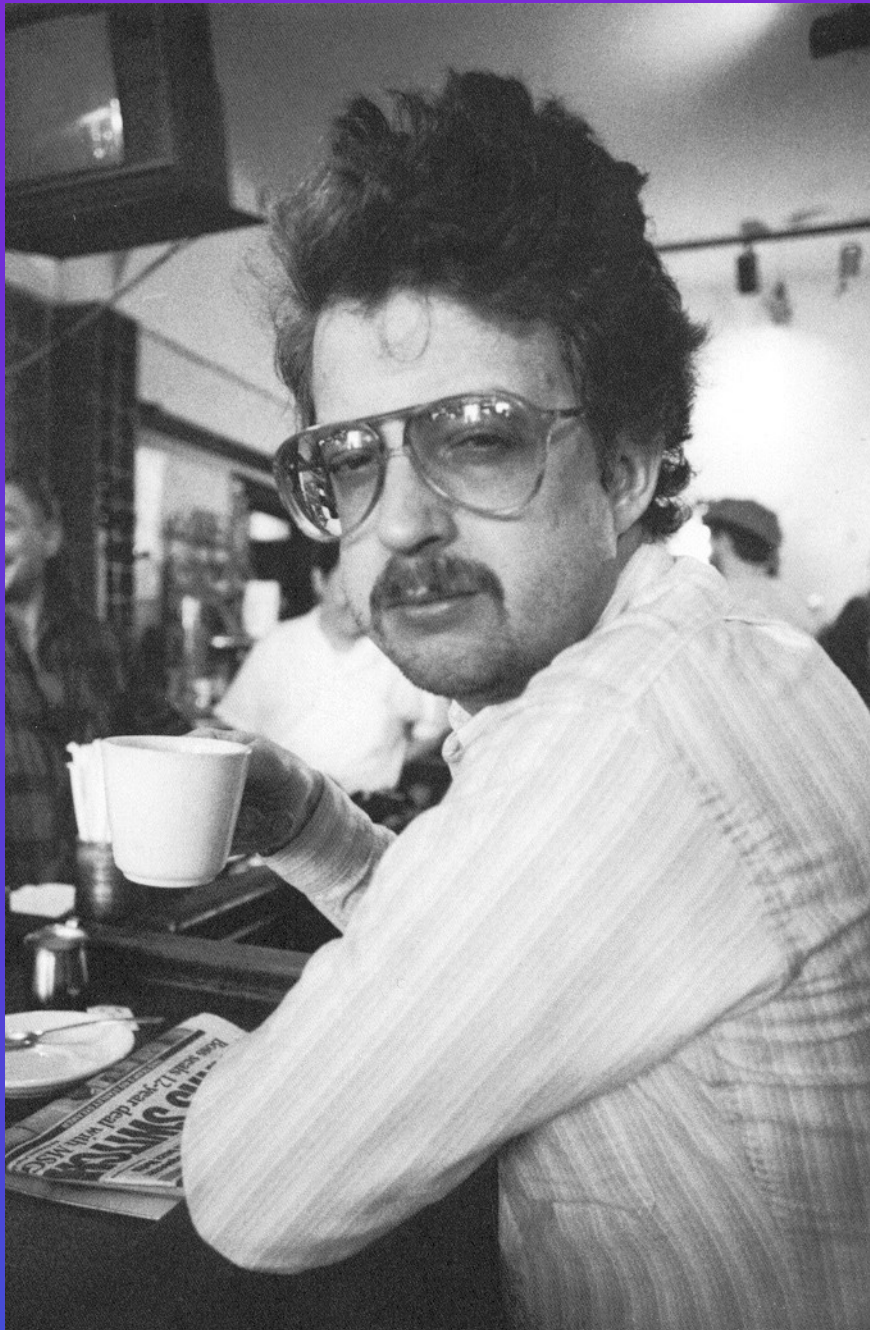
Dangers of Fever

- Fever itself is not a problem in great majority of pts
- In very sick, fragile patients, increased metabolic demands may be a problem
- In elderly, fever may cause decreased mental function
- Fever makes babies look sick

Reason for Treating Fever...

Febrile Baby





Parent of Febrile Baby

Afebrile Baby



Parent of Afebrile Baby



Other Reasons to Treat Fever

- Ease assessment of baby
- Decrease fluid loss (easily replaced if baby isn't vomiting/diarrhea)
- Assess for other causes of tachycardia, hyperpnea
- Baby feels better
- Parent and baby get some sleep

Febrile Seizure

- Sudden onset of fever
- Rectal temperature over 102° (38.8C)
- Febrile seizure does not cause elevated WBC count
- No greater incidence of bacteremia or meningitis
- DOES NOT cause brain injury by any measure

Febrile Seizures

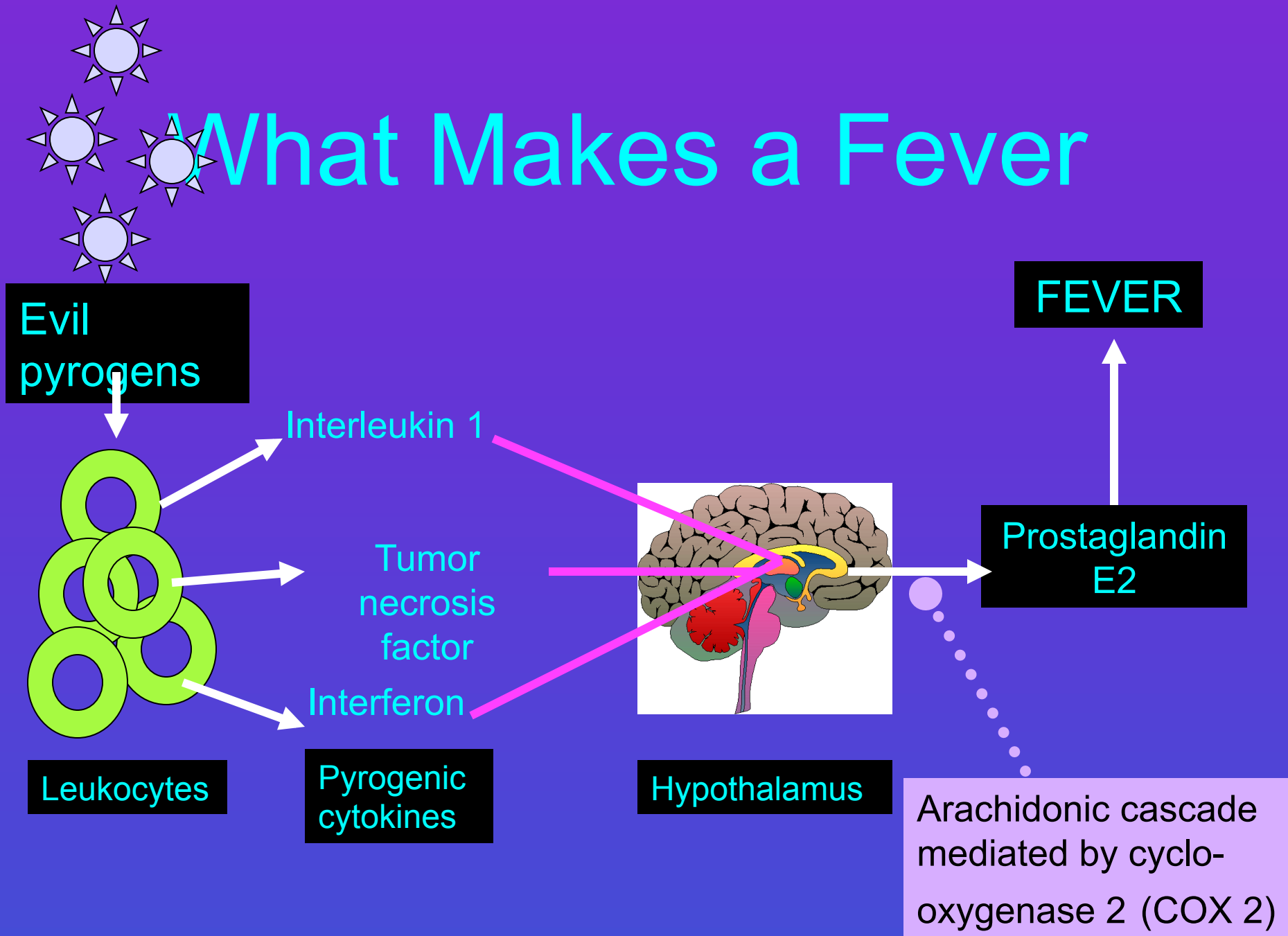
- One time recurrence in 30% of cases
- More recurrences in 30% of those
- Treating prophylactically with acetaminophen or ibuprofen does not decrease incidence of recurrent seizures
- Discharge?
 - Parental capacity
 - Other problems with kid



Old Wives' Tale #2

Wake up a baby every
four hours to treat the
fever

What Makes a Fever



Antipyretic drugs work
by blocking the
formation of COX 2
which prevents the
formation of
Prostaglandin E2

Cyclooxygenase

- Two forms
 - COX 1 – initiates production of prostacyclin which has antithrombogenic and cytoprotective functions
 - Blocking COX 1 leads to gastric irritation
 - COX 2 – principle mediator in the inflammatory response

COX Inhibitors

- Acetaminophen does not affect COX in the periphery – why it's not an anti-inflammatory drug
- NSAIDs and aspirin block COX 1 and COX 2 everywhere
- COX 2 inhibitors block only COX 2
 - Rofecoxib – Vioxx
 - Celecoxib – Celebrex
 - Supposedly fewer GI effects

Acetaminophen

- Incredibly safe
- Metabolized differently in kids
 - Few hepatotoxic metabolites
- 15 mg/kg (7 mg/lb)
- Maybe less when given q 4 hrs at home
- Rectal absorption is awful
 - Studies recommend 40 - 45 mg/kg rectally

Trivia Question:

Which end of the suppository goes in first?

Have to cut it lengthwise to cut dose

Ibuprofen

- No evidence that it is more effective than acetaminophen
- Except in septic adults
- Close cousin of aspirin
- Gastric upset, vomiting
- Every 6 hours
- Dosage range and timing is confusing

Ibuprofen

- Blocks renal prostaglandin production
- Prostaglandins dilate afferent arteriole in glomerulus
- Decrease blood flow to kidney
- Decrease filtration pressure
- 84,00 pedi patients with short term use, no greater incidence of GI bleed or renal disease
- BTW, ACE inhibitors dilate EFFERENT arterioles, so the combination of the 2 can cause renal failure

Alternating Motrin and Tylenol

- Fraught with danger – overdose the NSAID
- Not necessary

No Way to Treat Temp

- Tubbing, alcohol baths, fans on wet skin
 - Briefly reduce temp until hypothalamus regroup, then tries harder
 - Causes vasoconstriction and shivering, which will raise temp even more
- Feed a cold, starve a fever – what the heck does this mean?



Old Wives' Tale #3

Don't cover up with a
blanket – that will make
the fever higher

Most Children Survive Parenting

- Moms CAN tell if baby has a fever
- Moms can't calculate dosage
 - 40% correct when given concentration, weight, and mgs/pound
 - 40 % draw up correct amount
 - 1/3 overlap between the two
 - 45% underdose, 9% overdose

When Do You Recheck the Temp After Antipyretic Dose?

- Lowest trough after dose – about 3 hours after administration
- If it's going to move, it will begin to move at ONE hour
- Both acetaminophen and ibuprofen wear off at 4 – 5 hours

Traumatic and Non-infectious Causes of Fever

- Head injury affecting hypothalamus
 - Fever won't be your first clue
 - Meds won't work well
- Brain tumor
- Recovery from trauma – inflammatory response
- Leukemia and other cancers
- Reactions to drugs
- Teething

Some Infectious Causes of Fever in Babies

- Sepsis
- Meningitis
- Otitis media
- Urinary tract infection

Sepsis

- Baby less than 2 mo old
 - Immature immune system
- Lethargy, listless, not alert, doesn't care
- Fever most of the time
- Most common organism
 - strep pneumoniae (pneumococcus)
- Antibiotics NOW – IM if can't get IV
 - Takes at least 4 hours to get into spinal fluid
 - don't wait until after tap



Meningitis

- Level of consciousness, level of consciousness, level of consciousness
- Most do not have stiff necks
- Most is viral
- Most common causative agents in bacterial meningitis – strep pneumoniae, routine vaccines
- Neisseria – no vaccine



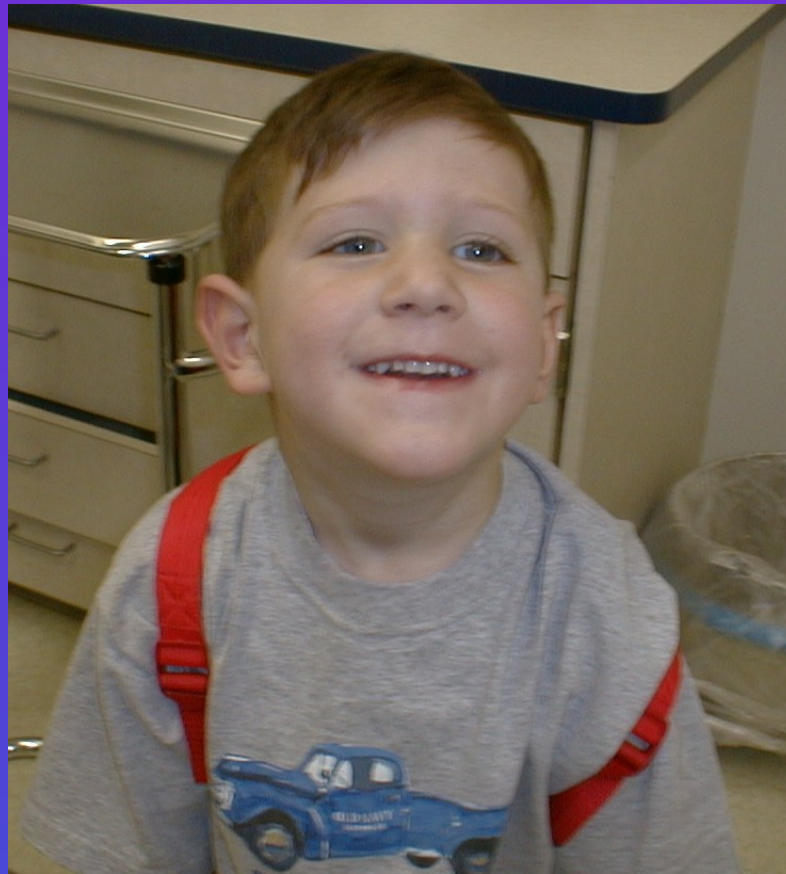
Otitis Media

- Many countries do not treat it with antibiotics unless symptoms last more than 3 days
- Many studies showing treated and untreated otitis resolves in 3 days 80% of the time
- Auralgan off the market
- Most common causative bacterial agent is strep pneumoniae

Urinary Tract Infection

- Supposedly up to $\frac{1}{4}$ of infectious fevers are UTIs
- Female babies and uncircumcised male babies up to 18 mo old
- Circumcized male babies up to 6 mo old

Not Sick



Sick



Sick



Not Sick



Sick



Not Sick



Sick





Sick



Not Sick





Sick





Not sick

