

# The Febrile Infant

David Schaevitz MD

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A Global  
Challenge



**World Health  
Organization**

WHO

# ENDING PREVENTABLE NEWBORN DEATHS & STILLBIRTHS

EVERY YEAR:

**2.6 million** babies die in the first 28 days of life. Most in the first week.

## THE TOP CAUSES:

1. Prematurity
2. Complications during birth
3. Severe infections

AN ADDITIONAL:

**2.6 million** stillbirths occur each year

**50%** after labour has begun

BUT:

**75%**

of newborn deaths CAN be prevented with high-quality care. So can the majority of maternal deaths and stillbirths.



Healthy mother



Healthy birth



Good health in the first days of life



The start of a healthy childhood

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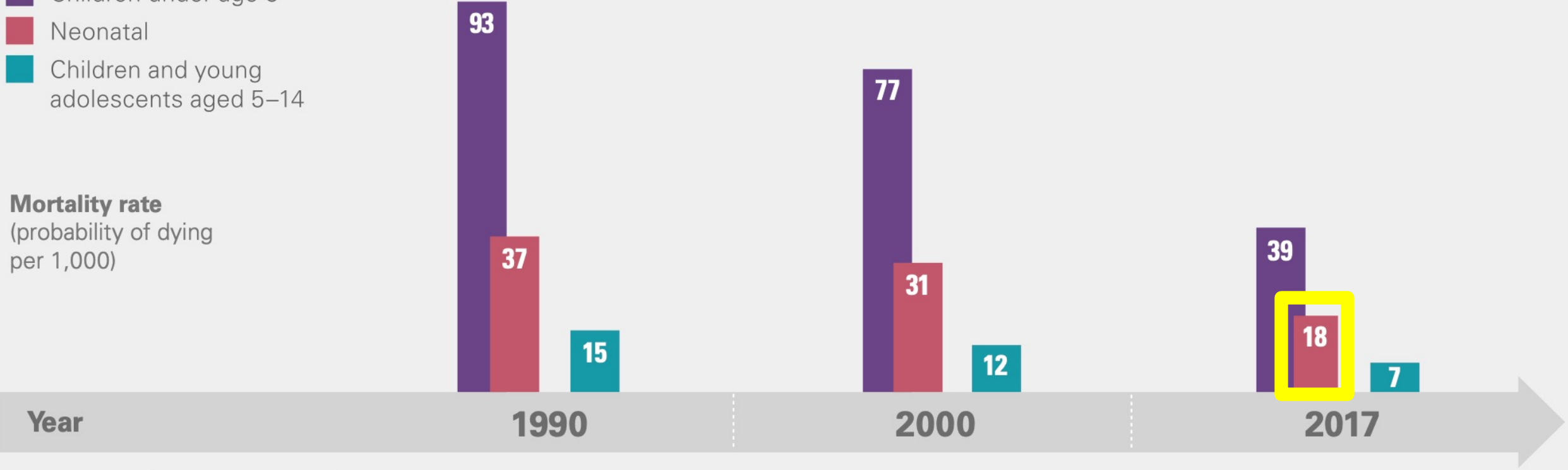


The start of a healthy childhood

# Global mortality rates and deaths by age

- Children under age 5
- Neonatal
- Children and young adolescents aged 5–14

**Mortality rate**  
(probability of dying per 1,000)



# NZ raw numbers

## Cross-sector Indicators

Geographic Area: New Zealand • Time Period: 2018-06

 Download

 Help

Indicator		
Sex: Total		
Neonatal mortality rate	(*)	3.481134953
Infant mortality rate	(*)	4.725436991
Neonatal deaths	(*)	208
Infant deaths	(*)	282

\*per 1,000



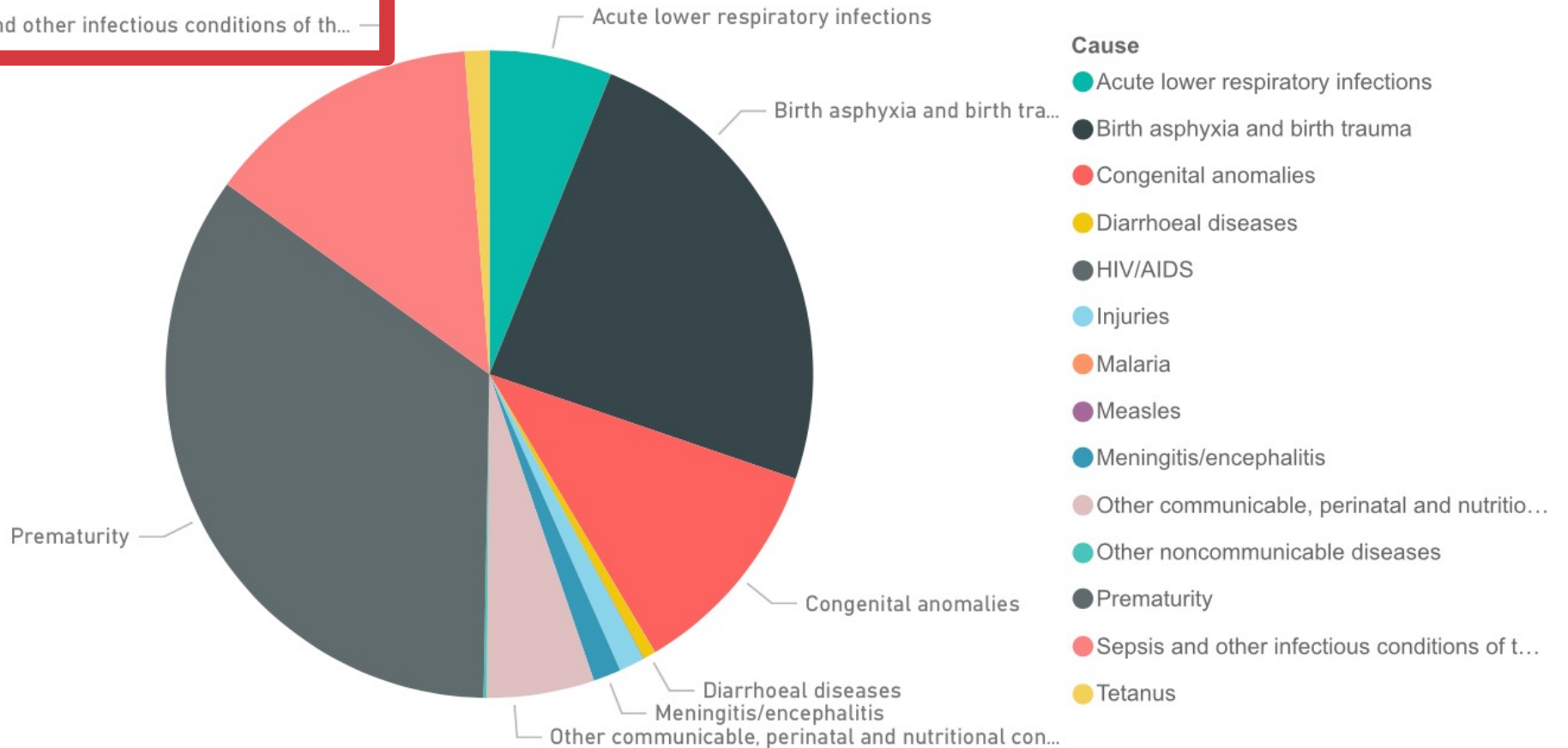
# Latest Global WHO Stats of Neonatal Deaths

Number of neonatal deaths - by cause

Year: Latest data\*

Sepsis and other infectious conditions of th...

Global Stats



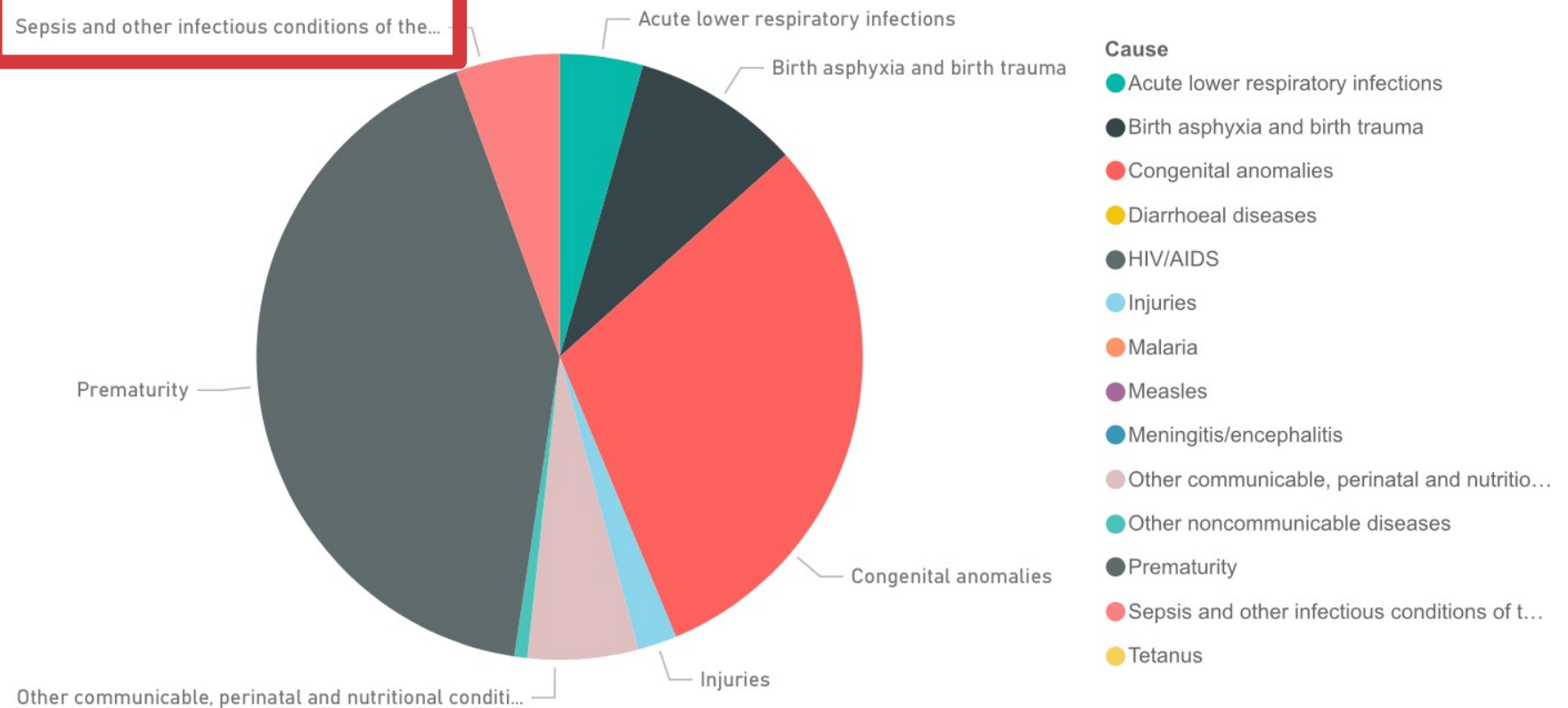
13.81% died from sepsis, but this is independent of other infectious diseases!

# Latest New Zealand WHO Stats of Neonatal Deaths

Number of neonatal deaths - by cause  
WHO region: Western Pacific / Year: Latest data\*

Country name: New Zealand

Sepsis and other infectious conditions of the...



Global Stats

5.53% died from sepsis. About 10 deaths!!



Morbidity is significant

- Hearing loss
- Visual impairment
- Cerebral palsy
- Impaired psychomotor and mental development

This can be a  
difficult  
diagnosis.



Which infant is  
septic?



Infant A?



Infant B?

## Case

- *A 20-day-old boy presents to the ED for evaluation of a rectal temperature of 38°C. The baby was born by spontaneous vaginal delivery at 39 weeks' gestational age. The mother's prenatal labs were normal, including negative screening for group B Streptococcus. The patient felt warm to the parents today but has otherwise been asymptomatic. The baby has been eating 3 ounces every 4 hours and making an appropriate amount of wet nappies.*

What next  
doctor?



# Obs

- Temp 38.3 rectal
- HR 170
- RR 58
- BP 75/51
- O<sub>2</sub>Sat 99% on RA

# Physical Exam

- *The physical examination is normal, including a flat anterior fontanel and good hydration*

What next  
doctor?

- Can I take him home  
doctor?



# The Old School

Table 1.

## The Rochester, Philadelphia, and Boston Criteria

Criterion	Rochester Criteria (0-60 days of age)	Philadelphia Criteria (29-56 days of age)	Boston Criteria (28-89 days of age)
<b>History and Physical Exam</b>	<ul style="list-style-type: none"> <li>■ Born at term (&gt;37 weeks)</li> <li>■ Infant previously healthy</li> <li>■ No postnatal antimicrobial therapy</li> <li>■ Well-appearing</li> <li>■ No focal infection</li> <li>■ No evidence of skin, soft tissue, or bone infection</li> </ul>	<ul style="list-style-type: none"> <li>■ Well-appearing</li> <li>■ No focal infection</li> <li>■ Reassuring exam</li> </ul>	<ul style="list-style-type: none"> <li>■ No antibiotics within preceding 48 hours</li> <li>■ No immunizations within preceding 48 hours</li> <li>■ Well-appearing</li> <li>■ No focal infection</li> </ul>
<b>Laboratory Parameters</b> (defines low risk)	<ul style="list-style-type: none"> <li>■ WBC: 5000-15,000 mm<sup>3</sup></li> <li>■ Absolute band count &lt;1500/mm<sup>3</sup></li> <li>■ UA: ≤10 WBC/HPF</li> <li>■ Stool: ≤5 WBC/HPF on smear</li> </ul>	<ul style="list-style-type: none"> <li>■ WBC: &lt;15,000/mm<sup>3</sup></li> <li>■ Band total neutrophil ratio &lt;0.2</li> <li>■ UA: &lt;10 WBC/HPF</li> <li>■ Urine: Gram stain negative</li> <li>■ CSF: Gram stain negative</li> <li>■ CXR: No infiltrate</li> <li>■ Stool: No blood, few to no leukocytes on smear</li> </ul>	<ul style="list-style-type: none"> <li>■ WBC: &lt;20,000/mm<sup>3</sup></li> <li>■ UA: &lt;10 WBC/HPF</li> <li>■ CSF: &lt;10 WBC/HPF</li> <li>■ CXR: No infiltrate</li> </ul>
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# The Old School

## Criterion

### Rochester Criteria (0-60 days of age)

#### History and Physical Exam

- Born at term (>37 weeks)
- Infant previously healthy
- No postnatal antimicrobial therapy
- Well-appearing
- No focal infection
- No evidence of skin, soft tissue, or bone infection

#### Laboratory Parameters (defines low risk)

- WBC: 5000-15,000 mm<sup>3</sup>
- Absolute band count <1500/mm<sup>3</sup>
- UA: ≤10 WBC/HPF
- Stool: ≤5 WBC/HPF on smear

#### Treatment for High-Risk Patients

- Hospitalize
- Empiric antibiotics

#### Treatment for Low-Risk Patients

- Home
- 24-hour follow-up required
- No empiric antibiotics

#### Performance Criteria

- NPV: 98.9% (97.2-99.6)



## **Children under 6 weeks of age, any fever (i.e. $>38^{\circ}\text{C}$ )**

- bacterial infection in approximately 15% and the possibility of rapidly progressive disease.

Full sepsis work up is necessary including:

- CXR
- FBC
- Blood cultures
- CSF
- Urine (bladder aspirate or catheter)

POC Glucose

- 6.2 mmol/L

CXR



# FBC

- Hb 160
- Hct .53
- Plt 235
- WBC 12.4
- Normal Diff
- No bands

# CSF

- Clear
- WBC 0
- RBC 3
- Glucose 43 mg/dl
- Protein 10 mg/dl
- Gram stain negative

# Urine

- WBC <10
- RBC 4
- Epi <10
- Otherwise negative



Dispo?





Antibiotics should be commenced immediately in infants who appear unwell (lethargic or very irritable).

Infants who look well may have IV antibiotics commenced once all investigations are completed, or may be observed closely *in hospital* without antibiotics if all initial results (FBC, urine and CSF microscopy, CXR) are normal. The decision regarding whether to start antibiotics will generally be made by the admitting team under these circumstances.

Same  
story,  
but Child  
is 50  
days old.

- How does this change your management?

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Same  
story,  
but Child  
is 50  
days old.



## **Children 6 weeks to 3 months of age, any fever (i.e. $>38^{\circ}\text{C}$ )**

The risk of bacterial infection in this age group is around 6%

### **If the infant looks unwell**

Perform full sepsis screen:

- CXR
- FBC
- Blood culture
- CSF,
- Urine (CSU or clean catch).

Admit on IV antibiotics (amoxicillin & cefotaxime, dose as described above).



Same  
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### **If the child looks well and feeding is satisfactory**

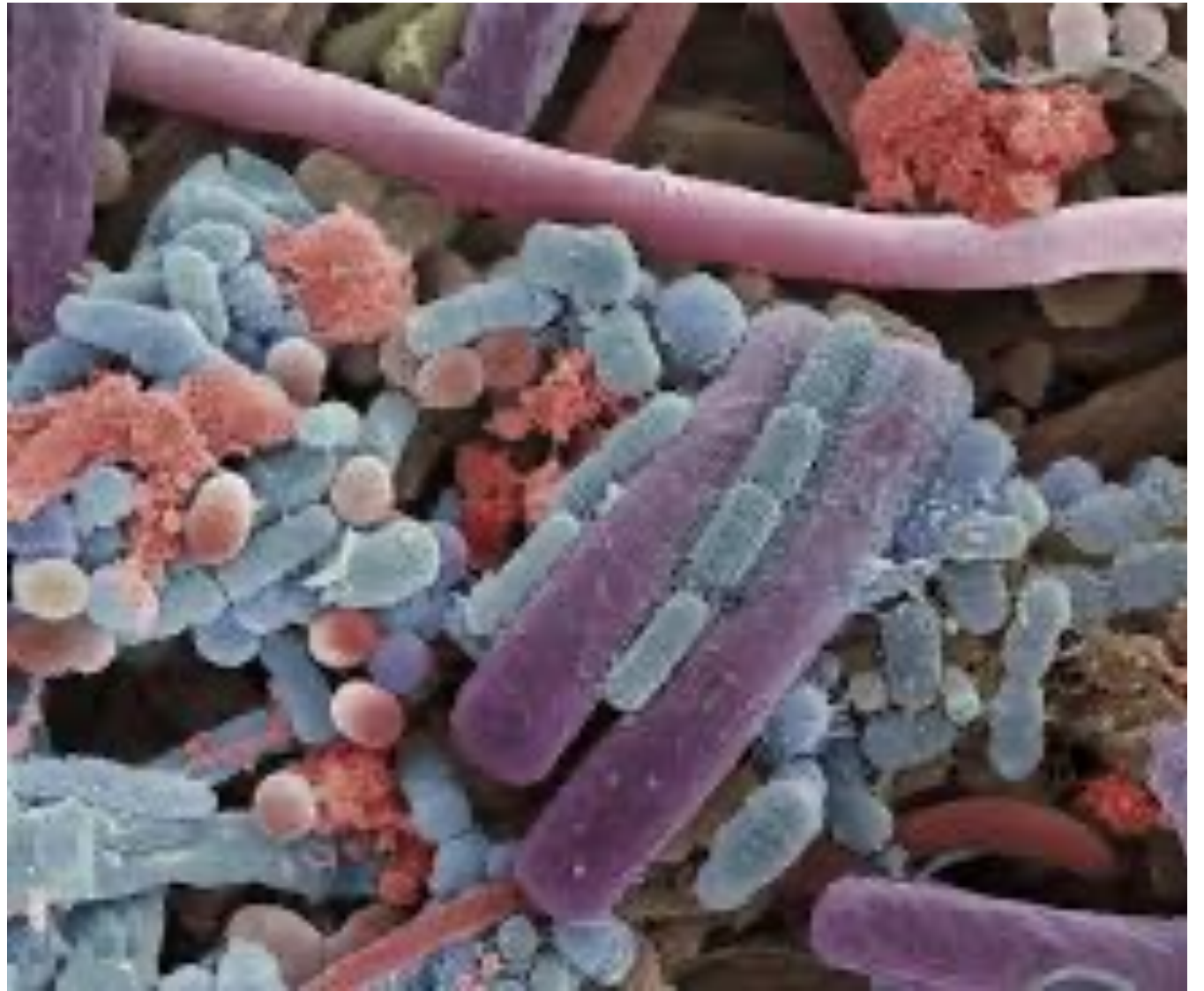
- Blood culture
- Urine (CSU or clean catch sent to lab)
- CXR if indicated by respiratory signs (grunting, tachypnoea, recession, oxygen requirement).

If initial results are normal, the infant may be managed at home.

Clinical review must occur within 24 hours (GP or hospital).

If you have any doubts regarding the infant's clinical state, laboratory results or social situation admit to hospital.

Who am I?

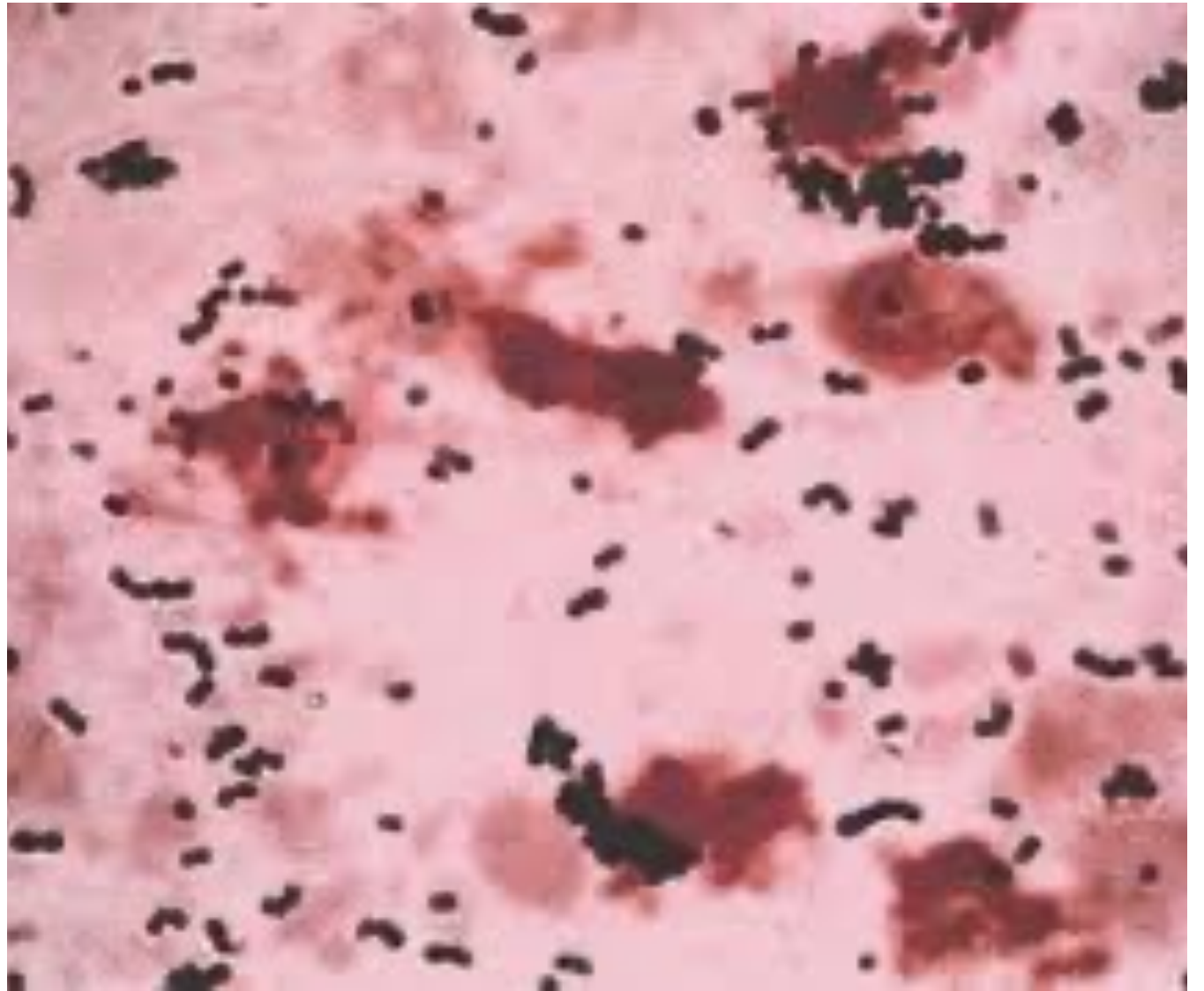




# Who am I?

- A gram positive cocci commonly found in the GI and GU tract of humans, women are screened for me and sometimes receive peripartum prophylaxis to prevent me from infecting.  
Who am I?

# Group B Strep



# Who am I?

- A gram positive, rod shaped bacillus, I can be contracted by the mother during pregnancy by eating fruits, vegetables, meat and cheeses. Unpasteurized food can cause particular risk. Who am I?

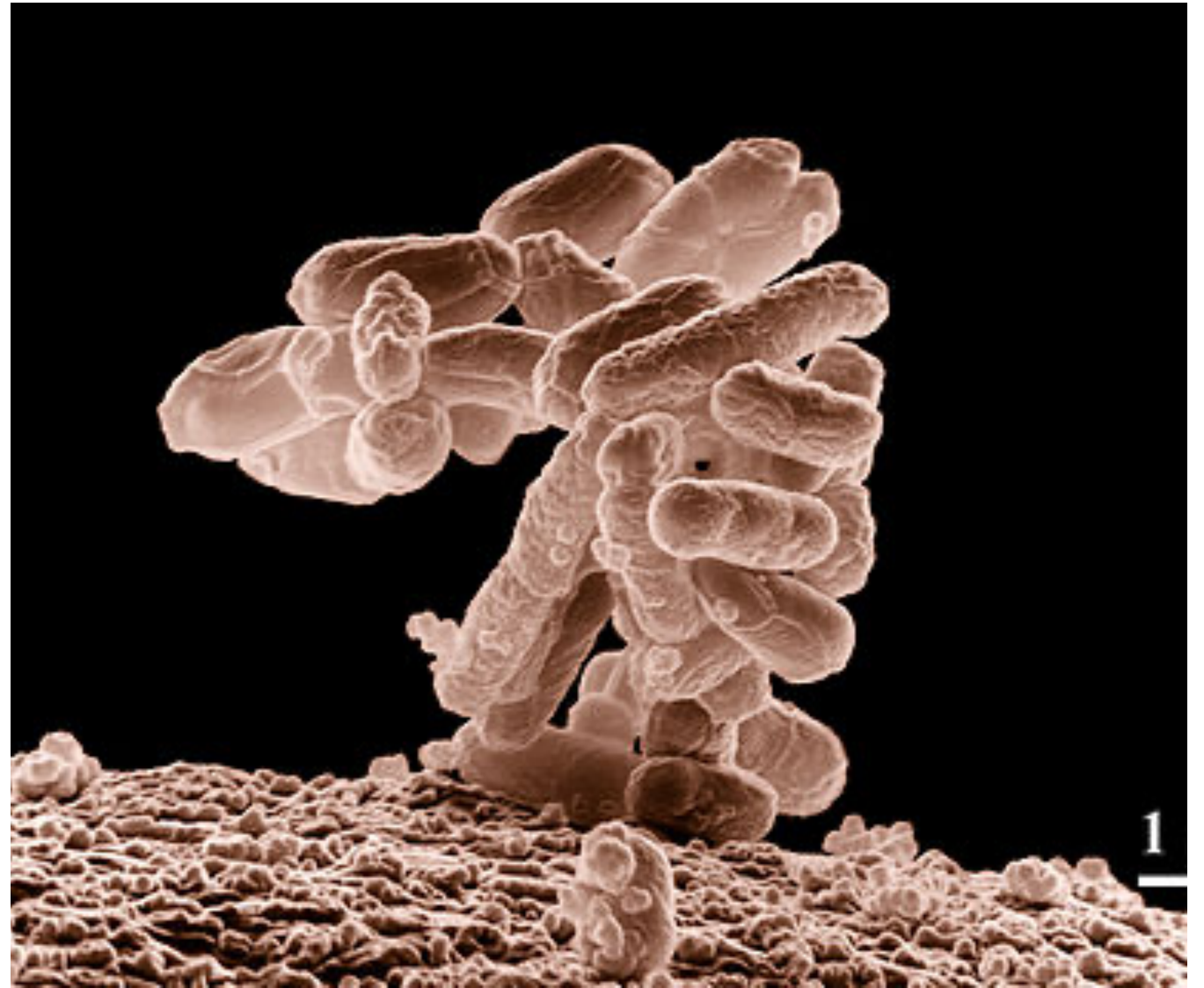
# Listeria Monocytogenes



# Who am I?

- A gram negative rod commonly found in the GI tract, I can lead to UTI, pneumonia and meningitis.

# E. Coli



ABX?



- AMOX (gram +)  
CEFOTAXIME (gram +/-)

The  
End!

- Thank you!!!