

# Risk of Bloodstream Infections and Antibiotic Resistance in Hospitalized Children with Severe Acute Malnutrition



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## CONTEXT

- 10-30% of children with SAM admitted to a stabilization center (SC)
- High mortality in SCs (>10%)
- Mortality increases with bloodstream infections, especially with antibiotic resistant pathogens
- Poor understanding of bloodstream infections in SCs
  - source of infection? source of transmission?
  - pathogens involved? antibiotic resistance patterns?
  - risk of infection and consequences?
- No systematic approach for detecting clinical deterioration and risk of mortality among children hospitalized with complicated SAM

# STUDY PURPOSE

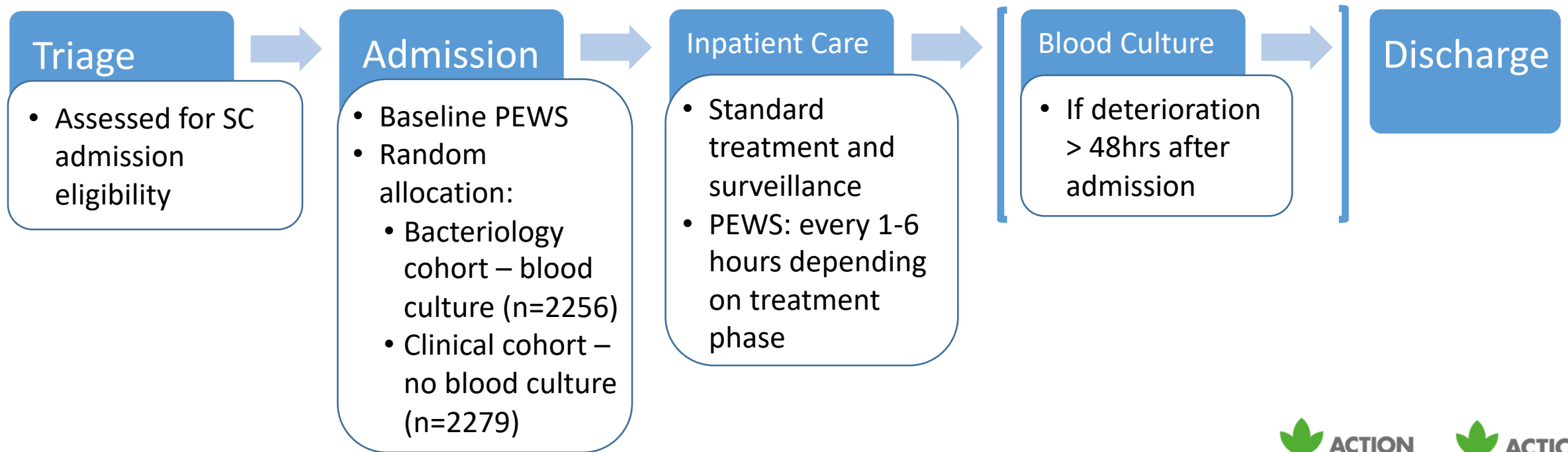
*This study aimed to:*

- 1) Identify the risk of bloodstream infections in a SC
- 2) Describe the antibiotic resistance profile of SC bloodstream infections
- 3) Evaluate use of a pediatric early warning score (PEWS)\* for signaling clinical deterioration

\* becoming standard of care in many countries, but limited evidence on use in low-resource settings and none in SAM population

# METHODOLOGY (1)

- Descriptive longitudinal study from October 2016 to November 2017
- MSF-supported nutritional SC in Madarounfa, Niger
- Children aged 1-59 months with complicated SAM



# METHODOLOGY (2)

## *PEWS indicators*

### Temperature

- Axillary temperature

### Neurological status

- Level of consciousness
- Convulsions or spasms

### Respiratory status

- Respiratory rate
- Respiratory distress
- Oxygen saturation
- Supplemental oxygen
- Presence of pallor

### Cardiovascular status

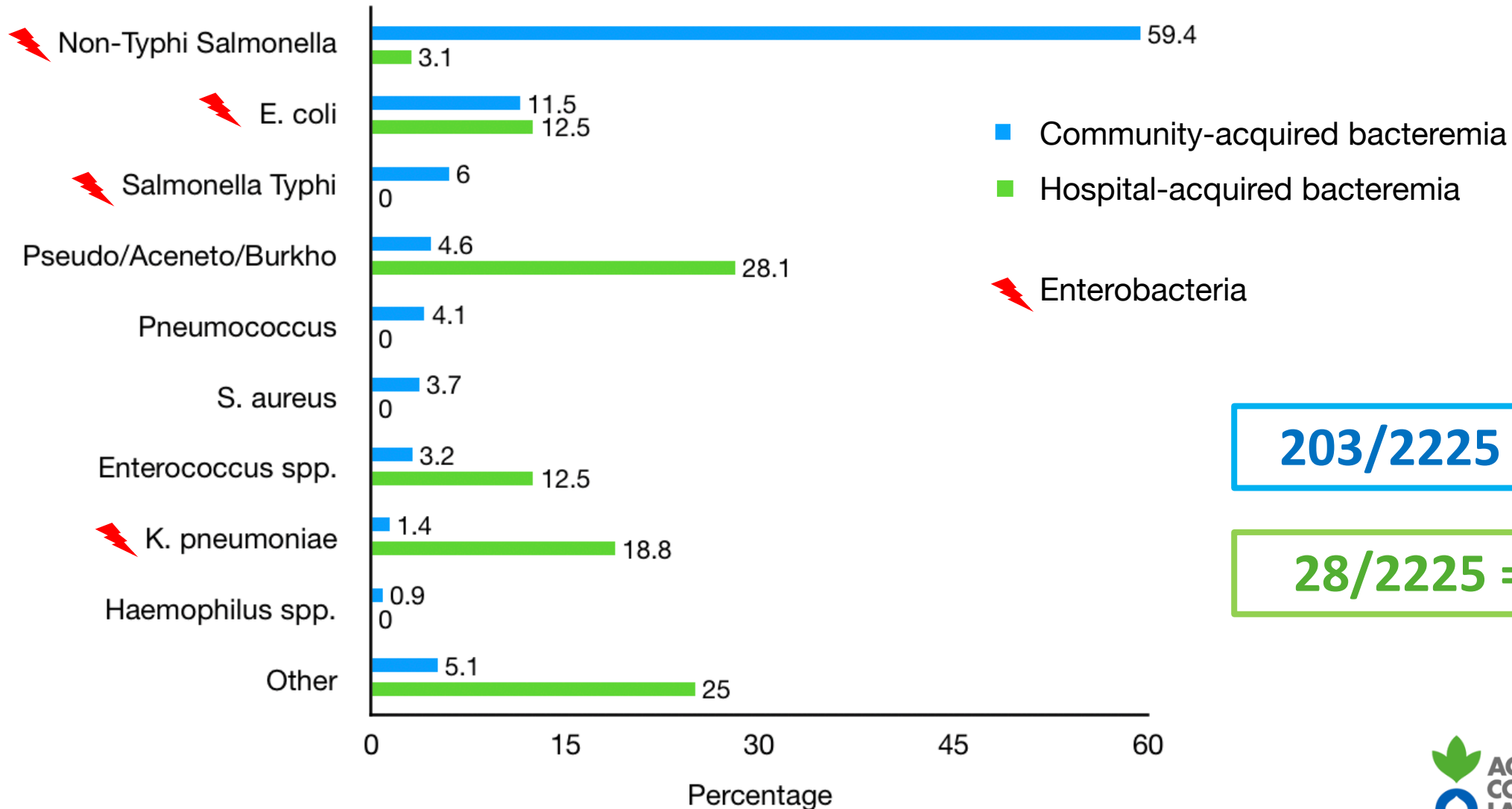
- Cardiac rate
- Capillary refill time

## METHODOLOGY (3)

### *Outcome definitions*

- Community-acquired infection:
  - + blood culture <48 hours after admission
- Hospital-acquired infection:
  - blood culture at admission AND
  - + blood culture >48 hours after admission
- Clinical deterioration: increase of PEWS  $\geq 1$

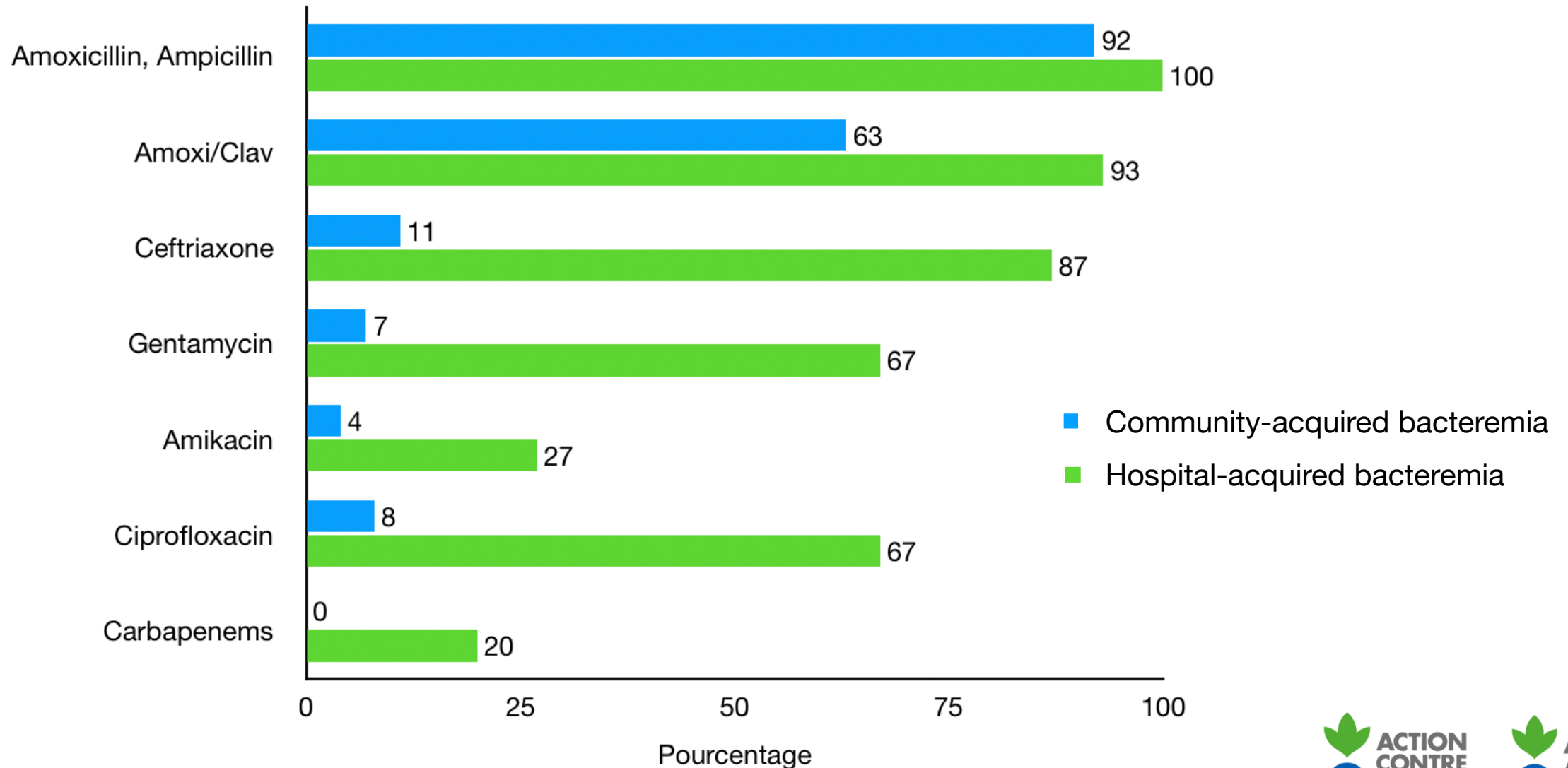
# RESULTS (1) – Bloodstream infections: etiology and risk



203/2225 = 9.1%

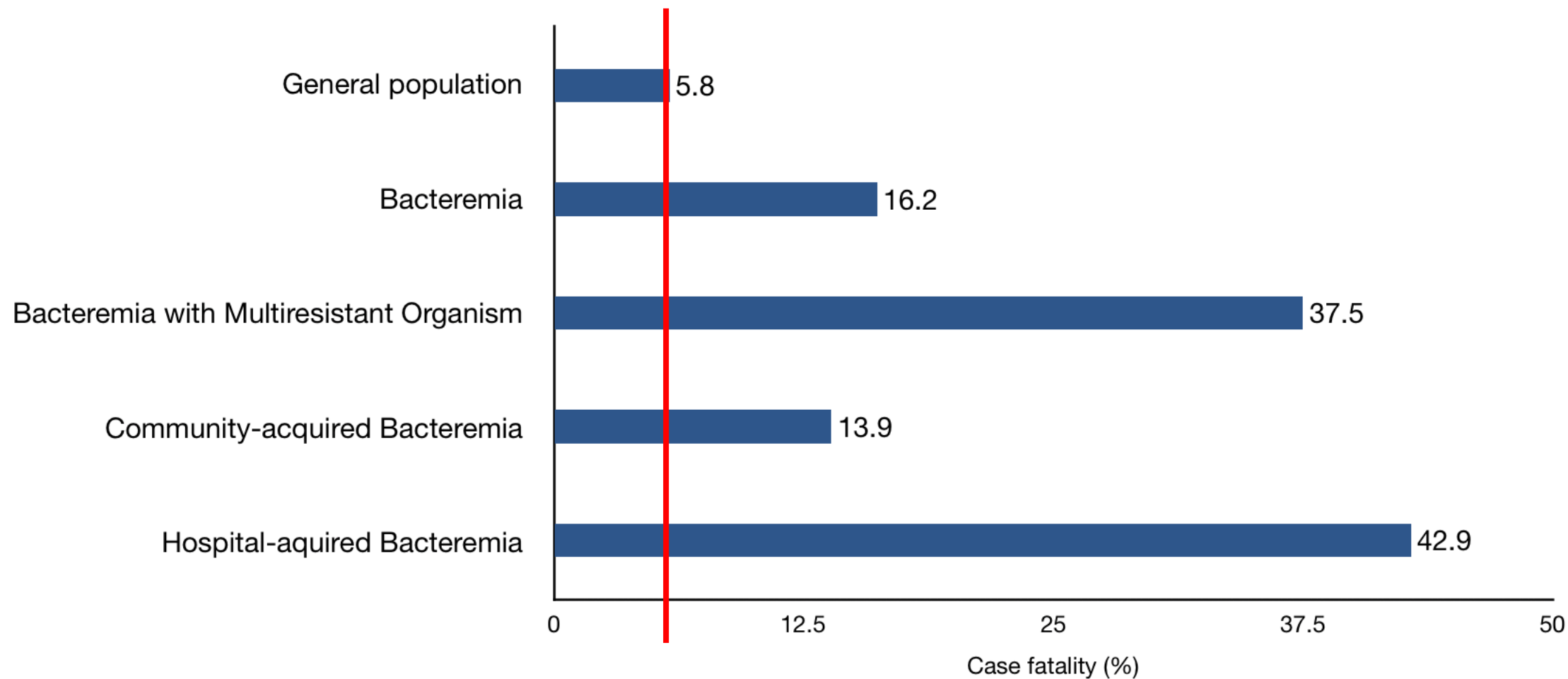
28/2225 = 1.3%

## RESULTS (2) – Antibiotic resistance among Enterobacteria

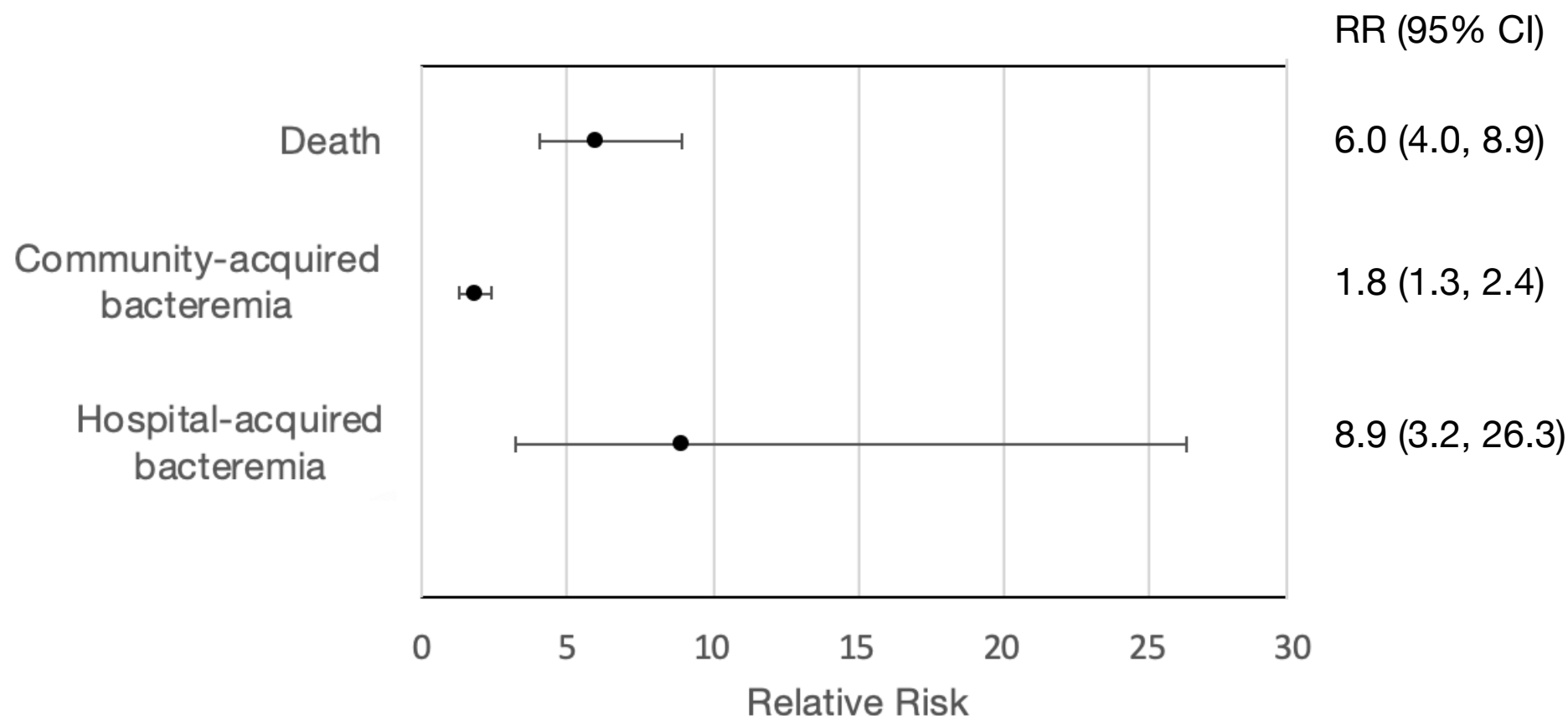




## RESULTS (3) – Case fatality



## RESULTS (4) – PEWS as indicator of clinical deterioration



## STRENGTHS

- LARGE SAMPLE SIZE OVER FULL YEAR TO CATH SEASONALITY
- Collection of blood samples at multiple time points to identify both community- and hospital-acquired bacteremia and causative agents
- Presence of bacteriology laboratory to establish resistance to commonly prescribed and guideline-recommended antibiotics
- Use of PEWS as a simple method for detecting clinical deterioration, pointing towards risk of bacteremia and death

## LIMITATIONS

- Blood sample collection difficult in severely ill children
- Reduced sensitivity of blood culture in children with SAM

## CONCLUSION

- Bacteremia was identified among 10% of children admitted to the SC
- High rates of antibiotic resistance were detected among both community- and hospital-acquired bacteremia.
- Antibiotic resistance was associated with increased risk of death.
- PEWS may be useful tool for detection of children at risk of bacteremia and death in SCs.

## IMPLICATIONS/RECOMMENDATIONS

- ➡ Adapt therapeutic guidelines for improved empiric and targeted treatment of bacteremia, following context-specific infection and antibiotic resistance patterns.
- ➡ Develop and implement a SAM-specific PEWS to prevent further deterioration and death.

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