


# Serious Bacterial Infections in Febrile Young Children – Lack of value of biomarkers

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## Introduction

- Fever is a marker of insignificant viral infection, as well as more serious bacterial sepsis
- Children at risk of severe infections may present with non-specific symptoms / signs
- Seeking markers of invasive disease as well as culture positivity for organisms has been a goal of Paediatricians for many years

# Introduction



- Prior research and literature review - No clear role for the use of biomarkers to predict SBI in febrile children
- Research focus - Determining the site and nature of SBI in febrile children (< 5 years of age), using multiple testing modalities
- Correlated clinical picture + duration of hospitalisation + biomarker testing results



## Methods: This study

- Prospective, cross-sectional
- Febrile children <5 yrs old
- Presenting to SBAH over 1 yr
- Evaluated clinically for symptoms / signs of sepsis
- Biomarker testing:
  - ✓ FBC & diff, CRP, PCT
  - ✓ Urine dipsticks
  - ✓ CXR
  - ✓ CSF cell count & culture
  - ✓ Blood culture and/or
  - ✓ Cultures of urine, stool or sputum

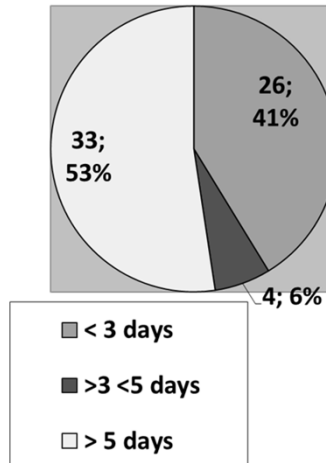


## Days of stay – 63 Subjects

- <3 days
- ✓ 26/63 (41.3%)
- ≥3 days
- ✓ 37/63 (58.7%)
- ≥ 3 & ≤ 5 days
- ✓ 4/63 (6.3%)
- > 5 days
- ✓ 33/63 (52.4%)



Figure 4: Days of stay

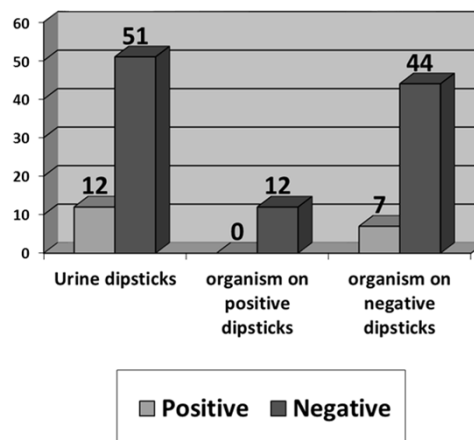


## Results

- Temperature
- ✓ Average 38.5° C
- ✓ Minimum temp 38° C
- ✓ Maximum temp 40° C
- Urine dipsticks
- ✓ 12/63 positive (19%)
- ✓ 0/12 positive dipsticks cultured organism in urine (0%)
- ✓ ? Validity of dipsticks vs formal sample
- ✓ 7/51 neg dipsticks cultured organism on urine (13.7%)



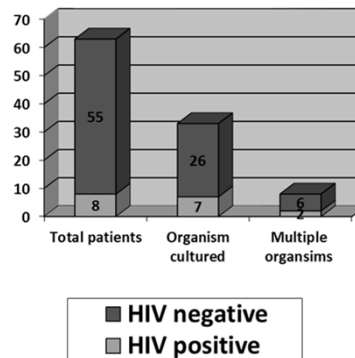
Figure 10: Urine samples



# HIV status

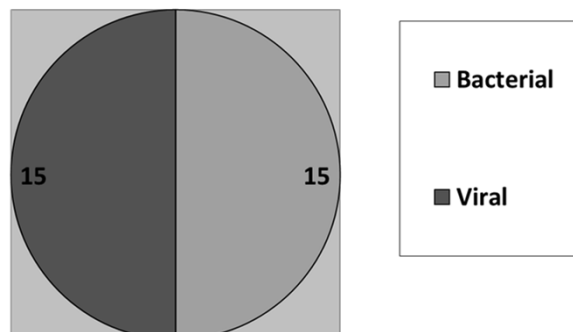
- HIV + 8/63 (12.7%)
- 7/8 + organism (88%)
- 2/8 + multiple organisms (25%)
- ✓ CMV, CNS (blood), AFB +, TB culture + (sputum)
- ✓ *Klebsiella pneumoniae* (blood), Adenovirus (stool)

Figure 2: HIV status



# Significant organisms cultured

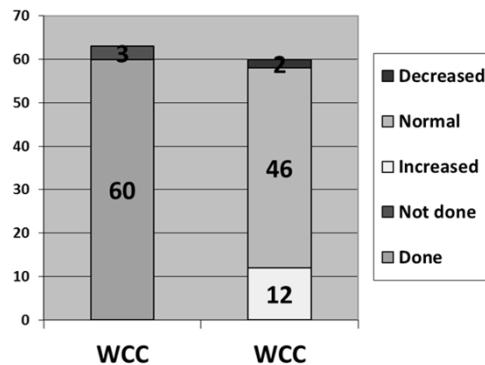
Figure 18: Significant cultured organisms



# White Cell Count

- WCC
  - ✓ done 60/63 (95.2%)
  - ✓ increased in 12/60 (20%)
  - ✓ decreased in 2/60 (3.3%)
  - ✓ abnormal in 14/60 (23.3%)
  - ✓ wide range 2-58 x10<sup>9</sup>/L (average WCC 13)

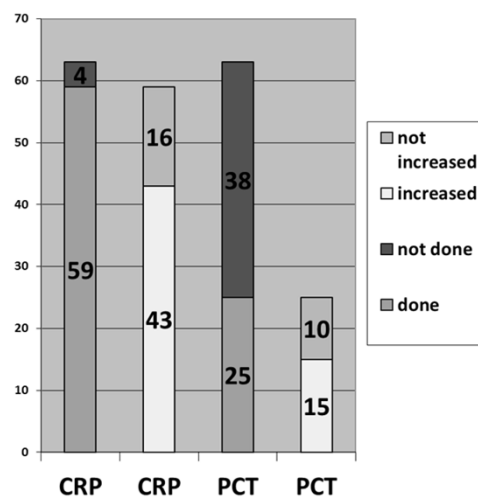
Figure 7: White cell count (WCC)



# CRP & PCT

- CRP
  - ✓ done 59/63 (93.7%)
  - ✓ >10 mg/L in 43/59 (72.9%)
  - ✓ wide range 12-336 (average CRP 64.5)
- PCT
  - ✓ done 25/63 (39.7%)
  - ✓ >2µg/L in 15/25 (60%)
  - ✓ wide range 4-728 (average PCT 55)

Figure 8: CRP and PCT



## Statistical Significance

Table 6	Duration of Stay (p-value)
Temperature	0.1229
White cell count	0.4708
CRP	0.6890
PCT	0.9745

Table 12	Blood culture (p-value)
Temperature	0.6492
White cell count	0.3579
CRP	0.570
PCT	0.572
Duration of stay	0.212



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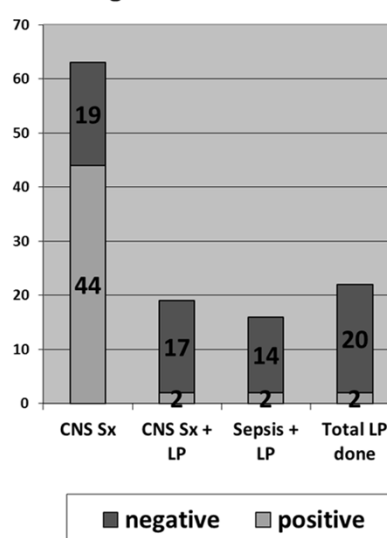
## Lumbar Puncture

- CNS symptoms 44/63 (69.8%)
- CNS symptoms + LP done 19/44 (43.2%)
- ✓ 2/19 culture positive (10.5%)
- ✓ 6/19 (31.6%) positive according to criteria
- ✓ 2/6 (33.3%) CSF PCR positive (HSV & Enterovirus)
- Clinically septic + LP done 16/53 (30.2%)
- ✓ 2/16 positive (12.5%) + CNS symptoms
- Total LP done: 22/63 (34.9 %)
- ✓ 2/22 (9.1%) culture positive
- ✓ 7/22 (31.8%) positive according to criteria



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Figure 12: CSF results



## Statistical Significance

Table 25	GI symptoms
Blood culture	0.178
Urine culture	0.315
Stool culture	0.365

Table 26	Urine culture	CSF culture
Urine dipsticks	0.9858	
CNS symptoms		0.2778



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## Admission Diagnosis

Figure 16: Admission diagnosis

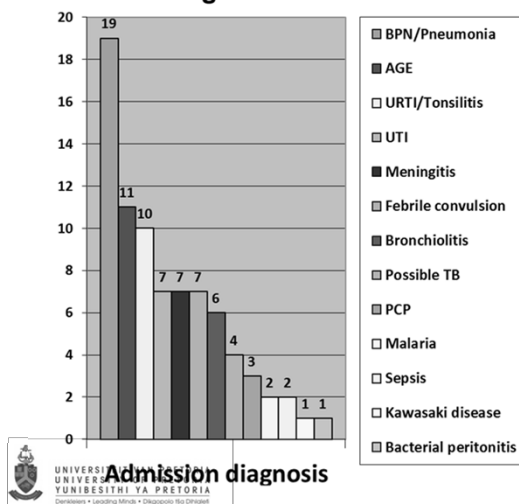
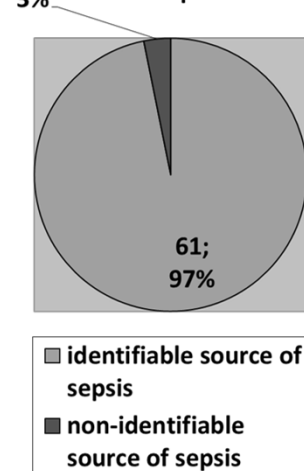


Figure 17: Source of sepsis



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## Conclusion

- Fever or degree of fever does not predict severity of infection, nor source of infection, nor duration of hospitalisation
- Elevated biomarkers (WCC, CRP, PCT) are not related to duration of hospital stay nor do they predict a positive blood culture
- Biomarkers have not been shown to be effective in predicting SBI's in febrile children under 5 years
- This study suggests that clinical suspicion of serious infection and appropriate action are as valuable as extensive testing