CRP is a commonly available biomarker, but peaks later in the course of illness, typically 4–6 hours. In contrast, PCT levels rise quickly in response to bacterial infections, typically within 2–4 hours, but may take up to 6–12 hours to peak. CRP performed better than PCT in predicting for SBIs in our population. We postulate that this could be because the majority of these infants receive their workup after hospitalisation rather than on presentation to the ED, therefore providing an adequate window for CRP to rise.

In predicting IBIs, PCT of >1.7 had the highest AUC of 0.898, compared to a PCT of >0.5ng/mL with an AUC of 0.836. The diagnostic values of PCT in this study correspond to those previously reported, with most studies utilising the same thresholds. Indeed, systematic reviews and recent studies have concluded that PCT was superior to CRP in identifying IBIs. However, the PCT cutoff values have been debated and vary from 0.12 to 1.0ng/mL, as different studies tried to differentiate invasive and non-invasive bacterial infections. We found that a PCT cutoff of 1.7ng/mL yielded similar sensitivity and NPV to a cutoff of 0.5ng/mL, and performed with much higher specificity (90.8% compared to 78.3%, respectively).

The PECARN rule in the original study by Kuppermann et al. reported a sensitivity of 97.7%, specificity of 60.0% and NPV of 99.6% in identifying infants who are at risk of SBIs. In comparison, its validation in our cohort showed a lower sensitivity of 88.4%, specificity of 36.6% and NPV of 86.3% in predicting SBIs. The decrease in performance could be attributed to differences in patient populations and delivery of health services. Singapore is geographically a small nation and young infants with fever tend to arrive very early in the course of illness. Our population consisted of 23 infants in whom urinalysis was negative but urine cultures were positive for urinary tract infections. These accounted for a number of false negatives when the above algorithm was applied.

In predicting IBIs, Lab-score showed much lower sensitivities for predicting SBIs and IBIs in our cohort (46.5% and 88.9%, respectively), compared to 94% in the original study. Lab-score, which takes into account urinalysis, also resulted in missed cases in our population whereby urinalysis was normal but urine cultures turned positive. Although the sensitivity was low, specificity for Lab-score was high at 92.4% and 81.9% for SBIs and IBIs,