

Experience of Using Blood Culture Rapid Diagnostics in Critical Care Units: Single Centre Experience in Malaysia

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Background

Bacteremia is a major health concern which is associated with high morbidity and mortality¹. Most septic patients can be found in emergency medicine departments or critical care units, settings in which rapid administration of targeted antibiotic therapy can reduce mortality². Routine blood cultures, though has been the gold standard and most common method of diagnosis of bloodstream pathogens, are not rapid enough to aid in the antimicrobial selection at the onset of bacteremia³. With the aim of reducing turnaround time from several days to few hours from the time of positive blood culture, BIOFIRE® Blood Culture Identification 2 (BCID2) Panel test, with the use of molecular testing, has been proposed. In this study, the results of rapid molecular diagnostic blood culture identification panel in patients with bacteremia in critical care units were evaluated.

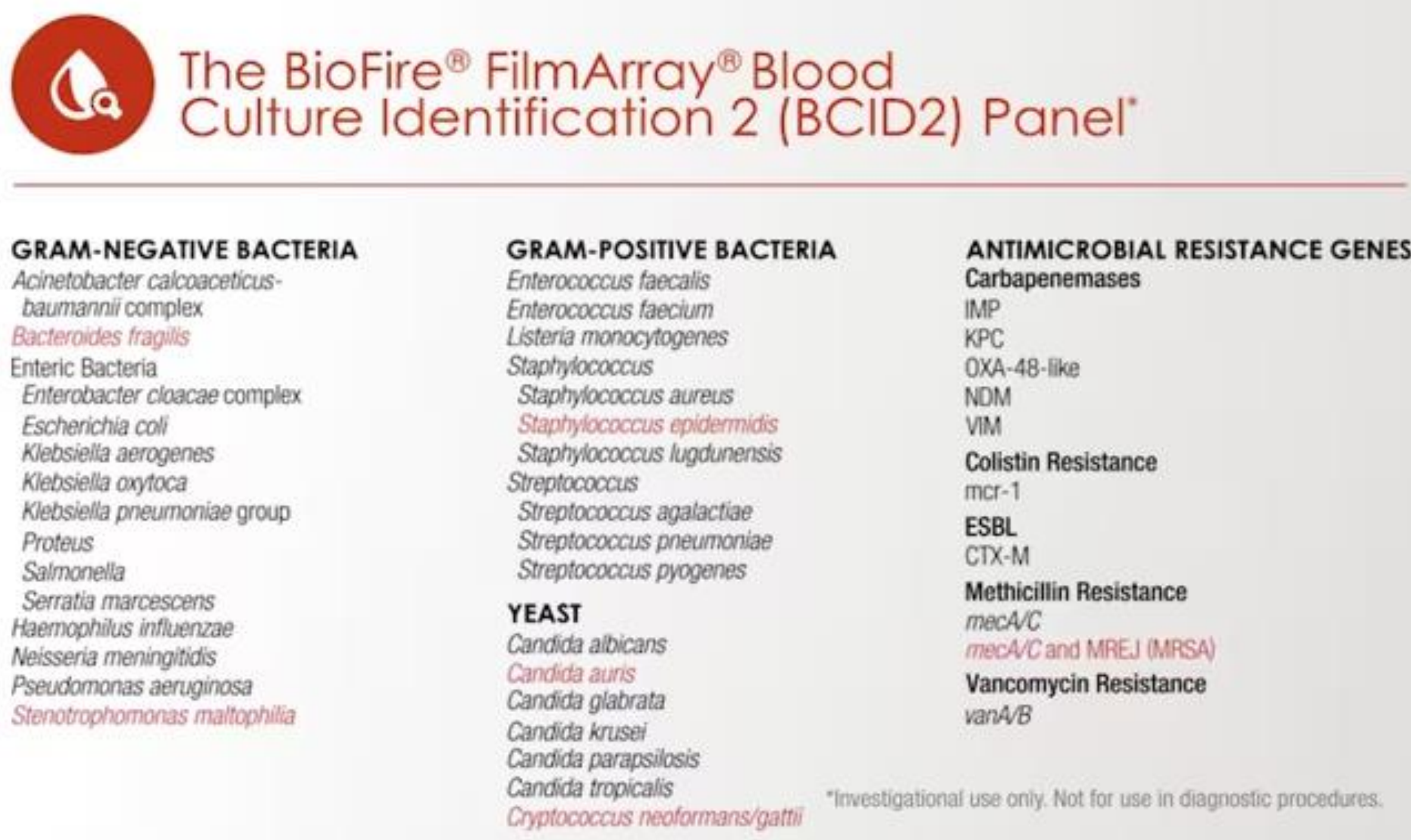


Figure 1 shows the panel of organisms and resistance genes that can be detected by BCID2.

Method

This observational cohort study involved identical cohort comparison between routine blood culture (standard practice) and BCID2 panel test (Rapid Molecular testing) from 2022 to 2024.

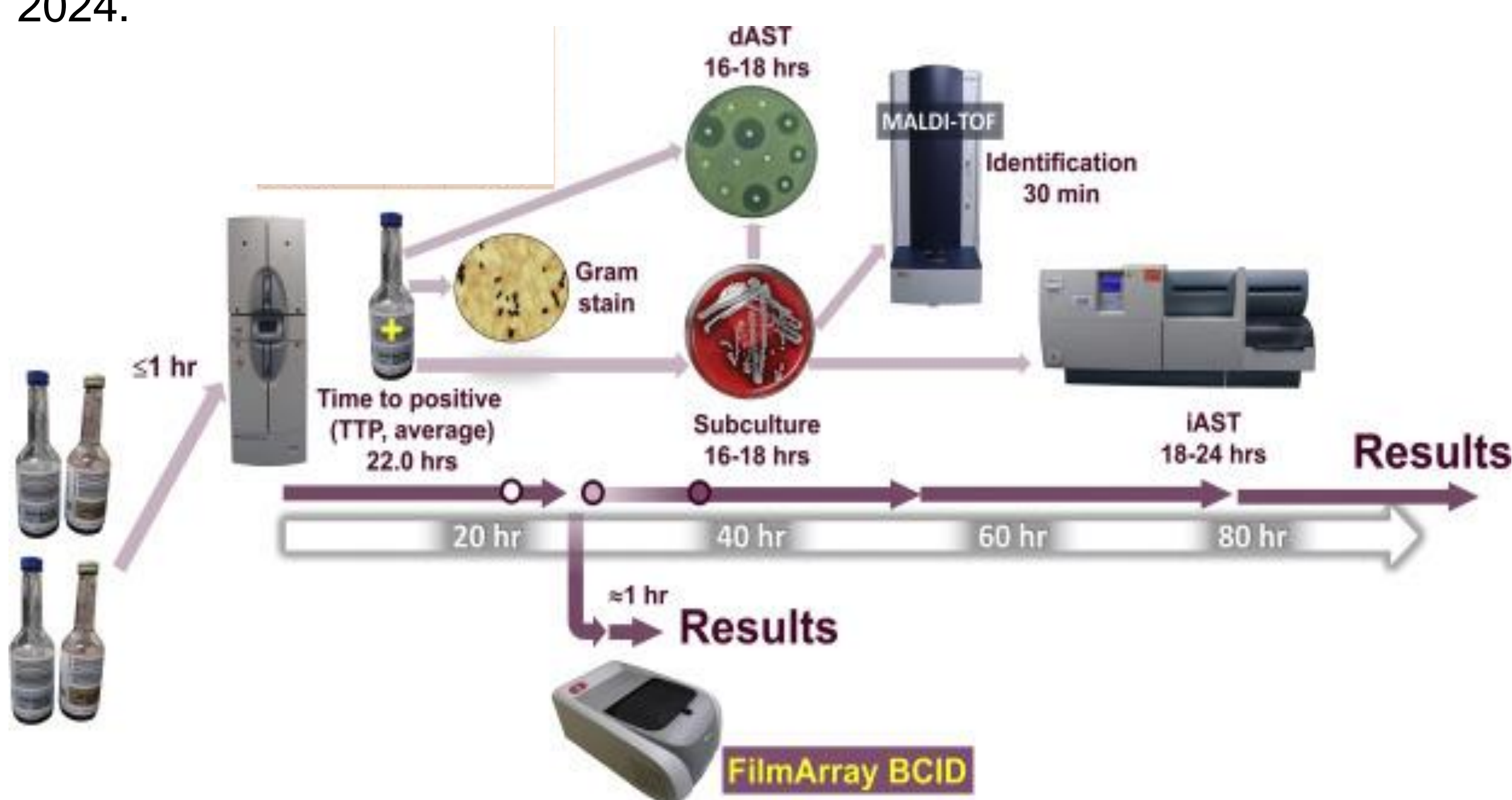


Figure 2 shows the flow of blood culture bottles if organism(s) were detected by blood culture bottles.

Conclusion

BCID2 panel test was associated with significant reduced turnaround time from positive blood cultures than routine blood cultures method, with additional benefit of rapidly detecting resistance genes from the organism.

References

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- Donna M Volk, J Kristie Johnson, Rapid Diagnostics for Blood Cultures: Supporting Decisions for Antimicrobial Therapy and Value-Based Care, *The Journal of Applied Laboratory Medicine*, Volume 3, Issue 4, 1 January 2019, Pages 686–697. <https://doi.org/10.1373/jalm.2018.028159>
- So M-K, Kim S-K, Chung H-S, Bae J-Y, Lee M. Large-Scale Clinical Evaluation of Rapid Blood Culture Identification Panels for Bloodstream Infections at a Tertiary Hospital. *Diagnostics*. 2023; 13(6):1177. <https://doi.org/10.3390/diagnostics13061177>

Results

Out of the positive blood culture samples (N=30) collected,

Figure 3 Mean Turnaround Time (hours) reduction from 49 hours to 21 hours using BCID2 panel

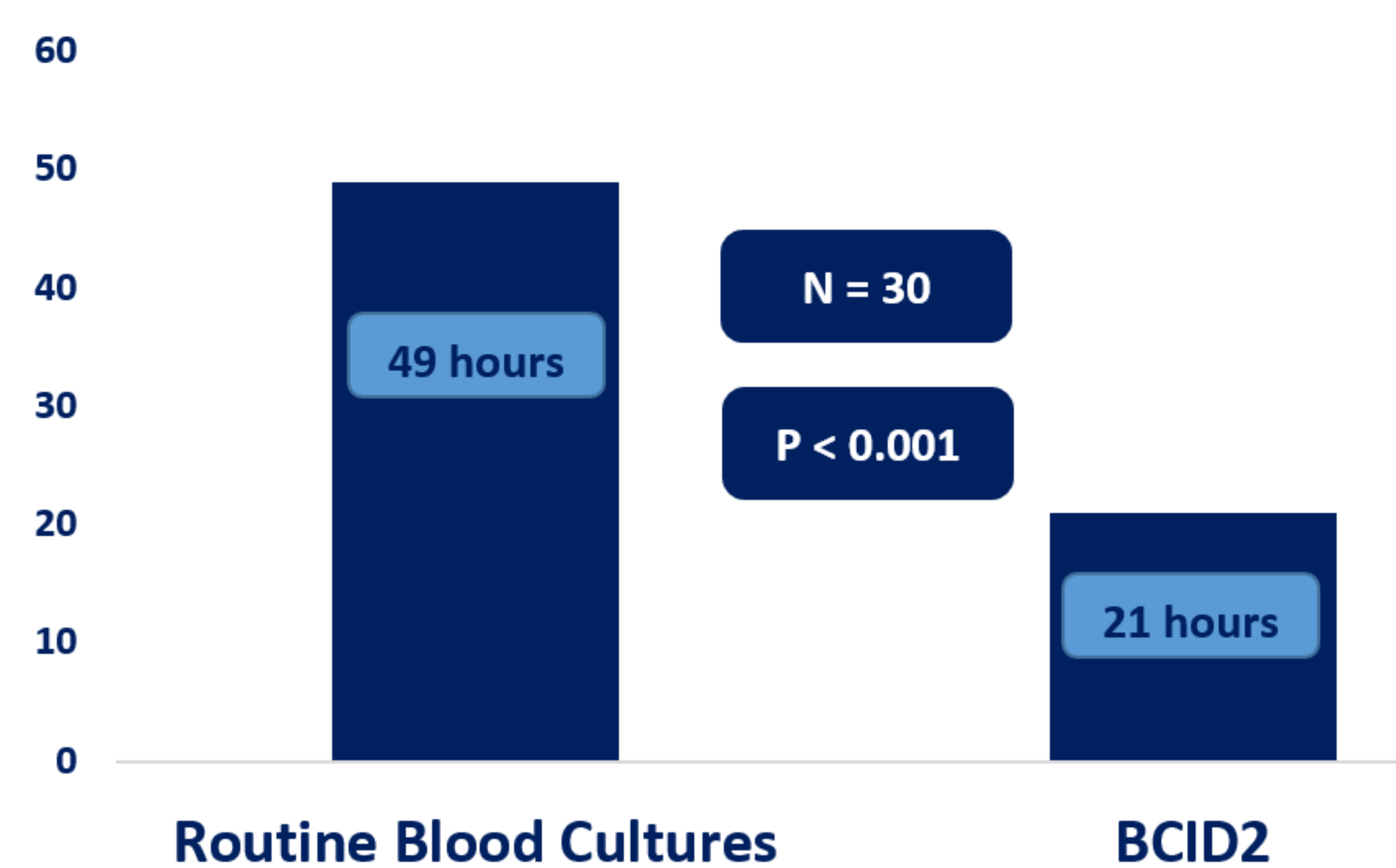
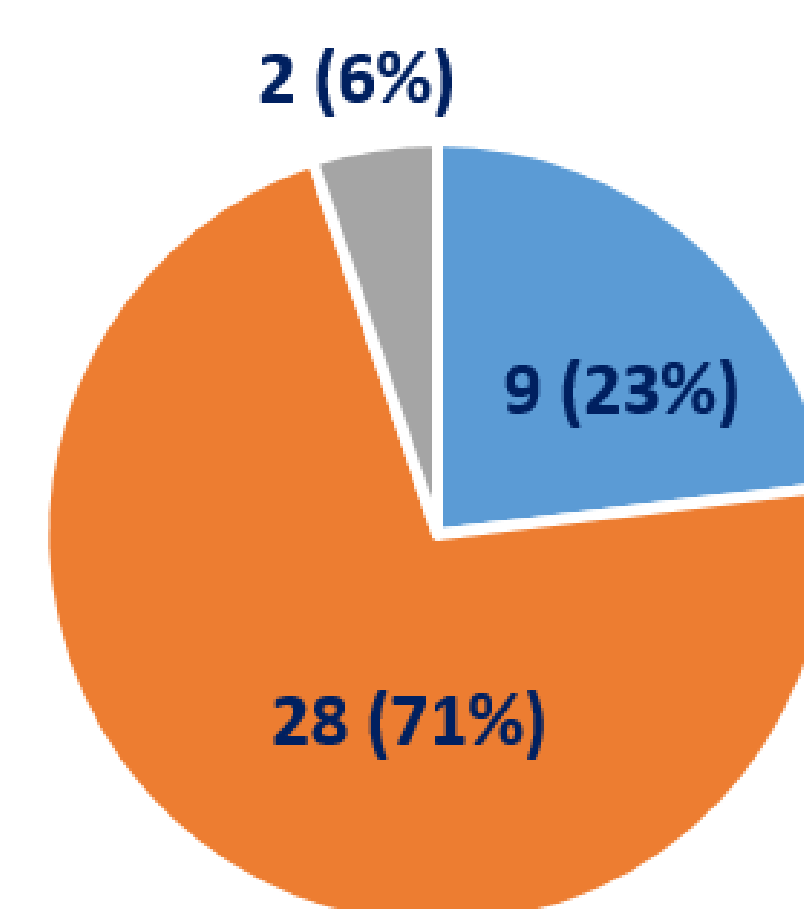


Figure 4

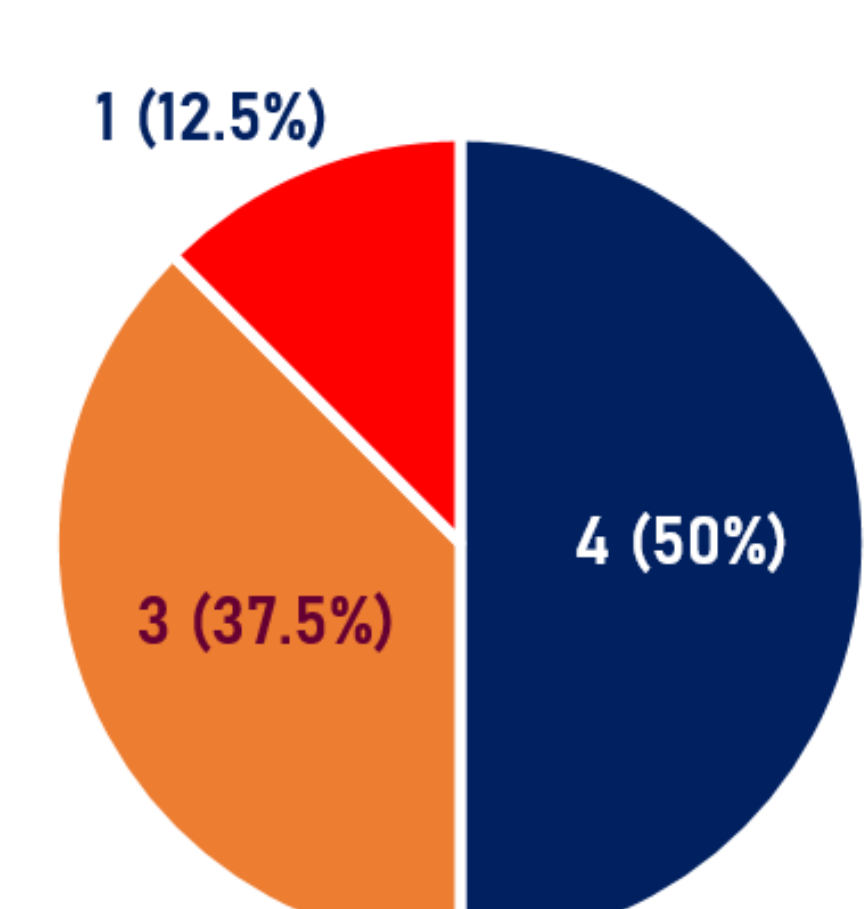
Types of Microbes detected by BCID2 (39 organisms from 30 samples)



■ GPC ■ GNB ■ Yeast

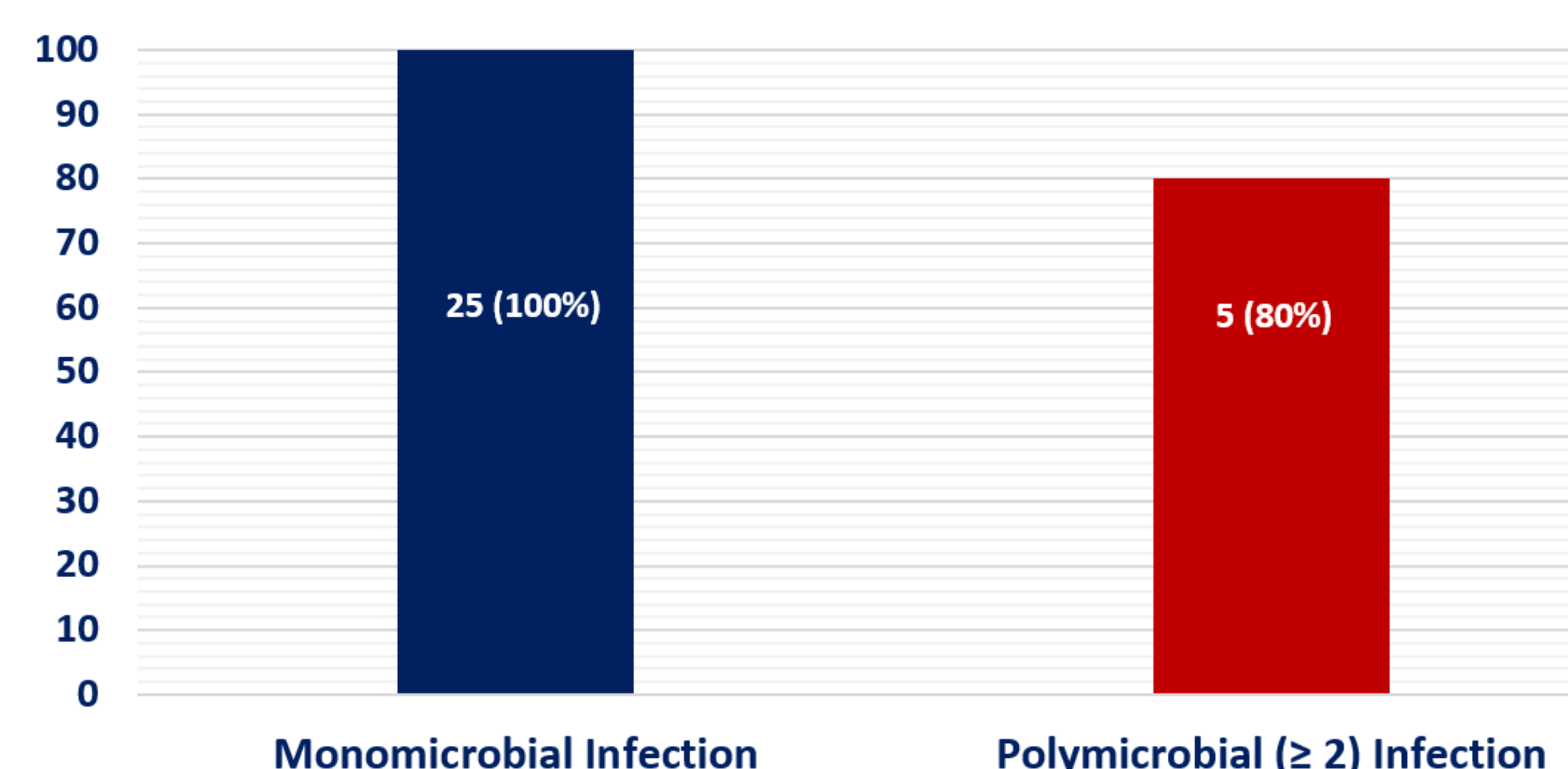
Figure 5

Resistance genes detected by BCID2 (8 genes from 30 samples)



■ MecA/B ■ CTX-M ■ CRE-NDM

Figure 6 Percentage of Concordance between BCID2 and Routine Blood Cultures (%)



There is one polymicrobial case that *Acinetobacter baumannii* and *Streptococcus dysgalactiae* detected by BCID2 but only *Streptococcus dysgalactiae* grew on culture plate.

Limitation: There were 5 positive blood culture samples being excluded from this study because BCID2 were unable to detect *Burkholderia cenocepacia*, *Citrobacter koseri* and *Morganella morganii*.

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