Staphylococcus aureus (SA) remains a significant human pathogen and is frequently associated with clinical infections. However, the rapid detection of SA and methicillin-resistant S. aureus (MRSA) is critical to provide timely therapy and prevent the spread of infections. The Cepheid Xpert MRSA SA assay is a real-time PCR test for the detection of SA and MRSA. The assay is based on the detection of the mecA gene, which encodes for the MLSB (methicillin-sensitive) type of resistance to oxacillin. The mecA gene is a determinant of oxacillin resistance in SA. The assay is performed using a cartridge-based system that includes the sample, reagents, and amplification equipment. The cartridge is loaded with the sample, which is then subjected to a series of steps, including DNA extraction, amplification, and detection. The results are generated within 2-7 hours, depending on the sample type and the presence of oxacillin resistance genes.

The testing of blood cultures using the Cepheid Xpert MRSA SA assay is performed in the clinical microbiology laboratory. Blood cultures are tested for the presence of SA and MRSA using broth dilution susceptibility testing and phenotypic broth microdilution broth microtiter plates. The broth dilution susceptibility testing is performed using the Sensititre® microtiter plate method. The broth microdilution susceptibility testing is performed using the oxacillin microdilution method, which is a standard method for the detection of oxacillin resistance in SA. The MIC (minimum inhibitory concentration) is determined for each isolate, and the results are compared to the CLSI breakpoints for the detection of oxacillin resistance.

The Cepheid Xpert MRSA SA assay was compared to the Sensititre® microtiter plate method and the oxacillin microdilution method in a study of paired patient blood cultures. The assay was performed on 33 patient blood culture sets, including 22 with SA (14 MSSA and 8 MRSA) and 11 with CoNS. The Cepheid Xpert MRSA SA assay correctly identified 21 of 22 SA (95.5%) and 11 of 11 CoNS (100%). The assay also correctly identified 20 of 20 SA (100%) and 10 of 10 CoNS (100%) using the oxacillin microdilution method. The assay correctly identified 18 of 20 SA (90%) and 9 of 10 CoNS (90%) using the Sensititre® microtiter plate method. The assay was performed on blood cultures containing 3 to 10,000 colony-forming units/mL, and the assay was able to detect MRSA and MSSA with a sensitivity of 95.5% and a specificity of 100%.

In conclusion, the Cepheid Xpert MRSA SA assay is a rapid and sensitive method for the detection of SA and MRSA in blood cultures. The assay is performed within 2-7 hours and requires minimal sample preparation. The assay is highly specific and sensitive for the detection of SA and MRSA. The assay is a valuable tool for the detection of oxacillin resistance in SA and is a useful adjunct to the standard methods for the detection of oxacillin resistance.