28th ECCMID EUROPEAN CONGRESS OF CLINICAL MICROBIOLOGY AND INFECTIOUS DISEASES
Madrid, Spain
21 – 24 April 2018

P0162 Prospective evaluation of beta-lactamase detection in penicillin susceptible S. aureus by interpretation of the penicillin disc method

Andrew Henderson*[1 2 3], David Whiley[3 4], Fleur Francis[5], Cathy Engler[5], Matthew Glover[5], Joel Douglas[6], Letitia Gore[4], Patrick Harris[3 4], Henry Chambers[8], David L. Paterson[3 7], Graeme Robert Nimmo[4], Robert Norton[5]

[1]Princess Alexandra Hospital, Infection Management Services, Woolloongabba, Australia, *[2]The University of Queensland, School of Chemistry and Molecular Biosciences, Saint Lucia, Australia*, *[3]University of Queensland, Centre for Clinical Research, Herston, Australia*, *[4]Pathology Queensland, Department of Microbiology, Herston, Australia*, *[5]Townsville Hospital, Pathology Queensland, Douglas, Australia*, *[6]Pathology Queensland, Department of Microbiology, Woolloongabba, Australia*, *[7]The University of Queensland, Australian Infectious Diseases Research Centre , Saint Lucia, Australia*, *[8]UC San Francisco, School of Medicine, San Francisco, United States*

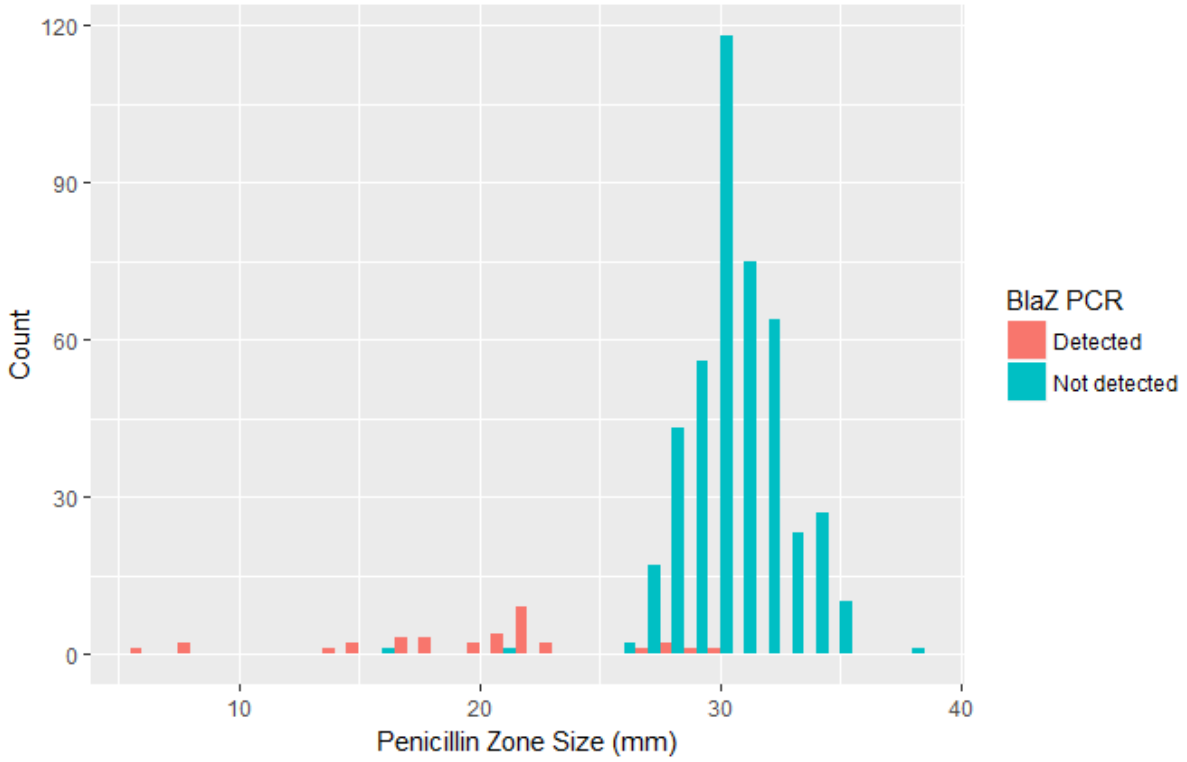
Background: Penicillin susceptible *Staphylococcus aureus* (PSSA) may occasionally be encountered as a cause of complicated *S. aureus* infection, such as endocarditis or bloodstream infections. Clinicians may choose to treat these patients with penicillin over a semi-synthetic penicillin derivative, such as flucloxacillin or oxacillin, due to a favourable Pk/Pd profile. In this study, we prospectively evaluated the penicillin disc (1-IU) method for detection of *blaZ*, with interpretation of the penicillin edge according to EUCAST recommendations.

Materials/methods: Non-duplicate isolates were prospectively collected for the study from 3 laboratories in Queensland, Australia (Townsville Hospital, Gold Coast Hospital, Princess Alexandra Hospital). Initial antimicrobial susceptibility testing was performed by the Vitek 2 system. Real-time PCR for *blaZ* was performed following phenotypic testing with the 1-IU penicillin disc and the PCR used as the gold standard for detection of penicillin resistance.

Results: 472 PSSA isolates were collected between September 2014 to December 2015 from three clinical microbiology laboratories in Queensland, Australia. The overall prevalence of *blaZ* amongst the isolates was 7%. *blaZ* was detected in 4/83 isolates with a Vitek MIC of ≤ 0.03 µg/ml, and 8/275 and 22/114 with MICs of 0.06 µg/ml and 0.12 µg/ml respectively. The sensitivity of nitrocefin (15%, 95% CI 5 – 31%) was lower than the penicillin disc test (97%, 95% CI 85 – 100%) for detection of *blaZ,* with the difference in sensitivity between the penicillin disc test and nitrocefin found to be statistically significant ($p < 0.01$). Two isolates had mixed populations with inner colonies with penicillin zone sizes < 26mm (Figure 1). Both inner and outer colonies were negative for *blaZ*, but had *mecA* detected from the inner colonies only.

Conclusions: The penicillin disc zone size and edge interpretation is a reliable method for detection of *blaZ* in *S. aureus* isolates that otherwise test susceptible to penicillin by Vitek 2 AST. Although rates of *blaZ* were lower in isolates that had MICs of ≤ 0.03 µg/ml, this cannot be relied upon for excluding the presence *blaZ*.

Figure 1. Histogram plot of penicillin zone size stratified by presence of *blaZ*.


120
90
60
30
0
Count
10
20
30
40
Penicillin Zone Size (mm)
BlaZ PCR
Detected
Not detected