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**MRSA - still there and threatening**

# Molecular epidemiology of methicillin-resistant *Staphylococcus aureus* carrying the genes for the Panton-Valentine leukocidin in Belgium from 2010 to 2014

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## Objectives

Epidemiology of methicillin-resistant community acquired *Staphylococcus aureus* (CA-MRSA) in Europe is characterized by a clonal heterogeneity with the predominance of the European clone ST80-IV, although the recent increase of the USA300 clone. In Belgium, the number of USA300 strains recovered between 2005 and 2009 had gradually augmented to become as frequent as the European clone. The objective of this study was to update the molecular epidemiology of MRSA carrying the Panton-Valentine leukocidin (PVL) genes in Belgium from January 2010 to July 2014.

## Methods

Since 2003, Belgian laboratories are invited to send to the National Reference Center (NRC) MRSA isolates for toxins detection. Identification and methicillin resistance were confirmed by multiplex PCR 16S rRNA-*mec*A-*nuc*. The presence of *luk*F-*luk*S genes was detected by PCR. Molecular typing included *spa*-typing, multi-locus sequence typing (MLST) and SCC*mec* determination. MRSA ST8 PVL positive strains were assigned to USA300 clone by detection of the *arc*A gene present on the pathogenicity island of arginine catabolic mobile element (ACME).

## Results

A total of 1.311 strains, including 791 MRSA were received at the NRC for toxins detection between 2010 and 2014. Three hundred and fifty-six (45%) stains of MRSA harboured the genes *luk*S-*luk*F and 94% of them belonged to seven typical CA-MRSA clones: ST8 including the USA300 clone (n=184, 51.7%), European ST80 clone (n=56, 15.7%), South West Pacific ST30 clone (n=35, 9.8%), Taiwanese ST59 clone (n=29, 8.1%), ST5 clone (n=16, 4.5%), ST772 clone (n=10, 2.8%) and African ST88 clone (n= 5, 1.4%). A majority (77.7%) of the ST8 PVL positive strains contained the *arc*A gene specific of the USA300 clone. The proportion of the USA300 clone remained stable over the past four years (29-47%), while the European clone decreased markedly in the first half of 2014 (<3% of the stains). All the clones harboured the SCC*mec* IV element, except the Taiwanese ST59 clone which possessed the SCC*mec* V.

## Conclusion

This study confirms the rapid dissemination of the USA300 clone which has become the main CA-MRSA clone in Belgium and the clonal diversification of CA-MRSA to the detriment of the European ST80 clone. These epidemiological changes underline the importance of surveillance and typing data to monitor and control the spread of the CA-MRSA in the general population.