

Methicillin resistance *Staphylococcus aureus* (MRSA) and Vancomycin Resistant *Staphylococcus aureus* (VRSA) problem in human and livestock and solutions

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Abstract

Staphylococcus aureus is an opportunistic bacterium of humans and other mammals that is becoming more clinically and veterinary important due to its fast development of antibiotic resistance. Some of these *S. aureus* varieties are methicillin-resistant *S. aureus* (MRSA), which is common in healthcare organizations, community settings, and livestock farms across the world. Beyond humans, MRSA has the potential to live in other animal species, which could result in the emergence and spread of antimicrobial agent resistance in various animal species. Vancomycin is a type of antibiotic classified as a final resort option, employed to address severe infections instigated by Gram-positive bacteria. Vancomycin remains among the primary choices for the initial treatment of MRSA infections. During the past few years, there has been an emergence of *Staphylococcus aureus* strains exhibiting strong resistance to vancomycin. The *vanA* gene cluster, obtained from vancomycin-resistant enterococcus, eases the transfer of vancomycin resistance in *S. aureus*. In terms of likely transfer routes, underlying mechanisms, and consequences of methicillin and vancomycin resistance from animals to humans and vice versa, this review aims to highlight the Methicillin resistance *Staphylococcus aureus* (MRSA) and vancomycin resistance *Staphylococcus aureus* (VRSA) issues

Key words: *Staphylococcus aureus*, MRSA, VRSA, human, animal.