

Title: First outbreak of methicillin-resistant *Staphylococcus aureus* on a dairy farm in Poland. Evidence of on-farm and intra-household transmission.

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Background: Methicillin-resistant *Staphylococcus aureus* (MRSA) continue to pose an emerging public health threat globally, being responsible for a wide variety of infections, ranging from mild skin infections to life-threatening invasive diseases. Until quite recently, most of the MRSA isolates have been detected in the hospital settings. However, the epidemiology of this pathogen is changing rapidly, with newly established, community-associated reservoirs. To date, only few cases of MRSA transmission between humans and animals have been reported. Here we describe a first case of such transmission in Poland, associated with a MRSA outbreak on a dairy farm.

Materials and methods: The study was conducted on a dairy farm (herd size 514 cows) located in Lublin Province, from May till August 2018. The milk sampling was performed in accordance with routine laboratory techniques. Oral and nasal swabs were collected from people who had direct contact with the animals on the farm (farm workers and veterinary personnel), and their families. Isolation and identification of *S. aureus* and antimicrobial susceptibility profiling was carried out, as previously described [Jagielski et al., J Dairy Sci;97,6122-8;2014]. Molecular characterization of MRSA isolates was performed with three independent typing methods i.e. Multiple-Locus Variable number tandem repeat Analysis (MLVA) [Sabat et al., J Clin Microbiol;41,1801-04;2003], Multilocus Sequence Typing (MLST) [Enright et al., J Clin Microbiol;38,1008-15;2000], and spa-typing [Harmsen et al., J Clin Microbiol;41,5442-48;2003].

Results: A total of 13 MRSA isolates from 9 cases (4 humans, 5 cows) were cultured. Eleven bovine (n=5, 5 cases) and human (n=6, 4 cases) isolates were indistinguishable by MLVA-typing (pattern A), and were of ST398 MLST type and t034 spa type. The other two isolates (of human origin, 2 cases) had identical MLVA-pattern (pattern B) and were of ST45 MLST type and t2633 spa type.

Conclusions: This is the first report of a MRSA outbreak in Poland, not associated with hospital setting. It is also the first case of a direct transmission of MRSA between human and cows in our country. Noteworthy, the MRSA strain responsible for the outbreak was of MLST type ST398, a highly transmissible clone, with a broad host range.