

An unusual outbreak of community-onset impetigo by Methicillin-resistant *Staphylococcus aureus* resistant to fusidic acid with increased virulence

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Introduction

- The Netherlands has a low prevalence of methicillin-resistant *Staphylococcus aureus* (MRSA).
- The National Institute for Public Health and the Environment receives MRSA isolates from Dutch patients as part of national MRSA surveillance.
- Multiple locus variable number of tandem repeat analysis (MLVA) is then performed and next-generation sequencing (NGS) for a subset of isolates.

Methods

- Between July and October 2019, an outbreak of impetigo with MRSA not responding to topical fusidic acid (first-line treatment) occurred.
- Mainly localised in two towns from the eastern part of the Netherlands (outbreak region) with an epidemiological link to 3 cases from another region.
- NGS was performed:
 - Whole-genome multi-locus sequence typing (wgMLST)
 - Identify resistance genes and virulence factors
- Rapid increase of cases
 - Collaboration between general practitioners, medical microbiologists, the Public Health Institute and municipal health services to stop the outbreak.
 - General practitioners in the outbreak region were requested to submit samples for culture in case of no response to fusidic acid.
 - Treatment recommendations were altered.
- To obtain insight into the extent of the outbreak:
 - Questionnaires from 3 general practitioners from the outbreak region and 8 from a nearby control region.
 - Data on the number of prescriptions for mupirocin from pharmacists from both regions.

Results

- Typing of MRSA isolates sent in for the national surveillance showed that the isolates were MLVA-type MT4627 (rare).
- The national surveillance identified 55 cases with MLVA-type MT4627, including 46 children.

Table 1. Characteristics of 55 MRSA MLVA-type MT4627 cases

	Characteristics	
	n	%
Median age [IQR]	6 [4:9]	
Gender (% female)	24	44%
infection	46	84%
Location of infection		
Skin	46	100%
Origin		
hospital	2	4%
General practitioner	53	96%
Independent living	53	100%
Profession with direct patient care	3	6%

- Among infections, all but one were community-onset.
- General practitioners from the outbreak and control region noticed an increase in impetigo unresponsive to fusidic acid, but the control region did not send samples for culture.
- Mupirocin prescriptions were increased.

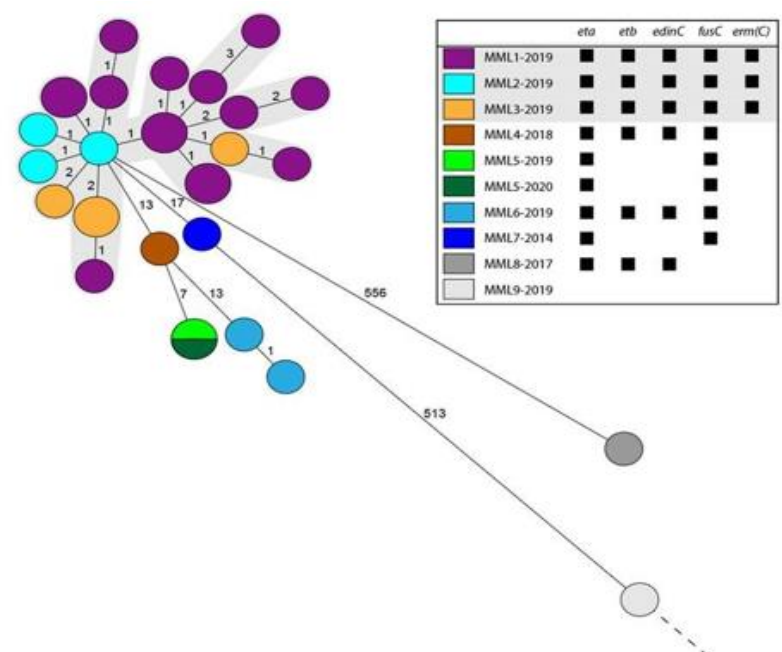


Figure 1. Minimum spanning tree of wgMLST of 28 isolates.

- Combination of exfoliative toxins was not present in other isolates of our collection and the allele difference between Dutch isolates and other international isolates was high.
- After Nov 2019: 4 new cases (n=2 from outbreak region).

Conclusion

The rare MRSA MLVA-type MT4627, resistant to fusidic acid, caused a community outbreak with impetigo in children in multiple regions.