Environmental samples were collected from SANICULT™ swab and RODAC™ plates from two fire stations, in two different Fire Districts in the NW.

Second samples collected 7-9 months later:

Sample sites: Medic truck, Fire truck, Fire engine, Outer fire gear, Garage, Kitchen, Bathrooms, Gym, Other sites

The isolates were identified by BBL Crystal™ Gram-Positive ID System and/or 16S rRNA sequencing and coagulase test. 

Methicillin resistance was determined by presence of the mecA gene by PCR assay.

Selected isolates were PFGE typed with SmaI.

PCR assay for SCCmec was performed by direct PCR amplification according to the CLSI guidelines and PFGE analysis was done.

Results:

- Twenty three (4.8%) of the 460 second samples were MRSA positive.
- Eighty one (18.0%) of the 450 second samples from both fire and medic trucks and living quarters of each station, were MRSA positive resulting in 44 isolates. Of these, 8 were SCCmec type IV, of which 7 were USA300. Three isolates were type II and 15 not type I
- Twenty isolates were grouped into 4 clusters. One cluster of 4 type IV MRSA isolates were identified from all sample sites. The first MRSA strain was isolated from the medic/fire truck and 1 isolate from the living quarters from the living quarters.

Conclusion:
- This is the first molecular characterization of MRSA isolated from fire medic trucks and fire station living quarters surfaces. Both hospital and community acquired MRSA were identified. The same MRSA strain was isolated from the medic/fire trucks and fire station living quarters surfaces suggesting a spread of MRSA between the vehicles in the garage, and the living spaces in the fire stations. The level of risk to the personnel and/or patients due to contaminated fire/medic trucks and fire station living quarters surface pose for MRSA colonization and subsequent MRSA infection is unknown and requires further studies.
- However, the data suggests that surfaces outside hospital/nursing homes should be examined for MRSA contamination and could represent reservoirs for MRSA transmission.

# Materials & Methods

Environmental samples were collected from SANICULT™ swab and RODAC™ plates.

The mecA gene was verified by PCR. The Pantone- Valentine leukocidin gene, MLST typing and SCCmec type were determined by PCR assays and sequencing.

Antimicrobial susceptibility testing was performed by disk diffusion according to the CLSI guidelines and PFGE was done.

Results:

- Twenty-three (4.8%) of the 460 first samples were MRSA positive.
- Eighty-one (18.0%) of the 450 second samples from both fire and medic trucks and living quarters of each station, were MRSA positive resulting in 44 isolates. Of these, 8 were SCCmec type IV, of which 7 were USA300. Three isolates were type II and 15 not type I
- Twenty isolates were grouped into 4 clusters. One cluster of 4 type IV MRSA isolates were identified from all sample sites. The first MRSA strain was isolated from the medic/fire truck and 1 isolate from the living quarters from the living quarters.

Conclusion:
- This is the first molecular characterization of MRSA isolated from fire medic trucks and fire station living quarters surfaces. Both hospital and community acquired MRSA were identified. The same MRSA strain was isolated from the medic/fire trucks and fire station living quarters surfaces suggesting a spread of MRSA between the vehicles in the garage, and the living spaces in the fire stations. The level of risk to the personnel and/or patients due to contaminated fire/medic trucks and fire station living quarters surface pose for MRSA colonization and subsequent MRSA infection is unknown and requires further studies.
- However, the data suggests that surfaces outside hospital/nursing homes should be examined for MRSA contamination and could represent reservoirs for MRSA transmission.

# Results

- 540 samples from 1st sampling with 26 MRSA (+4.8%)
- 8 of 9 sample locations MRSA+ 8 (31%) MRSA type IV, 7 USA 300, 18 not type I-V (NT) 8 MLST types
- 460 samples from 2nd sampling with 18 MRSA (+3.9%)
- 9 of 9 sample locations MRSA+ 

Table 1. MRSA positive surfaces comparing first and second sampling

<table>
<thead>
<tr>
<th>First sampling</th>
<th>Second sampling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medic truck</td>
<td>14 of 26 (4.6%)</td>
</tr>
<tr>
<td>Fire truck</td>
<td>2 of 18 (11%)</td>
</tr>
<tr>
<td>Outer fire gear</td>
<td>1 of 20 (0.5%)</td>
</tr>
<tr>
<td>Garage</td>
<td>0 of 20 (0%)</td>
</tr>
<tr>
<td>Kitchen</td>
<td>3 of 30 (10%)</td>
</tr>
<tr>
<td>Bathrooms</td>
<td>1 of 10 (10%)</td>
</tr>
<tr>
<td>Bedrooms</td>
<td>1 of 10 (10%)</td>
</tr>
<tr>
<td>Gym</td>
<td>1 of 10 (10%)</td>
</tr>
<tr>
<td>Other</td>
<td>3 of 20 (15%)</td>
</tr>
</tbody>
</table>

NT= not type I-V; ST=MLST type; * ST types included 8, 5, 15, 45, 72, 9, 105; ^ USA300 type III

# Conclusions

- All 26 MRSA from 1st sampling multi-drug resistant
- 16 of 18 MRSA from 2nd sampling multi-drug resistant
- USA300 and hospital-like MRSA found
- MRSA found in Medic/Fire Trucks, Fire engine living quarters (Fig 1); transferred from equipment to living area by personnel? 
- The same MRSA strain found in trucks and living quarters
- Same MRSA found in both districts (Fig 2); transfer by paramedic trainee?
- Level of risk to fire personnel and/or patients due to contaminated surfaces is unknown

# References:

Seaton & Reynolds, Am J Infect Con (in press)