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Re-distribution of Methicillin-resistant *Staphylococcus aureus* (MRSA) during the laundering of cotton towels

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Introduction: The objectives of this experiment were to quantify the microbial reduction on *MRSA*-inoculated towels washed in a high efficiency (HE) washing machine utilizing various machine settings and to determine if *MRSA* can be transferred from inoculated towels onto the non-inoculated towels during a wash cycle.

Methods: White towel swatches (sterilized, 1000 cm²) were inoculated with 3-strain *MRSA* cocktail (10⁷ CFU/cm²), while blue swatches received no *MRSA* inoculation prior to washing. Control swatches only received *MRSA* with no washing. Four white swatches and three blue swatches were machine washed using one of the following temperatures and wash cycles: a) hot water, casuals (HC); b) warm water, cotton (WC); c) cold water, delicate (CD); or d) hot water, cotton with chlorine (HCC,1000ppm). Water (50ml) was collected after the initial wash (IW) portion of the wash cycle and after the final rinse (FW). The swatches were further cut into 100cm² swatches and serial dilutions were made onto Mannitol Salt Agar (MSA) with Methicillin and incubated at 37°C for 48 h prior to counting. Three replications were performed.

Results: Inoculated towels washed in HC setting had 4.30 log CFU/cm² reductions of *MRSA* when compared to the control towels; while the non-inoculated towels *MRSA* population increased by 2.83 log CFU/cm². The IW contained 4.06 log CFU/ 50ml and FW contained 3.21 log CFU/50ml. Inoculated towels washed in WC setting had 3.70 log CFU/cm² reductions of *MRSA*, while the non-inoculated towels *MRSA* population increased by 3.55 log CFU/cm². The IW contained 4.46 log CFU/ 50ml and FW contained 3.62 log CFU/50ml. Inoculated towels washed in CD setting had 2.92 log CFU/cm² reductions of *MRSA*, while non-inoculated towels *MRSA* population increased by 4.61 log CFU/cm² after the cycle. The IW contained 5.51 log

CFU/ 50ml and FW contained 4.18 log CFU/50ml. For the setting HCC setting *MRSA*-inoculated towels, non-inoculated towels, IW and FW had no *MRSA* recovery.

Significance: Machine washing towels using detergent without bleach treatment and hot water is not sufficient to destroy high levels of *MRSA*. Data from the rinse water and non-inoculated towels indicates the *MRSA* was simply re-distributed onto the non-inoculated towels and into the initial and final rinse water.