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Background

Patients shed pathogens into the environment and high touch items, including the bed, become heavily contaminated. As dry surface biofilms (DSB) are highly tolerant to cleaning/disinfectants, DSB on mattresses may be a source of pathogens, despite being covered with bedsheets.

Aim

The aim of this study was to determine if DSB could be transmitted through cotton sheets and if sheets could become vehicles of transmission.

Method

- *Staphylococcus aureus* DSB was grown in vitro on coupons. A piece of sheet was placed over a coupon, and the coupon lifted to a height of 30cm by gripping with the forefinger and thumb (n=18/test parameter).
- For transmission through the sheet the forefinger and thumb were then touched horse blood agar plates (HBA).
- To determine transfer by the sheet, the sheet was then touched to HBA 20 sequential times.
- To stimulate cleaning, the DSB was treated with 5% neutral detergents for 5 seconds. .

Results

- Less bacteria were transferred through thicker bedsheets with 250 thread/inch² sheets transmitting ≤ 10 cfu while the 1/3rd of 150 thread/inch² transmitted >100 cfu. Wetting the biofilm increased transmission through the sheet.
- The cotton sheets were able to act as vehicles transferring between 100 and 1000 bacteria colonies for up to 20 touches. Surprisingly, thicker sheets transferred less bacteria than thin sheets with less than 100 colonies transferred/touch. Wetting the DSB increased the number of colonies transmitted to ≥ 1000 bacteria/touch.

Fig 1: Frequency of transmission of bacteria after transmission testing on HBA plate



Fig 2: Organisms transferred by cotton sheet (150 threads/square - inch) with touches before and after treatment with 5% neutral detergent

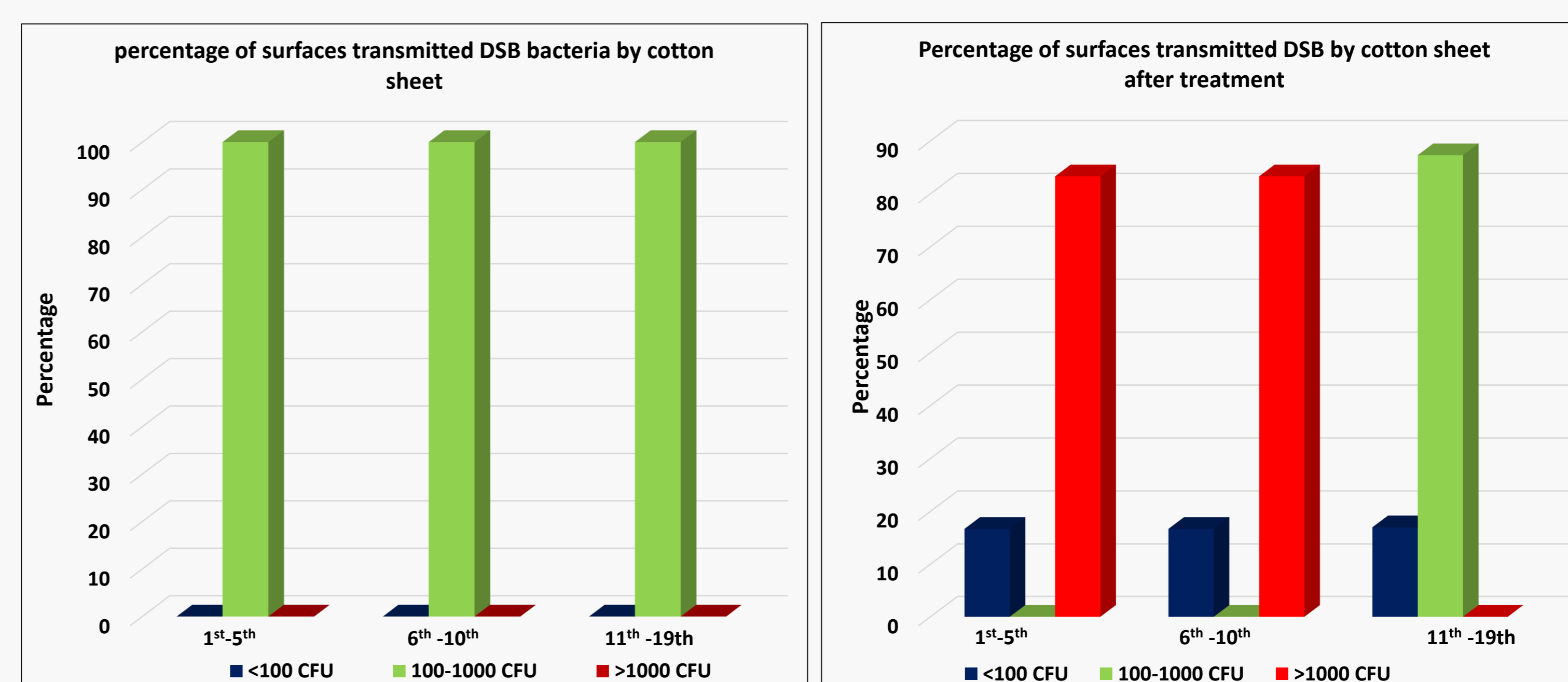


Fig 3: Organisms transferred through 150 and 250 thread/ sq. inch cotton sheet before and after treatment with 5% neutral detergent

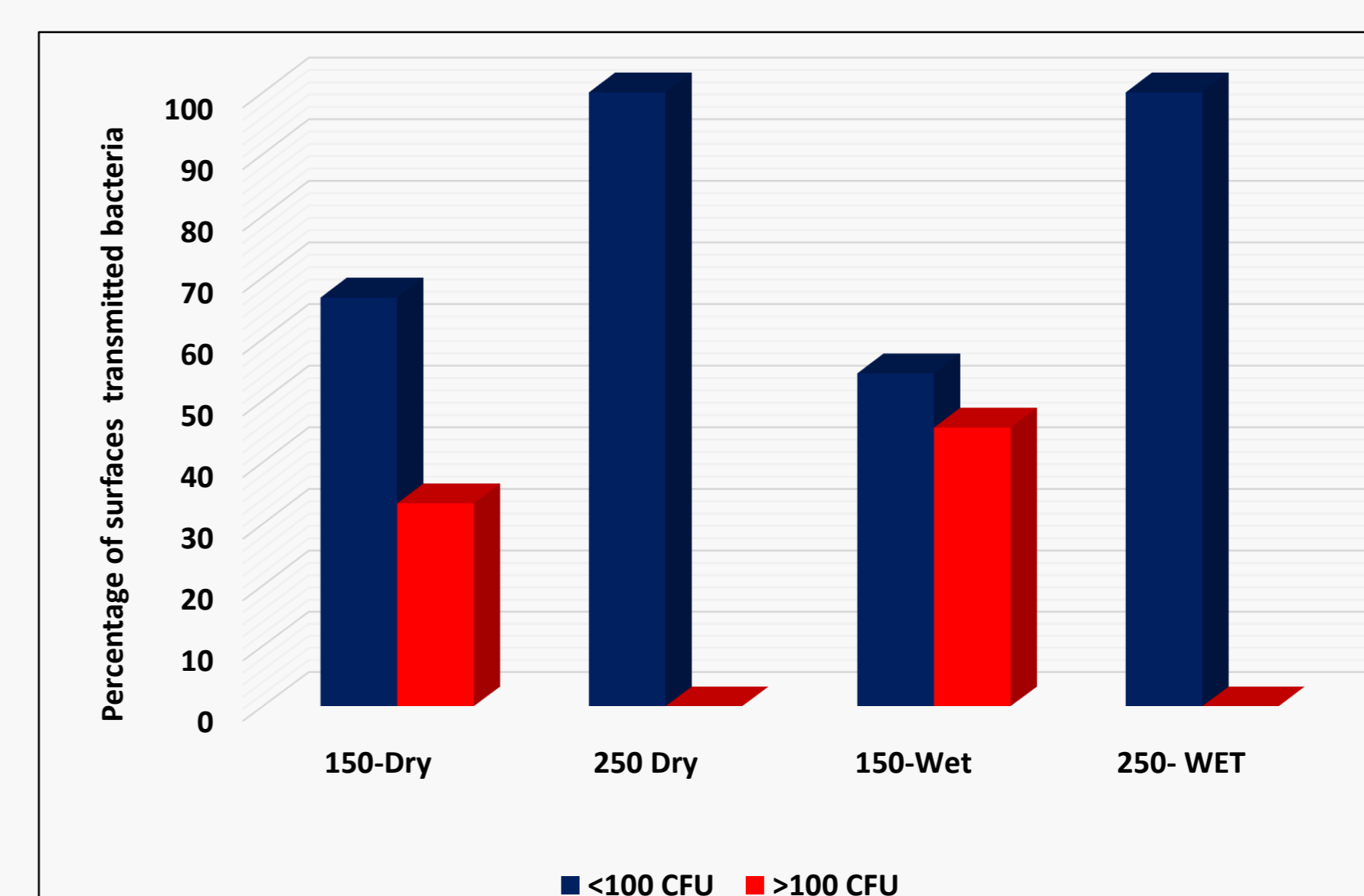
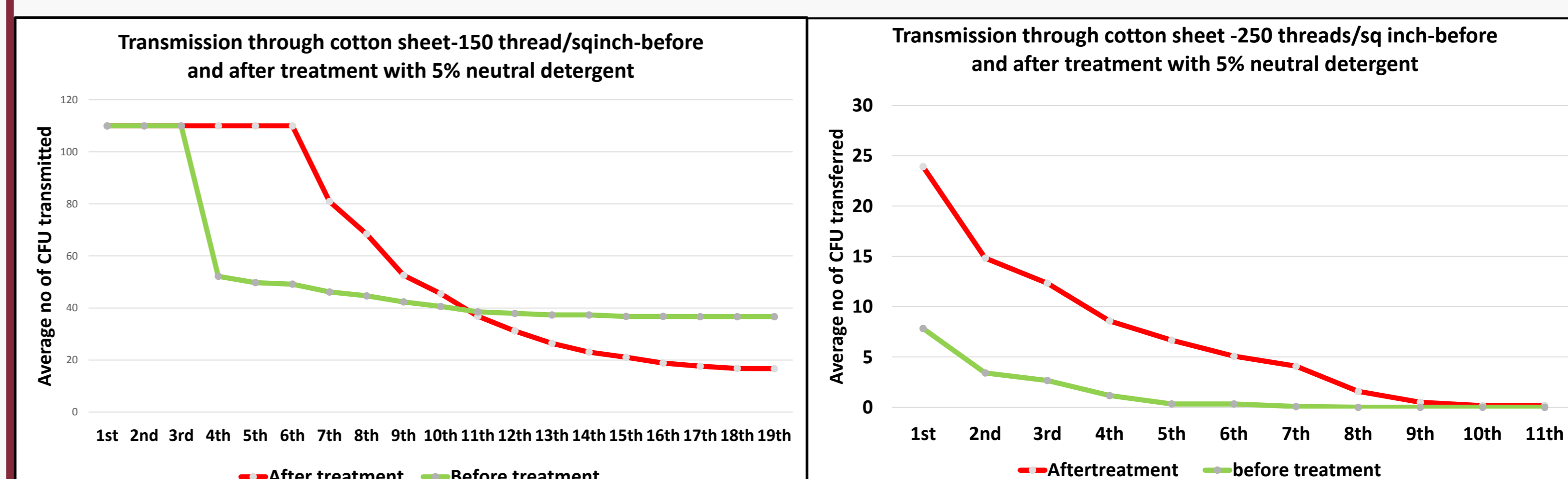


Fig 4: Frequency of transmission through different types of cotton sheet before and after treatment with 5% neutral detergent



Conclusion

After treatment with neutral detergent, the transmission rate of DSB bacteria by and through cotton sheet has been increased. DSB can be transmitted to the patient from the bed mattress, through the sheet.

As biofilm bacteria can be transferred through cotton sheets, this study highlights the importance of cleaning bed mattresses to prevent transmission of pathogens.