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Publication Title/Journal/Conference:

Germicidal Activity against Carbapenem/Colistin-Resistant *Enterobacteriaceae* Using a Quantitative Carrier Test Method, *Antimicrobial Agents and Chemotherapy* - July 2018;62(7):1-5.

Methodology/Study Design: *In vitro* study

Experiment:

- Susceptibility to germicides (e.g., disinfectants, antiseptics) for carbapenem- or colistin-resistant *Enterobacteriaceae* is poorly described.
- Study assessed the efficacy of multiple germicides against 3 species of *Klebsiella pneumoniae* carbapenemase (KPC)-producing *Enterobacteriaceae*, including clinical isolates (9) of *K. pneumoniae* (Kp11), *Enterobacter cloacae* (Ec12), and a strain of *Escherichia coli* (ATCC BAA-2340), as well as *E. coli* carrying *mcr-1* (MRSN 388634).
- 21 different germicides were tested including:
 - 5 high-level disinfectants/chemical sterilants
 - 7 low- and intermediate-level disinfectants (2 dilutions of sodium hypochlorite)
 - 8 antiseptics, and 1 disinfectant/antiseptic
- A disc-based quantitative carrier test method was used to assess the bactericidal activity of the germicides to produce results similar to those encountered in healthcare settings versus suspension testing.
- An inoculum containing approximately 10⁶ test organisms with 5% fetal calf serum (FCS) was placed on each disk.
- The dried inoculum was exposed to the test germicide for 1 minute exposure time at room temperature then neutralized.

Results:

- Overall, most germicides reached at least 3-log₁₀ reduction (20/22 [91%] for KPC *K. pneumoniae*, 22/22 [100%] for *E. cloacae*, 18/22 [82%] for KPC *E. coli*, 19/22 [86%] for MCR-1 *E. coli*).
- All germicides, except for 1% chlorhexidine gluconate plus 61% ethyl alcohol and 3% hydrogen peroxide against MCR-1 *E. coli*, demonstrated at least a 2-log₁₀ reduction for these pathogens even in challenging test conditions (5% FCS and 1 min exposure time).
- Super **Sani-Cloth**[®] and **Sani-Cloth**[®] Prime both showed ≥ 4.4 log₁₀ reduction on all 4 organisms.

Conclusions:

- There is no standard level of germicidal efficacy for environmental surfaces, but most germicides tested are likely to be clinically effective (>3-log₁₀ reduction with a margin of safety) against carbapenem/colistin-resistant *Enterobacteriaceae* when used appropriately.

Limitations:

- The phenotypic and genotypic resistances to germicides were not evaluated.