
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 $10^6$ 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 $\geq 4.4\log10$ 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.