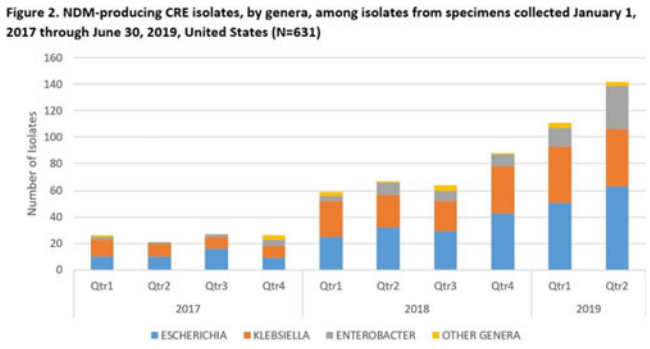

Fig. 2.

predominated. Aggressive public health response and further understanding of current US NDM-CRE epidemiology are needed to prevent further spread.

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Chlorhexidine MICs Remain Stable Among Antibiotic-Resistant Bacterial Isolates Collected from 2005 to 2019 at Three US Sites

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Background: Chlorhexidine bathing reduces bacterial skin colonization and prevents infections in specific patient populations. As chlorhexidine use becomes more widespread, concerns about bacterial tolerance to chlorhexidine have increased; however, testing for chlorhexidine minimum inhibitory concentrations (MICs) is challenging. We adapted a broth microdilution (BMD) method to determine whether chlorhexidine MICs changed over time among 4 important healthcare-associated pathogens. **Methods:** Antibiotic-resistant bacterial isolates (*Staphylococcus aureus* from 2005 to 2019 and *Escherichia coli*, *Klebsiella pneumoniae*, and *Enterobacter cloacae* complex from 2011 to 2019) were collected through Emerging Infections Program surveillance in 2 sites (Georgia and Tennessee) or through public health reporting in 1 site (Orange County, California). A convenience sample of isolates were collected from facilities with varying amounts of chlorhexidine use. We performed BMD testing using laboratory-developed panels with chlorhexidine digluconate concentrations ranging from 0.125 to 64 µg/mL. After successfully establishing reproducibility with quality control organisms, 3 laboratories performed MIC testing. For each organism, epidemiological cutoff values (ECVs) were established using ECOFFinder. **Results:** Among 538 isolates tested (129 *S. aureus*, 158 *E. coli*, 142 *K. pneumoniae*, and 109 *E. cloacae* complex), *S. aureus*, *E. coli*, *K. pneumoniae*, and *E. cloacae* complex ECVs were 8, 4, 64, and 64 µg/mL, respectively (Table 1). Moreover, 14 isolates had an MIC above the ECV (12 *E. coli* and 2 *E. cloacae* complex). The MIC_{50} of each species is reported over time (Table 2). **Conclusions:** Using an adapted BMD method, we found that chlorhexidine MICs did not increase over time among a limited sample of *S. aureus*, *E. coli*, *K. pneumoniae*, and *E. cloacae* complex isolates. Although these results are reassuring, continued surveillance for elevated chlorhexidine MICs in isolates from patients with well-characterized chlorhexidine exposure is needed as chlorhexidine use increases.

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Table 1. Chlorhexidine MIC Results

Organism	MIC Range (µg/mL)	MIC_{50} (µg/mL)	MIC_{90} (µg/mL)	ECV (µg/mL)
S. aureus	1–8	2	4	8
E. coli	1–64	2	4	4
K. pneumoniae	4–64	16	32	64
E. cloacae complex	1–>64	16	64	64

Table 2. Chlorhexidine MIC_{50} Results Over Time

Year	*S. aureus*		*E. coli*		*K. pneumoniae*		*E. cloacae* complex	
	n	MIC_{50} (µg/mL)	n	MIC_{50} (µg/mL)	n	MIC_{50} (µg/mL)	n	MIC_{50} (µg/mL)
2005–2007	27	4	0	N/A	0	N/A	0	N/A
2008–2010	18	4	0	N/A	0	N/A	0	N/A
2011–2013	25	4	8	2	25	16	2	N/A
2014–2016	43	2	27	2	20	16	23	16
2017–2019	16	2	123	2	97	16	84	16