restriction modification barriers, which identify and restrict foreign DNA (Lindsay et al. 2012; Jones et al. 2015).

7.4.4 Dissemination of Vancomycin Resistance Among Bacterial Pathogens

Along with methicillin resistance, vancomycin resistance in staphylococci is a threat to healthcare. Vancomycin resistance is also observed in enterococci and is a serious problem as vancomycin serves as a drug of last resort. Vancomycin resistance is encoded in the *van* gene cluster consisting of *vanA*, *vanB*, *vanH*, *vanR*, *vanS*, *vanW*, *vanX*, *vanY*, and *vanZ,* typically named after the ligases they encode (Kristich et al. 2014). Genes conferring resistance to vancomycin are carried on MGEs; *vanA* is carried on Tn*1546* and *vanB* can be chromosomally or plasmid-encoded and is carried on Tn*1549*-like transposons or on Tn*5382* (Kristich et al. 2014). Vancomycin resistance can be transferred by conjugation. The vancomycin resistance observed in *S. aureus* was likely acquired from VRE by transfer of Inc18 plasmids comprising insertions of Tn*1546*, encoding vancomycin resistance (Zhu et al. 2008; Malachowa and DeLeo 2010).

7.4.5 Dissemination of Fluoroquinolone Resistance Among Bacterial Pathogens

Among the high priority resistances listed by WHO are also clarithromyin resistance and fluoroquinolone resistance (WHO 2017). Clarithromycin resistance observed in *H. pylori* occurs due to point mutations of the 23S rRNA gene. Such ABRs, which are mediated by chromosomal mutations, are transmitted vertically among bacteria instead by HGT (Mégraud 2013).

Fluoroquinolones are mainly prescribed to treat gastrointestinal and urinary tract infections (Sanchez and de Melo 2018). Among the pathogens listed by WHO, *Campylobacter* spp., *Salmonella* spp., and *Shigella* spp., exhibit high levels of fluoroquinolone resistance (WHO 2017). Quinolone resistance can be chromosomally encoded or through acquisition of plasmid-mediated quinolone resistance genes like *qnrA*, *qnrB*, *qnrS*, and *aac(6′)-lb-cr* (Patel et al. 2011; Sanchez and de Melo 2018). Quinolone resistance can be transferred to other bacteria by conjugation or transformation (Mannion et al. 2018). For example, plasmid DNA from *Shigella flexneri* isolates was transformed and transported by conjugative transfer into an antibiotic susceptible *E. coli* strain. The *E. coli* strain acquired resistance to quinolones and β-lactams in addition (Mannion et al. 2018). *qnr* harboring plasmids often also carry resistance genes for other antibiotics, which can also be transferred by conjugation as discovered by Hata et al. (2005). The conjugative plasmid pAH0376 (~47 kb) in *S. flexneri*