

In a screen for the presence of 260 ARGs in different habitats, including wastewater, soil, human, and livestock samples, Li et al. (2015) observed that the most abundant and commonly distributed ARGs were the ones associated with antibiotics extensively used in human and veterinary medicine. These included the growth promoters (e.g. aminoglycoside, bacitracin, β -lactam, chloramphenicol, macrolide–lincosamide–streptogramin, quinolone, sulfonamide, and tetracycline). Ninety-nine out of 260 ARGs shared between human and young livestock feces, it was possible to observe that some were more abundant in humans than in animals (e.g. bacitracin resistance genes), while the opposite was observed for others (e.g. macrolide–lincosamide–streptogramin, tetracycline, sulfonamide, aminoglycoside, and multidrug resistance genes) (Li et al. 2015). The association between humans and domestic wastewater was also reported by Li et al. (2015), who found that 68 ARGs (out of 260) encoding resistance to tetracycline, beta-lactam, and aminoglycosides detected in human feces samples and domestic raw wastewater showed high similarity. While it is clear that most of the ARGs detected in humans can reach the wastewater treatment plants and even persist after treatment, there are evidences that the dissemination in the environment may favor some, probably harbored by stable mobile genetic elements and/or ubiquitous bacteria (Czekalski et al. 2014; Munck et al. 2015). Some ARGs, despite the low general prevalence, are good examples of high persistence or dissemination potential. For example, the *bla*_{KPC-2} gene carried by carbapenem-resistant bacteria has been detected in the rivers receiving wastewater treatment plants discharges (Picão et al. 2013; Yang et al. 2017). In India, New Delhi, the *bla*_{NDM-1} gene was detected in drinking water bacteria (*Achromobacter* spp., *Kingella denitrificans*, and *P. aeruginosa*), after the observation of some cases of human contamination with *Enterobacteriaceae* and *A. baumannii* isolates carrying this gene (Walsh et al. 2011). In summary, although some evidences are available, the impact of animal and environmental reservoirs onto the human health is still an issue deserving thorough research (Phillips et al. 2004; Martinez 2008; Woolhouse et al. 2015).

10.10 Final Considerations

This overview reinforces the need for an urgent implementation of the One Health perspective, in which the health and well-being of the citizens, the safety of the food chain, and the protection of the environment are comprehensively surveilled and controlled. Along with other contaminants and human-health threats, antibiotic resistance is a key issue in the One Health priorities for the next decades.