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Assessing multidrug resistance patterns in bacteria isolated from canine urine samples submitted to the Veterinary Diagnostic Laboratory, University of Illinois

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The emergence of multidrug-resistant (MDR) bacteria in dogs is a threat to animal and human health. While previous studies provided evidence that food animals were the main source of transmission of MDR bacteria to humans, recently, companion animals are getting more attention because of their close contact with their owners. The major sources of MDR bacteria in dogs include bacteria isolated from patients with urinary tract infections (UTI). There are limited studies that examined the antimicrobial resistance (AMR) patterns of canine urinary bacterial pathogens in Illinois. To address this lack of knowledge our study evaluates the prevalence of major Gram-positive and negative bacteria and their AMR patterns that were isolated from canine urine samples submitted to the Veterinary Diagnostic Laboratory, University of Illinois, between 2019 and 2020. We analyzed 803 isolates from 2583 urine samples obtained from dogs suspected of UTI. The most prevalent bacteria were *Escherichia coli* (45.58%), *Staphylococcus pseudintermedius* (17.93%), *Proteus mirabilis* (11.08%), *Enterococcus faecalis* (9.46%), *Streptococcus canis* (6.10%), and *Enterococcus faecium* (3.74%). Multidrug-resistant isolates were observed in 63 (43.75%) *S. pseudintermedius* isolates (*n*=144), 85 (23.22%) *E. coli* isolates (*n*=366), 16 (17.98%) of *P. mirabilis* isolates (*n*=89), and 5 (10.2%) of *S. canis* isolates (*n*=49). A very high prevalence of resistance to penicillin (56.94%) in *S. pseudintermedius* isolates and a high prevalence of resistance to ampicillin (31.42%) in *E. coli* isolates were observed. The high prevalence of resistance to antimicrobials commonly used to treat UTI was concerning. Considering the risk of MDR bacteria zoonotic transmission that could cause a serious health issue to vulnerable populations, collecting urine samples for bacterial culture and susceptibility testing before initiating the UTI therapy is recommended to avoid treatment failures and the selection of MDR bacteria. Additionally, veterinarians should advise canine UTI cases owners about the possibility of zoonotic transmission of MDR-bacteria.

Keywords: dog, urinary tract infection, bacteria, antimicrobial resistance, multidrug resistance, Illinois.