

## Abstract

# Etiological Spectrum and Antimicrobial Resistance of Most Frequently Isolated Pathogens, Associated with Urinary Tract Infections in Ambulatory Patients <sup>†</sup>

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**Introduction:** Urinary tract infections (UTIs) are one of the most common infections both in the community and in the hospital setting. **Aim:** The aim of this study is to investigate the etiological spectrum and antimicrobial resistance of most frequently isolated pathogens, associated with UTIs in ambulatory patients in Varna city, Bulgaria during a seven-month period (October 2020–April 2021). **Materials and methods:** A total of 1600 urine samples, collected from patients with suspected UTIs were tested. Screening for bacterial growth was done by HM&L Uroquattro instrument (ALIFAX, Italy). Species identification and antimicrobial susceptibility testing were performed by VITEK 2 Compact System (bioMerieux) and Kirby-Bauer disk diffusion method. **Results:** A total of 127 urine samples (7.9%) were positive for bacterial growth by HM&L. From these samples, 127 bacterial pathogens were isolated: Gram negative bacteria were found in 62.2% (n = 79) and Gram positive—in 37.8% (n = 48). *E. coli* was the predominant species, associated with UTIs in the studied group of patients (77%, n = 61). The Gram-positive bacteria accounted for 37.8% (n = 48), with *E. faecalis* being the leading pathogen in this group (87.5%, n = 42). *Staphylococcus saprophyticus* and *Streptococcus agalactiae* were diagnosed in 8% (n = 4) and 4% (n = 2) respectively. The resistance rates in the group of Gram-negative isolates (n = 79) in decreasing order were as follows: ampicillin, 64.5% > trimethoprim/sulfamethoxazole, 35.4% > ciprofloxacin, 29.1% > amoxicillin-clavulanic acid, 27.8% > cefuroxime, levofloxacin, 21.5% > fosfomycin, 12.6% > ceftriaxone, 13.9% > ceftazidime, 10.1% > gentamicin, nitrofurantoin, 6.3% > nitroxoline, 5%. The resistance rates among the isolates of *E. faecalis* (n = 42) were as follows: ciprofloxacin, 28.6% > gentamicin, 23.8% > levofloxacin, 19% > nitrofurantoin, 4.7% > amoxicillin, 2.4%. A low rate of 3rd generation cephalosporin resistance (ceftazidime, cefotaxime, ceftriaxone) is detected among the representative of order *Enterobacterales* in the study. The rates of ESBL-producing isolates, confirmed by the phenotypic DDST, were as follows: 5% in *E. coli* (n = 4), 2.5% in *K. pneumoniae* (n = 2) and *Enterobacter cloacae* (n = 2). No resistance to meropenem, amikacin, vancomycin and teicoplanin was found in the studied collection of isolates (n = 127). **Conclusion:** The etiological spectrum of UTIs in ambulatory patients was dominated by *E. coli*, followed by *E. faecalis*. In the group of Gram-negative uropathogens, high resistance rates to ampicillin, trimethoprim/sulfamethoxazole and quinolones were detected. Third generation cephalosporins, fosfomycin, nitrofurantoin and nitroxoline retained very good activity.

Among *Enterococcus faecalis* isolates, the second most commonly isolated bacterial species, a decreased activity of quinolones was found too, but the aminopenicillins and nitrofurantoin remain highly active.

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