



**Fund “Nauka” Project № 19006 Resume – Competition-Based Session 2019:**  
**“Evaluation of the HB&L Uroquattro device as a rapid screening test for urinary tract infections”**

**Project leader:** Prof. Temenuga Zhekova Stoeva, MD, PhD

Urinary tract infections take an important part of all human infections: they affect all age groups, male/female, hospital and ambulatory medicine. A prompt and accurate microbiology result is of great importance for patient’s treatment and infection management.

The aim of the project is to estimate a light scattering technology based analyzer for bacterial growth (HB&L UroQuattro, Alifax) in comparison to conventional uroculture. To achieve this goal, a 3 hours rapid screening and a simultaneous 24h conventional culture of urinary samples will be performed. Bacterial isolates will be identified by biochemical manual tests and Vitek 2 automated system (Biomerieux). The antimicrobial susceptibility testing will be performed by HB&L Uroquattro, Bauer-Kirby disc diffusion method and Vitek 2.

This innovative technology for urine microbiology analysis will allow broadening the diagnostic process of Urinary tract infections by determining the residual antimicrobial activity (RAA) of bacteriostatic substances in the clinical sample.

This project will estimate at what extend the automation in microbiology practice decreases the financial, time and human resources at any step of the diagnostic process.

The local antimicrobial resistance data will help the choice of adequate treatment of ambulatory urinary tract infections.

**Achieved results:**

Given the significant number of urine samples tested in outpatient and hospital microbiology laboratories, the use of the automated HB&L Uroquattro system significantly improves the operations of microbiology laboratories. The implementation of the project and the obtained results for sensitivity, specificity, PPV and NPV fully correspond to the set research objectives, namely to evaluate the automated system for the rapid detection of bacterial growth in urine samples. The levels of resistance to a range of antimicrobial drugs in a large collection of bacterial isolates associated with uroinfections were investigated and a high degree of concordance was demonstrated between the results obtained within 3 hours with the HB&L Uroquattro with the results obtained by the disc diffusion method and the automated system Vitek 2. Strongly positive samples were proven already in the first hour of the study, and the result of the antibiotic sensitivity test directly from the urine samples was obtained in the next 3-5 hours (result within 1 day). For the first time in Bulgaria, a test for

residual antimicrobial activity in urine samples was conducted, which supports the interpretation of the cultural examination (especially in cases of unreported antibiotic therapy) and prevents false negative results. The etiological spectrum of urinary tract infections in a large group of outpatients was established.

The results of the project prove a significant reduction in laboratory costs through the implementation of the automated system in routine practice, a reduction in diagnostic errors associated with manual type of work, as well as subjectivity in sample reporting.

Based on the local resistance results (Varna region), recommendations for empiric antibiotic therapy of urinary tract infections have been developed. Clinical and microbiological information on a large number of patients with uroinfections has been accumulated in the database of the automated system, which can be used in a future epidemiological study to assess the severity of antibiotic resistance associated with various clinical syndromes (including uroinfections).