



## Summary brief

14 September 2021

### Time to curb resistant urinary pathogens at a district level hospital in Nepal

#### WHO antibiotic categories:

**Access Group:** antibiotics with lower potential of resistance; preferred for initial therapy

**Watch Group:** antibiotics with higher potential of resistance and targeted for antibiotic resistance

**Reserve Group:** antibiotics which are last resort

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Link to manuscript will be updated  
after publication

#### Key Messages

- In the Gulmi district hospital of Nepal, one third of the urine samples of patients with urinary tract infection sent for bacterial culture and antibiotic susceptibility testing showed bacterial growth and one in four of them were multidrug resistant.
- Bacteria were least resistant to the antibiotic Nitrofurantoin among all tested antibiotics. The treatment guideline for urinary tract infections should be updated to include Nitrofurantoin for initial treatment.
- Due to the high prevalence of multidrug resistant bacteria, inclusion of district level health facilities in national antibiotic resistance reporting and regulating over-the-counter antibiotics prescription will help in addressing antimicrobial resistance at the grass root level in Nepal.

#### What is the problem and why is it important?

Urinary tract infections are common infections encountered in outpatient and inpatient settings. In remote areas, where tests are not always available to detect the specific pathogens causing the infection, it is common practice to start therapy with antibiotics. However, this can increase antibiotic resistance if the medicine is not appropriate for the pathogen. This resistance increases the cost of care because the patient must go through more than one round of treatment, and this delay can cause poorer patient outcomes.

In the Nepal health system, the district hospitals function as the first referral point to rural health facilities and provide testing facilities. However, there is limited information on antibiotic resistance in these health facilities. This study of a district hospital investigated the proportion and types of pathogens causing urinary tract infections to determine the pattern of resistance to antibiotics.

#### How did we measure it?

From April 2019 to April 2021, we reviewed the records of urine samples that were sent for bacterial culture and antibiotic susceptibility testing at the microbiology laboratory of Gulmi Hospital of Lumbini Province. Laboratory personnel helped with the data collection. Growth of bacteria and their resistance to the tested antibiotics were reported according to the World Health Organization (WHO) antibiotic categories. (See the WHO antibiotic categories in the side bar) Bacteria that were resistant to three

or more classes of antibiotics tested in the laboratory were considered as multidrug resistant. Reserve group antibiotics were not tested in this health facility.

### What did we find?

- Growth of bacteria was detected in more than one third of the urine samples (116/315, 36.83%) tested. Most of them were gram negative bacteria (84.5%). No mixed growth of the bacteria was reported. All the bacteria were tested for antibiotic susceptibility.
- Most of the urine bacteria (95.7%) were resistant to at least one antibiotic tested. One fourth (25%) of the bacteria were found to be multidrug resistant with one (0.86%) bacterial isolate resistant to all tested antibiotics.
- Among commonly tested antibiotics, the highest resistance was observed towards cefixime (62.2%) from the watch group and ampicillin (65.6%) from the access group of antibiotics. Compared to commonly prescribed oral antibiotics from the watch group like ciprofloxacin, ofloxacin and cefixime; Nitrofurantoin showed lower resistance (13.9%).

### Implications

- Multidrug resistant urinary tract infections increase morbidity and further consumptions of antibiotics.
- Multidrug resistant bacteria are alarming because such infections can be difficult to treat at a district level hospital and may require referral. Furthermore, common initial therapy before testing may not be effective.
- Antibiotics with the watch group are not needed to be prescribed at first because urine isolates are responding to Nitrofurantoin, an access group antibiotic.
- Updates in empirical therapy for treatment of urinary tract infection to include Nitrofurantoin, including district level health facilities in national antibiotic resistance reporting system and regulating over-the-counter antibiotics can facilitate rational use of antibiotics and help in better patient outcomes.

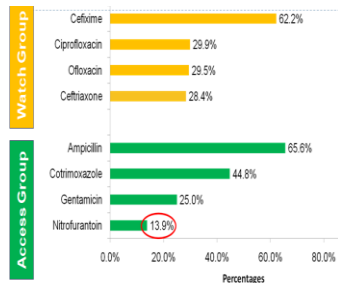


Figure 1 Resistance of urine isolates to commonly tested antibiotics

**Multi drug resistance in urinary pathogens: high time we start monitoring antibiotic resistance at the district level**