

# Epidemiology of urinary tract infections in HIV positive patients at a tertiary care hospital in Central Europe (2011 - 2016)

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## Objective

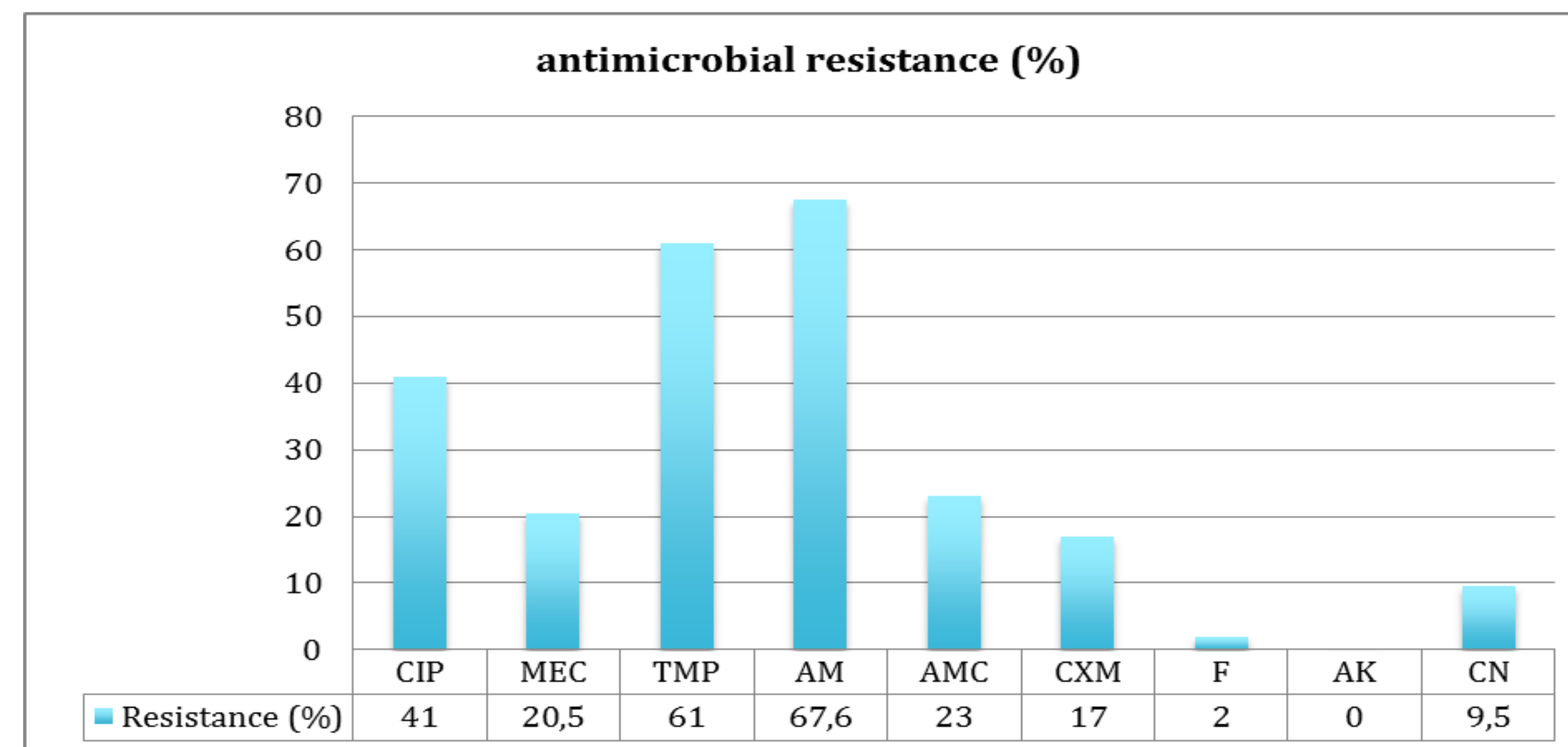
Up to now there is limited published data concerning recent epidemiology of urinary tract infections (UTI) in HIV positive individuals. The aim of our study was to determine the microbiological prevalence of symptomatic UTI in HIV patients and to describe possible independent risk factors for UTI like:

- CD4 count,
- patient's origin from high prevalence countries,
- sexual behaviour,
- intravenous drug abuse, and
- pneumocystis prophylaxis.

Additionally we aimed to describe resistance rates of *E. coli* to antimicrobial agents commonly used in UTI (Figure 1) among our study population.

## Patients and Methods

- retrospective case-control study over a six-year period of 313 HIV patients attending the Department of Dermatology (Division of Immunodermatology) at the Vienna general hospital
- HIV patients included: 101 patients with UTI and 212 age and gender matched controls without UTI; age range: 17 - 78 years (median age 43, mean 44); demographic data is shown in Table 1.
- UTI was defined as a urine culture with bacterial count of  $> 10^4$  CFU/ml (colony forming units/ millilitre) or a pure culture of  $> 10^2$  CFU/ml, both accompanied with symptoms of a urinary tract infection according to the algorithm published by Wilson et al.<sup>1</sup> and according to the protocol for workup of urine cultures of our microbiological laboratory.
- Antimicrobial resistance according to EUCAST recommendations.
- The required data was investigated from RDA (Research, Documentation & Analysis), HIS (hospital information system of the Vienna general hospital), and HIP (HIV Patient Management System, Version 3.12.1.5777).
- The statistical analysis was performed using SPSS Software Version 20.0. Odds ratio (OR) with 95% confidence intervals (CI) were used to explore relationships between categorical variables and p values  $< 0,05$  were regarded as significant.



**Figure 1:** Resistance rates of *E. coli* to CIP - ciprofloxacin, MEC - mecillinam, TMP - trimethoprim, AM - ampicillin, AMC - ampicillin/ clavulanic acid, CXM- cefuroxime, F -nitrofurantoin, AK- amikacin, CN -gentamicin

## Results

- HIV infected individuals with CD4 count  $>200$  cells/mm<sup>3</sup> were less likely than HIV infected individuals with CD4 count  $<200$  cells/mm<sup>3</sup> to experience UTI: OR 0.811, 95% CI 0.712-0.923 vs. OR 2.555, 95% CI 1.553 - 4.205, respectively.
- There was no significant association between the other risk factors in our study.
- Isolated microorganism species are shown in Table 2
- 16.8% of patients with UTI were positive with bacteria producing Extended-spectrum beta-lactamases (ESBLs)
- in vitro resistance rate of *E. coli* to following different antimicrobial agents are shown in Figure 1.

Organism	No. (%)
<i>E.coli</i>	110 (56)
<i>Enterococcus spp.</i>	35 (18)
<i>K. pneumoniae</i>	12 (6)
<i>Proteus spp.</i>	11 (6)
<i>Enterobacter spp.</i>	6 (3)
<i>Candida spp.</i>	11 (5.5)
<i>Pseudomonas aeruginosa</i>	4 (2)
<i>Citrobacter spp.</i>	3 (1.5)
Other	4 (2)
<b>Total</b>	<b>196 (100)</b>

**Table 2:** Distribution of organisms isolated from urinary cultures in HIV positive individuals

AgeCat	CD4 Count (cells/mm <sup>3</sup> )			Total
	< 200	201-500	>501	
18-29	9	17	17	43
30-50	32	64	85	181
>50	10	32	47	89
<b>Gender</b>				
Female	28	50	57	135
Male	23	63	92	178
<b>UTI</b>				
Yes	28	37	36	101
No	23	76	113	212
<b>Total</b>	<b>51</b>	<b>113</b>	<b>149</b>	<b>313</b>

**Table 1:** Demographic data and UTI according to CD4 counts (AgeCat - age category, UTI - Urinary tract infections)

## Conclusion

The present study shows:

- an increase in frequency of UTI in HIV patients with CD4 counts  $< 200$  cells/mm<sup>3</sup>
- E. coli* as predominant pathogen with increased resistance rates (compared to isolates from urinary cultures of the general population with UTI.<sup>2-4</sup>)

These findings can be crucial for the further implementation of surveillance strategies and should be considered when it comes to the management of UTI in HIV patients.

## References

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