

Neisseria gonorrhoeae Strain Types and Antibiotic Susceptibility in Belgium: National Data from 2013

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Background

Molecular surveillance of *Neisseria gonorrhoeae* will help in understanding the acquisition and development of antibiotic resistant strains.

We aimed to determine the antimicrobial susceptibility and the genotypes of *N. gonorrhoeae* strains collected in Belgium during 2013.

Methods

Of all *N. gonorrhoeae* isolates received in 2013 at the Belgian Reference Centre for Sexually Transmitted Infections, the antimicrobial susceptibility was determined using the agar dilution method. The minimal inhibitory concentrations (mg/L) were obtained for penicillin, tetracycline, ciprofloxacin, ceftriaxone, cefixime, azithromycin and spectinomycin. The β -lactamase production was detected using nitrocefin solution.

The sequence types of the isolates was defined employing the NG-Multi Antigen Sequence Typing Method.

Patients and Antimicrobial Characteristics

	Antimicrobial Resistance
592 isolates	Ceftriaxone 0%
579 individual patients	Spectinomycin 0%
11 patients >1 event	Azithromycin 2.4%
86 (14.5%) women, 500 (84%) men	Ciprofloxacin 51.4%
Age range: 22 months-72 years	Penicillin 32.1%, 14.4% PPNG
Median age: 31 years	Tetracycline 46.6%, 8.6% TRNG
111/212 (52.4%) MSM	Cefixime 0.3% (MIC: 0.5 mg/L)
64/163 (39.3%) HIV + (>90%MSM)	Beta - lactamase 17.3%

NG- Multi Antigen Sequence Types

198 different sequence types: 160 *porB* alleles and 75 *tbpB* alleles
47.6% of all isolates belonged to 10 ST

Sequence Type	N (%)
21	15 (2.5)
225	10 (1.7)
387	34 (5.7)
1407	39 (6.6)
2212	20 (3.4)
2400	32 (5.4)
2992	79 (13.3)
4995	16 (2.7)
5624	23 (3.9)
7072	14 (2.4)

Sequence Type	Characteristic	P-value
387	Hetero men	<0.0001
	<=25 y	0.0001
2212	MSM	0.021
2992	Men	<0.001
	MSM	0.0012
5624	Men	0.036
	MSM	0.038
2400	MSM	0.0076

Conclusions

T 387, mainly detected in **heterosexual men**, was associated with **younger age**. This strain type was significantly associated with **sensitivity to all antimicrobials** tested and showed low modal MIC values for ceftriaxone, cefixime, azithromycin and spectinomycin.

ST 2212, 2992, 5624 and 2400 were more present in **MSM** and were more **resistant** to ciprofloxacin (except for 2992), penicillin and tetracycline.

Higher modal MIC values for ceftriaxone were obtained with **ST 1407**, and **all ST 7072** isolates had a cefixime MIC of 0,25mg/L. **All 10 STs** showed distinct MIC distributions for ceftriaxone, cefixime and azithromycin.

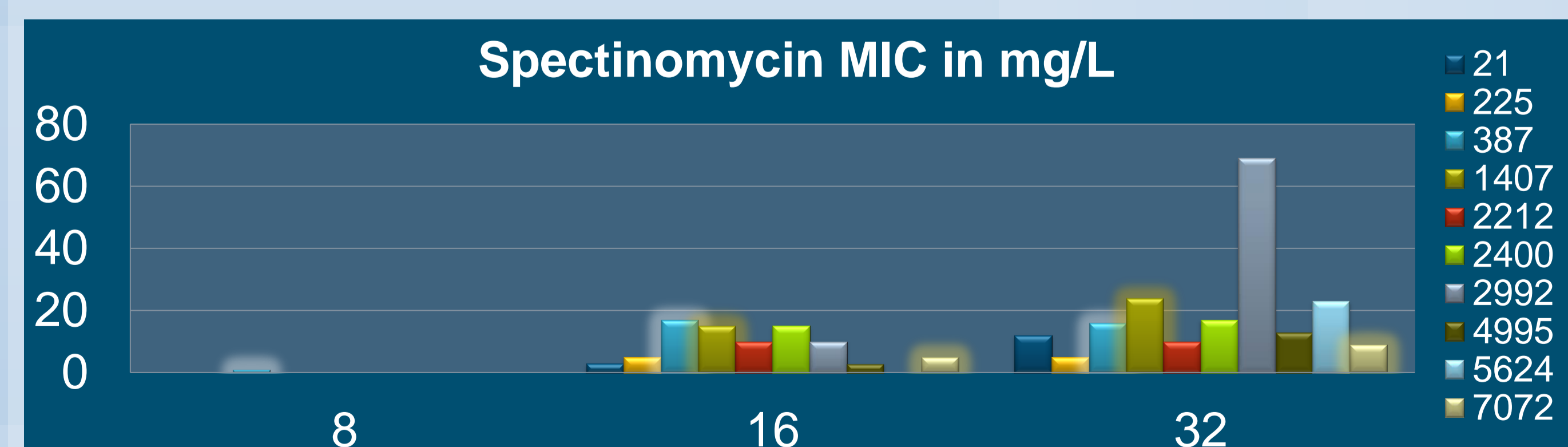
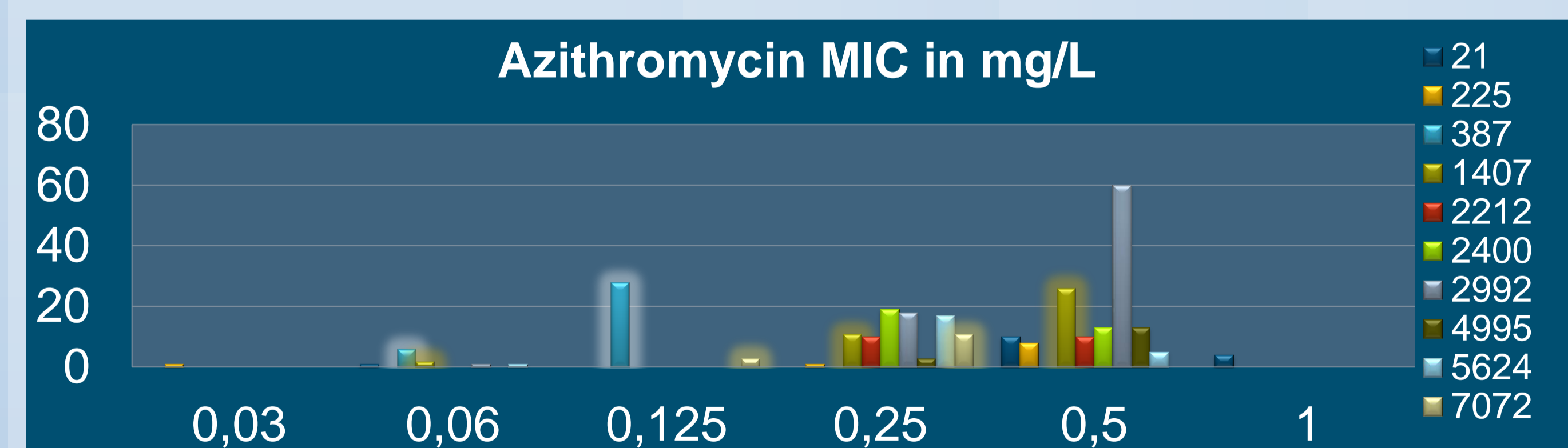
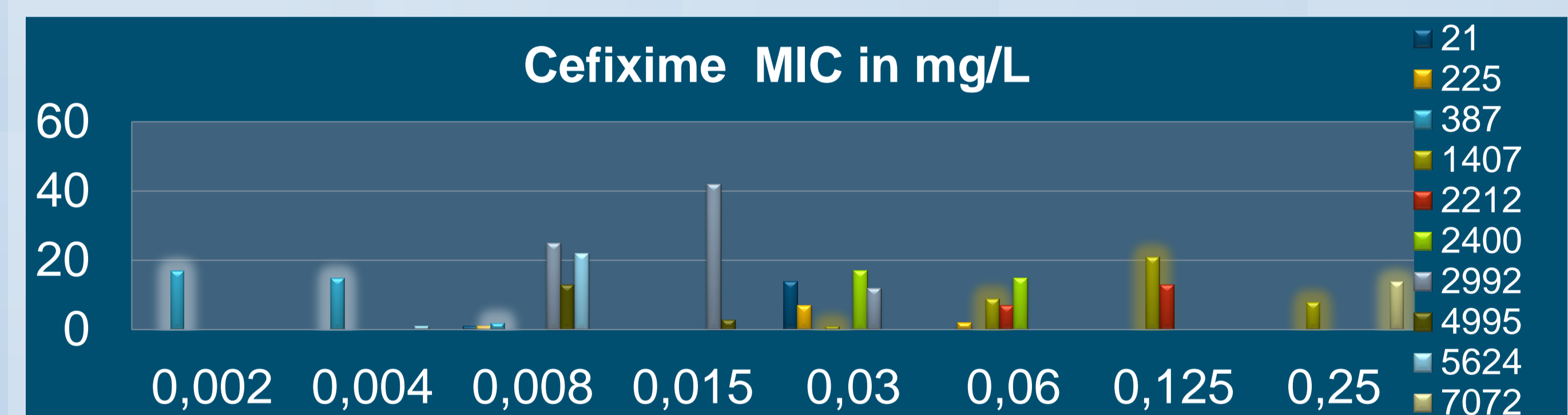
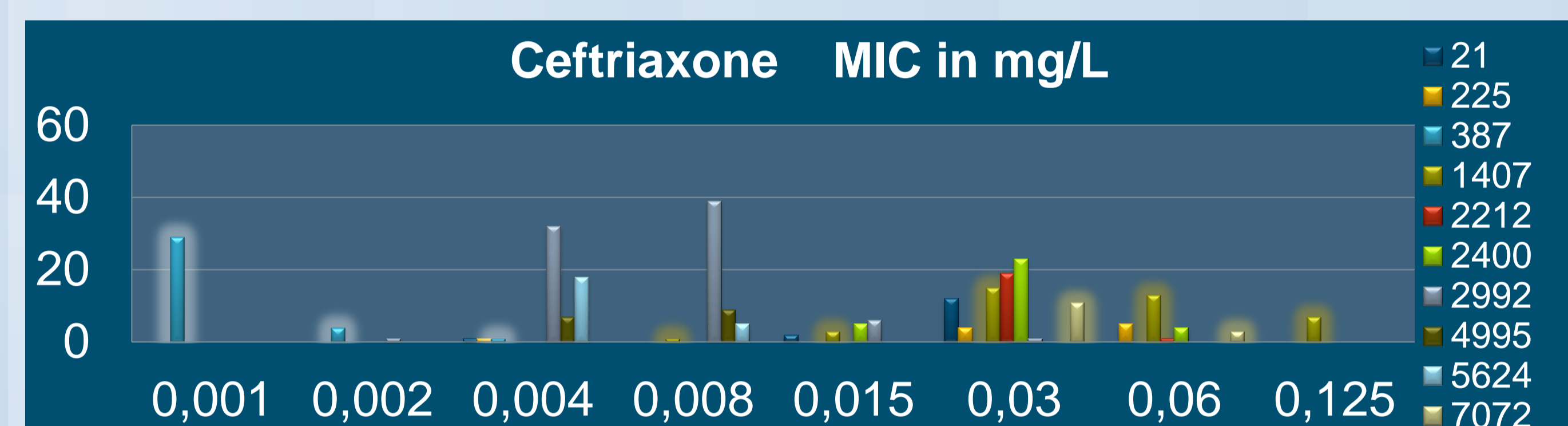
Sequence Types and Antimicrobial Pattern

The 10 STs mostly present in this study population were significantly ($p < 0.001-0.005$) associated with ciprofloxacin, penicillin and tetracycline susceptibility.

ST 387 was associated with sensitivity to ciprofloxacin, penicillin, tetracycline.

ST 21 and 2992 were associated with sensitivity to ciprofloxacin and resistance to penicillin and tetracycline.

ST 225, 1407, 2212, 2400, 4995, 5624, and 7072 were associated with resistance to ciprofloxacin, penicillin and tetracycline.



Abbreviations: MSM: men who have sex with men; PPNG: penicillinase-producing *N. gonorrhoeae*; TRNG: tetracycline resistant penicillinase-producing *N. gonorrhoeae*; MIC: minimal Inhibitory concentration; ST: sequence type



Molecular typing can predict antimicrobial susceptibility



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