

Cephalosporin use in eastern Europe: Results of the WHO/Europe-ESAC project.

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Introduction and purpose

There is no reliable data on antimicrobial use in non-European-Union (EU) south-eastern European countries (SEE) and newly independent states (NIS). We aimed to collect valid, representative, comparable total national wholesales data on systemic antimicrobial use in these non-EU countries of the World Health Organization (WHO) European Region. We report on systemic cephalosporin use.

Methods

Valid 2011 total (outpatients and hospital care) data on cephalosporin (ATC group J01D) use of 5 SEE (Bosnia and Herzegovina, Montenegro, Serbia, Turkey – plus Kosovo) and 7 NIS (Armenia, Azerbaijan, Belarus, Georgia, Kyrgyzstan, Republic of Moldova, Tajikistan) and Croatia (a SEE country not reporting 2011 data to ESAC-Net), were analysed according to the WHO Anatomical Therapeutic Chemical (ATC)/Defined Daily Doses (DDD) methodology and expressed in DDD/1000 inhabitants/day (DID). We distinguished between first-, second-, third-, and fourth-generation cephalosporins. The data were further compared to 2011 total care (ambulatory and hospital care) ESAC-Net data of the ECDC (www.ecdc.europa.eu/en/healthtopics/antimicrobial_resistance/esac-net-database/Pages/database.aspx)

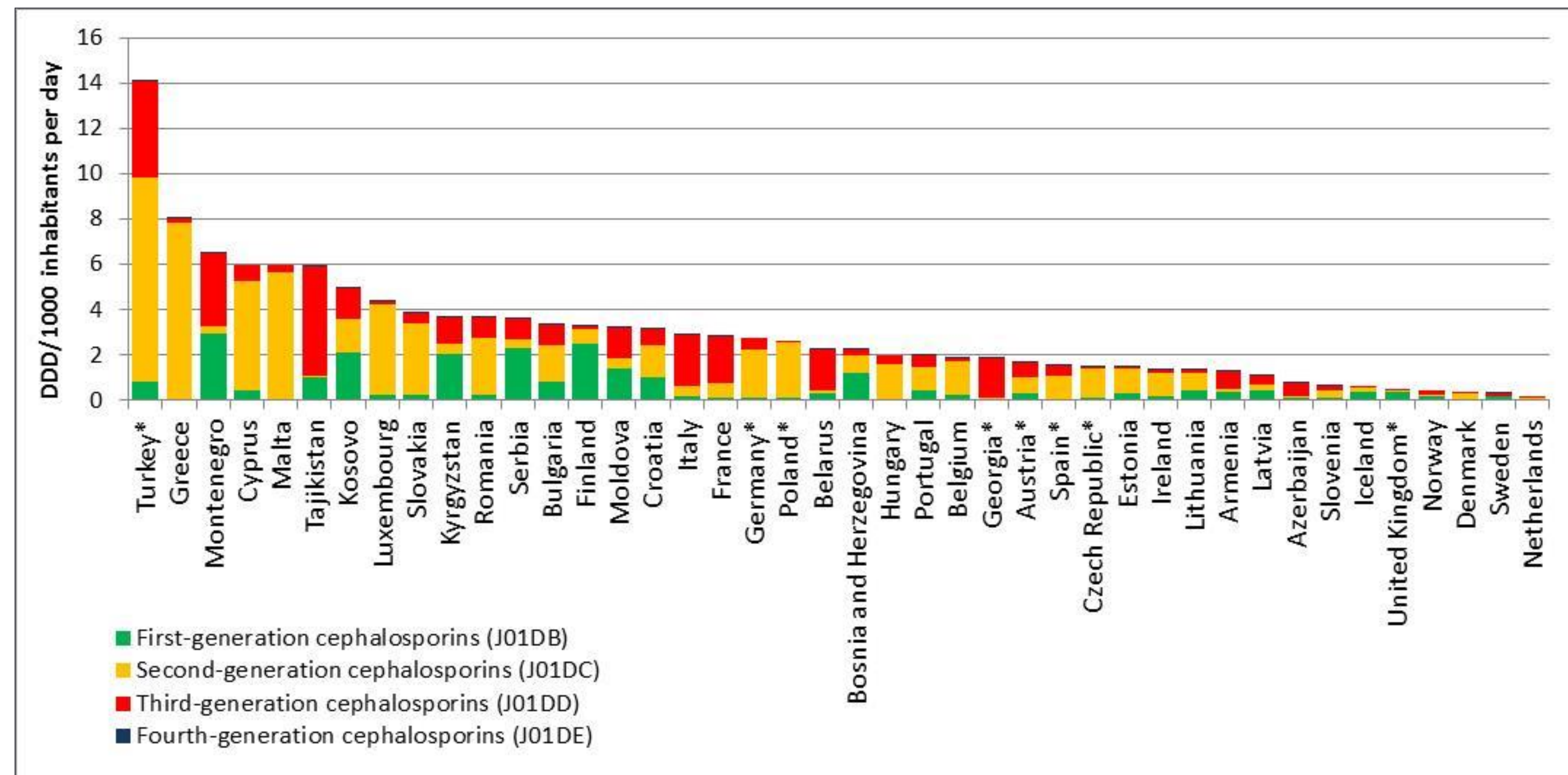


Figure 2. Total cephalosporin use subdivided into 4 main subgroups, expressed in number of DDD/1000 inhabitants/day in 2011, in 12 European countries and Kosovo as compared to 29 ESAC-Net countries.

DDD=defined daily doses. *Countries reporting only outpatient antibiotic use Kosovo (in accordance with UN Security Council resolution 1244 (1999))

Reference: Versporten A, Bolokhovets G, Ghazaryan L, Abilova V, Pyshnik G, Spasojevic T, Korinteli I, Raka L, Kambaralieva B, Cizmovic L, Carp A, Radonjic V, Maqsdova N, Celik H, Payerl-Pal M, Pedersen H, Sautenkova N, Goossens H on behalf of the WHO/Europe-ESAC Project Group. Antibiotic use in eastern Europe: a cross-national database study in coordination with the WHO Regional Office for Europe. *Lancet Infect Dis* 2014 May;14(5):381-7.

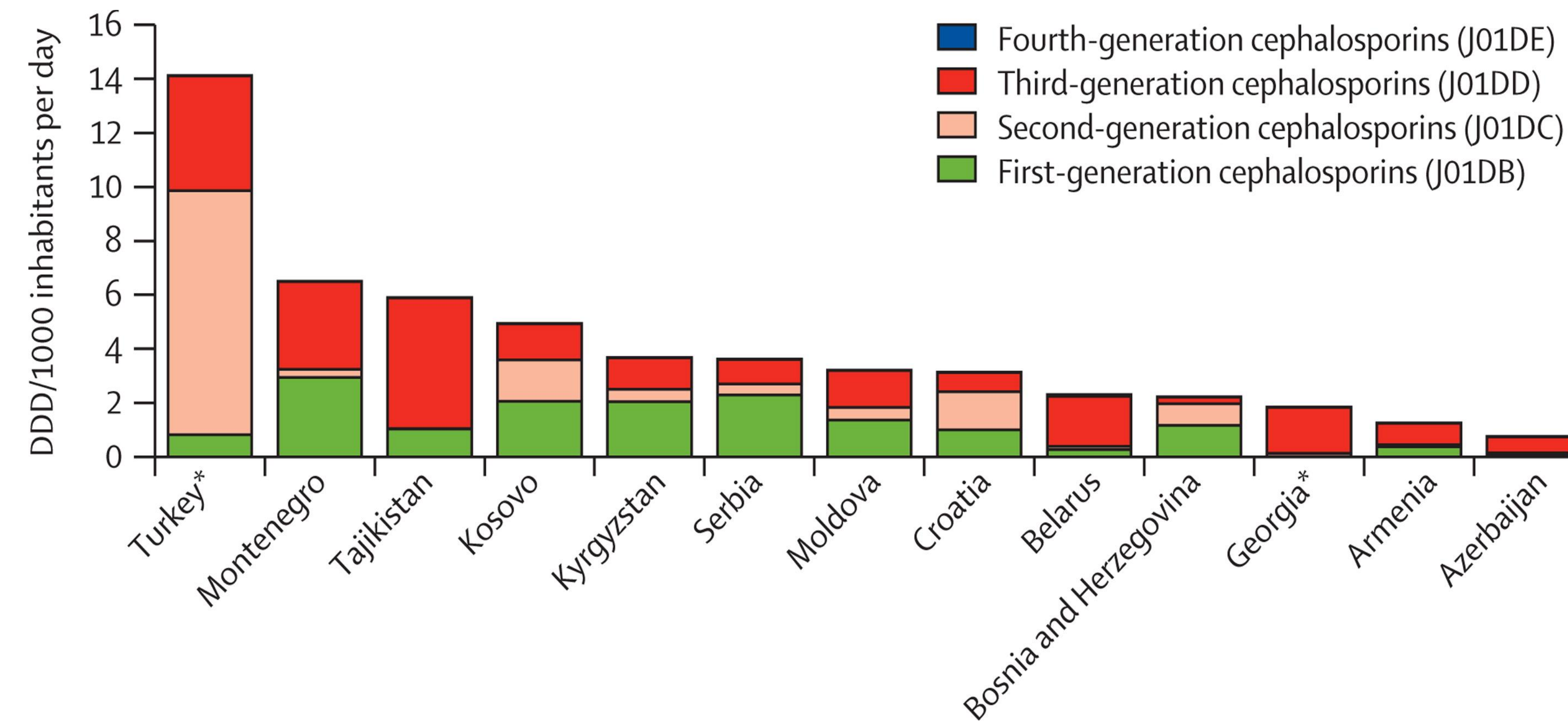


Figure 1: Total cephalosporin use subdivided into four main subgroups in 12 European countries and Kosovo, 2011.

DDD=defined daily doses. *Countries reporting only outpatient antibiotic use Kosovo (in accordance with UN Security Council resolution 1244 (1999))

Results

Total cephalosporin use varied from 0.8 DID (4% of total antibiotic use) for Azerbaijan to 14.1 DID (33%) for Turkey. Highest first-generation cephalosporin use was reported by Montenegro, Serbia, and Kosovo (2.9, 2.3 and 2.1 DID respectively; on average 8% of total antibiotic use) representing mainly cefalexin (*Fig.1*); and is comparable to the use in EU northern European countries (*Fig.2*). Lowest first-generation cephalosporin use is noted by Georgia (0.02 DID, 0.1%). Highest use of second-generation cephalosporins was reported by Turkey (9.0 DID, 21%, mainly cefuroxime) followed by Kosovo (1.5 DID, 6%, mainly cefaclor) and lowest by Tajikistan (0.02 DID, 0.1%, cefuroxime). Highest third-generation cephalosporin use was reported by Tajikistan (4.9 DID, 14%, mainly ceftriaxone), Turkey (4.2 DID, 10%, mainly oral substances such as cefixime and cefoperazone), Montenegro (3.2, 8%, mainly cefixime) and lowest by Bosnia and Herzegovina (0.2 DID, 1%, ceftriaxone and cefixime) (*Fig.1*). Parenteral administration of cephalosporins was high in most NIS (5.8, 3.2, 2.2 and 2.0 DID in Tajikistan, Kyrgyzstan, Republic of Moldova and Belarus) representing 11-17% of total antibiotic use (mainly ceftriaxone). Turkey is the only country reporting use of the third-generation cephalosporins cefdinir and cefditoren for oral use (in total 1.3% of total cephalosporin use) as well as very minor use of parenteral ceftizoxime. Most NIS consumed proportionally more third-generation cephalosporins (mainly ceftriaxone) (up to 91% of total cephalosporin use in Georgia and 80% in Tajikistan, Azerbaijan and Belarus) (*Fig.3*).

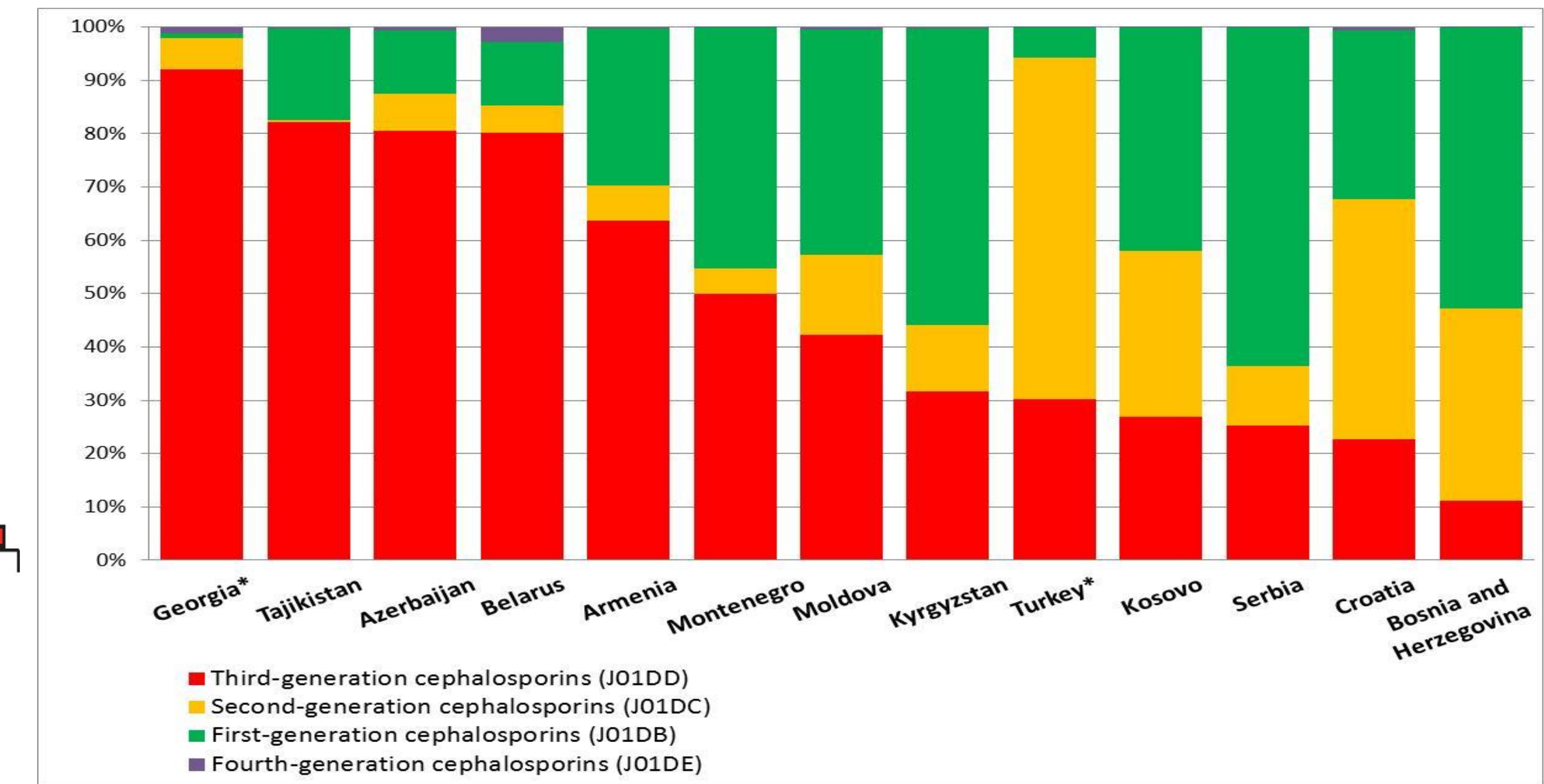


Figure 3: Proportional cephalosporin use (out of total cephalosporin use) by the 4 main subgroups (in number of DDD/1000 inhabitants/day) in 12 European countries and Kosovo, 2011.

Countries are ranked on third-generation cephalosporin (J01DD) from high to lowest proportional use.

*Countries reporting only outpatient antibiotic use

Kosovo (in accordance with UN Security Council resolution 1244 (1999))

Conclusion

We present for the first time a standardised and validated data set of systemic cephalosporin use in eastern Europe. SEE countries still use considerable volumes of the older narrow-spectrum cephalosporins. On the contrary, in depth studies are needed to understand the remarkably high parenteral use of 3rd generation cephalosporins in NIS; which cannot be explained by hospital use only.

Third-generation cephalosporins may select for ESBL-producing bacteria and antibiotic resistance should be monitored in countries reporting high third-generation cephalosporins use. Policy-makers and medical professionals should use these data to trigger actions and to develop, implement and evaluate national guidelines.