Summary of Latest EU-wide Data on Antibiotic Resistance and Antibiotic Consumption

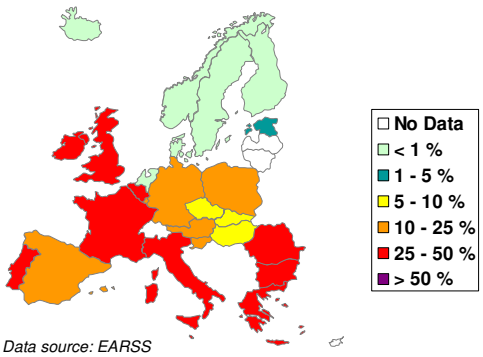
Antibiotic resistance is an emerging problem throughout the European Union (EU) and increasing trends in antibiotic resistance in bacteria causing infections in humans are being reported by many Member States. There are large, inter-country variations in occurrence of antibiotic resistance in the EU.

Use of antibiotics is recognized as the main driving force behind increasing occurrence of antibiotic resistance. As observed for antibiotic resistance, there are also large, inter-country variations in the consumption of antibiotics in the EU. Previous studies have reported on correlations between the level of antibiotic consumption and occurrence of antibiotic resistance in European countries (see e.g., Goossens H, et al. Lancet 2005;365:579-87).

Antibiotic resistance in the European Union

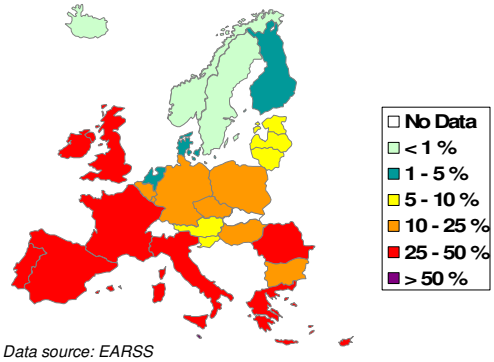
Occurrence of methicillin-resistant Staphylococcus aureus (MRSA) continues to increase in several European countries, although in some cases national control efforts have resulted in decreased resistance. Most southern European countries as well as the UK and Ireland report MRSA proportions of 25% or higher. In the northern part of Europe, the proportion of MRSA remains at a lower level (Figures 1a and 1b). MRSA is one of the most commonly identified microorganisms resistant to antibiotics in hospitals, and it is associated with prolonged hospitalisation and increased mortality.

Fig 1a) Proportion of methicillin-resistant *Staphylococcus aureus* isolates in EU and EEA/EFTA countries in 2002



Data source: EARSS

Fig 1b) Proportion of methicillin-resistant *Staphylococcus aureus* isolates in EU and EEA/EFTA countries in 2007

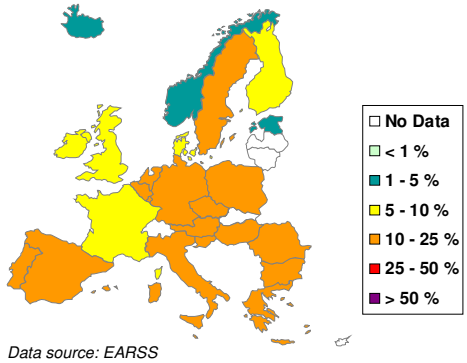


Data source: EARSS

For some other bacteria an even sharper increase in resistance has been observed. One example is the occurrence of fluoroquinolone resistance in Escherichia coli which has increased significantly in nearly all Member States in recent years (Figures 2a and 2b). The speed at which fluoroquinolones are loosing their activity against E. coli is alarming. E. coli is a common cause of urinary tract infections as well as bloodstream infections and, in intensive care units, even pneumonia.

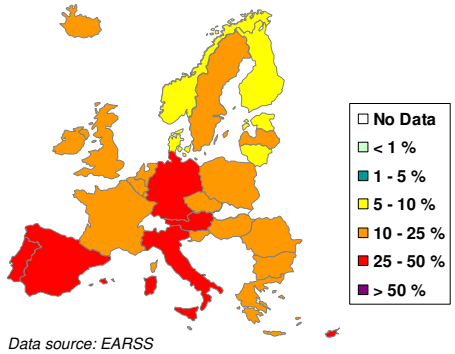
Antibiotic resistance constitutes an increasingly important human health hazard in the European Union. Containment and prevention of antibiotic resistance calls for international cooperation as well as concerted, multi-disciplinary efforts at the national level.

Fig 2a) Proportion of fluoroquinolone-resistant *E. coli* isolates in EU and EEA/EFTA countries in 2002



Data source: EARSS

Fig 2b) Proportion of fluoroquinolone-resistant *E. coli* isolates in EU and EEA/EFTA countries in 2007



Data source: EARSS

The data presented were collected by the European Antimicrobial Resistance Surveillance System (EARSS) which is contracted by the European Centre for Disease Prevention and Control (ECDC), and funded by the EU, the Dutch Ministry of Health, Welfare and Sports and the Dutch National Institute of Public Health and the Environment (RIVM). EARSS maintains a comprehensive surveillance and information system that collects data on occurrence of antimicrobial resistance in invasive bacteria (http://www.rivm.nl/earss/).

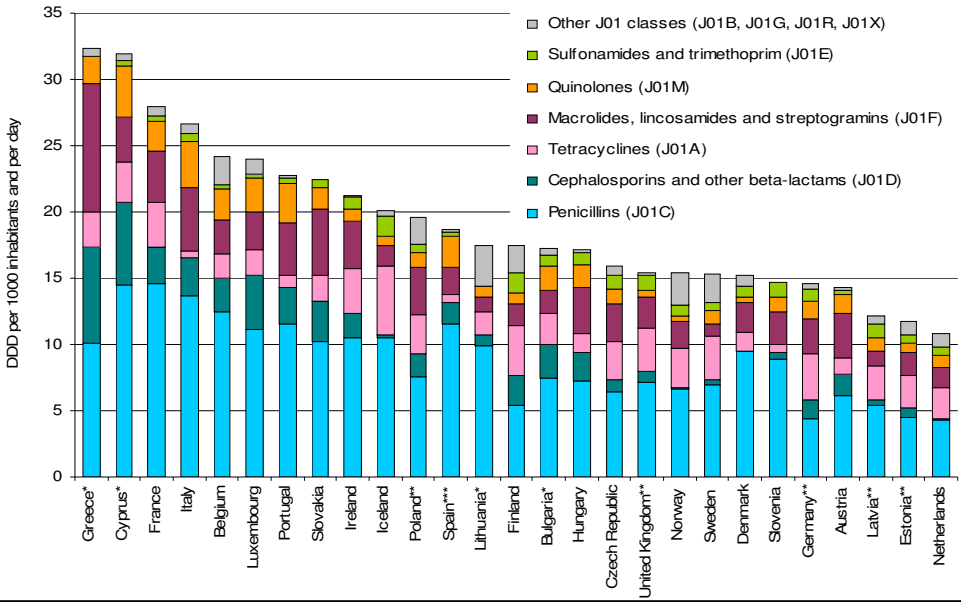
Antibiotic consumption in the EU

The vast majority of human use of antibiotics takes place outside hospitals (outpatient use). In 2006, total outpatient antibiotic use measured in Defined Daily Doses (DDD) per 1 000 inhabitants and per day varied from 10.8 in The Netherlands to 32.4 in Greece (Figure 3).

Penicillins represented the most frequently prescribed antibiotic class in all countries, ranging from 30% (Germany) to 62% (Denmark and Spain) of total outpatient antibiotic use. The proportion of use of other antibiotic classes varied greatly among countries, e.g. cephalosporins, from 0.2% (Denmark) to 22% (Greece); macrolides, 6% (Sweden and Lithuania) to 30% (Greece); and quinolones, 2% (Denmark) to 13% (Italy, Portugal).

Three countries (Italy, Ireland and Denmark) have shown a continuous increase in antibiotic consumption since 1999. In Greece, a continuous increase was observed until 2005, but was followed by a decrease in 2006. Conversely, total outpatient antibiotic use decreased in some countries, e.g. France, Belgium, Slovenia and, until 2004, in Sweden (Figure 4). These decreases have been attributed to national public campaigns (France and Belgium) or repeated media coverage on the prudent use of antibiotics (Slovenia and Sweden).

Figure 3. Total outpatient antibiotic use in 27 European countries in 2006



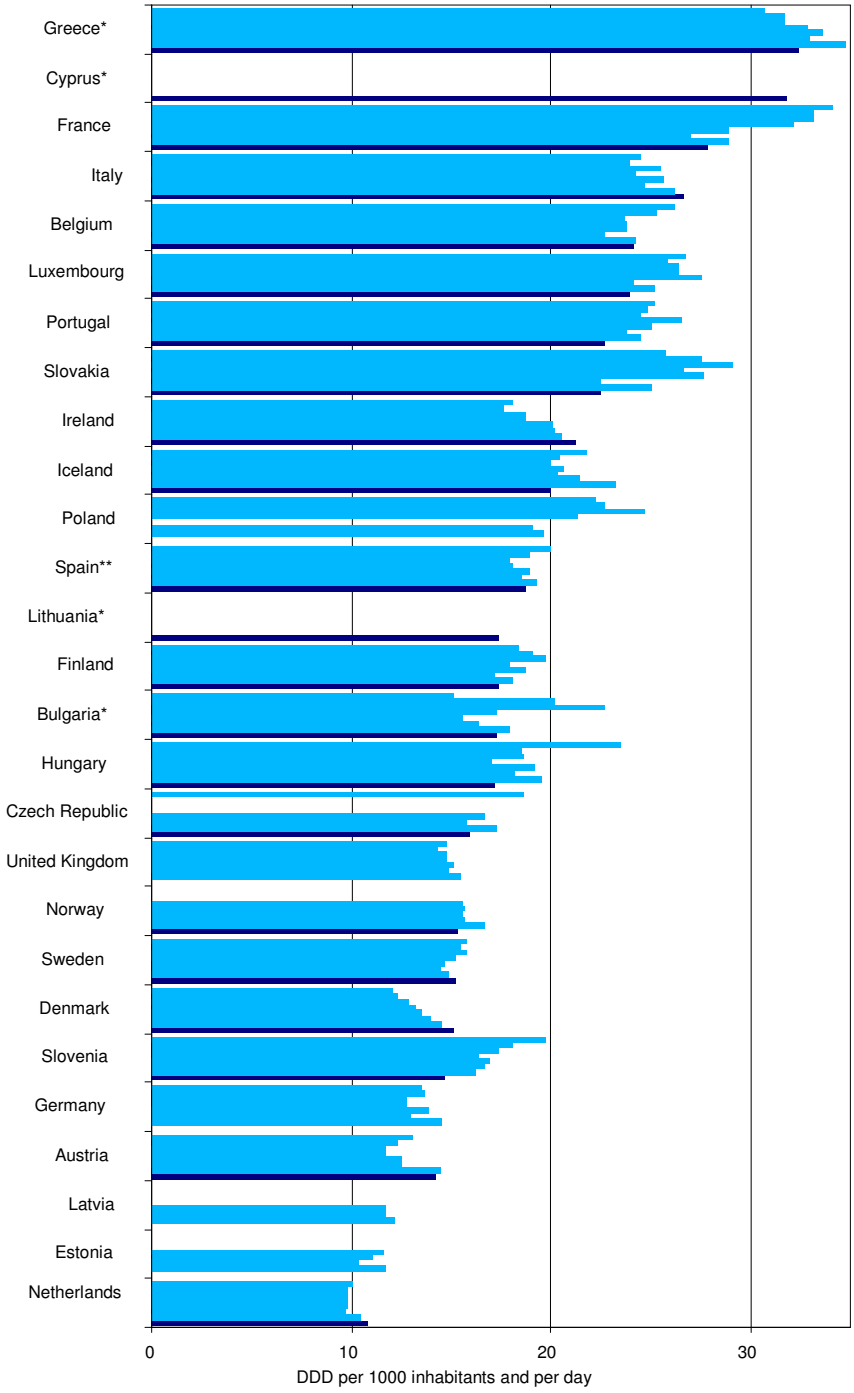
Source: ESAC.

*Total use, i.e. including inpatients, for Bulgaria, Cyprus, Greece and Lithuania.

**2005 data for Estonia, Germany, Latvia, Poland and United Kingdom

***Reimbursement data, which do not include over-the-counter sales without a prescription for Spain

Figure 4.Trends of total outpatient antibiotic consumption (ATC group J01) in 27 European countries, from 1999 (top bar) to 2006 (bottom bar, dark blue)



Source: ESAC.

*Total use, i.e. including inpatients, for Bulgaria, Cyprus, Greece and Lithuania.

**Reimbursement data, which do not include over-the-counter sales without a prescription for Spain

The data presented here were collected by the European Surveillance of Antimicrobial Consumption (ESAC) project which is contracted by the European Centre for Disease Prevention and Control (ECDC), and funded by the EU and University of Antwerp, Belgium. ESAC aims at collecting standardised, harmonised and comparable data on antimicrobial consumption (www.esac.ua.ac.be) and was launched on November 2001, acting on the Council Recommendations of 15 November 2001 on the Prudent Use of Antimicrobial Agents in Human Medicine.