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Raising awareness about prudent use of antibiotics: a necessity for the European Union

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In 1998, the European Union (EU) and its Member States started a long journey towards a more prudent use of antibiotics, which main steps are highlighted by Campos et al in this special issue of the journal[1]. One important step was the adoption by EU Health Ministers on 15 November 2001 of Council Recommendation 2002/77/EC on the prudent use of antimicrobial agents in human medicine with a series of specific measures aimed at containing the spread of antibiotic resistance by prudent use of antibiotics[2]. A recent report from the European Commission documents the progress of Member States towards this goal and indicates that efforts may have increased since 2008[3]. Comparative data on resistance patterns in Europe, including Spain, are available from the European Antimicrobial Resistance Surveillance System (EARSS)[4] which, since January 2010, is integrated into routine surveillance activities carried out by the European Centre for Disease Prevention and Control (ECDC).

Causes and public health consequences of antibiotic resistance are reviewed by Martínez-Martínez[5]. In 2009, a joint report from ECDC and the European Medicines Agency (EMA) estimated the burden of infections due to five common multidrug-resistant (MDR) bacteria in the European Union (EU)[6]. It was estimated that, each year, approximately 400,000 patients suffer from an infection due to one of these five MDR bacteria and approximately 25,000 die as a direct consequence of this infection. The latter could be compared to over 45,000 deaths from transport accidents each year in the EU[7]. If the same calculations were applied to Spain only, this would amount to over 2,000 deaths directly attributable to these five common MDR bacteria each year in Spain, which should be compared to over 4,000 deaths from transport accidents reported each year in this country[7].

Several studies have shown a relationship between antibiotic use and antibiotic resistance in European countries[8,9]. Figure 1 presents two additional examples of such correlations using the latest data from EARSS and from the European Surveillance of Antimicrobial Consumption (ESAC) project[10]. This figure confirms that countries with the highest consumption per capita of a certain class of antibiotics in outpatients also have the highest percentages of isolates that are resistant to such class of antibiotics among bacterial species commonly responsible for clinical infections. Evidence of a relationship between antibiotic use and resistance has also been provided for hospitals where variations in antibiotic use are quickly followed by variations in resistance in the same direction[11,12], thus providing the basis for interventions to control antibiotic resistance, in particular during outbreaks[13].

A detailed analysis of antibiotic use patterns in Spain is provided in this special issue of the journal by Lázaro-Bengoa et al[14]. The authors also provide a review on Spanish regulations on antibiotics. Data on antibiotic consumption in European countries are provided by ESAC[15]. Comparing antibiotic use among countries is sometimes difficult because the source of the data reported to ESAC varies depending on the country. Data reported by Spain to ESAC are provided by the Spanish Agency for Medicines and Healthcare Products (Ministry of Health and Consumer Affairs) and obtained from the ECOM (Especialidades Consumo de Medicamentos) database of retail pharmacy sales of all medicines acquired with National Health System prescriptions. These so-called "reimbursement data" have been shown to underestimate by approximately 30% the overall outpatient sales of antibiotics in Spain[10]. This substantial difference probably relates mostly to sales of antibiotics without a prescription[16,17], though prescriptions derived from private practice, civil servants or veterinary use may also contribute to such difference[10]. When sales data are used, Spain is one of the countries with the highest outpatient antibiotic use per capita in Europe. This was recently confirmed by a Eurobarometer survey that showed that 53% of Spanish interviewees had taken at least one course of oral antibiotics during the last year, which makes Spain the country with the reported third largest percentage of exposure to antibiotics among 27 EU Member States[18].

Only limited data on antibiotic consumption in hospitals are available from ESAC[15] —no data for Spain are available—. To get comparative data on antibiotic exposure of patients in European hospitals, ESAC developed a point prevalence survey methodology which was piloted in 20 European hospitals[19]. This methodology has now been integrated as part of a European point prevalence survey on healthcare-associated infections and antibiotic use coordinated by ECDC. This survey will be gradually implemented throughout Europe from 2011 onwards.

Antibiotic resistance is also a concern for zoonotic infections, foods, food animals, pets and agriculture. In this special issue, Domínguez et al review strategies for the prudent use of antibiotics in veterinary medicine[20]. In 2009, collaboration between EU agencies resulted in publication of a Joint Opinion on antimicrobial resistance focused on zoonotic infections[21]. The European Food Safety Agency (EFSA) is now preparing a Scientific Opinion on the public health risks of bacteria producing extended-spectrum beta-lactamase in foods and food-producing animals (EFSA-Q-2010-00812).

Cases of infections due to bacteria that are totally or almost totally resistant to available antibiotics are increasingly being reported in Europe, included Spain[22-24]. As highlighted in the joint report from ECDC and EMA[6], the current pipeline of new antibiotics is running

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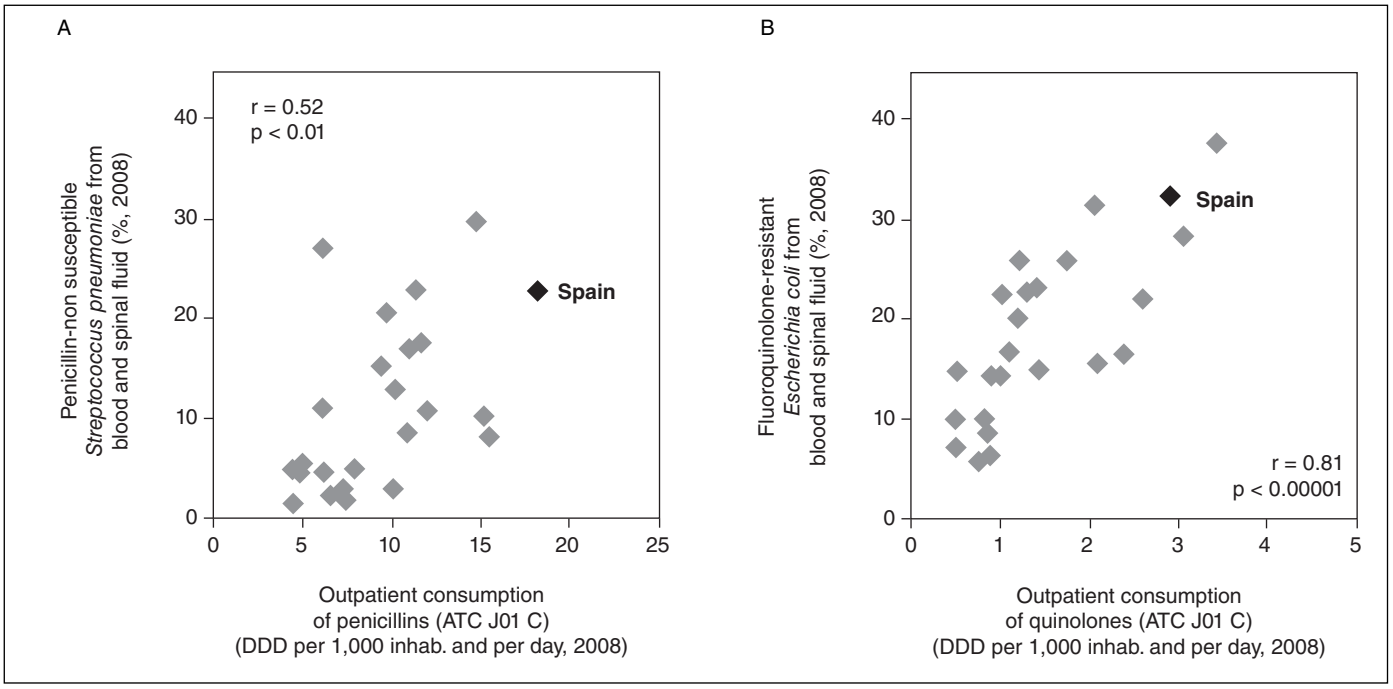

Figure 1. Correlations between outpatient antibiotic use and resistance in 24 European countries. A) Penicillin consumption vs. penicillin-non susceptible *Streptococcus pneumoniae*. B) Fluoroquinolone consumption vs. fluoroquinolone-resistant *Escherichia coli.* Data: EARSS & ESAC, 2008. Spain only reports data on reimbursed antibiotic prescription to ESAC. To better represent antibiotic sales and therefore exposure of the Spanish population to antibiotics correction factors were applied to ESAC data based on a former study[10]. DDD: defined daily doses; *r:* Spearman's rank test.

dry, especially for agents to treat infections due to MDR Gram-negative bacteria. In this issue, García-Rey reviews the reasons for the current lack of novel antibiotics in the pipeline[25]. Given it is unlikely that novel antibiotics will be available in the near future, infection control and prudent use of existing antibiotics have become key measures to fight resistant bacteria in Europe and elsewhere.

Good infection control practices, including hand hygiene as well as the screening and isolation of infected patients, are paramount to prevent spread of resistant bacteria. A Council Recommendation on patient safety, including the prevention and control of healthcare-associated infections was adopted by EU Health Ministers on 9 June 2009 displaying a series of actions in this area[26]. Spain is at the forefront of European initiatives on patient safety. On 3-4 June 2010, the 5th International Conference on Patient Safety: Healthcare Associated Infections and Antimicrobial Resistance held in Madrid reviewed and discussed global efforts in this area (http://www.seguridaddelpaciente.es/index.php/lang-es/informacion/eventos/conferencias-internacionales-sp/v-conferencia/programa.html).

Prudent use of antibiotics is the obvious other strategy that can be used to curb resistance. Campos et al[1] review international strategies as well as examples of successful national public awareness campaigns on the prudent use of antibiotics in EU Member States. Two of these countries showed that repeated campaigns had an effect on antibiotic use and also on resistance[27,28]. Since 2008, European Antibiotic Awareness Day is a European health initiative coordinated by ECDC that offers support to EU Member States by providing specific campaign materials, including a logo, key messages, slogans, visuals, television and web spots and media toolkits, and a platform for exchange of experiences between countries. All materials developed by European Antibiotic Awareness Day are available from a multi-lingual website (http://antibiotic.ecdc.europa.eu).

The first edition of the Day on 18 November 2008 focused on the general public and 32 countries participated[29]. In 2009, the Day focused on raising awareness about prudent use of antibiotics among primary care prescribers. In this special issue, Llor[30] reviews the strategies that can be applied for a more prudent use of antibiotics in primary health care. In the community, a large number of antibiotic prescriptions are for respiratory tract infections in children and Hernández-Merino proposes strategies for the prudent use of antibiotics in paediatric community medicine[31]. As highlighted by Delgado et al[32], community pharmacists have a key role to play to promote prudent use of antibiotics and prevent self-medication with antibiotics.

This year's European Antibiotic Awareness Day focuses on raising awareness of hospital prescribers about prudent use of antibiotics and specific materials have been developed for this purpose. In this special issue, Cisneros et al[33] review strategies for prudent use of antibiotics in hospitals and Delgado et al[32] highlight the role of hospital pharmacists in this multidisciplinary effort. There is a growing interaction between hospitals and other healthcare facilities such as long-term care facilities and nursing homes. Gudiol reviews the strategies that could contribute to a more prudent use of antibiotics in these facilities taking into account the level of experience and available resources[34].

Raising awareness about the prudent use of antibiotics is a necessity for the EU and this issue of the journal contributes to European efforts in this area. While the EU is showing the way forward, efforts to curb antibiotic resistance and raise awareness about the prudent use of antibiotics obviously do not stop at Europe. In the U.S., the Centers for Disease Control and Prevention (CDC) are coordinating the campaign "Get Smart: Know When Antibiotics Work" (http://www.cdc.gov/getsmart/), also focused on the general public and healthcare providers. ECDC and the CDC are already working together on their public awareness campaigns on the prudent use of antibiotics which, this year will take place on the same week in November. Last year, the EU and the U.S. agreed to establish a Trans Atlantic Task Force on Antimicrobial Resistance to provide opportunities to learn from one another and suggest areas of future cooperation across the Atlantic (http://www.ecdc.europa.eu/en/activities/diseaseprogrammes/tatfar/pages/index.aspx). Also the

World Health Organization decided to focus on antimicrobial resistance for the next World Health Day to be held on 7 April 2011 (http://www.who.int/world-health-day/en/).

Antibiotic resistance is a moving target. While EU Member States are making progress towards increased awareness about prudent use of antibiotics and the prevention and control of antibiotic-resistant bacteria and healthcare-associated infections, all the issues highlighted in this editorial will certainly remain a challenge in the future. European Antibiotic Awareness Day on 18 November 2011 acts as a reminder that the journey of the EU towards prudent use of antibiotics is not over and that this issue deserves full attention. More information about European Antibiotic Awareness Day can be found at: http://antibiotic.ecdc.europa.eu

Conflict of interests

The author declares he has not any conflict of interests.

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