EPSA Position Paper
Pharmaceuticals in the Environment & its Education in Pharmacy Curricula

Executive Summary

This Position Paper aims to present the inclusion of the topic "Pharmaceuticals in the Environment" in the pharmacy curricula across Europe. EPSA has gathered survey responses from **17 European countries** (Austria, Belgium, Croatia, France, Germany, Greece, Hungary, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden, Turkey and the United Kingdom). In addition, this Position Paper links with the Educational and Advocacy Outcomes of the **11th EPSA Annual Reception** hosted in Brussels in March 2020 on the topic of "Pharmaceuticals in the Environment - the role of pharmacists and other healthcare professionals" and the Online Discussion Forum organised in May 2020 with EPSA's Member Associations on the same topic. In March 2020 during the aforementioned event, EPSA carried out a joint **Public Health Campaign and Social Service activity** in order to promote proper disposal of medicines. The students were familiarised with the topic by best practice sharing and by expired medicines being brought to the campaign from a community pharmacy, to show students how medications are disposed of properly.

Introduction

Pharmaceutical products are of great importance when it comes to treating various conditions in humans and animals. The added benefit of using pharmaceuticals is indisputable, and the improved quality of life for patients is evident. The pharmacist is a valuable healthcare professional that has been educated and trained to deliver the most optimal treatment to patients. However, the use of pharmaceuticals poses various challenges and leads to unintended consequences for the environment (1) from pollution with medicine metabolites to unused medicines entering the environment. Medicines and their life cycles are a part of the pharmacist profession, but the impact of medicines on the environment lacks in education and training, in most cases even in its entirety.

Pharmaceuticals can enter the environment at different stages of their life cycle - from development and manufacturing to incorrect disposal, or through secretion from humans and animals. On the 11th of March 2019, the European Commission (EC) published a Strategic Approach (2) which depicts the main problems surrounding the pharmaceuticals in the environment and identified ways to overcome these challenges. Six main action areas were presented in the Communication of the EC and specific measures to decrease the negative impact of pharmaceuticals were introduced on a European and Member State level.

As European pharmaceutical students, it is essential for us to understand the scope of the impact that pharmaceuticals can have on the environment and acknowledge the strategies that are put in place. Within the different action areas presented by the European Commission in its

Communication, the most relevant areas for pharmaceutical students include the appropriate **use** and **disposal** of pharmaceuticals and the aim to **increase awareness** on the topic.

Use and Disposal of Pharmaceuticals

The main stages in the life cycle of pharmaceuticals have been identified as manufacturing, consumption, and waste management. According to a report from the Executive Agency for Health and Consumers, the majority of pharmaceuticals enter the environment during the consumption stage; through **excretions** from patients and through **incorrect disposal** of unused medications (i.e. throwing them in the sink, toilet, etc.) (2, 3, 4). The main route for pharmaceuticals to reach the environment is through **patient use**. It has been documented that between 30-90% of the Active Pharmaceutical Ingredients (API) in each medication is excreted in its original form, while some other medications are excreted as metabolites. These residues can reach the groundwater and surface water, thereby entering the environment. It is therefore important to have an optimised system for wastewater treatment in order to prevent any unintended impact of pharmaceuticals on the environment and wildlife.

By far, the biggest health threat of having pharmaceutical residues in the environment is the emerging **Antimicrobial Resistance (AMR)** (5). According to data from the European Centre for Disease Prevention and Control (ECDC) from 2018, AMR is estimated to account for approximately 33,000 deaths in the EU/EEA countries as a consequence of the resistance of bacteria to antibiotics (5). Bacteria can acquire resistance via different routes, for example within the patient's gut after orally consuming antibiotics or within the environment. Some of the main factors that contribute to the development of AMR include the unnecessary use of antibiotics (e.g. for viral infections), incorrect antibiotic treatment for patients (e.g. suboptimal doses or patients not finishing their antibiotics course), and incorrect or unnecessary use in animals. Due to the consequences for the environment and human health, it is important to prescribe antibiotics correctly and for patients to be aware of how to take and dispose of antibiotics properly. EPSA has been constantly advocating on the spread of Antimicrobial Resistance and correct use of antibiotics. In 2014, EPSA released a joint Position Paper with the European Dental Students' Association (EDSA) and European Medical Students' Association (EMSA), that tackles the aforementioned issue (6).

The **incorrect disposal** of unused medication is the second major pathway by which pharmaceuticals enter the environment (9). Although there are different ways by which patients can return their unused or expired medications to community pharmacies for controlled destruction, pharmaceuticals are still discarded in the general household waste. It is essential to highlight the importance of appropriate medicine disposal to patients in order to minimise the negative impact on the environment. Healthcare stakeholders jointly developed an online campaign called MedsDisposal (7) which promotes the appropriate use, storage and disposal of medications. This is already in place in some Member States (4).

Education and Training

As pharmaceutical students and future healthcare professionals in Europe, we need to be aware of the issues surrounding Pharmaceuticals in the Environment and the approaches put in place to tackle these. There are evident **gaps in the pharmaceutical curricula** regarding the correct disposal and usage of medications.

EPSA conducted a survey amongst its Member Associations with responses from 17 European countries (Austria, Belgium, Croatia, France, Germany, Greece, Hungary, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden, Turkey, the United Kingdom) (8). Out of those surveyed, only 16% of the students feel prepared to advise on the proper use of pharmaceuticals in regard to their disposal, and some of these students acknowledge that their understanding of the topic is still limited when doing so. In addition, the topic of Pharmaceuticals in the Environment is only included in the pharmaceutical studies of 32% of European countries (e.g. Belgium, Germany, Greece, Slovakia, Sweden). The extent of which students are taught about pharmaceuticals in the environment varies in extent, focus and practice, as some students come in contact with it through theoretical lectures or during practice in community or hospital pharmacy. Despite the differences in access to education on the topic, a large percentage of the respondents (95%) agree that the topic of Pharmaceuticals in the Environment is relevant to pharmacy education.

In order to obtain the required understanding and confidence to give advice to patients and the general public about the impact that pharmaceuticals have on the environment,
pharmaceutical curricula in all countries in Europe need to be evaluated in order to provide opportunities to pharmaceutical students to learn about and develop an understanding of pharmaceuticals in the environment.

Increasing Awareness

Increasing the awareness of the general public on the topic of Pharmaceuticals in the Environment aligns with the action areas highlighted by the Communication of the EC. It is important to **increase the education** on the appropriate use of medications and appropriate prescribing of medications amongst healthcare providers and the general public, in particular with antibiotics. Making the general public aware of the different ways of **medicine disposal** is also essential in order to reduce the presence of Pharmaceuticals in the Environment. It is also extremely important for pharmaceutical students to be taught about Pharmaceuticals in the Environment and correct disposal of medicine during their studies. To increase awareness across the student body, EPSA will encourage the sharing of good practices among EPSA Member Associations that represent pharmaceutical students across 36 countries, in order to understand the knowledge of students in these countries so EPSA can further advocate for the education on Pharmaceuticals in the Environment.

Call for Action

EPSA calls upon European National Governments, EU Member States, Ministries of Health, and European Institutions to:

1. Ensure that the Pharmaceuticals in the Environment topic is explored further on the European scale and to prioritise environmental issues linked with medicine disposal and ways to overcome them;
2. **Include the topic of Pharmaceuticals in the Environment in education and training programmes of undergraduate and postgraduate studies** of European pharmaceutical students in order to empower them and highlight the importance of safety of the environment;
3. Include **student advisory positions** in working groups and expert panels for Pharmaceuticals in the Environment.

EPSA calls upon the Faculties of Pharmacy across Europe to:

1. **Raise awareness** of the effects of Pharmaceuticals in the Environment through university-wide activities in all Member States;
2. Bridge the gaps in the knowledge of Pharmaceuticals in the Environment by **incorporating more classes on this topic in the pharmaceutical curricula**;
3. Support pharmaceutical students with their **public health awareness** to the general public in their activities on Pharmaceuticals in the Environment.

About EPSA

The European Pharmaceutical Students' Association (EPSA) is an umbrella organisation representing over 100,000 pharmacy and pharmaceutical students from 36 countries across Europe. The mission of EPSA is to actively engage at student and professional level, bringing pharmacy, knowledge and students together. EPSA develops a consensus of opinion between European pharmaceutical students on issues relevant to the pharmacy profession.

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