
ŠSSFD Position paper: "Climate change, the environment, and sustainable healthcare: What is the role of pharmacy?"

The Students' section of the Slovenian Pharmaceutical Society (ŠSSFD) is the national association representing pharmacy, laboratory biomedicine, cosmetic science, and industrial pharmacy students in Slovenia. ŠSSFD is aware of the healthcare sector's contribution to environmental pollution and the essentiality of a green transition in the pharmaceutical industry and community pharmacies to prevent the progression of global warming.

ŠSSFD recognizes the contribution of the pharmaceutical sector to environmental changes and acknowledges the potential of community pharmacists in rationalizing the disposal of medicines and green transition in the pharmaceutical industry. In Slovenia, regulations for the disposal of pharmaceuticals are strict. Used medicines are disposed of in specialized municipal utilities or community pharmacies. Most commonly, waste medicines are disposed of in pharmacies, which must provide notice about the option of free medicine disposal. According to protocols, disposed medicines are later destroyed, authorized by the health ministry (1). A survey from 2014 showed that only 33 % of households dispose of their medication according to legislative demands. On the other hand, it is promising that 73% of participants would wish to have more information about the correct medication disposal, so that can be addressed by including such content through media or other platforms (2).

ŠSSFD believes the problem for the improper disposal of medicines is not in inadequate resources but the perception of OTC and prescription medicines (especially those covered by the insurance) as non-hazardous waste if thrown away inappropriately. As a solution, ŠSSFD supports developing classifications of different pharmaceutical substances according to their environmental deposition and toxicity. Such solutions would benefit prescribers and pharmacists, emphasizing the correct disposal of certain medicines harmful to the environment. It is a fact that attitudes towards environmental problems and habits of waste separation develop at an early age. As a community and professionals, we have to raise awareness and reduce the risk of improper disposal by implementing content in the curriculum or even setting disposal containers in schools. We should also consider the effect of commercializing non-prescription medication, which often leads to reckless purchases and produces even more waste (3).

ŠSSFD recognizes local industries' efforts to participate in green initiatives to lower carbon footprint, demanding higher standards for input materials and process modifications, excluding unnecessary steps, and implementing continuous manufacturing (4, 5). Considering the production of greenhouse gases (GHGs) and the carbon footprint of input materials, it is ŠSSFD's opinion that communication between the pharmaceutical industry and community pharmacists by including them in risk assessments procedures (e.g., inhaler constituents, development stages of drug dispensaries and packaging) could lower potential waste.

In Slovenia, pharmaceutical pollutants are mainly found in wastewaters. As expected, hospital wastewaters have higher concentrations of active substances than municipal wastewaters. Particularly problematic are concentrations of analgetics (diclofenac) and antibiotics (ciprofloxacin),

proven to be environmental risks. The amount of waste medicine is also high; in 2014, Slovenia produced around 65 tons of waste medicines. According to community pharmacists, the main “culprits” for medicinal waste are low adherence to therapy or prescription of ineffective dosages when starting a therapy (e.g., hypertension medication presents 37% of waste medication). The latter leads physicians to prescribe new medicines with higher doses without returning or reusing previously prescribed medicines that weren't fully used. ŠSSFD recommends smaller dispensaries of medicines at the start of therapy to minimize residues in case of an ineffective treatment strategy. On the other hand, low adherence to therapy could be solved by intensifying pharmaceutical guidance, emphasizing the benefits and patients' understanding of therapy (6).

To do our part, members of ŠSSFD are volunteering at the Pro Bono Clinic ([PROBONO](#)), where people can dispose of unused but still usable medicines that are later disposed of properly or donated to those without health insurance. ŠSSFD is worried that students neglect the importance of green initiatives in the pharmacy sector because those contents are only scarcely mentioned during our studies. Therefore students should advocate for the inclusion of these contents in the curriculum. As previously mentioned, ŠSSFD believes an appropriate medication reuse policy would significantly reduce the burden of medication waste.

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