

## **SUMMARY**

The problem of expired and unused medications is a global issue, which occurs in both developed and developing countries. The question arises as to the reasons behind this harmful phenomenon. The pharmaceutical market is one of the fastest-growing markets worldwide, which leads to the annual increase in drug consumption. It is a complex problem involving multiple stakeholders, including patients, doctors, pharmacies, regulatory bodies, local authorities, governments, healthcare and environmental protection systems. Unfortunately, there is no harmonized standard of procedure worldwide. The main reasons for unused of medications include improvement in the patient's condition, excessive prescribing, change in treatment, discontinuation of treatment due to side effects or death, or purchasing more than necessary. The methods of disposing of unwanted and expired medications largely depend on the socio-economic culture and legal regulations in particular countries. Many countries lack legal tools and solutions that would designate entities responsible for collecting medications from households. According to the available literature (sources), the most commonly observed methods of disposing of household medications include throwing them in household garbage and pouring them down the sink or toilet. Furthermore, studies show that respondents are aware of the negative environmental impact and potential hazards associated with the improper medication disposal. The main threats include the development of antibiotic resistance and the presence of active substances and their metabolites in soil and water sources.

The stability of medications after the expiration date is an important but often overlooked issue. Scientific research confirms that in most cases medications stored in proper conditions maintain their stability even after the expiration date. Many countries have implemented programs for the return of unused or expired medications and educational initiatives to promote proper disposal methods for household medications. Medication recycling can be economically justified, especially in case of those containing expensive active substances or in situations when certain medications are not available. Expired medications can also be utilized as effective metal corrosion inhibitors. Unused medications that meet specific criteria can be collected and redistributed to those in need, for example through non-profit organizations. This work also aims to review the legal regulations, standards, and practices related to the management and disposal of medications returned by patients in Poland and selected countries. It has been noted that there is a lack of uniform guidelines and harmonization of actions by

governments and local authorities to support solutions for proper management of expired and unused medications. The analysis of medications returned to public pharmacies revealed that the majority of returned items were drugs. Expired drugs accounted for over 75% of all expired items. The most commonly returned medications belonged to the anatomical groups of the Digestive System and Metabolism, Respiratory System, and Nervous System. The study showed that prescription medications were more frequently returned with a valid expiration date than expired ones. An important aspect of this work is the economic evaluation of medications returned by patients to pharmacies, with a total value of 42,218.07 PLN.

The conclusions drawn from the conducted research emphasize the need for effective educational initiatives targeting both patients and medical staff to increase public awareness regarding proper medication disposal. It is also necessary to establish consistent legislation that defines a unified system for the disposal of medications returned by patients. Ensuring specialized medication collection containers in pharmacies and collection points, as well as appropriate labeling of medication collection sites, is crucial. The development of harmonized guidelines and simplification of legislation are also necessary.

In summary, the issue of medication waste is a global challenge that requires a comprehensive approach, including public education, the implementation of consistent legislation and guidelines, and the establishment of an efficient medication recycling system.