Sustainability in Ophthalmology: A Proposal for the Digitalization and Recycling Promotion of Ophthalmological Drugs and Medical Devices

Betül Dertsiz Kozan[1], Havvanur Bayraktar[2]

[1]University of Health Sciences Türkiye, Gazi Yaşargil Training and Research Hospital, Clinic of Ophthalmology, Diyarbakır, Türkiye
[2]University of Health Sciences Türkiye, Çam ve Sakura City Hospital, Clinic of Ophthalmology, İstanbul, Türkiye

Dear Editor,

Topical eye drops are among the most commonly prescribed treatments in ophthalmology practice. They are usually supplied to patients in a cardboard box with a printed package insert (also referred to as patient information leaflet). However, this traditional packaging method not only causes significant paper consumption in terms of environmental sustainability, but also limits information access because information leaflets quickly become outdated. Sustainability in health care has become increasingly important in recent years, with the reduction of unnecessary packaging in the health industry listed as an important goal in World Health Organization reports and the strategic plans of other international health organizations.[1] Medical studies have also emphasized the critical role of the pharmaceutical industry in reducing the carbon footprint of health services.[2] Given the extensive use of eye drops in ophthalmology, it is clear that even small changes in this area can significantly reduce the environmental impact. In this context, a practical and feasible solution may be to eliminate the cardboard box and provide eye drops in bottles printed with a QR code link to a digital version of the package insert. Such an approach would:

1. Lighten the environmental burden by reducing paper consumption,
2. Facilitate timely updates of digital patient information leaflets,
3. Decrease logistic and printing costs for pharmaceutical manufacturers, and
4. Allow patients to access the most up-to-date information from a smartphone or computer via the QR code.

In addition, the ability to present digital information leaflets in accessible formats (e.g. as audio or large print) could offer significant convenience for older or visually impaired patients. This would have positive impacts on both environmental sustainability and patient experience and treatment adherence.[3] Of course, such a transition requires the cooperation of the pharmaceutical industry and regulatory authorities. Providing a printed information leaflet is currently mandated by legal regulations, which may constitute an obstacle to the implementation of this practice. However, it is important to open discussions about such innovative practices today, as the trend toward digitalization in health care continues. Similar digital solutions are becoming increasingly common in prescribing processes in Europe and some other countries.[4,5] Sustainability is a current topic in ophthalmology practice, not only in regards to eye drops but also a wide range of other products, such as surgical implants and disposable materials. In particular, the introduction of electronic information for use (e-IFU) manuals for surgical devices is important both in terms of reducing paper waste and providing surgeons with access to the most current information. Schehlein et al.[6], highlighted the potential of using e-IFU in eye surgery to reduce packaging waste. Similarly, Stern et al.[7] reported findings supporting digital solutions for environmental

Keywords: Ophthalmology, sustainability, recycling, digitalization

Cite this article as: Dertsiz Kozan B, Bayraktar H. Sustainability in Ophthalmology: A Proposal for the Digitalization and Recycling Promotion of Ophthalmological Drugs and Medical Devices. Turk J Ophthalmol. 2025;55:291-292

Address for Correspondence: Betül Dertsiz Kozan, University of Health Sciences Türkiye, Gazi Yaşargil Training and Research Hospital, Clinic of Ophthalmology, Diyarbakır, Türkiye
E-mail: dr.dertsiz@hotmail.com **ORCID-ID:** orcid.org/0000-0002-0667-2866
Received: 25.08.2025 **Accepted:** 08.09.2025

DOI: 10.4274/tjo.galenos.2025.42273

waste reduction in the field of ophthalmology. Legal regulations in the European Union support e-IFU practices, strengthening the applicability of this approach on a global scale.[8] The adoption of this approach in the field of ophthalmology will provide both environmental and clinical benefits.

Patients can also be encouraged to recycle empty eye drop bottles by bringing them to pharmacies. Exempting patients from paying the medication contribution (10%) as part of this process will increase recycling rates and actively involve patients in sustainable practices. The Deposit Return System (DRS), initiated in Turkey on January 1, 2025, is a similar practice that encourages the consumer to recycle beverage packaging.[9] This proposed program for eye drop bottles will be a supportive approach that aligns with the current DRS practice. Collected bottles can be processed using appropriate recycling methods, making a tangible contribution to sustainability in the health sector.

In conclusion, eliminating eye drop boxes, providing digital package inserts, and encouraging patients to recycle empty bottles will make a valuable contribution in terms of environmental sustainability and patient-centered care. The pharmaceutical industry and regulatory authorities should consider this proposal.

Ethics

Informed Consent: Not applicable.

Declarations

Authorship Contributions

Concept: B.DK, H.B., Design: B.DK, H.B., Data Collection or Processing: B.DK, H.B., Analysis or Interpretation: B.DK, H.B., Literature Search: B.DK, H.B., Writing: B.DK, H.B.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. World Health Organization. Health-care waste. 2022.
2. Tennison I, Roschnik S, Ashby B, Boyd R, Hamilton I, Oreszczyn T, Owen A, Romanello M, Ruyssevelt P, Sherman JD, Smith AZP, Steele K, Watts N, Eckelman MJ. Health care's response to climate change: a carbon footprint assessment of the NHS in England. Lancet Planet Health. 2021;5:e84-e92.
3. Choi S, Chlebek CJ. Exploring mHealth design opportunities for blind and visually impaired older users. Mhealth. 2024;10:17.
4. European Medicines Agency. Electronic product information (ePI) initiative. 2021.
5. Bente BE, Van Dongen A, Verdaasdonk R, van Gemert-Pijnen L. eHealth implementation *in Europe*: a scoping review on legal, ethical, financial, and technological aspects. Front Digit Health. 2024;6:1332707.
6. Schehlein EM, Hovanesian J, Shukla AG, Talley Rostov A, Findl O, Chang DF. Reducing ophthalmic surgical waste through electronic instructions for use: a multisociety position paper. J Cataract Refract Surg. 2024;50:197-200.
7. Stern B, Rampat R, Shahnazaryan D, Gatinel D. Paper waste from instructions for use brochures in cataract surgery implant packaging in Europe and the United States. J Cataract Refract Surg. 2024;50:72-77.
8. European Commission. Commission Regulation (EU) No 207/2012 on Electronic Instructions for use of Medical Devices. 2012.
9. Lorax Compliance. Turkey rolls out nationwide Deposit Return System starting 1st January 2025. 2025. Link: https://www.loraxcompliance.com/blog/env/2025/02/13/Turkey_rolls_out_nationwide_Deposit_Return_System_starting_1st_January_2025_.html