

Ekologik barqarorlik va raqamli innovatsiyalar: Qon topshirish tizimida zamonaviy yondashuv

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Annotatsiya: Donorlik jarayonlarining raqamlashtirilishi qog'oz sarfini kamaytirish, ekologik barqarorlikni ta'minlash va sog'liqni saqlash tizimi samaradorligini oshirishga xizmat qiladi. Avtomatlashtirilgan tizimlar donorlarni ro'yxatga olish, qon banklarini boshqarish va donorlik ehtiyojlarini tahlil qilishni osonlashtiradi. Blokcheyn, IoT va sun'iy intellekt texnologiyalaridan foydalanish donorlik jarayonlarini shaffof, xavfsiz va tezkor qiladi.

Kalit so'zlar: Qon donorligi, ekologik barqarorlik, raqamlashtirish, blokcheyn, sun'iy intellekt, donor ma'lumotlari.

Аннотация: Цифровизация процессов донорства способствует снижению потребления бумаги, обеспечению экологической устойчивости и повышению эффективности системы здравоохранения. Автоматизированные системы упрощают регистрацию доноров, управление банками крови и анализ потребностей в донорстве. Использование технологий блокчейна, Интернета вещей (IoT) и искусственного интеллекта делает процессы донорства прозрачными, безопасными и оперативными.

Ключевые слова : Донорство крови, экологическая устойчивость, цифровизация, блокчейн, искусственный интеллект, данные доноров.

Annotation: The digitalization of donation processes helps reduce paper consumption, ensure environmental sustainability, and improve the efficiency of the healthcare system. Automated systems simplify donor registration, blood bank management, and the analysis of donation needs. The use of blockchain, Internet of Things (IoT), and artificial intelligence technologies makes donation processes transparent, secure, and efficient.

Keywords: Blood donation, environmental sustainability, digitalization, blockchain, artificial intelligence, donor data.

Today, environmental sustainability and the use of automated systems in the healthcare sector are among the most pressing issues. The blood donation system plays a crucial role in saving lives, but its efficiency is often dependent on manual management and paper-based documentation. This article explores the possibilities of optimizing resource utilization and improving the quality of life through the automation of the donation system and the application of an ecological approach. The environmental benefits of an automated blood donation system lie in paperless operations and the use of an electronic database. Paperless operations an automated system enables the digital registration, notification, and monitoring of donors, reducing paper consumption and positively impacting the environment. Research indicates that transitioning to paperless technologies in the healthcare system can reduce waste by 30-40% [Smith, J., & Brown, P. (2023)]. Electronic database: The use of an electronic database in the blood donation process enhances the efficiency of blood banks. This, in turn, helps conserve energy and resources required for system operations.

The role of innovative technologies in automating the blood donation system with an ecological approach is as follows:

- Blockchain technologies: Enable the secure and reliable management of donor information.
- IoT (Internet of Things): Can be used to monitor and track the blood storage process.
- Artificial intelligence: Analyzes donation needs and helps identify regions with high blood demand [Johnson, R. (2021)].

According to WHO studies, the use of digital technologies in the healthcare system leads to the following outcomes:

Reduction of paper documentation – This minimizes environmental impact and promotes ecological sustainability.

Real-time monitoring of blood reserves – This improves the efficiency of blood storage and distribution in donation centers.

Transparency of the blood supply system – The use of blockchain technologies enables tracking and enhances the security of the blood donation process.

According to WHO data, automated blood donation systems not only help save lives but also contribute to the efficient management of the healthcare system and ensure

environmental sustainability. Therefore, the digitalization and automation of donation processes have become one of the most pressing areas in modern healthcare [World Health Organization (WHO). (2020)].

Research by Green and Taylor (2022) highlights the importance of ensuring environmental sustainability in the healthcare system through technology. Their findings indicate that digitalization in medical services reduces paper documentation and helps decrease waste volume by 25-30%. This supports the ecological efficiency of automating the blood donation system. Additionally, the study provides insights into the role of electronic systems in energy efficiency and resource conservation. For example, the use of IoT and artificial intelligence technologies optimizes donation processes, reducing unnecessary expenses in medical institutions. The application of blockchain technology in the donation system enhances transparency, minimizing the risks of misallocation or loss of blood supplies. These studies demonstrate that automating the donation system is essential not only for improving efficiency but also for reducing its negative impact on the environment. Therefore, the article proposes integrating environmental sustainability with technological advancements to enhance the blood donation system [Green, T., & Wilson, L. (2022)].

The 2024 edition of the "Methodological Guidelines for Automating the Donation System", published by the Ministry of Health of the Republic of Uzbekistan, is intended for medical professionals, blood bank staff, and information technology specialists. This publication provides practical guidelines for modernizing the donation system in Uzbekistan. Released by the Ministry of Health Publishing House in Tashkent, it serves as an important manual for implementing sectoral reforms. These guidelines cover the following key aspects:

1. Importance and Necessity of Automating the Donation System:

- Reducing errors caused by human factors in the donation process.
- Simplifying data management in blood banks and storing it in a centralized system.

2. Development of Technological Infrastructure:

- Recommendations on implementing specialized software and hardware for donor registration.
- Integrating the system with medical institutions and expanding information exchange capabilities.

3. Environmental Sustainability:

- Reducing the negative impact on the environment by transitioning to a paperless system.

-Environmental benefits of using electronic records and digital databases.

4. Optimization of Blood Bank Operations:

-Implementing automated solutions for tracking blood reserves and managing the donor database.

-Efficiently organizing the distribution of blood to various medical institutions.

5. Implementation of Innovative Technologies:

-Ensuring transparency and security in the donation process using blockchain technology[Uzbekistan Ministry of Health. (2024)].

Reference

1. Smith, J., & Brown, P. (2023). Sustainable Healthcare Systems: The Role of Automation. *Journal of Environmental Health*, 15(3), 120-135.
2. Johnson, R. (2021). Blockchain and IoT in Blood Donation Systems. *International Journal of Healthcare Technology*, 12(4), 245-260.
3. World Health Organization (WHO). (2020). *Global Database on Blood Donation and Safety*. WHO Press.
4. Green, T., & Wilson, L. (2022). Eco-Friendly Approaches to Medical Record Management. *Environmental Science Journal*, 18(2), 89-105.
5. Uzbekistan Ministry of Health. (2024). *Methodological Guidelines for Automating the Donation System*. Tashkent: Ministry of Health Publishing House.