

Ethical and clinical imperatives of xenotransplant and organ shortage in the Eastern Mediterranean Region

Suleman Saeed¹ and Hamid Bin Tariq¹

¹University College of Medicine and Dentistry, Lahore, Pakistan (Correspondence to Suleman Saeed: suleman.saeed.271@gmail.com).

Keywords: organ transplant, xenotransplant, ethics, Eastern Mediterranean

Citation: Saeed S, Tariq HB. Ethical and clinical imperatives of xenotransplant and organ shortage in the Eastern Mediterranean Region. *East Mediterr Health J.* 2025;31(9&10):602–603. <https://doi.org/10.26719/2025.31.10.602>.

Received: 03/07/2025; Accepted: 05/10/2025

Copyright © Authors 2025; Licensee: World Health Organization. EMHJ is an open-access journal. This paper is available under the Creative Commons Attribution Non-Commercial ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; <https://creativecommons.org/licenses/by-nc-sa/3.0/igo>).

Dear Editor,

Xenotransplant, the transplantation of animal organs into humans, is a potential solution to the scarcity of human organs for transplant globally. By closing the gap between supply and demand, xenotransplant could significantly reduce the burden on patients with end-stage organ failure (1). In 2024, a WHO global database on donation and transplantation documented 172 397 solid organ transplants worldwide, marking a 9.5% increase from 2022 (2). Recent innovations, including CRISPR-based gene editing and improved immunosuppressive regimens, have propelled this field forward (3).

With traditional donor pools remaining limited and the demand for organs steadily increasing, waitlist mortality has increased, making xenotransplant no longer a theoretical model but an emerging therapeutic option. In a significant advancement at the New York University Langone Hospital, genetically modified pig kidneys were transplanted into 2 brain-dead human recipients, where the organs remained viable and functional for 54 hours without any signs of hyperacute rejection (4). These developments could yield a vast new supply of transplantable organs, marking one of the most significant medical breakthroughs of our time.

Xenotropic endogenous retroviruses are among several potential sources of xenogenic infections, such as Epstein-Barr virus or cytomegalovirus, which demand rigorous monitoring, particularly in regions with existing communicable diseases (5). The rapid increase in xenotransplant may increase the risk of emerging zoonotic threats, which healthcare systems in low-income countries are often ill-equipped to handle (3). To mitigate risk, health policymakers should establish

screening systems for donor animals and recipients, and protocols to manage associated risks.

In the Eastern Mediterranean Region, where religious, cultural and economic factors deeply shape healthcare decision-making, xenotransplant presents a unique implementation challenge. Public mistrust, lack of awareness and potential religious objections, especially regarding porcine donors, may hinder its acceptance. Ethical concerns regarding animal welfare must be acknowledged, as the procedures involved are invasive and may cause suffering. While animal rights are vital, the priority in the context of critical organ shortages must be patient survival.

Health authorities must prioritize inclusive stakeholder dialogue and public education and develop culturally-sensitive policies to address the sensitivities associated with xenotransplant. Strengthening zoonotic surveillance, building transparent regulatory pathways and integrating xenotransplantation into existing health systems through proper training programmes will be essential.

Xenotransplant represents a groundbreaking approach to the organ shortage crisis. However, its implementation must be approached with careful consideration of the ethical, cultural, economic, and health system challenges involved. Global collaborations involving policymakers, religious leaders, healthcare professionals, and bioethicists are crucial to effectively integrate xenotransplantation into health systems.

Funding: None.

Conflict of interest: None declared.

Reference

1. Fischer K, Schnieke A. Xenotransplantation becoming reality. *Transgenic Res.* 2022;31(3):391–398. doi: 10.1007/s11248-022-00306-w. Epub 2022 May 11. PMID: 35545691; PMCID: PMC9135885.
2. The organ Donation and Transplantation Alliance. Global organ transplantation sees significant rise, with US highest number of patients transplanted per million population, WHO report reveals. *News*, 19 December 2024. <https://www.organdonationalfrance.org/article/global-organ-transplantation-sees-significant-rise-with-us-highest-number-of-patients-transplanted-per-million-population-who-report-reveals/>.

3. Fishman JA, Mueller NJ. Infectious diseases and clinical xenotransplantation. *Emerg Infect Dis.* 2024;30(7):1311-1318. doi: 10.3201/eid3007.240273. PMID: 38916550; PMCID: PMC11210669.
4. Montgomery RA, Stern JM, Lonze BE, Tatapudi VS, Mangiola M, Wu M, et al. Results of two cases of pig-to-human kidney xenotransplantation. *N Engl J Med.* 2023;388(20):1836–1847.
5. Kimsa MC, Strzalka-Mrozik B, Kimsa MW, Gola J, Nicholson P, Lopata K, Mazurek U. Porcine endogenous retroviruses in xenotransplantation—molecular aspects. *Viruses* 2014;6:2062-2083. <https://doi.org/10.3390/v6052062>.