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## ICMR Pioneers Drone-Based Cornea Transport to Revolutionize Eye Care

# Successful Pilot Demonstrates the Potential of Aerial Medical Logistics for Timely and Efficient Cornea Transplants under ICMR's i-DRONE Initiative

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Aligning with the vision of Hon'ble Prime Minister Shri Narendra Modi to make India self-reliant and technologically empowered, the Indian Council of Medical Research (ICMR) has launched a pioneering study on the aerial transport of human corneas and amniotic membrane grafts.

ICMR in collaboration with AIIMS New Delhi and Dr. Shroff's Charity Eye Hospital and with the support from Ministry of Civil Aviation has conducted a feasibility study to assess the potential of using drones to transport sensitive ophthalmic biomaterials such as human corneas and amniotic membrane grafts from peripheral collection centres to tertiary hospitals for transplantation procedures, in Sonipat and Jhajjar, Haryana. The drone successfully transported corneal tissue from Dr. Shroff's Charity Eye Hospital (Sonipat centre) to the National Cancer Institute (NCI), AIIMS Jhajjar, and subsequently to AIIMS New Delhi. The distance between the two cities was covered in around 40 minutes via drones which usually takes around 2-2.5 hours to cover via road. The drone maintained optimal conditions for specimen integrity and upon arrival, the cornea was evaluated, leading to a successful transplant surgery.



Drones are emerging as game changers in healthcare logistics, offering rapid delivery of life-saving medical supplies to remote and hard-to-reach areas. The timely transportation of corneal tissues is critical, as the viability of donated corneas is time-sensitive. Delays in transportation can compromise tissue quality and reduce the chances of successful transplantation. Drone-based transport offers a swift, temperature-stable, and efficient alternative to traditional road networks, which are often slow or unpredictable—especially in semi-urban or rural areas. This can help bridge the gap between donor sites and recipients, ensuring that no viable tissue goes unused and that more patients regain sight in time.

Over the past few years, ICMR's i-DRONE initiative has demonstrated the successful use of drones to deliver essential medical supplies in states such as North East India (Covid-19 and UIP vaccines, medications, and surgical), Himachal Pradesh (medications and samples in high altitude and sub-zero temperatures), Karnataka (intraoperative oncosurgical samples), Telangana (TB sputum samples) and the NCR (blood bags and its components). These efforts highlight the growing capability and promise of drones in bridging the last-mile healthcare gap.

Commenting on the development, Dr. Rajiv Bahl, Secretary, the Department of Health Research (DHR) and Director General, ICMR, stated:

“The i-DRONE platform was originally conceived during the COVID-19 pandemic to deliver vaccines to remote regions. Since then, we’ve scaled our efforts to include low-temperature delivery of blood products and essential medicines to high-altitude and sub-zero locations. This cornea transport study marks another step forward—enhancing patient access, ensuring timely transplants, and reducing pressure on overburdened tertiary hospitals. This initiative aligns perfectly with the Honourable Prime Minister's vision of a self-reliant India powered by innovation. Drone-based healthcare logistics are the future, and India is taking the lead by applying this to areas where it matters most—saving lives and restoring sight.”



Shri Piyush Srivastava, Additional Secretary and Senior Economic Advisor, Ministry of Civil Aviation, added:

“This collaboration between health and aviation sectors is an inspiring example of tech-enabled social impact. The use of drones for cornea delivery showcases India's growing capability to solve real-world healthcare challenges using homegrown solutions. Drones offer a scalable solution for timely

medical delivery in geographically challenging areas. As India strengthens its drone ecosystem, such studies are critical to building resilient and responsive healthcare infrastructure.”



Prof. (Dr.) M Srinivas, Director, AIIMS, New Delhi, remarked:



Corneal blindness affects millions in India, and timely availability of donor tissue is often a limiting factor. This drone-based transport model could be a transformative step toward ensuring equitable



access to vision-restoring surgeries, especially in underserved areas. The success of this pilot project opens the door to deploying precision drone logistics for a wide range of critical medical applications.”



Through this study, researchers aim to document operational workflows, identify technical bottlenecks, and generate evidence to support the integration of drone logistics in routine medical practice—especially for time-sensitive and temperature-sensitive biological materials like human corneas. The findings will help shape future protocols, policies, and best practices for aerial transport in healthcare. The event was attended by many dignitaries including Dr Anil Kumar, Director, National Organ and Tissue Transplant Organisation, MoHFW.



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**HFW/ ICMR – Drone Based Cornea Transport/25 March 2025/5**

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