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# REVOLUTIONIZING HEALTHCARE DELIVERY: THE ROLE OF MEDICARE DRONES IN ENSURING SUSTAINABILITY

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## Abstract

*Drones' accessibility in the medical sector and health industry has a tremendous potential to revolutionize the future and carry out critical functions with synchronized performance, systematic analysis and concise assessment. Medicare Drones are a type of UAV and its associated principles are similar to every other drones. The only difference here is the functional payload with precise modifications to deliver the indispensable medical equipment's, organs for transplants, medicines and certain diagnoses, treatment along with medical prescriptions. With technological advancement and innovation, it has become prudent to administer the Unmanned Aircraft System (UAS) like drones on the medical realm for numerous applications and purposes. In this journal paper we are focused on the applicability of drone technology to seek solution for the contemporary health system and the resolutions for future of medical sector.*

**Keywords:** *Drones, Unmanned Aerial Vehicle (UAV), Medicare, Unmanned Aircraft System (UAS), Drone Technology, Payload.*

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## 1. Introduction

The drone has very specific use in the medical community and health sector. A Medicare drone represents one of the UAV kinds that healthcare personnel employ to carry emergency medical kits, vaccinations, medications, and specific tests, among other things [6,10,30]. Drone technology is used by healthcare professionals to transport materials throughout the whole medical supply chain, from physicians & office to patients, lab partners & disposal facilities for waste. Due to skyrocketing demand, the medical drone industry is expanding dramatically [2], and drones' dependability and cost-effectiveness make them an excellent future technology for medical practitioners to utilize for both emergency & non-emergency reasons. As per the statistical report the drone technology is set to reach the valuation of worth more than \$600 million in the upcoming decades. A Medicare drone can be perceived as any other type of civilian drone equipped with cameras, sensors, lights and other such upgraded features to support coherent navigation, concise data collection, and basic communication requirements. And the drones deployed in the medical field can be of various types and some of them are as follows:

- **Rotor drones:** These drones are incorporated with multiple rotors and they are named on the basis of rotor numbers e.g., quad-copter, hex-copter, octal-copter and with increase in the number of rotors the payload carrying capacity also increases making them a sophisticated air vehicle to carry the ranges of payload for medical services. These types of drones are also applicable for aerial photography, data collection and analytical emphasis, and such traits makes it suitable for emergency response management teams to employ multi-rotor drones in aiding the rescue operations and the prescribed instant requirements [27].
- **Fixed-Wing Drone:** One benefit of deploying drones that resemble aircraft and have a fixed wing with rotors is that they are better suited for long range and typically have long endurance in addition to carrying

an expected amount of cargo for delivery and providing essential medical transport services. [27].

- **Passenger Ambulance Drones:** The instant exigencies have an out-most significance in the health organizations, the hospices, facilities can use ambulance drones to provide emergency services to citizens who need immediate attention. In recent years, the drone manufacturing industry has experienced a boom due to government collaborations to revolutionize the health sector using drone technology. Currently, with research and development, manufacturers are trying out with passenger drones. [22]. Such provision will not only make the health arena effective and efficient but it will benefit the humanity in humongous ways. The drone driven market is yet to proliferate in the globalized world and they could potentially transform medical field and the advancement in such technology would directly impact the global, national, and rural health sectors [1].

Drone technology is the joint venture of many industries which includes software industry (algorithms, codes, programming internet of things (IoT), software designs, IT, manufacturing industry (components production, assembly, parts manufacturing), supply chains, marketing, promotion and licensing policies of the government for privacy, security and safety. Medical drones are becoming more and more popular due to the many advantages they bring to healthcare professionals, employees, and workers. Since they don't need pilots, medical drones are more practical than more conventional forms of transportation including automobiles, helicopters, and aircraft [27]. It cannot be denied that drones pose certain hazards; among the main dangers to drones are radio frequency interference, the possibility of data theft, security flaws, etc. Despite visual line of vision technology has recently made strides, allowing drones to fly further and with more endurance. The price of a drone may vary based on its model and size. Drones often have lower startup and ongoing costs. Medicare drones are quite simple to use and don't need much training.

## 2. Scope of Medicare Drones

The scope of Medicare drones, also known as medical drones or health drones, in the health sector is vast and holds significant potential for advancing healthcare delivery and improving patient outcomes [2,3]. In this article, we will explore the scope of Medicare drones and the prospective procurement of advanced services in the medical paradigm using drone technology, highlighting their potential benefits and implications for the sustainability of the health sector. This can be particularly beneficial in areas with limited infrastructure, such as rural or underserved communities, or in disaster-stricken areas where access to medical care may be disrupted. Medicare drones can quickly and efficiently deliver medical supplies, reducing transportation time, cost, and the risk of delays. This can significantly improve access to medical care, especially in emergencies or during pandemics, where the timely delivery of medical supplies is crucial. Medicare drones can facilitate telemedicine, which is the remote provision of medical care using telecommunications technology. Drones equipped with cameras, sensors, and other medical devices can collect and transmit real-time medical data, allowing healthcare providers to remotely assess patients' conditions, provide diagnoses, and offer medical advice. Medicare drones can bridge the gap between patients and healthcare providers, enabling timely and efficient remote medical consultations, and reducing the need for patients to travel long distances for medical care. Medicare drones can be used for medical imaging, including aerial imaging and thermal imaging, to provide valuable insights into various medical conditions. Aerial imaging using drones can capture high-resolution images of large areas, such as disaster-stricken regions or remote areas, providing critical information for disaster response, surveillance, and planning. Thermal imaging using drones can detect temperature variations on the body, which can be indicative of various medical conditions, such as inflammation, infection, or cancer. Medicare drones can quickly and efficiently capture medical images, allowing healthcare providers to remotely analyze and interpret the data, and make informed medical decisions [6,12]. Drones can assess the damage

caused by disasters, such as earthquakes, hurricanes, or floods, by capturing aerial images or conducting thermal imaging. This information can help emergency management agencies and healthcare providers to prioritize their response efforts, allocate resources, and coordinate rescue and relief operations. Medicare drones can also deliver medical supplies, medications, and other essential items to disaster-stricken areas, where access to healthcare may be limited or disrupted. This can help provide timely medical care to affected populations and support the overall disaster response and recovery efforts.

## 3. Research and Development

The creation of breakthrough medical advancements using Unmanned Aerial Vehicles (UAV) like drones, together with an expansion of their applications, serves the vital interests of the current and future generations in a sustainable way. Gross applicability of the UAVs in medical field is still under considerations due to numerous contradictions and limitations [13]. According to study, researches and analysis on the applications of UAVs in medical field much has been done in-order to develop sophisticated, functional and futuristic drone-based technology but due to complexities and intricate design parameters there is less production and utility. The health sector will see significant change in the next 10 years, and due to its excellent potential, drone usage in the medical field is even being urged by physicians all around the globe. The use of drones opens up new possibilities for the medical community as a whole and the healthcare system. Even while drone usage in healthcare is still in its early stages, acceptance is anticipated to increase rapidly [7]. The benefits of drone technology will revolutionize the medical paradigm, which will ultimately have an impact on the growth & development of nations and contribute to the HDI with gradual contributions to the economy. Drones could make day-to-day procedures safer, highly convenient, less expensive and greatly reduces the workload of humans closely associated with the health sector. Drones are on the pathway of becoming the most suitable and fastest growing technology in the healthcare industry [15].

## 4. Drones Deliver Vaccines in India During Covid-19 Pandemic

The Indian Council of Medical Research (ICMR) deployed locally built unmanned aircraft (i-Drone) for the delivery of COVID-19 vaccines like COVID-Shield, COVAXIN, etc. to the inaccessible or compromised regions and strengthened the vaccination drive program to ensure every citizen of our country gets vaccinated and benefits from the basic health care facilities. During the critical COVID-19 vaccination stages of lockdown and quarantine, the Indian Council of Medical Research (ICMR) pioneered the progressive drone delivery campaign to reach states like Manipur, Nagaland, and the Andaman and Nicobar Islands.[8] The first flight of the Drone Response and Outreach in the North East (i-Drone) program operated by the Indian Council of Medical Research transported 900 doses of the COVID-19 vaccine from the Old DC Complex in Manipur's Bishnupur district to the Primary Health Centre (PHC) situated on Karang, one of the islands in Loktak Lake. As of October 4th, 2021, the vaccination doses were successfully administered to 25 persons at Karang PHC. The vaccinations were transported to Loktak Lake by drone across a distance of 31 kilometers in less than 15 minutes as opposed to the customary 3–4 hours. The i-Drone project is a foreshadowing of drone technology's future in India, and its explosive rise over the next ten years may be anticipated [8,15,18]]. From the official tweet of Honorable health minister about the deploy of drones during covid-19:

Dated: 4th October 2021

“Addressed lunch of ICMR’s initiative for drone-based vaccine delivery system in North Eastern India. Covering 31kms in 13 minutes, vaccines were transported from District Hospital Bishnupur to Karang health center Loktak Lake, Manipur. The distance usually takes 3 to 4 hours.” [8]. Amidst the surge in corona cases the Garuda Aerospace Pvt Ltd, a drone start-up from Chennai started Drone-as-a-Service (DaaS) model such as Drones for public announcements, Drones for sanitization, Drone for delivery. Additionally, these automated UAVs helped sanitize busy areas including marketplaces, subway stations, airports, schools, universities,

hospitals, and government buildings, which would have been difficult for Front Lines Worriers (FLWs) to complete using human spraying techniques [9]. It also has patented autopilot technology and an advanced flight controller system as remarked by the CEO of Garuda Aerospace Agnishwar Jayprakash “The DaaS (Drones-as-a-Service) model can accomplish the sanitization operations in a quarter of the time. Automated sanitization aims are to address inaccessibility, speed and efficiency of public health workers who are conducting manual spraying operations under severe health risks to themselves and their families”. [9].

## 5. Applicability of Drone in the Medical Field

Drones offer unique advantages in terms of their applicability in the medical field, providing innovative solutions to various challenges and improving patient care and outcomes. In this article, we will explore the different applications of drones in the medical field, highlighting their potential benefits and implications for the sustainability of the health sector [2]. This can be particularly beneficial in disaster-stricken areas, remote or underserved communities, and during emergencies where time is of the essence [1]. Drones can quickly and efficiently deliver medical supplies, reducing transportation time, cost, and the risk of delays. This can significantly improve access to medical care, especially in areas with limited infrastructure, and ensure that patients receive timely and critical medical supplies. Drones can facilitate telemedicine, which is the remote provision of medical care using telecommunications technology [3]. Drones equipped with cameras, sensors, and other medical devices can collect and transmit real-time medical data, allowing healthcare providers to remotely assess patients' conditions, provide diagnoses, and offer medical advice. Drones can bridge the gap between patients and healthcare providers, enabling timely and efficient remote medical consultations, and reducing the need for patients to travel long distances for medical care. Drones can be used for medical imaging, including aerial imaging and thermal imaging, to provide valuable insights into various medical conditions. Aerial imaging using drones can capture high-resolution images of large



areas, such as disaster-stricken regions or remote areas, providing critical information for disaster response, surveillance, and planning. Thermal imaging using drones can detect temperature variations on the body, which can be indicative of various medical conditions, such as inflammation, infection, or cancer. Drones can quickly and efficiently capture medical images, allowing healthcare providers to remotely analyze and interpret the data, and make informed medical decisions [4,5]. Equipped with cameras, sensors, and other technologies, drones can quickly search vast areas, identify and locate individuals in distress, and relay their locations to rescue teams. Drones can access remote or hazardous areas, such as disaster-stricken regions, mountainous terrain, or dense forests, where traditional search and rescue methods may be challenging or time-consuming.

- **Medical equipment and organ transportation:** Transportation of medical equipment is a critical aspect of healthcare delivery, as timely access to medical devices and supplies is crucial for patient care. Drones can provide innovative solutions for medical equipment transportation, overcoming challenges such as traffic congestion, long distances, and limited access to healthcare facilities. Drones can transport emergency medical equipment, such as defibrillators, ventilators, or portable ultrasound machines, to the scene of accidents or emergencies, where time is of the essence [2,6,7,9]. Drones can quickly deliver these life-saving devices to first responders, paramedics, or healthcare providers, enabling them to provide immediate medical care to patients in need. **Remote and Rural Areas:** Drones can transport medical equipment to remote or rural areas where access to healthcare facilities may be limited. Drones can transport medical devices, supplies, or diagnostic tools to remote clinics, community health centers, or underserved areas, ensuring that patients have access to the necessary medical equipment for diagnosis, treatment, or monitoring of their conditions. This can significantly improve healthcare delivery in remote or underserved areas, reducing health

disparities and improving patient outcomes. Drones can quickly and efficiently transport medical equipment between hospitals, laboratories, or clinics, reducing transportation time, cost, and the risk of delays [12,13,14]. This can improve the availability and accessibility of medical equipment, ensuring that healthcare providers have the necessary tools for diagnosis, treatment, or monitoring of patients. **Transportation of organs for transplantation** is a critical process that requires timely and efficient delivery to ensure the success of transplant procedures. Drones can offer significant advantages in organ transportation, including faster transportation times, reduced transportation costs, and increased availability of organs for transplantation. **Faster Transportation:** Drones can significantly reduce the transportation time of organs for transplantation compared to traditional methods, such as road or air transport. Drones can bypass traffic congestion, travel in a straight line, and operate at higher speeds, allowing for faster delivery of organs to transplant centers or hospitals. This can be especially crucial for organs with a limited window of viability, such as hearts, lungs, or livers, where every minute counts in ensuring successful transplantation [10,11].

- **Diagnostics and prescription:** This journal have shown tremendous potential for revolutionizing diagnostics and prescription services. In this journal, we will explore the advantages of using drones for diagnostics and prescription, and how they can transform the landscape of healthcare delivery. **Diagnostics** is a crucial component of healthcare that involves the identification and monitoring of diseases and conditions to inform appropriate treatment plans. Drones can play a pivotal role in diagnostics by providing unique capabilities for remote sensing, data collection, and analysis [15,16,8]. This data can be used for diagnostic purposes, such as identifying disease outbreaks, monitoring environmental factors that influence health, or assessing the impact of disasters on public health. For example, drones can survey large areas of land to detect mosquito breeding

sites for vector-borne diseases, monitor air quality in urban areas to assess the risks of respiratory diseases, or detect changes in water quality in rural regions to identify potential sources of waterborne diseases. Remote sensing capabilities of drones can enable early detection and response to health threats, facilitating timely interventions and improving health outcomes. Vehicle (UAV) like drone is most suited for exclusive diagnosis and prescriptions. For instance, drones can collect biological samples, such as blood, urine, or saliva, from patients in remote areas or underserved communities. These samples can be transported to laboratories for analysis, allowing for timely diagnosis and treatment of diseases. Drones can also collect and analyze data from wearable devices, such as heart rate monitors, glucose meters, or electrocardiograms, to monitor patients with chronic conditions and provide remote diagnostics. The data collected by drones can be transmitted to healthcare providers or analyzed using artificial intelligence (AI) algorithms, allowing for rapid and accurate diagnostics [17,18].

- **Public Health, Relief, and Medical Surveillance during disaster:** Medicare drones and the prospective procurement of advanced services in the medical paradigm. In this topic, we will explore the advantages of using drones for public health, relief, and medical surveillance during disasters, and how they can revolutionize the way healthcare services are delivered in emergency situations. Public health is a crucial aspect of healthcare that focuses on the well-being of populations and aims to prevent diseases, promote health, and protect communities. Drones are used in public health, especially during disasters, by providing unique capabilities for surveillance, monitoring, and intervention. During disease outbreaks, natural disasters, or humanitarian crises, drones can quickly assess the situation and collect data on the spread of diseases, damage to infrastructure, population movements, and other critical information. This data can help public health authorities to make informed decisions, allocate resources effectively, and plan interventions to

address health needs promptly. **Rapid Response:** Drones can provide rapid response capabilities during emergencies, allowing public health authorities to quickly assess the situation and respond to health needs. For example, in the case of disease outbreaks, vaccines, diagnostic tools to affected areas, providing timely intervention and preventing further spread of the disease [22,23]. Drones can also transport samples for laboratory testing, enabling quick diagnosis and treatment of diseases.

- **Supplies during emergency:** In recent years, delivery of medical supplies during emergencies, providing unprecedented advantages and opportunities for enhancing the sustainability of the health sector. In this article, we will delve into the topic of supplies during emergencies medical supply procurement and delivery. Emergencies, whether they are natural disasters, disease outbreaks, or humanitarian crises, can severely disrupt the availability and accessibility of medical supplies [24,25]. The timely delivery of medical supplies, such as medications, vaccines, medical devices, and other essential resources, is critical in emergency situations to save lives and provide appropriate care to affected populations. However, traditional methods of supply delivery, such as ground transportation, can face numerous challenges in emergency situations, including traffic congestion, roadblocks, damaged infrastructure, and adverse weather conditions. These challenges can result in delays, increased costs, and limitations in reaching remote or hard-to-reach areas, where timely access to medical supplies is crucial.
- **Passenger Ambulance Drones:** An ambulance drone is an integrated unmanned aerial vehicle (UAV) that works on the principles of Unmanned Aerial System (UAS) and its applicability are uniquely associated within the medical domain for rapid-response care and transportation of medical equipment's, patients etc. A conceptual innovation in medical field is the flying ambulance specifically designed and engineered to foster the growing demands of sophisticated emergency requirements in health care system [37, 38]. As we can imagine that the

conceptualization of drone ambulance model is a clear-cut way to optimization of the simple drone into an integrated flying vehicle which can fulfill the exclusive health needs of the people. In fact, the drone ambulance is identical like the conventional ambulance and helicopter whose size may vary but their function is far more efficient and efficacious [39]. These ambulances are able to land almost anywhere making it an epitome of futuristic technology. An intricately designed piece of equipment, ambulance drones can perform airlifts from confined spaces, land on top of buildings, and make an impact in areas that are heavily congested with traffic and encroached upon, which is nearly impossible for conventional helicopters and ambulance vehicles to do. Here, instead of manual piloting, one single person could control the drone ambulances remotely and all other indispensable mechanisms are autonomously operated on autopilot through the skies, and only negligible commands are to be taken over manually during more take-offs, landings and certain situations [29]. Through the medium of such advanced drones the health care could be made more accessible to the people especially during exigencies and with the rise of autonomous embedded systems in the air vehicles to consider a drone ambulance is a solution to the major problems occurring in the contemporary health system. But to imagine the drone ambulance blossoming in the healthcare industry is to first concentrate on a number of concerns that must be unwaveringly analyzed, impeccable study must be conducted, and prolific development must be undertaken until the drone ambulance can become a reality. A wounded person often needs trained medical workers to care for them while they are being transported in order to keep them in a stable state, although at the moment, this is not a common occurrence on a big scale since those particular criteria are still being developed. An estimation is also made that having a well build networks of ambulance drone in the city could give an immediate aid to citizens suffering from cardiac arrest and with surety of 80 % chance of survival. Additionally, drone ambulances have certain impediment in its

mass manufacturing and promotion due to the safety, security and regulatory proclaims and are often criticized on the basis of the likely unethical menace that these drones could bring and along with such other attached threats [22]. Amidst the crisis of premium solution for the health sector the drone ambulance should be prioritized and further promotion with firm support from government and investment is needed at instance for the growth and perpetuity of drone technology. Some other merits of using drone ambulance are accelerated response times, reach difficult places, expand operations scale, efficiently support digital transformation, improve disaster response and enhance battlefield safety etc. [18].

## 6. Advantages of Drone Technology in the Healthcare Industry

The advent of Medicare drones and the prospective procurement of advanced services in the medical paradigm using drone technology offer significant advantages. Drones are versatile and capable of performing a wide range of tasks in the healthcare sector, ranging from delivering medical supplies and equipment to remote areas, providing telemedicine services, supporting emergency response and disaster relief efforts, and facilitating efficient transportation of organs for transplantation [26,27]. In many regions around the world, accessing healthcare can be challenging due to geographical barriers, inadequate infrastructure, and limited transportation options. Drones can overcome these challenges by efficiently delivering medical supplies, vaccines, and other essential healthcare items to remote and inaccessible areas, ensuring that patients in these areas receive timely and life-saving care. Drones can be valuable tools in emergency response situations, such as natural disasters, accidents, or pandemics. They can quickly reach affected areas, assess the situation, and deliver medical supplies, equipment, and personnel to provide emergency medical care [28]. Drones can also facilitate communication and coordination among healthcare providers, emergency responders, and patients in crisis situations, enabling faster and more effective emergency response efforts. Telemedicine, or remote healthcare services, has

become increasingly important, particularly during the COVID-19 pandemic. Drones can support telemedicine efforts by delivering medical devices, medications. Drones equipped with telecommunication equipment can also establish connectivity in remote or disaster-stricken areas, enabling remote consultations, remote monitoring of patients, and real-time communication between healthcare providers and patients. Timely transportation of organs for transplantation is critical to the success of transplant procedures. Drones can provide a fast and efficient means of transporting organs, as they can quickly reach the intended destination, bypassing traffic congestion and other transportation challenges [29]. Drones can also be equipped with specialized containers to ensure the safe transportation of organs, maintaining their viability and improving the success rates of transplant procedures. The use of drones in healthcare can potentially reduce costs and save time compared to traditional methods of transportation. Drones are relatively inexpensive to operate compared to other modes of transportation, such as helicopters or ground vehicles. They can also cover long distances in a shorter period, reducing transportation time and enabling faster delivery of medical supplies, equipment, and services. Additionally, drones can operate autonomously, reducing the need for human intervention and associated costs, making them a cost-effective and time-saving solution for healthcare logistics. Drones can improve the efficiency and productivity of healthcare operations by reducing manual tasks, streamlining logistics, and optimizing workflows. For example, drones can automate the delivery of medical supplies within healthcare facilities, reducing the time and effort required for manual transportation. Drones can also optimize supply chain management by monitoring inventory levels, tracking expiration dates of medical supplies, and delivering supplies on-demand, ensuring that healthcare facilities have an adequate supply of essential items without excess inventory or stockouts. Drones typically use electric propulsion systems, which are more environmentally friendly compared to traditional vehicles that rely on fossil fuels. The use of drones for healthcare logistics can help reduce carbon emissions and air pollution,

contributing to efforts to mitigate climate change and protect the environment.

## 7. Limitations of Drone Technology in the Health Sector

While the advent of Medicare drones and the prospective procurement of advanced services in the medical paradigm using drone technology offer numerous benefits to the health sector, there are also limitations that need to be considered. One of the main limitations of drone technology in the health sector is regulatory and legal challenges. The use of drones in healthcare delivery is subject to various regulations, including those related to airspace, safety, privacy, and data protection. These regulations can vary by country, region, or even municipality, making it challenging to implement drone-based healthcare services consistently and at scale. Obtaining necessary approvals, licenses, and permits for drone operations in healthcare can be time-consuming and complex, and failure to comply with regulations can result in legal and financial liabilities. Additionally, there may be concerns related to the privacy and security of patient data when using drones for telemedicine or remote diagnostics, which need to be adequately addressed to ensure compliance with data protection laws. Another limitation of drone technology in the health sector is the cost of implementation and maintenance. While the cost of drones has reduced over the years, it can still be a significant investment for healthcare facilities, particularly smaller healthcare providers or facilities in resource-constrained settings. The cost of acquiring drones, training personnel, and maintaining the necessary infrastructure for drone operations, such as charging stations, can add to the overall expenses. Moreover, drones require regular maintenance, repairs, and upgrades, which can further add to the operational costs [30]. It may also be challenging for healthcare facilities to secure funding for drone programs, particularly in low-resource areas where healthcare budgets are limited. Technical limitations of drones can also impact their use in the health sector. Despite advancements in drone technology, drones still have limitations in terms of their payload capacity, flight range, and battery life. This can limit the types of medical supplies, equipment, or sensors that can be



carried by drones, and the distance they can travel. In some cases, the weight of medical payloads, such as organs for transplant, may exceed the payload capacity of drones, requiring alternative transportation methods. Additionally, adverse weather conditions, such as strong winds or heavy rain, can affect the flight performance and safety of drones, limiting their usability in certain situations. Operational limitations can also impact the use of drones in healthcare. Drone operations require skilled pilots who are trained to operate drones safely and efficiently [31]. However, there may be a shortage of trained personnel with the necessary expertise in operating drones for healthcare purposes. Training personnel on drone operations and ensuring compliance with regulations can be time-consuming and resource-intensive. Moreover, operational challenges, such as coordinating drone flights with existing air traffic, managing multiple drones in a fleet, and maintaining real-time communication with ground operations, can pose logistical challenges that need to be addressed to ensure safe and effective drone operations in healthcare. Public perception and acceptance of drones in healthcare can also be a limitation. Drones are relatively new and unfamiliar technology for many people, and there may be concerns related to safety, privacy, and ethical considerations. Some individuals may have concerns about the potential for drones to invade their privacy or compromise the security of their personal health information. Others may have concerns about the safety of drones in crowded urban areas or around vulnerable populations, such as the elderly or children. Ensuring public acceptance of drones in healthcare may require effective communication, education, and engagement with communities and stakeholders to address their concerns and build trust.

## 8. Results

The introduction of Medicare drone and the possible use of drone technology for the acquisition of sophisticated medical services might change the healthcare industry and make it more efficient and sustainable. Unmanned aerial vehicles (UAVs), commonly referred to as Medicare drones, have grown in favor in recent years because of their adaptability, portability, and capacity to reach

distant and challenging locations [32]. These drones may be used in a variety of ways to increase healthcare delivery, access to services, and system efficiency. Improving access to medical care in rural and underprivileged regions is one of the primary ways Medicare drones may support the long-term viability of the healthcare industry. Geographical restrictions, a lack of facilities and poor transportation networks make it difficult for people to reach healthcare services in many regions of the globe. Medicare drones can overcome these challenges by transporting medical supplies, vaccines, and even performing medical procedures in remote areas, thereby bridging the gap and ensuring timely access to healthcare services. Medicare drone can play a crucial role in disaster response and emergency medical services, further contributing to the sustainability of the health sector. During natural disasters or humanitarian crises, access to healthcare services is often severely disrupted, and the timely delivery of medical aid is critical. Drones can be rapidly deployed to transport medical supplies, conduct search and rescue operations, and even provide telemedicine services in disaster-stricken areas. For instance, transport medical supplies and enforce lockdown measures, minimizing the risk of infection among healthcare workers and ensuring the continuity of essential healthcare services. Moreover, Medicare drones can improve the efficiency of healthcare delivery within existing healthcare systems, leading to more sustainable healthcare systems. Drones can also be utilized for the delivery of medications, particularly in rural areas or during emergencies, ensuring timely and accurate medication administration. This can improve patient outcomes, reduce hospital readmissions, and optimize healthcare resource utilization, ultimately leading to more sustainable healthcare systems [33,34,35]. In addition to the above benefits, the prospective procurement of advanced services in the medical paradigm using drone technology can have a profound impact on healthcare delivery. Advanced medical equipment and sensors, enabling them to provide medical services such as telemedicine, remote diagnostics, and even perform minor medical procedures. This has the potential to transform healthcare delivery, making it more efficient, cost-effective, and patient-

centric. For example, drones can be equipped with cameras and sensors for remote monitoring of patients with chronic diseases, allowing healthcare providers to monitor patients' vital signs, medication adherence, and provide real-time interventions, leading to better disease management and reduced hospitalizations. This can significantly improve the quality of care for patients with chronic diseases, while also reducing the burden on healthcare facilities and making healthcare more sustainable in the long run. Drones can also be used for remote diagnostics, where they can collect and transmit medical data from patients in remote areas to healthcare facilities for timely diagnosis and treatment planning. This can be particularly beneficial in areas where access to specialized medical expertise is limited, allowing patients to receive timely and accurate diagnoses, leading to appropriate treatment plans and better health outcomes. This can also help in early detection of diseases, such as cancer, where early intervention is critical for successful treatment.

## 9. Conclusion

Keeping the health sector sustainable is crucial since it plays a crucial role in every society. In the past few years, the introduction of Medicare drones the possible application of drone technology to acquire sophisticated medical services have been recognized as a potential breakthrough that has a chance to change the delivery of healthcare. Unmanned aerial vehicles (UAVs), frequently referred to as drones, have quickly grown in popularity because of their adaptability, portability, & capacity to reach distant and challenging locations. In this article, we'll look at how the integration of Medicare drone and the potential use of drone technology for advanced service procurement would affect the health sector's capacity to remain sustainable. Medicare drones have the ability to significantly improve healthcare delivery and solve some of the difficulties the healthcare industry is now facing [36,37]. Access to healthcare services in off-the-grid and underprivileged communities is one of the primary areas where Medicare drones may have a big influence. Due to physical obstacles, a lack of facilities and poor transit networks, access to

healthcare services is often restricted. Drones may fill the gap and provide prompt access to healthcare services in such situations by transporting medical supplies, administering immunizations, and even performing medical operations. For instance, drones have been utilized in Rwanda's remote districts to transfer blood & medical supplies to outlying health facilities, speeding up life-saving procedures [39]. Medicare drones may also help with emergency medical services and disaster response, which will help the health industry remain viable. The timely delivery of medical help is essential since access to medical care is often severely impeded by disasters or humanitarian crises. In disaster-stricken regions, drones may be immediately deployed to provide medical supplies, conduct rescue missions, and even offer telemedicine services. For instance, during the COVID-19 pandemic in China, drones were utilized to carry medical supplies and perform surveillance to carry out lockdown measures, reducing the risk of getting sick among healthcare personnel and preserving the continuation of crucial healthcare services [40]. Additionally, drones have the potential to significantly increase the effectiveness of healthcare delivery inside current healthcare systems. Drones may be used to transfer medical specimens between healthcare institutions, including blood samples or tests from laboratories, speeding up diagnosis and treatment. In order to ensure timely and precise drug administration, drones may potentially be used for pharmaceutical delivery, especially in remote places or during crises. This may lead to healthier healthcare systems by enhancing patient outcomes, lowering hospital readmission rates, and optimizing the use of available resources. "The empowerment of health sector with the applicability of drone is both a blessing and a condemnation as it can be stated that drone technology is a double-edged sword."

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