WHICH AIRCRAFT ARE MOST COMMONLY USED FOR MEDICAL AIR SERVICES?

News / Business aviation

From Learjets and Challengers to turboprops such as the Pilatus PC-12, different aircraft bring different capabilities to a medical flight. Sebastian Demiet, COO of MTI 24/7, explains why aircraft selection ultimately depends on the patient, route, and operational requirements. There is no aircraft that suits every conceivable medical air ambulance scenario equally. Mission parameters like patient condition, destination distance, medical equipment and personnel requirements, airport availability, the need for more than one relative joining the patient, and many other variables come together to define the appropriate aircraft choice.

At MTI 24/7, some aircraft types encountered regularly include the Learjet 35, Learjet 45, Learjet 60, Bombardier Challenger 604, alongside turboprops such as the Pilatus PC-12. Those aircraft types reflect the air ambulance fleet utilized by our customers but are not fundamentally more

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suited to any given scenario.

More importantly, this list serves to highlight just how different aircraft can suit various missions within the scope of medical air transport operations.

Learjets are particularly common in medical aviation because of their versatility and relatively low operating costs. Many are dedicated air ambulance aircraft with permanent medical interiors, rather than passenger aircraft that require reconfiguration for each mission. Dedicated air ambulance aircraft are also an important quality benchmark for many insurance and assistance companies arranging patient transport.

The aircraft has to fit the mission

The aircraft itself is never the starting point. The process begins with the patient and the complete medical and operational requirements of the journey.

Medical aircraft choice is rarely as simple as selecting an aircraft based purely on its range and speed characteristics. Other key factors include how much space is available inside the aircraft for monitoring a patient; whether the stretcher fits and is safely secured; and whether there is adequate accommodation for the medical crew and equipment.

Patient weight and dimensions can also influence aircraft selection, particularly in bariatric cases where the stretcher system and patient loading arrangements need to be considered. Specialist requirements, such as an incubator for a neonatal transport, can similarly influence whether the necessary equipment can be installed and whether additional medical personnel can be accommodated.

Airport considerations also become relevant, especially as flight distance grows. A smaller or turboprop aircraft might enable a closer departure location relative to the actual patient, potentially reducing ground transport distances significantly. Larger aircraft have higher speed and greater ranges and capabilities but require certain infrastructure to operate.

This infrastructure can include not only sufficient runway performance but also an appropriate airport fire category for the aircraft concerned.

Starting the process with the aircraft rather than with the overall journey is not always optimal.

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Learjet 35: A familiar air ambulance aircraft

Of all aircraft associated with medical transport missions worldwide, the Learjet 35 perhaps ranks highest among recognizable names within the scope of fixed-wing medical repatriation and transport services offered across many operators around the globe.

On shorter missions, the Learjet 35 offers an effective balance between range and speed requirements. As a medical-configured aircraft, it can accommodate the patient and all necessary equipment, such as a ventilator, monitors, oxygen supplies, and additional equipment for intensive care and emergency situations, as dictated by each individual patient case.

The Learjet 35 and 36 can also operate long-distance medical missions. In the case of the Learjet 35, tip tanks provide additional fuel capacity, meaning range is not necessarily the limitation that might be assumed from the aircraft's relatively compact size.

Yet cabin space constitutes a major limiting feature. While the medical configuration can accommodate the patient, one family member, crew, and equipment, it may not always accommodate additional medical personnel than the usual room for two professionals.

The relatively tight Learjet cabin has nevertheless proved highly effective for medical transport,

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which is one reason the aircraft remains so widely used. The medical setup across dedicated Learjet air ambulances is also generally similar, with a minimum medical team of two clinical personnel.

Learjet 45 and 60: More options within the family

Another common aircraft for medical air transport operations is the Learjet 45.

Similar concepts still apply here: an efficient and speedy medical transport aircraft type suitable for transporting medical patients within urban areas and internationally when necessary.

Just as before, it is necessary to consider what specific capabilities the aircraft offers, rather than making assumptions about an aircraft type in general.

All Learjet 45s can comfortably accommodate two clinical personnel members while medical equipment installed within an individual aircraft can vary significantly.

The important distinction may therefore be whether any additional equipment required for a particular patient can be installed and whether additional medical personnel, if required, can be accommodated. An incubator, for example, creates different requirements from those of a standard adult stretcher patient.

The Learjet 60 offers more range than previous models, as well as slightly increased cabin dimensions that can become beneficial in medical scenarios.

Medical aircraft choice remains highly dependent upon particular patient circumstances and requirements. Longer-range medical missions might require a Learjet 60 rather than 45 because of extended flight times. Patient condition during prolonged flights can dictate the need for greater cabin capabilities for equipment use and patient monitoring.

Challenger 604 and 650: More range and space

Another popular aircraft for international medical air ambulance flights is the Challenger 604 and Challenger 650. Medical repatriation missions spanning vast geographic distances can benefit greatly from enhanced range provided by these models, as well as improved cabin dimensions.

At MTI 24/7, the two Challenger aircraft models mentioned above are often considered for medical transport missions requiring maximum range. These missions usually involve the transport of patients over considerable distances between nations or even continents. Medical equipment and clinical personnel might also require additional space inside the cabin for monitoring or treatment activities.

The core medical configuration is often comparable to that found on dedicated Learjet air ambulances, including a minimum medical team of two professionals. The principal advantage in certain circumstances is the additional cabin capacity available for specific medical requirements, personnel or accompanying passengers.

The larger cabin can also provide greater flexibility for family accompaniment. While one relative may be able to travel on Learjet missions under favorable circumstances, Challenger aircraft can often accommodate more than one accompanying person, depending on the medical configuration and mission requirements.

In practice, family accompaniment depends on the circumstances of the individual mission,

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available seating and how the additional passengers are accommodated within the transport arrangement. Challenger aircraft can provide greater flexibility when more than one relative wishes to travel.

Many medical repatriation flights take place in the wake of sudden medical incidents. Family members and patients may face an unfamiliar healthcare and insurance system, along with multiple logistical challenges, including airport transit, ground ambulance, and international flight logistics.

Family members can usually accompany patients on these flights using medical aircraft that can accommodate them, along with a stretcher-equipped medical bay for the patient.

Increased range and larger cabins provide benefits that smaller aircraft cannot match under similar scenarios. However, a larger cabin and longer range may be unnecessary when completing a medical transport mission with comparable results achievable through alternative means. Furthermore, using an aircraft with smaller range may reduce overall transport costs.

Pilatus PC-12: Why turboprops matter

All aircraft previously described fall under the classification of jets; which constitute a large portion of medical air transport operations worldwide.

Another set of aircraft commonly employed in similar operations are turboprops, exemplified by the Pilatus PC-12.

Airport access plays an essential role here. A patient residing near a small regional airport would benefit considerably from a medical transport operation conducted via turboprop aircraft instead of business jets since those aircraft have greater operating capabilities at smaller airfields.

Airport considerations matter greatly in this respect.

Runway performance is only one consideration. Airport operating hours, available infrastructure and the required fire category can also determine whether a particular aircraft can use an airport for a medical mission.

Medical aircraft choice requires consideration of various mission variables.

Cabin space is more than a comfort issue

Passenger cabin volume usually receives considerable attention when assessing business jets' convenience. However, medical aircraft selection processes involve different concerns altogether. Clinical personnel working with patients in transit situations must have sufficient access to vital resources within a pressurized cabin environment.

Space becomes critical for accessing the patient's airway, ventilation resources, and vital signs monitoring tools. If the patient's condition deteriorates unexpectedly, the clinical team needs ready access to all available instruments and medication.

Smaller aircraft can be fully equipped for critical-care missions and provide the medical team with the space required to treat and monitor the patient.

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Larger aircraft like the Challenger 604/650 offer more cabin space, which can be beneficial when additional medical personnel, equipment or accompanying family members are required.

Look beyond the aircraft model

Perhaps the most important point is that the name of the aircraft tells only part of the story.

The same aircraft type can have very different medical configurations.

Across dedicated Learjet and Challenger air ambulances, however, the fundamental medical configuration is often similar. The more important differences can therefore arise from the specific patient and mission requirements rather than from the aircraft model itself.

When evaluating options for a patient, MTI 24/7 therefore needs to understand what the specific aircraft can provide.

How much medical oxygen is available? Which equipment can be installed? How many medical personnel can travel? Is there space for a family member? Can the aircraft operate from the required airports? Will a fuel stop be necessary?

Additional questions can include whether the patient fits the available stretcher system, whether specialist equipment can be installed, whether additional medical personnel can be accommodated and, particularly for bariatric patients, whether the aircraft and available equipment allow the patient to be loaded safely.

Airport conditions also need to be considered, including runway length and the relevant airport fire category; two factors that can be more important than whether one aircraft is newer, larger or faster than another.

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