As early as 1784, the medical fraternity began to consider the benefits their patients might gain from being transported by air. However, it was not until 1917 that the first air ambulance took to the skies in the form of a French Dorand AR II.

Over the next few decades the aeromedical industry began to develop. The majority of development was within the military sphere in Europe and the USA. World War II saw an exponential increase in the use of aeromedical transport with an estimated one million patients being airlifted during this conflict. In the Korean and Vietnam wars in the 1950s and 1960s, the helicopter was used for the first time as a front-line medical evaluation vehicle. This brought about dramatic reductions in patient morbidity and mortality, as seen in Table I.

This marriage of aviation and medicine, although greatly developed by the military, has readily been adopted by the civilian pre-hospital environment. Worldwide, the practice of aeromedical transport, whether for the purpose of pre-hospital casualty response or inter-facility transfer, has been recognised as a vital component in the continuum of patient care.

Unfortunately this does not necessarily hold true in the South African medical environment, where aeromedical transport is often seen as an ineffective option, particularly as it is seen as very expensive.

**THE SOUTH AFRICAN REQUIREMENT**

The delivery of health care in South Africa has changed dramatically over the last decade. The emphasis has been placed on primary health care, which ideally is situated closer to the community. At the same time there has been a consolidation of tertiary health services, within both the public and private health care sector.

The disease and injury profile has probably not altered that significantly over the same period of time. Trauma and violence still play a significant role in South African society, as does the ever increasing incidence of HIV/AIDS and tuberculosis.
A REGIONAL AEROMEDICAL MODEL

In the Western Cape, the provincial emergency medical services decided to embark on an extensive aeromedical programme to complement the existing road ambulances. This has been done in conjunction with the Red Cross Air Mercy Service, a non-profit organisation operating as an independent trust that has been providing aeromedical services in southern Africa since 1966.

The programme is based on the philosophy of ‘the most appropriate resource for the particular requirement’.

To address the requirement, two aircraft are available on a daily basis. These aircraft are dedicated air ambulances and are typically utilised as follows and as seen in Fig. 1:

- Distance to incident
- Aircraft type

<table>
<thead>
<tr>
<th>Distance to Incident</th>
<th>Aircraft Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>± 50 - 200 km radius</td>
<td>BO105 helicopter</td>
</tr>
<tr>
<td>± 200 - 500 km radius</td>
<td>Pilatus PC12 fixed wing</td>
</tr>
</tbody>
</table>

This model excludes particular scenarios such as mountain rescue where a rescue helicopter is used exclusively. These aircraft operate from their base at the Cape Town international airport.

The correct selection of aircraft is vital to ensure operational and cost effectiveness, keeping in mind that many of the rural areas may require a fixed-wing aircraft with short runway capability as well as the ability to safely negotiate the dirt strips commonly encountered (Fig. 2).

The appropriate utilisation has proven to be very cost effective, comparing favourably with road transportation.

A cost-effective alternative

The Board of Healthcare Funders (BHF) has set the tariff for road transportation at R22.00 per patient-carrying kilometre for an advanced life support road ambulance.
To fly a patient with the Pilatus PC12 costs the Province R18.40 per kilometre (inclusive of medical crew and equipment) as outlined below:

- BHF tariff, road ALS ambulance = R22.00/km
- Pilatus PC12
  - Fixed costs* = R12.00/km
  - Operational costs† = R6.40/km R18.40/km

*Includes all costs such as landing fees and navigational fees.
†Based on a monthly utilisation of 60 hours.

This is however not a true reflection of the real savings to the health sector, as other soft costs have not been factored in. This includes the facts that:
- road transport is often for single patients whereas the aircraft has multi-patient capability
- distance transmitted by air is significantly shorter (15 - 25%) than that travelled by road to the same destination
- scene resources such as advanced life support paramedics are not tied up for many hours during long road transfers
- patients are delivered timeously to definitive tertiary care, thereby potentially improving patient outcome.

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**THE WAY FORWARD**

South Africa, as a developing country, faces unique health care challenges. The delivery of an efficient yet cost-effective aeromedical service is at the forefront of the attempt to address some of these challenges.

The benefit of appropriate medical transportation by air has been proven by numerous studies throughout the world. The benefit to patient care is of paramount importance, especially as regards achieving appropriate medical intervention timeously.

The vast distances that separate rural communities from tertiary medical Centres should no longer be seen as an obstacle in the delivery of appropriate health care. The outstanding challenge remains for the medical fraternity to adopt aeromedicine as an integral part of their patient care regime.

**IN A NUTSHELL**

Aeromedical transport is no longer a rarity but rather an everyday event.

Although initial development was under the auspices of the military a highly successful civilian model has developed.

South African medical practitioners often shy away from utilising an aeromedical service due to the perceived high financial cost of such a service.

When used appropriately the aircraft can greatly benefit patient care while at the same time costing less than equivalent road transportation.

The full range of benefits achieved still needs to be quantified. Appropriate utilisation is based on many parameters, including medical criteria as well as distance.

South Africa is a country characterised by long distances. These distances are no longer an obstacle as regards the delivery of emergency medical services.