In 2004 the Argyll and Clyde health board established the Emergency Medical Retrieval Service to support its rural community hospitals. This article describes why the service was established and its aims. This service covers a geographically extensive area, with approximately 85,000 people living in remote locations. Rural general practitioners in six community hospitals provide initial patient assessment and resuscitation. Providing emergency care and safe transfer of seriously ill and injured patients presenting to these community hospitals is a significant challenge. All parties involved felt that there was a need to provide a service to transport critically ill and injured patients from these remote locations to definitive care. The idea of the team is to bring the resuscitation room to the patient in the rural setting. With this aim and in order to implement the Intensive Care Society guidelines for the transport of critically ill patients, it was decided that consultants in Emergency Medicine and Anaesthetics with an interest in critical care would staff the service medically. This service is unique within the UK and the authors aim to report our findings from ongoing research and audit in future papers.

In 2004 the Argyll and Clyde health board established the Emergency Medical Retrieval Service to support its rural community hospitals. This article describes why and how the service was established.

The NHS Argyll and Clyde health board area is extensive, covering approximately 7600 km² and 26 inhabited islands (see fig 1). Approximately 85,000 people in the area live in remote locations far from emergency department (ED) and specialist hospital care. Rural general practitioners (GPs) in six community hospitals provide initial patient assessment and resuscitation. In addition to these community hospitals, a small district general hospital with limited specialties on site exists in the far northwest of the health board area. The main ED and hospital specialties for the area are based in a large district general hospital in Paisley on the southern boundary of the health board. Tertiary surgical specialties are provided by various hospitals in Glasgow.

Providing emergency care and safe transfer of seriously ill and injured patients presenting to these community hospitals in remote areas is a significant challenge. The care of these patients is complicated by limited critical care skills and facilities at the initial point of care coupled with prolonged transfer times to definitive care.

Accident and emergency type attendances at community hospitals in the health board area total approximately 15,000 per year. The majority of patients are managed by the GPs on site and do not require hospital specialist care. Those who do are transferred from the community hospitals to Paisley and Glasgow by road, ferry, and air. Road transfer of patients from mainland community hospitals by ambulance takes up to four hours and removes the vital emergency ambulance resource from the referring area. Land and ferry transfer from the islands takes considerably longer. A number of non-emergency patients are also transferred on commercial scheduled flights, especially from Campbeltown and the islands.

Of the patients in Argyll and Clyde transferred from the community hospitals, about 470 are transferred by ambulance service helicopter, fixed wing aircraft, or military search and rescue aircraft each year. These patients are escorted in flight by ambulance service technicians or paramedics. The majority of the patients transferred in this manner are not seriously injured or unwell and require minimal monitoring or interventions en route. A number of patients transferred by air are however seriously unwell. The system in place in Argyll and Clyde before the establishment of the Retrieval Service saw paramedics and ambulance technicians attend rural hospitals in aircraft and transport critically ill patients to urban EDs with minimal resuscitation and stabilisation before transfer. There was no system of audit in place to assess the outcome of these patients.

Anecdotally however, the emergency physicians in the urban hospitals receiving these patients were aware of a number of patients who had seriously compromised physiology before transfer or had deteriorated during transfer from airway, respiratory, and circulatory compromise. On occasion patients requiring tertiary surgical care were also transferred by air to hospitals unable to provide this care and secondary speciality care.
Establishing a rural emergency medical retrieval service

Road transfers to definitive care were required. This has been shown to adversely affect outcome particularly in seriously injured patients.1–3

The consultants from one of the hospitals now providing the retrieval service had carried out a number of retrievals from rural community hospitals on an ad hoc basis. A small series of these has recently been described.4

**Initiating the service**

Following appeals by rural GPs and urban emergency medicine consultants, Argyll and Clyde health board approved a 12 month evaluation of an emergency medical retrieval service in 2004. A working group of 11 consultant emergency physicians and intensive care consultants from two hospitals keen to provide the service was formed.

At the start of the project the following development priorities were identified: activation criteria, community hospital liaison, ambulance service liaison, clinical governance system, equipment management, and training. The service covered a population of 32 700 served by five community hospitals.

**Activation criteria**

The service aims to deploy a critical care consultant directly to patients in remote community hospitals, initiate appropriate interventions, and safely transfer the patient by the most appropriate method to the most appropriate centre capable of providing definitive care.

The retrieval team is led by an ED or anaesthetic consultant together with a flight paramedic from the Scottish Ambulance Service. Depending on the location and aircraft used, the team may also contain a nurse or retrieval registrar. The team aims to care for adults with medical illnesses and traumatic injuries. GPs or nurses working in community hospitals or rural practices can request the team. Requests are made directly to the duty retrieval consultant. The team appreciates that single GPs with sick patients cannot afford the time for multiple referral phone calls. Once a decision has been made for team activation it is the retrieval consultant who requests the aircraft and identifies a bed for the patient, freeing up the GP to treat the patient. The retrieval consultant also provides advice for patient management while the team is en route.

The team are keen to discuss all cases of actual or potential serious illness and injury with their rural colleagues in order that as many appropriate cases involved the retrieval team and as few as possible cases were missed. The team therefore decided against activation criteria based on specific physiological parameters and settled on the following request guideline: “Adults with life threatening injury or illness where advanced medical intervention is appropriate to optimise safe transfer.”

A centrally funded paediatric retrieval service operating out of the Royal Hospital for Sick Children is already in existence and hence there is no requirement for the team to be involved in the retrieval of patients under the age of 14 years.5

**Community hospital liaison**

The service is aimed to support GPs in remote areas caring for seriously ill patients. These GPs have been assessing, treating, and transferring these patients in community hospitals for decades; the urban retrieval team consultants had not. Communication and advice from the GPs was therefore essential from the outset.

The lead consultant from the service visited all of the community hospitals on a number of occasions before the set up of the service to gain information about the problems the retrieval service hoped to address. The activation criteria and process were also discussed at this time. The rural GPs identified safe transfer of these patients as a problem and were enthusiastic about the provision of the service. The local healthcare cooperative were supportive and nominated a GP to form part of the working group as a stakeholder representative.

**Ambulance service liaison**

It was imperative that the ambulance service was supportive of the service—from the paramedics in the air to the service’s senior management. An initial meeting with the manager of the Scottish Ambulance Service Airwing was very positive and it was clear that the ambulance service itself had identified that a small proportion of their air transfers in our health board area would benefit from senior medical input. This was echoed by the majority of flight paramedics on the helicopter and fixed wing aircraft and by the medical director of the ambulance service.

Dedicated staff in the air desk in Dundee control the air resources of the Scottish Ambulance Service. In total there are two helicopters and three fixed wing aircraft across the country. One fixed wing aircraft and one helicopter operate within the area of the retrieval team. The staff at the air desk were provided with information about the role of the service and about our dispatch process.

Around 24 paramedics and technicians work on the helicopter and fixed wing aircraft. All were briefed on the role of the service, made familiar with the equipment to which they had access and encouraged to attend an emergency anaesthetic assistant’s course developed by the team. Involvement of the flight paramedic on scene in the community hospital is essential to an efficient resuscitation and every effort is made to ensure they play their role in the team.

In adverse weather conditions and when a lit landing site is not available, the Scottish Ambulance Service request the assistance of the military for patient transfer in Search and Rescue Sea King helicopters. In Argyll and Clyde, Royal Navy Gannet provide this service. Crews from this squadron were briefed on the role of the team.

**Clinical governance**

Caring for critically ill patients in remote locations or in aircraft carries significant risks due to limited experienced assistance, equipment, physiological monitoring, and repeated patient movements during loading and unloading. Clinical governance is the system through which NHS organisations are accountable for continuously improving the quality of their services and safeguarding high standards.
of care, by creating an environment in which clinical excellence will flourish. A strong clinical governance system is essential to optimise the safety and efficiency of the team and to minimise risk.

Two of the team’s consultants had recently trained with the Helicopter Emergency Medical Service (HEMS) based at the Royal London Hospital. London HEMS has an extremely robust clinical governance system using the aviation safety experience of their pilots and the experience of their senior physicians. This system was therefore used as the basis of the retrieval service clinical governance structure.

The clinical governance structure has the following components:

- **training**—clinical, equipment, aircraft, safety
- **communication**—within team and interagency
- **audit**—missions, missed retrievals, advice only requests
- **adverse incident reporting system**
- **debriefing system**
- **equipment management**
- **standard operating procedures**—clinical, non-clinical, aviation.

Clinical governance meetings are held every six weeks to discuss the above issues. These meetings include an in depth discussion and audit of a selected case.

**Equipment management**

The service needs to be equipped to deal with a wide variety of clinical conditions including medical problems and traumatic injuries. The need to have a comprehensive set of equipment and drugs however needs to be balanced with the limitations of weight and bulk when travelling by aircraft.

Supplementary equipment can be taken depending on the patient’s injuries. This equipment includes pelvic splints, vacuum splints, traction splints, and a pneumatic antishock garment. All members of the team were issued with personal protective equipment appropriate for working in aircraft and in the prehospital environment. This included flame retardant flight suits, helmets, boots, and eye and ear protection.

**Training**

All members of the team need to be familiar with the team’s standard operating procedures and the use and storage of equipment. Training for all three aircraft types was undertaken. This training included familiarisation with each aircraft’s medical equipment, communication procedures, personal protective equipment, and emergency drills.

Given the geography of the area covered by the retrieval service, formal helicopter underwater escape training is undertaken by the team members. This is identical to training undertaken by the paramedics and pilots from the Scottish Ambulance Service helicopter.

Flight paramedics working with the team were trained in the use of the retrieval team’s equipment and provided with the standard operating procedures. An emergency anaesthetic assistant’s course was developed for the paramedics allowing them to take an active role when patients were being anaesthetised.

We are keen that future consultants in emergency medicine working in this area have skills in retrieval medicine and prehospital care. We therefore created two clinical fellow posts in retrieval medicine who received training and experience in these areas. These doctors were also instrumental in setting up the service in terms of data management, equipment management, research, and training the other agencies involved.

We have also created a specialist registrar (SpR) post in Retrieval Medicine. This post is designed for trainees in emergency medicine who wish to gain experience in retrieval medicine and prehospital care. The SpR has an operational role in providing the service and is involved in the service’s development. As part of training, the retrieval SpR accompanies a consultant on missions and keeps a detailed logbook.

**CONCLUSION**

Critically ill patients require an integrated system of care from injury or illness onset to definitive care. This is relatively simple to provide in the urban setting but extremely challenging in remote environments with limited on site facilities and prolonged transfer times to care of an appropriate level.

The introduction of the retrieval service is a significant step forward in providing this integrated system of care by providing rapid access to an experienced physician with critical care skills and safe transfer to definitive care. The team is also active in promoting optimal care in the rural prehospital environment and in the community hospitals.

Although the service is in its early stages we believe that we are developing a robust integrated patient care system to augment the work of rural GPs and the ambulance service. With current pressures on rural health care, including new medical staff contracts, recruitment difficulties, and moves towards centralisation of services, we believe that a regional retrieval service is essential for this area to maintain and improve the care of the critically ill.

**Authors’ affiliations**

A S Whitelaw, R Hsu, A R Corfield, S Hearns, Royal Alexandra Hospital, Paisley, UK

Correspondence to: Dr A Corfield, Consultant in Emergency Medicine, Royal Alexandra Hospital, Coseobar Road, Paisley PA2 9PN, UK; alasdair.corfield@rah.scot.nhs.uk

Accepted for publication 21 May 2005

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