



# **Stroke Telemedicine Services: A Guide to the Commissioning and Provision**

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**Date:** December 2014

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This document represents a summary of accumulated knowledge, experience and documentation relating to Governance Issues for Telemedicine in Acute Stroke from stroke care networks and sites in England.

### **Summary of the Minimum Standards for an Acute Stroke Service using Telemedicine**

Telemedicine can be used to assess acute stroke patients although it must be recognised that there are compromises that have to be made. It is unlikely that the quality of the assessment will be as good, in all cases, as a service where the equivalent level of clinical expertise is at the patient's bedside. Nevertheless it offers the possibility of providing expert stroke opinions to services that do not have sufficient local expertise to provide a 7 day, 24 hour service or in remote areas where it is not feasible to transport a patient to a comprehensive stroke centre.

It is essential that acute stroke services are not two tier. Patients being considered for thrombolysis and patients unsuitable for thrombolysis should receive the same level of attention and care and therefore if patients are being managed through a 'remote' consultant this needs to be performed for all patients and not just those that are deemed potentially suitable for thrombolysis

Telemedicine is only able to replace the expert opinion on diagnosis and immediate management. It cannot replace the need for high quality stroke unit facilities, well trained stroke nurses on site and access to on-going specialist medical opinion that will be needed repeatedly during the course of an average stroke admission. All the standards defined in the National Clinical Guidelines for Stroke 4<sup>th</sup> edition (2012) need to be met regardless of the way that the hyperacute assessment is made.

A telemedicine consultation does not remove the need to provide specialist bedside assessment of the patient on a daily basis. It is unacceptable to provide an acute assessment using telemedicine on a Friday evening and then not provide a specialist bedside opinion until the Monday. There have been no studies evaluating the effectiveness or feasibility of conducting telemedicine ward rounds

There must always be the option of a bedside assessment of a patient where telemedicine is insufficient to address the patient's needs.

This document sets out the governance issues that need to be addressed for any stroke service that is establishing a telemedicine service.

## **1 Introduction**

### **1.1 Purpose of document**

The purpose of this document is to help teams develop a governance framework to support the implementation and delivery of a telemedicine system in acute stroke, primarily to enable assessment of people presenting with acute stroke by a remote specialist in stroke care, to determine eligibility for thrombolysis with alteplase (recombinant tissue plasminogen activator; rtPA).

Telemedicine in acute stroke may be used to provide effective 24 hour stroke specialist advice either at single sites, or across networked sites working in collaboration, within or across trusts. Many of the governance principles apply to both settings but there are special considerations for clinicians giving and receiving opinions between trusts. These distinctions are emphasised in this document.

Guidance provided in this document represents accumulated current practice across a number of networks and clinical sites across England. The guidance must be considered as recommendation only and any governance framework established within a trust, or between trusts, for the use of telemedicine in acute stroke, must be fully endorsed by local risk management and governance committees.

Attached to this document is a set of minimum standards for an acute stroke service that uses telemedicine to assess patients acutely either for the evaluation of patients suitability for thrombolysis or as part of a more general acute assessment service.

### **1.2 Strategic context**

Telemedicine is a real-time audiovisual conferencing system that allows specialists in stroke care to remotely assess patients and to view their brain imaging. This enables the remote stroke clinician to advise the local team on the patient's suitability for thrombolysis and other management.

The implementation of a telemedicine system in acute stroke is supportive of a range of standards and quality markers contained in recent policy and guideline publications.

- The National Stroke Strategy (2007) contains quality markers which require patients with a suspected stroke to be transferred to, and assessed at, a hyper acute stroke service, available 24 hours a day.
- NICE Clinical Guideline 68; Acute Stroke and Transient Ischaemic Attack (2008) recommends thrombolysis and some other acute interventions (e.g. hemicraniectomy for malignant MCA syndrome) as a clinically and cost effective treatment for acute stroke.
- RCP National Clinical Guidelines for Stroke (2012) which supports the use of telemedicine but says that the evidence base supporting its effectiveness and safety is limited and that at present it is not possible to say definitively that it is as good as a specialist bedside assessment.

Direct delivery of acute stroke care by specialists cannot always be achieved in every hospital because of geographical issues or staffing shortages. Telemedicine, allowing a stroke physician to talk to the patient and/ or carer, watch a clinical examination and view the imaging can be used

safely for evaluation of the appropriateness of thrombolysis and other acute treatments, as an alternative to face to face in a specialist stroke centre. Various forms of telemedicine (using telephone consultation, video camera linkage with or without remote access to the radiology) have therefore been tested in a number of settings over recent years. The literature consists of one underpowered randomised controlled trial: STRokEDOC (Meyer *et al.* 2008) of telemedicine for thrombolysis decision-making and many observational studies. The STRokEDOC trial compared telephone consultation to video link and found that correct treatment decisions were made significantly more often in the video link arm than the telephone consultation arm. However, there was no statistically significant difference in functional outcomes at 90 days (Meyer *et al.* 2008). From the evidence available it is not yet possible to firmly conclude that any form of telemedicine for acute decision making is as good as a standard bedside assessment or whether telephone consultation is better or worse than video link telemedicine services; however the consensus of the Intercollegiate Stroke Working Party developing the 4<sup>th</sup> edition of the National Clinical Guidelines was that video-linked telemedicine is preferable to telephone only consultations. All telemedicine services should have immediate access to Information Technology (IT) support to ensure that the service is available whenever needed.

## **2 Definitions**

### **2.1 Telemedicine**

Telemedicine systems consist of a digital network including a two-way video and audio conference facility, plus brain scan image transfer using a high speed data transmission. In acute stroke, the video camera captures real-time clinical signs from the patient, enabling a consultant to receive images remotely and hence undertake a remote presence consultation. In addition, brain scan image transfer, typically via Picture Archive and Communication System (PACS) and broadband technology, enables the remote consultant to assess images.

Local medical teams and clinicians with the patient employ specialised mobile telecarts, typically provided in A&E or acute stroke units.

### **2.2 Remote telemedicine consultant**

For the purpose of this document considering telemedicine in acute stroke, a remote telemedicine consultant is defined as a consultant with experience of acute stroke, who has demonstrable training, skills and experience in the procedures used to diagnose, treat and oversee patients who will benefit from thrombolysis as well as giving more general advice on the diagnosis and management of patients not suitable for thrombolysis. The competences necessary to support this have been described by national consensus – the Interprofessional Thrombolysis Framework.

Clinicians with appropriate competences may include, but is not limited to, stroke physicians, emergency medicine physicians, neurologists and specialist practitioners.

## **3 Clinical Quality Requirements**

### **3.1 Service requirements**

The specification and scope of any telemedicine system for use in acute stroke firstly needs to be defined and agreed. Consideration needs to be given to:

- If the service will be solely delivered by consultant physicians, or if other appropriately-trained and experienced grades will use the system to provide a remote opinion.
- Operational hours, and if the service is to be used both in-hours and out-of-hours.
- If the service is to be used solely for patients presenting at the same trust as that employing, or holding an honorary contract with, the consultant providing the remote opinion.
- If the service will enable remote opinions to be sought and given between different trusts.
- If the service is going to be used solely for the assessment of patients with acute stroke to determine their eligibility for thrombolysis, or if it will be used for other related purposes (e.g. TIA/post acute stroke care).

Where different trusts are collaborating to provide a network of telemedicine to support acute stroke care across a range of clinical sites, it is recommended that a lead trust should be designated to take responsibility for all governance issues: including clinical, information, and technological.

The outline of the service to be provided should be determined, referenced as much as possible to existing national guidelines and standards, such as the National Stroke Strategy, the NICE Clinical Guidelines and the RCP Clinical Guidelines (see section 3.3.1 on standards below).

The service requirements should be defined. As an example:

The service must provide the following:

- Coordination of a rota of identified on-call remote telemedicine consultants available at all specified operational hours.
- Technical capability to carry out audiovisual teleconferencing and remote access to CT brain scan images during operational hours.
- Access to specialist advice following the initial consultation, within operational hours, for the management of complications or other queries relating to treated patients.
- A framework to monitor the quality of both the clinical and technical services, to include patient experiences and opinions, and to generate regular performance reports.
- An administrator facility to coordinate the rota, produce activity, performance and patient experience reports, and coordinate regular multidisciplinary outcome meetings and teaching updates.
- A mechanism, with clear and documented lines of accountability and timing, for the handover of information regarding patients treated via telemedicine from the remote stroke specialist to local stroke consultant and team.

### **3.2 Patient pathways**

Patient pathways will vary between sites but for the successful use of telemedicine at both single sites, and especially between networked sites, it is essential to ensure that all relevant national, local and network standards (see below) are embedded within services and adhered to. All contributors to the clinical pathway need to fully understand what should happen, where and when.

The most effective way to accomplish this, and ensure genuine engagement of all relevant stakeholders along the care pathway relevant to the use of telemedicine, is to undertake thorough process mapping and action planning exercises involving all of the specialties, departments and organisations contributing to the care pathway.

### **3.3 Quality**

#### **3.3.1 Standards**

Thrombolysis in acute ischaemic stroke must be delivered without delay, and telemedicine must safely and effectively support a time-constrained service. Recent trial data demonstrate efficacy of alteplase for up to 4.5 hours after stroke onset. Telemedicine services should adhere to national quality standards. The National Stroke Strategy Quality Marker 7 states that all patients with suspected acute stroke are immediately transferred by ambulance to a receiving hospital providing hyper-acute stroke services (where a stroke triage system, expert clinical assessment, timely imaging and the ability to deliver intravenous thrombolysis are available throughout the 24-hour period). The National Stroke Strategy Quality Marker 8 states that patients with suspected stroke receive an immediate structured clinical assessment from the right people. Patients requiring brain imaging are scanned in the next available scan slot within usual working hours, and within 60 minutes of request out of-hours with skilled radiological and clinical interpretation being available 24 hours a day. The National Stroke Strategy Quality Marker 9 states that Hyper-acute stroke services provide as a minimum, 24 h access to brain imaging, expert interpretation and the opinion of a consultant stroke specialist and thrombolysis is given to those that would benefit.

The telemedicine service must adhere to, or exceed accepted guidelines for best practice, and have been developed in line with the following:

NICE Clinical Guideline 68 – Stroke (2008) state:

- Access (within a specified maximum time frame) to a remote specialist in acute stroke care who is trained and experienced in the management of acute stroke via a telemedicine service.
- An assessment of the patient by the remote stroke consultant specialist using agreed documentation, protocols and policies.
- Real-time audiovisual conferencing, plus remote access to CT brain images, to enable the stroke specialist, working with other clinical practitioners local to the patient, to determine eligibility for thrombolysis.
- Local staff who are trained and experienced in both acute stroke care, and in the use of telemedicine.
- Assurance that the telemedicine facility, and its usage in the delivery of thrombolysis for eligible patients, is fully integrated within a comprehensive, effective and safe stroke service.

RCP National Clinical Guidelines for Stroke (2012) is broadly similar but says

- A telemedicine service in an acute stroke unit should consist of: a video link which enables the stroke physician to observe a clinical examination and/or telephone which enables the stroke physician to discuss the case with a trained assessing clinician and talk to the patient and carer directly.
- All telemedicine services should have a link which enables the stroke physician to review radiological investigations remotely.
- An acute stroke unit using a telemedicine service should still include specialist stroke nurses at the admitting hospital.
- Staff providing care through telemedicine (at both ends of the system) should be specifically trained in:
  - the use of the technology
  - assessment of acute stroke patients, delivery of thrombolysis and other acute interventions in the context of the remote system being used.
- The quality of decisions made through telemedicine should be regularly audited.

### **3.3.2 Administration standards**

Records made by the remote stroke specialist during the telemedicine consultation must be entered into the patient's health care records within a specified interval (e.g. less than 15 hours after consultation). One practical method to accomplish this is through an electronic workbook and checklist shared between the remote consultant and the clinicians at the local site. This can then be emailed to the hospital site and bound in the patient notes.

### **3.3.3 Monitoring process and outcomes**

The treatment of people with thrombolysis should be evaluated and audited by entering data on the Sentinel Stroke National Audit Programme (SSNAP). A framework for the recording of the performance of the telemedicine technology should be made, to include a record of any episodes of technical failure of audiovisual connection or loss of digital brain image data. The outcome of cases should be reported back to appropriate divisional and/or trust clinical governance committees on a regular basis. Any major complications or serious adverse incidents should be reported to the divisional director and trust clinical governance committee.

Clinical teams should meet at regular intervals to review all cases treated through the telemedicine system, including those who are ultimately deemed to be ineligible for thrombolysis.

## **4 Clinical Governance Issues**

### **4.1 Patient consultation via telemedicine**

The telemedicine consultation should take place under the same GMC guidance as if the remote telemedicine consultant was face-to face with the patient. The patient's privacy and dignity needs to be ensured. Confidentiality of the consultation must be maintained. The consultation should be in-line with GMC guidance in Good Medical Practice: Duties of a Doctor (2006).

## **4.2 Patient confidentiality**

As with conventional consultations and examinations, how and where a teleconference takes place will be an important consideration for clinical teams to ensure confidentiality of the consultation and examination. Local guidance should be developed and issued that sets out the 'appropriate use of telemedicine'. This will include measures to ensure confidentiality of consultation. Although most telemedicine videoconferencing facilities do not record the images and sound, consideration should be given to ensuring that the patient has access to any records kept about themselves generated as a result of the teleconsultation. If recordings of the teleconference, data, or images are made and transferred as part of the teleconsultation and subsequently stored, they should remain protected and secure.

## **4.3 Patient consent**

Informed consent for the use of telemedicine in acute stroke should be sought and documented by the attending practitioner in each case. In particular, the patient and family/carers should be made clearly aware that a remote telemedicine consultant will be consulted. If the remote telemedicine consultant is not employed by the trust where the patient is located, this should also be made clear.

Signed consent from the patient for the use of telemedicine is not required where the video-consultation is not recorded. Ideally, summary written information, in addition to verbal explanation, should be made available to patients and/or their families/carers, (see Appendix 1) who should then be asked for consent. An assessment checklist should require the practitioner to document if verbal consent has been obtained.

Many patients with acute stroke have a communication impairment, or cognitive or attention deficits, which render fully informed consent difficult to obtain. In such a situation, capacity should be assumed, and individuals should be given the opportunity to make those decisions that they have the competence to. Family and carer involvement is important where an individual cannot provide consent. In the absence of capacity to provide consent, the local physician may make the decision to employ telemedicine in the best interests of the patient, but should ensure full documentation of this.

If the video-consultation is recorded for the purposes of audit, training and research, then patients should be asked for their written consent for the digital information to be retained as soon as practicable following the stroke. The GMC guidance for making and using video and audio recording for patients is contained in Guidance for Doctors (2002).

## **4.4 Responsibilities of relevant staff groups**

It is essential to have considered and clarified the roles and responsibilities, and required training, of all relevant staff along the acute stroke care pathway in relation to telemedicine. The precise pathway, and hence the groups of staff involved, will vary from site to site. The following is provided as an illustration of the relevant stages at one site (see also Appendix 2):



#### **4.5 Roles and responsibilities of consultants giving remote opinion via telemedicine on patients within their own trust**

The role of the remote telemedicine consultant is to advise the local team in their trust on the best management of the patient, when their advice is sought. The remote telemedicine consultant is accountable for the advice that is given. Responsibility for the care of the patient remains that of the on-call medical team, or other designated specialist team (e.g. acute stroke unit staff), at the same hospital trust.

A remote telemedicine consultant who is giving an opinion for a patient within their trust should be able to provide evidence to demonstrate that they:

- Are trained in stroke thrombolysis, and receive training updates.
- Are regularly involved in the provision of both day-time and out-of hours thrombolysis for acute stroke (consideration will be needed to locally determine minimal levels of activity to maintain skills).
- Are trained in the use of the telemedicine equipment.
- Are able to perform an NIHSS stroke assessment.
- Attend regular multidisciplinary thrombolysis outcome review meetings.
- Attended a stroke thrombolysis masterclass (or approved equivalent).
- Attended training in interpretation of CT head scans.

A remote telemedicine consultant should possess the skills to undertake the following tasks:

- Reviewing clinical information provided on the patient.
- Reviewing time of onset/time last seen well.
- Assessing and conversing with patient via video-link.
- Reviewing physiological parameters.
- Reviewing inclusion and exclusion criteria.
- Reviewing medication.
- Reviewing brain imaging.
- Explaining to patient and/or family the risks and benefits of thrombolysis if appropriate.
- Advising the local team as to whether thrombolysis is appropriate or not.
- Providing guidance on any other issue relevant to care of the person with acute stroke.

Additional work undertaken by consultants in providing a remote opinion via telemedicine should be reflected in their job plan. This will need to be negotiated within the trust. Additional remuneration for out of hours on-call work should be calculated on the basis of frequency, intensity and actual work (see BMA and GMC guidance).

#### **4.6 Roles and responsibilities of consultants giving remote opinion via telemedicine on patients between trusts**

The role of the remote telemedicine consultant is to advise the local team in another trust on the best management of the patient, when their advice is sought. The remote telemedicine consultant is accountable for the advice that is given. The remote telemedicine consultant will hold a full or honorary contract with one of the trusts participating in the telemedicine network, but is not required to hold an honorary contract with each of the participating trusts.

Responsibility for the care of the patient remains that of the on-call medical team, or other designated specialist team (e.g. acute stroke unit staff), at the hospital trust where the patient is receiving treatment.

#### **4.7 Roles and responsibilities of clinicians seeking remote opinion**

The clinician (doctor/nurse/physician assistant/therapist) seeking advice from the remote telemedicine consultant has the responsibility of having demonstrable appropriate training and skills, and a requirement to adhere to guidelines and protocols. As an example, they should:

- Have completed and be certified in NIHSS scoring.
- Have completed an approved thrombolysis training course.
- Follow the procedure for contacting the remote stroke specialist.
- Ensure that the appropriate diagnostic scan is acquired speedily, usually within 30 minutes of the patient's arrival.
- Assess the patient as per protocol.
- Provide the remote telemedicine consultant with a detailed assessment of the patient in order to enable both clinicians to complete the approved checklist.
- Enable a clearly auditable process for making the decision to thrombolyse or not.
- Ensure that the thrombolysed patient is transferred to a bed within the hospital with the capacity to provide appropriate care for a patient with acute stroke.
- Ensure a thorough handover of the details of patient treatment and condition takes place.

#### **4.8 Responsibilities of organisations providing care for people with acute stroke**

- Each organisation, whether a single site or part of a network of trusts, must have organised hyper-acute stroke care on a unit designated for hyper-acute stroke.

- Each unit must meet the seven acute criteria for units with beds providing care in the first 72 hours:
  - Continuous physiological monitoring (ECG, oximetry, blood pressure) for 24 hours.
  - Immediate access to scanning for urgent stroke patients.
  - Direct admission from A&E/front door.
  - Specialist ward rounds on seven days a week.
  - Acute stroke protocols/guidelines.
  - Nurses trained in swallow screening.
  - Nurses trained in stroke assessment and management.
- The unit must be staffed to provide specialist 1:2 nursing for the first 72 hours and subsequently for recommended stroke unit intensity.
- Staff must be trained in the provision of thrombolysis for acute ischaemic stroke.
- Staff must be trained in the management of complications of thrombolysis.
- Protocols for stroke thrombolysis and the management of complications must be in place.
- The unit must be able to provide care to the standards set out in the Royal College of Physicians' Intercollegiate Clinical Guidelines for Stroke 4th edition 2012, the NICE guidelines for Acute Stroke and TIA 2008.

#### **4.9 Workforce issues**

Trusts will be required to provide sufficient qualified and appropriately trained staff to support the use of telemedicine in acute stroke. The competences necessary to support this have been described by national consensus – the Interprofessional Thrombolysis Framework

##### **4.9.1 Core skills and competences of remote telemedicine consultant**

For the purpose of this document considering telemedicine in acute stroke, a remote telemedicine consultant is defined as a consultant with experience of acute stroke, who has demonstrable training, skills and experience in the procedures used to diagnose, treat and oversee patients who will benefit from thrombolysis.

The competences necessary to support this have been described by national consensus – the Interprofessional Thrombolysis Framework.

Clinicians with appropriate competences may include, but is not limited to, stroke physicians, emergency medicine physicians, neurologists and specialist practitioners. Those clinicians who do not practice stroke medicine as their major specialty, should deliver their expertise in the context of an integrated comprehensive stroke service.

The following core skills and competences are required for such remote telemedicine consultants working in acute stroke:

- Advanced clinical assessment skills in relation to acute stroke management.

- In-depth knowledge and understanding of risks and benefits of thrombolysis therapy in acute ischaemic stroke, including having attended a recognised training course (e.g. thrombolysis masterclass or equivalent) and regular (e.g. annual) update courses.
- A responsibility to deliver care based on current evidence, best practice and, where possible, validated research.
- A responsibility to work to standards, guidelines and protocols agreed within a trust, between trusts or across a network of trusts.

#### **4.9.2 Competency assessment**

An appropriate competency assessment process for all relevant staff who will use the telemedicine system and equipment should be in place. For individual sites, the responsibility for this lies with the provider organisation. For networked sites working in collaboration, the requirement will lie with the network or designated lead provider organisation.

#### **4.10 Contingencies for technical failure**

Technical failure is the key risk in the usage of telemedicine and remote consultation in the emergency care of people with acute stroke. Contingency plans must be in place both at single sites, and particularly across multiple networked sites, to mitigate risks ensuing from technical failure.

Importantly, the remote telemedicine consultant should be provided with a mobile computer with adequate mobile broadband capability, thus enabling rota consultants to provide advice from suitable locations. Whilst achieving the appropriate broadband speed is not problematic in hospital, speeds in a number of home and other settings for both fixed line and mobile broadband can be variable resulting in difficulties in viewing images. Remote access to PACS images is dependent on a minimum requirement for transfer speeds of 1 Mb/s.

Should the remote telemedicine consultant be unable to receive and/or transmit audiovisual information during a consultation, then documented contingency procedures should exist. These need to be agreed at a local or network level but may include:

- The remote telemedicine consultant coming to the site and directly attending the patient.
- Consultation by telephone only, if both an attendant physician has experience in thrombolysis in acute stroke and an opinion on the scan from a local radiology consultant can be obtained.

The technical failure should be clearly recorded in both the patient notes and any remote consultation checklist.

### **5 Information Governance Issues**

#### **5.1 Information management and technology**

Where trusts are collaborating to provide a network of telemedicine to support acute stroke care, it is recommended that a lead trust should be designated to take responsibility for information governance. Individual trusts, or the designated lead provider trust across a network of trusts, have the responsibility to:

- Lead on asset management and allocations, contract maintenance and system monitoring.
- Coordinate access to PACS for consultants on the telemedicine rota.
- Refresh equipment at appropriate intervals.
- Develop operational and technical handbooks.
- Provide IT help and service desk requirements.
- Manage storage of, and appropriate authorised access to, digital information.

## **5.2 Liability**

Individual trusts, or a designated lead provider trust across a network of trusts, have the responsibility to ensure that remote stroke specialists, and associated staff using telemedicine in acute stroke, are provided with:

- Employer's liability
- Public liability
- Professional indemnity