Operational research seeks benefit for stroke victims

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Researchers from the University of Exeter, Peninsula College of Medicine and Dentistry (PCMD), are working with clinicians from the South Western Ambulance Service NHS Foundation Trust (SWASFT) and the Royal Devon & Exeter Hospital NHS Foundation Trust (RD&E) to reduce the time it takes from the start of a stroke to the administration of vital clot-busting drug treatment.

The researchers are from the PCMD-based National Institute for Health Research (NIHR) Peninsula Collaboration for Health, Operational Research and Development (PenCHORD), which is part of the NIHR Peninsula Collaboration for Leadership and Applied Health Research and Care (PenCLAHRC).

The study is investigating the whole process of emergency treatment that follows when a person suffers an acute stroke from a blocked artery in the brain. For most patients in this situation, the earliest possible administration of the clot-busting drug Alteplase can greatly improve their chances of recovery – called thrombolysis. The drug is currently licensed for delivery up to three hours from the onset of a stroke, but in that time the patient needs to call an ambulance, get to hospital, have a brain scan, and be assessed by specialists before receiving the treatment.

The research team is working with healthcare professionals from SWASFT and the RD&E to analyse the various steps by which a stroke patient is identified, transported to hospital and treated. This includes paramedics, the emergency department (ED) team, triage nurses, the

acute stroke team and the radiology department (which performs the brain scans).

By investigating what happens 'on the ground', researchers have been able to create computer simulations that imitate the various permutations of stroke victim identification, transport, arrival at hospital and treatment.

The computer model takes into account the number and level of healthcare professionals involved with each case, the time of day or night, and the 'busy-ness' of the various hospital departments involved in the treatment process.

Their analysis of over 1400 episodes of care has enabled them to identify the bottlenecks in the system, and take steps to speed up the process of emergency care which can lead to earlier clot-busting treatment. The researchers estimate that the number of people whose stroke could be greatly improved by earlier treatment could treble.

The research has already led to the introduction of a pilot for early referral to the acute stroke team at the moment the ambulance arrives at the ED. The pilot was introduced in December 2011 and early figures already show that the changes have led to a doubling of the number of patients admitted with acute stroke receiving clot-busting treatment within the three hour window (the national average is just five per cent: the national target is 10 per cent).

The research team is currently working on a thorough evaluation of the pilot scheme, as well as developing a mobile phone referral method that ambulance crews can use to inform the stroke team that a patient is on their way – so reducing the time the patient spends in the ED before receiving thrombolysis.

Professor Stuart Logan, Director of PenCLAHRC, commented: "This project shows just how powerful close collaboration between academics, clinicians and managers can improve patient outcome. Research can sometimes feel like a luxury, this is the kind of work that reminds us of why with proper partnerships can have immediate impact. We look forward to the next stages of the study, which has the potential for major impact nationally and internationally."

Dr Martin James, Consultant Physician and Lead Clinician for Stroke at the RD&E said: "Our work with academic researchers in PenCHORD to build the computer simulation has been a great example of the NHS collaborating with Universities to improve care. Using the simulation has enabled us to identify and unblock the bottlenecks in getting the treatment to patients much more quickly than we could in the past. What used to takes us months or even years of trial and error can be accomplished in an afternoon using the simulation. This means that research findings can be applied to the care of patients much more quickly, and reduce the misery of disability after a stroke, which is what these collaborations are all about."

James Wenman, the Clinical Development Manager for the South Western Ambulance Service NHS Foundation Trust said, "We are delighted to be working in partnership with the Peninsula College of Medicine and Dentistry, and our colleagues at the RD&E on this important project. Improving the services we provide to patients who have experienced a stroke is a key priority for SWASFT. The sooner patients receive treatment, the greater their chance of survival, which means they are more likely to make a full recovery. The Trust aims to deliver the right care in the right place at the right time, and this initiative will undoubtedly help us to achieve this in our ongoing quest to save lives."

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