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Analogue to digital

SAMueL 2: Transforming Stroke Pathways Across the System

PenARC (now NIHR ARC South West)

The challenge
The Stroke Audit Machine Learning (SAMueL) project demonstrates how digital tools can optimise stroke care across the entire health system. While treatments like thrombolysis and thrombectomy dramatically reduce death and disability, many patients were missing out due to variation in practice between hospitals.

The approach
PenARC's SAMueL project brought together patients, clinicians, researchers, and policymakers to apply artificial intelligence (AI) to national stroke data, identifying areas where care could be improved across the whole pathway.

Insights revealed that hospitals using thrombolysis more effectively achieved better outcomes, and underperforming units were supported to improve treatment rates, potentially helping 400 people avoid lasting disability and 280 avoid death or severe disability annually.

For thrombectomy, SAMueL combined geographic data and treatment-time modelling to recommend optimal specialist centre locations, ensuring that patients receive timely care closer to home. Implementation of these recommendations, including new centres, is estimated to prevent 300 deaths or severe disabilities each year.

The outcomes and impact
The work directly influenced national policy: NHS England funded improvements in six hospitals, increasing thrombolysis rates from 9.7% to 14.5%, and the programme has expanded to 12 more trusts. The AI models and code are now embedded in the National Stroke Audit and Clinical Guidelines. The project's real-world impact has been recognised with the national Patient Safety Awar

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