

Reminder of the aims

Aim 1: To maximise the impact of national comparative audit on clinical practice change in thrombolysis through the development and use of sophisticated hospital-level analysis and bespoke feedback. This analysis, allowing for differences in hospital patient populations, will investigate both the benefit and potential harms of thrombolysis. Hospitals will be compared with both national benchmarks and with a group of hospitals with similar patient populations.

Aim 2: To evaluate the potential health economic impact of realistic and achievable alterations to the acute stroke care pathway.

Aim 3: Using co-production with clinicians, determine the best way to use and present the outputs from SAMueL-2 to increase impact and reduce unwarranted variation in clinical practice in thrombolysis.

The 'qual' component

5.5. Explore how best to incorporate modelling and machine learning into local improvement

To answer the question “Given existing variations in thrombolysis use, what is the best way for us to use and present the outputs of machine learning to reduce unnecessary variation and promote best patient outcomes?”

- clinician panel n=40 - *co-production workshops*
- patient vignettes n=20 *think aloud interviews*
- Explore intelligibility and trust in modelling and machine learning n=20

In addition to these activities, we will work flexibly and responsively with this panel to explore specific implementation questions that emerge during the project, for example convening virtual meetings to examine how best to configure the dashboard, or to understand the kinds of health economics modelling they would find most useful. Qualitative data will comprise meeting notes, interview transcripts and workshop outputs which will primarily be analysed using a combination of thematic approaches and framework analysis.

Where we are now

- we are NOT trying to optimise thrombolysis and will not be able to show direct impact on health outcomes.
- We are engaged in an **implementation development** activity directed to
 - Finding out what it takes to get [ML] **usefully/meaningfully** incorporated [**adopted**] into a national audit
 - See if we can improve the national audit by plugging in [ML]
 - Exploring the [**human and technical**] processes by which we get [ML] into a national audit (i.e. how do we “best to incorporate modelling and machine learning into local improvement”)

Question: What should a machine-learning model based on SNAAP data look like, do, and deliver, if it is to optimise improvement, and reduce unwarranted variation, in thrombolysis?

- 1** To generate empirically and theoretically informed knowledge about how thrombolysis is currently delivered, centred on physicians' views, understandings, and practices.
- 2** To learn more about how stroke physicians' and staff think and feel about SNAAP and about the use of machine-learning in improving clinical practice.
- 3** To combine what we learn from 1 and 2, and use this knowledge, alongside contributions from stakeholders, to develop and refine the application of ML to national audit data.

[Slightly] revised plan

1. [AI] is not a single product/intervention, nor is it finished
2. We have multiple sources of data

AI Development work

a) user design process. With various groups of stakeholders. E.g. Nov 2022 Revising models to respond to comments about age/disability.

b) project team activity minutes, email chat and qual notes

Explore intelligibility and trust (context)

c) NHSE CoP – use this both to learn and as engagement

d) 3 case studies – observe and talk to people in 3 hospitals – ethics sub in Jan 2023

e) Talk to key informers e.g. who can give insight to practice, or help access people

f) Talk to /observe regional and national level groups and meetings e.g. ISDNs, UK stroke forum, conferences, commissioners

- **WP1** Study of context to refine our ML approach (methods: focussed obs + semi structured ivs)
- **WP2** To improve our understanding of physicians' and stroke care staffs' attitudes and interpretations of information from the national stroke audit and to the use of ML to improve clinical decision-making (methods: focussed obs + semi structured ivs)
- **WP3** ML testing and learning in order to understand the feasibility and usefulness of ML (methods: coproduction workshops)