

# Using simulation and machine learning to maximise the benefit of intravenous thrombolysis in acute stroke in England and Wales: the SAMueL modelling and qualitative study

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## Plain English summary

### SAMueL modelling and qualitative study

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## Plain English summary

Stroke is a common cause of adult disability. Expert opinion is that about one in five patients should receive clot-busting drugs (also called 'thrombolysis') to break up the blood clot that is causing their stroke. At the moment, in the UK, only about one in nine patients actually receive this treatment. There is a lot of variation between hospitals, which means that the same patient might receive different treatment depending on which hospital they attend.

Clot-busting drugs are not suitable for everyone. Doctors must feel confident in their use, and lack of confidence may explain some of the variation in use. Hospitals must also be well set up to be able to investigate and treat stroke patients quickly (e.g. getting patients to a head scanner quickly, which is an essential step before treating).

In our work, we have developed methods for understanding what the main causes of variation between hospitals are. We ask three questions:

1. How much difference is due to processes (e.g. how quickly a patient is scanned)?
2. How much difference is due to differences in patient populations?
3. How much difference is due to different decision-making by doctors?

For each hospital, we can say what would have the most positive effect, that is, is it the decision-making (lack of confidence), is it that the processes, like scanning, need to be sped up or is it that the hospital needs to find a way of better finding out when a person has had a stroke (if that is unknown, then it is not possible to give clot-busting drugs)?

By using these methods, we predict that the number of people across England and Wales for whom clot-busting drugs would prevent disability after stroke could be nearly doubled.

Along the way, we interviewed doctors on their thoughts about what we were doing. Although doctors were interested in our work, some needed to know more about how our methods work before they felt that they could trust them.

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