

Introduction

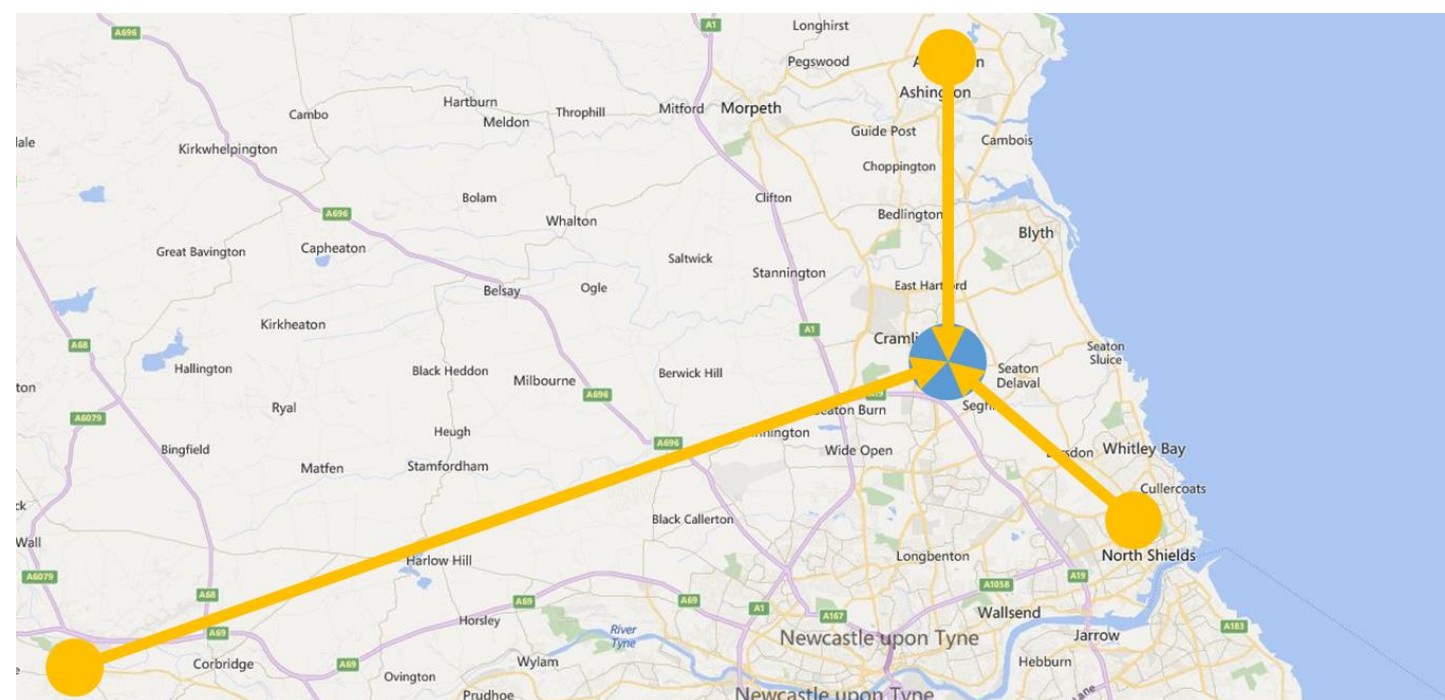
- Stroke is a major cause of death and disability in the United Kingdom, accounting for 50,000 deaths in the UK every year.
- Stroke treatment is time-critical: delays in getting a patient to hospital to receive treatment result in increased disability.
- If a patient can get to hospital quick enough (within 4.5 hours) then they may be eligible for drugs which may reduce disability.

Ambulances and FAST

- 80% of stroke patients are transported to hospital via emergency ambulance.
- Paramedics are trained to recognise stroke using the FAST test.
- This often records false positives and negatives.
- A number of factors might affect the accuracy of this test and this project investigated test timing and service re-organisation.

A&E Restructuring

- A&Es were restructured in June 2015 in Northumbria Healthcare NHS Trust in order to provide greater continuity of specialist care access
- Wansbeck, Hexham and North Tyneside A&Es were closed and centralised at the Northumbria Specialist Emergency Care Hospital (NSECH) in Cramlington.



This project asked:

- Does the quality of stroke assessment by paramedics change by day of the week or time of day? Does the quality of stroke assessment by paramedics change according to distance from hospital?**

In light of the recent restructuring of Accident and Emergency departments in Northumbria, it also investigated:

- What is the effect (if any) on the new A&E system in Northumbria on stroke care?**
- Which populations will be most affected by the change?**

Method

Data from this project primarily came from two sources:

- Sentinel Stroke National Audit Programme (SSNAP): an initiative by the Royal College of Physicians to improve stroke care by collecting key data on stroke patients and their treatment.
- North East Ambulance Service (NEAS) stroke records showing time and location of call, the hospital the patient was taken to, and their arrival time.
- A one year period from 01/04/2014 – 01/04/2015 was chosen for the project.

The data was then analysed using SPSS and Microsoft Excel. The Chi Square test was used with a level of statistical significance set at $p=0.05$. The chart below summarises the key steps of handling the data.

Data handling step	Method
Remove patients from SSNAP who did not arrive by emergency ambulance.	A macro was made and used.
Remove duplicate entries from each data source.	Excel functions and conditional formatting.
Find which patients in the NEAS list appeared in the SSNAP list to see which patients actually had a stroke.	A macro was written to perform an initial sift. This found approximately 80% of the matches. The remainder was done manually.
Find the day of the week and the time of day of each hospital admission.	Excel functions.
Calculate the distance and time to the 'old' and 'new' A&E.	A macro was written which communicated with the Google Distance Matrix API.

Results

- NEAS transported 1200 patients they suspected of having a stroke to a Northumbria Healthcare hospital
- 31% of the patients NEAS paramedics suspected had a stroke were confirmed in hospital.

FAST performance by time of day and day of week

- There was no relationship between accuracy of assessment and day of the week. ($p=0.55$).
- There was also no link was found between time of day and quality of assessment ($p=0.062$).

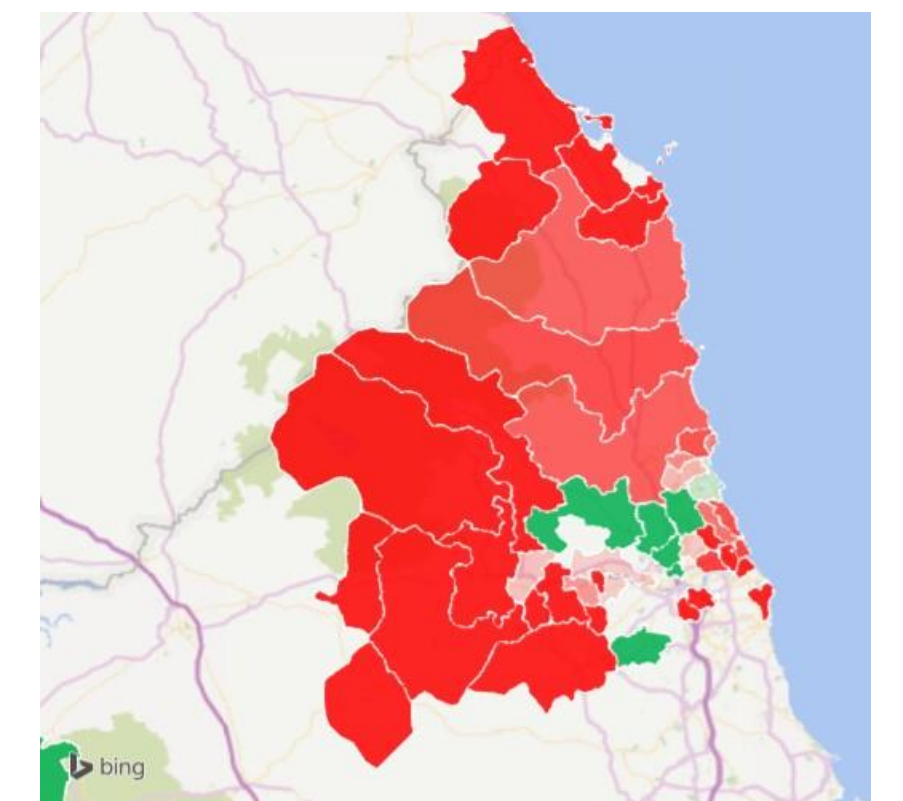
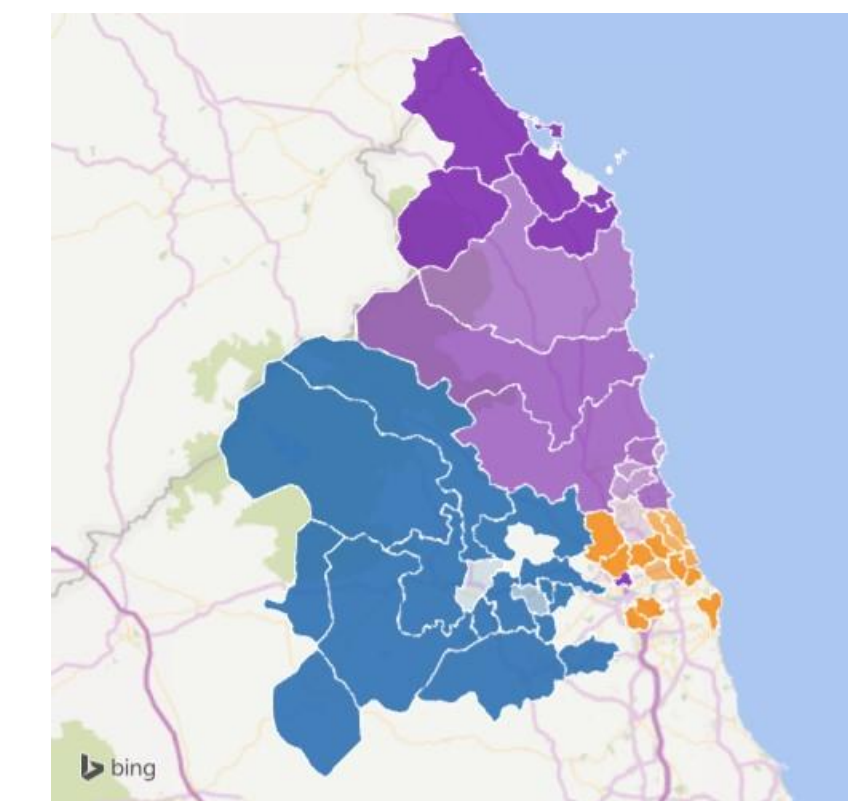
Quality of assessment by distance from hospital

- No links were found between quality of assessment and distance from hospital.
- No link was found between distance from hospital and stroke mortality.

Results relating to emergency care centralisation

- 79.3% of patients would travel further in the new system.
- The distance travelled increased by an average of 4.63 miles
- The time to hospital increased by approximately 4 minutes
- The distribution depended upon proximity to an original A&E

Some of these results are presented in the maps below.



Where stroke patients go (left): patients who had strokes in the blue area went to Hexham General Hospital, purple went to Wansbeck General Hospital, yellow went to North Tyneside General Hospital. Who is better off? (right): Those in the green areas will have to cover less distance to get to hospital in the new system, those in the red areas will have to travel further.

Summary and conclusions

Does the quality of stroke assessment by paramedics change by day of the week, time of day, or distance from hospital?

No.

What is the effect on the new A&E system in Northumbria on stroke care?

The data suggest that there will be no change in the stroke given, although the average transport time to hospital will increase by approximately 4 minutes.

Which populations will be most affected by the change?

This depends upon the distribution of the population. People who live north of Wansbeck or west of Hexham are will see an increase in transport distance and possibly times. 90% of patients who were transported to Hexham would now travel further. while those who live in north Newcastle and around Cramlington will see a significant drop in their transport time.

Key References

- <https://www.northumbria.nhs.uk/emergency/>
- Diagnostic Accuracy of Stroke Referrals From Primary Care, Emergency Room Physicians, and Ambulance Staff Using the Face Arm Speech Test, Harbison et al, Stroke. 2003;34:71-76