Estimating Cost-Effectiveness of Centralizing Acute Stroke Care Using Linked Observational Data

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BACKGROUND
- Previous studies demonstrated that centralizing acute stroke treatment increases the chance of treatment and lowers costs from onset to treatment compared to care at community hospitals.¹ ²
- Thus far studies investigating cost-effectiveness use aggregated data/simulated cohorts, thereby limiting external validity of results.

OBJECTIVE
This study aimed to estimate cost-effectiveness of centralizing acute stroke care in the Northern Netherlands using linked observational data.

METHOD
- Stroke care systems differed statistically significantly on the factors gender, age, mode of referral, and stroke severity on arrival.
- Differences between the systems were estimated parametrically and using propensity score matching.³
- Additionally we altered assumptions underlying cost derivation after hospital discharge, since this part was not observed.

Method 1: Ordinary least squares (N = 1,047)
Method 2: Propensity score matching (N = 1,047)

PATIENT LEVEL DATA
- In the North of the Netherlands a centralized and decentralized acute stroke system co-exist (Figure 1).
- This study uses observational data from 267 and 780 patients in a centralized and decentralized system, respectively.
- The original dataset was linked to the hospital information system to estimate actual healthcare costs and EuroQol-5D questionnaire (EQ5D) utility values up to three months post stroke.

Figure 1. Organizational structure in the North of the Netherlands

RESULTS
- Mean healthcare costs up to three months were $US 7,980 (CI, 6,693 – 8,996) for the centralized system compared to $US 9,523 (CI, 8,923 – 10,123) for the decentralized system (P = 0.01).
- The mean EQ5D utility value at three months was 0.65 (CI, 0.63 – 0.67) for the decentralized system and 0.69 (CI, 0.65 – 0.73) for the centralized system (P = 0.06).
- The dominant effect remains stable after correcting for differences in systems and altering assumptions underlying cost derivation.

DISCUSSION
- The results are mainly determined by the differences in patient health, as measured with mRS scores, in both stroke care systems.
- Due to an ageing population expanding centralized systems to other hospitals and regions appears to provide great potential for economic value as well as patient value.
- Females have higher healthcare cost and lower health after three months, mainly driven by cost after hospital discharge (P = 0.007).

CONCLUSION
- In a real world setting a centralized system for acute stroke care appeared both cost-saving and yields better health outcomes.
- These results provide a strong societal rationale for centralization of acute stroke care systems.
- Furthermore, this study illustrates that re-organizing healthcare can improve patient outcomes even before onset of disease.