Socioeconomic variation in stroke: What have we learnt in Sweden

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Stroke in Sweden

- Around 25,000 to 30,000 patients have a stroke in Sweden each year.

- About 8,000-12,000 patients have a TIA

- Stroke is one of the most costly diseases to the community

- The total estimated cost to the society has been estimated to SEK 18 billions (€ 2 billions) per year in Sweden.
Stroke care in Sweden

• 72 hospitals admit acute stroke patients

• Publicly financed healthcare

• Prescribed drugs are subsidised > 220 SEK (£200)
The Swedish Stroke Register, Riksstroke

- Support high and consistent quality of care for stroke patients throughout Sweden, ultimately to ensure patient benefit in the form of the best possible care

- Provide a database for research on stroke management and outcomes in routine clinical settings

- Riksstroke is also an instrument for following up the National Board of Health and Welfares guidelines for stroke care.

- Riksstroke is a tool for continuous quality improvement of stroke care
Riksstroke - background

- Riksstroke was established in 1994
- All Swedish hospitals admitting acute stroke patients participate from 1998 (currently 72 hospitals)
- 500,000 stroke events (I61, I63, I64) recorded since start
- 23,000 stroke events/year are recorded in the Riksstroke database
- TIA since 2010, ~8000 per year (recent years)
- Riksstroke is sponsored from the Swedish Government and the Swedish Society and the Federation of Swedish County Councils
Collection of information

For each individual patient, a case record is used to collect data:

- **In the acute phase**
  (from before onset, during the hospital stay and at discharge)

- For a **3-months follow-up** by questionnaire

- For a **12-months follow-up** by questionnaire

The recorded data is transferred by Internet to the [ICT Services and System Development (ITS)](https://www.its.umea.se) At Umeå University

High coverage and validity
Some of the indicators collected by Riksstroke

**Background data**
- Living conditions (at home, in institution)
- Marital/cohabitant status
- Primary ADL functions before stroke
- Previous stroke
- Co-morbidity
- Smoking
- Level of consciousness on admission, NIHSS
- Time to arrival in hospital

**Process indicators**
- Admission to stroke unit
- Diagnostic procedures
- Thrombolysis
- Oral anticoagulants
- Other antithrombotic therapy
- Antihypertensive therapy
- Statins
- Access to rehabilitation after discharge
- Length of hospital stay

**Outcome indicators**
- Medical complications during hospital stay
- Discharge status
- Survival at 3 months
- Living conditions at 3 and 12 months
- ADL dependency at 3 and 12 months
- Support by next-of-kin at 3 and 12 months
- Patient satisfaction with hospital stay and rehabilitation after discharge
- Low mood at 3 and 12 months
- Perceived general health at 3 and 12 months
- Satisfaction with community care at 12 months
Open comparisons of quality indicators

www.Riksstroke.org

Västerbotten

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- High target level
- Moderate level
- < Moderate

- A. Täckningsgrad (hög 92%; måttlig 85%)
- B. Uppföljda 3 månader efter stroke (hög 90%; måttlig 85%)
- C. Vårdade på strokeenhet, IVA eller neurokirurgisk klinik (hög 90%; måttlig 85%)
- D. Direktintag på strokeenhet, IVA eller neurokirurgisk klinik (hög 90%; måttlig 80%)
- E. Svällningsförmåga undersökt (hög 95%; måttlig 90%)
- F. Reperfusionsbehandlade, 18-80 år (hög 15%; måttlig 10%)
- G. Tid från ankomst till sjukhus till trombolytstart (hög 40 min; måttlig 60 min.)
- H. Tromboeythämmande behandling efter hjärnfarkt utan förmögenhet att använda trombolytika (hög 50%; måttlig 85%)
- I. Antikoagulantieberedning efter kardioembolisk hjärnfarkt; <80 år (hög 70%; måttlig 95%)
- J. Blodtryckssenkande behandling efter stroke (hög 80%; måttlig 70%)
- K. Statinbehandling efter hjärnfarkt (hög 75%; måttlig 65%)
- L. Fullt tillgodosedd behov av hjälp och stöd efter utskrivning (hög 75%; måttlig 60%)
- M. Uppföljningsbesök i öppenvård, hos läkare och/eller sjuksköterska (hög 90%; måttlig 80%)

© Behandlingen centraliserad till annat sjukhus
Analysis and feedback

• Annual reports on stroke acute phase, TIA acute phase, 3 months follow up, 1 year follow up

• Additional ad hoc reports e.g. structure of stroke care, opinions of carers

• Dashboard with online presentation of hospital’s own data compared with national data

• Participating hospitals may subscribe to data in the form of tables and charts, as well as time series continuous on-line

All reports are posted on the Riksstroke website [www.Riksstroke.org](http://www.Riksstroke.org)
EqualStroke: Inequities in stroke care and outcome

Socioeconomic differences (age, sex and regional differences)

“The objective of the healthcare system is to provide good health and good care on equal terms to the whole population.”

The Health and Medical Service Act.
SFS 1997:142.
Individually linked data from national registers

- Stroke events
- Patient characteristics (incl. living alone)
- Acute care
- Secondary prevention
- Patient-reported outcome

- Hospital admissions
- Date and cause of death
- Dispensed drugs

- Education
- Income
- Country of birth
Acute care
Dissemination of stroke thrombolysis

- acute treatment of ischemic stroke
- approved by the regulatory authority in Sweden 2003
- administered within 4.5h from onset
- requires considerable organizational changes

2003: 3 counties >2%
2008: all counties >2%

Proportion of patients treated with thrombolysis:
- <2%
- 2% - 4.9%
- 5% - 9%
- >9%
Reperfusion rates 2015

- National average: 14% (18-80 years)
- Still marked regional differences!
- 3-fold difference between counties with lowest/highest rates
Stroke thrombolysis and education

Patients with lower education have less access to reperfusion therapy

Possible explanations:
• Distance to hospital
• Patient awareness of symptoms
• Discrimination
Stroke unit care

• Socioeconomic differences during the implementation phase has diminished

Secondary prevention
Secondary prevention, statins

- Prescription of statins increased 2004-2009. Social differences during implementation
Outcome
Suicide incidence per 100,000 person years (adult Swedish population)
Suicides 1 year after stroke per 100 000 person years

Socioeconomic position and risk of post-stroke suicide attempt (adjusted for sex and age)
Survival and SES

Cox regression survival curves in 18- to 74-year-old stroke patients. Adjusted for age, gender, stroke severity, and stroke subtype. Separate lines for different education groups.

Education and differences in stroke care and outcome

Adjusted for:
- age&sex
- living condition
- comorbidities
- stroke severity,
- type of hospital

Eriksson M, et al. Läkartidningen. 2015;112
Patients with high income (highest tertile) have:

- Higher probability of secondary prevention (statins, and AC)
- Lower probability of attempted suicide
- Better survival
- Higher probability to return to work
Patients born outside Europe have

- Higher probability of statins, but lower probability of AC
- Lower risk of attempted suicide
- Lower survival
- Lower probability to return to work
Summary

• Even in a country like Sweden, where socioeconomic differences are relatively small, and where the majority of health care is publicly financed we observe social inequalities in stroke care and outcome.

• Acute and secondary prevention interventions and prognosis are better in patients with a high compared with a low level of education, better in people with high than low income, better in people who are cohabitant than single. As to country of birth, a more complex pattern has emerged.

• The socioeconomic gradients remain after adjustment for multiple potential confounders, leaving the possibility that there is an element of unconscious discrimination in stroke care.