Economic burden of stroke and the impact of recurrence across Europe

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Background & aims

Stroke impacts the whole of the economy, and its costs are societal

- Health, social, and informal (unpaid) care; as well as labour market costs

Previous studies on burden limited to Western Europe/EU, not Europe-wide

The cost impact of recurrent stroke following initial TIA or stroke is unknown

Our **aims** are therefore to:

- Estimate the economic cost of stroke across 36 European countries
- Estimate the proportion of these costs due to stroke recurrence

Methodology

Costs of stroke in Europe

Study includes 36 countries in mainland

Societal perspective: health, social, & unpaid care; and productivity losses

All costs incurred in 2022

Data sources include: https://academic.oup.com/eurheartj/article/44/45/4752/7251239

- Global Burden of Disease
- International organisations: EUROSTAT & OECD
- National ministries, statistical institutes, & regional governments
- Previously published studies

Costs of recurrent stroke following initial TIA

Stroke risk associated with previous TIA were estimated from OXVASC

- Using 879 controls naïve to TIA/stroke and 2,500 TIA patients
- Relative risks (**RR**) were adjusted for comorbidities & socioeconomic status

Age- & sex-specific prevalence of previous TIA (p_x) in stroke cases

- Estimated using multivariable logistic regression in 3,790 stroke patients

For each age- & sex- category, estimated population attributable factors

- **PAF = p_x(RR-1)/RR**; & applied to age- & sex- country costs of stroke

Costs of recurrent stroke following initial stroke

OXVASC longitudinal data were used to estimate:

- Healthcare, social care & societal costs

Regression models adjusted for:

- Follow-up time, recurrent vascular events, age, sex & comorbidity

Costs were predicted under an observed scenario & a counterfactual

- Counterfactual scenario: no recurrent stroke

For each cost category, age- and sex-specific attributable fractions estimated:

- AF = (Observed – Counterfactual) / Observed
- AFs applied to corresponding age- & sex-specific costs

Results

Stroke cost Europe **€92 billion** in 2022

Stroke accounted for **2.2%** of total **health-related expenditure**

	Stroke costs
Healthcare	€21 bn
Social care	€27 bn
Informal care	€32 bn
Morbidity losses	€4 bn
Mortality losses	€8 bn
TOTAL costs	€92 bn

To allow for comparisons:

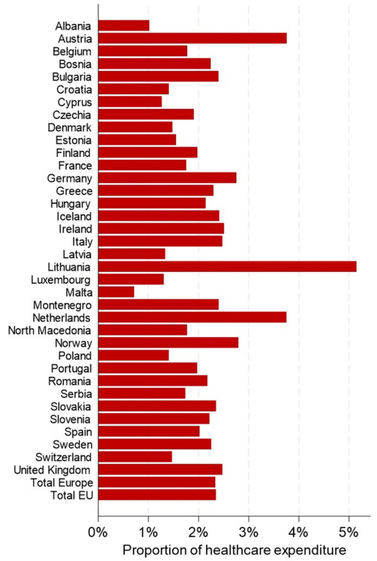
- Costs divided by population
- Adjusted for price differentials

Stroke cost Europe:

€173 per citizen

Substantial country disparity

- Albania €34
- Austria €323



Recurrent stroke cost Europe **€18 billion** in 2022

	Total costs	Stroke following initial TIA	Stroke following initial stroke
Healthcare	€4.6 bn	€2.7 bn	€2.0 bn
Social care	€5.9 bn	€4.8 bn	€1.1 bn
Informal care	€5.1 bn	€5.1 bn	€0
Morbidity losses	€0.6 bn	€0.4 bn	€0.2 bn
Mortality losses	€1.5 bn	€0.6 bn	€1.0 bn
TOTAL costs*	€17.8 bn	€13.6 bn	€4.1 bn

Recurrence following initial stroke had no impact on informal care (p=0.48)

Costs of stroke ranged from:

- €4.6 million in Montenegro
- €4.8 billion in Germany

Of the €92 billion in stroke costs, approximately 20% due to recurrent stroke

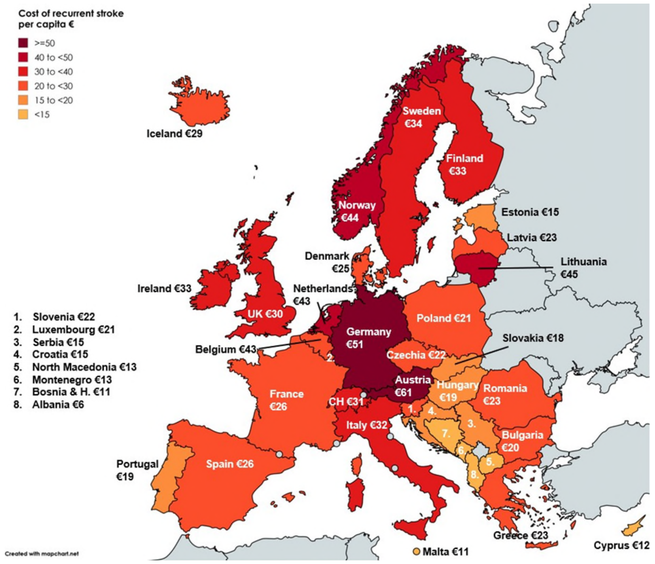
- Proportion lowest in North Macedonia (16%)
- Proportion highest in Switzerland (22%)

To allow for comparisons, total costs of recurrent stroke:

- Divided by population; and adjusted for price differentials

Overall, recurrent stroke cost each citizen in Europe €33 per annum

- Ranging from €6 in Albania to €61 in Austria



Conclusions

Stroke cost Europe €92 billion in 2022, accounting for:

- 2.2% of total health-related expenditure
- €173 per citizen in Europe

Of this cost, a fifth (€18 billion) was due to recurrent stroke

In the EU, recurrent stroke cost €14 billion

- For context, this equates to over 7 years of the EU's humanitarian aid budget

Recurrent stroke increases overall societal costs

- Health, social, and informal (unpaid) care as well as labour market costs

Intensive secondary prevention can therefore substantially reduce costs

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