



NATIONAL INSTITUTE FOR HEALTH AND WELFARE

The relationship between quality of care and hospital costs in Europe

Unto Häkkinen and EuroDRG teams in Finland, France, Germany, Spain and Sweden

Motivations

- Not much information on quality between countries and hospitals
- An important policy question: are costs and quality related to each other
 - If there is a positive correlation=> better quality can be provided only by increasing costs
 - If there is a non positive correlation => potential for improving performance by containing costs with no reduction in quality or improving quality without increasing costs



Aims

- To compare quality of hospital care using patient level data in treating of two important diseases (AMI and Stroke) in five European countries
- To examine whether cost-quality trade-off exists by comparing hospital level costs and survival rates
- To analyse whether hospitals which perform well in terms of cost or quality in treating one patient group (AMI) are performing well also in treating another patient group (Stroke)



Data

- Patient level data of hospital discharges linked with cost information collected for EuroDRG project from Finland, France, Germany, Spain and Sweden



AMI episodes

Hospital inpatient admission due to AMI (ICD-10: I21-I22) as main diagnosis

Excluded, if:

- bypass surgery
- LoS = 0
- LoS = 1 and patient transferred to another hospital
- Cost outlier (with a bilateral trim based on 3 times the standard deviation of the cost distribution)
- In a hospital with less than 50 cases



Stroke episodes

Hospital inpatient admission due to stroke (I61, I63 or I64 as main diagnosis)

Excluded, if:

- LoS = 0
- LoS = 1 and patient transferred to another hospital
- Cost outlier (with a bilateral trim based on 3 times the standard deviation of the cost distribution)
- In a hospital with less than 50 cases



Description of AMI samples

			Cost/patient (€)			Length of stay			In hospital mortality %		
Country	Number of cases	Number of hospitals	Average	Min	Max	Average	Min	Max	Average	Min	Max
			hospital			hospital			hospital		
Finland	1253	5	4684	2118	5826	5,5	4,6	5,7	6,4	5,2	11,7
France	8415	38	5197	2961	8010	6,0	3,5	8,1	4,9	1,2	16,9
Germany	5159	18	4274	2844	5411	8,3	5,1	15,1	11,8	1,2	23,5
Spain	2781	6	6705	2140	7334	7,7	5,9	10,5	6,7	4,6	16,6
Sweden	15305	33	5113*	2110*	7310*	5,5	4,3	7,3	7,1	3,3	13,5

*transferred to € using exchange rate



Description of stroke samples

			Cost/patient (€)			Length of stay (days)			In-hospital mortality (%)		
Country	Number of cases	Number of hospitals	Average	Min hospital	Max hospital	Average	Min hospital	Max hospital	Average	Min hospital	Max hospital
Finland	2237	5	5 048	2 647	5 389	8,6	5,8	10,1	6,9	5,7	9,8
France	8919	32	5 660	2 946	8 500	12,5	6,9	17,6	15,1	7,4	27,6
Germany	7754	16	4 442	2 742	6 217	12,0	9,5	18,3	12,7	6,5	31,0
Spain	3785	8	4 127	2 582	5 365	9,0	6,5	10,2	12,9	7,5	16,0
Sweden	15680	33	6159*	3 851	9 592	11,4	6,1	17,6	11,5	3,8	18,9





Patient level variables used in estimations

- Age (classified)
- Gender
- Type of AMI/ stroke
- Total number of different diagnoses coded in medical records
- Patients transferred to the hospital from other institutions
- Patients discharged from the hospital to another institution
- Emergency, describing if patient admitted from emergency department, ward or similar institution as relevant in each country
- Two variables of Charlson index describing single non severe comorbidity, and two comorbidities and more (or one single severe one), respectively



Estimation strategy in practice

Quality: Fixed effects probit model for survival (discharged alive). Estimated from a pooled data

Cost: Fixed effects OLS for (log) cost, separate models for survived and deceased patients . Estimated separately for each country

Describing the results

- Quality (discharged alive from the hospital stay): marginal effects (probit model) of hospital dummy variables (effect coding). The marginal effects describes how many percent points the survival differs from the average survival of all hospitals
- Cost level: weighted fixed effects scaled to country average. The fixed effects describes how many per cents the cost differs from the country average

Quality and cost models will be examined with correlation diagrams



Quality

AMI

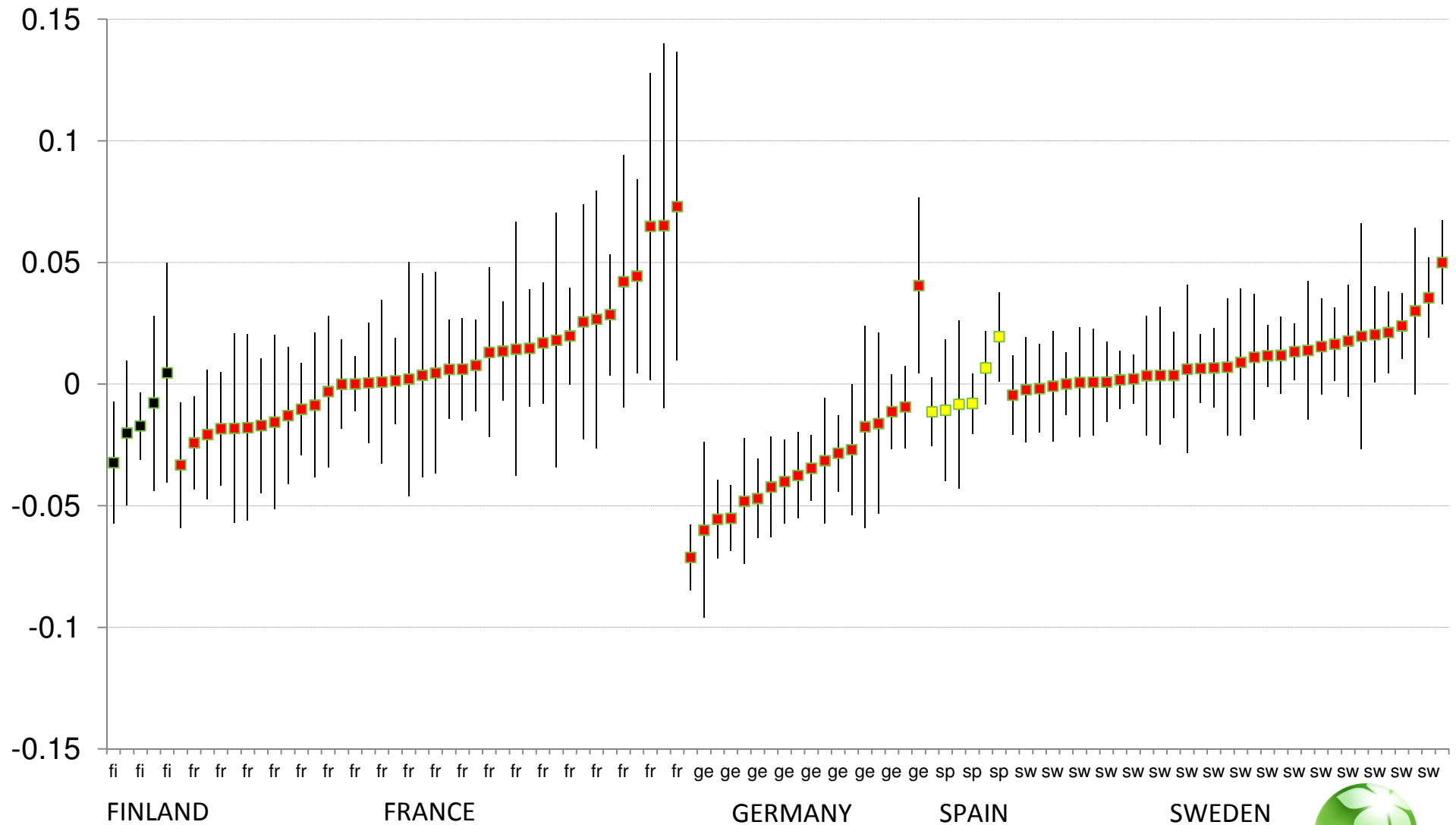
- the Swedish hospitals have the highest survival
- the German hospitals appear to perform poorly (survival 4 percentage points lower than in Sweden)

Stroke

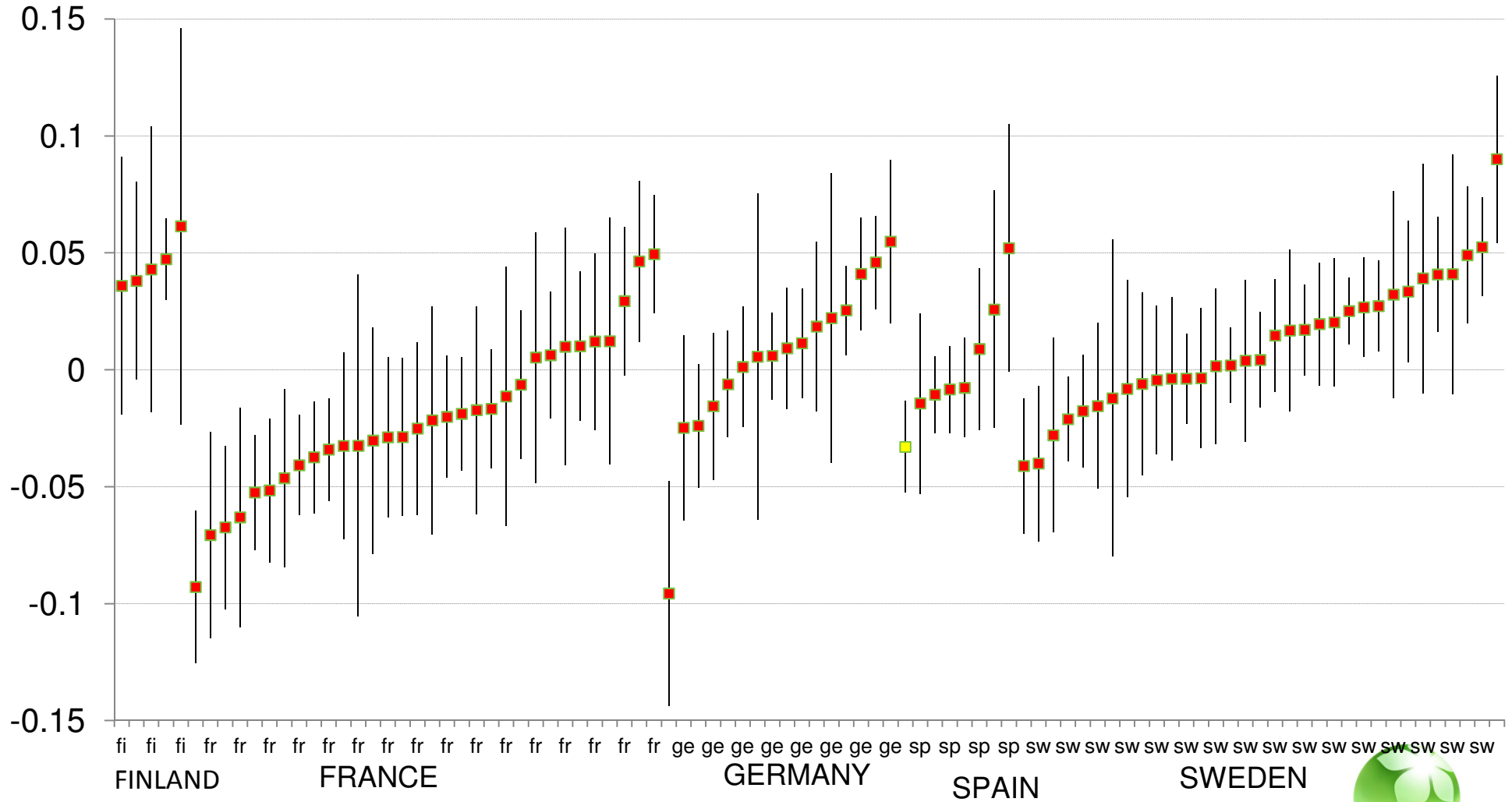
- quality seems to be high in the five Finnish hospitals
- French hospitals are performing quite poorly (survival 6 percentage points lower than in Finland)



Quality (discharged alive) of 100 European hospitals in care of AMI, marginal effects with confidence intervals



Quality (discharged alive) of 94 European hospitals in care of stroke, marginal effects with confidence intervals

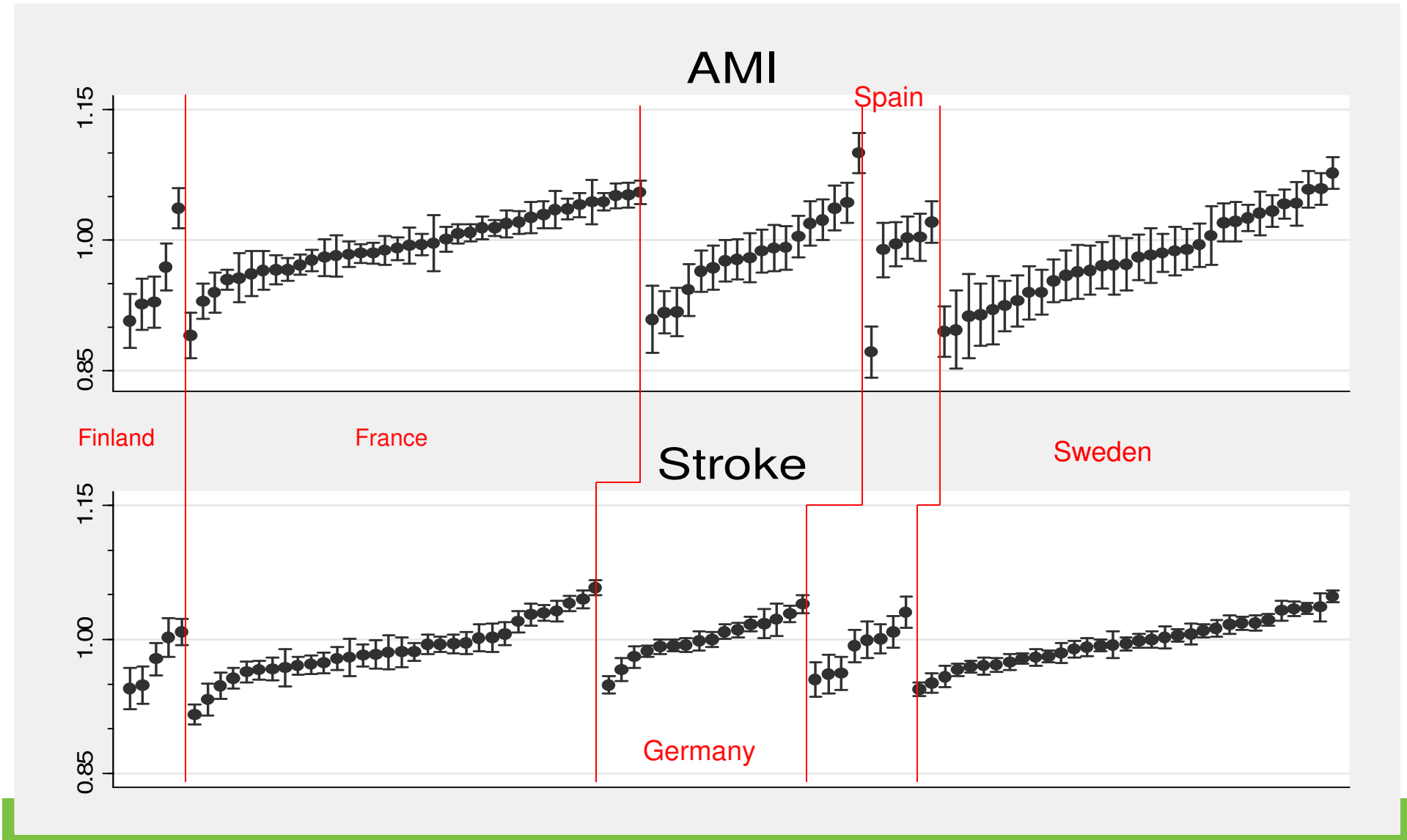


Cost

- The cost models were estimated separately for each country, since cost accounting methods varied between countries and we do not have data on price differences → we are not comparing cost between the countries
- Considerable variation exists between hospitals within countries. The variation is somewhat higher in the cost of AMI patients than cost of Stroke patients



Cost level and their confidence intervals in European hospitals . AMI and Stroke patients. Based on country and disease specific cost functions (country averages = 1).

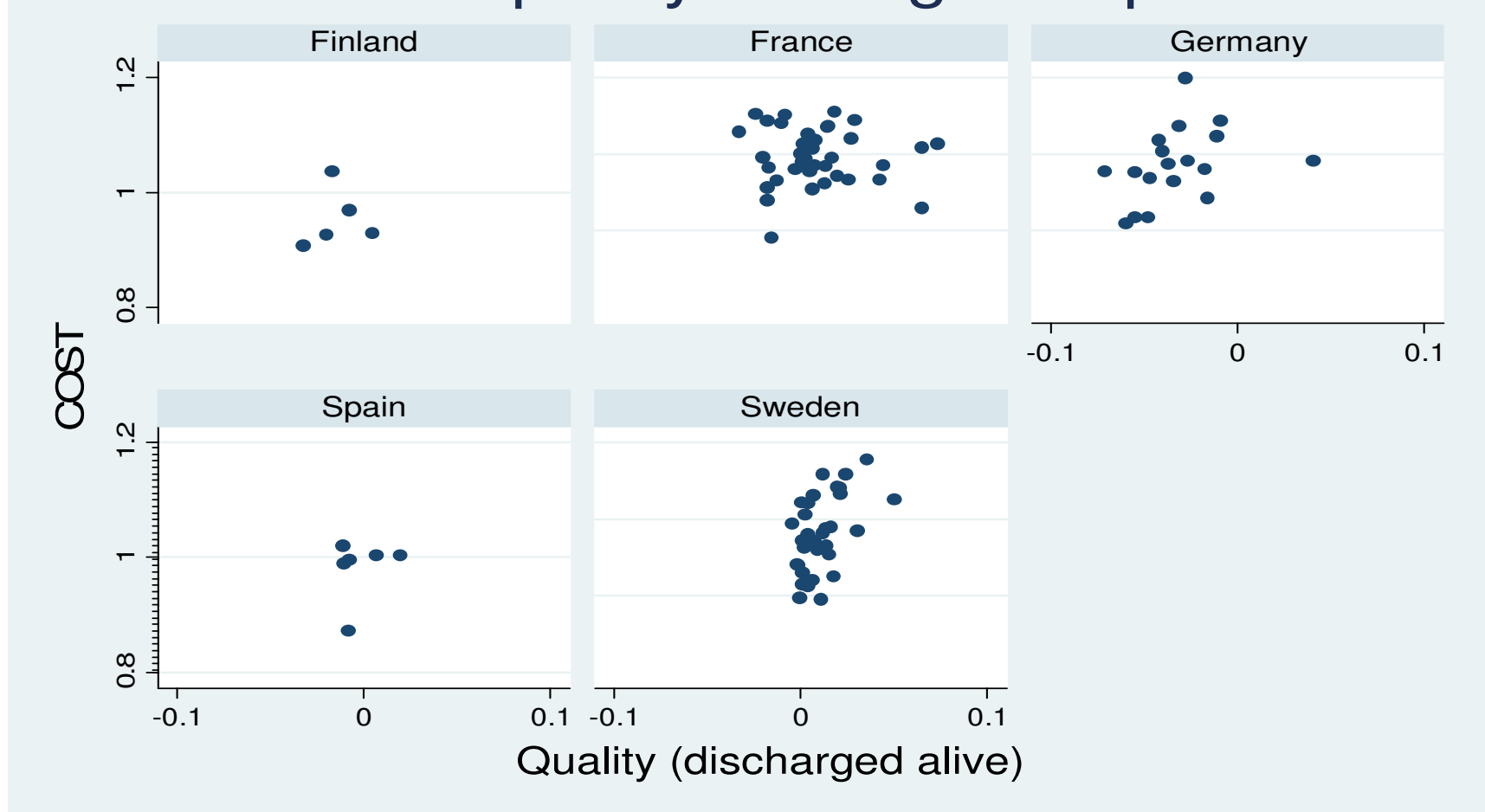


Relationship between quality and cost

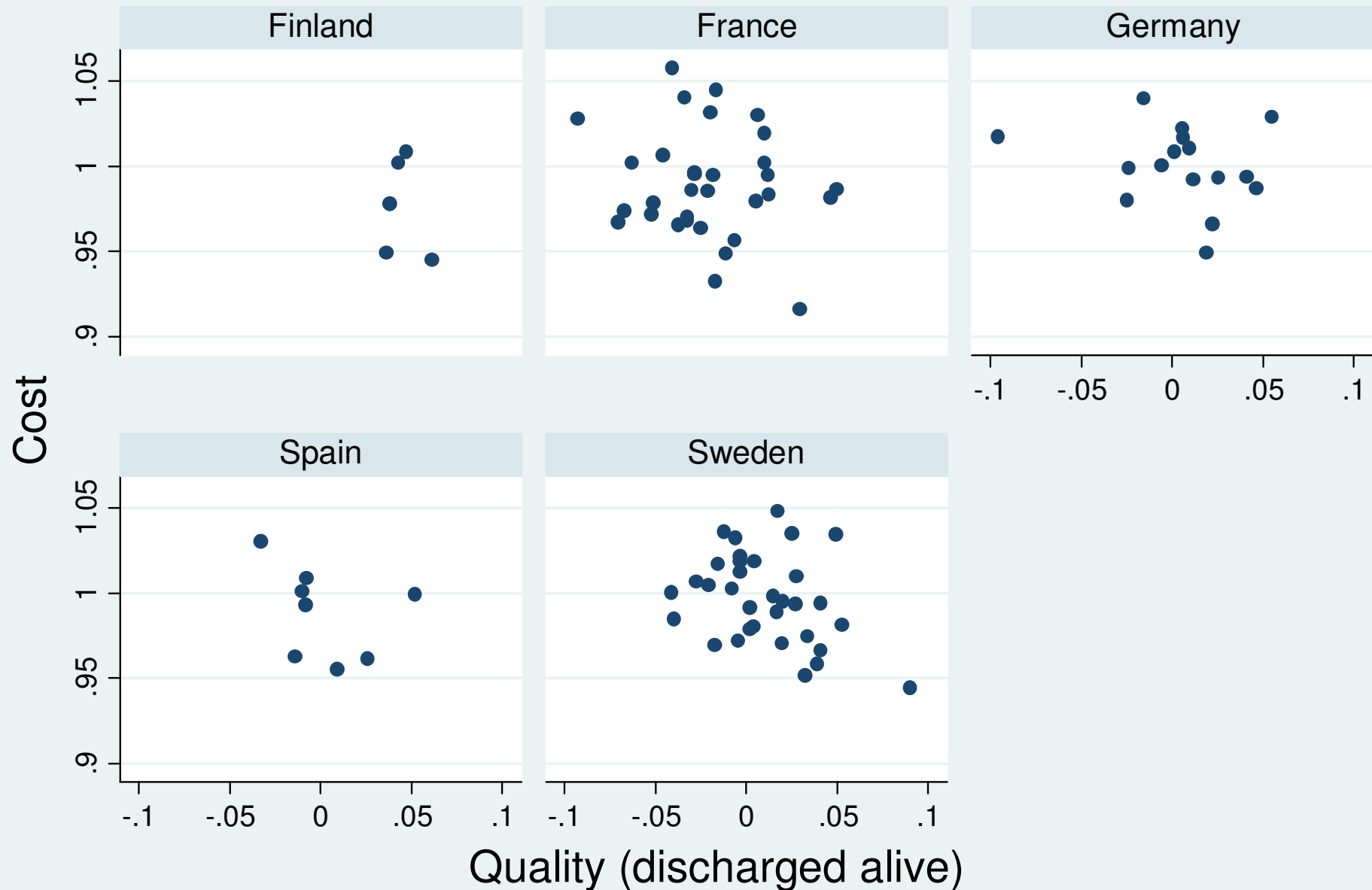
- Hospitals marginal effects of survival were plotted against hospital level fixed effects of costs
- Any clear cost/quality association could not be found.
- The only exception is the Swedish hospitals in treating AMI patients.



Cost and quality among AMI patients



Cost and quality of Stroke patients

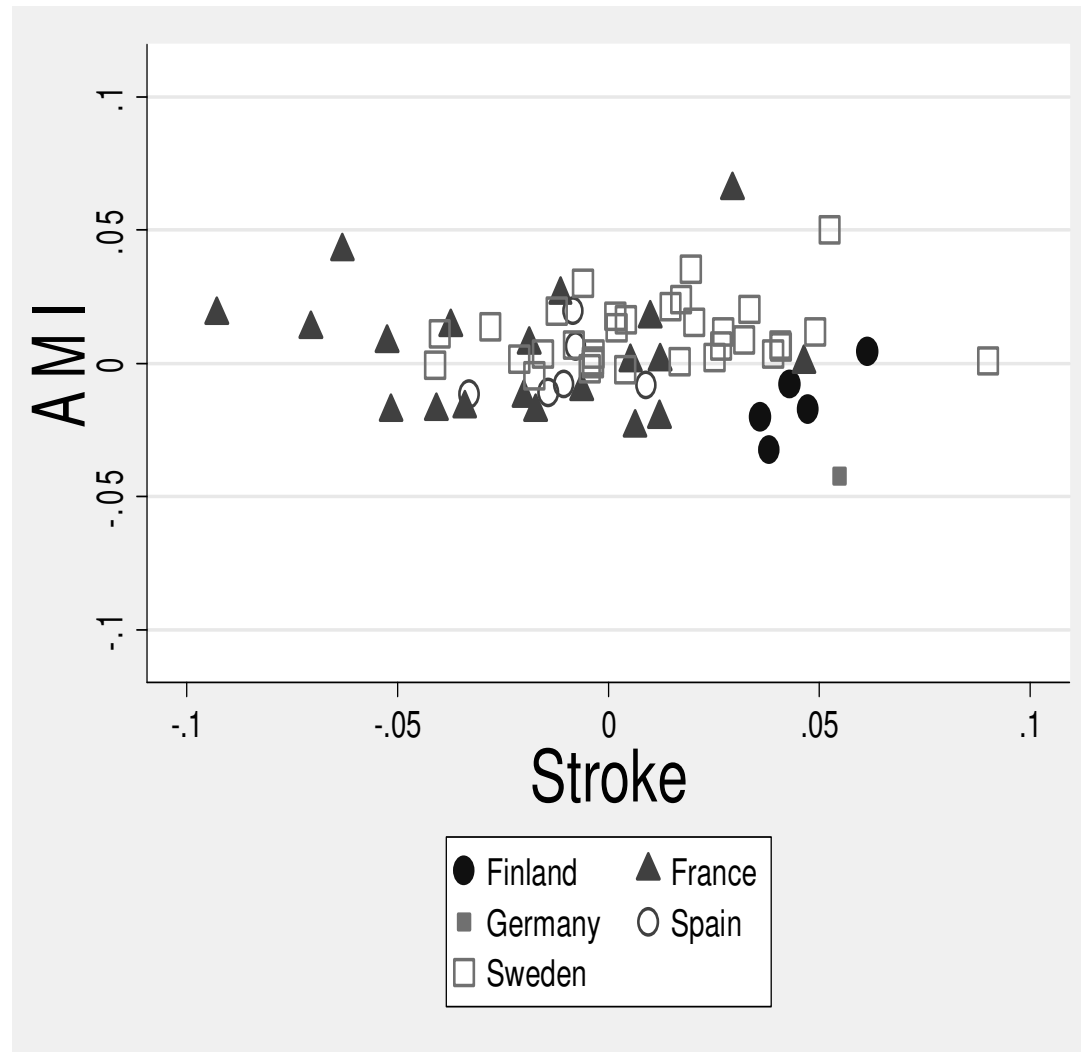


Cost and quality between the two diseases

- Marginal effects of survival of AMI patients plotted against the marginal effects of Stroke patients
 - no correlation between the hospital level qualities in treating the two disease, except in the five Finnish hospitals
- Cost level of AMI patients plotted against the cost level of Stroke patients
 - positive correlation in Finland, Spain and Sweden. In Sweden can be explained by teaching status of hospitals



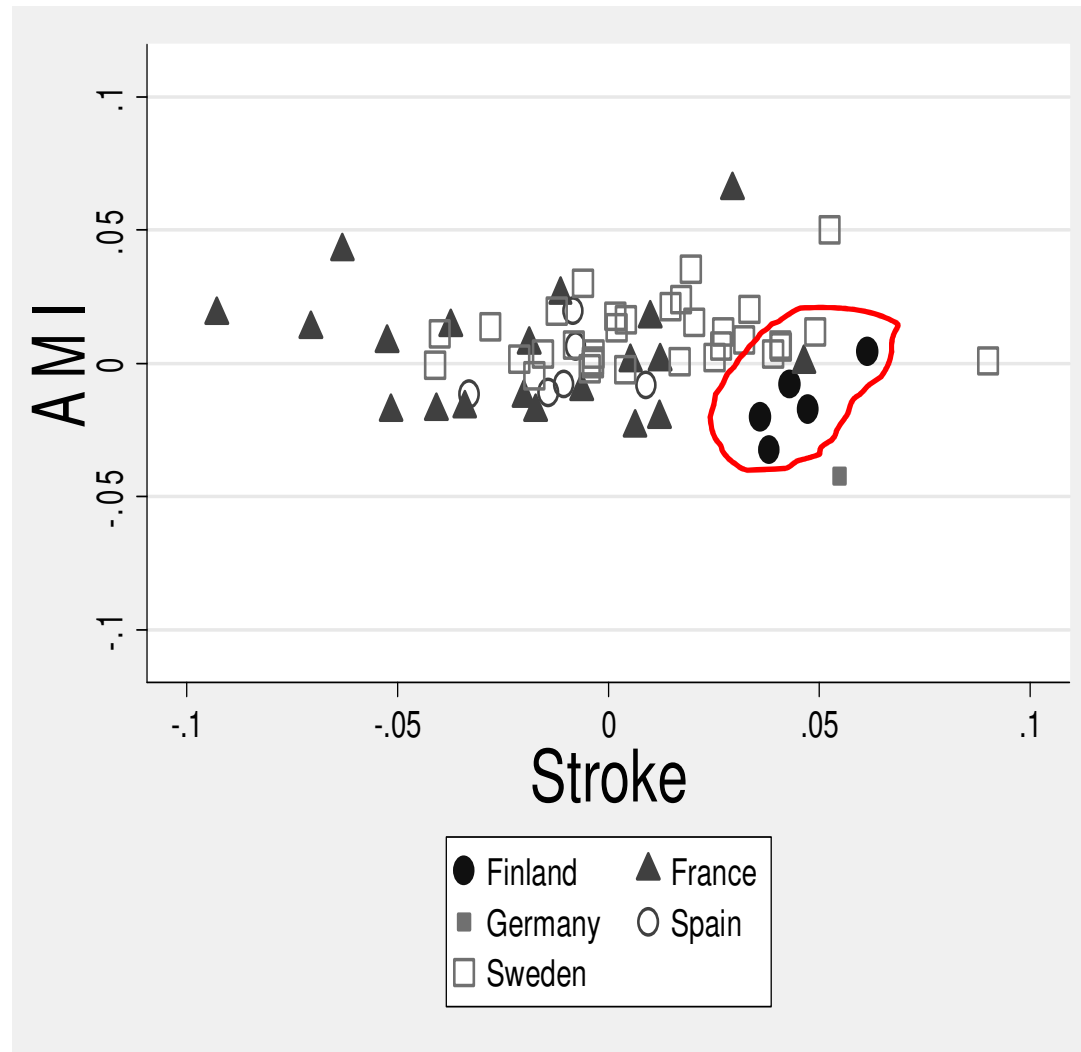
Quality in the care of AMI and Stroke patients in 65 European hospitals



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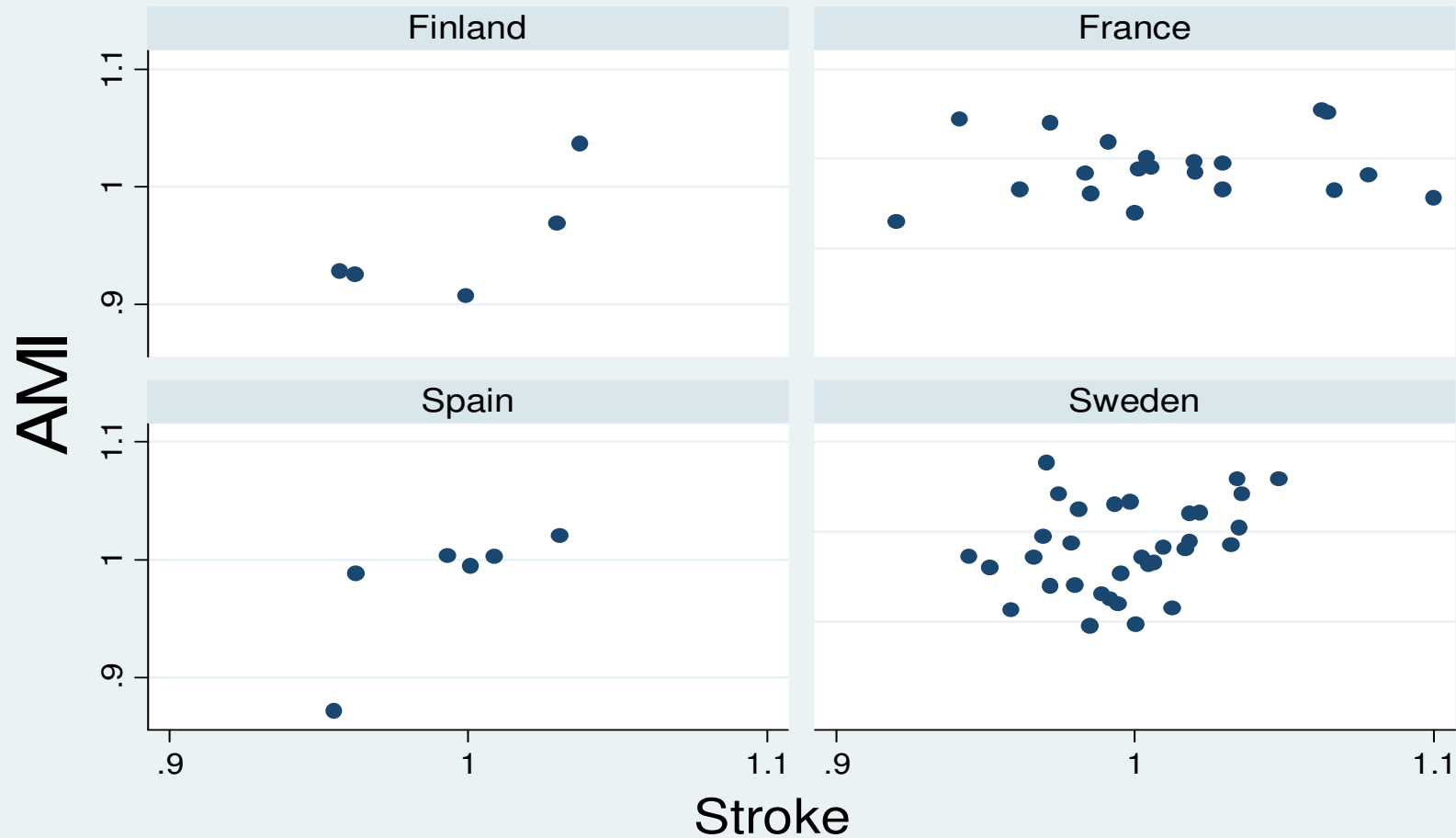
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Cost of AMI and Stroke patients by country



Conclusions

- Swedish hospitals perform better than hospitals in Germany, Finland and Spain in the care of AMI patients.
- The Finnish hospitals perform better in the care of stroke patients.
- No clear relation between cost and quality within countries
 - Potential for improving performance by containing cost or improving quality/outcome



Conclusion

- No correlation both at national as well as hospital level in quality of treating the two diseases
 - Using information quality on one specific health problem cannot be used as an only tracer to be generalized whole country or hospital level quality of care.
 - A comprehensive benchmarking requires performance information on many health conditions,



Limitations

The results only indicative:

- Not possible to follow patients for equally long times
- The risk adjustment crude: more information on co-morbidity and severity of patients
- Not possible to control patients previous use of services

These limitations will be handled in EuroHOPE project



EuroHOPE (European Health Care Outcomes, Performance and Efficiency)

- Considers five diseases (AMI, stroke, hip fracture, very-low- birth-weight infants and breast cancer) in seven countries (Finland, Norway, Sweden, Italy, Scotland, Hungary and Netherlands)
- Produce national, regional and hospital level performance information (including costs and outcomes) of the five diseases
- Compares cost and quality at hospital level in Nordic countries
- *First results in 25 September 2012 , Brussels, Belgium*

