

The EuroDRG project: comparing European casemix systems

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<http://www.eurodrg.eu/>

- Diagnosis-Related Groups in Europe: towards Efficiency and Quality
- Funded under 7th EU Framework Programme
- 3 year project: Jan 2009 - Dec 2011

- 11 countries

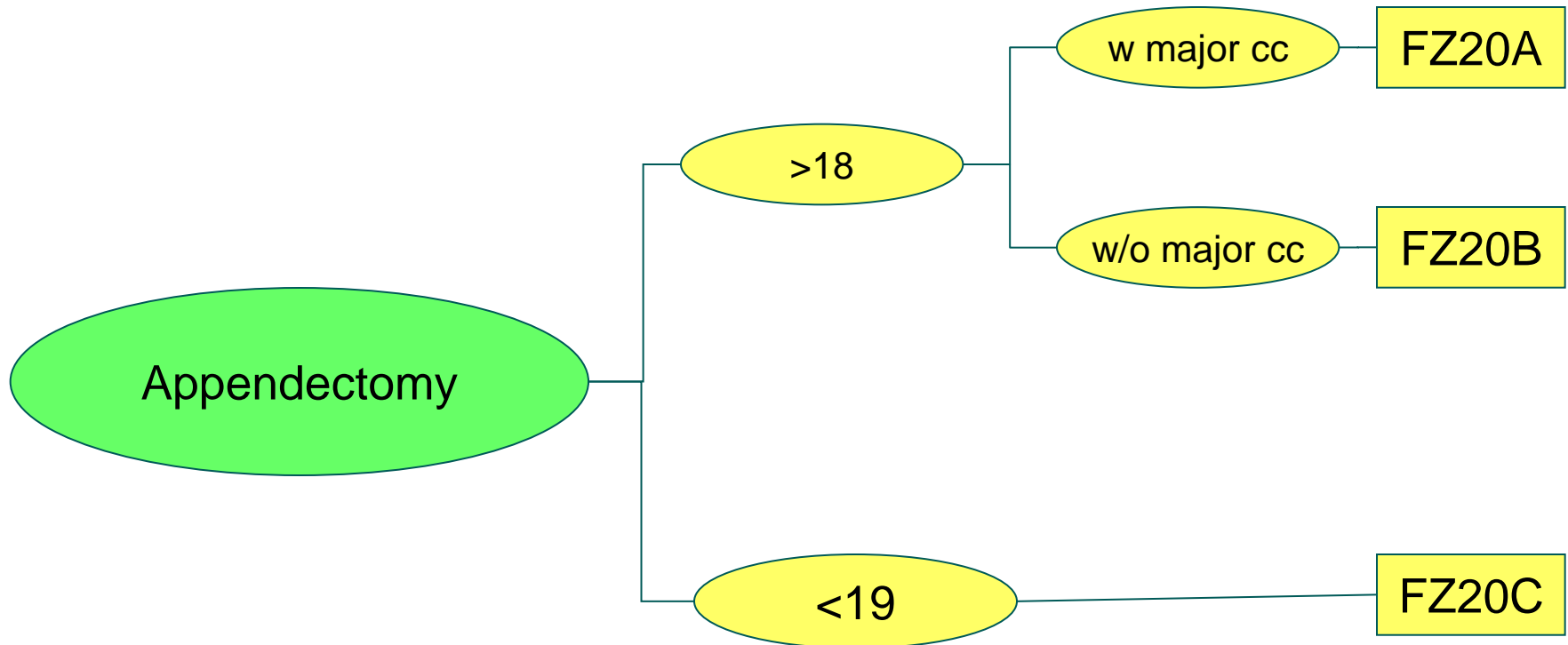
- Austria, England, Estonia, Finland, France, Germany, Ireland, Netherlands, Poland, Spain, Sweden

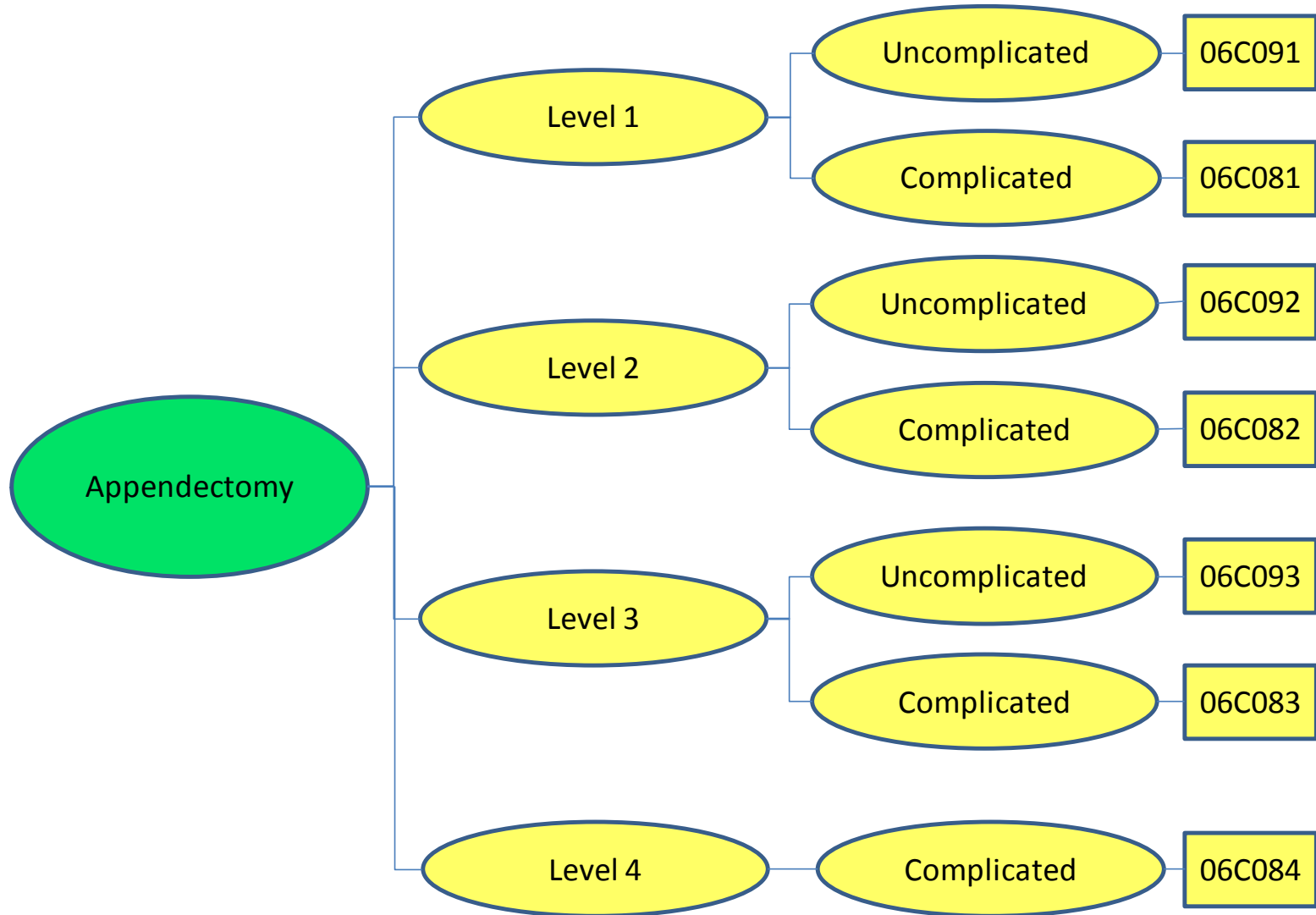
- 10 episodes of care

- AMI, appendectomy, breast cancer, CABG, childbirth, cholecystectomy, hernia, hip replacement, knee replacement, stroke

- Classification system for hospital patients
 - Different DRG systems across Europe
- Used to reimburse hospitals
 - Transparent funding with price set in advance
 - Equal pay for equal work: same price paid for all patients in the same DRG
- How well do these DRG systems perform?

- Why do costs/LoS vary for patients who are receiving the same treatment?
- How much of the variation is captured by:
 - The DRG to which they are allocated
 - Socio-demographic characteristics
 - Diagnostic characteristics and co-morbidities
 - Quality and adverse events
 - The hospital in which they are treated
- Do some DRG systems have greater explanatory power than others?





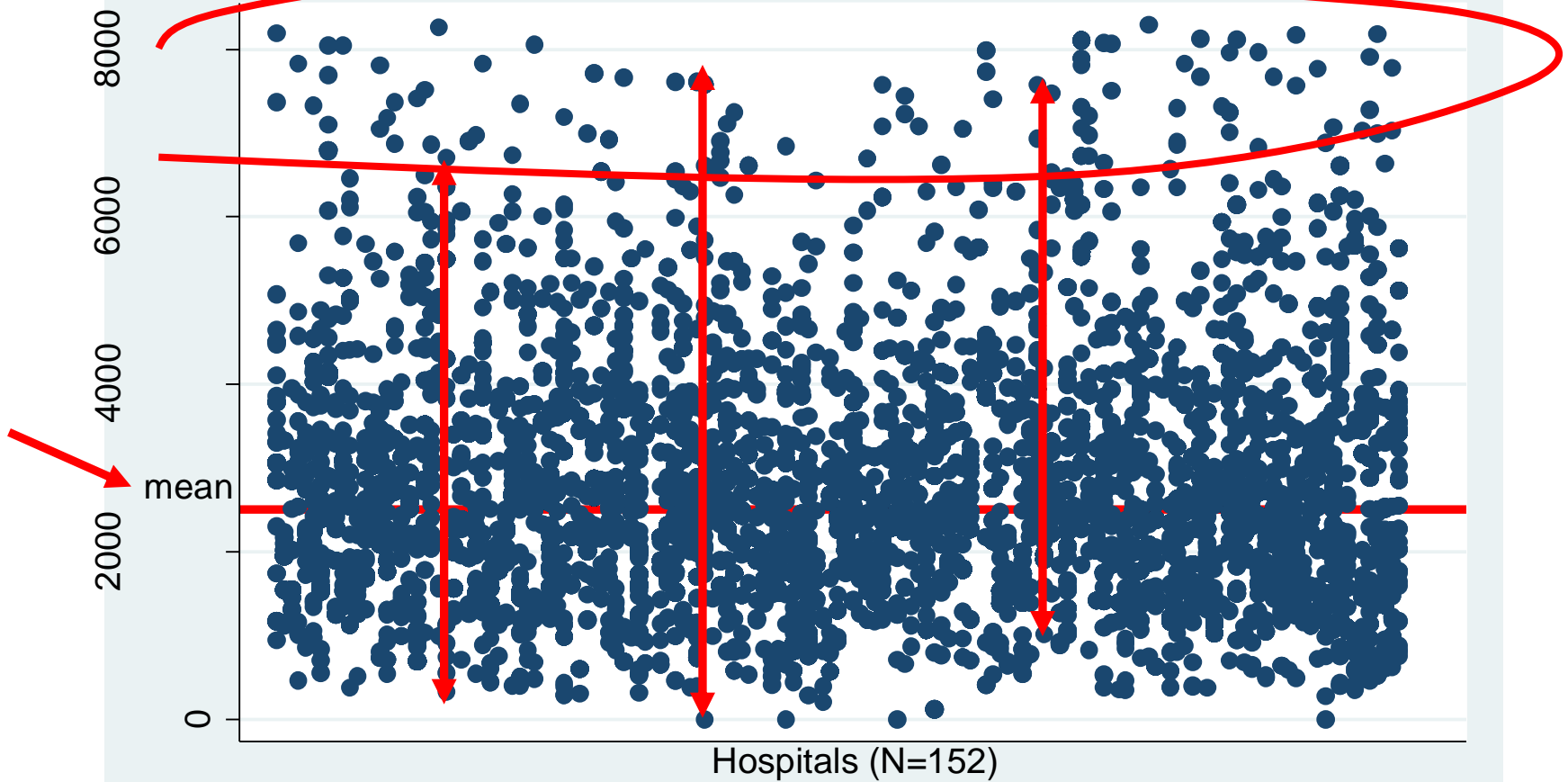
Country	Number of DRGs	Form of primary diagnosis	CCs	Age	LoS	Death
Poland	2	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
Ireland	2	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
Sweden	3	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
Austria	3	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
England	3	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
Finland	3	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
Estonia	4	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
Spain	6	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
France	8	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
Germany	11	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]

- Analysis of routine patient-level data
 - Costs or length of stay for patients having the particular episode of care
 - Diagnostic and treatment details for all these patients
- Analysis of the hospitals in which patients were treated

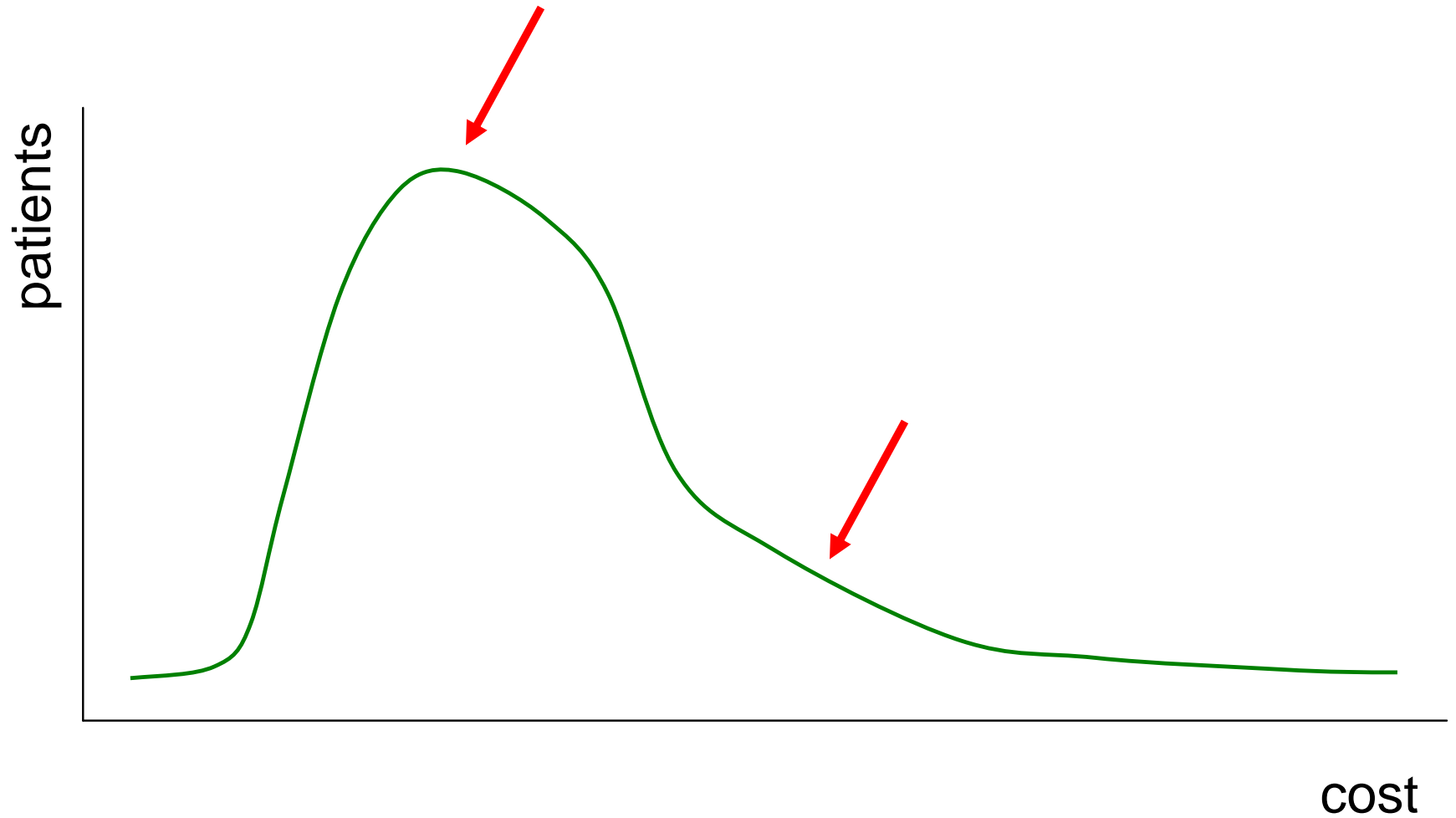
Country	Patients	Hospitals
Finland	1,480	5
→ Spain	1,814	8
Estonia	2,113	18
→ Germany	2,451	22
Sweden	5,609	29
Ireland	5,813	37
→ France	9,948	82
Austria	13,202	112
Poland	31,105	475
England	33,394	151

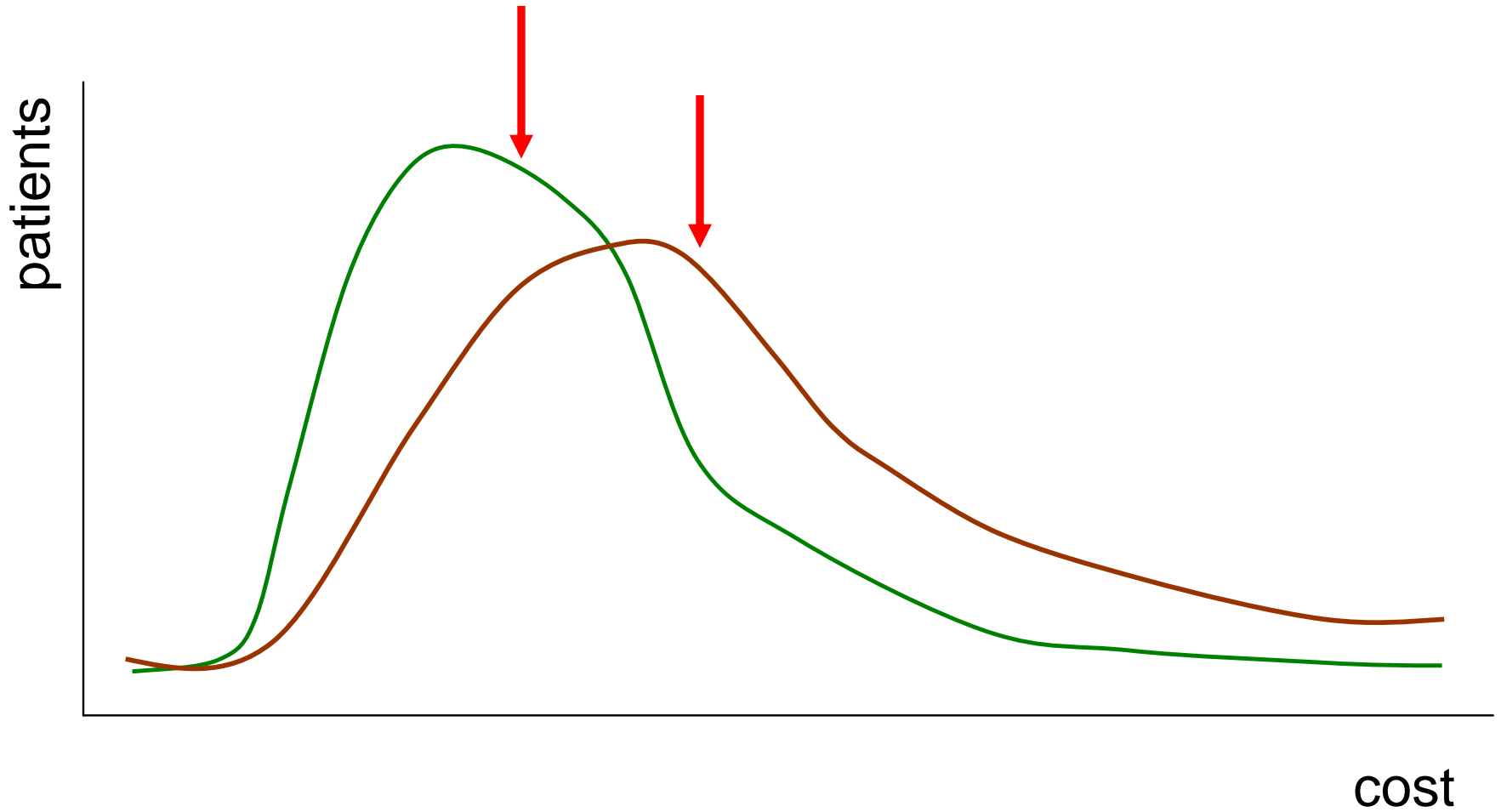
Patient costs: variation within and across hospitals

Appendectomy patients: England (2007/8)



Source: *Hospital Episode Statistics, 2007/8*





- Why do some patients have different costs than others?

$$\ln c_{ij} = \alpha + \beta^d d_{ij}^d + \beta^p x_{ij}^p + u_j + \varepsilon_{ij}$$

Log cost patient i in hospital j

DRGs

Patient characteristics

Hospital effect

- Are DRGs better than patient characteristics at explaining costs?

- Age and gender
- Whether transferred to/from hospital
- Type of admission (emergency)
- Counts of diagnoses and procedures
- Specific diagnoses and procedures
- Charlson and other co-morbidities
- OECD Patient safety indicators
- Urinary tract and wound infections
- Discharged dead or alive

- LoS are “count” data
- Estimate Poisson or Negbin models
- Include same patient characteristics as for cost equation
- Extract hospital effect by introducing dummy variable for each hospital

- Why is the average cost/LoS of treating patients in one hospital higher than in another?

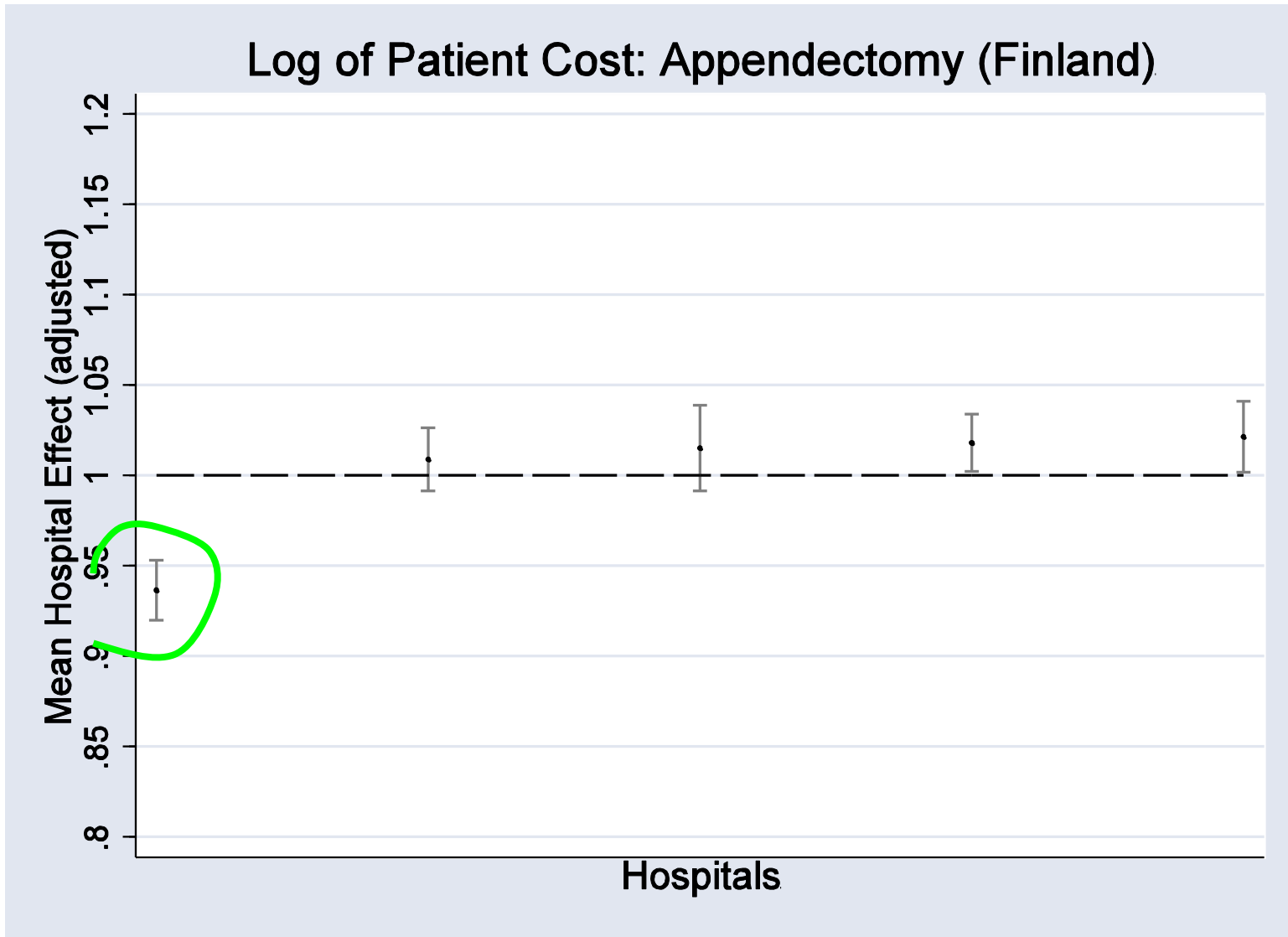
$$\hat{u}_j = \alpha_o + \sum_{m=1}^M \gamma_m z_j + \mu_j$$

↑
Estimated
hospital
effect for
hospital j

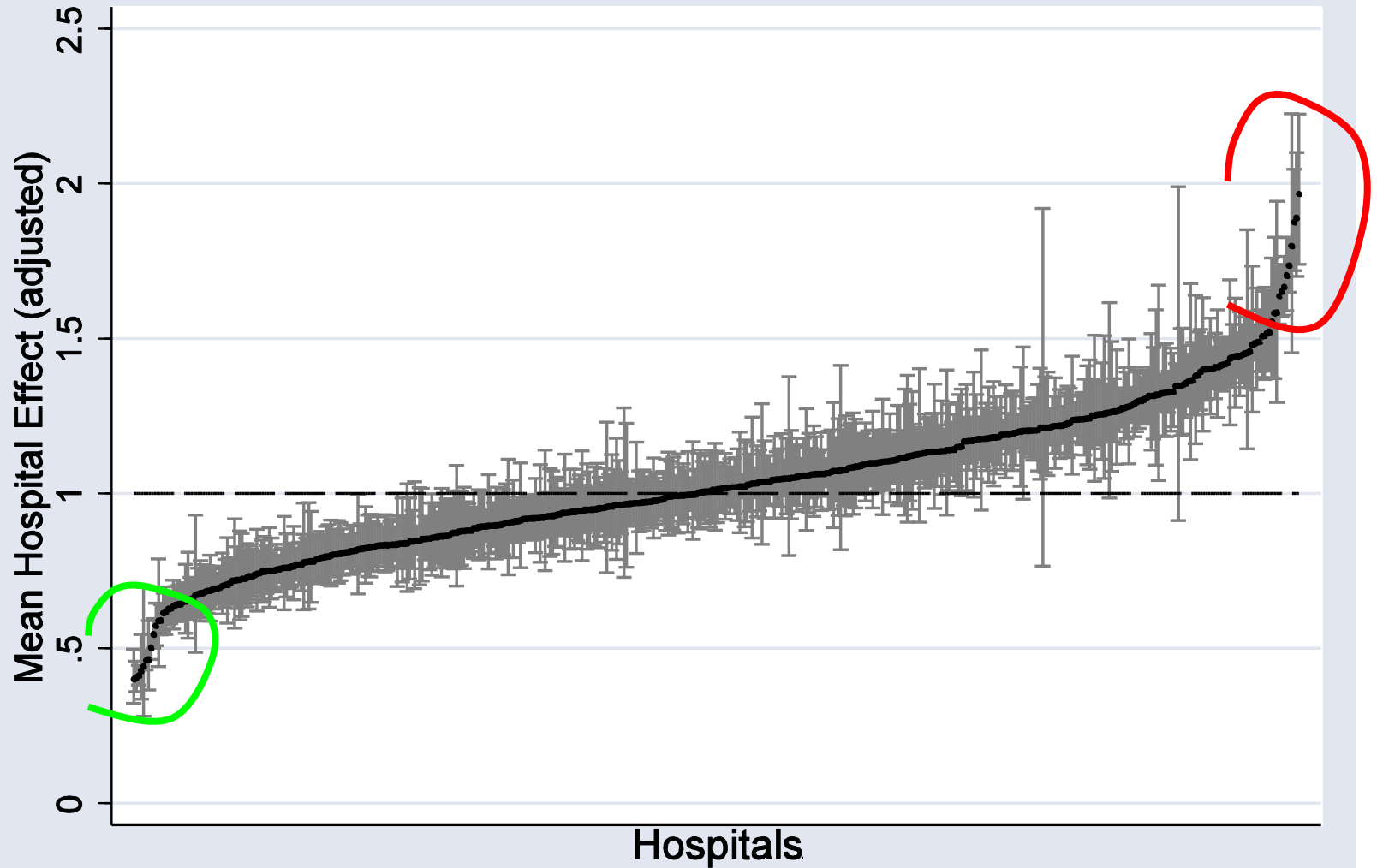
↑
Hospital
characteristics
Eg size, teaching
status

Appendectomy patients have HIGHER costs/LoS if they.....

- Are less than 11 or more than 35 years old
- Had a higher number of total diagnoses
- Underwent more procedures
- Were admitted as emergencies
- Had a laparoscopy
- Died (but shorter LoS)
- Had deep vein thrombosis pulmonary embolism
- Suffered wound infection



Length of Stay: Appendectomy (Poland)



- Are DRGs better than patient characteristics at explaining costs?

~~$$[1] \ln c_{ij} = \alpha + \beta^d \mathbf{d}_{ij}^d + \beta^p \mathbf{x}_{ij}^p + u_j + \varepsilon_{ij}$$~~

$$[2] \ln c_{ij} = \alpha + \beta^d \mathbf{d}_{ij}^d + u_j + \varepsilon_{ij}$$

$$[3] \ln c_{ij} = \alpha + \beta^p \mathbf{x}_{ij}^p + u_j + \varepsilon_{ij}$$

- Yes: if $R^2[2] > R^2[3]$

- Are DRGs better than patient characteristics at explaining costs?
 - Yes: England, Sweden
 - No: Austria, Finland, Germany, Ireland, Poland, Spain
 - About the same: France

- DRGs capture much of the variation in cost
 - Supports their use for reimbursement
- Costs also driven by patient characteristics
- Large variation in costs among hospitals
 - Scope for better utilisation of resources
- Some DRG systems have higher explanatory power than others
 - Scope for refinement, but not necessarily more groups



<http://www.eurodrg.eu/>

- Berlin conference 17-18 November 2011
- Methods & results to appear in *Health Economics*
- www.york.ac.uk/che/staff/research/andrew-street/