DRGs in Europe: towards transparency, efficiency, and quality of hospital care?

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The basic question:

What do we want when we pay hospitals?

That

- they care for patients when they need care?
  … and do not risk-select …
- they provide services? … and are not idle …
- expenditure is well controlled? … and not sky-rocketing …
- services are efficiently provided? … and money not wasted …
- service provision is transparent? … and not opaque …
- services are provided only if appropriate?
  … and not unnecessarily …
- provided services are of high quality?
  … and do not endanger patient safety …

Incentives of different forms of hospital payment

Payment mecha-nism	Patient needs (risk selection)	Activity		Expendi-ture control	Technical efficiency	Trans-parency	Quality	Admini-strative simplicity
		Number of services/ case	Number of cases					
Fee-for-service	+	+	+	—	0	0	0	—
Global budget	—	—	—	+	0	—	0	+

Incentives of different forms of hospital payment

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		Number of services/ case	Number of cases					
Fee-for-service	+	+	+	—	0	0	0	—
DRG based case payment	0	—	+	0	+	+	0	—
Global budget	—	—	—	+	0	—	0	+

Incentives of different forms of hospital payment

→ "dumping" (avoidance), "creaming" (selection) and "skimping" (undertreatment)
→ up/wrong-coding, gaming

Payment mecha-nism	Patient needs (risk selection	Ac / Number of services/ case	Numbe of cases	Expendi-ture control	Technical efficiency	Trans-parency	Quality	Admini-strative simplicity
Fee-for-service	+	+	+	–	USA 1980s			–
DRG based case payment	0	–	+	0	+	+	0	–
Global budget	–	–	–	+	European countries 1990s/2000s			+

Empirical evidence (I): hospital activity and length-of-stay under DRGs

USA 1980s

Country	Study	Activity	ALoS
US, 1983	US Congress - Office of Technology Assessment, 1985	▼	▼
	Guterman et al., 1988	▼	▼
	Davis and Rhodes, 1988	▼	▼
	Kahn et al., 1990		▼
	Manton et al., 1993	▼	▼
	Muller, 1993	▼	▼
	Rosenberg and Browne, 2001	▼	▼

Cf. Table 7.4 in Busse et al. 2011

Empirical evidence (II)

European countries 1990/ 2000s

Country	Study	Activity	ALoS
Sweden, early 1990s	Anell, 2005	▲	▼
	Kastberg and Siverbo, 2007	▲	▼
Italy, 1995	Louis et al., 1999	▼	▼
	Ettelt et al., 2006	▲	
Spain, 1996	Ellis/ Vidal-Fernández, 2007	▲	
Norway, 1997	Biørn et al., 2003	▲	
	Kjerstad, 2003	▲	
	Hagen et al., 2006	▲	
	Magnussen et al., 2007	▲	
Austria, 1997	Theurl and Winner, 2007		▼
Denmark, 2002	Street et al., 2007	▲	
Germany, 2003	Böcking et al., 2005	▲	▼
	Schreyögg et al., 2005		▼
	Hensen et al., 2008	▲	▼
England, 2003/4	Farrar et al., 2007	▲	▼
	Audit Commission, 2008	▲	▼
	Farrar et al., 2009	▲	▼
France, 2004/5	Or, 2009	▲	

Cf. Table 7.4 in Busse et al. 2011

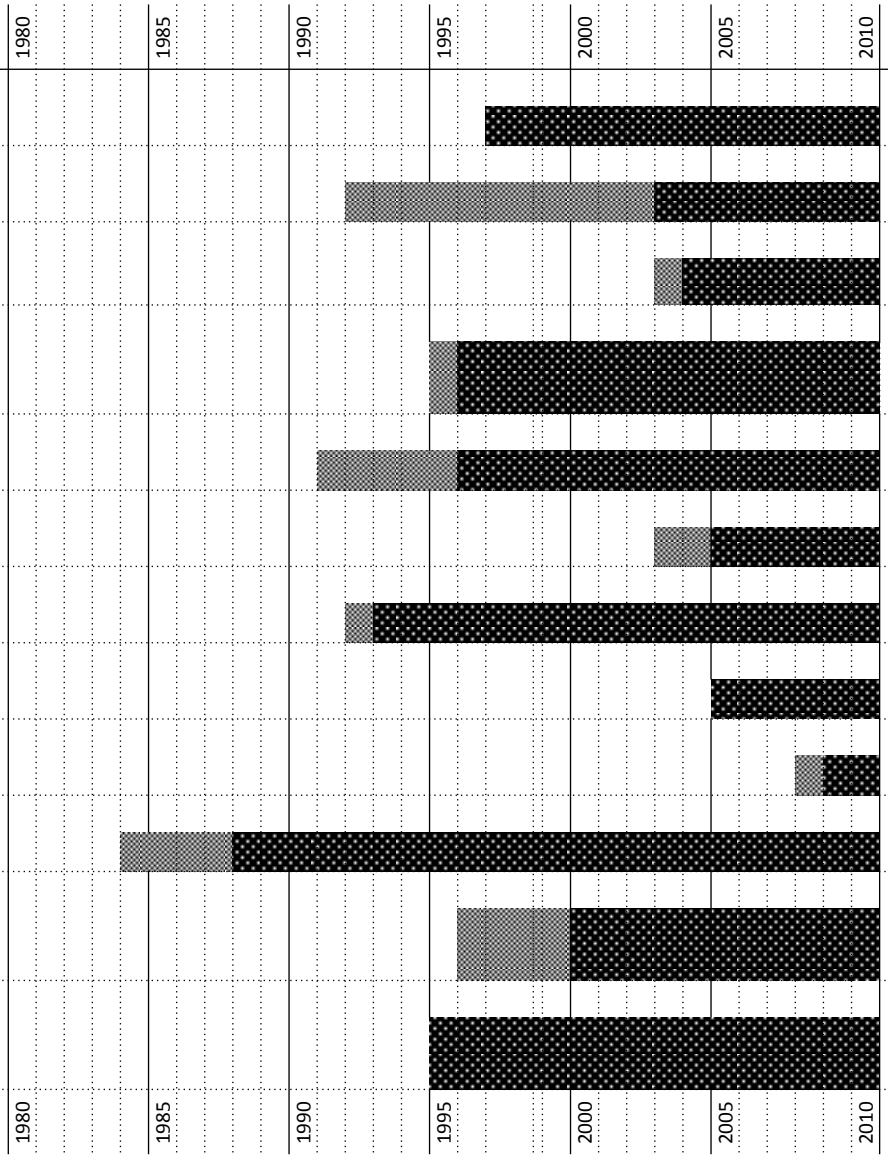
Reasons for DRGs:

To get a common "currency" of hospital activity for

- transparency → efficiency benchmarking & performance measurement (protect/ improve quality),
- fair budget allocation (or division among providers),
- planning of capacities,
- payment (→ efficiency & → reduction of variation)

Exact reasons, expectations and DRG usage differ among countries – due to (de)centralisation, one vs. multiple payers, public vs. mixed ownership.

Timeline and purposes of introduction



Country	Original purpose	Principal purpose in 2010
Austria	Budgetary allocation	Budgetary allocation, Planning
England	Measuring hospital activity	Payment
Estonia	Payment	Payment
Finland	Measuring hospital activity, benchmarking	Planning, benchmarking, hospital billing
France	Measuring hospital activity	Payment
Germany	Payment	Payment
Ireland	Budgetary allocation	Budgetary allocation
Netherlands	Payment	Payment
Poland	Payment	Payment
Portugal	Measuring hospital activity	Budgetary allocation
Spain (Catalonia)	Payment	Payment, benchmarking
Sweden	Payment	Measuring hospital activity, benchmarking

Introduction of DRGs
DRG-based hospital payment

France: Public and private mix

- Public sector:
  - 65% of acute beds,
  - obligation to provide 24h emergency care, to accept all patients and participate to public health activities
  - Compete with private for surgery but remain reference for complex procedures
- Private for profit sector:
  - 25% of acute beds
  - provides nearly half of inpatient surgery and 70% of ambulatory surgery
- Private not-for profit: mostly medium LT care and comparable to public for acute care

France: Hospital payment – historic perspective (I)

Public sector:

- In 1983, per diem was replaced by Global Budget
- Around the same time, the idea of moving to DRGs payments was floated for the first time
- An information system was progressively set up, first on a voluntary basis among public hospitals to document their activity (1986)
- DRG Data (activity) mandated for all public hospitals since 1996 and increasingly used to adjust global budget

Private sector:

- Complex itemized billing consisting of per diems and several types of fees for services and fixed payments for inputs

France: Hospital payment – historic perspective (II)

- Idea of moving to DRG-based payments was very controversial in 1990s, but there was a consensus on its merits in early 2000

- DRG based payment expected to
  - Increase the efficiency and fairness of funding (linked to activity, rather than historical costs)
  - Improve transparency of hospital activity and funding
  - Create a level-playing field between public and private sector (*read: increase competition*)
  - Contribute to modernizing management

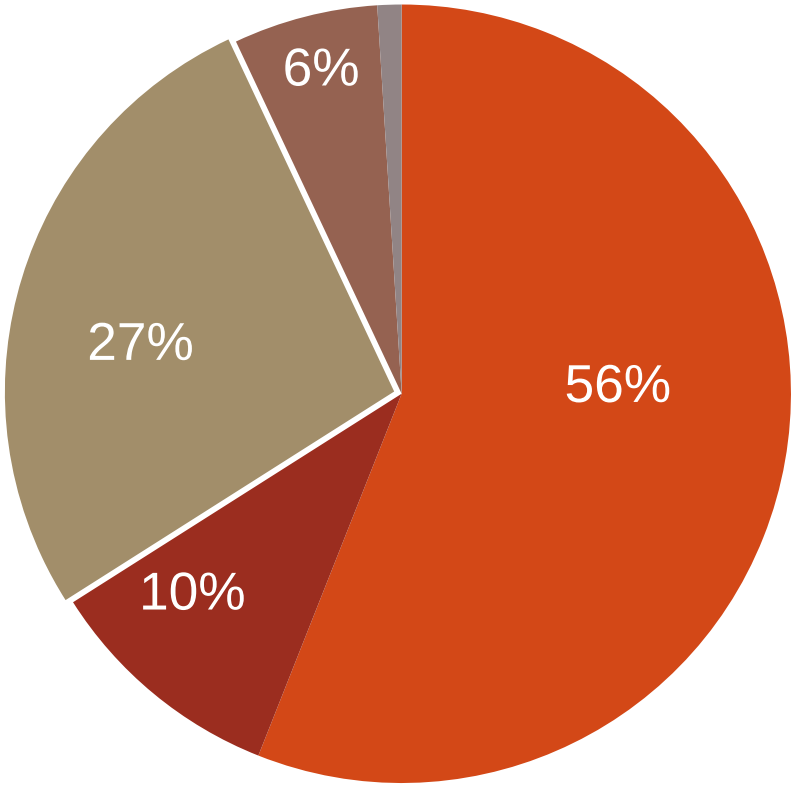
France: Hospital payment – introduction of DRGs

- In 2002, the move to DRG-based payments was announced for implementation in 2004/05 *(in parallel to e.g. Germany)*
- Introduced progressively in public hospitals from 10% of payments in 2004, 25% in 2005 to 100% in 2008 *(similar to Germany)*
- Private hospitals paid entirely by DRGs since 2005 , but during a transition period (until 2012), the prices are adjusted to reflect each hospitals' historic cost pattern to avoid large adjustments *(was applied in Germany to all hospitals)*

France: Hospital payment – but not only DRGs

- Public hospitals receive additional payments to compensate for specific 'public missions':
  - education, R&D, activities of general interest (e.g. developing prevention)
  - investments in infrastructure (legal obligations)
- Cost of maintaining emergency care paid by fixed yearly grants + FFS taking into account the yearly activity of providers
- Restricted list of expensive drugs and medical devices is paid retrospectively (actual level of prescription)
  - Expenditure on these drugs & devices increased by 37% between 2005-2007

Payment components in France (2008)



- DRG-based payment
- Lump-sum payments for "public missions" (teaching, emergency)
- Global Budgets (rehab, psychiatry, LT care)
- Additional Drugs and Medical Devices
- Other services

Scope of DRGs within hospital activities

Excluded costs
(e.g. for infrastructure; *in U.S. also physician services*)

Payments for non-patient care activities
(e.g. teaching, research, emergency availability)

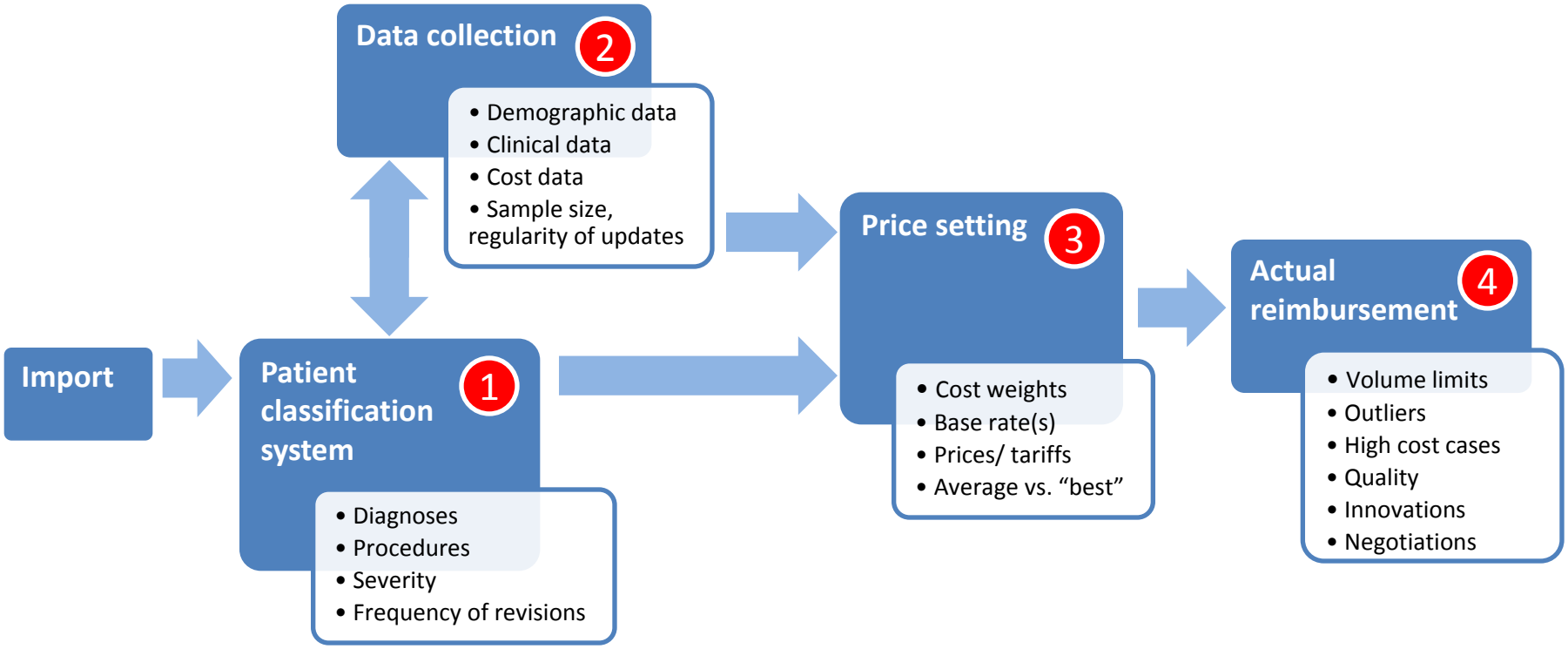
Payments for patients not classified into DRG system
(e.g. outpatients, day cases, psychiatry, rehabilitation)

Additional payments for specific activities for DRG-classified patients (e.g. expensive drugs, innovations),
possibly listed in DRG catalogues

Other types of payments for DRG-classified patients
(e.g. global budgets, fee-for-service)

DRG-based case payments,
DRG-based budget allocation
(possibly adjusted for outliers, quality etc.)

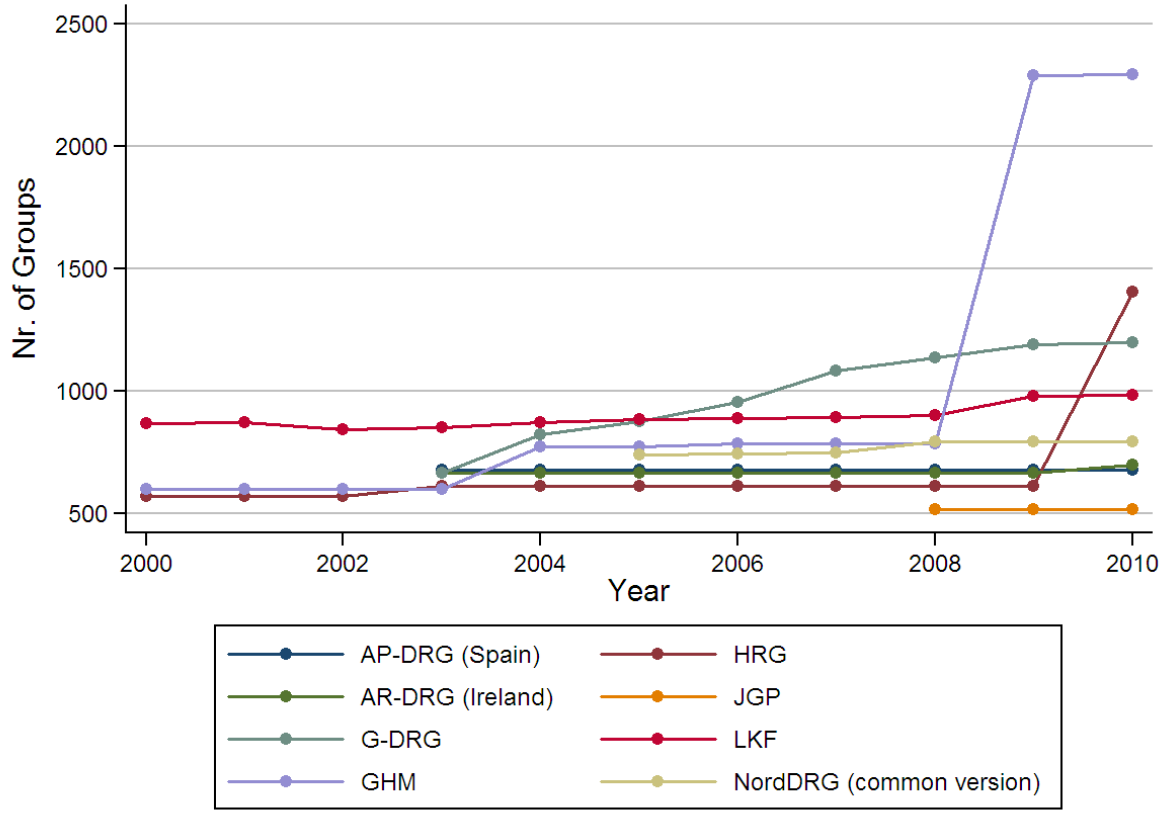
Essential building blocks of DRG systems



Basic characteristics of Patient classification systems in Europe

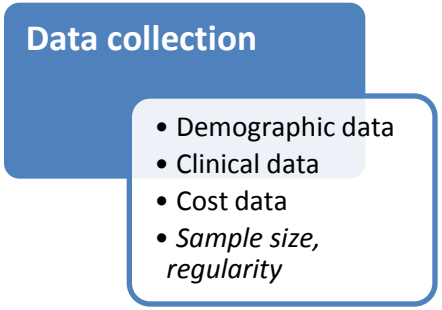
Patient classification system

- Diagnoses
- Procedures
- Severity
- Frequency of revisions



	AP-DRG	AR-DRG	G-DRG	GHM	NordDRG	HRG	JGP	LKF	DBC
DRGs / DRG-like groups	679	665	1,200	2,297	794	1,389	518	979	≈30,000
MDCs / Chapters	25	24	26	28	28	23	16	-	-
Partitions	2	3	3	4	2	2*	2*	2*	-

Main questions relating to data collection



Clinical data

→ classification system for diagnoses *and*
→ classification system for procedures

Cost data

→imported (not good but easy) *or*
→collected within country (better but needs standardised cost accounting)

Sample size

→entire patient population *or*
→a smaller sample

Many countries: *clinical data* = all patients;

cost data = hospital sample
with standardised cost accounting system

Table 1| **Comparison of diagnosis related groups (DRGs) in European countries for selected episodes of care***

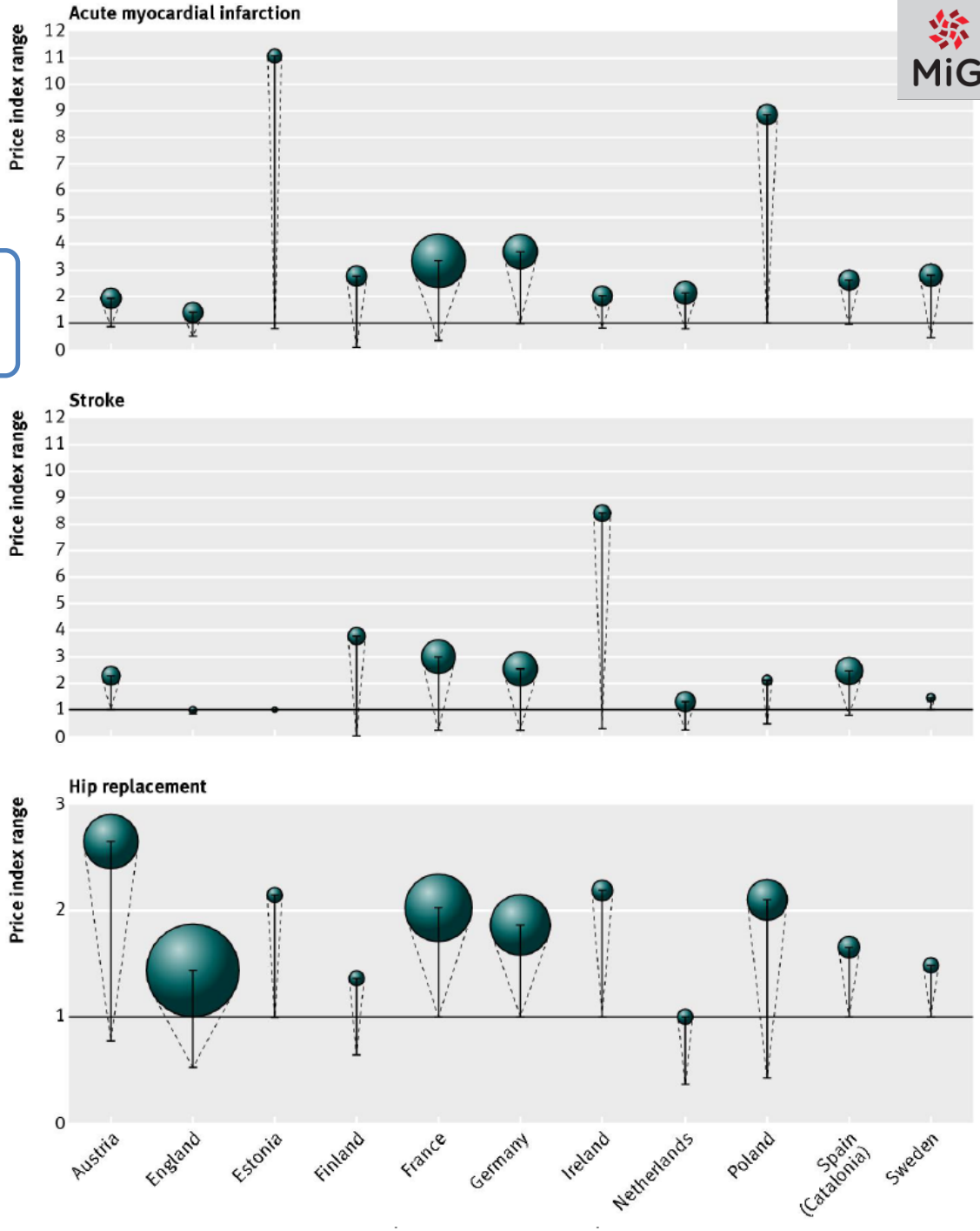
	Austria	England	Estonia	Finland	France	Germany	Ireland	Netherlands	Poland	Spain (Catalonia)	Sweden
Total No of DRGs by year											
2005	883	610	496	831	701	878	665	100 000	—	670	740
2008	900	610	496	831	800	1137	665	30 000	490	676	976
2011	991	1389	786	1020	2375	1194	698	4000	522	684	976
No of cases											
Acute myocardial infarction	16 545	73 857	3 409	12 007	69 054	202 758	6 192	31 341	81 634	7 721	34 817
Stroke	18 092	70 256	5 729	13 095	96 920	267 592	5 380	31 663	87 397	11 089	32 849
Hip replacement	19 363	86 090	1 737	21 762	140 313	222 261	5 231	22 935	45 312	2 902	20 263
No of diagnosis related groups†											
Acute myocardial infarction	6	7	4	6	16	10	6	7	6	6	7
Stroke	5	2	1	5	10	10	5	6	3	8	2
Hip replacement	8	14	2	2	10	9	3	2	6	3	2
Relative price range for diagnosis related groups‡											
Acute myocardial infarction	0.87-1.92	0.51-1.38	0.81-11.05	0.10-2.79	0.37-3.32	1.00-3.69	0.83-2.03	0.80-2.15	1.00-8.84	0.97-2.64	0.47-2.81
Stroke	1.00-2.27	0.88-1.00	1.00	0.06-3.80	0.21-3.01	0.25-2.55	0.28-8.41	0.12-1.17	0.48-2.10	0.76-2.44	1.00-1.45
Hip replacement	0.78-2.64	0.53-1.70	1.00-2.14	0.65-1.37	1.00-2.03	1.00-1.87	1.00-2.18	0.38-1.00	0.43-2.10	1.00-1.66	1.00-1.49
Adjusted (deviance) R^2§											
Acute myocardial infarction	0.09	0.39	NA	0.50	0.53	0.49	0.18	NA	0.25	0.37	0.42
Stroke	0.14	0.25	0.33	0.26	0.53	0.49	0.40	NA	0.30	0.14	0.16
Hip replacement	0.26	0.50	0.22	0.22	0.37	0.32	0.37	NA	0.39	0.18	0.29

Patient classification system

- Diagnoses
- Procedures
- Severity
- Frequency of revisions

Price setting

- Cost weights
- Base rate(s)
- Prices/ tariffs
- Average vs. “best”



Size of bubble: number of DRGs

Range: DRG weights (index case = 1)

Example AMI episode

Table 3 Description of case vignettes

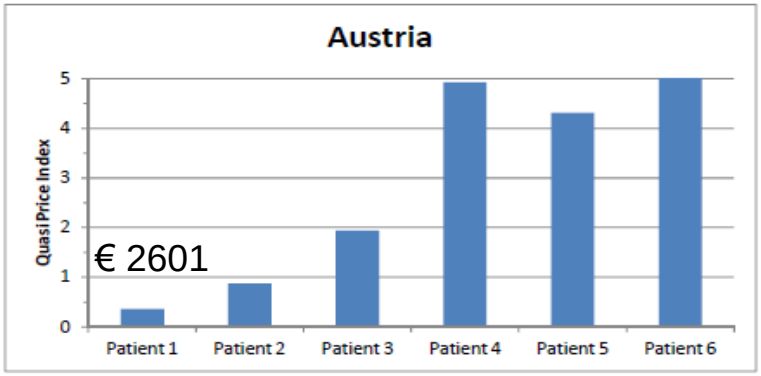
	Case vignettes[a]
Index case	NSTEMI, no relevant complications[b], no invasive treatment, LOS 6 days
Patient 1	STEMI, cardiogenic shock, diabetes, sequelae of stroke, no invasive treatment, death after 1 day
Patient 2	NSTEMI, no relevant complications[b], no invasive treatment, angiography for diagnostic evaluation, LOS 4 days
Patient 3	STEMI, no relevant complications[b], PCI with one BMS, LOS 5 days
Patient 4	STEMI, no relevant complications[b], PCI with multiple DES, LOS 15 days
Patient 5	STEMI, left ventricular failure, diabetes, sequelae of stroke, haemorrhage complicating a procedure, PCI with multiple BMS, angiography, LOS 25 days
Patient 6	Subsequent MI, VSD as complication of AMI, congestive heart failure, ischaemic cardiomyopathy, sequelae of stroke, PCI with multiple DES, angiography, death after 2 days

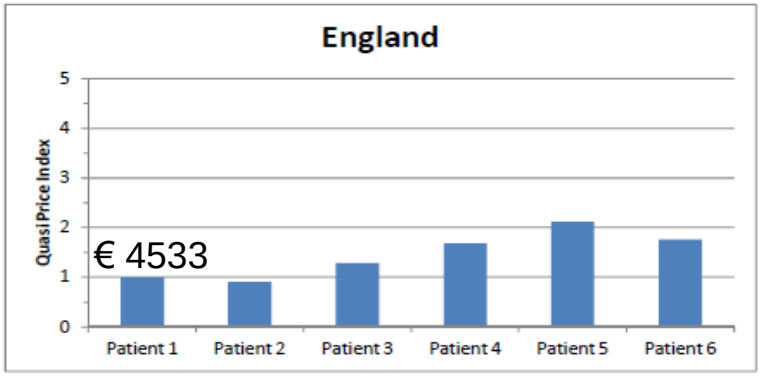
[a]A complete specification of case vignettes is available as Supplementary material online, *Table S1*. All patients were specified to be 70 years old and to be treated as inpatients.

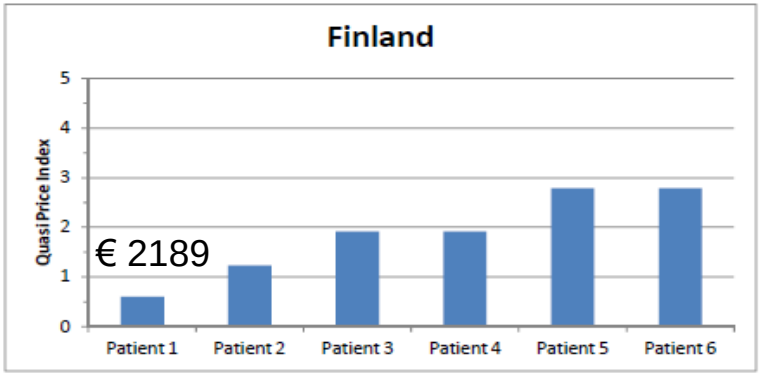
[b]Patients with 'no relevant complications' may well have one or multiple secondary diagnoses. However, these diagnoses are not relevant for the grouping of patients into DRGs.

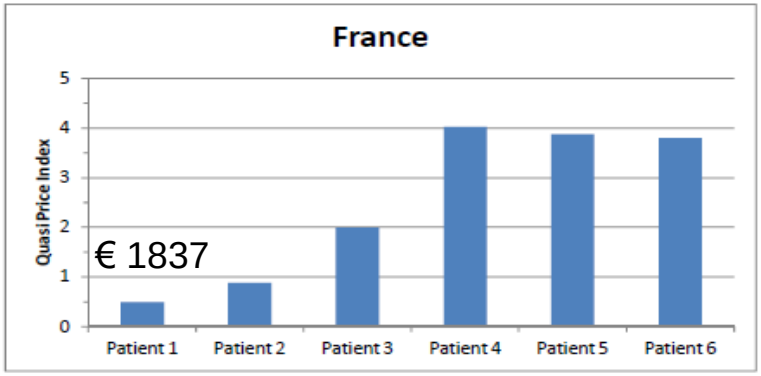
BMS, bare metal stent; DES, drug-eluting stent; LOS, length of stay; NSTEMI, non-ST elevated myocardial infarction; PCI, percutaneous coronary intervention; STEMI, ST-elevated myocardial infarction; VSD, ventricular septal defect.

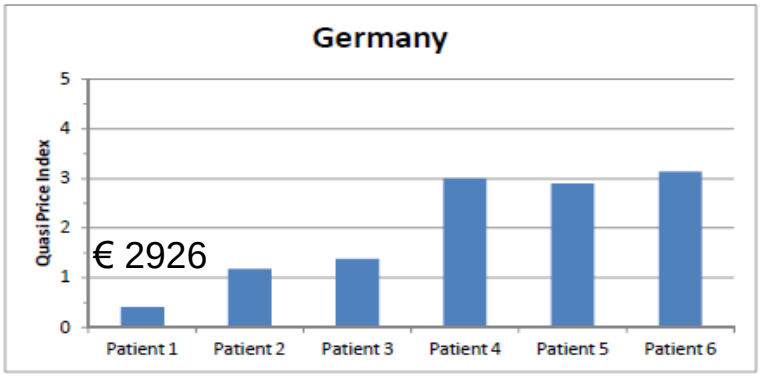
AMI: relative DRG payments

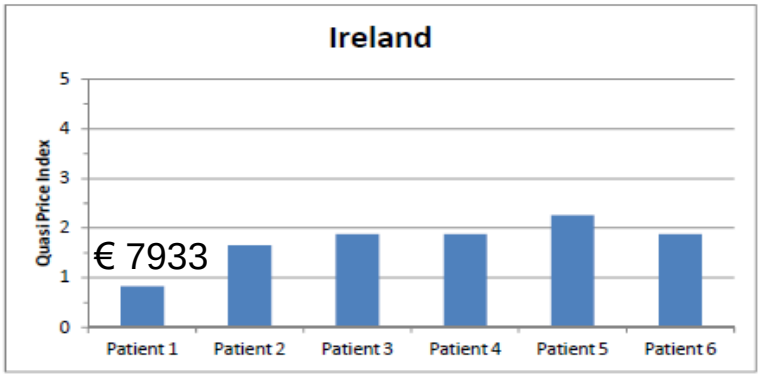












Incentives and (un-)intended strategies

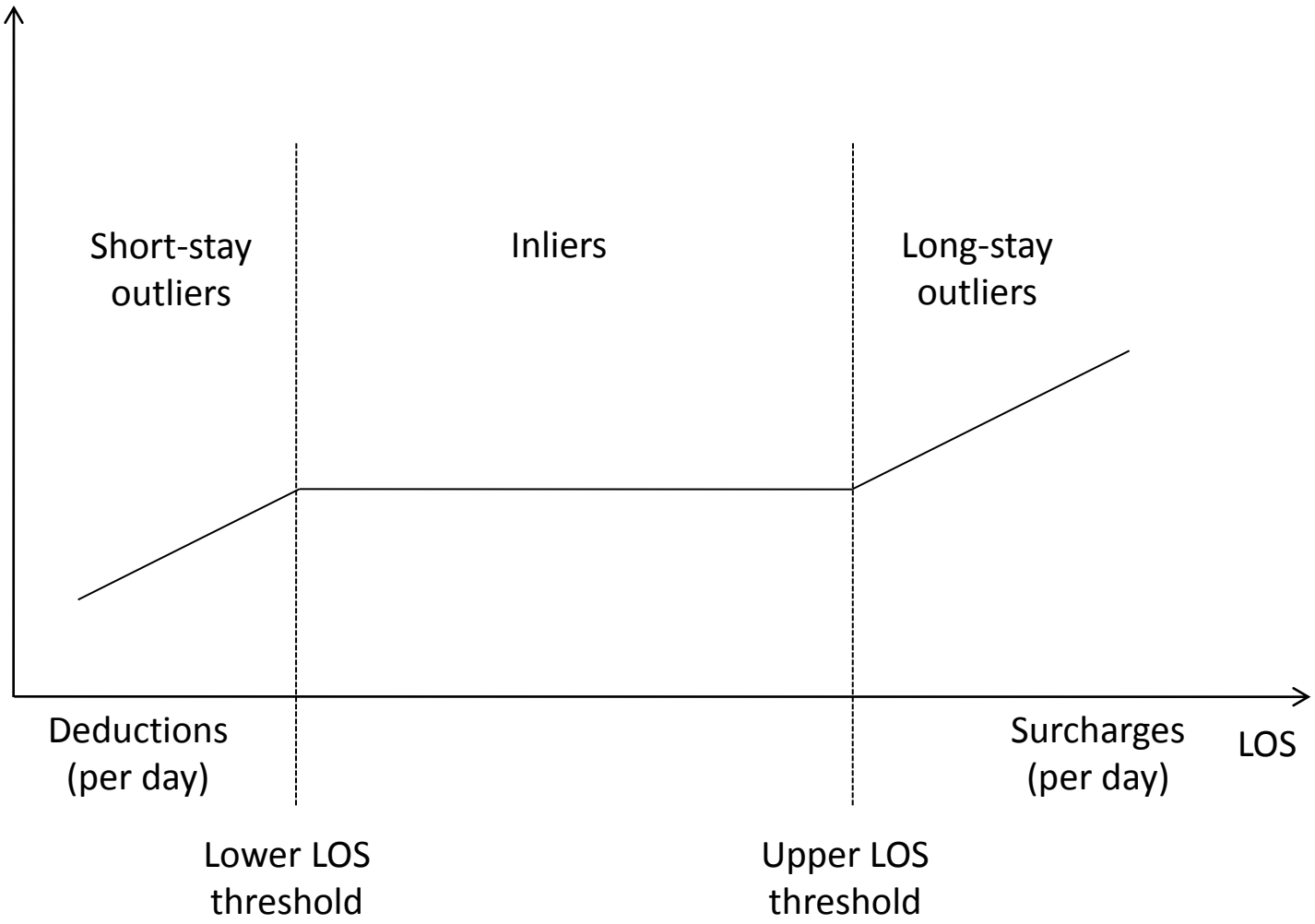
Incentives of DRG-based hospital payment	Strategies of hospitals
1. Reduce costs per patient	a) Reduce length of stay • optimize internal care pathways • inappropriate early discharge ('bloody discharge')
	b) Reduce intensity of provided services • avoid delivering unnecessary services • withhold necessary services ('skimping/undertreatment')
	c) Select patients • specialize in treating patients for which the hospital has a competitive advantage • select low-cost patients within DRGs ('cream-skimming')
2. Increase revenue per patient	a) Change coding practice • improve coding of diagnoses and procedures • fraudulent reclassification of patients, e.g. by adding inexistent secondary diagnoses ('up-coding')
	b) Change practice patterns • provide services that lead to reclassification of patients into higher paying DRGs ('gaming/overtreatment')
3. Increase number of patients	a) Change admission rules • reduce waiting list • admit patients for unnecessary services ('supplier-induced demand')
	b) Improve reputation of hospital • improve quality of services • focus efforts exclusively on measurable areas

Positive and negative consequences are closely related

How DRG systems reduce unintended behaviour: 1. long- and short-stay adjustments

Actual reimbursement

- Volume limits
- **Outliers**
- High cost cases
- Quality
- Innovations
- Negotiations



How DRG systems reduce unintended behaviour: 2. Fee-for-service-type additional payments

Actual reimbursement

- Volume limits
- Outliers
- **High cost cases**
- Quality
- **Innovations**
- Negotiations

	England	France	Germany	Nether-lands
Payments per hospital stay	One	One	One	Several possible
Payments for specific high-cost services	Unbundled HRGs for e.g.: • Chemotherapy • Radiotherapy • Renal dialysis • Diagnostic imaging • High-cost drugs	Séances GHM for e.g.: • Chemotherapy • Radiotherapy • Renal dialysis Additional payments: • ICU • Emergency care • High-cost drugs	Supplementary payments for e.g.: • Chemotherapy • Radiotherapy • Renal dialysis • High-cost drugs/ devices	Since 2012: • ICU • Care in cooperation with practice-based physicians
Innovation-related add'l payments	Yes	Yes	Yes	Yes (for drugs)

How DRG systems reduce unintended behaviour: 3. adjustments for quality

Type of adjustment	Mechanism	Examples
Hospital based		
DRG/ disease based		
Patient based	• Payment for an individual patient is adjusted upwards or downwards by a certain amount • No payment is made for a case	• Certain readmissions within 30 days are not paid separately but as part of the original admission *(e.g., in England and Germany)* • Complications (that is, certain conditions that were not present upon admission) cannot be used to classify patients into DRGs that are weighted more heavily *(e.g., in the United States)*

How DRG systems reduce unintended behaviour: 3. adjustments for quality

Type of adjustment	Mechanism	Examples
Hospital based		
DRG/ disease based	• Payment for all patients with a certain DRG (or a disease entity) is adjusted upwards or downwards by a certain percentage • DRG payment is not based on average costs but is awarded to those hospitals delivering 'good quality'	• Insurers negotiate with hospitals that DRG payment is higher/lower if certain quality standards are met/not met *(e.g., in Germany and the Netherlands)* • DRG payment for all hospitals is based on 'best practice'; that is, costs incurred by efficient, high-quality hospitals *(e.g., in England)*
Patient based	• Payment for an individual patient is adjusted upwards or downwards by a certain amount • No payment is made for a case	• Certain readmissions within 30 days are not paid separately but as part of the original admission *(e.g., in England and Germany)* • Complications (that is, certain conditions that were not present upon admission) cannot be used to classify patients into DRGs that are weighted more heavily *(e.g., in the United States)*

How DRG systems reduce unintended behaviour: 3. adjustments for quality

Type of adjustment	Mechanism	Examples
Hospital based	• Payment for entire hospital activity is adjusted upwards or downwards by a certain percentage • Hospital receives an additional payment unrelated to activity	• Predefined quality results are met/not met *(e.g., in England)* • Overall readmission rate is below/above average or below/above agreed target *(e.g., in the United States)* • Hospitals install new quality improvement measures *(e.g., in France)*
DRG/ disease based	• Payment for all patients with a certain DRG (or a disease entity) is adjusted upwards or downwards by a certain percentage • DRG payment is not based on average costs but is awarded to those hospitals delivering 'good quality'	• Insurers negotiate with hospitals that DRG payment is higher/lower if certain quality standards are met/not met *(e.g., in Germany and the Netherlands)* • DRG payment for all hospitals is based on 'best practice'; that is, costs incurred by efficient, high-quality hospitals *(e.g., in England)*
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4. Frequent revisions of PCS and payment rates

Country	PCS		Payment rate	
	Frequency of updates	Time-lag to data	Frequency of updates	Time-lag to data
Austria	Annual	2–4 years	4–5 years	2–4 years
England	Annual	Minor revisions annually; irregular overhauls about every 5–6 years	Annual	3 years (but adjusted for inflation)
Estonia	Irregular (first update after 7 years)	1–2 years	Annual	1–2 years
Finland	Annual	1 year	Annual	0–1 year
France	Annual	1 year	Annual	2 years
Germany	Annual	2 years	Annual	2 years
Ireland	Every 4 years	**Not applicable (imported AR-DRGs)**	Annual (linked to Australian updates)	1–2 years
Netherlands	Irregular	Not standardized	Annual or when considered necessary	2 years, or based on negotiations
Poland	Irregular – planned twice per year	1 year	Annual update only of base rate	1 year
Portugal	Irregular	**Not applicable (imported AP-DRGs)**	Irregular	2–3 years
Spain (Catalonia)	Biennial	**Not applicable (imported 3-year-old CMS-DRGs)**	Annual	2–3 years
Sweden	Annual	1–2 years	Annual	2 years

Conclusions

- DRG-based hospital payment is the main method of provider payment in Europe, but systems vary across countries
  - Different patient classification systems
  - DRG-based budget allocation vs. case-payment
  - Regional/local adjustment of cost weights/conversion rates
- To address potential unintended consequences, countries
  - implemented DRG systems in a step-wise manner
  - operate DRG-based payment together with other payment mechanisms
  - refine patient classification systems continously (increase number of groups)
  - place a comparatively high weight on procedures
  - base payment rates on actual average (or best-practice) costs
  - reimburse outliers and and high cost services separately
  - update both patient classification and payment rates regularly
- If done right (which is complex), DRGs can contribute to increased transparency and efficiency – and quality

DRG payment – the way forward

Excluded costs
(e.g. for infrastructure; *in U.S. also physician services*)

Payments for non-patient care activities
(e.g. teaching, research, emergen… …ability)

Payments fo… … system
(e.g. outp… …litation)

Additiona… …specific activities for DRG-classified p…ients (e.g. expensive drugs, innovations), possibly listed in DRG catalogues

Develop intersectoral "bundled" DRGs based on care pathways

Other types of payments for DRG-classified patients
(e.g. global budgets, fee-for-service)

DRG-based case payments,
DRG-based budget allocation
(possibly adjusted for outliers, quality etc.)

Integrate all relevant costs and measure them accurately

Separate priority activities not related to a particular patient from DRG payments

Pay separate for patient-related activities which you want to incentivize (upon prior authorization, 2nd opinion?)

- Define clinically meaningful groups (constant updating),
- which are cost-homogeneous (on average or "best practice"),
- measure quality and
- adjust payment

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EuroDRG
Diagnosis-Related Groups in Europe: Towards Efficiency and Quality

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Welcome to the new EuroDRG webpage

EuroDRG was a research project from 2009 to 2011 funded by the European Commission within the 7th framework programme. http://cordis.europa.eu/projects/rcn/89392_en.html This website is managed by the Department of Health Care Management of the Berlin University of Technology. It will be updated regularly and incorporate also results from other research projects to provide most recent information about DRGs and hospital payment systems across Europe.

Countries

The EuroDRG project formed a team of researchers from twelve European countries (Austria, England, Estonia, Finland, France, Germany, Ireland, the Netherlands, Poland, Portugal, Spain and Sweden). They analysed the national DRG-based hospital payment systems by using qualitative and quantitavie research methods. Beyond the project, the EuroDRG team still collaborates in ongoing research and upcoming publications. In addition to the countries mentioned above, Denmark, Hungary and Italy were analysed within the HealthBASKET project which was the forerunner of the EuroDRG collaboration.

DRGs in Europe

Within the framework of the EuroDRG project each of the country specific DRG-based systems was analysed in a structured and comparative way. In addition literature reviews and overview articles on the most important DRG topics were conducted. Both, the country reports and overview articles were published in the book: Diagnosis-Related Groups in Europe: Moving towards transparency, efficiency and quality in hospitals

http://www.mcgraw-hill.co.uk/html/0335245579.html

Episodes of care

In order to analyse the DRG systems in depth and to make international comparisions possible, the EuroDRG team designed ten episodes of care (EoCs): Acute myocardial infarction (AMI), Appendectomy, Breast cancer surgery, Childbirth, Cholecystectomy, Coronary artery bypass graft (CABG), Inguinal hernia surgery, Hip replacement, Knee replacement and Stroke. The EoCs are uniformly defined across countries through diagnosis and/or procedure codes and can be understood as 'meta-DRGs' which encompass varying numbers of actual DRGs within countries.

Patient classification

The analysis of the national DRG systems was twofold for each EoC: Firstly, We looked at the specific

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New from Open University Press

Diagnosis-Related Groups in Europe

Moving towards transparency, efficiency and quality in hospitals

Reinhard Busse, Alexander Geissler, Wilm Quentin and Miriam M. Wiley (Eds)

Berlin University of Technology, Germany; Berlin University of Technology, Germany; Berlin University of Technology, Germany; Economic and Social Research Institute, Dublin, Ireland

Diagnosis Related Group (DRG) systems were introduced in Europe to increase the transparency of services provided by hospitals and to incentivise greater efficiency in the use of resources invested in acute hospitals. In many countries, these systems were also designed to contribute to improving - or at least protecting - the quality of care. After more than a decade of experience with using DRGs in Europe, this book considers whether the extensive use of DRGs has contributed towards achieving these objectives.

PAYMENT & INSURANCE

By Wilm Quentin, David Scheller-Kreinsen, Miriam Blümel, Alexander Geissler, and Reinhard Busse

Hospital Payment Based On Diagnosis-Related Groups Differs In Europe And Holds Lessons For The United States

DOI: 10.1377/hlthaff.2012.0876
HEALTH AFFAIRS 32,
NO. 4 (2013): 713–723

ABSTRACT **England, France, Germany, the Netherlands, and Sweden spend less as a share of gross domestic product on hospital care than the United States while delivering high-quality services. All five European countries have hospital payment systems based on diagnosis-related groups (DRGs) that classify patients of similar clinical characteristics and comparable costs. Inspired by Medicare's inpatient prospective payment system, which originated the use of DRGs, European DRG systems have implemented different design options and are generally more detailed than Medicare's system, to better distinguish among patients with less and more complex conditions. Incentives to treat more cases are often counterbalanced by volume ceilings in European DRG systems. European payments are usually broader in scope than those in the United States, including physician salaries and readmissions. These European systems, discussed in more detail in the article, suggest potential innovations for reforming DRG-based hospital payment in the United States.**

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David Scheller-Kreinsen is an economic adviser in the Hospital Division of the National Association of Sickness Funds, in Berlin, Germany.

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ANALYSIS

HEALTH SYSTEMS PERSPECTIVES

Diagnosis related groups in Europe: moving towards transparency, efficiency, and quality in hospitals?

Hospitals in most European countries are paid on the basis of diagnosis related groups. **Reinhard Busse and colleagues** find much variation within and between systems and argue that they could be improved if countries learnt from each other

Reinhard Busse *professor*[1], Alexander Geissler *research fellow*[1], Ain Aaviksoo *director of health policy programme*[2], Francesc Cots *director of management control*[3], Unto Häkkinen *research professor*[4], Conrad Kobel *research fellow*[5], Céu Mateus *assistant professor*[6], Zeynep Or *research director*[7], Jacqueline O'Reilly *research analyst*[8], Lisbeth Serdén *researcher*[9], Andrew Street *professor of health economics*[10], Siok Swan Tan *researcher*[11], Wilm Quentin *research fellow*[1]

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European Heart Journal (2013) **34**, 1972–1981
doi:10.1093/eurheartj/ehs482

CLINICAL RESEARCH
Acute coronary syndromes

Acute myocardial infarction and diagnosis-related groups: patient classification and hospital reimbursement in 11 European countries

Wilm Quentin[1,2]*, Hanna Rätto[3], Mikko Peltola[3], Reinhard Busse[1,2], and Unto Häkkinen[3], on behalf of the EuroDRG group†

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See page 1950 for the editorial comment on this article (doi:10.1093/eurheartj/eht062)

Aims As part of the diagnosis related groups in Europe (*EuroDRG*) project, researchers from 11 countries (i.e. Austria, England, Estonia, Finland, France, Germany, Ireland, Netherlands, Poland, Spain, and Sweden) compared how their DRG systems deal with patients admitted to hospital for acute myocardial infarction (AMI). The study aims to assist cardiologists and national authorities to optimize their DRG systems.

Methods and results National or regional databases were used to identify hospital cases with a primary diagnosis of AMI. Diagnosis-related group classification algorithms and indicators of resource consumption were compared for those DRGs that individually contained at least 1% of cases. Six standardized case vignettes were defined, and quasi prices according to national DRG-based hospital payment systems were ascertained. European DRG systems vary widely: they classify AMI patients according to different sets of variables into diverging numbers of DRGs (between 4 DRGs in Estonia and 16 DRGs in France). The most complex DRG is valued 11 times more resource intensive than an index case in Estonia but only 1.38 times more resource intensive than an index case in England. Comparisons of quasi prices for the case vignettes show that hypothetical payments for the index case amount to only €420 in Poland but to €7930 in Ireland.

Conclusions Large variation exists in the classification of AMI patients across Europe. Cardiologists and national DRG authorities should consider how other countries' DRG systems classify AMI patients in order to identify potential scope for improvement and to ensure fair and appropriate reimbursement.

Keywords Myocardial infarction • Diagnosis-related groups • Europe • Economics • Prospective payment system • Hospital

Regulation of providers (especially hospitals)

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Fachgebiet Management im Gesundheitswesen, Technische Universität Berlin
(WHO Collaborating Centre for Health Systems Research and Management)

&

European Observatory on Health Systems and Policies

Scenario 1

In an entrepreneur's ideal world, one could set up a hospital, determine how to run it and be responsible for all losses and profit.

The right to establish a hospital would include the **freedom to choose** a **location**, to determine the **size** and to decide on the **range of technology and services** offered. One could also decide whether services to deliver on an in- or out-patient basis, set **price levels** and **refuse to accept certain patients**.

Also, one had the right to decide on **staffing numbers** and **qualification mix**, the working conditions of the employees and their **salaries**.

Lastly, there would be no restrictions on business relationships with suppliers and other hospitals, including the right for **mergers** and horizontal and vertical **takeovers**.

Scenario 2

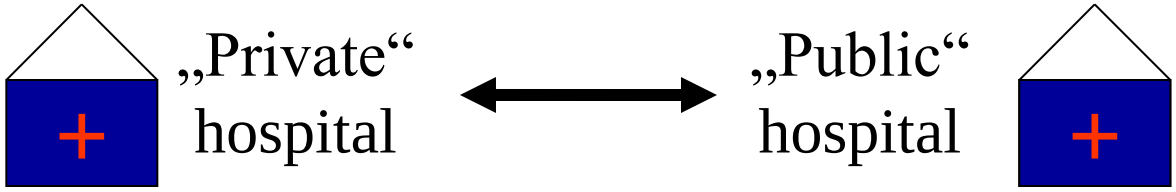
In the other end of the spectrum, the national government (or a subordinated public body such as a Health Authority) establishes hospitals where and at what size deemed necessary according to a public plan.

The **planning authorities determine** the **technology** installed and the **range of services** offered. Services are delivered free to all citizens at the point of service, hence no prices need to be set.

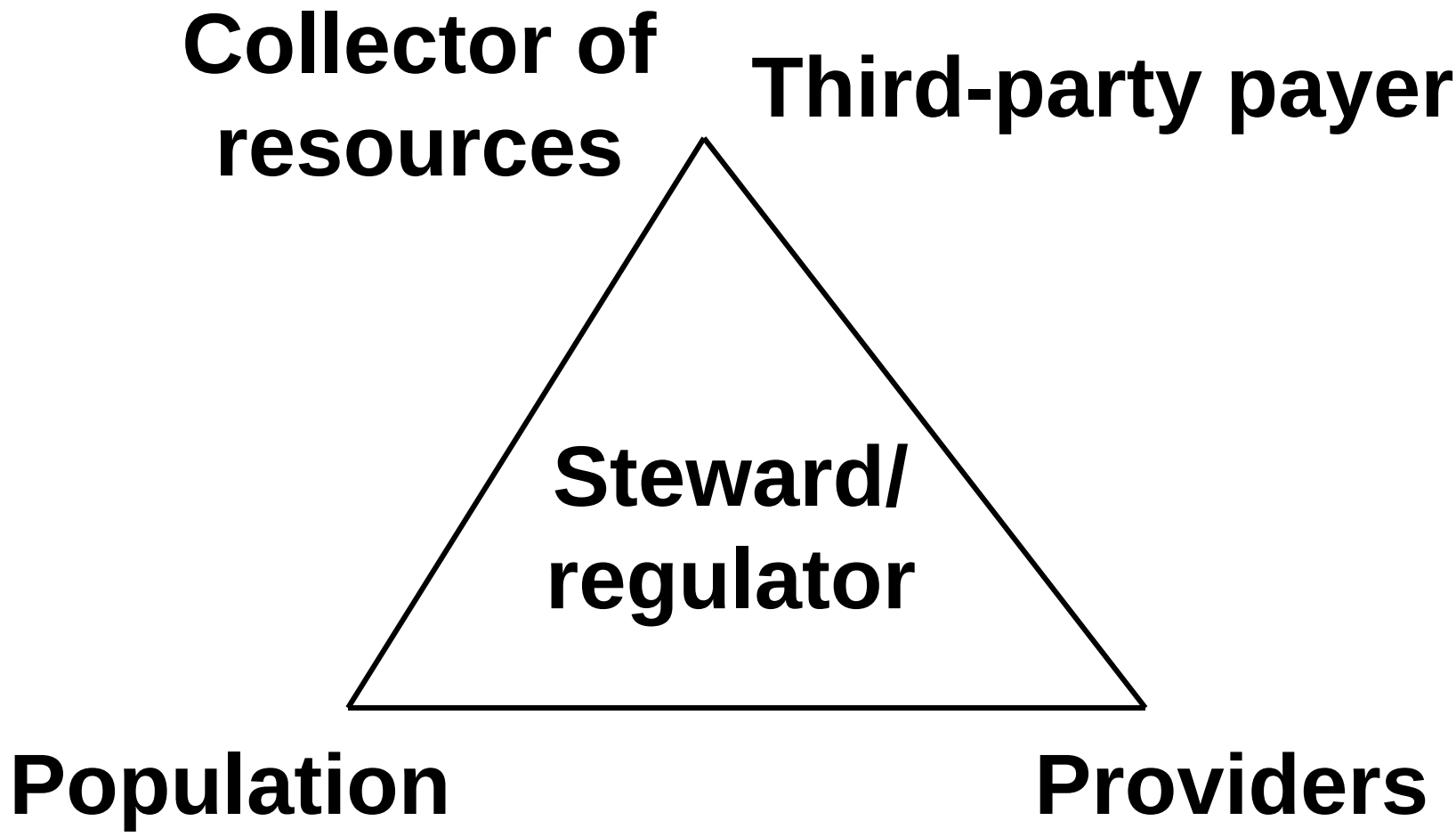
Staffing and working conditions are decided by the public authorities and **standard public salaries** apply.

As the hospitals are part of the public health services infrastructure, they have **no independent relationships** with other actors and no room for mergers or takeovers.

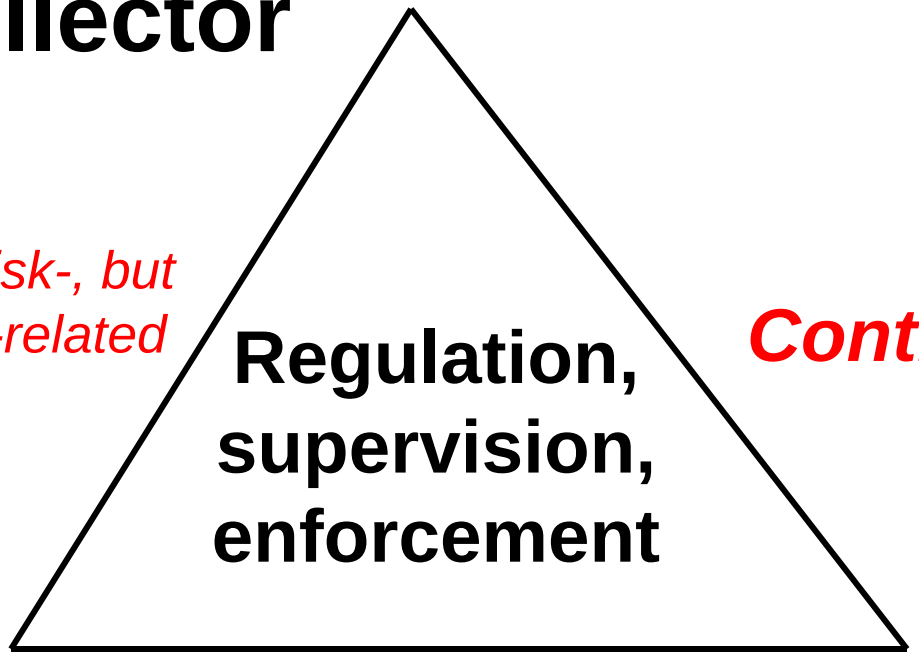
Two types of “non-regulation“



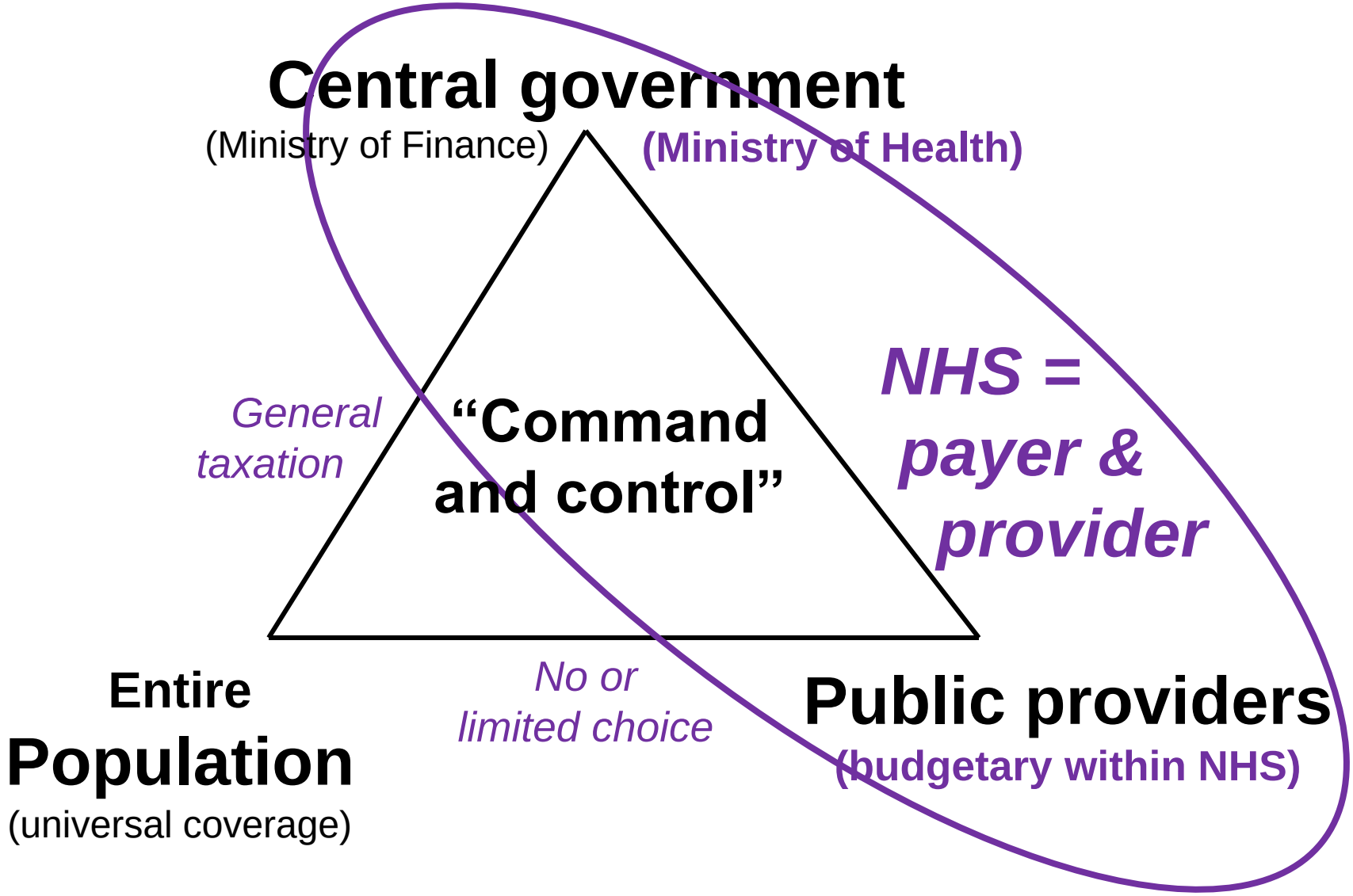
Both hospitals are not regulated:
(1) There are intentionally no regulations to restrict the market behaviour of the hospital owners and/ or managers.
(2) The hospital is subject to public sector ”command-and-control”.
In practice, most hospitals in many countries fall some-where between the two extremes and require more regulation than these two.

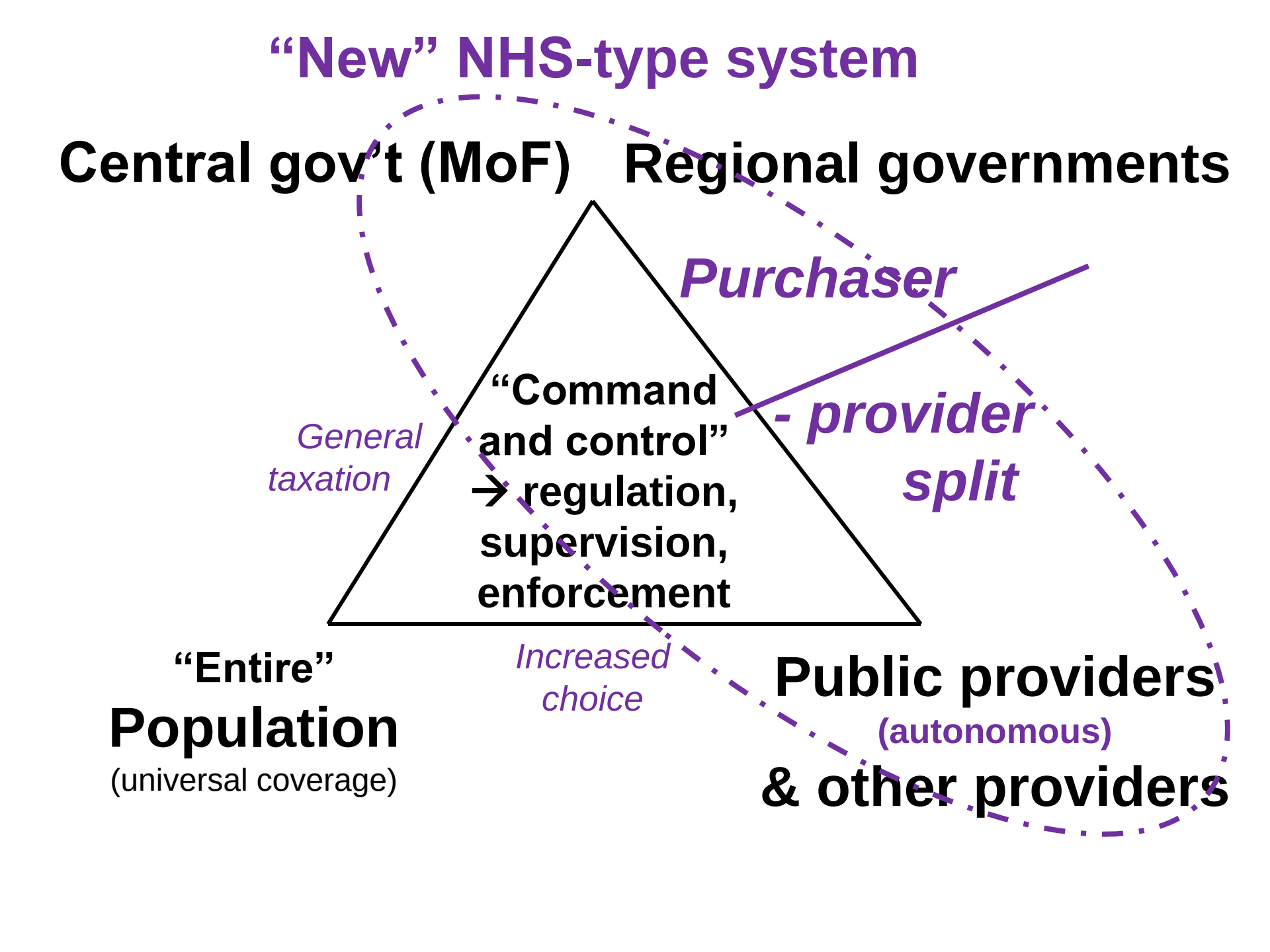

Collector of resources
Third-party payer
Steward/ regulator
Population
Providers

Social Health Insurance system



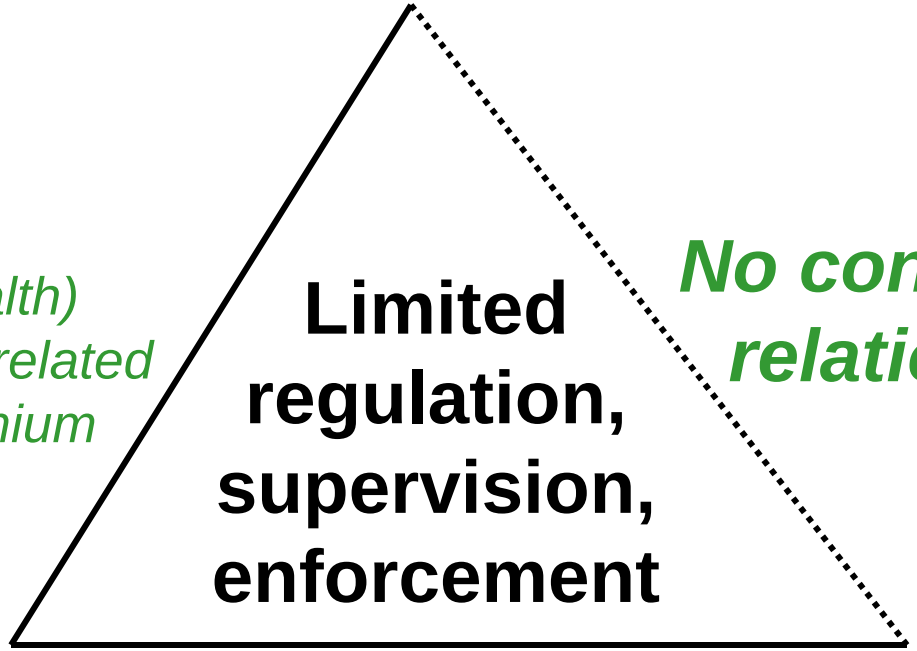
Classical integrated NHS-type system




"New" NHS-type system
Central gov't (MoF)
Regional governments
Purchaser
- provider split
"Command and control" → regulation, supervision, enforcement
General taxation
Increased choice
"Entire"
Population
(universal coverage)
Public providers
(autonomous)
& other providers

PHI – Indemnity insurance

Private health insurers

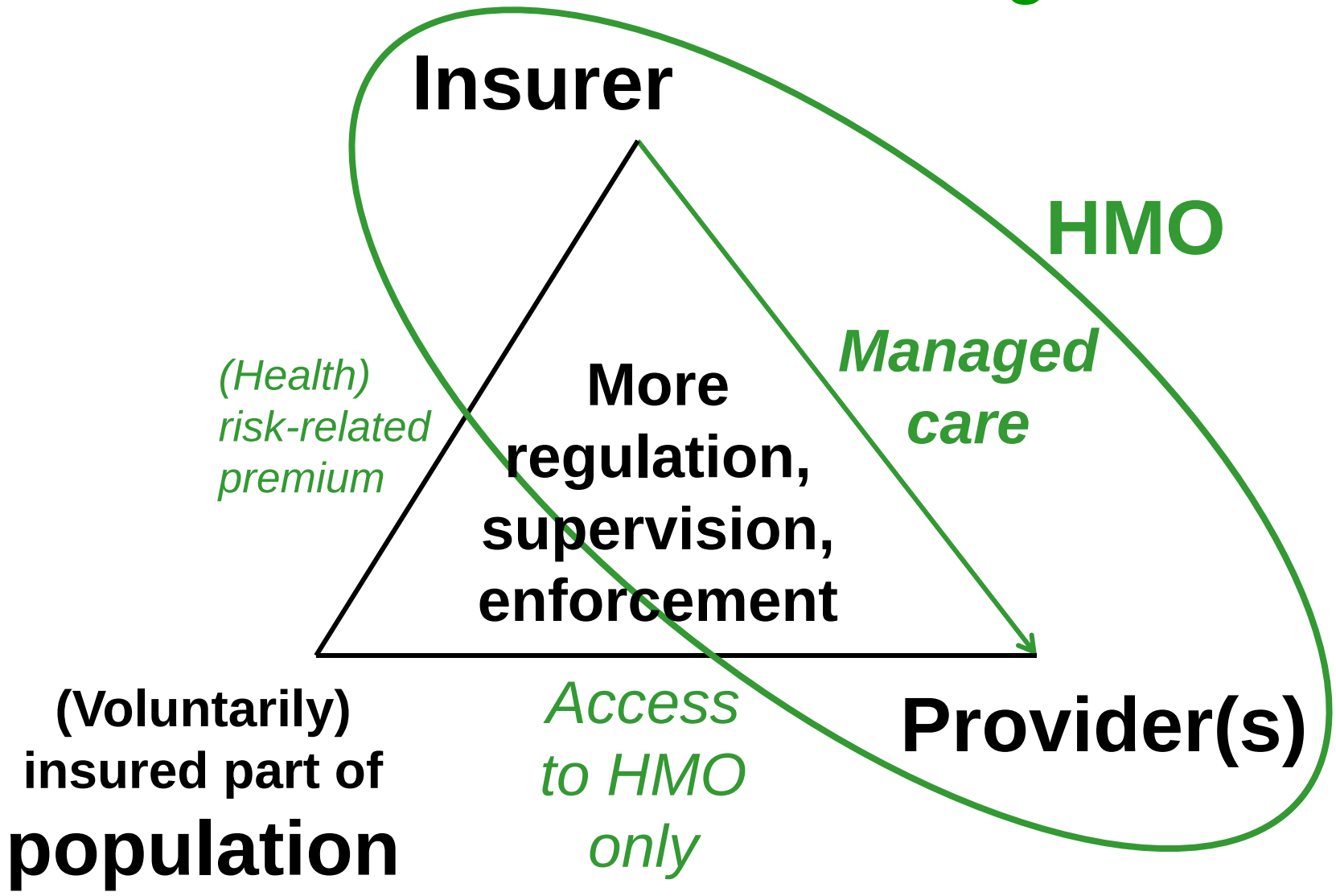


(Voluntarily) insured part of population

Providers

All (public, not-for-profit & private)

PHI – Health Maintenance Organization



Different sets of (intertwined) reforms

Third-party payers 2

→ *split from providers & regulator*

1

Command-and-control/ laissez-faire

→ *Regulation*

Relationship:

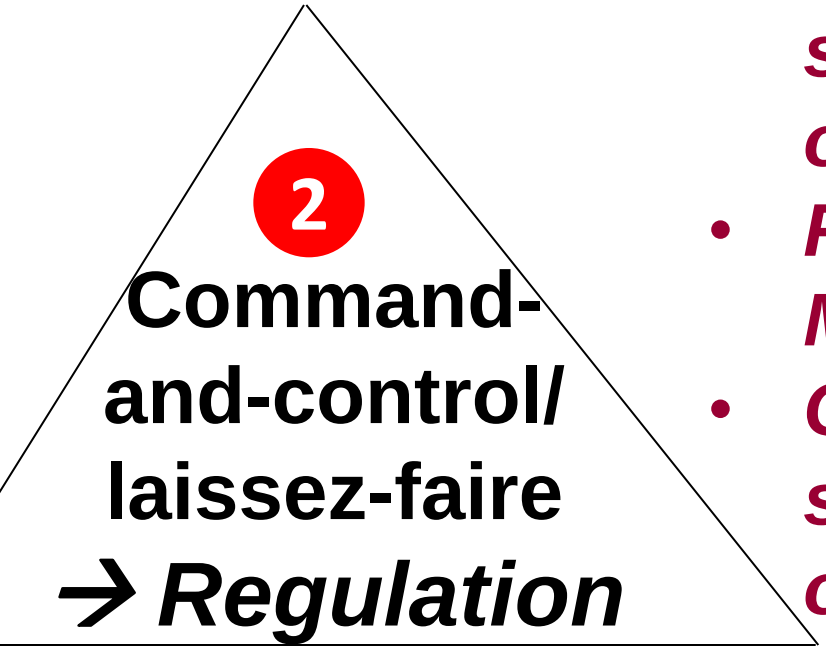
- ***integrated → contracts***
- ***none → integrated → contracts***
- ***contracts more sophisticated (volume, price, quality)***

4

Providers 3

→ *autonomisation (public)*

→ *diversification*



- *Often an initially unplanned side product of provider and/ or purchaser reforms*
- *Requires a new mindset in MoH – and new skills*
- *Chance to develop system strategically (driven by objectives), and not ad hoc*

What are the *objectives* of hospital regulation?

- To **enable hospital care**: establishment and availability of hospitals, capacity and technology
- To promote and protect the **population‘s health**
- To **specify and reward hospital services**: access, types, payment, quality …
- To get **value-for-money**/ not waste public resources
- To **protect hospital employees**
- To **steer the business behaviour** of hospitals: e.g. mergers, financial reserves, advertisements

Enabling hospital care

- Planning of capacities (by area, specialty): ex-ante (= before hospitals are built) or ex-post (= contracts for existing hospitals)
- Combining planning with money for investments
- “Certificate of need“ for high technology

Protect population‘s health

Require

- accreditation,
- enternal quality management,
- participation in external QA programmes,
- possibly with public disclosure of results (e.g. ranking lists)

Specifying and rewarding hospital services

- Access: disallow patient selection, mandate non-scheduled admissions, require physician staffing around the clock, allow patient choice
- Types of services: There may be a case to restrict certain ambulatory services if they can be delivered more efficiently outside hospitals.
- Payment: uniformity of payment units (eg. DRGs) crucial for transparency, uniform prices less so
- Quality: minimum volume thresholds, inclusion of quality into payment

Get value-for-money

- Require Health Technology Assessment for all (new) technologies,
- Include technologies meeting pre-defined threshold or being prioritised into publicly financed benefit basket (provision public or private),
- Disallow technologies with harm > benefit even in private sector
- Regulate payment scheme with efficiency (among other objectives) in mind

Protecting hospital employees

- equal treatment, opportunities and pay for men and women (76/207/EEC and 75/117/EEC)
- right to part-time work (97/81/EC; 98/23/EC)
- safeguarding of employees' rights in the event of transfers of undertaking, businesses or parts of businesses (77/187/EEC; 98/50/EC)
- working times (93/104/EC)

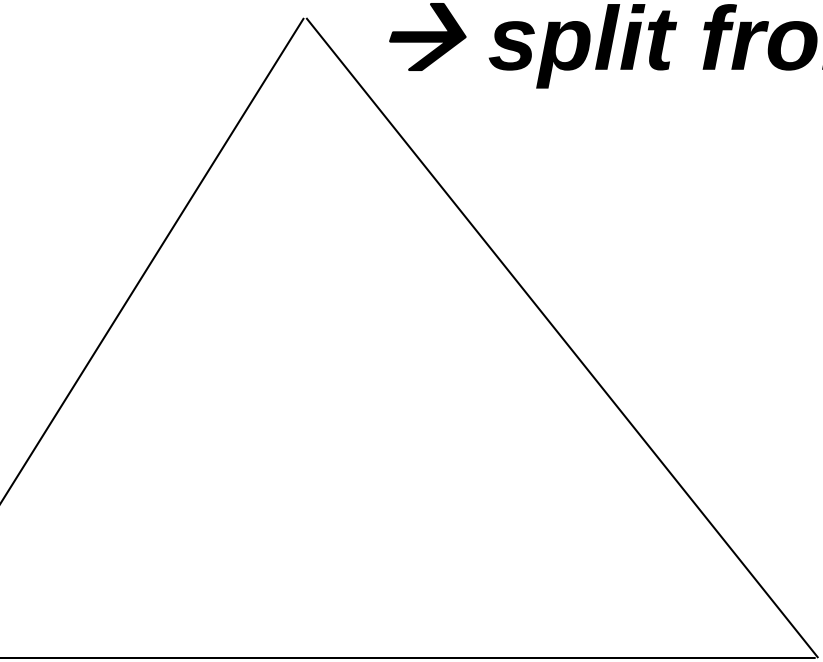
Steering the business behaviour of hospitals - the UK example

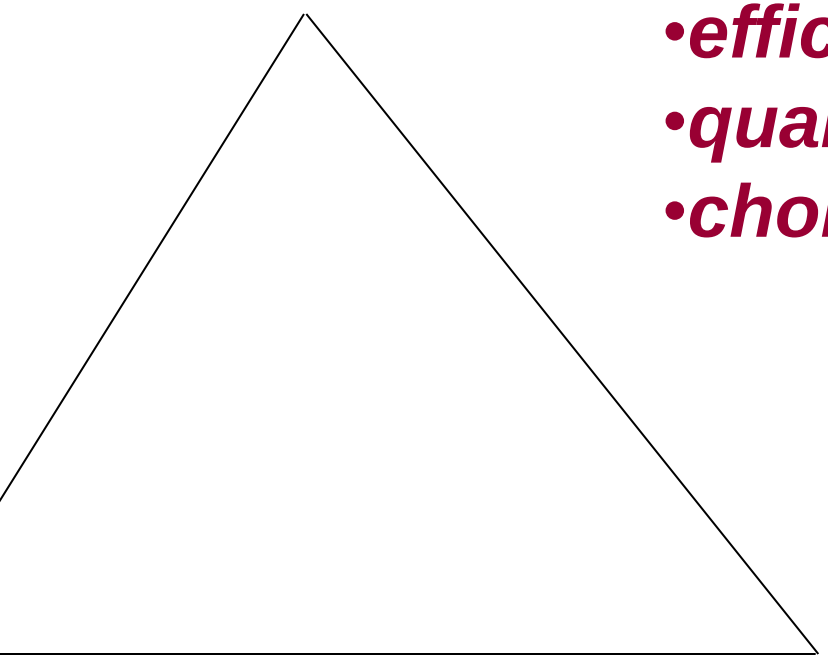
"*The operation of the NHS internal market: Local freedoms, national responsibilities*".

Besides the question of **mergers**, the guidance regulates the exit of providers as well as conduct concerning **pricing and costing** as well as **collusive behaviour**. Examples of collusive behaviour are given: price-fixing, market-sharing agreements, collusive provider tendering for contracts, **lack of competition** at the contract renewal stage, and unjustifiable purchaser support for inefficient units. The difficulties of detection are acknowledged, especially as providers may engage in tacit rather than overt collusion. The **penalties** for collusion are cancellation of the contracts and "management action".

Third-party payers 2

→ *split from providers & regulator*





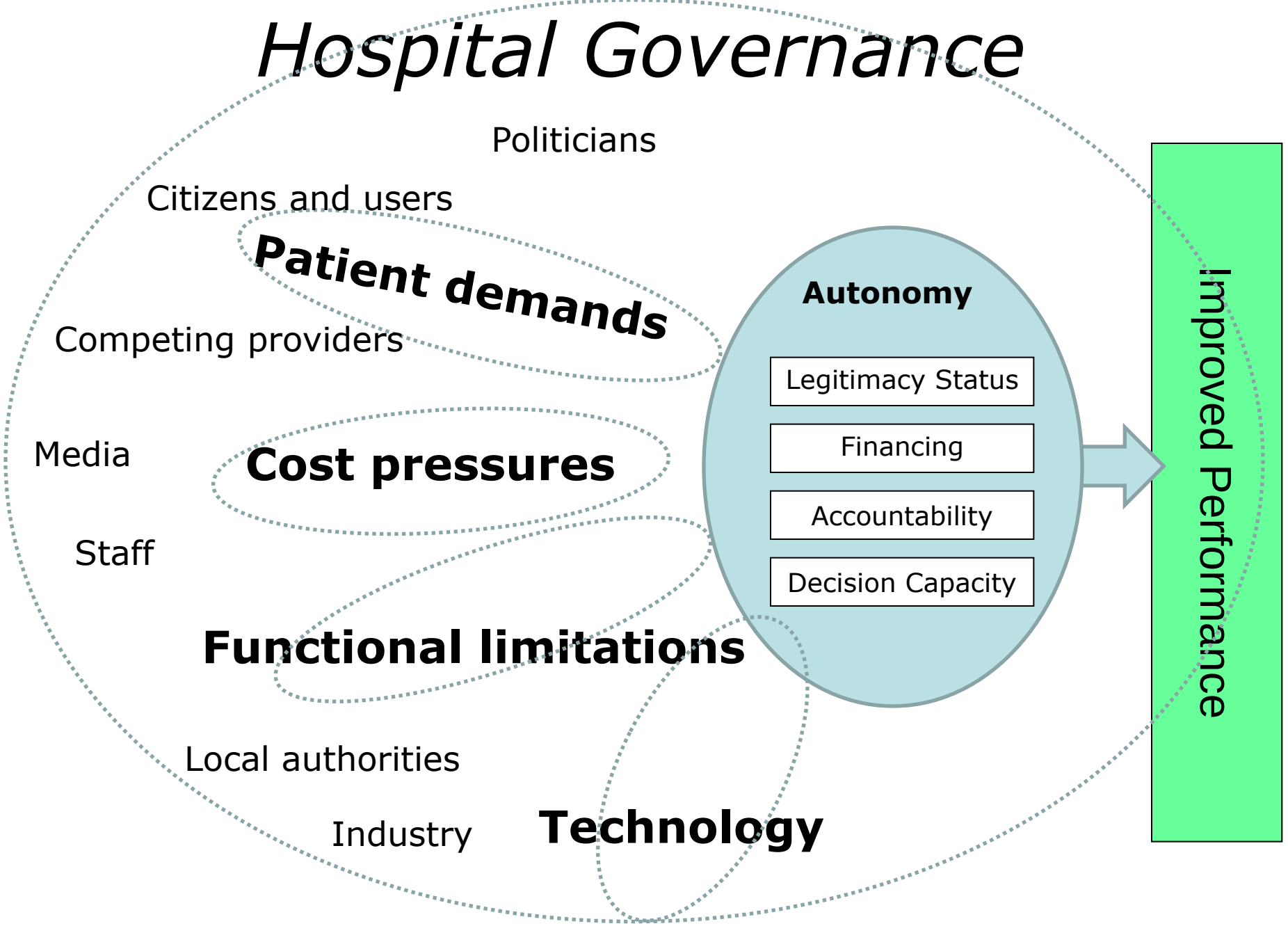
WHY?

- ***efficiency***
- ***quality***
- ***choice for patients***

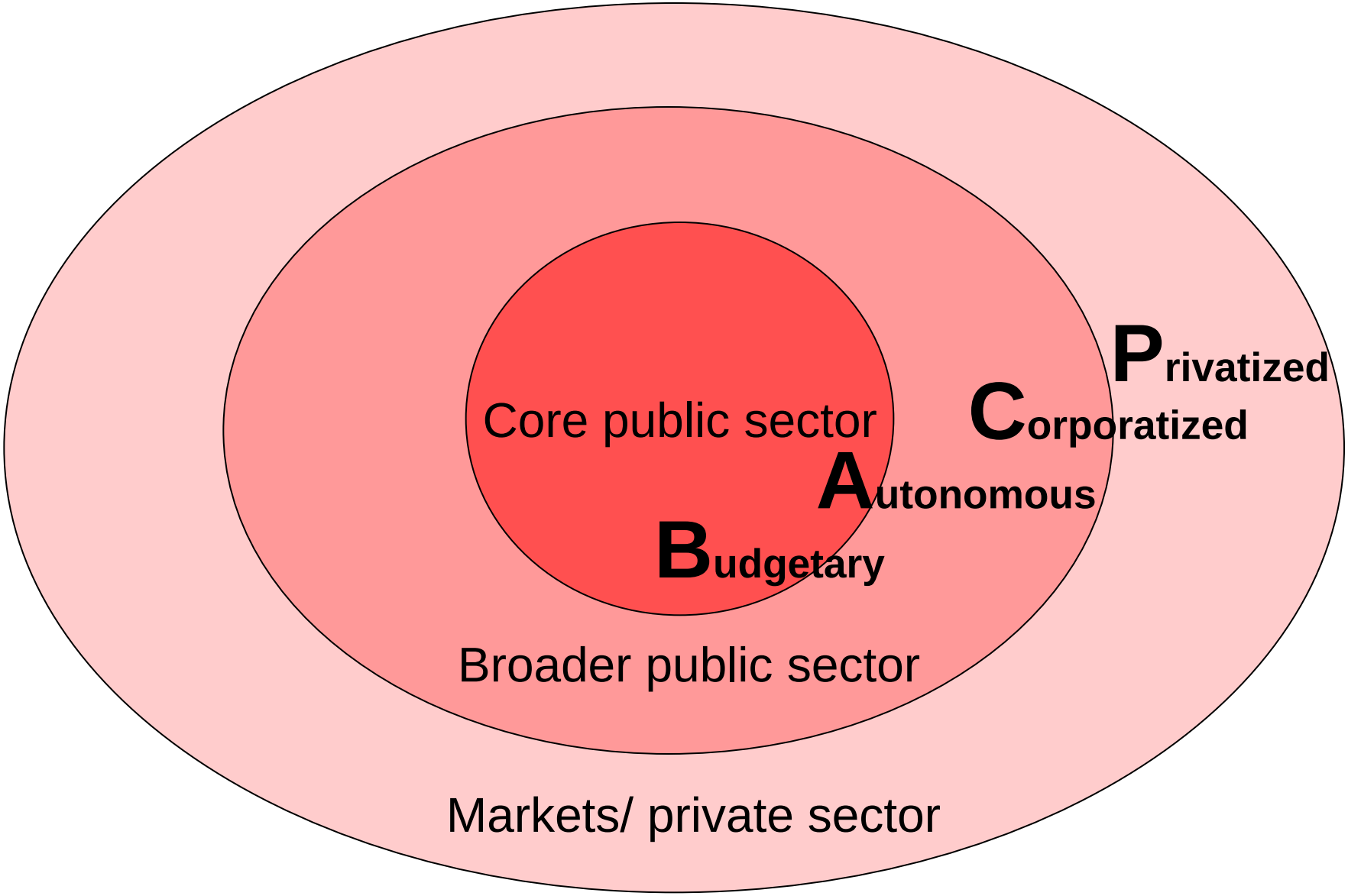
Providers 3

→ ***autonomisation (public)***

→ ***diversification***


Hospital Governance
Politicians
Citizens and users
Patient demands
Competing providers
Media
Cost pressures
Staff
Functional limitations
Local authorities
Industry
Technology
Autonomy
Legitimacy Status
Financing
Accountability
Decision Capacity
Improved Performance

	Core public bureaucracy		Private organization
Autonomy	Few decision rights	→	Full autonomy
Market exposure	None	→	At full risk for performance
Residual claimant	Public purse	→	Organization
Accountability	Hierarchical direct control	→	Regulation and contracting
Social functions	Unfunded mandate	→	Explicitly funded mandate

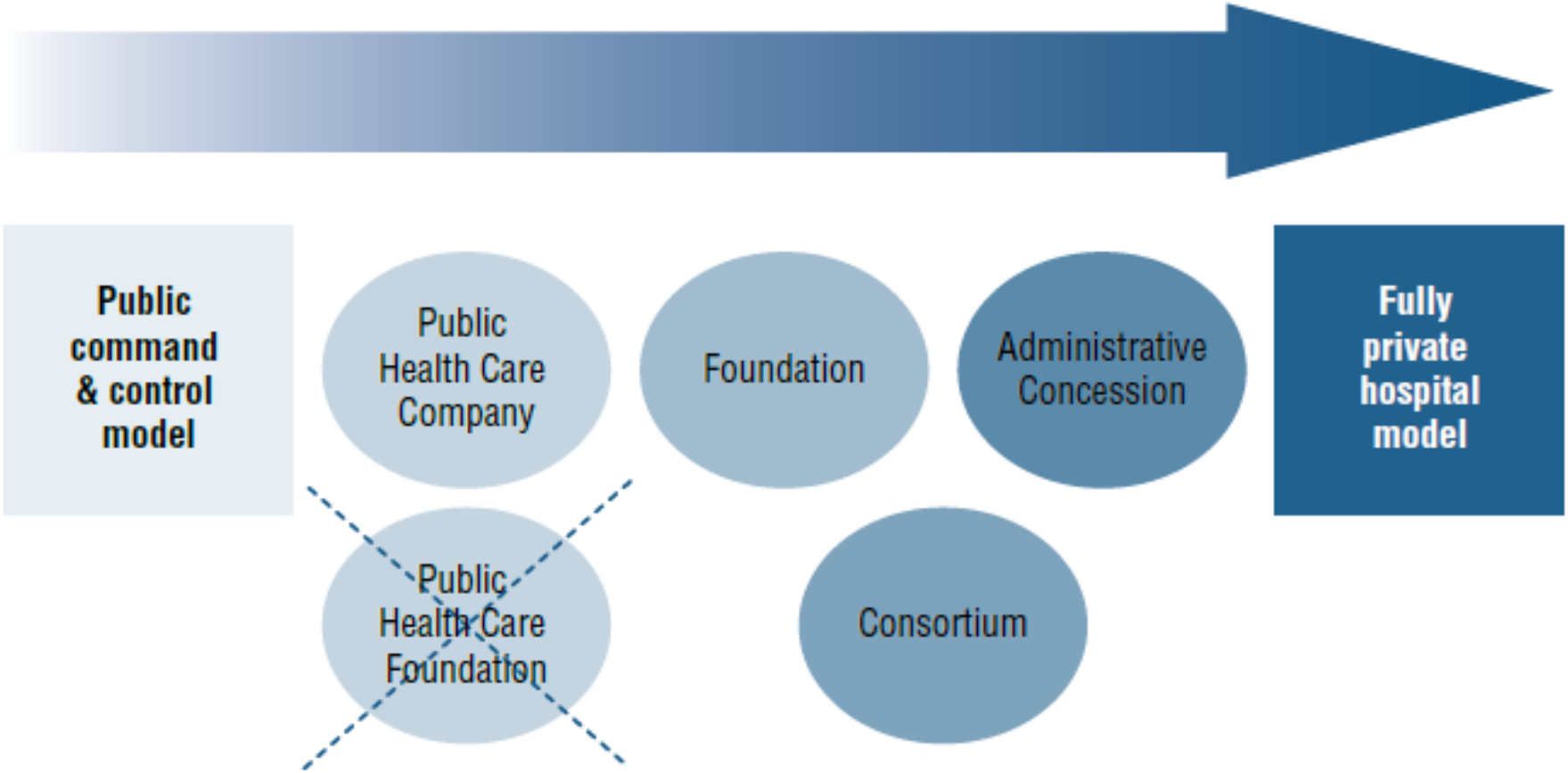


For explanation please refer to „A Conceptual Framework for the Organizational Reform of Hospitals“ (Harding/ Preker, Worldbank)

Reality is complex:

- public hospitals encompass wide range from „command-and-control“ (or “budgetary“, B) via „autonomous“ (A) to „corporatized“ (C)
- public hospitals may be under public or private law
- what about “public enterprises“ with partly private ownership? or PPPs = private investment into “public“ hospitals?
- big differences between contracted and other private for-profit hospitals

Figure 1: Hospital autonomy and self-governance, Spain, 2013



Source: the authors. Note: The cross in dotted lines indicates that there is no current example of this legal model; the last hospital of this type was transformed back into the traditional model in December 2012.

Spain

	Public Healthcare Company	Public Healthcare Foundation	Foundation	Consortium	Administrative Concession
Status/recognition	Regional law. Portfolio by regional health department. Non-statutory staff.	Secondary legislation. Portfolio by regional health department. Statutory staff.	Secondary legislation. Partially decide on services portfolio. Non-statutory staff.	Agreements with non-profit-making organization. Decide on services portfolio. Non-statutory staff.	Contract with private company. Partially decide on portfolio. Non-statutory and statutory staff.
Financing	Capital investment under public procurement law. Budget. Not able to retain surpluses.	Capital investment under public procurement law. Budget. Not able to retain surpluses.	Free to invest; for high-volume contracts, procurement law. Manage cash flow and pay providers. Can retain surpluses but need to reinvest in hospital.	Free to invest; for high-volume contracts, procurement law. Activity and capitation payment. Manage cash flow. Can retain surpluses but need to reinvest.	Free to decide sources of capital investment and not subject to national procurement law. Capitation. Can retain surpluses. Overall profit capped.
Accountability	Supervisory Board chaired by regional health minister. No patient involvement. No reporting obligations.	Supervisory Board partially appointed by regional health minister. No patient involvement. No reporting obligations.	Supervisory Board chaired by regional health minister. No patient involvement. Accounts registered annually.	Supervisory Board of participating organizations. Local business people on the Board. Annual report.	Management Board, Joint Committee and Commissioner. No patient involvement. Annual report.
Decision capacity versus responsibility	Intense political interference. Information partially shared with staff. Some freedom for clinical managers.	Intense political interference. Information partially shared with staff. Some freedom for clinical managers.	Intense political interference. Information partially shared with staff. Some freedom for clinical managers.	Low level of political interference. Information partially shared with staff. Some freedom for clinical managers.	Low level of political interference. Information partially shared with staff. Some freedom for clinical managers.

Netherlands

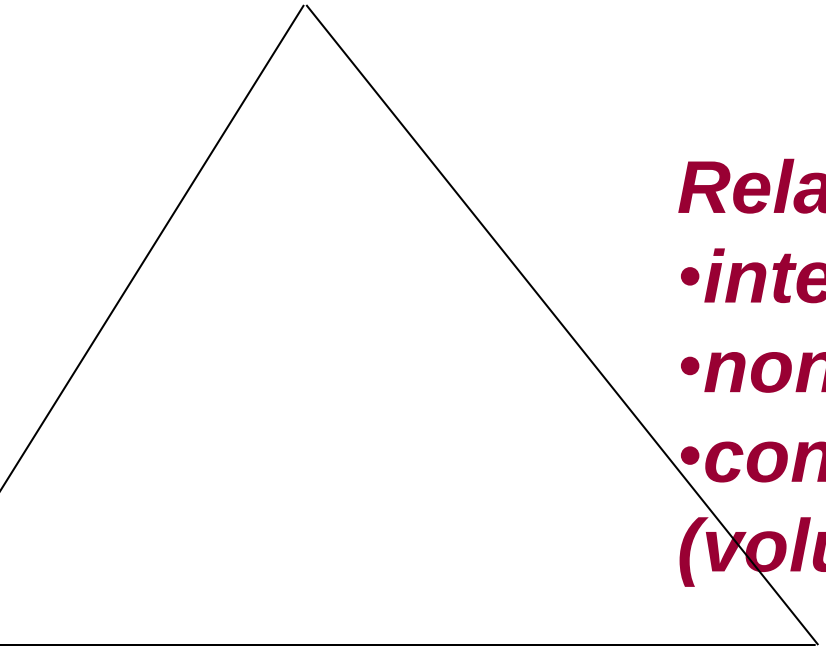
	Private non-profit-making foundations
Status/recognition	All hospitals are non-profit-making foundations. Profit-making hospitals are not allowed by law. Hospitals require a government licence to provide services. Due to the market reform, hospital decisions on the service portfolio are no longer subject to Ministry of Health approval. Staff: 30% salaried (with employee contracts and subordinated to the Executive Board) and 70% self-employed (fee-for-service payments).
Financing	Case-based hospital funding (fixed tariff for each variant (numerous) of a DRG system using so-called diagnosis–treatment combinations (DTCs). Able to retain surpluses and has to bear the deficits if they occur. Capital financing by borrowing from banks.
Accountability	Supervisory Board appointed by cooptation (but increasingly selected on the basis of expertise), without political involvement (appointments by Ministry of Health, Welfare and Sport only in exceptional circumstances). Executive Board appointed by Supervisory Board (but Employees' Council and Clients' Council can give opinion on appointments). Executive Board sets overall budget estimates, which Supervisory Board approves. Required to publish an annual Financial Account and an annual quality of care account. Board meetings not open to public. Citizen participation through the Clients' Council.
Decision capacity versus responsibility	Almost totally free from political interference (but Ministry of Health, Welfare and Sport intervention in exceptional cases). Hospital divisions and units with their own budget and management – high discretionary managerial power. Executive Board's control over physicians is weak, particularly in the case of self-employed physicians.

Israel

	Government owned	Private non-profit-making	Sick fund owned	Private, sick fund major shareholder
Status/recognition	Public asset as per general law. Service portfolio by Ministry of Health; planning ratified by Board of Directors and hospital management. Staff subject to national salary agreements.	United States-based private company. Service portfolio by hospital management and Board of Directors, subject to Ministry of Health approval. Staff subject to national salary agreements.	Sick fund-owned private company. Service portfolio by hospital management and regional and national sick fund, subject to Ministry of Health approval. Staff subject to national salary agreements.	Private company. Service portfolio by hospital management and Board of Directors subject to Ministry of Health approval. Staff contracted. No unionization.
Financing	Capped targeted hospital activities (tariff reductions above cap). Can retain surpluses. "Extra" services for privately arranged and/or supplemental insurance policies (patient payments to "research funds", formally not for choice). Capital investment by government (Ministry of Health/Ministry of Finance/ parliamentary approval) and "friendly" organizations. Specific investment decisions by management, subject to Ministry of Health approval.	Capped targeted hospital activities (tariff reductions above cap). Can retain surpluses. Patient choice if paid for out of pocket or by supplemental insurance (subject to strict physician/hospital income sharing arrangements). Capital investment by owners with own funds, bank loans, etc. Specific investment decisions by management, subject to Board of Directors' and Ministry of Health approval.	Prospective budgets from regional and national sick fund offices (taking into account other sick funds' behaviour). Income from capped targeted hospital activities (tariff reductions above cap). Can retain surpluses (prior to authorization of sick fund). Capital investment from national and regional sick fund and "friendly" organizations. Investment decisions by management (prior authorization of regional and/or national sick fund headquarters).	Block contracts with sick funds plus private pay, based on supplemental insurance, private insurance and direct out-of-pocket payments. Can retain surpluses. Capital investment by shareholders with own funds, bank loans, etc. Specific investment decisions by Director, with Board approval.

Israel (cont.)

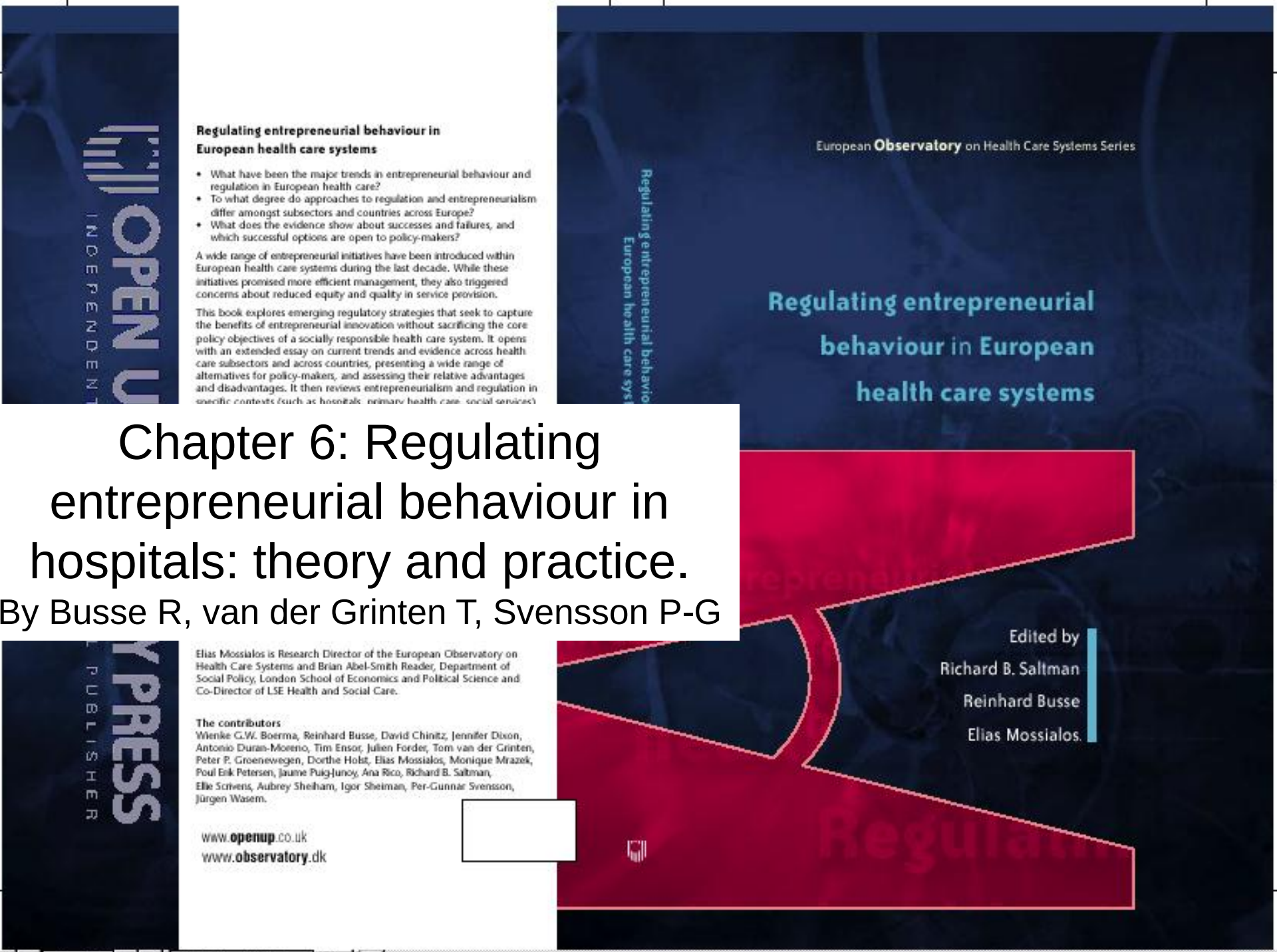
	Government owned	Private non-profit-making	Sick fund owned	Private, sick fund major shareholder
Accountability	Direct control by Ministry of Health (must supply data on patient flows, medical mishaps and salaried employees). State controller evaluates hospital performance. No Supervisory Board or direct citizen participation.	Owners, a number of seats on Board of Directors; additional members proposed by management and approved by owners. Owner-appointed *controller* (reporting to them) plus *State controller* who officially evaluates hospital performance. No Supervisory Board, no direct citizen participation.	Hospital director reports to sick fund headquarters; members and Labor Federation Members with indirect access through *forums*. State controller evaluates hospital performance. No Supervisory Board. Need to report to Ministry of Health patient flows and medical mishaps.	Board of Directors elected by shareholders. No Supervisory Board or direct citizen participation, but need to report to Ministry of Health on patient flows and medical mishaps.
Decision capacity versus responsibility	Direct political influence. Management has little or no control over workforce costs. Freedom to partially affect professional and internal operational structures (subject to Ministry of Health requirements).	Medium level of political interference. Management has little or no control over workforce costs. Can affect professional and internal operational structures (subject to Ministry of Health requirements).	Limited by instructions of regional and/or national sick fund headquarters. Management has little or no control over workforce costs. Can affect professional and internal operational structures (only subject to Ministry of Health and fund headquarters requirements).	Near-complete autonomy for hospital management to achieve the goals set by the Board. Freedom to affect professional and internal operational structures.



Relationship:

- ***integrated → contracts***
- ***none → integrated → contracts***
- ***contracts more sophisticated (volume, price, quality)***

4



Chapter 6: Regulating entrepreneurial behaviour in hospitals: theory and practice.

By Busse R, van der Grinten T, Svensson P-G