

# CHALLENGES OF SERBIAN DRG COSTING

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# MEET SERBIAN TEAM



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# REPUBLIC OF SERBIA

- ✓ Population: 6 647 003
- ✓ Capital: Belgrade
- ✓ Surface area: 88.499 km<sup>2</sup>
- ✓ 57 acute hospitals financed on the basis of DRG



# CHALLENGES OF SERBIAN DRG COSTING – DATA USE



**AR-DRG version 6.0**

ICD -10



**Cost Weights (actual) for AR-DRG version 6.0x**

National Hospital Cost Data Collection Australian Public Hospitals

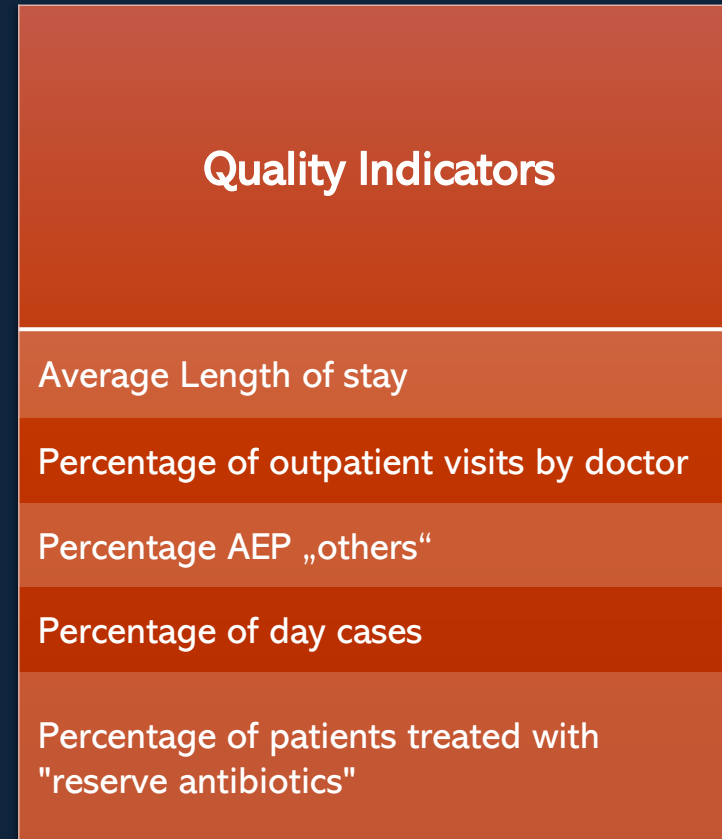
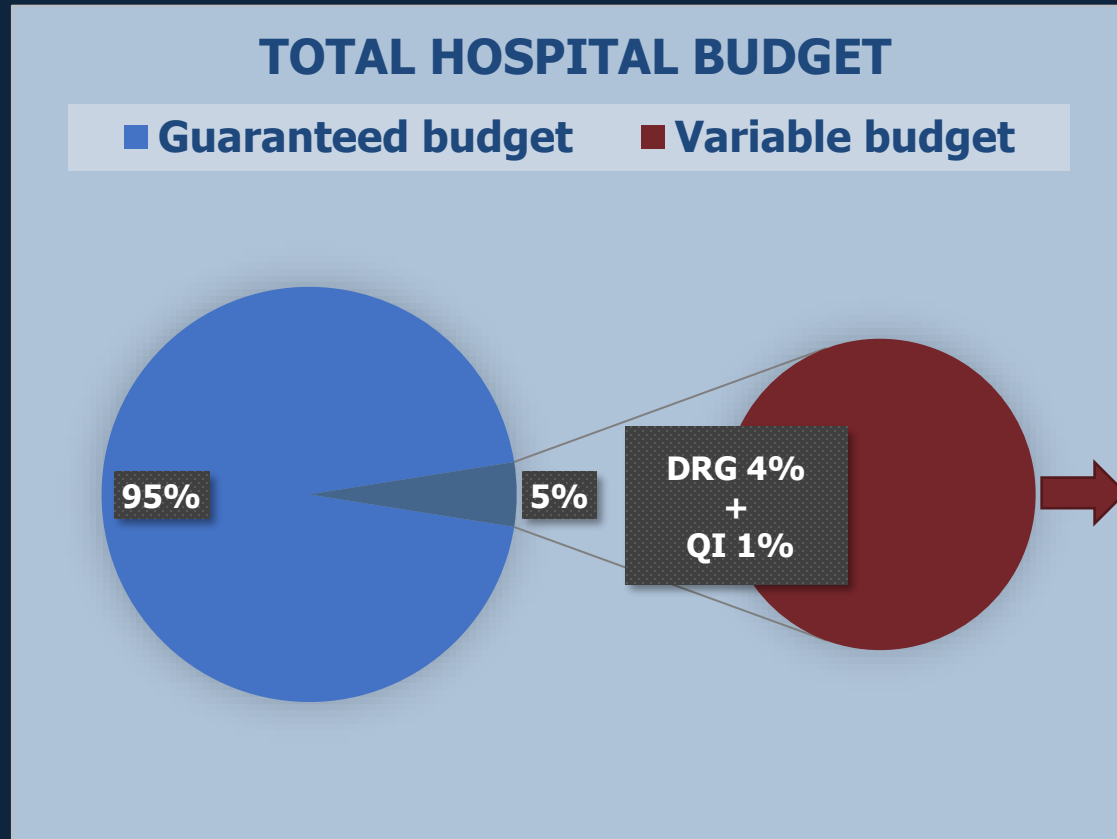


**NHIF E-Invoice**

2019-2023

# HOSPITAL PAYMENT MODEL

Payment for Performance 5% of annual budget



# COSTING PROCESS



## HOSPITALS

- **13 Hospitals** Including University Clinical Centre
- Total number of cases analysed **453,640**
- The number of cases that needed to be processed individually **26,308**



## DATA STRUCTURE

Data sources:

- **e-invoice** of NHIF
- Hospital **financial spreadsheets**
- Additional data related to **operational minutes**

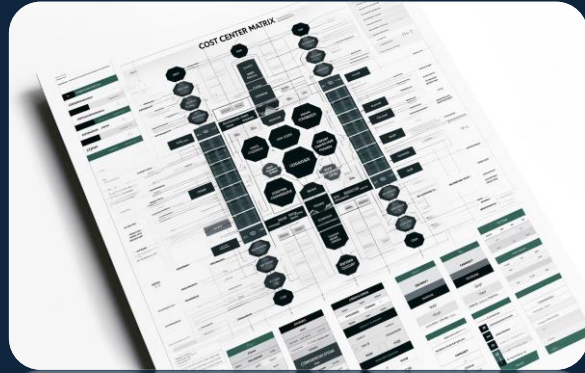


## METHODOLOGY

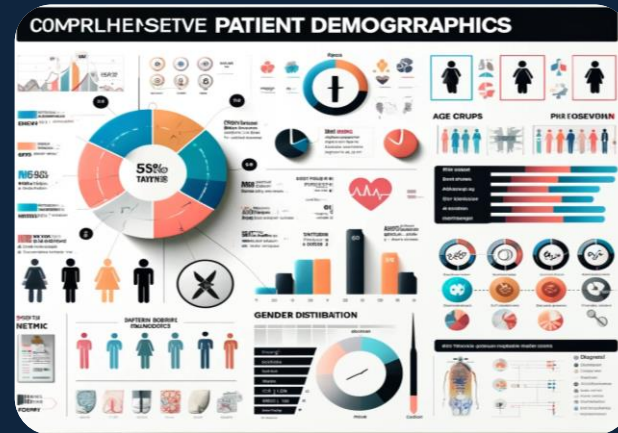
- Allocation of hospitals costs to cost centers with **activity-based costing elements**
- For the calculation of the **DRG cost weights and base rate**



# METHOD SUITABLE FOR USE IN SERBIA



✓ COST CENTER MATRIX



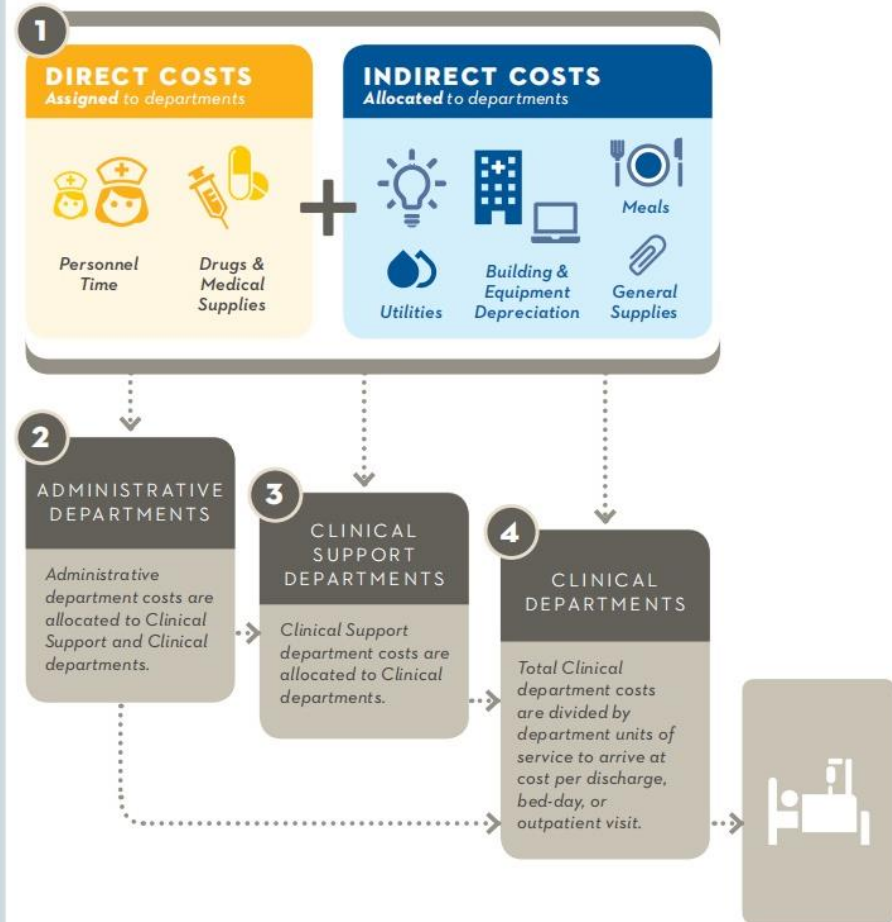
✓ PATIENT LEVEL DATASET



✓ UNIT LEVEL DATASET

# COST CENTERS MATRIX

FIGURE 2. Top-Down Costing



"It is more important to obtain accurate relative cost estimates than accurate absolute unit cost estimates."

"The right costing methodology depends on the context, objectives, and payment system under development."

"Methodologies may be used in combination because there are inherent trade-offs in selecting just one methodology."

"Start with top-down costing to cast a wide net and get a large sample size in a timely manner. But supplement with bottom-up costing to contribute additional information to meet the objectives of the costing exercise."

"The right methodology may evolve as the payment system matures."



# Elaboration of the costing methodology for the allocation of hospital costs to cost centers – cost matrices

Troškovni centar	Površina (m2)	Broj zaposlenih	Broj sestara	BO dani	Broj poseta	Broj analiza	Broj ekspozicija	Jedinice krvi	Broj minuta	Ostali operativni troškovi	Doktori medicine-godišnja primanja (Bruto 2)	Farmaceuti, medicinske sestre/tehničari, zdravstveni saradnici-godišnja primanja (Bruto 2)	Nemedicinski administrativni saradnici, nemedicinski tehnički/pomoćni radnici (Bruto 2)	Lekovi i sanitetski potrošni materijal	Ukupni troškovi (Investicije) oprema/vozila/inventara poslednjih 5 godina	Ukupni godišnji troškovi
										Operating Costs (Exc. Salary)	Doctor of Medicine- Annual Salary	Nurses, technicians, Medical associates, pharmacist- Annual Salary	Non-Medical Staff- Annual Salary	Drugs and Medicine Consumable Supplies		
<b>Godina</b>	2019	2019	2019	2019	2019	2019										
<b>A. Zajedničke nemedicinske službe</b>	0,00	0,00	0,00	0,00	0,00	0,00										
Administracija- Pravni i finansijski poslovi																
Održavanje - Tehnički poslovi																
Pranje bolničkih postelja (večera)																
Sanitarni nadzor i održavanje prostora																
Obezbeđenje																
Socijalna medicina, Informatika i statistika																
Transport																
Ishrana pacijenata																
Ostalo (ukoliko postoji, obavezno navesti na šta se odnosi)																
<b>B. Zajedničke medicinske službe</b>	0,00	0,00	0,00	0,00	0,00	0,00										
Farmaceutika zdravstvena delatnost (bolnička apoteka)																
Laboratorijska biohemijska i mikrobiološka dijagnostika																
Radiološka dijagnostika																
Transfuziologija																
Operacioni blok																
Prijem bolesnika																
Patologija, patohistologija i citologija																
Anestezijologija sa reanimacijom																
Fizijatrija																
Intenzivna nega																
Nuklearna medicina																
Služba za naučnoistraživaču i obrazovnu delatnost																
Polikliničke ambulante i onk komisija i terapiju bola																
Ostalo (ukoliko postoji, obavezno navesti na šta se odnosi)																
<b>Stacionarni troškovni centar</b>																
Stacionar	0,00	0,00	0,00	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Odeljenje za hirurgiju																
<b>Final Cost Centre- Inpatient Department</b>																
	0,00	0,00	0,00	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Služba poliklinike - ambulante																
Služba za fizikalnu medicinu i rehabilitaciju																
Odeljenje za patohistološku dijagnostiku i molekularnu patologiju																
Odeljenje za molekularnu biohemiju sa hematološkom i limunobiološkom laboratorijom																
<b>UKUPNO</b>	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00



# Elaboration of the methodology for the calculation of the Serbian DRG cost weights costs

## Allocation of overhead and intermediate

### Allocation bases for splitting costs of Overhead cost centers.

Administration (finance and legal department)	Number of Staff
Maintenance	Number of Staff
Laundry & Linen	Floor Area (m <sup>2</sup> )
Cleaning Services	Floor Area (m <sup>2</sup> )
Security	Floor Area (m <sup>2</sup> )
Medical Welfare (Social medicine) IT Center and statistics	Number of Staff
Transport	Number of Staff
Dietary	Patient Days
Others	Number of Staff

### Allocation bases for splitting costs of Intermediate cost

Pharmacy and Drugs	Patient Days
Laboratory <sup>1</sup>	Number of Tests
Imaging <sup>1</sup>	Number of Exams
Transfusiology	Number of Blood units; if number of Blood units is not available the costs were allocated to Inpatient cost centers
Operating Theatres	Allocation to Inpatient cost centers
Emergency Medical Services	Allocation to Outpatient cost centers
Histopathology	Number of Tests
Anesthesia and Reanimation	Allocation to Inpatient cost centers
Physiotherapy and Rehabilitation	Number of Visits; if number of Visits is not available the costs were allocated to Outpatient cost centers
ICU	Allocation to Inpatient cost centers
Internal medicine	Number of Visits
Colposcopy, Citology	Number of Visits
Central Sterilisation	Number of Visits
Nuclear Medicine	Number of Exams
Social Medicine and Health Statistics	Number of Staff
Scientific – Research activity	Allocation to Inpatient cost centers
Others	Number of Staff

# PATIENT LEVEL DATASET E-INVOICE

Database E- invoice includes specific cost data on a patient level.

<b>DRG code</b>
DRG weight
Department code
Value of services provided without the value of OB days
Value of OB days - sum
Drugs for hemophilia
Medicines in a health institution
Cytostatics
Drugs from list C
Drugs out of the Drug List
Drugs for the treatment of rare diseases
Dietary products for phenylketonuria
Blood and labile blood products
Dialysis material and dialysis preparations (excluding epoetin)
Sanitary and medical supplies
Implants
Medical material paid outside the budget

Opis .xml formata elektronske fakture verzije 14.03 za sekundarnu

zdravstvenu zaštitu za 2020. godinu

## Sadržaj

Ovaj dokument ima za cilj detaljan opis strukture, sintakse i semantike elektronske fakture za sekundarnu zdravstvenu zaštitu.

Sadržaj ovog dokumenta je sledeći:

Sadržaj .....	1
Struktura fakture.....	2
Opis prvog sloga (Ustanova).....	2
Opis drugog sloga (Osiguranik).....	3
Opis trećeg sloga (DodatneDijagnoze).....	5
Opis četvrtog sloga (ListaLekovaDijagnoze).....	5
Opis petog sloga (DSG).....	
Opis šestog sloga (Usluga).....	
Opis sedmog sloga (SanMedMat).....	
Opis osmog sloga (Kod).....	
Opis devetog sloga (Bud).....	

# UNIT LEVEL DATASET

## Doctors of medicine – annual salary

Cost Centre	Doctor of Medicine-Annual Salary
Inpatient Department	Standardised activities in minutes (identification of surgical patients based on special hospitals' database)

### **NONSURGICAL PART (internistics, neurology, infectology, dermatology, pediatrics...)**

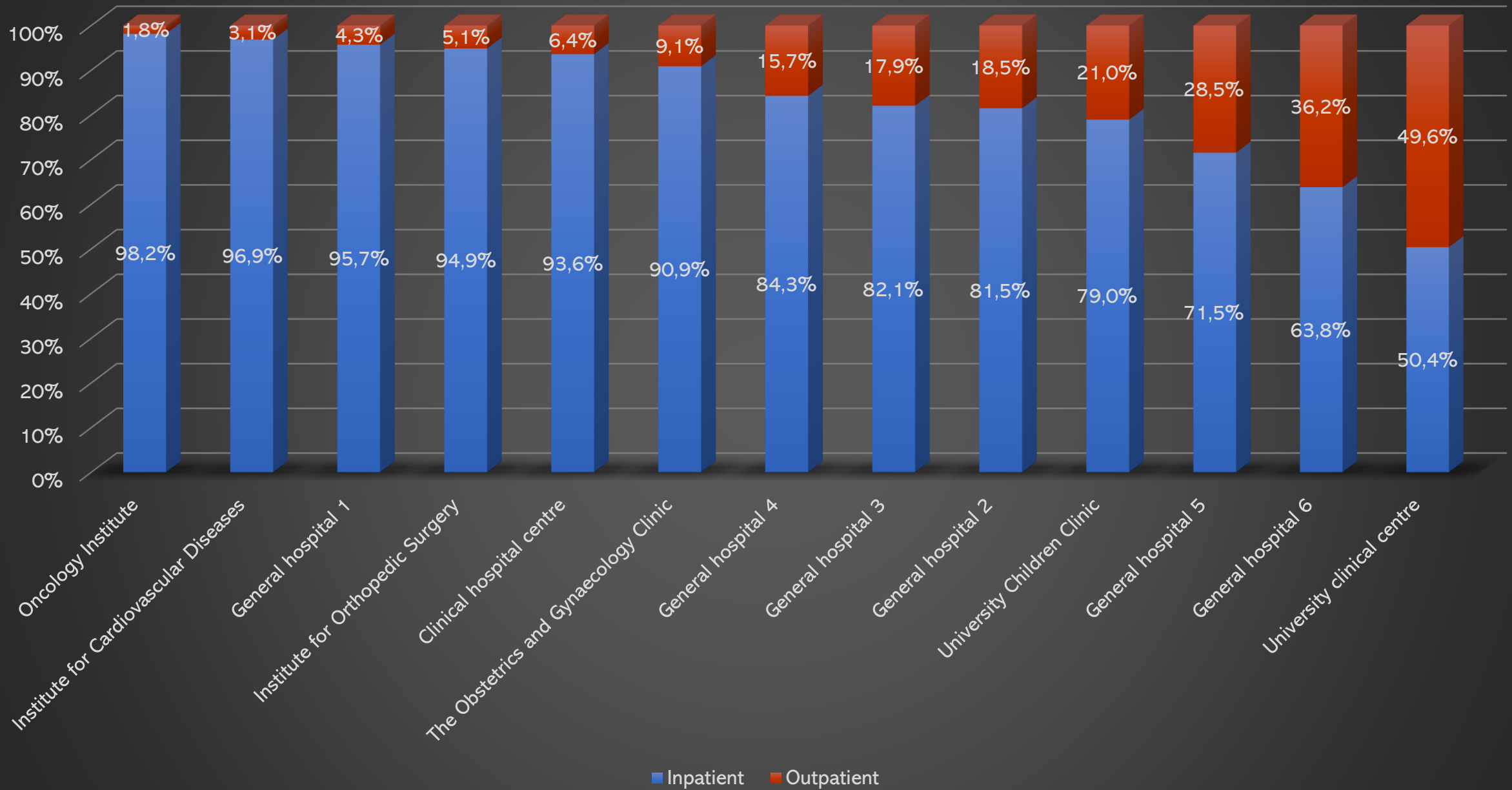
- Admission: 30 min / patient
- Day care: 25 min / patient
- Discharge: 30 min / patient

### **SURGICAL PART (all surgical professions, anesthesiology)**

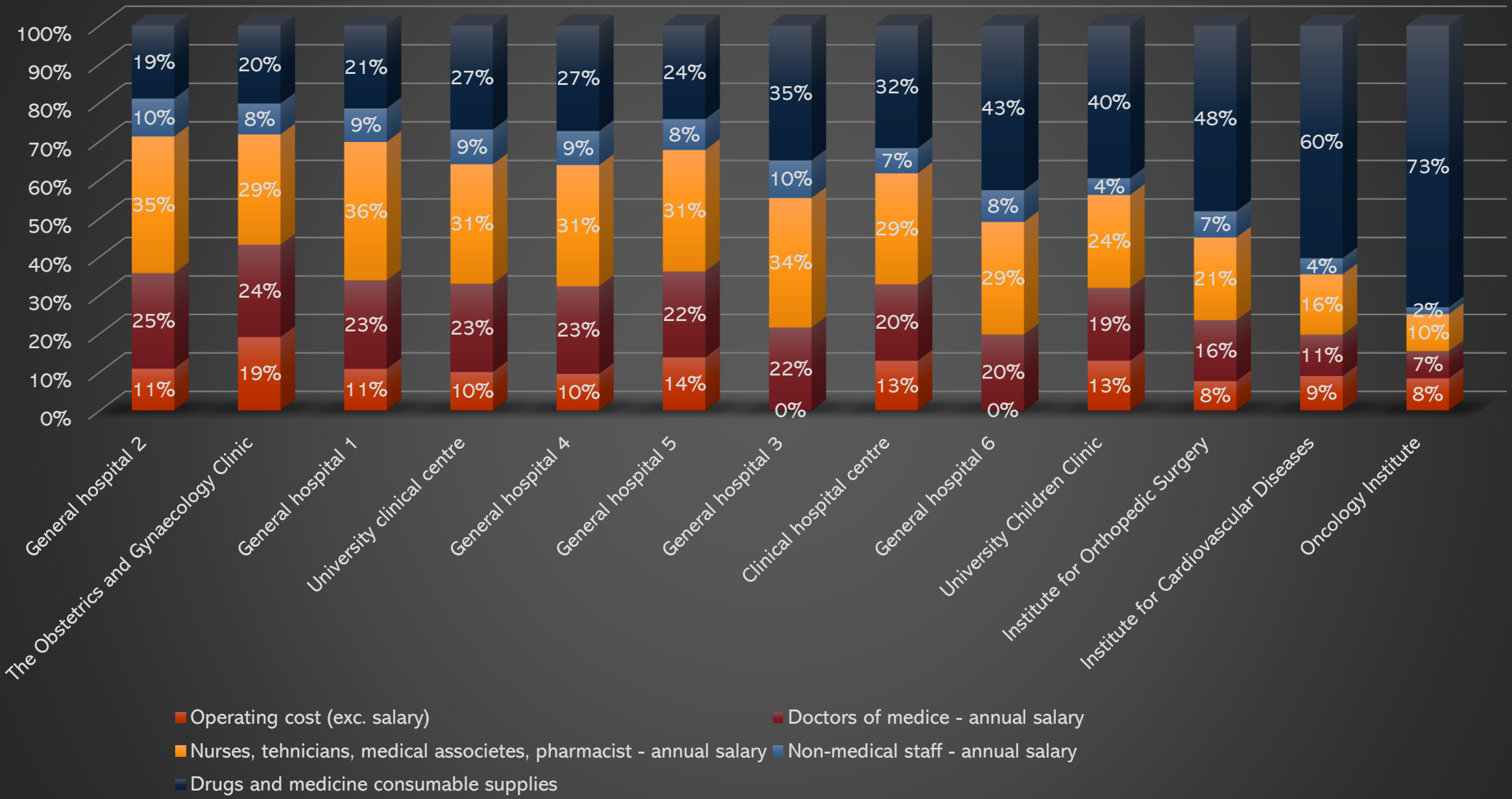
- Admission: 20 min / patient
- Day care: 15 min / patient
- Discharge: 20 min / patient



# THE FINAL STRUCTURE OF TYPES OF COSTS



# THE FINAL STRUCTURE OF TYPES OF COSTS





# COST WEIGHTS – CURRENT AND NEW

DRG Group	Name	Current cost weights	New cost weights	Difference in %
8	Unrelated OR DRGs	1,4	0,9	-33,6
9	Error DRGs	0,0	0,2	0,0
A	<b>Pre-MDC</b>	<b>4,8</b>	<b>2,6</b>	<b>-46,7</b>
B	Diseases and disorders of the nervous system	7,1	7,7	8,4
C	Diseases and disorders of the eye	2,3	1,6	-30,8
D	Diseases and disorders of the ear, nose, mouth and throat	1,4	1,6	10,9
E	Diseases and disorders of the respiratory system	4,2	4,1	-1,5
F	Diseases and disorders of the circulatory system	16,1	16,4	2,3
G	Diseases and disorders of the digestive system	9,2	8,1	-11,5
H	Diseases and disorders of the hepatobiliary system and pancreas	2,8	2,9	3,7
I	Diseases and disorders of the musculoskeletal system and connective tissue	8,2	9,7	17,8
J	Diseases and disorders of the skin, subcutaneous tissue and breast	4,4	4,4	-1,3
K	Endocrine, nutritional and metabolic diseases and disorders	2,4	2,8	16,6
L	<b>Diseases and disorders of the kidney and urinary tract</b>	<b>5,8</b>	<b>8,1</b>	<b>41,2</b>
M	Diseases and disorders of the male reproductive system	1,0	0,8	-15,4
N	Diseases and disorders of the female reproductive system	3,3	4,2	26,6
O	Pregnancy, childbirth and the puerperium	5,1	4,4	-12,6
P	<b>Newborns and other neonates</b>	<b>3,6</b>	<b>2,1</b>	<b>-40,4</b>
Q	Diseases and disorders of the blood and blood forming organs and immunological disorders	1,7	2,2	31,2
R	Neoplastic disorders (haematological and solid neoplasms)	9,1	8,7	-3,6
S	Infectious and parasitic diseases	0,1	0,1	-22,8
T	Infectious and parasitic diseases	0,7	0,8	12,4
U	Mental diseases and disorders	2,6	1,7	-34,2
V	<b>Alcohol/drug use and alcohol/drug induced organic mental disorders</b>	<b>0,1</b>	<b>0,2</b>	<b>38,5</b>
W	<b>Injuries, poisoning and toxic effects of drugs</b>	<b>0,1</b>	<b>0,1</b>	<b>-40,8</b>
X	<b>Injuries, poisoning and toxic effects of drug</b>	<b>0,3</b>	<b>0,4</b>	<b>49,9</b>
Y	Burns	0,1	0,1	16,3
Z	Factors influencing health status and other contacts with health services	2,2	3,0	35,7
<b>Total</b>		100	100,0	0,0

# AN EXAMPLE OF A DISCREPANCY IN THE DATA

## I12A/B/C

Infect/Inflam of Bone and Joint W Misc Musculoskeletal Procs W Cat CC/ Sev or Mod CC/ O CC

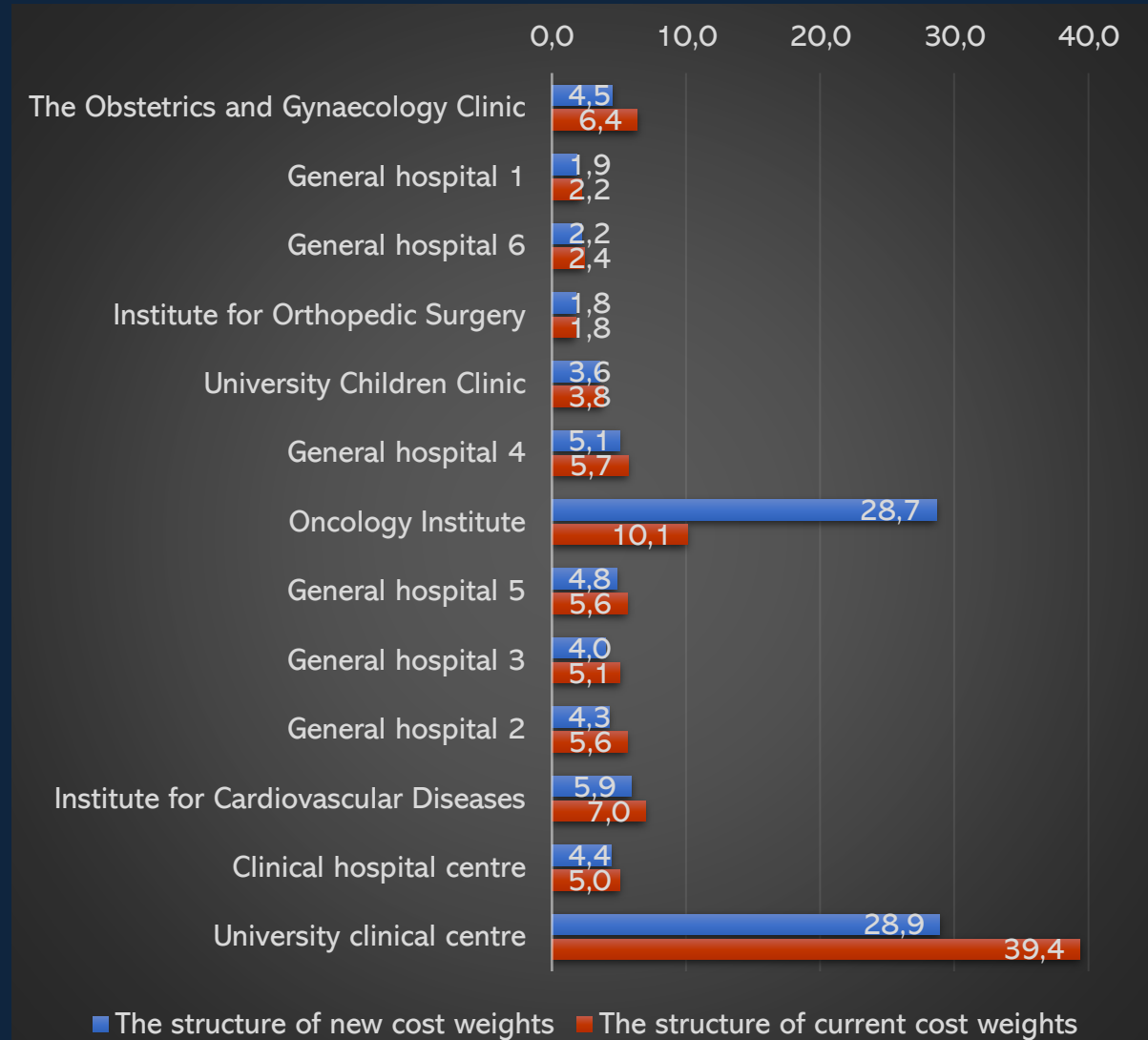
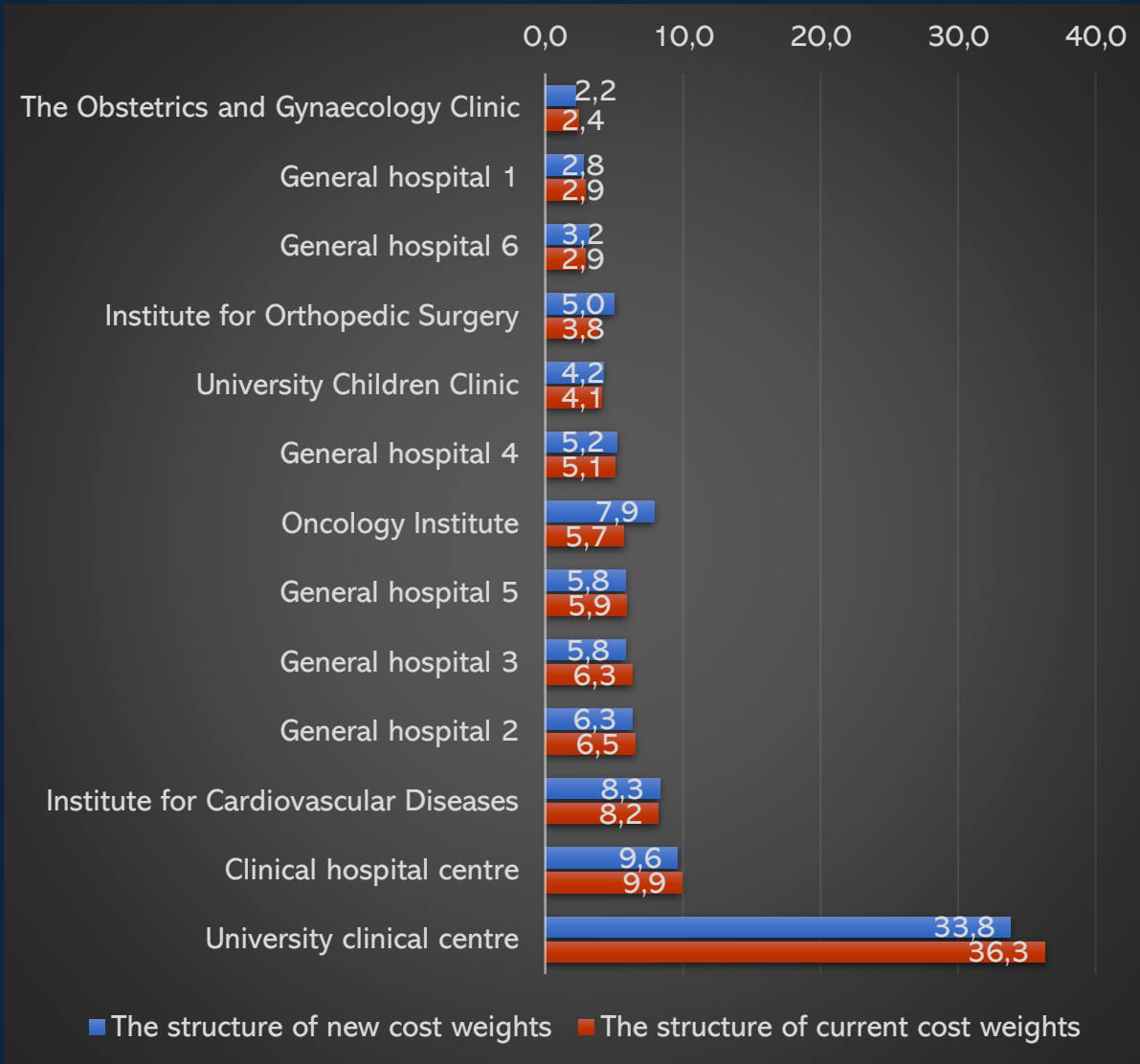
DRG	Number of cases	Total costs	Average costs / case	Cost weight
I12A	17	21.016,44	1.236,26	2,18
I12B	45	84.047,94	1.867,73	3,29
I12C	76	93.888,05	1.235,37	2,17
DRG	Max cost / case	Min cost / case	Max OBD	Min OBD
I12A	3.065,37	437,69	35	4
I12B	5.545,27	314,71	49	4
I12C	3.966,72	45,39	59	0

Average costs in EUR, operating minutes, TOTAL OBD, ICU OBD per selected DRG.

DRG	Operating cost (Exc. salary)	Doctors of medicine annual salary	Nurses, technicians, medical associates, pharmacist - annual salary	Non - medical staff - annual salary	Drugs and medicine consumable supplies	Imaging	Laboratory	Total cost	OBD	OR minute	OBD ICU
I12A	224,30	170,56	446,79	97,06	277,60	0,00	19,95	1.236,26	15,8	1,6	8,8
I12B	244,61	242,15	539,41	136,48	665,54	23,51	16,04	1.867,73	19,3	4,7	7,4
I12C	206,90	175,76	397,11	97,30	293,38	12,52	52,39	1.235,37	14,1	6,9	6,9



# POTENTIAL BUDGET IMPACT – PILOT HOSPITALS 2019 VS 2022



# POTENTIAL BUDGET IMPACT – 2019 VS 2022

The differences between the share of total number of weight of each hospital in total number of weights of all pilot hospitals: current cost weights vs. new cost weights in %.

Hospital	The difference in %
General hospital 3	-7,8
University clinical centre	-6,9
The Obstetrics and Gynecology Clinic	-5,9
Clinical hospital centre	-3,6
General hospital 2	-3,1
General hospital 5	-1,6
General hospital 1	-0,8
General hospital 4	0,8
University Children Clinic	1,3
Institute for Cardiovascular Diseases	1,8
General hospital 6	9,3
Institute for Orthopedic Surgery	30,7
Oncology Institute	37,5

Hospital	The difference in %
General hospital 3	-21,1
University clinical centre	-26,5
The Obstetrics and Gynaecology Clinic	-29
Clinical hospital centre	-12,2
General hospital 2	-24,1
General hospital 5	-13,8
General hospital 1	-14,4
General hospital 4	-10,9
University Children Clinic	-6,7
Institute for Cardiovascular Diseases	-15
General hospital 6	-9,1
Institute for Orthopedic Surgery	0
Oncology Institute	183,7

# DATA CHALLENGES

- ✓ Quality issues in cost allocation
- ✓ Zero value costs
- ✓ Quality issues in patient-level allocation
- ✓ Specific hospital issues
- ✓ Incomplete ICU cost allocation
- ✓ Operating room data
- ✓ Cost discrepancies
- ✓ Data corrections



# FUTURE STEPS - NEW CALCULATIONS BASED ON NEW DATA



## Refinement of cost allocation methods:

- Update allocation keys based on latest data.
- Improve direct cost assignments with granular data.
- Automatisations of collecting financial data

## Recalculation of DRG cost weights:

- Conduct new cost weight calculations with updated data.

## Training:

- Develop comprehensive training programs for hospital staff.
- Conduct workshops
- Optimisation of clinical care processes

## Pilot testing:

- Conduct pilot tests of new calculations in all hospitals.
- Incentives for enhancing quality data



**Thank you!**

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