*Health*BASKET

Sample costs of selected benefits

in Poland

version 2

(Deliverable 24, Phase III)

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Objective of WP9

The objective of the Work Package was to estimate and compare the costs and prices of 10 different health services (episodes of care) in Poland at the micro-level, based on a sample of providers.

The provided data were expected to comprise both information on the resources used and associated costs. Costs were expected to be calculated from the **provider perspective**, what meant they were expected to be based on accounting information sources of the providers. Prices were expected to be taken from **purchaser perspective,** however potential co-payment from the patient point of view were also accounted.

Method of research

Selection of providers

In a first step, a sample of representative health care providers for each setting relevant to the case-vignettes, were selected. The list of providers finally taking part in the exercise and their infrastructure characteristics were presented in An annex: Sample providers and their characteristics. Further in the document the codes were used in relation to the providers, instead of their real names, since costing data were generally regarded as *tangible,* and providers preferred not to be revealed openly as the source of data. For research and control purposes, the names of providers are possible to be revealed.

The providers were selected to the research on the main two criteria:
- the costing information availability,
- performance of services according to case vignettes and
- willingness to participate in the study.

In course of the study, some hospitals and outpatient providers were checked, but finally excluded from the study because they did not fulfil, despite of initial assumptions, one of the criterion listed above. Regarding inpatient settings, tertiary care hospitals, teaching hospitals and university hospitals were excluded from the sample, assuming that their cost structure differs considerably from other hospitals. As regards outpatient services, they were observed both in entirely outpatient facilities, and also in hospitals providing outpatient services. Structural information on providers were collected based on data from Register of Health Care units (www.rejestrzoz.gov.pl), which is an official registration system for health care providers in Poland.

Cooperation with providers personnel

The case-vignettes and accompanying questionnaires were presented to the providers' personnel and they were filled by the personnel with assistance of the University researchers. This approach was selected to avoid delays of submitted cost data and mistakes concerning its calculation, although it has its limitations since medical documentation of particular patients

were not accessible for researchers directly, because of legal limitations derived from Polish law[1].

Therefore, after being instructed, medical personnel (physicians, nurses and medical secretaries) *extracted,* from all medical records, the cases which were the most suitable for the research area, and then *extracted* from the records, the elements of care for resource utilisation study. The case vignettes were anonymous, meaning they did not carry personal data of the patient, although there was a symbol (number) of the case attributed to the case vignette and personnel of the given provider could return to the particular patient record, when required.

Having the resources consumed for given cases determined, financial and accounting personnel attributed costs to resource unit, getting total costs of given case, according to costs level from middle 2006.

Practical application of the method required however, interactive cooperation of the medical personnel and financial personnel of the provider, together with the researcher. This was mainly due to the fact, that accounting services of the provider had **limited information on the costs of given resource.** Therefore, it was often situation that resources extracted from the medical records had to be verified and accommodated to the items which costs were possible to evaluate, by the provider's accounting services.

In some providers and some cases, it was also necessary to make an ***expert estimation*** of the given cost element, because of lacking direct figures in the providers books.

Major difficulties

The main difficulties which were found during the study, were related to following issues:

- there was no universal method of costs calculation used by the providers – this caused that each time the case-vignettes had to be modified, and compromises on precision of the measurement had to be found,

- medical and accounting data rarely met within one providers. Elements of care, understood as cost element by clinical personnel, not necessarily were recognised by the accounting personnel of the same provider. This forced the researchers and cooperating personnel of the providers to another compromises: in search of "*common language*" of the two sides of provider services, the researchers had to decide what elements of resources should be determined to make cost evaluation possible,

- tendency to *standardise* cases. It was a strong tendency, among clinical personnel mainly, to present cases *as standard as possible,* not necessarily reflecting whole variety of the given case. Therefore, it was a tendency to omit elements of care of the given patient, which were extraordinary for the main diagnostic category, or a tendency to omit entire cases of patients which presented significant variation from assumed *standard.* As the first tendency was generally eradicated, the second was supposedly not.

[1] Act on profession of physician, act on health care units and act on personal data protection.

- Case-vignettes descriptions created questions, how far the real case may differ from the one labelling the vignettes. In the most spectacular form it was interpreted in County Hospital One, where appendectomy cases were taken from a period of 12 recent years (between 1994 and 2006), because during this time there were 7 cases of 14 years old boys operated with diagnosis of appendicitis.

Costs data themselves, appeared to be markedly different between providers. Significant differences were revealed as regards labour costs, number and costs of diagnostic procedures, and costs of applied drugs. The biggest differences however, were revealed in category "*Overhead"*, what was most probably caused by differenced in understanding of this category between providers.

Analysis

Data collected were analysed and synthesized by the researchers with the aim of providing an estimation of the direct costs associated with each case-vignette. As a result description of the underlying cost structure was provided for the given service in given provider. Many cost variations were identified within the providers and between the providers, and they were analysed, giving an assumption of explanation.

As a reference point, there were presented results of costs estimations performed with different method and reliable source. The similarities, differences and conclusions from them were discussed in concluding chapter.

Results

Case vignette 1 - appendectomy

Appendectomy for young patient, was available from following providers:

County Hospital One
County Hospital Two
County Hospital Three
Regional Hospital One
Regional Hospital Two
Regional Hospital Three

The result tables are enclosed in the file named appendectomy.xls, in following sheets:

1. Tables – which contains case vignettes tables of individual cases from 6 providers,
2. Analysis – which contains summary figures, analysed by cost item and by provider,
3. Average – which contains summary tables for 6 individual providers and a summary for whole sample (total 7 tables).

Infrastructure of the providers is presented in the table, titled An annex: Sample providers and their characteristics. Generally, the County hospitals were smaller (approx. 200-250 beds) and employ significantly less personnel. The biggest hospital was the Regional Hospital One, which has 720 beds and more than 210 physicians. Shortened Table 1 is presented below.

Code	Beds	Physicians	Nurses	other
County Hospital One	250	48	203	140
County Hospital Two	249	66	253	110
County Hospital Three	201	61	180	136
Regional Hospital One	720	210	440	
Regional Hospital Two	694	194	377	103
Regional Hospital Three	377	103	180	

Table 1. Basic infrastructure elements in the sample hospitals.

Average from all providers

Phase	Elements	Units	No. of units used/ patient	Unit Cost	Total costs
Pre-operative (admission and planning)	*Diagnostic Procedures*		0,0	0,0	0,0
	Imaging (e.g. ultrasound)	No.	0,5	10,3	17,1
	Laboratory (e.g. blood count)	No.	1,8	5,0	17,6
	Laboratory (e.g. blood coagulation, C-reactive protein (CRP), etc.)	No.	0,7	1,5	8,3
	Other (ECG, etc.)	No.	0,3	5,4	7,6
	Care before OP		0,5	22,7	56,7
	Surgeon/Physician input	Patient days	0,4	9,6	25,5
	Nursing input	Patient days	0,4	9,1	17,9
	Other (paramedical)	Patient days	0,3	0,6	12,8
	Drugs, infusions, injections, etc.	DD*	1,9	9,2	31,1
	Drug A, Drug B, etc.		1,1	0,2	2,7
Operation	OP-Team (altogether or separately)	Min.	12,8	0,0	20,4
	Surgeon	Min.	26,4	0,8	29,3
	Anaesthetist	Min.	34,7	0,2	52,1
	OP-nurses etc.	Min.	41,0	0,1	16,1
	Drugs (anaesthetics, other?)	DD	2,3	17,1	76,2
	OP-Theatre running costs (e.g. sterilisation)	Min.	45,0	59,4	357,3
Wake-up room**	Personnel	Hours	3,7	22,0	36,4
Post-operative	*Normal Ward*		0,0	0,0	0,0
	Surgeon/Physician	Patient days	4,2	30,7	226,0
	Nursing	Patient days	4,2	31,9	195,5
	Other (e.g. Physiotherapy)	Patient days	1,4	0,0	16,7
	Drugs	DD*	1,4	11,7	44,5
	usable devices	No.			10,5
	pharmacy overhead		120,6	0,1	12,1
	higienical materials				5,0
	Diagnostic Procedures (e.g. imaging, laboratory)		0,1	2,1	3,2
	Imaging (e.g. ultrasound)				23,0
	Therapeutic Procedures (e.g. punctures, drainages, special wound dressing)	No.	0,0	0,8	0,8
Overhead (including administration, catering, etc.)	Total, or:	Patient days	4,2	88,3	503,6
	- On ward level		0,1	1,6	10,9
	- On departmental level		0,7	10,9	50,0
	- On hospital level		0,0	0,0	0,0
Capital costs (if taken into account in your country)			0,0	0,0	0,0
Total costs			0,0	0,0	1846,8

Table 2. Average costs of the service in 6 providers, by category of cost.

Aggregated table of resource consumption was presented in Table 2. The most reliable were observations of length of stay, which was accounted in average 4,2 days; the shortest stays were observed in County Hospital Two (2,5 days in average), while in Regional Hospital One the average was 6,9 days. Distribution of physicians and nurses time for pre-operative, operation and post-operative was highly differentiated; in County Hospital Two almost all labour costs were attributed to the first phase, since separation was not feasible. Also other

elements of care were differently attributed, because of organizational and accounting reasons Figure 1. Altogether the costs of care for appendicitis patients were estimated 1847 PLN (458 Euro).

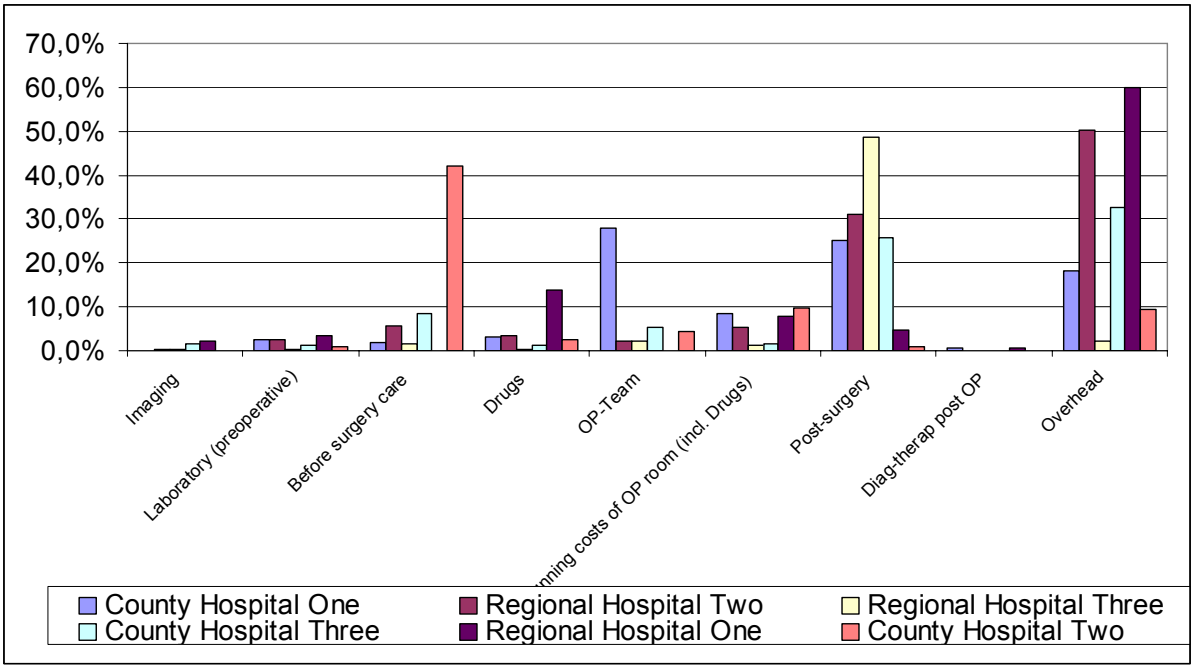

Figure 1. Distribution of costs of appendicitis in sample of hospitals.

The payment for the case, according to Universal Catalogue of Services of NHF, is possible according to two *diagnostic categories:*

213	WYCIĘCIE WYROSTKA ROBACZKOWEGO W PRZYPADKACH POWIKŁANYCH ROZLANYM ZAPALENIEM OTRZEWNEJ Z ROPNIAMI WEWNĄTRZBRZUSZNYMI *Appendectomy in complicated case, with perineiitis and abdominal abscesses*	450
84	WYCIĘCIE WYROSTKA ROBACZKOWEGO *Appendectomy, simple*	145

	PLN/point	Payment range in PLN	
Regional Hospital One	10	1450	4500
Regional Hospital Two	10	1450	4500
Regional Hospital Three	10	1450	4500
County Hospital One	10	1450	4500
County Hospital Two	9,9	1435,5	4455
County Hospital Three	9,8	1421	4410

Table 3. *Contracted products* used for claiming the service, their point and monetary values for given providers.

Depending on the categorisation of patients, providers were able to receive either approx. 1400 PLN, or approx. 4500 PLN for the case, comparing to the average costs of 1847 PLN. Real categorisation was not possible to receive from the providers, mainly due to separation of the medical documentation from reimbursement documentation and limited access to them because of personal date protection. Besides, the characteristics of the Universal Catalogues of Services, and the payment method in Poland causes that hospitals are able to receive significantly more money than resulted from simple categorisation of the case, since they can aggregate payments for different procedures, if they took place during hospitalization. There is a set of different procedures that could be potentially attributed to the case, which enlarge

final payment of the purchaser. This makes that appendectomy might be profitable procedure in most of cases.

Discussion

The data presented by six providers differed remarkably. On average, the procedure was the cheapest, as regards the production costs, in County Hospital Two, where average was 800,33[2] PLN, what is just over 200 Euro. In this hospital however, there were lacking data on postoperational care. Further exploration of the case revealed that average length of stay for uncomplicated appendectomy was 2 days, followed by a number ambulatory visits; they however were not accounted to the overall costs of the case. The highest costs were revealed by Regional Hospital Three (2692 PLN, or 672 Euro). This was three time higher than the cheapest one.

The lowest costs at the individual level were observed in County Hospital Two; 610 PLN (152 Euro), while the highest was observed in Regional Hospital Three; 3459,22 PLN (864 Euro).

	PLN	Euro
Average	1871,944	467,9861
County Hospital One	1643,669	410,9172
County Hospital Three	2235,3	558,825
County Hospital Two	800,33	200,0825
Regional Hospital One	2476,55	619,1375
Regional Hospital Three	2691,7	672,9258
Regional Hospital Two	1338,46	334,615
Minimum	609,75	152,4375
Maksimum	3459,22	864,805
SD	736,6053	

Table 4. Average costs of the service in sample providers, in PLN and Euro (exchange rate 4 PLN/Euro).

The major element differentiating level of costs in each of the hospitals it was the overhead costs. In the Regional Hospital One, an average overhead costs calculated per case was almost 1500 PLN, while in the cheapest County Hospital Two, it was just 75 PLN. This difference was hard to explain, and any clarification of the data with hospital personnel did not help. Method applied to costs accounting in some hospitals, which was not reduced in this study resulted with this kind of inconsistency[3].

In detailed analysis, one might notice also following deviation from the average:

- drugs expenditure in post – operative phase ranged from 0 PLN to 210 PLN in average. The hospital which revealed 0 PLN, declared that drugs costs were included in preoperating phase costs.

[2] Estimated conversion rate was 4 PLN per 1 Euro

[3] The major methodological problem, also pointed by accounting personnel in some hospitals, was that the costs assessment was made in relation to few individual cases/epizodes, without making overall costs assessment of the provider itself. It created possibility that among different providers there were differences regarding attributing certain costs to given service.

- Nursing and surgeons costs in post –operative phase differed markedly, what supposedly was a result differences in LOS but also in salaries level and number of personnel whose salaries were attributed to the service,
- Costs of some diagnostic tests were not revealed in all providers, but when they were, the costs varied, as in USG example, from 2,4 PLN (0,5 Euro) to 53 PLN (ab. 13 Euro) per patient.

General observation was that County hospitals were markedly cheaper than Regional one, with an exception of Regional Hospital Two. The characteristic of this hospital was that, despite its name and category, it plays a role similar to County hospitals; serves for local population, in comparably simple cases. More complicated cases use to be referred to other neighbouring Regional Hospital (eg. AMI).

Conclusions

The differences in revealed costs of production the sample services were quite high. Part of the difference could be attributed to methodology of cost accounting, which was not concise among the providers, but partly to management and structure of the hospitals.

Comparing revealed costs with prices paid by the purchaser (National Health Fund), shows that classifying patients to the cheaper *simple* category (nr 84), three hospitals would achieve break even point in this *product line. T*he next three have to classify part of their patients to *complicated cases* (nr 213*),* to reach this point (although the given cases should be rather qualified as the simple ones).

Case vignette 2 – normal delivery

Normal delivery data were available from following providers:

County Hospital Two
County Hospital Three

Regional Hospital One
Regional Hospital Two
Regional Hospital Three

The result tables are enclosed in the file named normal delivery.xls, in following sheets:

1) Tables – which contains case vignettes tables of individual cases from 5 providers,
2) Analysis – which contains summary figures, analysed by cost item and by provider,
3) Average – which contains summary tables for 5 individual providers and a summary for whole sample (total 6 tables).

Infrastructure of the providers is presented in the table, titled An annex: Sample providers and their characteristics. Generally, the County hospitals were smaller (approx. 200-250 beds) and employ significantly less personnel. The biggest hospital was the Regional Hospital One, which has 720 beds and more than 210 physicians. Shortened Table 5 is presented below.

Code	Beds	Physicians	Nurses	other
County Hospital Two	249	66	253	110
County Hospital Three	201	61	180	136
Regional Hospital One	720	210	440	
Regional Hospital Two	694	194	377	103
Regional Hospital Three	377	103	180	

Table 5. Basic infrastructure elements in the sample hospitals.

Normal delivery - all providers					
Phase	**Elements**	**Units**	**No. of units used/ patient**	**Unit Cost**	**Total costs**
Pre-delivery (admission and planning)	*Diagnostic Procedures*		0	0	0
	Imaging (e.g. ultrasound)	No.	1,06	28,2802	29,332
	Laboratory (e.g. blood count)	No.	1,2	6,89	8,3288
	Laboratory (e.g. blood coagulation, C-reactive protein (CRP), etc.)	No.	1,38	7,7	15,46
	Microbiology (e.g. examination of swap)		0,16	1,5946	2,2346
	Cardiotocography	No.	0,34	0,8778	0,9648
	Other (ECG, lung-function, etc.)	No.	0,42	20,92	24,86
	Care before delivery		0,52	35,46	102,44
	Obstetrician input	Patient days	0,78	59,894	67,2548
	Midwife input	Patient days	0,78	61,023	64,9062
	Other (paramedical)	Patient days	0,24	3	3
	Drugs, infusions, injections, etc.	DD*	2,62	18,6784	45,8244
	Drug A, Drug B, etc.		0	0	0
Delivery	Delivery Team (altogether or separately)	Min.	4,2	0	0
	Midwife	Min.	247,68	0,086	62,7464
	Obstetrician	Min.	39,8	0,128	12,43
	Anaesthetist	Min.	12	0	20
	Paediatrician	Min.	34,6	0,128	10,356
	Delivery room running costs (e.g. sterilisation)**	Min.	4,2	0	32,76
Post-delivery (normal ward for mother and child)	Obstetrician	Patient days	4,56	65,764	271,2176
	Nursing	Patient days	2,94	44,73	177,317
	Other (e.g. Physiotherapy)	Patient days	0,6	0	0
	Drugs	DD*	1,62	8,7236	32,148
	Diagnostic procedures of mother and child (e.g. imaging, laboratory: blood count, bilirubine)	No.	1,26	13,74	28,26
	Therapeutic procedures (e.g. punctures, drainages, special wound dressing)	No.	0,26	13,18	13,18
Overhead (including administration, catering, etc.)	Total, or:	Patient days	3,18	85,684	495,9894
	- On ward level		0,24	19,58	78,32
	- On departmental level		0	0	0
	- On hospital level		0	0	0
Capital costs (if taken into account in your country)			0	0	0
Total costs			0	0	1599,33

Table 6. Average costs of the service in 5 providers, by category of cost.

Average figures of resource consumption were presented in Table 6. The length of stay, was accounted in average 3,18 days; the shortest stays were observed in County Hospital Two (2,8 days in average), while in Regional Hospital Three the average was 6,1 days. Distribution of costs of for pre-operative, operation and post-operative phases was differentiated, because of organizational and accounting reasons (Figure 2). Altogether the costs of care for appendicitis patients were estimated 1599,33 PLN (approx. 400 Euro).

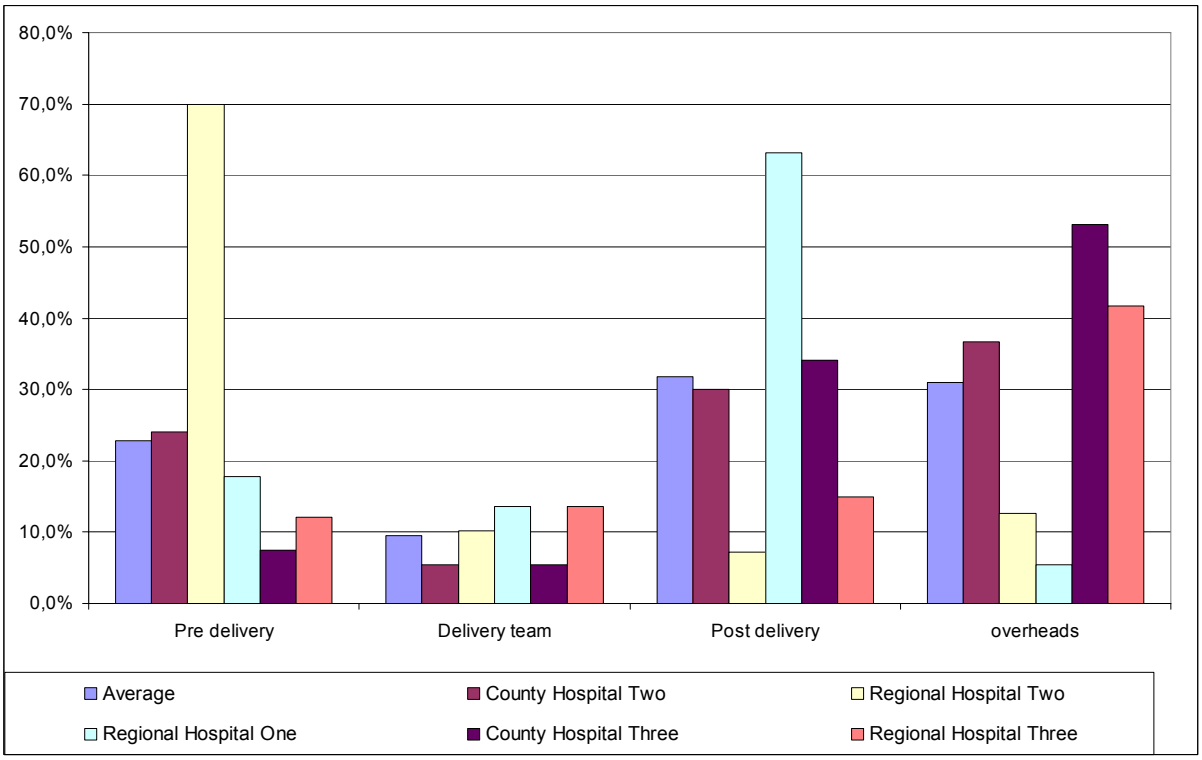

Figure 2. Distribution of costs for phases of care in normal delivery, in sample of hospitals.

The payment for the case, according to Universal Catalogue of Services of NHF, is possible according to *diagnostic category nr 804.* There is also a number of different *diagnostic categories* of the newborns which are easily applicable to majority of cases. Here it was one category taken; *Healthy newborn,* which should be regarded when normal delivery is associated with good health status of the child.

This causes, known and discussed problem, that starting from the introduction of the Universal Catalogue, a number of "pathologies" in newborns rose dramatically. Here, there is only one potential *benefit* presented; *prolonged stay of mother caused by child health problem.*

804	PORÓD FIZJOLOGICZNY *Normal delivery*	100
780	POŁOŻNICTWO - PRZEDŁUŻONA HOSPITALIZACJA MATKI KARMIĄCEJ PIERSIĄ Z POWODU STANU ZDROWIA DZIECKA (OSOBODZIEŃ) *Prolonged hospitalization of mother caused by child health status (per day)*	3
1142	Noworodek zdrowy *Healthy newborn*	100

	PLN/point	Payment for 804	Payment for 1142
Regional Hospital One	9,5	950	950
Regional Hospital Two	9,5	950	950
Regional Hospital Three	9,5	950	950
County Hospital Three	9,8	980	980
County Hospital Two	9,9	990	990

Table 7. *Contracted products* used for claiming the service, their point and monetary values for given providers.

The characteristics of the Universal Catalogues of Services and the payment method in Poland, causes that hospital receive significantly more money than resulted from simple categorisation of the case. There is a number of different procedures that could be potentially attributed to the case, which enlarge final payment of the purchaser. The one which is the most obvious is *neonatological care over healthy newborn,* which is weighted 100 points (similarly like delivery itself). This however can be easily increased by classifying newborn to *less healthy* category. In general an income of the hospitals were estimated at least 1900 PLN per case, while the costs estimated were approx. 1600 PLN.

Discussion

The data presented by five providers differed remarkably; more than twice between the cheapest and the most expensive. On average, the procedure was the cheapest, similarly to appendectomy, in County Hospital Two, where average was 976,30[4] PLN, what is just over 244 Euro. Similarly like in appendectomy, LOS in this hospital however, was among the shortest; 1 to 3 days altogether. The highest costs were revealed again by County Hospital Three (2187 PLN, or 546,7 Euro), which accidentally reported the longest length of stay (6,1 days).

The lowest costs at the individual level were observed in County Hospital Two; 760 PLN (190 Euro), while the highest were observed in Regional Hospital Three; 2805 PLN (701 Euro).

	PLN	Euro
Average	1599,33	399,83
County Hospital Two	976,30	244,08
Regional Hospital Two	1403,86	350,97
Regional Hospital One	1720,95	430,24
County Hospital Three	2186,95	546,74
Regional Hospital Three	1708,59	427,15
minimum	760,50	190,13
maksimum	2805,03	701,26

Table 8. Average costs of the service in sample providers, in PLN and Euro (exchange rate 4 PLN/Euro).

The major element differentiating costs among the hospitals was the overhead costs, similarly like in appendectomy. In the most expensive County Hospital Three, an average overhead

[4] Estimated conversion rate was 4 PLN per 1 Euro

costs calculated per case was 801 PLN, while in the cheapest County Hospital Two, it was just 123 PLN. This difference was hard to explain, otherwise than by method applied to this study[5].

In detailed analysis, one might notice also following deviation from the average:

- Nursing and surgeons costs differed markedly, what supposedly was a result differences in LOS but also in salaries and number of personnel whose salaries were attributed to the service. Differently from other hospitals, the County Hospital Two (the cheapest one), did not separate costs of physician, nurses and among phases. The only exception was the anaesthesiologists, which are contracted *per service* in this hospital, and not salaried.
- Costs of diagnostic tests were not revealed in all providers, but when they were, the costs varied, as in USG example, from 2,1 PLN (0,5 Euro) to 52 PLN (ab. 13 Euro) per examination.

Conclusions

The differences in presented costs of production of the sample of services were quite high, although significantly lower than in appendectomy. Part of the difference could be attributed to methodology of cost accounting, especially the issue of overhead costs, but part should be attributed to management and structure of the hospitals.

Comparing the costs with prices paid by the purchaser (National Health Fund), it shows that classifying patients to the cheaper *simple* category (nr 804 and 1142) three hospitals would achieve easily break even point in this *product line. T*he next one could achieve it without much effort, classifying part of newborns to more *complicated cases,* what is very common phenomenon, according to personnel declarations. The last, the most expensive hospital, would have difficulties in reaching the break even point, even qualifying big part of patients to the *complicated ones.* Taking this *unrepresentative* sample of hospitals and cases, one may say that obstetrics and neonatology is relatively well paid area in Polish public health care system.

Case vignette 3 – Hip replacement

Hip replacement data were available from following providers:

County Hospital One
County Hospital Two
County Hospital Three

Regional Hospital One
Regional Hospital Two
Regional Hospital Three

[5] The major methodological problem, also pointed by accounting personnel in some hospitals, was that the costs assessment was made in relation to few individual cases/episodes, without making overall costs assessment of the provider itself. It created possibility that among different providers there were differences regarding attributing certain costs to given service.

The result tables are enclosed in the file named hip replacement.xls, in following sheets:

1. Tables – which contains case vignettes tables of individual cases from 6 providers,
2. Analysis – which contains summary figures, analysed by cost item and by provider,
3. Average – which contains summary tables for 6 individual providers and a summary for whole sample (total 7 tables).

Infrastructure of the providers is presented in the table, titled An annex: Sample providers and their characteristics. Generally, the County hospitals were smaller (approx. 200-250 beds) and employ significantly less personnel. The biggest hospital was the Regional Hospital One, which has 720 beds and more than 210 physicians. Shortened Table 9 is presented below.

Code	Beds	Physicians	Nurses	other
County Hospital One	250	48	203	140
County Hospital Two	249	66	253	110
County Hospital Three	201	61	180	136
Regional Hospital One	720	210	440	
Regional Hospital Two	694	194	377	103
Regional Hospital Three	377	103	180	

Table 9. Basic infrastructure elements in the sample hospitals.

Vignette 3 - Hip replacement - all providers					
Phase	**Elements**	**Units**	**No. of units used/ patient**	**Unit Cost**	**Total costs**
Pre-operative (admission and planning)	*Diagnostic Procedures*		0,0	0,0	0,0
	Imaging (e.g. X-Ray)	No.	0,1	0,9	7,4
	Imaging (e.g. ultrasound)	No.	0,7	30,2	54,9
	Imaging (e.g. CT)	No.	0,3	4,4	8,6
	Laboratory (e.g. blood count)	No.	3,5	6,1	44,9
	Laboratory (e.g. blood coagulation, C-reactive protein (CRP), etc.)	No.	0,6	1,8	11,3
	Other (ECG, lung-function, etc.)	No.	1,5	8,9	35,8
	Care before OP		1,9	25,8	286,8
	Surgeon/Physician input	Patient days	1,3	26,5	112,9
	Nursing input	Patient days	1,3	21,9	79,4
	Other (paramedical)	Patient days	0,6	0,5	6,1
	Drugs, infusions, injections, etc.	DD*	5,4	23,3	194,2
	Drug A, Drug B, etc.		0,0	0,0	0,0
Operation	*Devices (type of implant, stent, etc.) total price paid by hospital*	No.	0,8	2240,8	3817,6
	OP-Team (altogether or separately)	Min.	21,1	16,0	110,3
	Surgeon	Min.	37,8	0,5	24,4
	Anaesthetist	Min.	78,3	0,2	81,9
	OP-nurses etc.	Min.	85,6	0,1	17,9
	Drugs (anaesthetics, other?)	DD	2,0	34,2	154,9
	utilisation of medical devices		0,0	0,0	23,3
	sterilisation		0,0	0,0	31,7
	Blood		59,2	59,9	423,9
	OP-Theatre running costs	Min.	0,2	15,6	33,2
Wake-up room***			0,3	0,0	10,7
Post-operative	*Intensive Care Unit*		0,0	0,0	0,0
	Surgeon/Physician	Patient days	1,5	6,1	147,1
	Nursing	Patient days	1,5	4,8	99,3
	Other	Patient days	1,0	0,0	18,6
	Drugs	DD*	1,1	9,6	53,5
	pharmacy overhead		613,6	0,0	61,4
	Diagnostic Procedures (e.g. imaging, laboratory)	No.	0,2	1,4	7,9
	Therapeutic Procedures (e.g. punctures, drainages, special wound dressing)	No.	0,0	0,0	5,4
	Normal Ward		0,0	0,0	0,0
	Surgeon/Physician	Patient days	7,6	28,1	389,6
	Nursing	Patient days	7,6	29,9	355,6
	Other (e.g. Physiotherapy)	Patient days	3,1	0,0	26,6
	Drugs	DD*	6,7	18,3	270,9
	Diagnostic Procedures (e.g. imaging, laboratory)	No.	0,9	20,6	56,7
	Therapeutic Procedures (e.g. punctures, drainages, special wound dressing)	No.	0,1	2,5	12,2
	Overhead costs	days	11,5	99,9	1249,4
	Drugs given to patient		1,0	0,0	0,0
Total costs			0,0	0,0	8326,3

Table 10. Average costs of the service in 6 providers of hip replacements, by category of cost.

Average figures of resource consumption were presented in Table 10. The length of stay, was accounted in average 11,5 days; the shortest stays were observed in County Hospital One (8,5 days in average), while in Regional Hospital One the average was 14 days. Distribution of costs for elements of care in the sample hospitals was differentiated, because of organizational and accounting reasons (Figure 3). The most confusing was attributing department personnel costs to overheads in the Regional Hospital One (the biggest in the sample). Altogether the costs of care for appendicitis patients were estimated 8326 PLN (approx. 2080 Euro), in which 3817 PLN (approx. 950 Euro) was the costs of prosthetic device alone. It is however important to stress that proportion of cement to non-cement implants was unequal in the hospitals; in County Hospital Three only cement implants were used, while in Regional Hospitals Two and Three only non-cement ones.

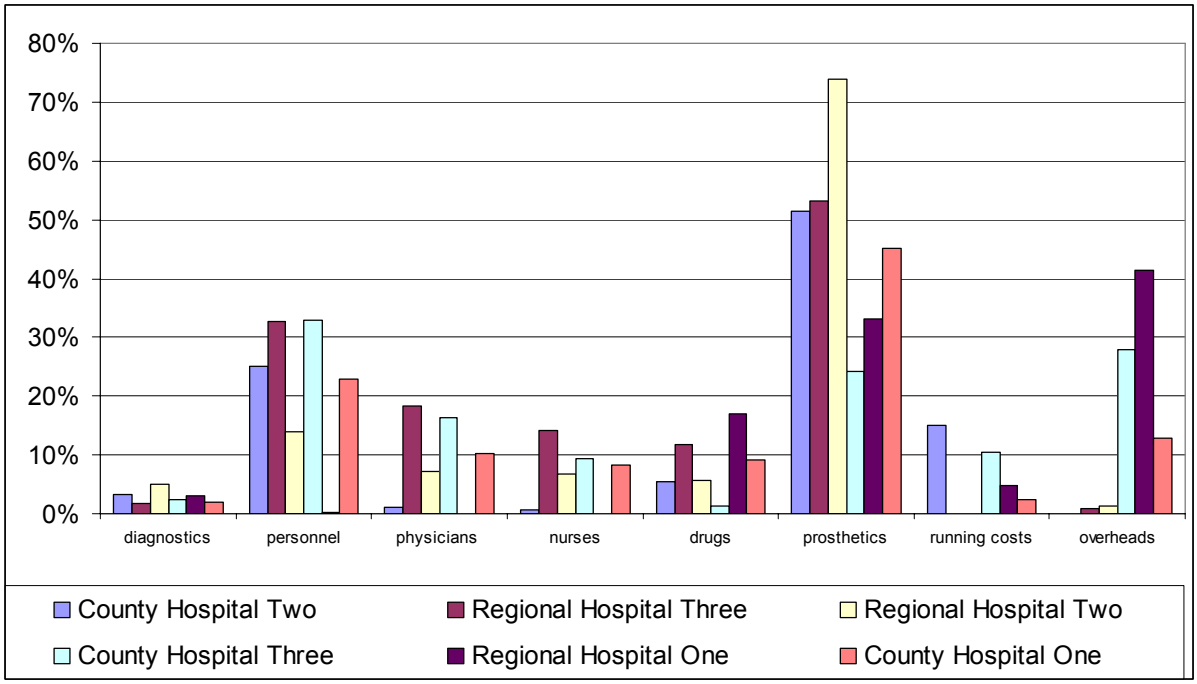

Figure 3. Distribution of costs for elements of care in hip replacement, in sample of hospitals

The payment for the case, according to Universal Catalogue of Services of NHF, is possible according to a number of *diagnostic categories,* varying according to implant which was used (cement or non-cement), and according to scope of the procedure (with or without *acetabulum* replacement). Also revising operation is higher valued. For the purpose of this study only regular hip replacement was taken into consideration, with use cement of non – cement implant. The payment ranged between 10 and 10,1 PLN per point in this category of services, what gives the hospitals payment rates as follows:

ENDOPROTEZOPLASTYKA PIERWOTNA POŁOWICZA BIODRA (Z KOSZTEM ENDOPROTEZY CEMENTOWEJ) *Hip replacement with cement implant*	600
ENDOPROTEZOPLASTYKA PIERWOTNA POŁOWICZA BIODRA (Z KOSZTEM ENDOPROTEZY BEZCEMENTOWEJ) *Hip replacement with non-cement implant*	920

Payment range/PLN	Payment range/Euro

	PLN/point	cement	non-cement	cement	non-cement
Regional Hospital One	10	6000	9200	1500	2300
Regional Hospital Two	10	6000	9200	1500	2300
Regional Hospital Three	10	6000	9200	1500	2300
County Hospital Three	10	6000	9200	1500	2300
County Hospital Two	10,1	6060	9292	1515	2323

Table 11. *Contracted products* used for claiming the service, their point and monetary values for given providers.

The characteristics of the Universal Catalogues of Services and the payment method causes that hospital receive significantly more money than resulted from simple categorisation of the case. There is a number of different procedures that could be potentially attributed to the case, which enlarge final payment of the purchaser.

Discussion

The data presented by the five providers differed slightly. On average, the procedure was the cheapest, in Regional Hospital Two, followed by in County Hospital Two (7153 PLN and 7441 PLN respectively, what is 1789 and 1860[6] Euro).

The highest costs were revealed by Regional Hospital One (9554 PLN, or 2388 Euro), and not far beyond the Regional Hospital Three (9360 PLN and 2340 Euro, respectively). The difference between the cheaper and more expensive hospitals are small, specially taking into consideration differences in costs of implant itself.

	PLN	Euro
Average	8297,0	2074,3
		0,0
County Hospital Two	7441,7	1860,4
Regional Hospital Three	9360,8	2340,2
Regional Hospital Two	7153,9	1788,5
County Hospital Three	8457,6	2114,4
Regional Hospital One	9554,3	2388,6
County Hospital One	7952,0	1988,0

min	5825,6	1456,4
max	11718,3	2929,6

Table 12. Average costs of the service in sample providers, in PLN and Euro (exchange rate 4 PLN/Euro).

The major element differentiating costs among the hospitals were the overhead costs, which were related to LOS. In the most expensive Regional Hospital One the overhead costs were approx. 4000 PLN (although here, the departmental personnel costs were attributed to the overheads), while Regional Hospital Three, and second the most expensive presented only 90 PLN of overheads. Instead the Regional Hospital Three revealed much more personnel costs

[6] Estimated conversion rate was 4 PLN per 1 Euro

in all phases of the hospitalisation. This Hospital also was using expensive implant, almost 5000 PLN each, when Regional Hospital One used implants for 3000 PLN, although both were non-cement.

In detailed analysis, one might notice also following deviation from the average:

- Nursing and surgeons costs differed markedly, what was a result of differences in attributing the costs; in some hospitals they were markedly lower, with higher overhead costs in the same time.
- Costs of implants ranged from approx. 2000 PLN (cement one) to approx. 5000 (non-cement one).
- Costs of diagnostic tests were not revealed in all providers, but when they were, the costs varied, as in USG example, from 3,9 PLN (1 Euro) to 136 PLN (ab. 35 Euro) per patient.

General observation was that differences in costs among the hospitals were rather small, taking specially into consideration the high value of the implant, which different widely among hospitals. There is also inconsistency in overheads calculations, when one hospital reveals 4000 PLN while the other just 90 PLN, for similar period of time.

Conclusions

The differences in presented costs of production of the sample of services were quite small. Part of the existing difference could be attributed to methodology of cost accounting, especially to unclear method of overhead costs calculations. Comparing the costs with prices paid by the purchaser (National Health Fund), it shows that hip replacement can be economically beneficial for hospitals, when aware management of costs is applied. In one case, County Hospital Three however, which was implanting cement prostheses only, and presenting 9000 PLN costs per admission, it might be difficult to run this activity without deficit. All those conclusions have to be careful however, because of unrepresentative sample and doubtful comparability of data among the hospitals.

Case vignette 4– cataract operation

Cataract operation data were available from following providers:

Regional Hospital One
Regional Hospital Five
Regional Hospital Four
Ambulatory care One

The result tables are enclosed in the file named cataract operation.xls, in following sheets:

1. Tables – which contains case vignettes tables of individual cases from 4 providers,
2. Analysis – which contains summary figures, analysed by cost item and by provider,
3. Average – which contains summary tables for 4 individual providers and a summary for whole sample (total 5 tables).

Infrastructure of the providers is presented in Table 13 below. One provider, Ambulatory care One, was purely ambulatory care, employing physicians on *fee-for-service* contracts.

Code	Beds	Physicians	Nurses	Together
Regional Hospital One	720	210	440	
Regional Hospital Two	694	194	377	103
Regional Hospital Three	377	103	180	
Ambulatory care One	0	3	4	

Table 13. Characteristics of sample providers of cataract operations.

Cataract operation - all providers					
Phase	**Elements**	**Units**	**Unit Cost**	**No. of units used**	**Total costs**
Site of consultation/	O Out-patient				
Pre-operative Assessment	*Diagnostic*	No.	0,5	7,8	15,5
	Slit-lamp, other?	No.	0,0	0,0	0,0
	Laboratory (e.g.	No.	3,4	7,0	21,8
	Other (ECG, lung-	No.	1,9	4,8	35,4
Procedure	*Devices (type of*		3,0	158,0	542,3
	OP-Team	Min.	15,8	0,0	20,2
	Surgeon	Min.	19,5	0,1	6,6
	Anaesthetist	Min.	25,1	0,1	7,9
	OP-nurses etc.	Min.	29,5	0,1	5,2
	Drugs	DD	3,9	18,8	87,0
	OP-Theatre	Min.	36,5	62,0	254,0
After-Care	Drugs or other	No.	0,8	4,0	12,9
Overhead	Running Costs of	Min.**	69,6	98,5	734,9
Total costs			0,0	0,0	1743,6

Table 14. Average costs of the service in 4 providers, by category of cost.

Average figures of resource consumption were presented in Table 14. Although the operation could be performed in ambulatory settings, two of the hospitals from the sample; Regional Hospital One and Four, used to hospitalize patients before and after the procedure. The explanation was given, that the hospitals admit patients with complications and this justifies different treatment pattern. Then the length of stay was 2-3,7 days. Costs of implant, as one of the most important cost factor, varied from 360 to 650 PLN (80-160 Euro).

Distribution of costs for elements of care in the sample providers was differentiated by organizational and accounting reasons (Figure 4). The most confusing, similarly to the previous cases, was attributing department personnel costs to overheads in the Regional Hospital One (the biggest in the sample). Altogether the costs of care for cataract patients were estimated 1744 PLN (approx. 440 Euro), in which 542 PLN (approx. 135 Euro) was the costs of implant alone.

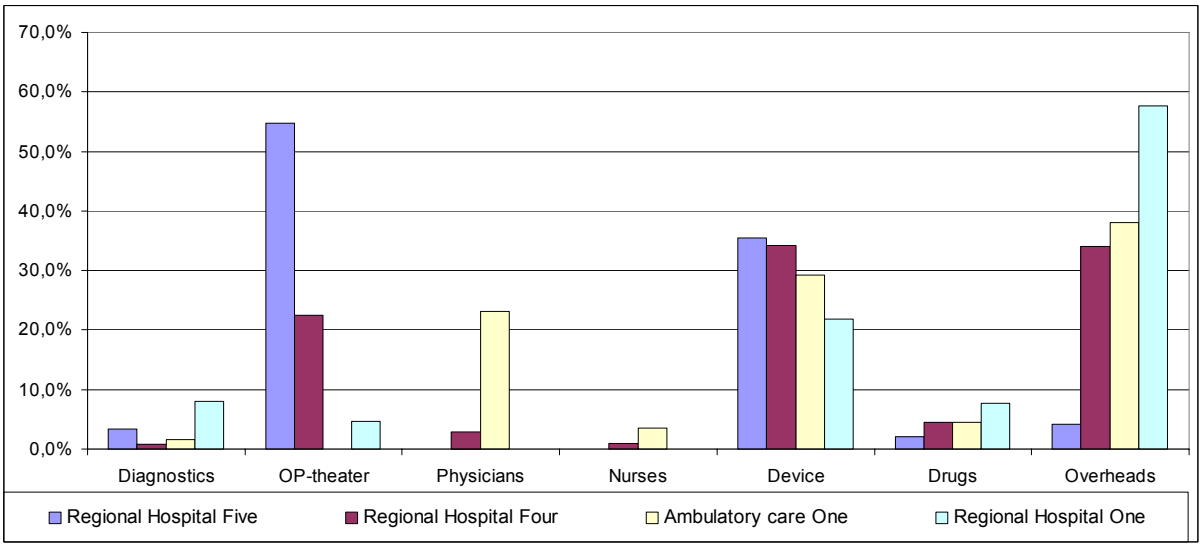

Figure 4. Distribution of costs by element of care, in sample of providers of cataract operation.

The payment for the case, according to Universal Catalogue of Services of NHF, is possible according to *diagnostic category nr 804.* There is also a number of different *diagnostic categories* form more complicated cases, like *combined cataract and glaukoma operation,* with *infusion of silicon oil*, etc.

Here there were three categories taken into account only three contracted products. The payment ranged between 9,8 and 9,9 PLN per point in this category of services, what gives the providers payment rates as follows:

628	ZAĆMA - OPERACJA ZAĆMY NIEPOWIKŁANEJ Z WSZCZEPEM SOCZEWKI METODĄ FAKOEMULSYFIKACJI (Z KOSZTEM SOCZEWKI ZWIJALNEJ) *Cataract operation, no complications, phakoemulsification with soft implant*	260
624	ZAĆMA - OPERACJA ZAĆMY NIEPOWIKŁANEJ Z WSZCZEPEM SOCZEWKI (Z KOSZTEM SOCZEWKI) *Cataract operation, no complications, traditional method with hard implant*	195
631	ZAĆMA - OPERACJA ZAĆMY POWIKŁANEJ Z WSZCZEPEM SOCZEWKI (Z KOSZTEM SOCZEWKI) *Cataract operation, complicated, traditional method with hard implant*	265

	Payment range/PLN			Payment range/Euro	
	PLN/point	phaco+soft lens	hard lens	phaco+soft lens	hard lens
Regional Hospital One	9,8	2548	1911	637	478
Regional Hospital Four	9,8	2548	1911	637	478
Regional Hospital Five	9,9	2574	1930,5	644	483
Ambulatory care One	9,8	2548	1911	637	478

Table 15. *Contracted products* used for claiming the service, their point and monetary values for given providers.

According to law, patients cannot choose the medical product (here, lens implant) and pay it privately, but this regulation is sometimes violated, especially when patient insists. Then, as it was in one of visited providers, patient pays additional amount as a difference of "*standard*" product the chosen one. This may be also additional income of the provider, although not legally approved.

Discussion

The data presented by four providers differed remarkably; more than twice between the cheapest and the most expensive provider. On average, the procedure was the cheapest in Regional Hospital Five, where average was 1110 PLN, what is just over 277[7] Euro. The highest costs were revealed by Regional Hospital One (2570 PLN, or 642,6 Euro).

Average	1 945,46	486,36
Regional Hospital Five	1 109,80	277,45
Regional Hospital Four	1 635,43	408,86
Ambulatory care One	2 248,08	562,02
Regional Hospital One	2 570,50	642,63
minimum	1 035,00	258,75
maksimum	2 719,00	679,75

Table 16. Average costs of the service in sample providers, in PLN and Euro (exchange rate 4 PLN/Euro).

The major element making difference in costs among the providers was the overhead costs, similarly to former cases. In the most expensive Regional Hospital One, an average overhead costs calculated per case was 1482 PLN, while in the cheapest Regional Hospital Five, it was just 46 PLN. This difference was hard to explain, otherwise than by method applied to costs accounting in the providers[8].

In detailed analysis, one might notice other deviation from the average:

- Nursing and surgeons costs differed markedly, mainly between the one private ambulatory setting and the remaining three public hospitals. Differently from other providers, the Ambulatory care One, employs physician and nurses per service contract, what makes also calculation easier.
- Costs of lens implant differed also; mainly between the cheapest Hospital Five, and the rest of providers. After more detailed search it was revealed that the Hospital reported not only phacoemulsification type operations, when soft lens are used, but also traditional, when hard lenses are used. The second ones use to be twice cheaper.

General observation was that differences in costs among the providers were significant and partly the differences might be result of different methods of costs accounting, what expressed in differences in overhead costs.

Conclusions

The differences in presented costs of production of the sample of services were again quite high. Part of the difference could be attributed to methodology of cost accounting, especially

[7] Estimated conversion rate was 4 PLN per 1 Euro

[8] The major methodological problem, also pointed by accounting personnel in some hospitals, was that the costs assessment was made in relation to few individual cases/episodes, without making overall costs assessment of the provider itself. It created possibility that among different providers there were differences regarding attributing certain costs to given service.

in overhead costs, but part should be attributed to management and structure of the providers.

Comparing the costs with prices paid by the purchaser (National Health Fund), it shows that even the most expensive provider, from the ones under investigation, were able to generate benefit in the product line of cataract operations. Similarly like before, taking this *unrepresentative* sample of hospitals and cases, one may say that ophthalmology is relatively well paid area in Polish public health care system.

Case vignette 5– stroke

Data for stroke therapy were available from following providers:

County Hospital One
County Hospital Three
County Hospital Two
Regional Hospital Three
Regional Hospital Two
Regional Hospital One

The result tables are enclosed in the file named stroke.xls, in following sheets:

1. Tables – which contains case vignettes tables of individual cases from 6 providers,
2. Analysis – which contains summary figures, analysed by cost item and by provider,
3. Average – which contains summary tables for 6 individual providers and a summary for whole sample (total 7 tables).

Infrastructure of the providers is presented in the table, titled An annex: Sample providers and their characteristics. Generally, the County hospitals were smaller (approx. 200-250 beds) and employ significantly less personnel. The biggest hospital was the Regional Hospital One, which has 720 beds and more than 210 physicians.

Vignette 5 - stroke					
Phase	**Stroke**	**Units**	**no of units**	**unit cost**	**Total costs**
	Nursing	Hours	8,0	3,5	168,0
Emergency dpt.	Physicians	Hours	0,9	11,6	42,4
Initial diagnosis (Assessment)	*Diagnostic Procedures*				
	Imaging (e.g., CT)	No.	0,4	62,2	67,2
	Imaging (e.g., rtg)	No.	0,8	8,0	10,2
	Imaging (e.g., echo-doppler)	No.	0,3	6,6	12,3
	Imaging (e.g., angiogram)	No.	2,0	48,0	121,3
	Laboratory (e.g. blood sugar, etc.)	No.	6,5	5,4	75,9
	Other	No.	0,2	10,0	15,5
Main Therapy	Lysis				
	Drugs		3,7	4,8	109,8
Hospital care (convalescence)	*Intermediate Care Unit (Stroke*				
	Physicians	Days	6,0	69,0	575,7
	Nursing	Days	6,0	46,8	422,0
	Other	Days	1,3	3,3	15,9
	Drugs	DD	5,2	7,1	252,9
	Diagnostic procedures (e.g. imaging,	No.	0,8	33,3	123,3
	Other therapeutic procedures	No.	0,2		1,0
	Normal Ward (which? _____)		2,1	22,8	287,7
	Physicians	Days	3,7	31,7	313,9
	Nursing	Days	3,7	13,4	161,1
	Other	Days	1,4	3,8	28,1
	Drugs	DD	4,2	3,4	118,5
	Diagnostic procedures (e.g. imaging,	No.	0,1	3,2	8,0
	Early rehabilitation				22,1
	Physiotherapist	Days	5,8	29,9	193,1
	Speech therapist	Days	4,3	9,2	121,7
	Other	Days	4,9	12,5	110,0
Discharge planning	Drugs given to patient until contact	DD			
	Medical aids given to patient	Units			
Overhead (including administration, catering, etc.)	Total, or:	Patient days	14,7	96,8	1568,9
	- On ward level		1,5	0,4	4,7
	- On departmental level				
	- On hospital level				
Capital costs (if taken into account in your country)					
Total costs					4955,0

Table 17. Average costs of the service in 6 providers, by category of cost.

The consumption of resources in case of stroke patients was presented in the Table 15. Total average costs was estimated at 4955 PLN (approx. 1250 EURO). Except this parameter the most reliable one refers to LOS, which in average was estimated 14,7 days, including (in average) 8 hours in emergency unit. In average 6 days of physicians and nursing care were attributed to the case, and approx. 6 days of rehabilitation by physiotherapist, 4,3 days by speech therapist and approx. 5 days qualified as *other* for of rehabilitation. In approx. 40% os cases CT examination was performed, and more frequently RTG ones. Angiography was differently qualified and costed in different providers; in some it was separated the imaging from injection of contrasting substance, in some other their were named and accounted together. Therefore there were striking differences observed both in consumption of resources and costs of units in diagnostic procedures.

The use of drugs, although at the providers level connected to the distinguished phases of care (emergency, intermediary and convalescence), were not possible to analyze with this level of detail, mainly due to the fact that not in every provider all phases were possible to observe.

Therefore more certain is the average total consumption of drugs which accounted approx. 500 PLN per episode (125 Euro).

The payment for the case, according to Universal Catalogue of Services of NHF, is possible according to *diagnostic category nr 1163 or 1166.* Additional payment is however possible for the days spend at intensive care (ICU) and rehabilitation unit, what may even multiply the payment; per day payment for care in ICU the charge is from 1200 PLN (300 Euro) to 2400 PLN (to 600 Euro).

Code	Name	nr of points	PLN/point (est.)
1163	UDAR MÓZGU - DIAGNOSTYKA PODSTAWOWA, LECZENIE Stroke, basic diagnostics and therapy	180	9,6-9,8
1166	UDAR MÓZGU - DIAGNOSTYKA ROZSZERZONA, LECZENIE Stroke, widened diagnostics and therapy	230	9,6-9,8
261	LECZENIE W OIT PACJENTÓW KWALIFIKOWANYCH WG SKALI TISS 28 I PED. TISS 28 - OD 25 DO 35 PKT W SKALI TISS (ZA OSOBODZIEŃ) - TYLKO W OIT, Intesive care for patients in adult classification TISS 28 and pediatric classification 28 between 25 to 35 points (per day)	120	9,5-9,8
263	LECZENIE W OIT PACJENTÓW KWALIFIKOWANYCH WG SKALI TISS 28 I PED. TISS 28 - OD 36 PKT (ZA OSOBODZIEŃ) - TYLKO W OIT, Intesive care for patients in adult classification TISS 28 and pediatric classification 28 over 36 points (per day)	240	9,5-9,8
005.10.0003	REHABILTACJA OGÓLNOUSTROJOWA W WARUNKACH ODDZIAŁU STACJONARNEGO (OSOBODZIEŃ) Stationary rehabilitation, general (per day)	90	1
005.10.0005	REHABILITACJA NEUROLOGICZNA WCZESNA (OSOBODZIEŃ) Early stationary rehabilitation (per day)	100	1

Table 18. *Contracted products* used for claiming the service, their point and point values for given providers.

The payment per point ranged between 9,5 and 9,8 PLN in services at ICU and neurological/stroke unit, and 1 PLN per point in rehabilitative services. Taking into consideration revealed resource utilisation figures, including LOS at different units, the payment rates looks as follows:

	PLN					
	PLN/point	*1163*	*1166*	*261*	*005.10.0005*	Total
County Hospital One	9,8	1764	2254	2352	200	4806
County Hospital Three	9,6	1728	2208	2304	1500	6012
County Hospital Two	9,7	1746	2231	0	250	2481
Regional Hospital Three	9,8	1764	2254	0	100	2354
Regional Hospital Two	9,8	1764	2254	0	200	2454
Regional Hospital One	9,8	1764	2254	4704	1400	8358
	Euro					
	Euro/point	*1163*	*1166*	*261*	*005.10.0005*	Total
County Hospital One	2,45	441	563,5	588	50	1201,5
County Hospital Three	2,4	432	552	576	375	1503
County Hospital Two	2,425	436,5	557,75	0	62,5	620,25
Regional Hospital Three	2,45	441	563,5	0	25	588,5
Regional Hospital Two	2,45	441	563,5	0	50	613,5
Regional Hospital One	2,45	441	563,5	1176	350	2089,5

Table 19. Payment expected for the *contracted products* by given providers.

The potential (not actually registered) payment in the hospitals ranged from approx. 2350 PLN (588 Euro) to approx. 8358 PLN (2090 Euro), per episode of stroke. Since the actual data were not revealed by the hospitals[9], the estimations of total amount charges were made at the basis of resource utilization; mainly LOS at different units. This calculation is however the most likely underestimated to some extend. Utilization of emergency unit was not revealed in cases of County Hospital Two, and Regional Hospitals Three and Two; they were not reported in the resource consumption tables, therefore they were also not counted as potential source of income, which weight a lot.

Discussion

The data presented by six providers differed enormously; over fivefold between the cheapest and the most expensive provider. On average, the case was the cheapest in Regional Hospital Two, where average was 1814 PLN, what is just over 454[10] Euro. The highest costs were revealed by Country Hospital Three (10772 PLN, or 2693 Euro). Totally the average was 5019 PLN (1255 Euro)[11].

Average	5019,371	1255
County Hospital Three	10772	2693
County Hospital Two	2859	715
Regional Hospital Three	4031	1008
Regional Hospital Two	1814	454
Regional Hospital One	7057	1764
County Hospital One	3197	799
minimum	1327	332
maksimum	11406	2852

Table 20. Average costs of the service in sample providers, in PLN and Euro (exchange rate 4 PLN/Euro).

[9] The reason for not revealing actual payments for given cases were mainly due to separation of the reimbursement systems (which are separate software packages) and medical documentation (which was the basis for resource consumption assessment). There was noticed, however, some hesitation of the hospital personnel to present both sets of data together, because of potential influence of the data onto "negotiation positions" with the National Health Fund in future

[10] Estimated conversion rate was 4 PLN per 1 Euro

[11] Difference between this figure and the average from detailed costs table (4955 PLN) was caused by *weighing effect* of the *averages* calculation

The major element making difference in costs among the providers was the overhead costs, similarly to the former cases. In the most expensive County Hospital Three and Regional Hospital One calculated overhead costs per case at approx. 4000 PLN, (ab. 1000 Euro) while in the cheapest hospitals in this regard it was between 300 and 600 PLN (80-150 Euro). This difference was again difficult to explain otherwise than by method applied to costs accounting in the providers[12], and were not possible to be reduced since more generic data were unavailable in the providers.

In detailed analysis, one might notice also other deviations from the average:

- Nursing and surgeons costs differed markedly, however the differences could be explained by variations in attributing personnel costs; sometimes they were attributed to stroke unit, sometimes to neurology, and sometime were just included in overhead costs. The researchers had impression that the figures revealed by hospitals, although each one separately correct, altogether create mess, causing most probably double counting,
- Costs of drugs were generally quite equalized at the level below 200 PLN, with an exception of County Hospital Three, where they exceeded 1000 PLN.

General observation was that differences in costs among the providers were significant and the variation could not be easily explained by differences in real costs; big part of the differences had to be a result of different methods of costs accounting, what expressed mainly in differences in overhead costs. Overhead costs cover also differences in structure of the facilities; eg. maintaining helicopter landing place or parking place for patients were attributed to the overhead costs in the studied hospitals.

Conclusions

The differences in presented costs of production of the sample of stroke cases were the highest among analysed cases. Big part of the difference should be however attributed to methodology of cost accounting, especially in overhead costs. Only a part should be attributed to management and structure of the providers.

Comparing the costs with prices paid by the purchaser (National Health Fund), it shows that even combining different *products,* which can be attributed to stroke patient, it would be hard to cover all revealed costs, especially in County Hospital Three. This is however unclear for what exactly the hospitals charge the payer; hospitals may combine different elements of care, when they charge the NHF, and there is not a rule of single payment for episode of care, like in most of case-mix systems happens.

[12] The major methodological problem, also pointed by accounting personnel in some hospitals, was that the costs assessment was made in relation to few individual cases/episodes, without making overall costs assessment of the provider itself. It created possibility that among different providers there were differences regarding attributing certain costs to given service.

Case vignette 6 – acute myocardial infarction

Data for myocardial infarction therapy were available from following providers:

County Hospital One
County Hospital Three
County Hospital Two
Regional Hospital Three
Regional Hospital One

The result tables are enclosed in the file named AMI.xls, in following sheets:

1. Tables – which contains case vignettes tables of individual cases from 5 providers,
2. Analysis – which contains summary figures, analysed by cost item and by provider,
3. Average – which contains summary tables for 5 individual providers and a summary for whole sample (total 6 tables).

Infrastructure of the providers is presented in the table, titled An annex: Sample providers and their characteristics. Generally, the County hospitals were smaller (approx. 200-250 beds) and employ significantly less personnel. The biggest hospital was the Regional Hospital One, which has 720 beds and more than 210 physicians.

Vignette 6 - AMI					
Phase	**AMI**	**Units**	**no of units**	**unit cost**	**Total costs**
	Physicians	Hours	2,0	25,0	100,0
Emergency dpt.	Nursing	Hours	12,0	5,5	264,0
Initial diagnosis (Assessment)	*Diagnostic Procedures*		0,0	0,0	15,8
	Imaging (e.g., Echocardiogram)	No.	2,8	34,0	246,2
	Imaging (e.g., Angiography)	No.	0,0	0,0	0,0
	Imaging (e.g., Scintigraphy etc.)	No.	0,0	0,0	0,0
	Laboratory (e.g., creatine kinase)	No.	7,7	2,9	116,7
	Laboratory (e.g., troponin, etc.)	No.	1,6	2,0	20,8
	Other (Electrocardiography etc.)	No.	0,6	11,0	27,3
Main Therapy	Lysis	DD	0,8	77,6	285,9
	Drugs	DD	0,4	3,0	10,8
	PTCA, stenting	No.	0,0	0,0	0,0
Hospital care (convalescence)	*Intensive Care Unit*		0,0	0,0	0,0
	Physicians	Days	4,2	24,5	540,7
	Nursing	Days	4,2	19,3	384,3
	Other	Days	0,7	0,0	15,8
	Drugs	DD	5,6	8,5	125,9
	Diagnostic procedures (e.g. imaging, ultrasound, laboratory)	No.	3,0	3,2	60,0
	Other therapeutic procedures	No.	0,0	1,0	2,0
	Normal Ward		2,0	34,0	299,2
	Physicians	Days	4,6	17,2	157,9
	Nursing	Days	4,6	16,8	164,5
	Other	Days	2,3	5,1	25,6
	Drugs	DD	5,9	10,0	334,5
	Diagnostic Procedures (e.g. imaging, laboratory)	No.	0,8	10,6	53,0
	Early rehabilitation (if during hospital stay)		0,0	0,0	20,9
	Physiotherapist	Days	3,4	8,0	115,0
Discharge planning	Drugs given to patient until contact with GP	DD	1,9	0,0	0,0
	Medical aids given to patient	Units	0,0	0,0	0,0
Overhead costs			11,0	85,4	809,5
Capital costs					24,5
Total costs					4136,6

Table 21. Average costs of the service in 5 providers, by category of cost.

The consumption of resources in case of AMI patients was presented in the Table 19. Total average costs was estimated at 4137 PLN (approx. 1034 EURO). Except this parameter the most reliable one refers to LOS, which in average was estimated 11 days, including (in average) 12 hours in emergency unit. In average 4,6 days of physicians and nursing care were attributed to the case, although this amount is burdened by a lack of data on physicians labour costs in two of the five hospitals. The two hospitals were able to report only total labour costs at the hospital ward, without distinction of physicians and other personnel.

The costs of drugs, were separately reported from 4 out of 5 hospitals. The costs of pharmacological therapy was 418 PLN (approx. 105 Euro) (334,5 PLN when taking 5 hospitals). As in other parts of the report DDD were not reported in some hospitals, and therefore averages were not reliable.

The payment for acute myocardial infarction, treated pharmacologically, according to Universal Catalogue of Services of NHF, is possible with *diagnostic category nr 1036 or 207.* Additional payment is possible for using supplemental procedure (like endocavital stimulation 1029), or the days spend at rehabilitation unit.

Code	Name	Points	PLN/point
1029	OSTRE ZESPOŁY WIEŃCOWE - LECZENIE PRZY POMOCY STYMULACJI ENDOKAWITARNEJ *Acute coronary syndrom – endocavital stimulation*	80	**9,4-10**
1036	OSTRE ZESPOŁY WIEŃCOWE - DIAGNOSTYKA, LECZENIE PODSTAWOWE - FARMAKOTERAPIA, HOSPITALIZACJA (W TYM 1-2 DOBY POBYTU W OIOK) *Acute coronary syndrom – diagnostics, pharmacotherapy, hospital care (incl. 1-2 ICU)*	250	**9,4-10**
1037	OSTRE ZESPOŁY WIEŃCOWE - LECZENIE PRZY POMOCY ANGIOPLASTYKI WIEŃCOWEJ BALONOWEJ *Acute coronary syndrom – PTCA*	300	**9,4-10**
509	OSTRE ZESPOŁY WIEŃCOWE – ZAŁOŻENIE KONTRAPULSACJI WEWNĄTRZAORTALNEJ *Acute coronary syndrom – implementation of intraaortal contrapulsation*	360	**9,4-10**
207	LECZENIE TROMBOLITYCZNE tPA (OSTRE ZESPOŁY WIEŃCOWE, ZATOROWOŚĆ PŁUCNA, ZAKRZEPICA) *Acute coronary syndrom – thrombolitic therapy (tPA)*	450	**9,4-10**
1041	OSTRE ZESPOŁY WIEŃCOWE - LECZENIE PRZY POMOCY ANGIOPLASTYKI WIEŃCOWEJ Z ZAŁOŻENIEM STENTU / STENTÓW *Acute coronary syndrom – PTCA with grafts*	700	**9,4-10**
005.10.0006	REHABILITACJA KARDIOLOGICZNA WCZESNA (OSOBODZIEŃ) Cardiological early rehabilitation	90	**1**

Table 22. *Contracted products* used for claiming the service, their point and point values for given providers.

The payment for the hospital ranges between 9,4 and 10 PLN per point in services of therapy at ICU and cardiological/internal medicine unit, and 1 PLN per point in rehabilitative services. Taking into consideration revealed resource utilisation figures, including LOS at different units, the revenue figures looks as follows:

				PLN		
code	PLN/point	1036	207	005.10.0006	Total (min)	Total (max)
County Hospital Three	9,6	2400	4320	630	3030	4950
County Hospital Two	9,7	2425	4365		2425	4365
Regional Hospital Three	9,8	2450	4410		2450	4410
Regional Hospital One	10	2500	4500	900	3400	5400
County Hospital One	9,8	2450	4410		2450	4410
				Euro		
code	EURO/point	1036	207	005.10.0006	Total	Total (max)
County Hospital Three	2,4	600	1080	157,5	758	1238
County Hospital Two	2,425	606	1091	0	606	1091
Regional Hospital Three	2,45	613	1103	0	613	1103
Regional Hospital One	2,5	625	1125	225	850	1350
County Hospital One	2,45	612,5	1102,5	0	613	1103

Table 23. Payment expected for the *contracted products* by given providers.

The potential (not actually registered) payment in the hospitals ranged from approx. 2400 PLN (610 Euro) to approx. 5400 PLN (1350 Euro), per episode of AMI. Since the actual data were not revealed by the hospitals[13], the estimations of total amount charges were based on resource consumption (mainly LOS at different units). The most advanced elements of care for AMI patients were not met in the hospitals; like PTCA and graphs. The likely reason for this was that the hospitals selected were not the university hospitals and, with an exception of Regional Hospital One, the hospitals are of local level rather. Therefore, patients who needed PTCA and graphs were transferred to other hospitals.

Discussion

The data presented by the five providers differed remarkably; over two times between the cheapest and the most expensive provider. On average, the case was the cheapest in County Hospital Two, where average was 2532 PLN, what is just over 633[14] Euro. The highest costs were revealed by Country Hospital Three (5663 PLN, or 1416 Euro). Totally the average was 4163 PLN (1014 Euro)[15].

	PLN	EURO
Average	4163	1041
County Hospital Three	5663	1416
County Hospital Two	2532	633
Regional Hospital Three	5501	1375
Regional Hospital One	4130	1033
County Hospital One	2857	714
minimum	1762	441

[13] The reason for not revealing actual payments for given cases were mainly due to separation of the reimbursement systems (which are separate software packages) and medical documentation (which was the basis for resource consumption assessment). There was noticed, however, some hesitation of the hospital personnel to present both sets of data together, because of potential influence of the data onto "negotiation positions" with the National Health Fund in future

[14] Estimated conversion rate was 4 PLN per 1 Euro

[15] Difference between this figure and the average from detailed costs table (4137 PLN) was caused by *weighing effect* of the *averages* calculation

maximum	8901	2225

Table 24. Average costs of the service in sample providers, in PLN and Euro (exchange rate 4 PLN/Euro).

The major element making differences in costs among the providers was the overhead costs, similarly to the former cases. In the County Hospital Three and Regional Hospital One calculated overhead costs per case at approx. 1200-1400 PLN, (ab. 300-350 Euro) while in other hospitals it was between 250-300 PLN. This difference can be explained by different methods applied to costs accounting in the providers[16], similarly to other cases discussed before. Distribution of costs, at the major categories, in the five hospitals were presented at Figure 2.

In detailed analysis, one might notice other deviation from the average:

- Nursing and physicians costs differed markedly, however the differences could be explained by variations in attributing personnel costs; sometimes they were attributed to emergency unit, sometimes to ICU, sometimes to cardiology, and in some cases big part was just included in the overhead costs. The figures provided by hospitals, although separately taken were considered correct, together might cause confusion. The highest personnel costs were revealed by Regional Hospital Three (3419 PLN) and the lowest County Hospital One (1068 PLN).
- Costs of drugs were also differentiated, and appeared in different locations; in ICU or cardiology/ internal medicine dept. The highest amount spent on drugs were in the County Hospital Three, where they exceeded 1800 PLN, the lowest registered amounts accounted 343 PLN per episode of care.

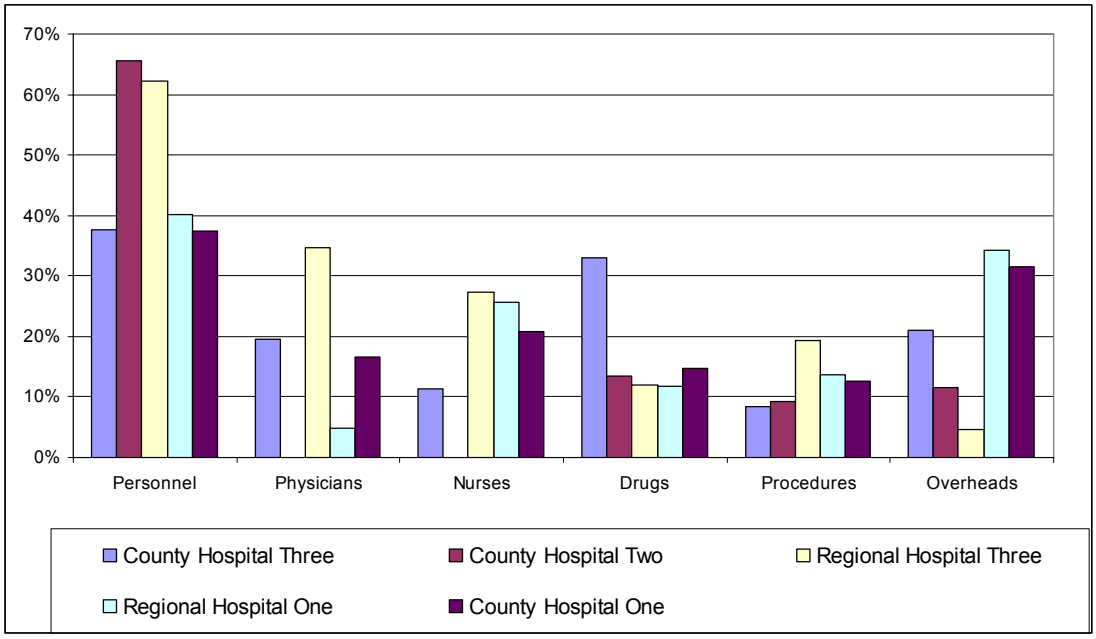

Figure 5. Distribution of costs of AMI patient therapy in five Polish hospitals.

[16] The major methodological problem, also pointed by accounting personnel in some hospitals, was that the costs assessment was made in relation to few individual cases/episodes, without making overall costs assessment of the provider itself. It created possibility that among different providers there were differences regarding attributing certain costs to given service.

General observation was that differences in costs among the providers were high, although not as high like in stroke. The variations could be explained by differences in real costs but again a big part had to be result of different methods of costs accounting.

Conclusions

The differences in presented costs of production of the sample of AMI cases were much smaller than in cases of stroke, but higher than in "surgical cases" described before. A part of the difference should be attributed to methodology of cost accounting, especially in overhead costs. Only a part should be attributed to management and structure of the providers, but factor of drugs seams to mean a lot in this.

Comparing the costs with prices paid by the purchaser (National Health Fund), it shows that combining different *products,* which can be attributed to AMI patients, it would be possible to cover all revealed costs, but with some difficulty, especially in County Hospital Three.

Case vignette 7 – cough

Data for ambulatory visit of sick child were available from following providers:

County Hospital Three
County Hospital Two
Regional Hospital Three
Regional Hospital One
Ambulatory care two

The result tables are enclosed in the file named cough.xls, in following sheets:

1. Tables – which contains case vignettes tables of individual cases from 5 providers,
2. Analysis – which contains summary figures, analysed by cost item and by provider,
3. Average – which contains summary tables for 5 individual providers and a summary for whole sample (total 6 tables).

Infrastructure of the providers is presented in Table 25 below. From the point of view of the case, this was not the most representative sample, since usually most of the simple paediatric cases are treated by free-standing physicians offices. Ambulatory care Two was such an example.

Code	Beds	Physicians	Nurses	Together
County Hospital Two	249	66	253	110
County Hospital Three	201	61	180	136
Regional Hospital One	720	210	440	
Regional Hospital Three	377	103	180	
Ambulatory care Two	0	2	4	

Table 25. Characteristics of the sample providers.

Vignette 7 - cough					
Phase	**Elements**	**Units**	**No. of units used**	**Unit cost**	**Total costs**
Assessment	*Diagnostic Procedures*		0	0	0,0
	Imaging	No.	0,12	3,2	3,2
	Laboratory (e.g. blood count, CRP, etc.)	No.	0,58	1,95	4,3
	Other (ECG, lung-function, etc.)	No.	0,04	0	0,0
	Physician	Min.	13,66	0,84	12,6
	Other personnel (nurse etc.)	Min.	4,9	0,105	2,4
Therapy + further care	Drugs prescribed	DD*	2,95	1,81	7,4
	Drugs or other goods given by provider	DD/No.	0,04	0,08	0,1
	Other diagnostics prescribed		0,12	1,76	1,8
	Second visit scheduled:		0	0	0,0
	O YES		0	0	0,0
	Personnel (for writing prescriptions etc.; if separate from above)	Min.	2,12	0,072	0,7
Overhead	Running costs of ambulatory service	Min.**	0,4	7,6	8,2
Total costs			0	0	32,8

Table 26. Average costs of the service in 5 providers, by category of cost.

The consumption of resources in case of little patients admitted with cough was presented in the Table 26. Total average costs was estimated at 32,8 PLN (approx. 8,2 EURO). Except this parameter the most reliable one refers to costs of a minute of physicians work, which ranged from 0,3 PLN/min (5 Euro/hour) to 1,5 PLN/min (25 Euro/hour) (in the only purely ambulatory care provider).

In average 13,66 min were reported as a duration of a single visit. The prescribed drugs were hard to estimate how much they costs, since usually physicians do not know how much the drugs are, and never register it in the files. The figures provided are estimates, and additionally it is not certain that the drugs were dispensed from pharmacies, since pharmacists have right to recommend other, especially cheaper drug.

The payment for ambulatory visit of a sick child to the primary care physician is included in the capitation fee, paid to the GP provider. For the capitation fee the GP is obliged to cover his/her costs and costs of selected types of diagnostics, such as: ECG, routine types of RTG, USG, and about 60 different types of laboratory examinations. The most important *contracted products* in primary care are following:

Product name	Fees (year 2006)
Kapitacja w opiece lekarskiej w p(gab) lek poz - ubezpieczeni 0-6 rż *Capitation fee for children 0-6 y.o.*	1,5 x regular fee
Kapitacja w opiece lekarskiej w p(gab) lek poz - ubezpieczeni 7-65 rż *Capitation fee for children and adults 7-65 y.o.*	regular fee

Kapitacja w opiece lekarskiej w p(gab) lek poz - ubezpieczeni powyżej 65 rż *Capitation fee for elderly citizens 65+ y.o.*	1,7 x regular fee
Kwota za poradę lekarza poz udzieloną ubezpieczonemu na podstawie przepisów o koordynacji w p(gab) lek poz *Fee for incidental visit of a patient within EU coordination scheme*	38 PLN (ab. 9,5 Euro)
Kwota za poradę lekarza poz dla ubezpieczonego spoza terenu ow nfz w p(gab) lek poz *Fee for incidental visit of not enlisted patient*	18 PLN (ab. 4,5 Euro)

Table 27. Payment expected for the *contracted products* by given providers.

The regular capitation fees generally are negotiated by the providers individually, although in recent years it tends to be negotiated, in a hot atmosphere, for whole groups of GPs in the given region.

Some providers in this sample are not primary care providers, but hospitals with paediatric ambulatory, like it happens in Regional Hospital One and Three. Theoretically they should be available for patients referred from GP, but this might be omitted during weekend and evening.

Discussion

Data presented by the five providers revealed remarkable differences; six times between the cheapest and the most expensive provider. On average, it was the cheapest in County Hospital Three, where average was 8 PLN, what is 2[17] Euro per visit. The highest costs were revealed by Country Hospital Three (56 PLN, or 14 Euro). Totally the average was 32,78 PLN (8,2 Euro)[18].

	PLN	Euro
Average	32,78	8,20
County Hospital Three	56,5	14,13
County Hospital Two	16,79	4,20
Regional Hospital Three	8,01	2,00
Regional Hospital One	44,3	11,08
Ambulatory care two	38,3	9,58
minimum	2,3	0,58
maximum	160,5	40,13

Table 28. Average costs of the service in sample providers, in PLN and Euro (exchange rate 4 PLN/Euro).

The major problem in the study was to calculate costs of physician time, since actual time per visit was not notified in medical documentation. This element was assessed by the physicians, together with financial personnel and researcher, in relation to given sample case. Reliability of the assessment, however, could be questioned, and it could be eliminated only by

[17] Estimated conversion rate was 4 PLN per 1 Euro

[18] Difference between this figure and the average from detailed costs table (5306 PLN) was caused by *weighing effect* of the *averages* calculation

prospective method of study, which was not available. This factor was also the major differentiating element of costs. The second most important was, as usual overhead costs. Here the differences also were significant, depended generally on organisation of the given provider.

Drugs were not dispensed by the ambulatory, because it is not practiced in Poland, but prescriptions were given to patients. Unfortunately only two providers out of five delivered the details on the prescriptions; County Hospital Three and Regional Hospital One. If added-up to the costs of visit, they would play prevailing role. Value of prescribed drugs were generally higher (taking pharmacy price of the drug, not reimbursement only) than the costs of visit itself.

In detailed analysis, one might notice other deviation from the average in physicians costs. They differed markedly, the major differences occurred between providers where physicians where employed on a salary basis, and those which contract physicians per visit.

General observation was that differences in costs among the providers were high. The variations could be explained by differences in real costs but also had to be result of different methods of costs accounting.

Conclusions

The differences in presented costs of production of the sample of ambulatory visits were significant, mainly due to the costs of physicians labour costs. A part of the difference should be attributed also to methodology of cost accounting, especially in overhead costs.

Comparing the costs with prices paid by the purchaser (National Health Fund), it shows potential problems in covering costs of visits, if the costs revealed were correct. On the other hand checking exercise, described later in the document, shows that presented costs of visits fit to the figures which were collected from statistical data. The average costs of visit calculated on sample of 26 public health care providers were 38,44 PLN, while the average in the sample of 5 providers, characterised above, were 33,53 PLN. The range of costs in 26 providers from statistical source were 13,11 to 64,44 PLN, while in the sample they were 8 to 56,5 PLN.

Costs per visit	26 providers (statistical source)	5 providers (sample)
Average	38,44	32,78
Minimum	13,11	8,01
Maximum	64,44	56,5

Taking into account these figures, one may conclude, that despite imperfections of the current study and incoherency in data and costs accounting methods, the results seems to be concise. More accurate data would require bigger sample and more coordinated methods of costs accounting in providers which deliver data.

Case vignette 8 – ambulatory colonoscopy

Data for ambulatory colonoscopy were available from following providers:

County Hospital Two
County Hospital Three
Regional Hospital One
County Hospital Four

The result tables are enclosed in the file named colonoscopy.xls, in following sheets:

1. Tables – which contains case vignettes tables of individual cases from 4 providers,
2. Analysis – which contains summary figures, analysed by cost item and by provider,
3. Average – which contains summary tables for 4 individual providers and a summary for whole sample (total 5 tables).

Infrastructure of the providers is presented in Table 26 below. The biggest was the Regional Hospital One, with 720 beds and over 210 physicians – multispecialty centre, and the three other hospitals were of lower specialist level.

Code	Beds	Physicians	Nurses
County Hospital Two	249	66	253
County Hospital Three	201	61	180
Regional Hospital One	720	210	440
County Hospital Four	202	65	190

Table 29. The size and employment on colonoscopy providers, in the sample.

Vignette 8 - colonoscopy					
Phase	**Elements**	**Units**	**Unit Cost**	**No. of units used**	**Total costs**
Site of consultation	O Out-patient department of hospital				
Assessment + Preparation	*Diagnostic Procedures*	No.	17,78	2,00	35,56
	Imaging	No.	22,00	1,00	44,25
	Laboratory (e.g. blood count, CRP, etc.)	No.	9,12	1,63	21,67
	Other (ECG, lung-function, etc.)	No.	36,44	1,35	44,13
	Physician	Min.	0,90	27,50	34,69
	Other personnel	Min.	0,35	47,88	15,27
	Drugs prescribed/ provided				14,79
	Fluids prescribed/ provided		27,70	0,50	27,70
Examination (colonoscopy)	Physician	Min.	0,77	31,50	28,35
	Other personnel	Min.	0,48	37,63	19,00
	Use of instrument (running and depreciation costs)	No.		0,43	85,90
	Drugs provided (especially sedatives)		9,40	1,41	10,87
Overhead	Running costs of ambulatory service	Min.**		0,47	109,35
Total costs			0,00	0,00	464,86

Table 30. Average costs of the service in 4 providers, by category of cost.

The consumption of resources in case of colonoscopy patients was presented in the Table 27. Total average costs was estimated at 465 PLN (approx. 115 EURO). In Regional Hospital One data on labour costs were unavailable because physicians performing the procedure were employed and affiliated to a hospital department, and colonoscopy was one of many, and not very frequent procedure they perform. In County Hospital Four, most of the cases reported were connected with 1 day of hospitalization, what was however a departure from the rules applied to the study. Limiting cases to ambulatory ones caused, that from County Hospital Two only one case was reported since most of the colonoscopy cases in the hospital were performed during shorter or longer hospitalization.

The payment for ambulatory colonoscopy is made according to fee scale presented below; diagnostic colonoscopy, with (50 points) and without (35 points) biopsy. This service can be equally performed during hospitalisation and in daycare or ambulatory settings; in all the situations the payment is the same. In hospital care, colonoscopy is therefore a part of the therapy, but paid separately, what means that hospitals aggregate their income from different element of services.

Code	Name	No of points
5.06.00.0000902	KOLONOSKOPIA DIAGNOSTYCZNA *Diagnostic colonoscopy*	35
5.06.00.0000903	KOLONOSKOPIA DIAGNOSTYCZNA Z POBRANIEM BIOPSJI (UWZGLĘDNIONE BADANIE HIST- PAT) *Diagnostic colonoscopy with biopsy and histopathological assessment*	50

Table 31. *Contracted products* used for claiming the service, their point and point values for given providers.

The four hospitals which provided data, were reimbursed differently by the National Health Fund in the year 2006. The difference in surgery, which covers the colonoscopy as a service, differed slightly; from 9,7 to 10 PLN per point.

		PLN		Euro	
		C-scopy	C-scopy with biopsy	C-scopy	C-scopy with biopsy
County Hospital Two	9,9	347	495	87	124
County Hospital Three	9,7	340	485	85	121
Regional Hospital One	10	350	500	88	125
County Hospital Four	10	350	500	88	125

Table 32. Payment expected for the *contracted products* by given providers.

Finally, the income per procedure, depending if with or without biopsy, ranged from 347 to 500 PLN, what is 87-125 Euro. Comparing to the costs revealed in the study, providing the service appeared to be profitable for two of the hospitals. However, when taking into account that other elements of care, like 1-day hospital stay, could be a subject of payment, too, one can expect most of the hospitals generate margin of profit with this service.

Discussion

Data presented by the four providers revealed some differences in costs among them. On average, it was the cheapest in Regional Hospital One, where average was 181 PLN, what is 45,3[19] Euro per procedure. The highest costs were revealed by County Hospital Four (836 PLN, or 209 Euro). Totally the average among the three providers was 516 PLN (129 Euro)[20].

	PLN	Euro
Average	516	129,0
County Hospital Two	292	72,9
County Hospital Three	554	138,5
Regional Hospital One	181	45,3
County Hospital Four	836	209,0
minimum	135	33,8
maximum	1152	288,0

Table 33. Average costs of colonoscopy in sample providers, in PLN and Euro (exchange rate 4 PLN/Euro).

[19] Estimated conversion rate was 4 PLN per 1 Euro

[20] Difference between this figure and the average from detailed costs table (342 PLN) was caused by *weighing effect* of the *average* calculation

The major problem in the study was that among providers taking part in the study only four delivered data on colonoscopy. There were two reasons for the situation; some providers use to send patients for colonoscopy outside of their settings, other they perform the procedure only in in-patient manner. The second issue was a reason why from one hospital there was only one case reported (since only one procedure during recent months was performed in out-patient manner), and other hospital reported finally 7 cases performed with one day stay in the hospital, beforehand.

Additionally costs of physician time were not calculated in Regional Hospital One, since they were not accounted and extracted from department costs, where the physicians work, what however made this hospital was unrealistically cheap. The total costs of colonoscopy differed markedly, and the major differences occurred between providers where physicians where employed on a salary basis, and those which contract physicians per visit. The variations in costs could be explained again by differences in real costs but also had to be result of different methods of costs accounting.

Conclusions

The differences in presented costs of production of the sample of colonoscopies were significant, mainly due to the costs of physicians labour costs. The most expensive hospital was reporting in-patient colonoscopies, what significantly influenced result. However, it is worth to note that majority of colonoscopies, at least in the sample providers, were performed in inpatient manner, rather and not ambulatory. A part of the difference should also be attributed also to methodology of cost accounting, especially depreciation of colonoscope.

Comparing the costs with prices paid by the purchaser (National Health Fund), it shows that, taking that colonoscopies were performed with biopsy and adding some charge for a day of hospital stay, the prices offered should cover the costs of production of the service. Small sample and differences in costs elements between hospitals make however, that analysis in the area of colonoscopy might be burdened by weighty mistakes.

Case vignette 9 – teeth felling

Data for ambulatory colonoscopy were available from following providers:

Dental care one
Dental care two
Dental care three
Dental care four
Dental care five

The result tables are enclosed in the file named tooth filling.xls, in following sheets:

1. Tables – which contains case vignettes tables of individual cases from 5 providers,
2. Analysis – which contains summary figures, analysed by cost item and by provider,
3. Average – which contains summary tables for 5 individual providers and a summary for whole sample (total 6 tables).

The providers taken to this sample were only private dental centers, employing from 2 to 5 physicians, contracted by the National Health Fund, with one exception, Dental care One, which was serving only for patients –employees of one company in Kraków.

Vignette 9 - tooth filling					
Phase	**Elements**	**Units**	**Unit Cost**	**No. of units used**	**Total costs**
Assessment	Imaging (e.g. X-ray)	No.	0,4	3,00	5,08
	Dentist	Min.	4,12	0,24	2,152
	Other personnel	Min.	9,2	0,12	2,9
Therapy	Dentist	Min.	32,1	0,42	17,16
	Other personnel	Min.	31,7	0,21	7,79
	Material (amalgam)		0,2	12,00	20,25
After care	Drugs prescribed	DD*	0,08	0,78	0,78
	Drugs given by provider	DD	0	0	0
	Second visit scheduled: O NO				
Overhead	Running costs of ambulatory service	Min.**	0,2	3	14,91
Total costs			0	0	71,022

Table 34. Average costs of the service in 5 providers, by category of cost.

Aggregated data on resource consumption in the sample providers was presented in Table 34. Relatively constant cost element was dentist work, although in Dental care One setting this parameter was not available, and was calculated together with materials. The labour of

dentists costs, according to those estimates, from 0,4 to 0,6 PLN/minute, what gives 8,5 to 10 Euro/hour. In most of the cases, the material used, despite there were different research requirements, was **not** the amalgamate, with one exception of Dental care Three. Then the costs of materials were approx. 1 Euro, while in other cases, it was between 2-5 Euro.

The payment for dental care is made according to fee scale composed on ab. 100 different procedures. The most suitable procedures were presented in table below. Each service can be composed of a number of procedures, which may be summed up.

Name	Code	points
RENTGENODIAGNOSTYKA - DO 2 ZDJĘĆ WEWNĄTRZUSTNYCH W OKRESIE 12 MIESIĘCY Z WPISANIEM OPISU DO DOKUMENTACJI (PRZYSŁUGUJE WYŁĄCZNIE W POŁĄCZENIU ZE ŚWIADCZENIAMI W RAMACH UBEZPIECZENIA ZDROWOTNEGO) *RTG – up to 2 intraoral images within 12 months, with documentation (connected with other service only)*	23.0301	160
ZNIECZULENIE MIEJSCOWE NASIĘKOWE *Local superficial anesthesia*	23.0402	80
LECZENIE PRÓCHNICY POWIERZCHOWNEJ - ZA KAŻDY ZĄB *Superficial dental decay therapy – for each tooth*	23.1101	140
CAŁKOWITE OPRACOWANIE I ODBUDOWA UBYTKU ZĘBA NA 2 POWIERZCHNIACH *Complete treatment and rebuilt of cavity in tooth – 2 areas*	23.1503	350
CAŁKOWITE OPRACOWANIE I ODBUDOWA ROZLEGŁEGO UBYTKU ZĘBA NA 2 POWIERZCHNIACH *Complete treatment and rebuilt of vast cavity in tooth – 2 areas*	23.1504	400

Table 35. *Contracted products* used for claiming the service, their point and point values for given providers.

The five providers which delivered data, were reimbursed differently by the National Health Fund in the year 2006. The difference in dentistry reimbursement mean that different number of zlotys (PLN) are attributed to one point. The ranges observed were between 0,06 to 0,07 PLN per point.

		Procedure				Total		Total (Euro)	
	PLN/point	23.0301	23.0402	23.1503	23.1504	Min	max	min	max
Dental care three	0,065	10,4	5,2	22,75	26	28	42	7	10
Dental care Two	0,07	11,2	5,6	24,5	28	30	45	8	11
Dental care One	0,07	11,2	5,6	24,5	28	30	45	8	11
Dental care four	0,06	9,6	4,8	21	24	26	38	6	10
Dental care five	0,065	10,4	5,2	22,75	26	28	42	7	10

Postulated payment	ver.1	10,27	12,12	69,99	82,54	82	105	21	26
	ver.2	10,86	13,36	74,96	99,03	88	123	22	31
	ver.3	10,86	18,63	96,04	109,05	115	139	29	35
	ver.4	10,27	12,12	69,99	83	82	105	21	26

Table 36. Payment expected and postulated for the c*ontracted products* by given providers.

Finally, the income per service, depending on the component procedures, ranged from 26 PLN to 45 PLN, what was 6 - 11 Euro. This price looks to be 2-3 time less than revealed costs of providers.

The prices for dental services seems significantly undervalued. In the opinion of the Chamber of Physicians experts the prices health services providers are paid in many cases are relatively coincidental or based on highly out-of-date historic costs. As a result, in the spring of 2003,

dentists[21] from the Supreme Medical Council commissioned the preparation of the costing of dental procedures financed from the universal health insurance, at the same time stipulating the required standard of those services. The costing of individual dental procedures was performed on the basis of a quantitative statement of resources used during a typical medical procedure, which constitutes an annex to a Ministerial regulation[22]. The table of materials and medical equipment usage (material costs) as well as the table of working time spent by personnel on performance of a procedure (personnel costs) were used.

As a result, the Chamber published a postulated price lists of all dental procedures, both the reimbursed by the National Health Funds and the ones which were not reimbursed. In the opinion of the Chamber, the calculated costs of particular procedures constituted the minimum necessary to satisfy the basic requirements of hygiene and safety. The values of postulated prices were presented in table .... in four different versions, assuming different levels of physicians pay (as a share of national average pay), and exchange of Euro (since dental materials and devices highly depend on currency rate). The differences between postulated charges and actually paid prices (by the NHF) are 2-3 fold.

Discussion

Data presented by the five providers revealed some differences in costs, but they seem not to be striking. On average, it was the cheapest in Dental care four, where average was 55 PLN, what is 14[23] Euro per service. The highest costs were revealed by Dental care one (85 PLN, or 21 Euro). Totally the average among the five providers was 71 PLN (18 Euro)[24].

	PLN	Euro
Average	71	18
Dental care three	83	21
Dental care Two	74	18
Dental care One	85	21
Dental care four	55	14
Dental care five	58	15
Min	36	9
Max	190	48

Table 37. Average costs of the service in sample providers, in PLN and Euro (exchange rate 4 PLN/Euro).

The most important observation is that prices offered by National Health Fund are consequently 2-3 time below the costs revealed by the providers, and those loudly voiced in public discussion. Regardless of the difference, NHF still is able to contact whole planned volumes. This paradox can be explained by the fact that for most of dental care providers contract with the public payer remains only a part, usually the smaller one, of total revenue. In the same time, having contract encourages patients, and part of them use to pay privately at the end of the day, because prefer better materials or have special preferences. This way services contracted by public payer are cross-subsidised by private purchasers.

[21] In Poland the Chamber of Physicians congregates both physicians and stomatologists
[22] The regulation of the Minister of Health and Social Welfare of December 22, 1998 on the special rules of cost accounting in the public health care units (Dz. U. Nr 164, poz. 1194)
[23] Estimated conversion rate was 4 PLN per 1 Euro
[24] Difference between this figure and the average from detailed costs table (342 PLN) was caused by *weighing effect* of the *average* calculation

Conclusions

The differences in presented costs of production of the sample dental care services were not as significant, as in other categories of services. Most of the differences arise due to the costs of physicians labour costs, but important element play also the costs of materials. It is difficult to assess to what extend the presented costs are correctly calculated although closeness with the figures presented and postulated by the Medical Chamber may suggest that they are close to the real.

Comparing the costs with prices paid by the purchaser (National Health Fund), it shows that the prices offered most probably not cover the costs of production of the service.

Case vignette 10 – ambulatory physiotherapy

Data for ambulatory physiotherapy were available from following providers:

County Hospital Three
Ambulatory care three
Ambulatory care four
Regional Hospital One
Ambulatory care five
Ambulatory care six

The result tables are enclosed in the file named ambulatory physiotherapy.xls, in following sheets:

1. Tables – which contains case vignettes tables of individual cases from 6 providers,
2. Analysis – which contains summary figures, analysed by cost item and by provider,
3. Average – which contains summary tables for 6 individual providers and a summary for whole sample (total 7 tables).

Infrastructure of the providers is presented in table below:

Code	Physicians	Physiotherapists
County Hospital Three		4
Ambulatory care three	1	4
Ambulatory care four	1	3
Regional Hospital One	5	18
Ambulatory care five		3
Ambulatory care six	3	5

Vignette 10 - ambulatory physiotherapy					
Phase	**Elements**	**Units**	**Unit Cost**	**No. of units used**	**Total costs**
Site of consultation/ operation	O Out-patient department of hospital				
Therapy Week 1	Physiotherapist (number of sessions x duration per session: x)	Min./hours	113,2	6,4	84,8
Therapy Week 2	Physiotherapist (number of sessions x duration per session: x)	Min./hours	108,5	6,4	83,6
Therapy Week 3	Physiotherapist (number of sessions x duration per session: x)	Min./hours	29,1	6,3	63,2
Therapy following weeks	Physiotherapist (number of sessions x duration per session: x)	Min./hours	20,3	6,3	46,0
Therapy following weeks	Physiotherapist (number of sessions x duration per session: x)	Min./hours	3,0	13,3	22,1
Therapy following weeks	Physiotherapist (number of sessions x duration per session: x)	Min./hours	2,8	0,0	268,1
Overhead	Running costs of ambulatory service	Min.**	0,0	0,0	4,4
Total costs					572,2

Table 38. Average costs of the service in 6 providers, by category of cost.

The payment for physiotherapy is made according to fee scale composed of about 50 different procedures. Each of the procedure can be provided in ambulatory or inpatient setting. Physicians prescribe character of the procedures, frequency of application, time period of entire rehabilitation session, and at the end they assess results. This makes that each patient receives, at least in theory, a different set of procedures.

A sample of physiotherapeutic procedures were presented in table below. Each rehabilitative session, which lasts different period of time, may be composed of any composition of the procedures presented.

no	name	Points
	Kinesitherapy	
1	Ćwiczenia bierne, czynno-bierne, wspomagane, pionizacja (indywidualna praca z pacjentem) -co najmniej 15 minut *Inert exercise, supported by therapist – at least 15 min*	**6**
3	Ćwiczenia według metod neurofizjologicznych, metody reedukacji nerwowo-mięśniowej (ćwiczenia specjalne) - wymagane potwierdzenie kwalifikacji *Neurophysiological exercises, neuromuscular reeducation*	**13**
4	Nauka poruszania się *Lesson of moving*	**7**
5	Mobilizacje i manipulacje *Mobillisation and manipulation*	**10**
	Masaż - Massage	
9	Masaż suchy - częściowy - minumum 20 minut na jednego pacjenta w tym min. 15 minut czynnego masażu (suma masaży częściowych nie może przekraczać 16 pkt.) *Dry massage, min 20 min,*	**8**
10	Masaż limfatyczny – leczniczy	**10**

	Lymphatic massage	
11	Masaż podwodny – hydropowietrzny *Underwater massage*	**9**
	Elektrolecznictwo - Electrotherapy	
14	Galwanizacja *Galvanisation*	**2**
15	Jonoforeza *Jonoferesis*	**3**
16	kąpiel czterokomorowa *Four chambers bath*	**9**
	Leczenie polem elektromagnetycznym	
27	Impulsowe pole elektromagnetyczne wysokiej częstotliwości *Impuls electromagnetic field*	**5**
28	Diatermia krótkofalowa, mikrofalowa *Short wave diatermy*	**5**
	Światłolecznictwo – Light therapy	
32	Laseroterapia – skaner *Lesarotherapy*	**2**
34	Światło spolaryzowane *Polarized light*	**1**
	Hydroterapia – Hydrotherapy	
	Kąpiele – Baths	
38	Kąpiel perełkowa *Perl bath*	**7**
	Krioterapia – Criotherapy	
46	Krioterapia - miejscowa (azot, dwutlenek węgla) *Local criotherapy*	**10**
	Balneoterapia – Balneotherapy	
50	Kąpiel borowinowa, solankowa, kwasowęglowa, siarkowodorowa, w suchym CO Salt water bath etc.	**10**

Table 39. *Contracted products* used for claiming the service, their point and point values for given providers.

The five providers which delivered data, were reimbursed according the point scale, where the point value among providers ranged 0,9 to 1 PLN per point. The difference of 10% was applied to different types of rehabilitation in the same provider; more valued was the neurological rehabilitation in Regional Hospital One, than general rehabilitation in this hospital.

Reimbursement is based on a sum of points values for each applied procedure. This means that after every visit there are procedures applied reported, and summarised number of points is a basis for reimbursement for this specific visit. Entire episode of *rehabilitative care* is composed of, in average, 20 visits, in average 2,4 procedure per visit, estimated 6 points per procedure, in average; this gives total amount which is potentially received form the purchaser.

	PLN/point	Average no of procedures per visit	Est. average number of point per procedure	Est. revenue per visit	no of visit per episode	Total average revenue per patient	total costs per patient
County Hospital Three	0,95	*2,40*	*6*	*13,68*	51	697,7	510
Ambulatory care three	0,9	2,70	*6*	*14,58*	12,6	183,7	133,5

Ambulatory care four	0,9	2,70	*6*	*14,58*	11,5	167,7	160,76
Regional Hospital One	1	*2,40*	*6*	*14,4*	20	288,0	830
Ambulatory care five	0,9	1,40	*6*	*7,56*	14	105,8	69,604
Ambulatory care six	0,9	2,80	*6*	*15,12*	13,5	204,1	125,048
	Italic marked estimated figures						

Table 40. Payment expected for the *contracted products* by given providers.

Estimations made here show that total revenue from the services which were analysed, exceeded the costs, with an exception of Regional Hospital One. Reliability of this assessment is not known, except that there is a common opinion among providers in most places in Poland, that rehabilitation is a beneficial sector in health care provision.

Discussion

Data presented by the six providers were hardly to compare, because of individual character of rehabilitative care. Each patient presented in the sample was separately assesses and the rehabilitation care was planned for him/her. This caused big differences as regards number of visits per patient, number and character of procedures applied, and as a result, the costs. Besides not all data were available from each provider (eg no of minutes). This made difficulties in comparisons. Instead of comparing entire episode of care, it was decided to compare more specific, synthetic and thanks to this, more homogeneous elements of this care.

It was revealed that the average length of rehabilitation cycle was 4 weeks, however one hospital presented data that the patients are rehabilitated 10 weeks. Generally rehabilitation visits take every weekday, although there were some cases when they happen only 2 or 3 days per week. In providers where duration of a single session was available, the average length was of visit was 38 minutes. Costs per minute of presented by the providers was generally very close, starting from 0,21 PLN to 0,35 PLN, although in one case, Regional Hospital One – highly specialised facility, it was 0,93 PLN per minute. This Hospital was also the most expensive as regards the total cost per episode, and also revealed higher costs than potential revenues for given service, even though the value of a point was the highest here. Cost per session (visit) was also the highest here – more than 40 PLN, when average was 15 PLN (10 and 3,9 Euro respectively) [25].

	Total[26]	weeks	days	minutes	cost/ minute	Total minutes	cost/ session	no of procedures	fee / procedure	no of visits
Average	305	4	5	38	0,38	405	15,13	2,40	4,26	20,43
County Hospital Three	510	10	5	30	0,33	1530	10,00			51,00
Ambulatory care three	134	3	5		0,26	0	10,80	2,70	4,13	12,60
Ambulatory care	161	2	5		0,35	0	14,40	2,70	5,58	11,50

[25] Estimated conversion rate was 4 PLN per 1 Euro

[26] Difference between this figure and the average from detailed costs table (572 PLN) was caused by *weighing effect* of the *average* calculation

four										
Regional Hospital One	830	4	5	45	0,93	900	41,50			20,00
Ambulatory care five	70	3	5		0,21	0	5,10	1,40	3,94	14,00
Ambulatory care six	125	3	5		0,22	0	8,99	2,80	3,37	13,50
min	24	2	3	30	0,21	0	2,42	1,00	1,93	6,00
max	1080	11	6	60	0,97	1650	54,00	4,00	10,92	55,00

Table 41. Average costs of the service in sample providers, in PLN and Euro (exchange rate 4 PLN/Euro).

An interesting observation was that prices offered by National Health Fund were estimated higher than the costs revealed by the providers, with exception of one provider.

Conclusions

The differences in presented costs of production of the sample dental care services were not as significant, as in other categories of services. Most of the differences arise due to the costs of therapist labour costs and intensity of manipulations; for one visit patient could have received from one to 4 different, distinguished procedures.

Comparing the costs with prices paid by the purchaser (National Health Fund), it shows that the prices offered most probably cover the costs of production of the service in most of providers.

Cross checking exercise in ambulatory care services

Statistical analysis of costs

Cost information in Polish health care system is scarce. This information is regarded as a confidential trade information, both by commercial companies and public health care units. Cost assessment of health care services required for signing adequate contracts for health care belongs to National Health Fund's (NHF) special tasks (art.97). Practically, however, the NHF lacks data on the actual costs incurred by providers for particular types of services. The NHF does not even have access to annual financial reports.

Reports on entities' financial status (MZ-03 SEMI-ANNUAL/ANNUAL financial report of autonomous public health care units and *SP 3 reports on corporate business activity)* are submitted to the public statistics system but in practice the data collected by this means are not used often especially not by the NHF for the purposes of price formation. It is also rare to see any analysis of costs based on the data, although potentially this opportunity exists for many years now. Here the limitation was introduced by Statistical Office and its interpretation if statistical confidentiality.

As a result of this project, there was an exercise performed, which aim was to compare micro – level data from case –vignettes analysis to data from other sources, which were supposed to be more comprehensive and potentially more resistant for mistakes. The choice of the statistical data was the only possible.

Method

Autonomous public health care units are required to provide statistical reports on their financial results and a balance sheet (MZ-03 SEMI-ANNUAL/ANNUAL financial report of autonomous public health care units). These reports entered in the Statistical Research Program for 2006, what means they cover for the first time the year 2005. The institution collecting these data is the Centre of Health Care Information Systems, i.e., one of the Ministry of Health units responsible for data processing. Previously, similar reports although under a different name (*F01z*) were collected by the Central Statistical Office. The report carries aggregated data on costs and revenues, for a period of the year, for entire entity, whatever it performs. Because majority of health care units perform a wide range of activities, it is not possible to distinguish financial data for each category of care, as inpatient, outpatient, or LTC separately.

The same autonomous public health care units, submit however separate statistical reports on their business activity, like hospital admission, ambulatory consultation etc. The *financial* and *activity* reports never met in the statistical system before. Collection of the two reports was performed by different bodies in the statistical system, and statistical confidentiality rules did not allow to the matching. The situation changed in 2006, and currently the Center for Health Information Systems, operating both data sets, is able to match the data.

To match financial and activity data, which would provide meaningful information, it was necessary to extract facilities performing *homogenous* activity. In this exercise there was a

selection made of outpatient health care facilities. Out of all public health care units which submitted *activity* reports for 2005, there was a selection made of those which performed *only* ambulatory care visits; no inpatient care, no home care, or other forms of care. The facilities, accounted approx. 50 entities, were matched with data set of *financial* data, and via identification code (REGON), there was a selection made of those units which performed only outpatient care and submitted financial report. Final number of units was 26 in whole of Poland.

Analysis

The observation of data reveled that size of the units, measured by yearly volume of costs, which belonged to the analyzed set, differed markedly; the smallest unit spent 26 202 Euro during the 2005, the biggest spent 2 582 067 Euro. Therefore direct values were not compared, but used for calculation of indicators.

Activity of the units was characterized by type of ambulatory services they provide, and following types were distinguished:

- internal medicine (general medicine) consultations
- other medical consultations,
- mother and child consultations
- surgical consultations
- dental services.

Logic of the division was based on specialties in medicine which are present in Polish health care; internal medicine or general medicine is regarded as the most general specialty for adults, other medical specialties regard fields as cardiology, gastroenterology etc. often being subspecialty of the internal medicine, but regarded as more specialist, rare and sophisticated. Mother and child consultations regard a specific consultations provided to pregnant women and mothers of newborns. Surgical consultations covers all categories of physicians performing surgical operation; in ambulatory care, at least a part of the visit might be associated with performing invasive procedure. Dental services are self-explanatory, although it might be noticed that public dental care facilities use to be rare, and sometimes they perform more complex services or services for special categories of patients (HIV, HB infected etc.).

In the sample of units, there were such, which had high percentage of *other medical* and also *surgical consultations.* This was used to make categorization of the units according to characteristics of activity. On the other hand dental services and mother and child services never played important role in activity of the analyzed facilities.

Cost per visit

Altogether, average cost of production of a single outpatient service was estimated 38,44 PLN (9,82 Euro). Standard deviation from the average was 14,55 PLN (3,64 Euro). Median was a little lower than the average, what suggest asymmetrically high marginal values in the sample; the highest costs were more *distinguishing,* than the lowest, what is an optimistic message that the highest costs were borne (?) by fewer entities.

In entire sample, the costs per visit ranges between 13,1 PLN (3,28) and 64,4 PLN (16,11), what is huge difference. After cutting off the marginal values (quartiles), the range decreases to 26,16 - 49,28 PLN (6,54 – 12,32 Euro), what could be called *representative range* of costs, covering middle half of the sample.

Costs per visit	PLN	Euro
Average	38,44	9,61
Median	37,04	9,26
Minimum	13,11	3,28
Maximum	64,44	16,11
Standard deviation	14,55	3,64
Upper quartile	49,28	12,32
Lower quartile	26,16	6,54

Table 42. Analysis of costs of the ambulatory visit in sample providers, in PLN and Euro (exchange rate 4 PLN/Euro).

Costs structure

In average, the costs structure in the observed facilities was as follows:

Usables; incl. drugs, usable materials, fuel,	7,6%
Personnel costs; incl. salaries and related taxes and premiums, contracts for medical services with self-employed	76,8%
Utilities and taxes; energy, taxes	12,2%
Depreciation	3,4%

Table 43. Costs structure of outpatient services in Poland in 2005, based on random sample of 26 health care units.

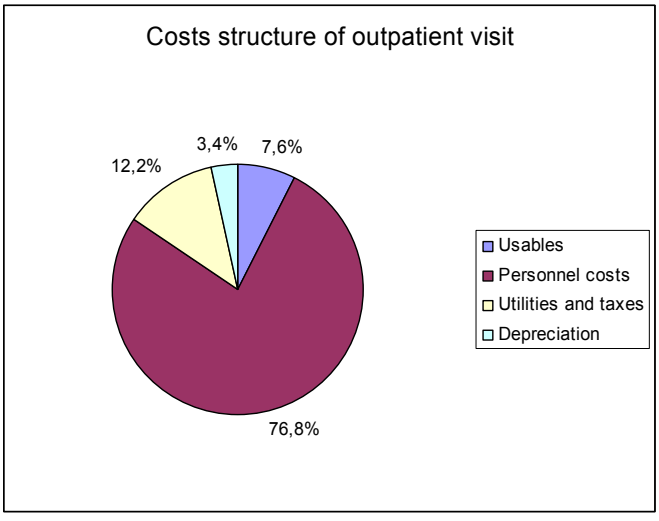

Chart 1. Costs structure of outpatient services in Poland in 2005, based on random sample of 26 health care units.

Percentage of usable materials, as a share of the total costs, varied significantly and if the average value was 7,6%, average difference (standard deviation) was 5,09%. Contrary, for personnel costs, which in average was 76,8%, the SD was only 7,67% what was very small difference in average.

In conclusion, relatively small variations in costs structure associated with remarkable variations in costs per visit suggests that, if any ineffectiveness occurs, it regards all types of

costs, and does not refer to some, specific cost category in particular providers. Also analysis of costs structures of the units with prevailing one of the activity areas (like *internal/general medicine, surgical visits*) did not reveal significant differences which could be attributed to the area of activity itself. It suggests that costs differences are caused by quality of management rather than area of activity.

An annex: Sample providers and their characteristics

	Hospital				Departments				
Regional Hospital One	*Beds*	*Physicians*	*Nurses*	*Other*		*Beds*	*Physicians*	*Nurses*	*Other*
	720	210	440		neurology	40	12	38	
					orthopedy	39	11	35	
					surgery	77	16	45	
					gyn&obs	42			
					ophtalmology	33			
County Hospital Two	*Beds*	*Physicians*	*Nurses*	*Other*		*Beds*	*Physicians*	*Nurses*	*Other*
	249	66	253	110	surgery	34	8	23	2
					Internal medicine	45	10	30	3
					ambulatory	0	8	10	1
					gyn&obs	40	9	35	
County Hospital Three	*Beds*	*Physicians*	*Nurses*	*Other*		*Beds*	*Physicians*	*Nurses*	*Other*
	201	61	180	136	Internal medicine	52	5	23	8
					ambulatory		5	15	6
					surgery	35	5	15	6
					orthopedy	23	5	12	7
					gyn&obs	22	5	14	5
					ICU	3	4	10	4
					Emergency care	2	5	6	2
					neonatal	14	1	9	2
Regional Hospital Three	*Beds*	*Physicians*	*Nurses*	*Other*		*Beds*	*Physicians*	*Nurses*	*Other*
	377	103	180		surgery	43	8	35	
					orthopedy	24	7	25	
					Internal medicine	24	5	34	
					Internal medicine	34	6	37	
					gyn&obs	67	9	28	
Regional Hospital Two	*Beds*	*Physicians*	*Nurses*	*Other*		*Beds*	*Physicians*	*Nurses*	*Other*
	694	194	377	103	surgery	24			
					orthopedy	56			
					Internal medicine	265			
					Internal medicine	50			
					gyn&obs	83(poł40)	23	73	
County Hospital One	250	48	203	140		*Beds*	*Physicians*	*Nurses*	*Other*
					surgery	34	8	23	2