



Possible ways to measure PPPs for health services

Background document: « Proposal of an output method for Purchasing Power Parities in (non market) health services », document NMS 26 of the Eurostat-OECD non-market services task force, 20 September 2006.

The basic choice between « activities » and « products » (like in construction)

- The Eurostat handbook on price and volume measurement in national accounts recommends in theory “*complete treatments*”, “*bundle of complementary services*“ (so “products” / “treatments” across activities providers), but, “*due to data availability*”, the “*practical compromise*” is “*based on a narrow concept of treatment which aims at capturing full treatments only within each CPA class*” (which is closer to “activities” than to “treatments” = “products”).
- In PPP, the same basic choice between the ideal theory and the practical compromise can lead to different possible ways.

If we choose practical compromise by activities in health goods and services

- The Eurostat handbook lists some quantity indicators by activity in health services, which can all be adapted for cross-country comparisons:
 - General practitioners: deflation by the price of specific consultations (A); or number of consultations by type of treatment (A); or number of consultations (B);
 - Specialists and dentists: deflation by the price of specific treatments (A); or number of first visits by type of treatment (A); or number of first visits (B);
 - Hospitals: for each function (inpatient, psychiatric, rehabilitative care, nursing services...), number of treatments by DRG or DRG-like classifications (A or B).

Health goods: what about generic drugs and originals?

- The Eurostat handbook does not comment on the case of pharmaceutical products, but health gains (contribution to the change in outcome) may be the right main indicator of volume for health goods as for health services.
- It means that generic and original drugs are deemed to be one category when measuring volume and price in PPP's (not two as is usual in the CPI). Using the CPI, the introduction of generic drugs has a decreasing impact on the volume index, but not on the price index (except if the original prices decrease because of competition).
- If a generic drug does not have the same curative power as the original, this could be taken into account in a formula, e.g. 1 generic = 0.8 original...

Health services: what has to change?

- Price deflation of given consultations or treatments is already the current method for medical services (GP, specialists, dentists) in PPPs.
- The distinction market / non-market complicates the picture; we could drop it completely and measure only “activities” (GP / specialists / dentists);
- A choice can be made between prices collected by price experts or by health experts (as for EU-Health Basket). Health experts could define the “case vignettes” for each activity, and price experts would collect the prices/costs in the usual way.
- The main change would be that hospital services are to be measured by function and then by DRGs or DRG-like classifications.

DRGs: a possible international classification?

- In inpatient care, we can hope that an international classification can be developed; most national systems have been influenced by the American one but all countries have diverged to some extent.
- In nursing services, RUGs (for Resource Utilisation Groups) have a similar pattern as DRGs in inpatient care.
- In outpatient care, DPGs (for Day Procedure Groups) in Canada and AVGs for (Ambulatory Visit Groups) in the US can provide frameworks, but they are now only used in US and Canada (more than this see the box on p.17 part 3).
- => a harmonised system of DRGs is a long-run objective, but we can hope it will be realised, built by other international projects; it would serve many purposes.
- It will be perhaps facilitated by the creation of a ICHI system (International Classification of Health Interventions)?

DRGs: some are already available for cross-country comparisons

- Before the development of an exhaustive international classification of DRGs, we could hope that a selection of DRGs, common to all countries or most countries (PPPs are frequently calculated with deficiencies in national data), like ocular affections (next slide), would provide quantity indices that we could extrapolate to the whole hospital services.
- Extrapolation of the price index would perhaps be better, but it supposes first that common conventions are found for “non attributable residual expenditures” (therefore certainly less quick and easy than an extrapolation of quantities).

D M C	US, version 01/10/2005		France, version 7, 2002-2003		Italy, tariffario per le prestazioni	
	D R G	"Diagnosis Related Groups" titles	G H M	"Groupes Homogènes de Malades" titles	D R G	"Diagnosis Related Groups" titles
Ocular affections	36	Retinal Procedures	48	Interventions sur la rétine	36	Interventi sulla retina
	37	Orbital Procedures	49	Interventions sur l'orbite	37	Interventi sull'orbita
	38	Primary Iris Procedures	50	Interventions primaires sur l'iris	38	Interventi primari sull'iride
	39	Lens Procedures With Or Without Vitrectomy	51	Interventions sur le cristallin avec ou sans vitrectomie	39	Interventi sul cristallino con o senza vitrectomia
	40	Extraocular Procedures Except Orbit Age >17	52	Autres interventions extra- oculaires, âge supérieur à 17 ans	40	Interventi sulle strutture extraoculari eccetto l'orbita, età > 17 anni
	41	Extraocular Procedures Except Orbit Age 0-17	53	Autres interventions extra- oculaires, âge inférieur à 18 ans	41	Interventi sulle strutture extraoculari eccetto l'orbita, età < 18 anni
	42	Intraocular Procedures Except Retina, Iris & Lens	54	Autres interventions intra- oculaires	42	Interventi sulle strutture intraoculari eccetto retina, iride e Cristallino
	43	Hyphema	59	Hyphéma	43	Ifema
	44	Acute Major Eye Infections	60	Infections oculaires aiguës sévères	44	Infezioni acute maggiori dell'occhio
	45	Neurological Eye Disorders	61	Affections oculaires d'origine neurologique	45	Malattie neurologiche dell'occhio
	46	Other Disorders Of The Eye Age >17 W Cc	62	Autres affections oculaires, âge supérieur à 17 ans avec CMA	46	Altre malattie dell'occhio, età > 17 anni con CC
	47	Other Disorders Of The Eye Age >17 W/O Cc	63	Autres affections oculaires, âge supérieur à 17 ans sans CMA	47	Altre malattie dell'occhio, età > 17 anni senza CC
	48	Other Disorders Of The Eye Age 0-17	64	Autres affections oculaires, âge inférieur à 18 ans	48	Altre malattie dell'occhio, età < 18 anni

Note that these DRGs are not fully quality adjusted: what kind of interventions, with what kind of laser (for instance)?

But... still unsatisfactory

- This approach will miss the drift between inpatient and outpatient care, or curative and preventive care, or any introduction of new treatment (except through relative costs); these are perhaps the main components of “productivity” (and certainly of cost-effectiveness progress) in health care system.
- DRGs are perhaps not enough detailed if they are to catch a difference in quality between countries (perhaps the ICHI classification will get this level of detail?).

If we dare to choose a theoretical approach by “products” / “treatments” (= “works”)

- If we choose not “what we do” but “what we produce”, the focus would be on health gains by groups of diseases, by complete treatments, across providers.
- But PPP’s still need aggregates by provider, for that is what NA provides.
- The reference framework is then a 2-dimensions table, crossing groups of diseases (by rows) and health providers (by columns), which is a common variant of “Cost Of Illness” and is similar to table 6 in current SHA (both in current prices). Health goods and services would be assessed together.

Cost of illness in value... and volume

Output, by adapted ICHA-HP classification of activities / products

Outcome, by adapted ICD-10 classification

		HP.1	HP.2	HP.3.1	HP.3.2	HP.4	total
Infectious and parasitic diseases	illness i						
	illness j						
...	illness k normal						
	illness k old, sp						
All other categories							
General individual prevention							
Total pers. curr. exp. of health							
Collective prevention							
Reception in emergency services							
Other coll. services							
Total current exp. of health							

ICHA-HP.1 to ICHA-HP.4: health goods and services strictly speaking, to be harmonized with ISIC rev 4.

In current prices, it is a variant of COI framework, which could become the new table 6 of SHA.

In volume, we should think « in row » first (effectiveness of the health care system).

We need an harmonization of COI

Country	Study	Indirect costs ?	Non attributable residual
US	Since (Rice, 1966), regularly updated, last (?) is (Hodgson et al., 1999) on 1995 data	No	13% before adjustment
Sweden	Since (Lindgren, 1981) on years 1964 to 1975, last (?) on year 1991	Yes	19% incl. dental care and mental. handicapped
Germany	(Henke et al., 1997) on year 1990, updated by (Martin et al., 1999) on year 1994	Yes	30% before adjustment
Canada	Since 1987, last (Santé Canada, 2002) on year 1998	Yes	45%
Netherlands	Since (van Roijen et al., 1992) on year 1988, last (Polder et al., 2002) on year 1999	Yes	17%, of which 7% indirect expenditures
UK	(NHS executive, 1996) on 1992 and 1993	Yes	10%
Australia	(AIWH, 2000) on years 1993 and 1994	Yes	10%
Japan	(Japan, 1999)	Yes	?
Spain	(Spain, 1993)	Yes	?
France	(CREDES, 2003) on year 1998	No	17%

Is harmonization of COI in progress?

- Lot of European pilot projects on COI and HE by age and gender (less important in my mind)

Country	Data	Relations to:		Remarks
		HC	HP	
Czech Rep	Yes	Yes	Yes	
Germany	Yes	No	Yes	
Denmark	Yes	Selected	Selected	
Estonia	Yes	Yes *	No	* at 2 digits
France	Yes	Yes *	Yes **	* French variation of SHA ** in some studies
Italy	Yes	Selected	Selected	
Latvia	Yes	Selected	Yes	
Lithuania	Yes	Yes	Yes *	* in some studie
Luxembourg	Yes	Yes	Yes *	* some exceptions
Netherlands	Yes	No	Yes	
Spain	Yes	Selected	Selected	
Slovenia	Yes	Selected	Selected	
All responses	12 of 25	5 and 5 selective	5 and 4 selective	

Presented by Eurostat unit F5 at the OECD health experts meeting, 6 October 2006

Suggests ICD-10 2nd digit, every 3 years, harmonized...

Harmonization of COI: main theoretical issues

- One political issue is the scope of health activities: health insurances, public policy, long term (social) care should be excluded in a classical ISIC/NA view.
- One technical issue is the treatment of co-morbidity.
- Another issue is the place of prevention. Individual prevention against a specific disease would be ideally counted with curative care (but are we sure we can estimate the health gained by prevention?). General individual prevention against several diseases could be counted elsewhere, and perhaps general collective prevention.
- All expenditures/activities of hospitals, general practitioners, etc. are to be allocated by diseases, or some codes are to be added to ICD-10 (for instance general prevention, or non-health activities: education, R&D, patients' meals?...).
- Perhaps not the task of this TF, but linked with SHA (table 6).

How to allocate volume to rows ?

- Imagine we know the health gain (based initially on number of QALYs for instance, but at last expressed in PPP \$ or €) provided by each full treatment (based on ICHI?) dedicated to a specific disease (with a specific monetary value of health gain per group of diseases, which is basically an average among countries). We need to split this « volume » by providers, in order to sum in the final step the total health volume output contributed by each provider (if all treatments were measured in QALYs, this total could be seen as QALYs weighted by specific disease prices).
- Allocating volume across providers in proportion to expenditures at current prices seems logical, and almost necessary if general practitioners want to be credited with the effectiveness of the medicines they prescribe.
- But some components could be objected as too « far » from the health effect, for instance radiology, better estimated by number of radiographies? What about the trade margins of pharmacists?

Practical calculation of COI in volume

- For each “row”: disease x age if needed, the idea is to share number of treatments (quantity) * QALYs provided by treatment (quality) = health gain (volume) on one side, price on another, the value being known by COI, and in a second step to allocate the volume between providers, in proportion to the value.
- The first algorithm ($\underbrace{\text{quant} \times \text{qual} \times \text{price}}_{\text{volume}} = \text{val}$) can vary for each row.
- First solution: direct estimate of volume by number of treatments and reference QALYs for each kind of treatment (if several for the same disease). Ideal solution, but ambitious for the database. **A⁺⁺**
- Second solution: direct estimate of volume by number of treatments and a proxy of health gains like survival rates (- cte) or 1 - post surgery femur fracture rate. **A**
- Third solution: direct estimate of quantity by number of treatments, cost weighted. Poor solution. **B**
- Fourth solution: deflation by few quality adjusted prices. **A⁺**

If QALYs are to be used: which ones?

- The result of a treatment is influenced by the age of the patients, their genetics and lifestyle, and, in some cases, their gender. It is not due to the producer, therefore, if QALYs are measured, they have to be AGGL standardized (like ESCS correction in PISA for education). For instance, the change in remaining life expectancy ($e^{-rL_{it}}$) should not to be taken into account in volume indices between countries or between periods. QALYs can nevertheless be updated, like weights.
- Hence, we can think that the right QALYs to be used in the PPP exercise are more characteristics of the treatment than of the country or the year. A dataset of QALY for UK, 2006, could be used for all countries and several years. Even heterogeneous datasets of QALYs (protocols, countries) can be used, we need homogeneity only at the group of diseases level (to weight treatments), sometimes crossed with age.
- Indeed, similar treatments are provided to young and old people, but with supplementary care for the latter. In this case, the treatments are not only different, they are non substitutable, and it should lead to different strata.

Quality adjusted price deflation

- The pilot project EU Health BASKET collects prices (for the consumer) and costs for 10-12 different health services (episodes of care) in the EU member states at the micro-level (in- and out-patient care). At least 20 case vignettes would be suitable (ICD-10 first digit).
- Of course, the same conventions would apply to this “bottom-up” approach as for the “top-down” approach (which should be the main one for COI).
- Only “representative” treatments and costs are collected. Several should be provided, with weights, combining in-patients and out-patients, with different providers in order to build “average” treatments and costs.
- Some qualitative parameters are collected, they are to be converted in quality adjusted prices.

Example of hip replacement

Our addition :
HP providers corresponding
HP.1
HP.1
HP.1
HP.1 or HP.3.5
HP.1 or HP.3.5
HP.1
HP.3.1
HP.1
HP.1
HP.1
HP.1 or HP.4

EU Health BASKET project						
Phase	Elements	Units	no. of units used / patient	Unit Cost	Total costs	
Pre-operative (admission and planning)	<i>Diagnostic Procedures</i>					
	Imaging (e.g. X-Ray)	No.				
	Imaging (e.g. ultrasound)	No.				
	Imaging (e.g. CT)	No.				
	Laboratory (e.g. blood count)	No.				
	Laboratory (e.g. blood coagulation, C-reactive protein (CRP), etc.)	No.				
	Other (ECG, lung-function, etc.)	No.				
	<i>Care before OP</i>					
	Surgeon/Physician input	Patient days*				
	Nursing input	Patient days				
Other (paramedical)	Patient days					
	<i>Drugs, infusions, injections, etc. Drug A, Drug B, etc.</i>	DD**				
Operation	<i>Devices (type of implant, stent, etc.) total price paid by hospital</i>	No.				

Cemented or uncemented prosthesis? Possibility of quality adjustment (based on QALYs for kinds of prosthesis)

Conclusion: short term and long term

- Short term: retain the activity approach, but treat generic and original drugs together;
 - drop market/ non-market status in GP/ specialists/ dentists activities;
 - work on a selection of common DRGs and extrapolate quantity indices for hospital services.
- Medium-long term: if the OECD Manual keeps the practical compromise by activity of the Eurostat handbook on price and volume, we have to wait for an international exhaustive classification of DRGs, perhaps relying on ICHI.
- Medium-long term: if the OECD Manual dares to follow the theoretical approach of complete treatments, we have to wait for an harmonization of COI and we have to choose specific solutions for each “row”, between 4 kinds of solutions. A “quality adjusted EU-Health Basket” project could be very cost-efficient.