

# Economic outcomes: Method for implementation

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# General cost categories

## Direct costs:

- Health care costs for diagnosing, treating and following up cases (in and out of hospital)
- Personal costs (eg, transport)

## Indirect costs

- Time costs (often termed productivity costs)

$$\text{costs} = (\text{number of cases}) \times (\text{cost} / \text{average case})$$



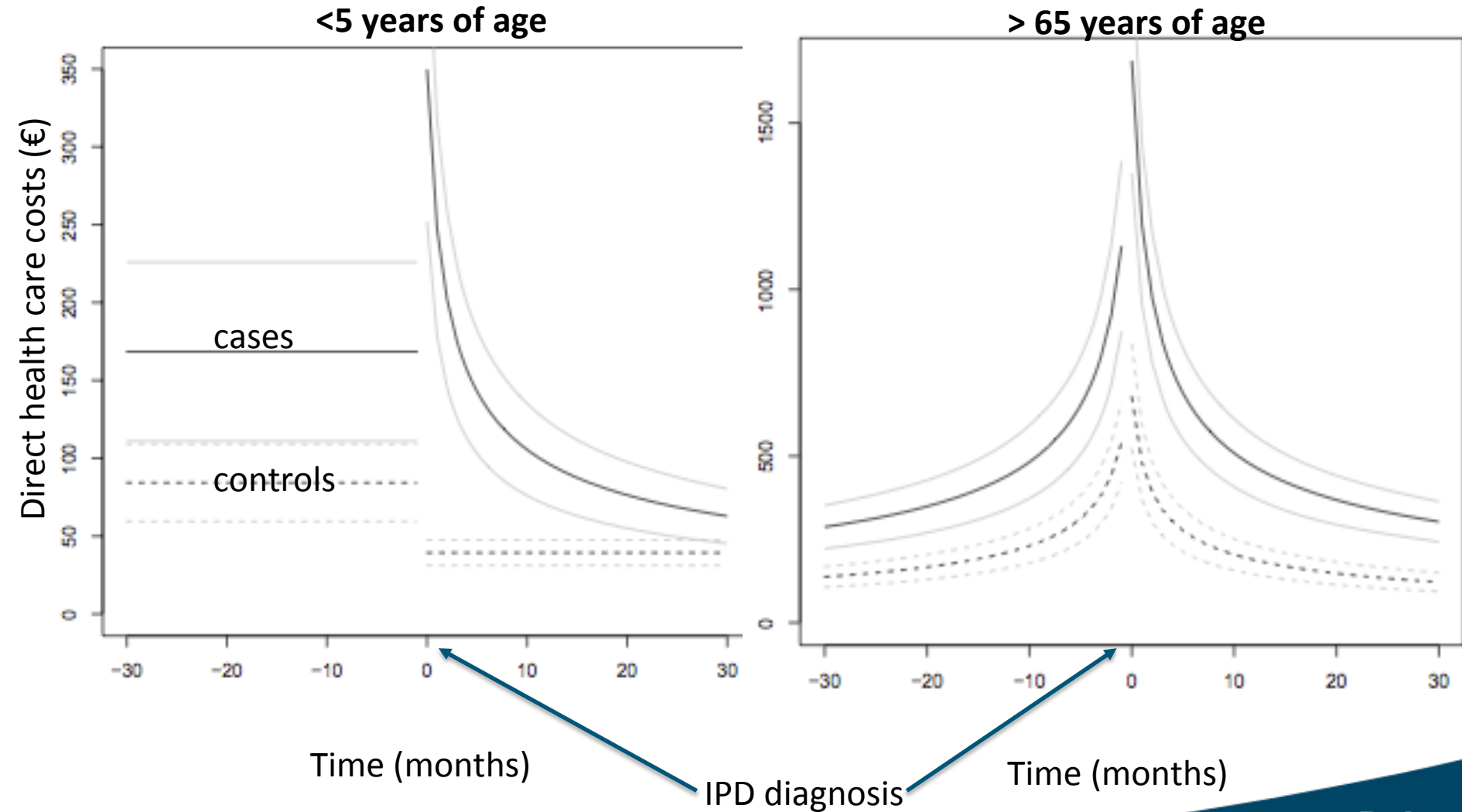
# Estimating health care system and patient costs

- **Claims or insurer administrative databases**

- (+) all costs (not just hospital), but no copayments

- (-) identifying cases (linkage), and selecting only relevant medical acts

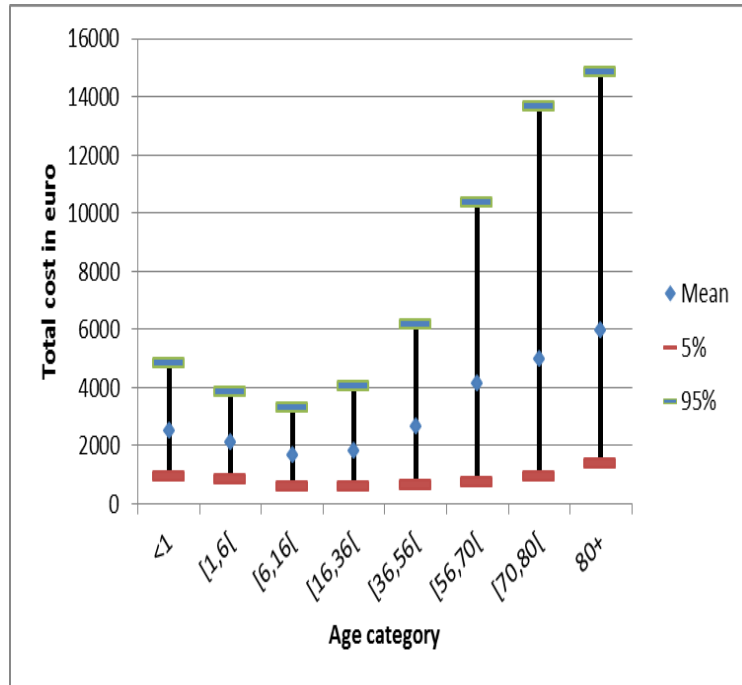
# Retrospective matched case-control cost study in an insurer database: example IPD



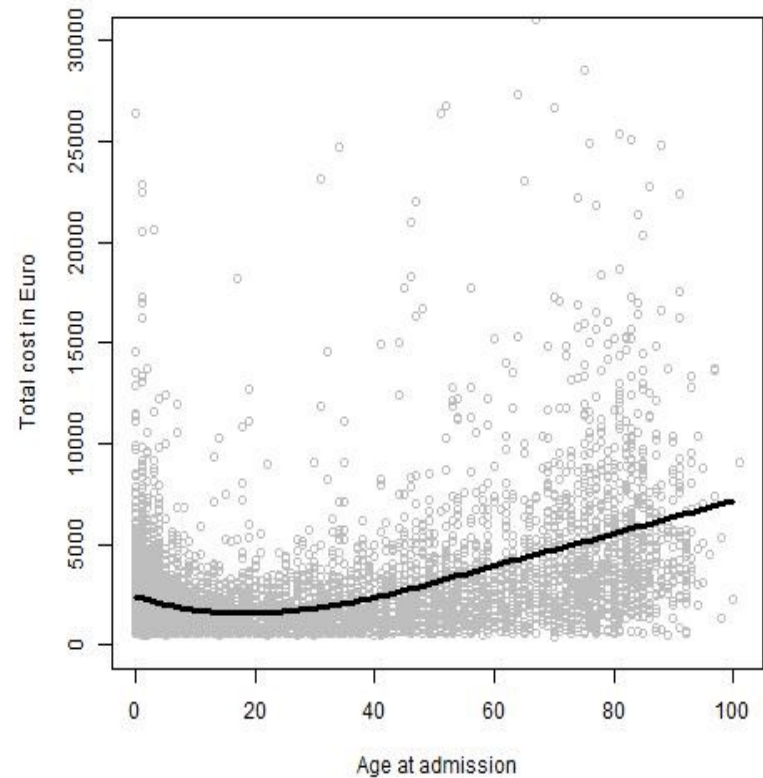
# Estimating health care system and patient costs

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- **Centralised hospital databases**
  - (+) diagnosis often ICD code based, no linkage required
  - (-) only hospital costs; often multiple diagnoses, may be entered by non-treating staff

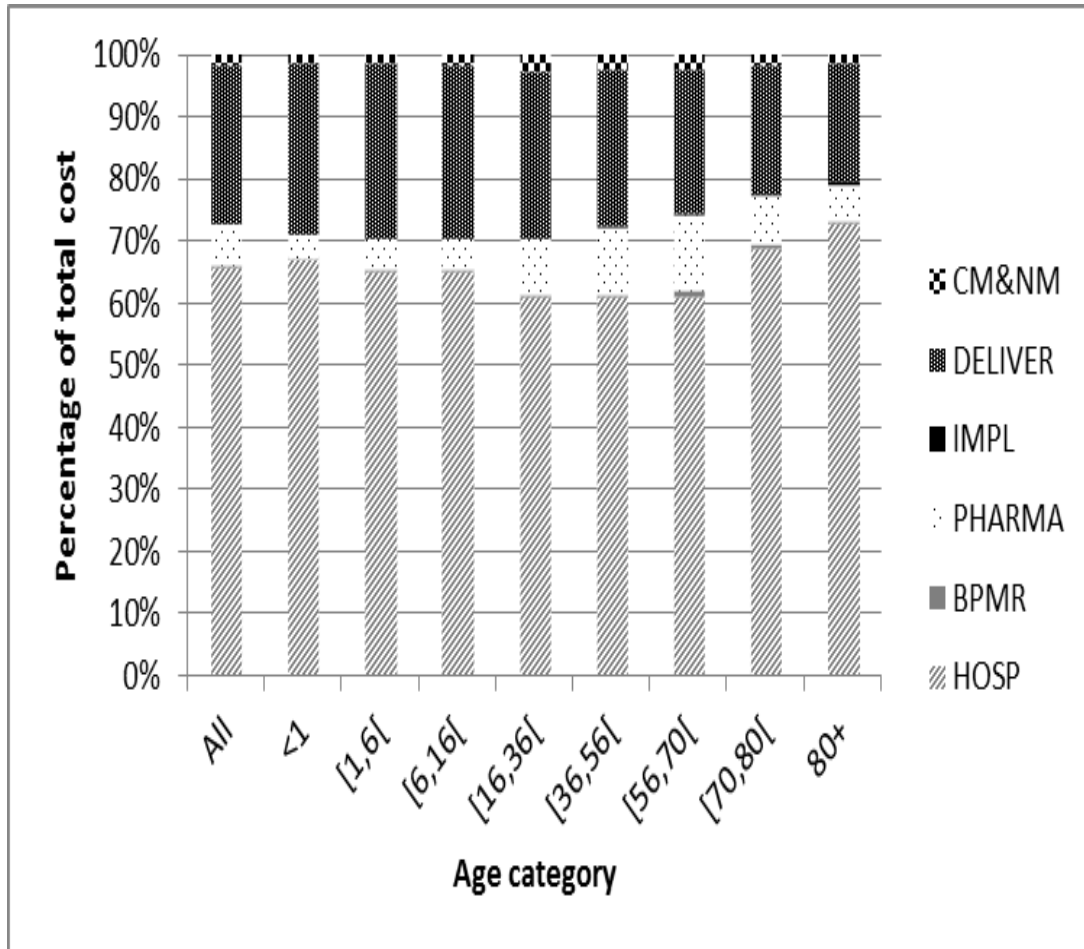
# Age specific hospitalisation costs for primary diagnosis influenza (all hospitals in Belgium, 2011)



Beutels P et al, 2013



# Distribution of in-hospital costs, primary diagnosis influenza



Length of stay important, but also pharma and medical deliveries

Cost category	Description
HOSP	Hospitalization cost, cost of staying at the hospital
BPMR	Blood Plasma, Mother's milk, radio-isotopes
DELIVER	Medical deliveries
PHARMA	Pharmaceutical products
IMPL	Implantations
CM&NM	Clinical microbiology and nuclear medicine

Beutels P et al, 2013



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  - (-) reliability of diagnosis; recall bias



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- **Restrospective/cross sectional**
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  - (-) reliability of diagnosis; recall bias
- **Prospective data collection (cohort, trial)**
  - (+) potentially accurate case definition, different perspectives can be included
  - (-) costly and time consuming

# Likely easiest to collect invoice data in GHSN hospitals

Obtain invoice amounts per patient-admission from accountancy/billing department at each site :

- Total charge to patient and their insurer
    - “Hotel” costs (and LOS)
    - Medication costs
    - Diagnostic costs
    - Intervention costs (eg surgery)
    - Days per type of ward (IC, general ward)
    - ILI/flu status
  - Local availability depends on health care system (may need per-diem estimate to apply to LOS)
- Available detail depends on health system and hospital

# Opportunities for analysis

- Relatively easy to assess cost charges in terms of :
  - Differences per patient/ admission for ILI , flu (Lab confirmed) and ICD-based
    - potential validation of cost estimations at the country level through ICD
  - Differences over time, and between study sites/countries
    - after adjusting for inflation (using Consumer Price Indices) and purchasing power (using PPP)
  - Differences between pathogens (eg RSV)
  - Correlations between LOS and charges
    - potential validation if only LOS is available
  - Correlations between severity/strains and the above
    - understand inter-season variability in costs per patient

# More difficult as part of GIHSN

- Insurer database analysis requires linkage, and collaboration of large insurer (eg national health insurance), but potentially interesting comparisons – all costs, incl follow up after separation in such databases:
  - Flu (strains) versus ILI, flu vs other pathogens
  - pregnant study women (with flu, ILI, other pathogens) vs other matched pregnant women
- National or regional centralised hospital database analysis (based on ICD) requires existence of a centralised database and access to it, and is a separate study altogether, mainly interesting to assess the representativeness of study sites

# Retrospective surveys?

Follow-up patients (survivors) to survey their experience after separation (health care costs but may also include indirect costs of impaired productivity) :

- Labour intensive and costly, hard to reach patients, hospital costs likely more important than other costs in hospitalised patients, potential recall bias.

# General limitations remain

Sites may not be representative for a region/country in terms of caseload, treatment practice and costs

Privacy/ethical approval?

Commercial interests/competition between hospitals?

Difficult to survey follow-up costs after separation (but less influential for burden of disease and cost-effectiveness analysis)

# Conclusion

- **Opportunity to collect information on hospital charges to inform**
  - **Attributable cost of illness, BoD, cost-effectiveness**
- **Potential opportunity to also collect info on non-hospital costs and indirect costs for hospitalised patients**
- **Representativeness is an important limitation**
- **Check out WHO guide and manual on cost burden estimation and CEA for flu**

# Resource use from a retrospective ILI survey (n=2250)

	COM, ILI (n=1107)	AMB, ILI (n=1116)	AMB, FLU (n=429)
% of respondents who took medication:			
against fever	28%	42%	50%
against pain	30%	35%	38%
anti-inflammatory	14%	29%	32%
antibiotics	4%	45%	38%
anti-virals	5%	8%	15%
against cough	41%	48%	52%
against sore throat	38%	39%	39%
nose spray	45%	45%	45%
other	9%	16%	12%
Number of medical visits:			
	NA	1.6 (1) [0-19]	1.6 (1) [0-13]
GP consults	NA	1.1 (1) [0-6]	0.97 (1) [0-4]
GP home visits	NA	0.3 (0) [0-6]	0.4 (0) [0-6]
specialist consults and home visits	NA	0.2 (0) [0-12]	0.2 (0) [0-7]
% of consultations with GP	NA	84%	86%



# Estimating direct costs : hospital costs

MOST PRECISE



LEAST PRECISE

## *Micro-costing*

Each component of resource use (e.g. laboratory tests, days of stay by ward, drugs) is estimated and a unit cost derived for each.

## *Case-mix group*

Gives the cost for each category of case or hospital patient. Takes account of length of stay. Precision depends on the level of detail in specifying the types of cases.

## *Disease-specific per diem (or daily cost)*

Gives the average daily cost for treatments in each disease category. These may still be quite broad (e.g. orthopaedic surgery).

## *Average per diem (or daily cost)*

Averages the per diem over all categories of patient. Available in most health care systems.

These are accessible in many countries

# Delphi panels

Ask estimates from experts (preferably clinicians)

- Several rounds: “Pick a number”
  - confront with other experts’ estimates
  - End in consensus

Probability of disease stages, treatment descriptions →  
apply unit costs

## Problems

- Subject to bias (experts are often paid)
- Atypical caseload
- Representative choice of experts?
- Best practice is not always current practice

Use only as a last resort; if nothing else is available