Review and consensus of cost effectiveness methods

Pepijn Vemer, PhD
University of Groningen, PharmacoEpidemiology and PharmacoEconomics (PE^2)

@ P.Vemer@rug.nl

@PepijnVemer

EConDA
Economics of Chronic Diseases

Key objectives

- Aid EU member states to develop, select, implement more cost-effective policies to improve chronic disease prevention
- Reduce health inequalities in chronic disease prevalence

WP4: Consensus

- EConDA Work Package 4: consensus building of methodology for measuring cost-effectiveness of interventions to prevent, screen and treat chronic diseases.

WP4: 3 phases

- Phase 1: literature review on cost-effectiveness of interventions to prevent, screen, treat COPD, CHD, CKD, T2DM
- Phase 2: Qualitative study – interviews with experts (n=13)
- Phase 3: expert meeting, form a consensus

Review of Cost-Effectiveness Methods

Basic methodology

- Several methods are available to do health-economic evaluations.
- Budget impact: how does the intervention impact the (healthcare) budget?
  - non-informative for our purpose.

Basic methodology

- Cost-benefit analysis (CBA)
  - INMB = λ * Δ Health – Δ Costs
  - INMB > 0 → Cost-effective

- Cost-effectiveness analysis (CEA)
  - ICER = Δ Costs / Δ Health
  - ICER < threshold → Cost-effective

Thresholds: consensus

- EConDA does not make CE assessment
  - No threshold is given
- Instead: simply report outcomes.
- Therefore CBA not useful for EConDA

WHO Threshold

- WHO has proposed a threshold of 3 times the GDP per capita (approximates, 2013):
  - Bulgaria: лв 33.000 / QALY
  - Finland: € 90.000 / QALY
  - Greece: € 59.000 / QALY
  - Lithuania: € 58.000 / QALY
  - Netherlands: € 106.000 / QALY
  - Poland: zł 225.000 / QALY
  - Portugal: € 62.000 / QALY
  - UK: £ 73.000 / QALY

Cost-effectiveness analysis

- EConDA uses cost-effectiveness analysis (CEA).

- N.B.: most other methods are (relatively) easily added afterwards, if deemed necessary, since they mostly require the same data.

Perspectives: theory

- Healthcare system: considers costs and outcomes associated with providing care without differentiating between categories of providers and payers.

- Societal perspective: broadest possible perspective, includes all costs and consequences, regardless of who experiences them.

Source: cdc.org

Perspectives: consensus

- Where possible: societal perspective
- Different kinds of costs are presented separately.
- When possible, Include absenteeism and presenteeism.

Perspectives

- Literature review: societal perspective in 16 / 134 studies (12%)
- So, in practice societal perspective is not often taken into account.

Indirect costs: consensus

- Human-capital (HC): patient's perspective and counts any hour not worked as lost.
- Friction-cost (FC): employer's perspective, and only counts as lost those hours not worked until another employee takes over.
- Preference for FC method.

Two ways of costing

- Costing of a lump sum:
  - How much does an intervention cost in total?
  - From literature; apply exchange rates/PPPs.

- Costing of resource use:
  - What resources are used in the intervention?
  - What are the unit costs (prices) of each unit?

Diseases: consensus

- Prefer lump sum pricing.
  - Too much heterogeneity between patients: so average over patient population.
- Alternative: expert opinion

Screening, lifestyle, prevention: consensus

- Prefer lump sum pricing over resource use costing.
  - Latter needs a very specific description of what is done, and this is very (health) system specific.
- Alternative: expert opinion

Treatment: consensus

- Best option: resource use costing
  - Dosage: same as for source of efficacy data.
  - Administration/dispensing partly country-specific.
  - Country specific unit prices

Discount rates: consensus

- Use country-specific discount rates
- Possible source: HE guidelines for each country.

Applying the consensus

Data availability

- A possible lack of (and limitations to) available data was discussed by the qualitative interviews.
  - E.g.: ‘it is necessary to get prospective data which is very difficult, its very limited in our countries’

Cost Data

	EConDA countries															
	Bulgaria (BG)		Finland (FI)		Greece (GR)		Lithuania (LT)		Netherlands (NL)		Poland (PL)		Portugal (PT)		United Kingdom (UK)	
Direct cost	cost/pop-yr	cost/patient-yr	cost/pop-yr	cost/patient-yr	cost/pop-yr	cost/patient-yr	cost/pop-yr	cost/patient-yr	cost/pop-yr	cost/patient-yr	cost/pop-yr	cost/patient-yr	cost/pop-yr	cost/patient-yr	cost/pop-yr	cost/patient-yr
CHD	120,345,292	5,767	448,848,250	3,961	631,986,155	2,874	64,138,623	2,995	1,735,082,448	3,632	4,462,113,744	7,874	207,363,232	2,682	2,024,402,271	1,521
CKD	x	360	x	266	x	184	x	197	x	236	x	521	x	175	x	199
CKD (stage 1)	x	242	x	179	x	124	x	132	x	159	x	350	x	118	x	134
CKD (stage 2)	x	242	x	179	x	124	x	132	x	159	x	350	x	118	x	134
CKD (stage 3)	x	363	x	268	x	186	x	199	x	238	x	525	x	177	x	201
CKD (stage 4)	x	472	x	349	x	241	x	258	x	310	x	683	x	230	x	261
CKD (stage 5)	x	472	x	349	x	241	x	258	x	310	x	683	x	230	x	261
ESRD	x	121,567	x	89,900	x	62,156	x	66,527	x	79,846	x	175,933	x	59,160	x	67,183
COPD	901,398,506	2,209	561,639,898	1,517	418,843,994	1,196	463,715,821	1,147	437,400,020	1,319	1,133,129,295	3,016	370,801,445	1,027	x	1,325
COPD (stage 1)	x	1,065	x	731	x	577	x	553	x	636	x	1,454	x	495	x	639
COPD (stage 2)	x	2,497	x	1,715	x	1,352	x	1,296	x	1,491	x	3,408	x	1,161	x	1,498
COPD (stage 3)	x	8,186	x	5,622	x	4,432	x	4,250	x	4,887	x	11,175	x	3,807	x	4,911
COPD (stage 4)	x	8,186	x	5,622	x	4,432	x	4,250	x	4,887	x	11,175	x	3,807	x	4,911
Hypertension	x	306	x	229	x	131	x	159	x	193	x	418	x	108	x	162
Stroke	97,191,028	43,395	821,068,281	29,805	609,154,151	21,624	39,338,326	22,532	1,489,255,849	27,326	2,653,985,360	59,244	167,846,010	20,181		2,541
T2DM	x	901	x	3,922	x	1,773	x	827	x	5,230	x	3,357	x	1,515	x	2,857
IGT	x	127	x	94	x	65	x	65	x	83	x	184	x	62	x	70
Indirect cost	cost/pop-yr	cost/patient-yr	cost/pop-yr	cost/patient-yr	cost/pop-yr	cost/patient-yr	cost/pop-yr	cost/patient-yr	cost/pop-yr	cost/patient-yr	cost/pop-yr	cost/patient-yr	cost/pop-yr	cost/patient-yr	cost/pop-yr	cost/patient-yr
CHD	299,942,663	14,374	311,991,709	2,753	1,040,131,486	4,730	165,989,376	7,750	2,147,685,204	4,495	9,308,247,319	16,425	496,405,220	6,421	5,483,465,614	4,121
CKD	x	14,374	x	2,753	x	4,730	x	7,750	x	4,495	x	16,425	x	6,421	x	4,121
COPD	x	10,712	x	7,357	x	6,986	x	5,562	x	6,396	x	14,624	x	4,982	x	548
Hypertension	x	444	x	110	x	100	x	253	x	172	x	513	x	147	x	252
Stroke	205,550,760	91,777	318,388,667	11,558	477,042,645	16,934	66,078,857	37,848	1,071,550,249	19,662	4,840,965,396	108,062	386,175,708	46,431	2,203,629,879	10,053
T2DM	x	457	x	1,988	x	899	x	419	x	2,651	x	1,702	x	768	x	1,448
IGT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Economic paramters																
Currency unit	Bulgarian Lev		l		l		l		l		zł		l		£	
Cost year	2013		2013		2013		2013		2013		2013		2013		2013	
Discount rate for cost	3.0%		3.0%		3.0%		5.0%		4.0%		5.0%		5.0%		3.5%	
Discount rate for outcomes (health)									1.5%		3.5%					
Power purhasing parity (PPP)	x		x		✓		✓		✓		✓		✓		✓	
Harmonised consumer price index (HCPI)	✓		✓		✓		✓		✓		✓		✓		✓	
Working age range	x		x		x		x		x		x		x		16-65	
Average disposable income, by sex & age	GR proxy		✓		✓		EE proxy		✓		✓		✓		✓	

Assumptions regarding Cost data

- Consistency between sources is lacking.
- E.g.: two different sources for direct costs of T2DM in The Netherlands (2013)

IDF Atlas Poster 2014	Van der Heijden et al. 2014
€ 5,230	€ 2,873

Human capital vs Friction Cost

- Most countries use HC methodology.
  - Dutch guidelines: friction costs.
- Therefore, data found show mostly HC, only FC for COPD in The Netherlands
- HC used for all countries, for consistency
- FC methodology can be implemented.

Human capital vs Friction Cost

- Note:
  - European Cardiovascular Disease Statistics 2012 basis indirect costs CHD, Stroke and Hypertension (via all CVD) for all countries.
  - Based on a study that used FC for the lost productivity due to morbidity, and HC for lost productivity due to the mortality.
  - (As yet unpublished.)

Assumptions regarding Cost data

- No estimates were found for indirect cost of CKD
- They were therefore assumed equal to the indirect cost of CHD

Assumptions regarding Cost data

- Data availability is a big issue.
- UK and NL:
  - Pharmacoeconomics part of decision process
  - Years of experience with collecting cost data, e.g. “Kosten van Ziekten”[Cost of Illness] study in NL.

- Almost no data was found for BG, FI, GR, LT, PL and PT.
- Proxy data (mostly based on NL) was used where necessary.

Assumptions regarding Cost data

- Data collection is an ongoing project.

Discount rates: HE guidelines

- NL: 1.5% outcomes, 4% costs
- UK:
  - England/Wales: 3.5%
  - Scotland: 1.5% outcomes, 6% costs
- FI: 3%
- PL: 3.5% outcomes, 5% costs
- PT/Baltic: 5%
- BG/GR: no guidelines.
  - Used 3%
  - Based on Athanakis, Clin Ther 2015, Athanakis, Rheumatol Int 2015, Makras Osteoporos Int 2015.