Health Economic Value of Osteopathy (HEVO-Project)

Verhaeghe N,[1] Schepers J,[1,2] van Dun PLS,[3] Annemans L,[1]

1. Department of Public Health, Interuniversity Centre for Health Economics Research (I-CHER) Ghent University, Belgium.
2. Catholic University of Leuven, Belgium.
3. Commission for Osteopathic Research, Practice and Promotion (CORPP), National Centre of COME Collaboration, Mechelen, Belgium.

I-CHER Interuniversity Centre for Health Economics Research

UNIVERSITEIT GENT

COME CENTRE FOR OSTEOPATHIC MEDICINE COLLABORATION belgium

GNRPO.be

i-CHER
Interuniversity Centre
for Health Economics Research

Research question

Is osteopathy cost-effective
for non-specific low back pain
and neck pain?

Rationale for spinal complaints

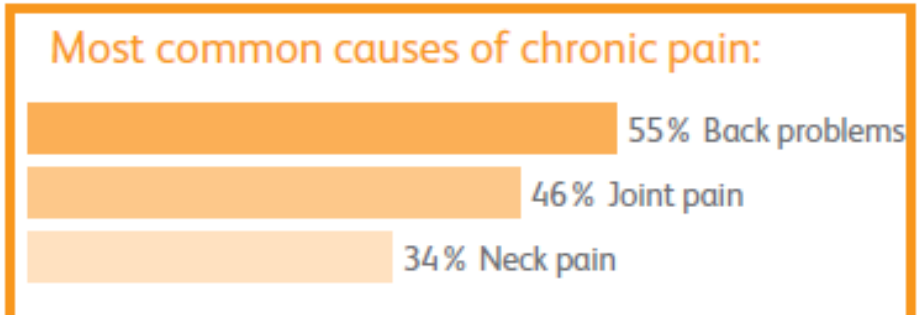
1. Increasing burden of spine disease

EXTENDED REPORT

The global burden of low back pain: estimates from the Global Burden of Disease 2010 study

Damian Hoy,[1] Lyn March,[2] Peter Brooks,[3] Fiona Blyth,[4] Anthony Woolf,[5] Christopher Bain,[6,7] Gail Williams,[8] Emma Smith,[9] Theo Vos,[10,11] Jan Barendregt,[8] Chris Murray,[11] Roy Burstein,[11] Rachelle Buchbinder[12,13]

Most common perceived causes of chronic pain, as identified by the Pain Proposal Patient Survey[3]



"Globally, and out of the 291 conditions studied, LBP was ranked as the greatest contributor to global disability"

"Spine surgery increased by 40% in the first decade of this century"

Rationale for spinal complaints

1. Increasing burden of spine disease
2. Approx. 65% of patients consulting an osteopath have spinal complaints

Fawkes C., Leach J., Mathias S., Moore A., The Standardised Data Collection Project – Standardised data collection within osteopathic practice in the UK: development and first use of a tool to profile osteopathic care in 2009. London, National Council for Osteopathic Research (NCOR), June 2010

Burke S.R., Myers R., Zhang A.L. A profile of osteopathic practice in Australia 2010–2011: a cross sectional survey, Musculoskeletal Disorders 2013, 14: 227

De Gendt T, Desomer A, Goossens M, et al. Stand van zaken voor de osteopathie en de chiropraxie in België. Health Services Research (HSR). KCE Reports 148A. D/2010/10.273/91. Brussel: Federaal Kenniscentrum voor de Gezondheidszorg (KCE); 2010.

i-CHER
Interuniversity Centre
for Health Economics Research

Rationale for spinal complaints

1. Increasing burden of spine disease
2. Approx. 65% of our patients have spinal complaints
3. Most osteopathic clinical research is about spinal complaints

Characteristics of included studies

Study	Country	Study population	Osteopathic intervention	Intervention duration	Follow-up
Andersson (1999)	US	patients 20-59y with LBP ≥3w - <6m	custom tailored	12w (8 sessions)	/
Licciardone (2003)	US	patients 21-69y with nonspecific LBP ≥3m	custom tailored	5m (7 sessions)	1m
UK BEAM (2004)	UK	patients with LBP	semi-standardized	12w (8 sessions)	9m
McReynolds (2005)	US	patients with neck pain (<3w)	semi-standardized	one session	/
Peters (2006)	Germany	pregnant (20-30w) women with LBP	custom tailored	4w (4 sessions)	/
Heinze (2006)	Germany	patients 18-65y with LBP >3w - ≤6m	custom tailored	6w (2-3 sessions)	6w
Chown (2008)	UK	patients 18-65y with >3m simple LBP	semi-standardized	3m (5 sessions)	9m
Recknagel (2008)	Germany	women 18-46y with post-partum non-specific BP ≥3m - <24m	custom tailored	6w (4 sessions)	6w
Schwerla (2008)	Germany	patients aged 20-55y ≥3m non-specific neck pain	custom tailored	10w (5 sessions)	3m
Engemann (2009)	Germany	patients 18-60y with chronic non-specific neck pain	custom tailored	6 sessions[1]	3m
Licciardone (2010)	US	pregnant women (≤30w) with back pain	semi-standardized	10w (7 sessions)	/
Cruser (2012)	US	military personnel 18-35y with acute LBP	semi-standardized	4w (4 sessions)	4w
Vismara (2012)	Italy	obese females (BMI>30kg/m²) with chronic LBP >6m	semi-standardized	10 sessions[1]	/
Licciardone (2013a)	US	diabetes mellitus patients aged 21-69y with LBP	semi-standardized	8w (6 sessions)	4w
Licciardone (2013b)	US	nonpregnant adults 21-69y with LBP ≥3m	semi-standardized	8w (6 sessions)	4w
Belz (2015)	Germany	women 18-42y with post-partum non-specific BP ≥3m	custom tailored	10w (5 sessions)	3m
Hensel (2015)	US	pregnant women 18-35y (30th week) with LBP	standardized	10w (7 sessions)	/
Schwerla (2015)	Germany	women 18-42y with post-partum LBP or pelvic girdle pain ≥3m	custom tailored	6w (4 sessions)	2w
Licciardone (2016)	US	patients 21-69y with nonspecific LBP ≥3m	semi-standardized	8w (6 sessions)	4w

BP, back pain; LBP, low back pain; m, months; w, weeks; y, year

[1] no information on intervention duration provided

Outcome “pain”: European studies

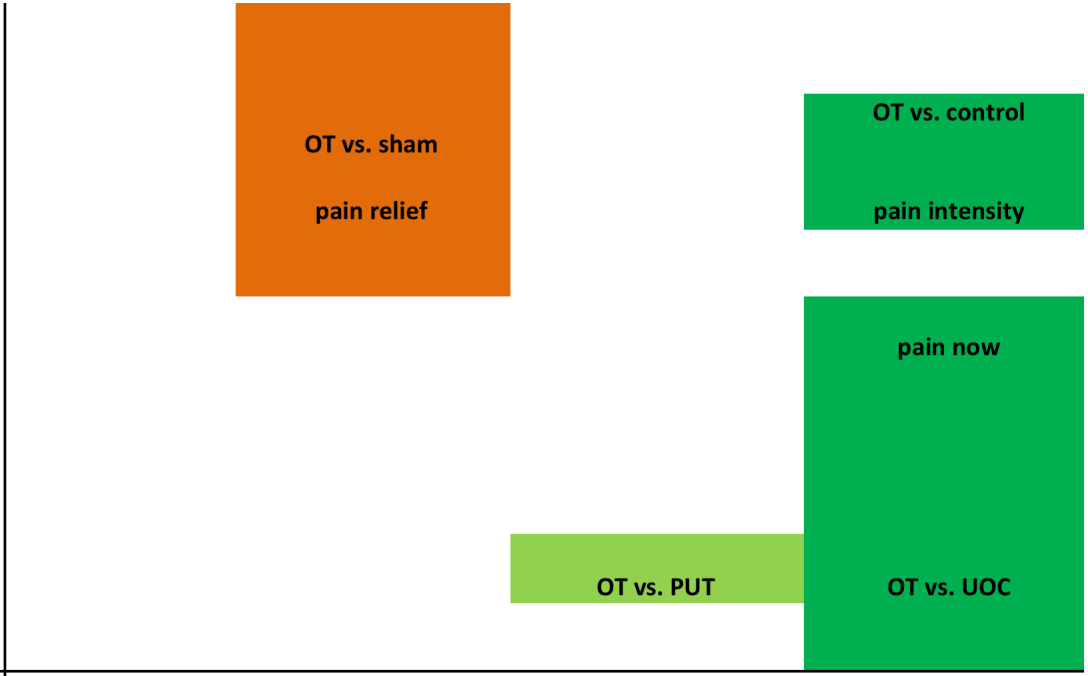
Figure 2a Effectiveness of osteopathic treatment associated with the outcome ‘PAIN’ in European studies

first author (year)	study population	intervention duration	OT worse than control group	non-significant improvement OT relative to baseline	significant improvement OT relative to baseline - no significant between-group difference	significant between-group effect OT vs. control
Peters (2006)	pregnant (20-30w) women with LBP	4 weeks (4 sessions)				
Heinze (2006)	patients 18-65y with LBP >3w - ≤6m	6 weeks (2-3 sessions)				
Recknagel (2008)	women 18-46y post-partum BP ≥3m - <24m	6 weeks (4 sessions)				
Schwerla (2008)	patients 20-55y ≥3m non-specific neck pain	10 weeks (5 sessions)			actual & worst pain	average pain
Engemann (2009)	patients 18-60y with chronic non-specific neck pain	6 sessions				
Vismara (2012)	obese females (BMI>30kg/m²) with LBP >6m	10 sessions				
Schwerla (2015)	women 18-42y postpartum LBP or PGP ≥3m	6 weeks (4 sessions)				
Belz (2015)	women 18-42y post-partum LBP ≥3m	10 weeks (5 sessions)				

BP, back pain; LBP, low back pain; m, months; OT, osteopathic treatment; PGP, pelvic girdle pain; y, year

Outcome “pain”: US studies

first author (year)	study population	intervention duration	OT worse than control group	non-significant improvement OT relative to baseline	significant improvement OT relative to baseline - no significant between-group difference	significant between-group effect OT vs. control
Andersson (1999)	patients 20-59y with LBP ≥3w - <6m	12 weeks (8 sessions)				
Licciardone (2003)	patients 21-69y with LBP ≥3m	5 months (7 sessions)				
McReynolds (2005)	patients with neck pain (<3w)	one session				
Licciardone (2010)	pregnant women (≤30w) with BP	10 weeks (7 sessions)				
Cruser (2012)	military staff 18-35y with acute LBP	4 weeks (4 sessions)				
Licciardone (2013a)	diabetes mellitus patients 21-69y with LBP	8 weeks (6 sessions)				
Licciardone (2013b)	adults 21-69y with LBP ≥3m	8 weeks (6 sessions)				
Hensel (2015)	pregnant women 18-35y with LBP	10 weeks (7 sessions)				
Licciardone (2016)	patients 21-69y with LBP ≥3m	8 weeks (6 sessions)				



BP, back pain; LBP, low back pain; m, months; OT, osteopathic treatment; PUT, placebo ultrasound treatment; UOC, usual obstetrical care; y, year

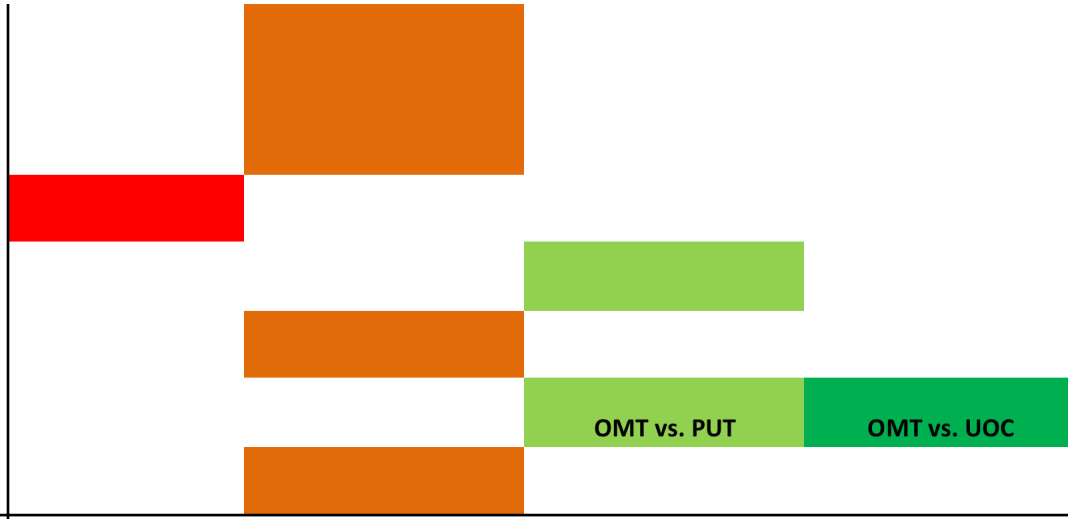
Outcome “back specific functioning”: European studies

first author (year)	study population	intervention duration	OT worse than control group	non-significant improvement OT relative to baseline	significant improvement OT relative to baseline - no significant between-group difference	significant between-group effect OT vs. control
UK Beam (2004)	patients with LBP	12 weeks (8 sessions)				■
Peters (2006)	pregnant (20-30w) women with LBP	4 weeks (4 sessions)				
Heinze (2006)	patients 18-65y with LBP >3w - ≤6m	6 weeks (2-3 sessions)				
Recknagel (2008)	women 18-46y post-partum BP ≥3m - <24m	6 weeks (4 sessions)				
Chown (2008)	patients 18-65y with >3m simple LBP	3m (5 sessions)			■	
Vismara (2012)	obese females (BMI>30kg/m²) with LBP >6m	10 sessions				
Schwerla (2015)	women 18-42y postpartum LBP or PGP ≥3m	6 weeks (4 sessions)				
Belz (2015)	women 18-42y post-partum LBP ≥3m	10 weeks (5 sessions)				■

BP, back pain; LBP, low back pain; m, months; OT, osteopathic treatment; PGP, pelvic girdle pain; y, year

Outcome “back specific functioning”: US studies

first author (year)	study population	intervention duration
Andersson (1999)	patients 20-59y with LBP ≥3w - <6m	12 weeks (8 sessions)
Licciardone (2003)	patients 21-69y with LBP ≥3m	5 months (7 sessions)
Licciardone (2010)	pregnant women (≤30w) with BP	10 weeks (7 sessions)
Cruser (2012)	military staff 18-35y with acute LBP	4 weeks (4 sessions)
Licciardone (2013b)	adults 21-69y with LBP ≥3m	8 weeks (6 sessions)
Hensel (2015)	pregnant women 18-35y with LBP	10 weeks (7 sessions)
Licciardone (2016)	patients 21-69y with LBP ≥3m	8 weeks (6 sessions)



OT worse than control group | **non-significant improvement OT relative to baseline** | **significant improvement OT relative to baseline - no significant between-group difference** | **significant between-group effect OT vs. control**

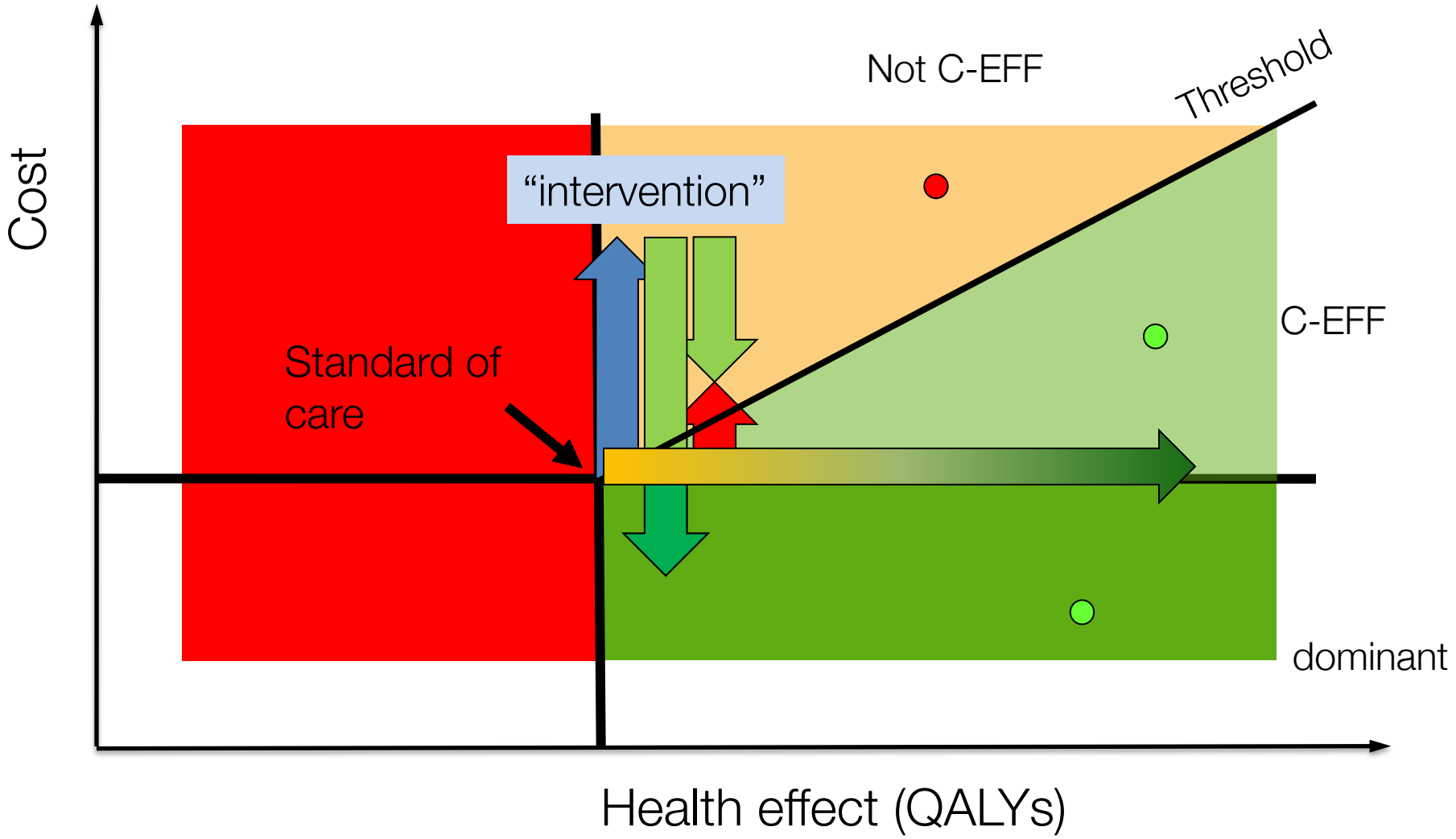
BP, back pain; LBP, low back pain; m, months; OT, osteopathic treatment; PUT, placebo ultrasound treatment; UOC, usual obstetrical care; y, year

Conclusions

The findings of the literature review suggest that :

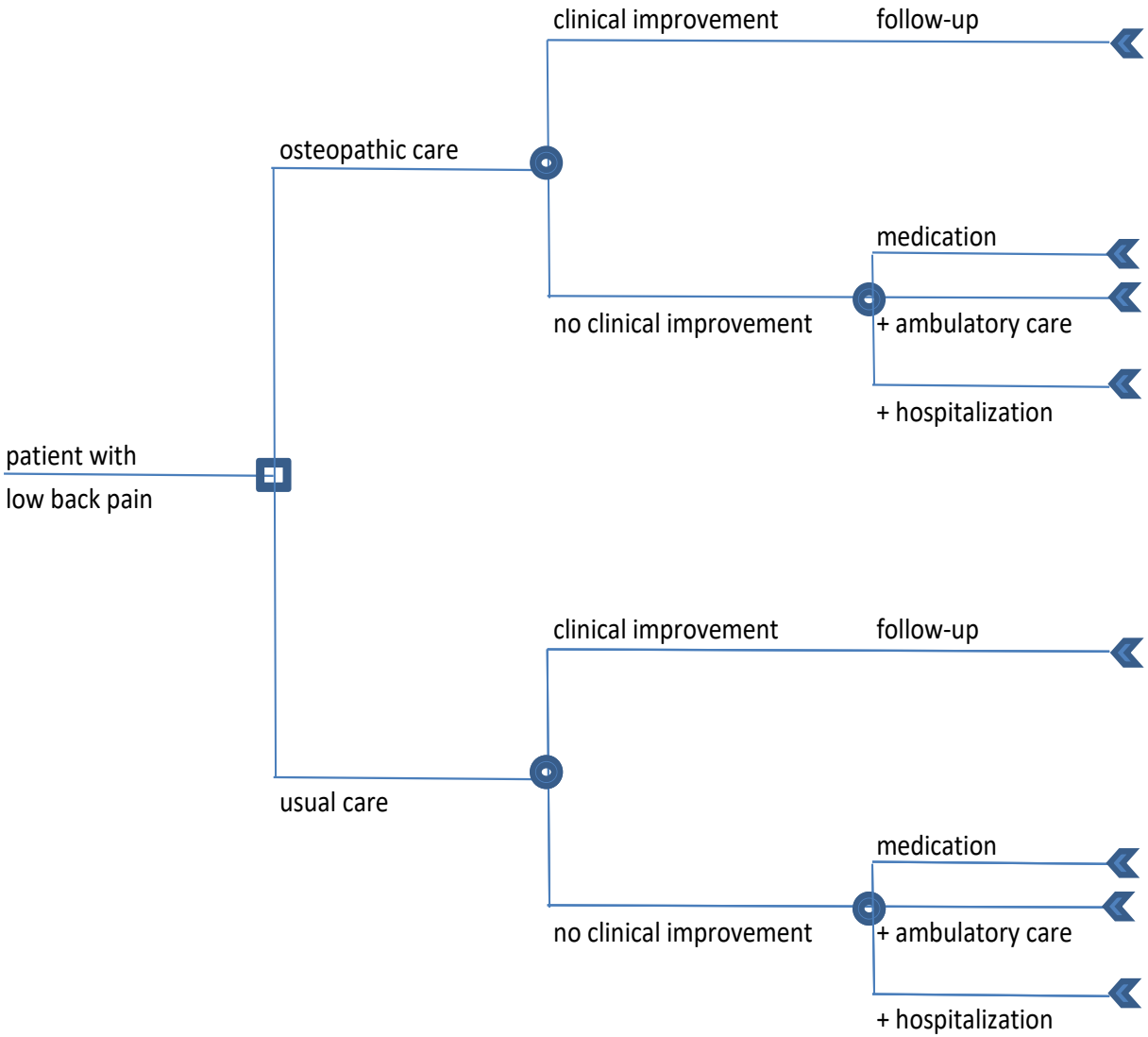
- Osteopathic care for spinal complaints may improve pain, back-specific functioning, health status, satisfaction with treatment and may reduce medication use.
- For the primary outcomes ‘pain’ and ‘back-specific functioning’, differences in the level of effectiveness between studies conducted in the US and in Europe in favor of the latter ones were observed.

Cost-effectiveness



ICER = incremental cost-effectiveness ratio = $\frac{Cnew - Cold}{Enew - Eold}$

Decision tree model



Base case and scenario analyses : osteopathy vs. usual care

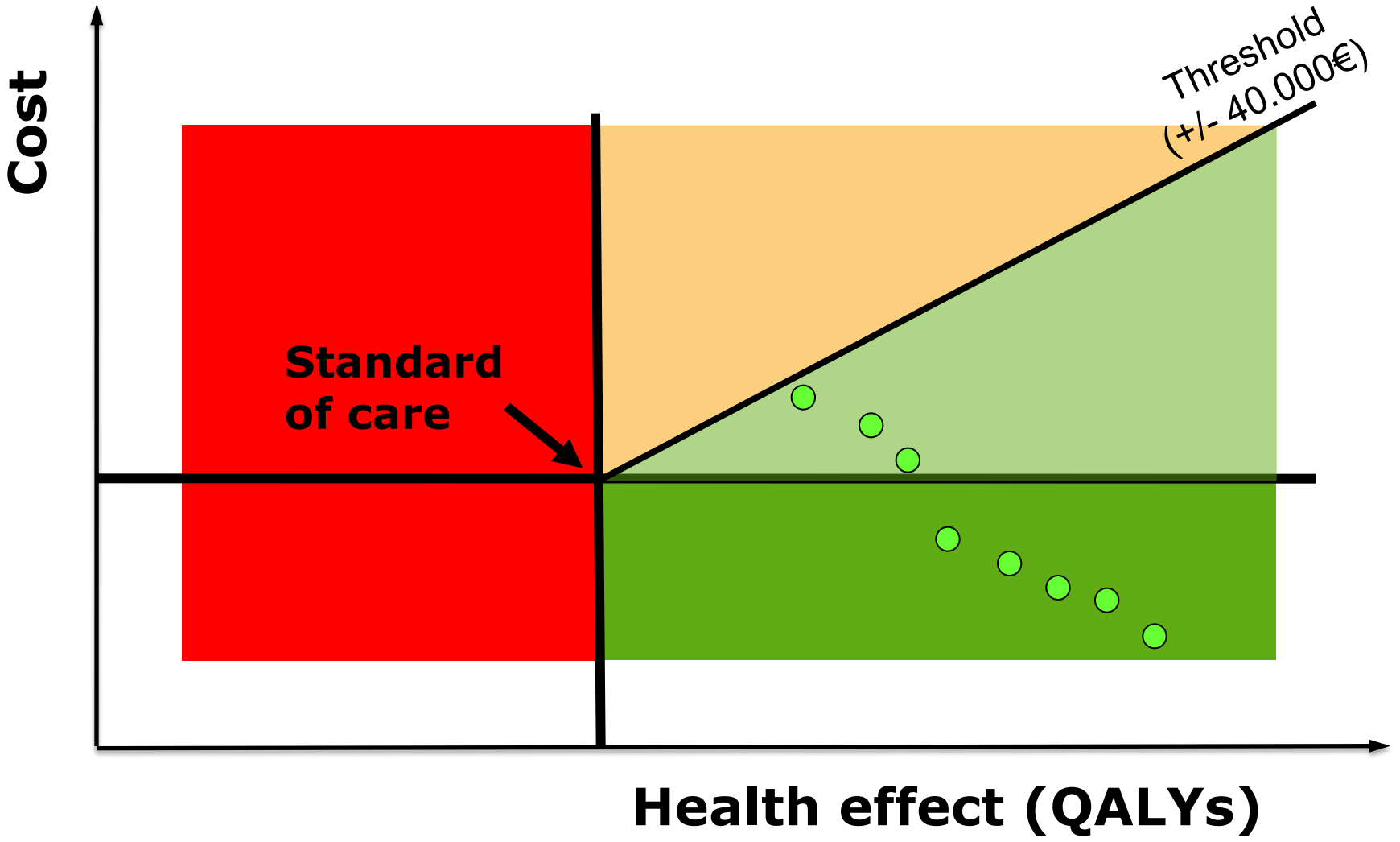
analysis	osteopathic care		usual care		Δ cost (€)	Δ QALY	ICER (€/QALY)
	cost (€)/patient	QALY/patient	cost (€)/patient	QALY/patient			
low back pain							
base case	300.18	0.66	379.79	0.63	-79.62	0.031	dominant
scenario 1	398.40	0.66	589.88	0.60	-191.48	0.060	dominant
scenario 2	280.34	0.67	601.72	0.60	-321.38	0.071	dominant
scenario 3	658.49	0.64	537.21	0.61	121.28	0.024	4,958
scenario 4	581.56	0.65	328.90	0.64	252.66	0.006	38,990
scenario 5	400.48	0.66	398.14	0.63	2.34	0.027	86.00
scenario 6	357.28	0.66	587.52	0.60	-230.24	0.059	dominant
neck pain							
base case	648.04	0.64	528.07	0.61	119.97	0.028	4,289
scenario 1	563.69	0.64	515.04	0.61	48.65	0.031	1,555
scenario 2	304.47	0.65	401.93	0.63	-97.46	0.023	dominant

ICER, incremental cost-effectiveness ratio; QALY, quality-adjusted life year

low back pain: base case, Heinze (2006); scenario 1, Belz (2014); scenario 2, Schwerla (2015); scenario 3, Licciardone (2013a); scenario 4, Licciardone (2013b); scenario 5, Cruser (2012); scenario 6, Peters (2006)

neck pain: base case, Engemann (2009); scenario 1, Schwerla (2008); scenario 2, McReynolds (2005)

Cost-effectiveness graphically



ICER = incremental cost-effectiveness ratio

Conclusions

- **base case :** osteopathic care was found to be a ‘dominant’ strategy for low back pain and a cost-effective one for neck pain
- osteopathic care for spinal complaints seems to meet all criteria for reimbursement
- productivity losses not included, true impact may be higher

i-CHER
Interuniversity Centre
for Health Economics Research

Thank you for your kind attention

Ready to answer your questions ...

i-CHER
Interuniversity Centre
for Health Economics Research

Results

- Qualitative Forest Plots for each outcome.
- Four levels of effectiveness were distinguished :
  - The outcome is found to be numerically or significantly worse from baseline to endpoint within the osteopathic care group or is found to be worse than in the comparison group,
  - There is no significant between-group difference, but the outcome is found to be numerically improved in the osteopathic care group compared to baseline,
  - There is no significant between-group difference, but the outcome is found to be significantly improved in the osteopathic care group compared to baseline,
  - There is a significant between-group difference.

i-CHER
Interuniversity Centre
for Health Economics Research

Some basics …

- The most effective method of measuring the **cost effectiveness** is to calculate the incremental cost effectiveness ratio (ICER)

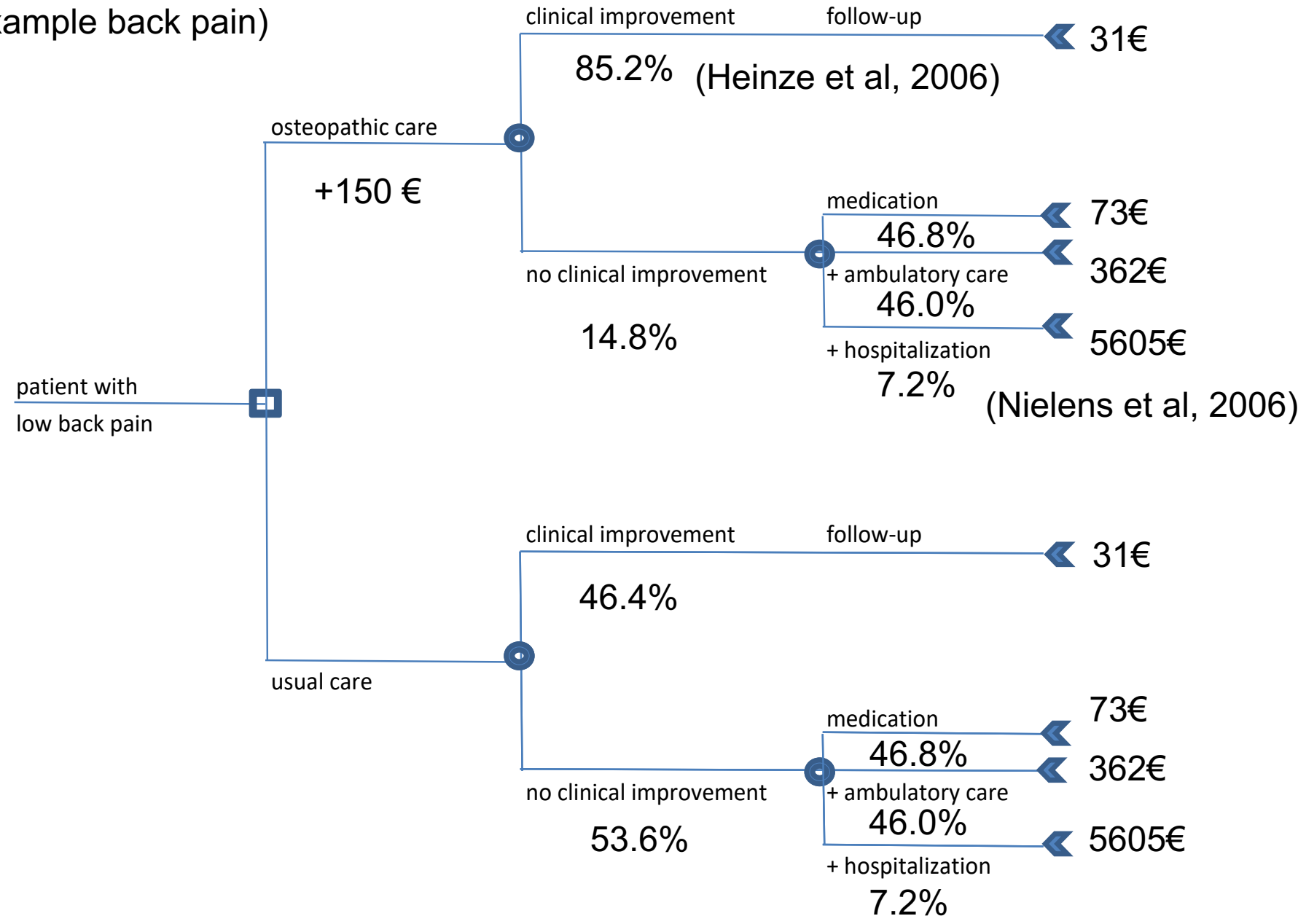
  The equation is as follows :

  $$\frac{C_{new} - C_{old}}{E_{new} - E_{old}}$$

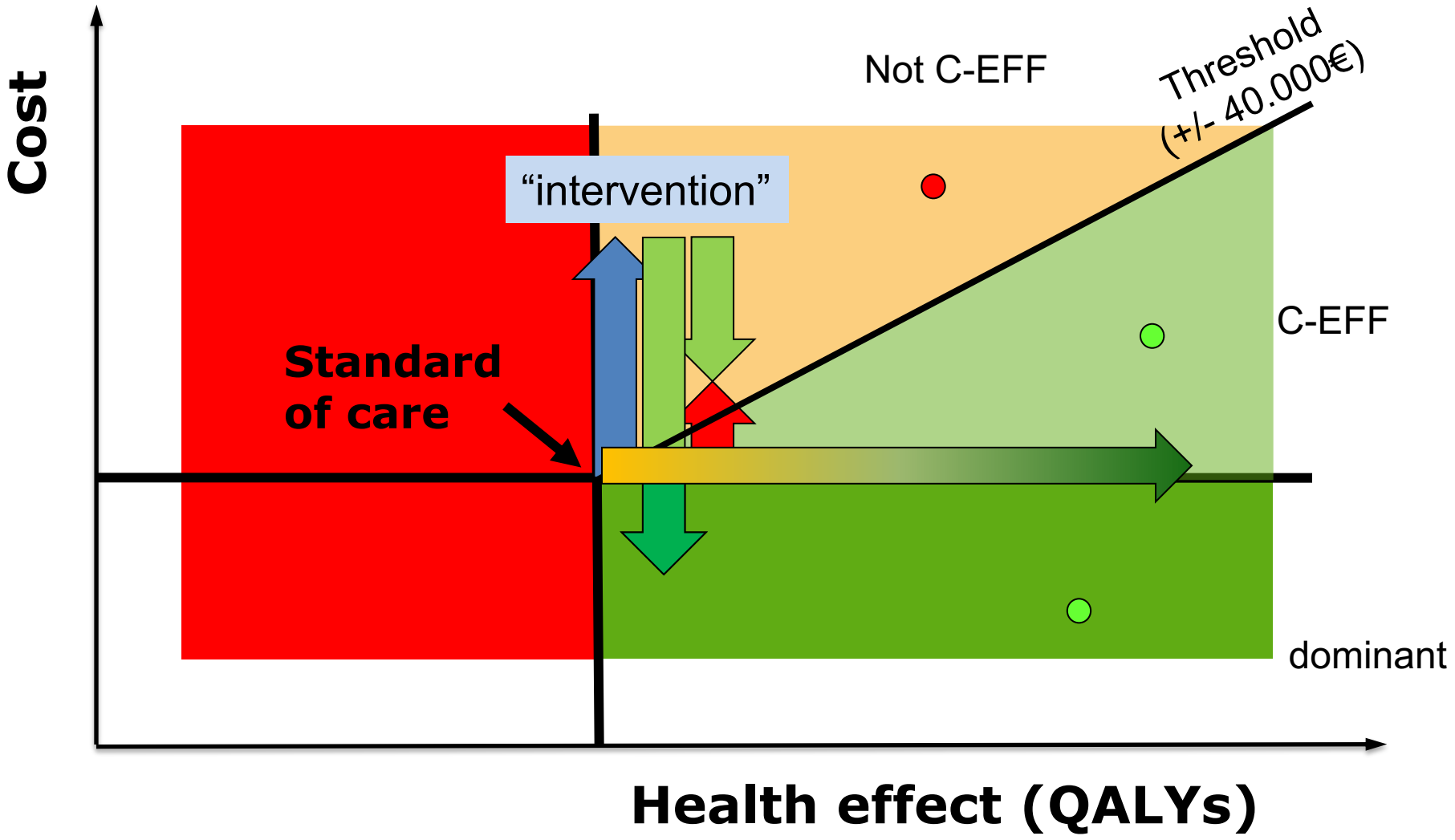
- **Cost utility analysis** is a method used to make policy decisions that considers the quantity as well as the quality of life-years saved from a medical intervention. This is measured by quality-adjusted life-years (QALYs)

Cost-effectiveness: decision tree

(example back pain)

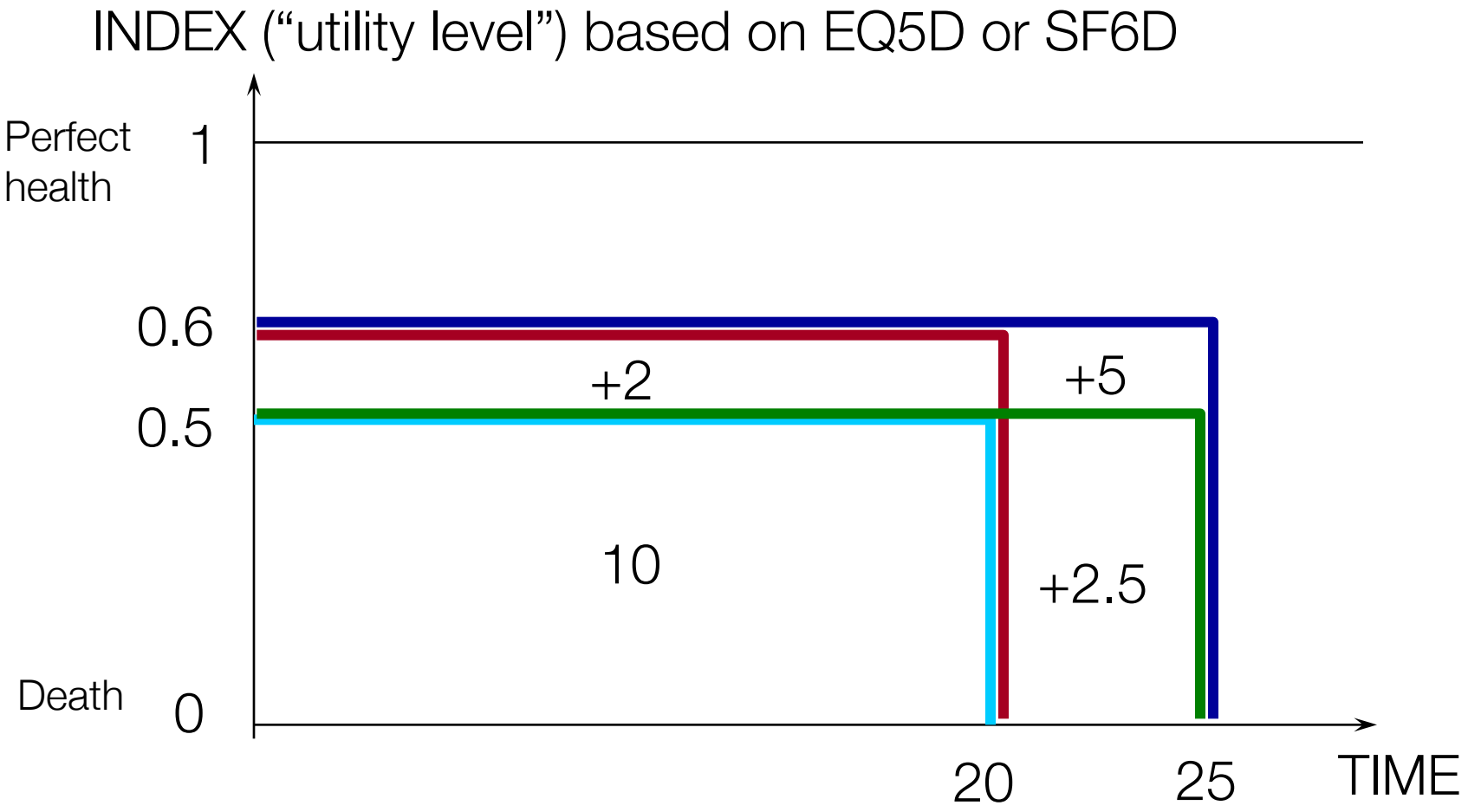


Cost-effectiveness

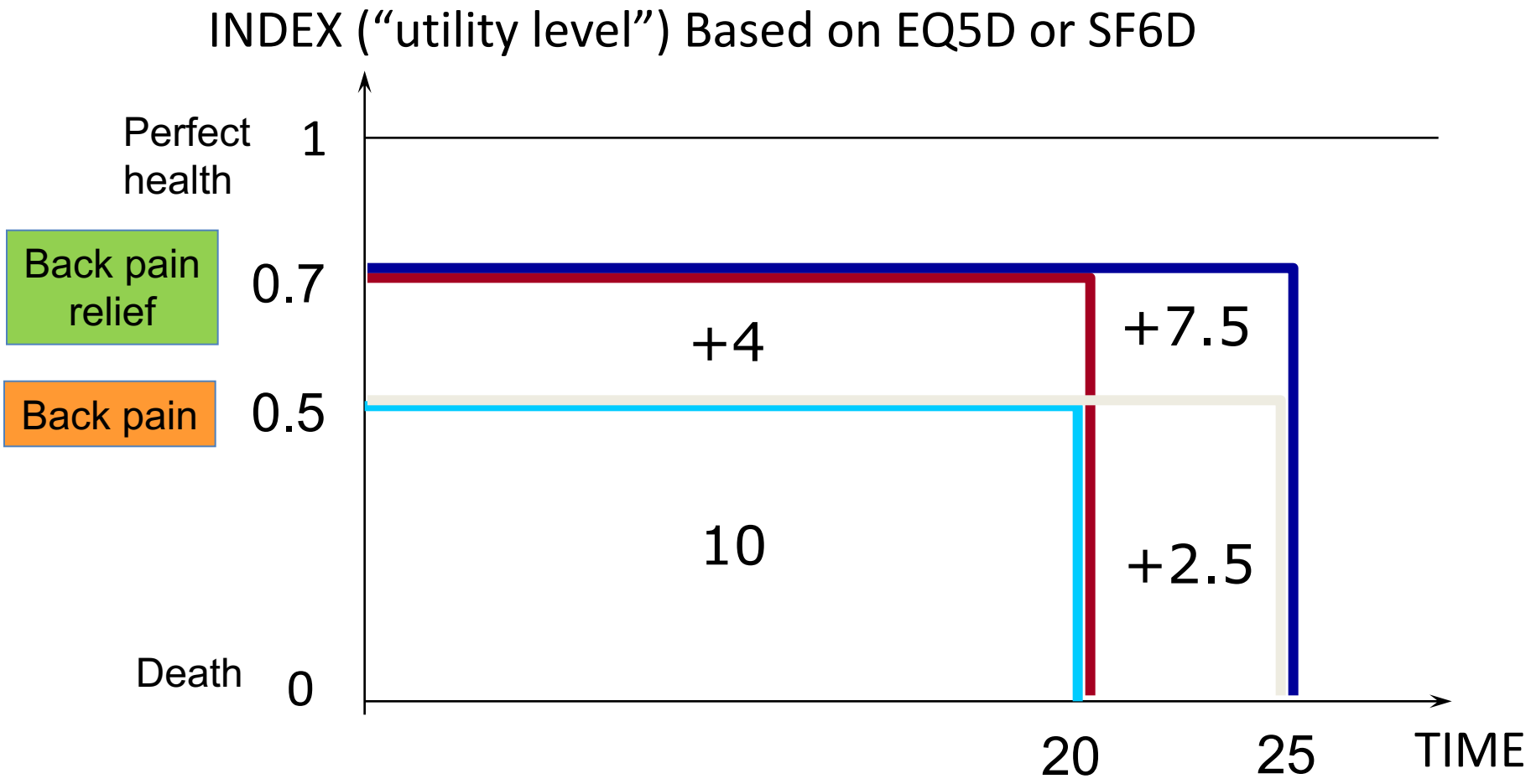


ICER = incremental cost-effectiveness ratio

Quality Adjusted Life Years



QALY = Quality Adjusted Life Years



i-CHER
Interuniversity Centre
for Health Economics Research

Methods

- The current model predicts health outcomes – expressed as QALYs – and costs over a one-year time period :
  - intervention period : 3 months
  - follow-up period : 9 months
- Clinically meaningful improvement in pain was defined as a mean improvement in pain score on the VAS or on the NRS of ≥2 points.

Methods

- Epidemiological data input :
  - patients treated by an osteopathic practitioner was estimated to be 5.7%
  - 47.4% was due to low back pain = 302,846 individuals/year
  - 21.3% was due to neck pain = 136,089 individuals/year

Methods

Criteria for '**base case**' :

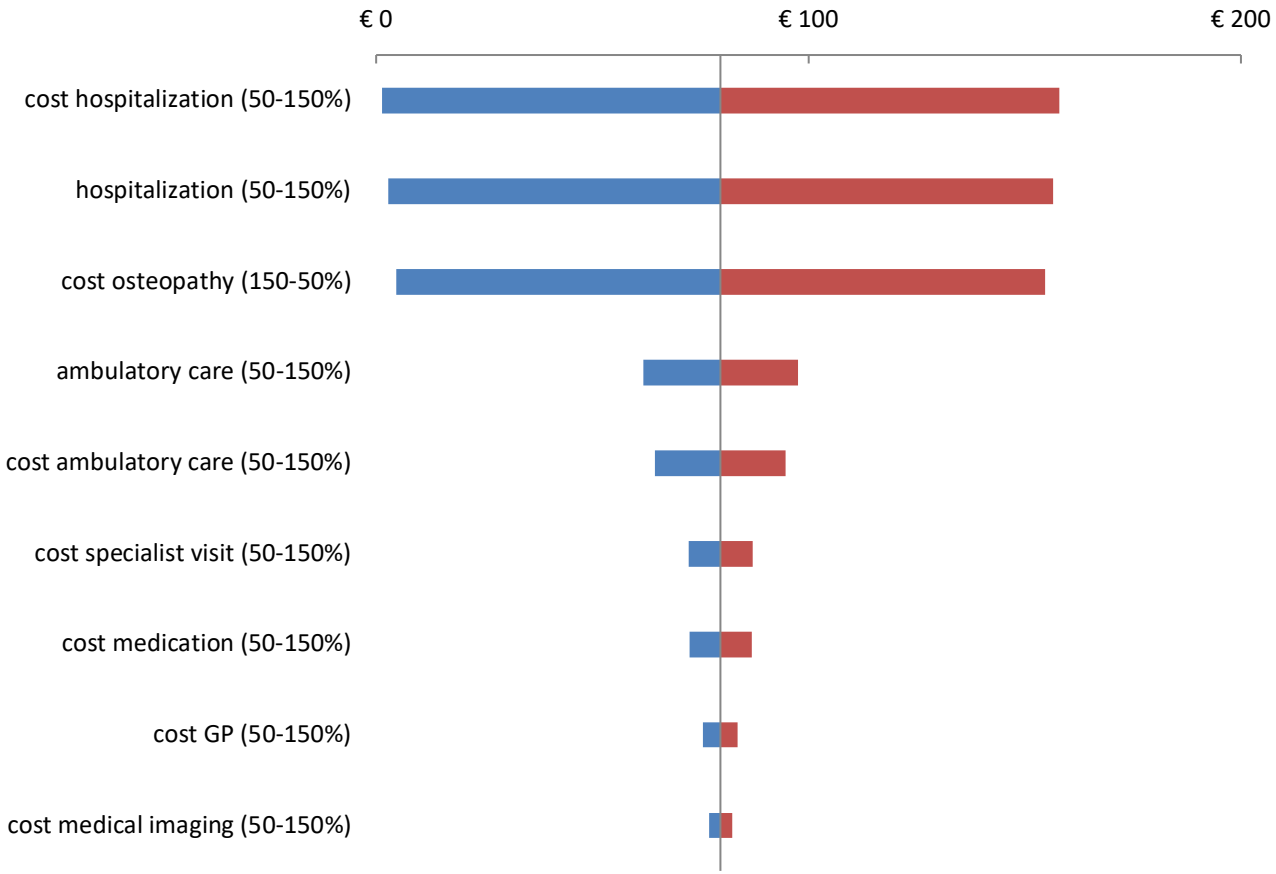
- A European study.
- Impact on pain assessed by the VAS or NRS
- A significant between-group difference in pain (intervention vs. control).
- Study population: a "general population" sample (and not e.g. pregnant women, women post partum, diabetes patients).
- Intervention duration ≤3 months.

Methods

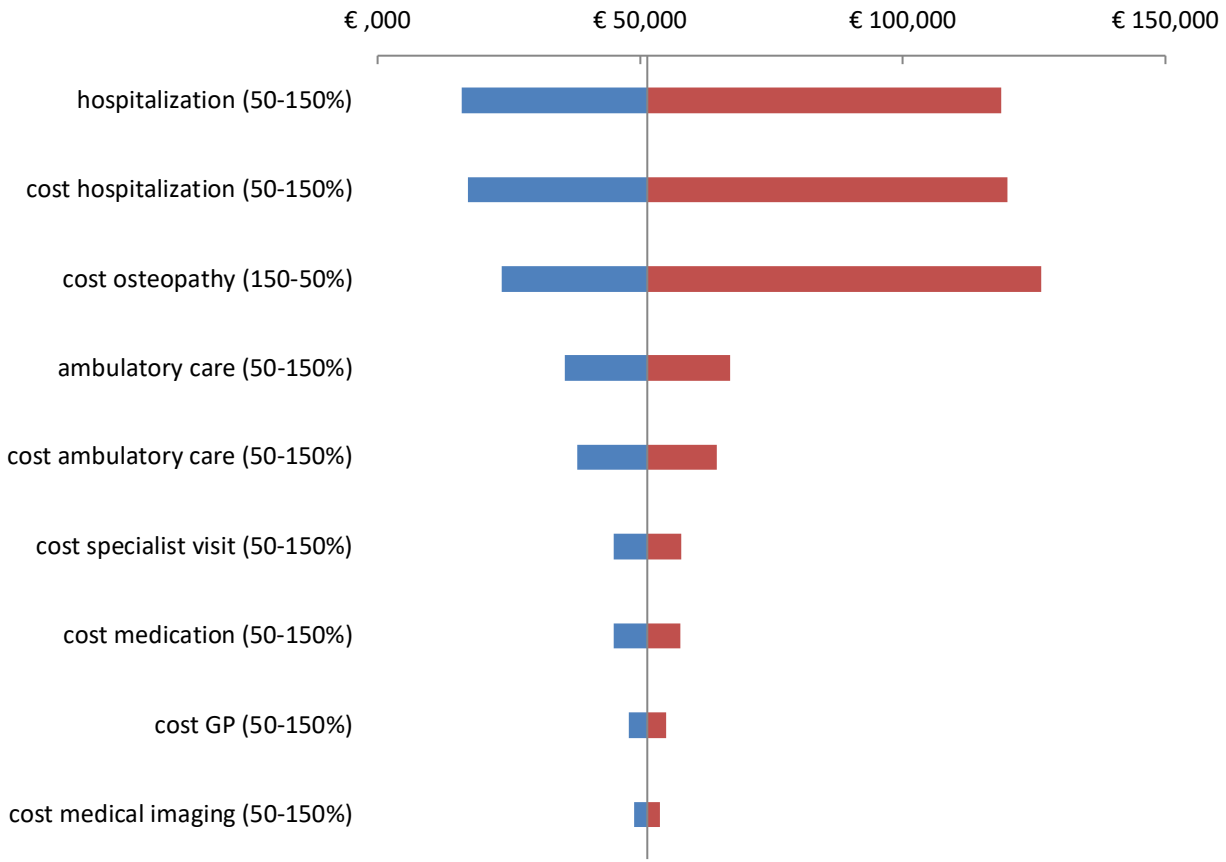
Criteria for '**scenario analyses**' :

- Impact on pain assessed by the VAS or NRS.
- A significant between-group difference in pain (intervention vs. control).
- Intervention duration ≤3 months.

One-way sensitivity analysis: low back pain – effects on the costs



One-way sensitivity analysis: neck pain – effects on the costs



Limitations

- The decision tree model is likely characterized to some degree of uncertainty related to the absence of more recent and accurate data.
- The utilities were derived from published foreign studies and may be subject to some degree of uncertainty related to the Belgian context.
- The study was conducted from a health insurance perspective only taking into account the direct medical costs.

Conclusions

- Low back pain :
  - Difference mean cost/patient/year osteopathy vs. usual care = €79.62
  - Belgian population level : 302,846 x 79.62 = €24,1 million cost savings

- What if …

not 2.7% but 10% or even 30% of the Belgian population consults an osteopath for low back pain :

  - 10% means 89.24€ million cost savings
  - 30% means 267.73€ million cost savings

Some basics …

What we need are treatments that :

- offer a benefit to patients and/or the health care system
- fill unmet medical needs
- are cost-effective,
- are affordable,

Based on Report of the Belgian EU Presidency,
endorsed by the EU Council of Ministers of Health in Dec 2010