

# Multivessel disease

## Quality or quantity of life?

## Both?

## What about costs of treatment?

Isabelle Durand-Zaleski

Henri Mondor hospital, URC Eco Ile-de-France, LIC EA4393 Université  
Paris Est, Créteil

# Outline

➔ **What is known for certain**

➔ **Questions**

- For cardiologists & surgeons
- For economists
- For policy makers

# What is known for certain (?)

## PCI is less invasive and less painful than CABG

- ➔ Multivessel coronary artery disease
- ➔ Percutaneous coronary intervention vs Coronary artery bypass graft
- ➔ Loss of 0.0015 QALY

➔ Weintraub et al, 2004

# Questions for cardiologists & surgeons

- Is CABG / PCI substitution an option?
- Long term results PCI vs CABG
- DES vs BMS or DES vs CABG

# CABG vs PCI for multivessel disease

## The SYNTAX trial and other studies

- virtual PCI in patients who underwent surgery
- 3.6 stents on average per patient
- Identical outcomes

F Poulin, S Rinfret, F Gobeil. Potential shift from coronary bypass surgery to percutaneous coronary intervention for multivessel disease and its economic impact in the drug-eluting stent era. *Can J Cardiol* 2007;23(14):1139-1145.

Taggart DP. Coronary artery bypass graft vs. percutaneous coronary angioplasty: CABG on the rebound? *Curr Opin Cardiol*. 2007 Nov;22(6):517-23

- Current studies reconfirm that CABG is still the best therapy in terms of improved survival and freedom from reintervention for most patients with proximal left anterior descending, multivessel and left main-stem coronary artery disease (CAD) and that these benefits are even greater in diabetic patients.
- Health economic analyses also confirm the cost-effectiveness of medical therapy and CABG but not PCI.

# How often is substitution possible?

- ➔ 4,121 patients 6 year follow up
- ➔ Delphi panel
- ➔ In patients with multivessel disease, only 8% are eligible for either PCI or CABG
- ➔ 13% diabetic patients
- ➔ 6-year costs were £4,000 higher for patients treated w/ CABG, but no data was reported for multivessel disease patients specifically

Griffin SC, Barber JA, Manca A, et al. Cost effectiveness of clinically appropriate decisions on alternative treatments for angina pectoris: prospective observational study. *B M J* 2007; 334:624-627

# DES vs BMS: the controversy

➔ [No authors listed] Drug-eluting coronary stents: many meta-analyses, little benefit. **Prescrire Int. 2009 Apr;18(100):70-4.**

## ➔ Health Technology Assessment

“the use of DES would be best targeted at the subgroups of patients with the highest risks of requiring reintervention, and could be considered cost-effective in only a small percentage of such patients.”

- Hill RA, Boland A, Dickson R, Düндar Y, Haycox A, McLeod C, *et al.* Drug-eluting stents: a systematic review and economic evaluation. *Health Technol Assess* 2007;11(46).

# DES vs BMS: French claims database 2007

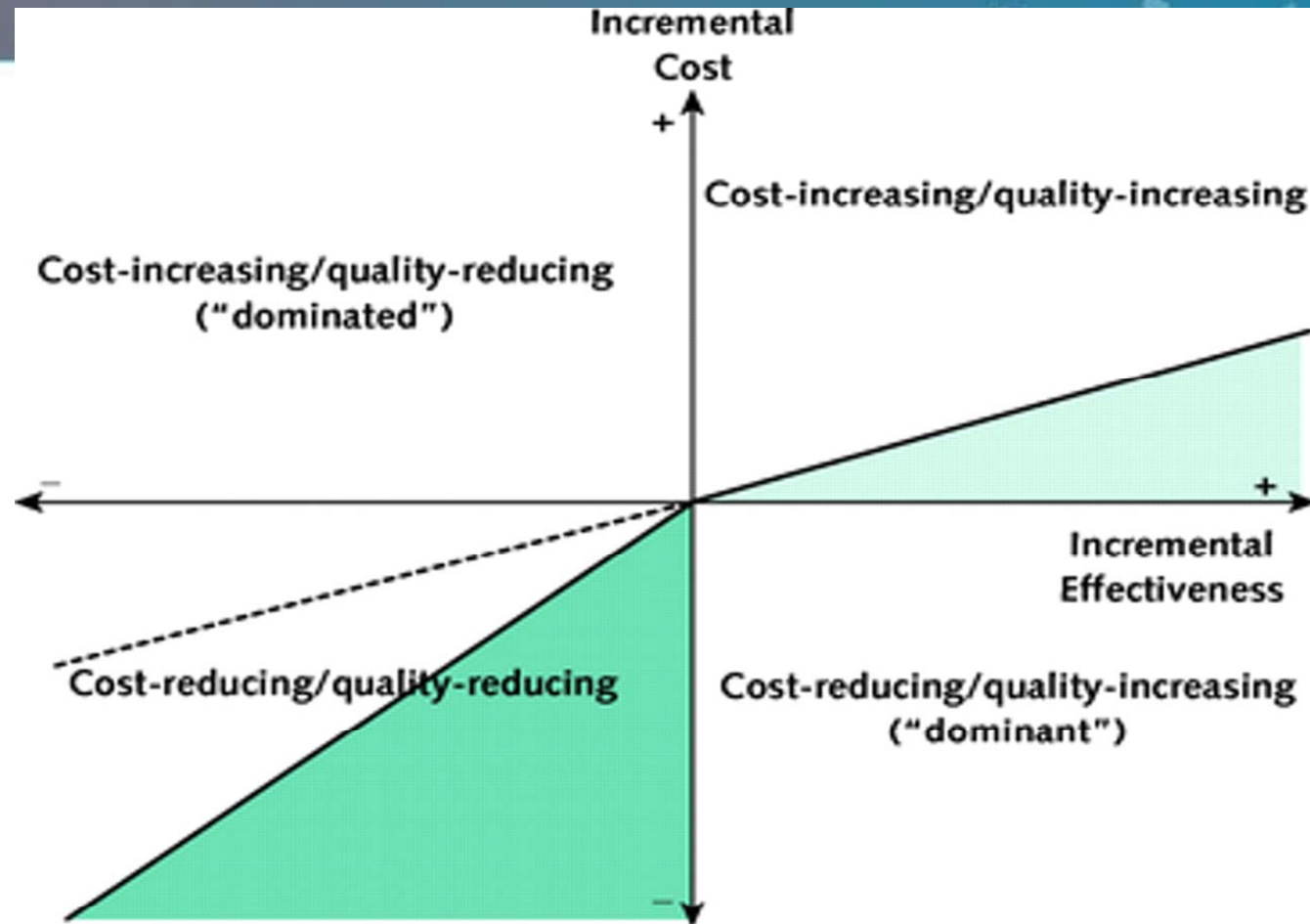
- ➔ No information on the type of disease
- ➔ 175,000 stents (40% DES)
- ➔ 158 million €
- ➔ 110,000 admissions
- ➔ 16% less revascularization in patients with DES
- ➔ No information on comparability nor estimate of propensity scores

Pratiques & Organisation des soins, Jan 2010

# Questions for society: Policy implications

- ➔ C/E threshold
- ➔ Decremental C/E
- ➔ Willingness to pay
- ➔ Other considerations

The cost-effectiveness plane. An innovation may fall into 1 of 4 quadrants on the cost-effectiveness plane, based on how its costs and effectiveness compare with those of a standard.



□ Incrementally cost-effective  
(no more than \$50 000  
lost per QALY gained)

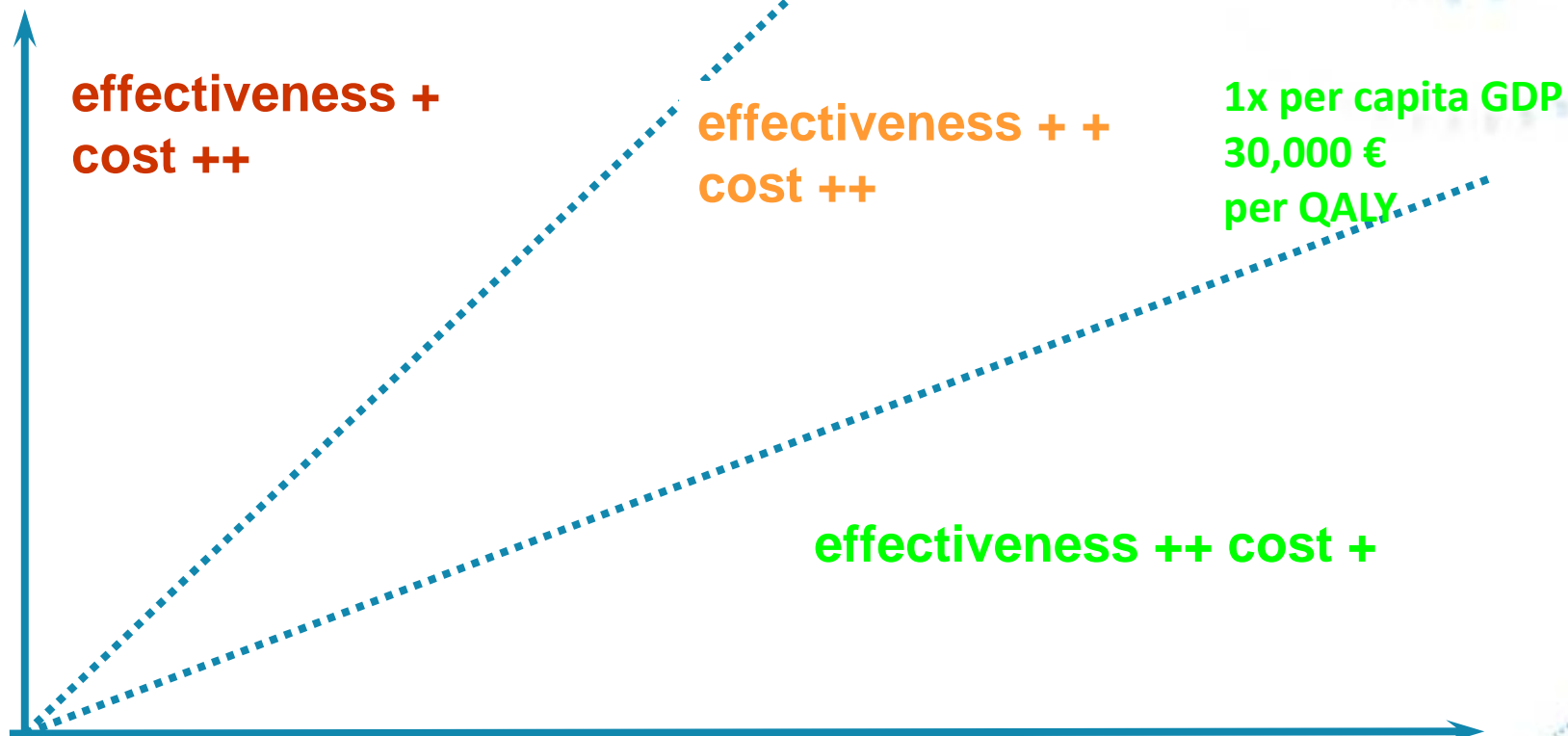
■ Decrementally cost-effective  
(at least \$100 000 gained  
per QALY lost)

Nelson A L et al. *Ann Intern Med* 2009;151:662-667

# Thresholds

**COST +**

3-5 x per capita GDP  
per QALY  
£50,000 per QALY



## For some authors, in multivessel disease, CABG is cheaper and less efficient, but not much

*Table.* Decrementally Cost-Effective Innovations Identified

Author, Year (Reference)	Disease	Intervention	Comparator	QALY Loss	Savings, \$	CER, \$*
Weintraub et al, 2004 (39)	Multivessel coronary artery disease	Percutaneous coronary intervention	Coronary artery bypass graft	0.0015	4944	3 210 306
Kozel et al, 2004 (23)	Major depressive disorder	Repetitive transcranial magnetic stimulation	Electroconvulsive treatment	0.0212	11 672	550 562
Manns et al, 2002 (25)	Chronic renal failure	Reuse of sterilized hemodialyzer	Typical single-use dialyzer	0.0040	1009	252 366
Stroupe et al, 2006 (35)	Inguinal hernia	Watchful waiting	Tension-free surgical repair	0.0140	2721	194 331
Byford et al, 2003 (15)	Deliberate self-harm	Brief, manual-assisted cognitive behavioral therapy	Usual care (problem solving, psychotherapy)	0.0118	1476	125 065
Manca et al, 2006 (24)	Neck pain	Brief physiotherapy intervention	Usual physiotherapy management	0.0010	122	122 278
Romagnuolo et al, 2002 (32)	Reflux esophagitis	Laparoscopic Nissen fundoplication	Medical treatment with omeprazole	0.0150	1638	109 172
Esnaola et al, 2002 (18)	Non-small-cell lung adenocarcinoma	Selective mediastinoscopy	Routine mediastinoscopy	0.0203	2067	101 836

CER = cost-effectiveness ratio; QALY = quality-adjusted life-year.

\* The CER is the savings per QALY lost.

**Nelson A L et al. Ann Intern Med 2009;151:662-667**

## Others think differently

- In patients with multivessel disease,
- 1 year after the initial revascularisation, PCI with BMS is the least costly procedure, followed by off-pump CABG, PCI with DES and on-pump CABG.
- DES became the most costly procedure if 3.5 or more DES were used or if staged PCI was performed.
- [Wang X](#), [Rokoss M](#), [Dyub A](#), [Gafni A](#), [Lamy A](#). Cost comparison of four revascularisation procedures for the treatment of multivessel coronary artery disease. **J Med Econ.** 2008;11(1):119-34.

# What do patients think?

- ➔ patients' willingness to pay (WTP) for treatments that may reduce the risk of restenosis and repeat revascularization after PCI.
- ➔ The WTP medians for the 10 and 20% risk reductions were 273 dollars and 366 dollars
- ➔ the median WTP for the 30% risk reduction was significantly higher at 1162 dollars
  
- ➔ Greenberg D, Bakhai A, Neumann PJ, Cohen DJ. Willingness to pay for avoiding coronary restenosis and repeat revascularization: results from a contingent valuation study. *Health Policy*. 2004 Nov;70(2):207-16.

# Conclusion

- ➔ Cost of each procedure, including the non monetary cost of the follow up
- ➔ Availability of trained professionals
- ➔ Patients preferences