Cost-Effectiveness and Public Health and Budget-Impact of FFR-Guided PCI in Patients with Multivessel Disease in Germany (Europe)

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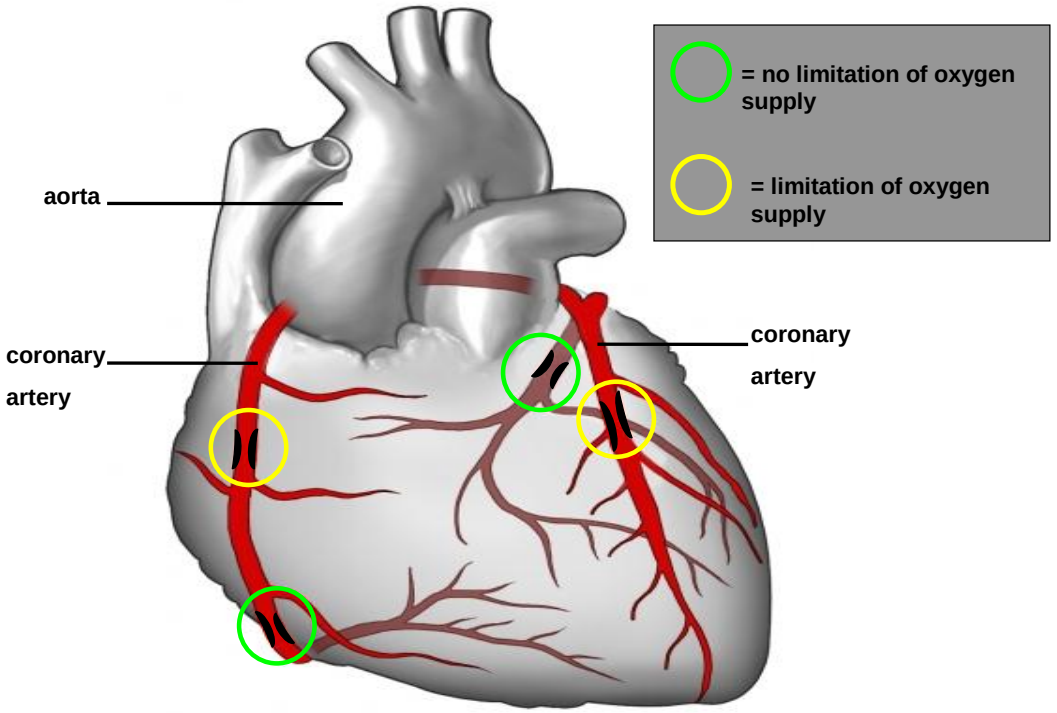
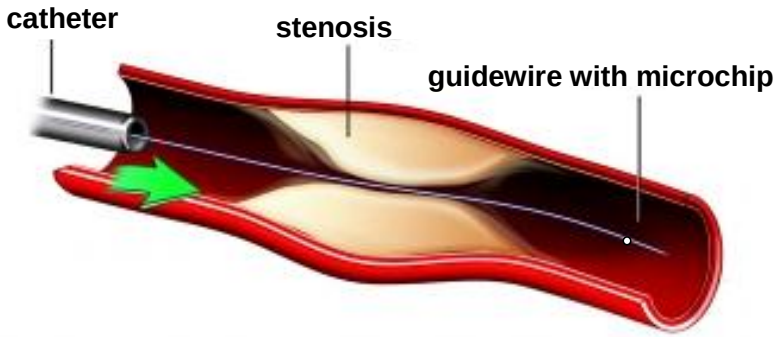
Multivessel Coronary Artery Disease and Fractional Flow Reserve (FFR)





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Fractional Flow Reserve versus Angiography for Guiding Percutaneous Coronary Intervention

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Background

- The FAME Study (NEJM 2009) showed FFR testing is effective in patients with multivessel coronary artery disease; reduces composite endpoint death or MI by 34% ($p<0.05$)

- Potential cost-effectiveness tradeoff: must pay FFR in all patients, save stents and FU costs only in some patients (FFR-),
  $\Rightarrow$ need to compare net incremental benefits and costs

Objectives

- To perform a cost-effectiveness analysis (CEA) and a public heath and budget impact analysis of FFR-guided stenting (FFR) vs. stenting guided by angiography alone (ANGIO) in multivessel patients in the context of different European health care systems

- Countries: Germany, France, UK, Italy (prelim.: Belgium, Switzerland)

Panel of National Experts

Belgium:	B. De Bruyne	Cardiovascular Center Aalst
	W. Desmet	University Hospitals Leuven
France:	T. Lefevre	Hopital Privé Jacques Cartier, Massy
	G. de Pouvourville	ESSEC Business School, Cergy
	G. Rioufol	Cardiovascular Hospital/Hospices Civils de Lyon
Germany:	V. Klauss	University of Munich
	A. Warnholtz	University of Mainz
	M. Wilke	Wilke GmbH, Munich
Italy:	F. Saia	University of Bologna
	M. Valgimigli	University of Ferrara
Switzerland:	E. Eeckhout	University Hospital Center Vaudois, Lausanne
	B. Hornig	St. Claraspital, Basel
UK:	S. Holmberg	Royal Sussex County Hospital, Brighton
	P. Ludman	Queen Elizabeth Hospital Birmingham
	K.G. Oldroyd	Golden Jubilee National Hospital, Glasgow

Methods

FAME Study: Multicenter, multinational RCT (20 centers); n=1005 (FFR: n=509, Angio: n=496), regression with interaction for country

CEA:

Population:	MV patients as in FAME trial
Time horizon:	1 year, closed cohort
Study Type:	Cost-utility analysis
Perspective:	Societal, direct costs
Outcomes:	MACE, QALY, cost, cost-effectiveness
Analysis:	CEA along trial, Bootstrap (5000 x n=1005)

HIA/BIA:

Time horizon:	2 years, open cohort
Perspective:	Payer
Analysis:	Scenario analysis (best/mean/worst case), sensitivity analysis for % market uptake FFR testing

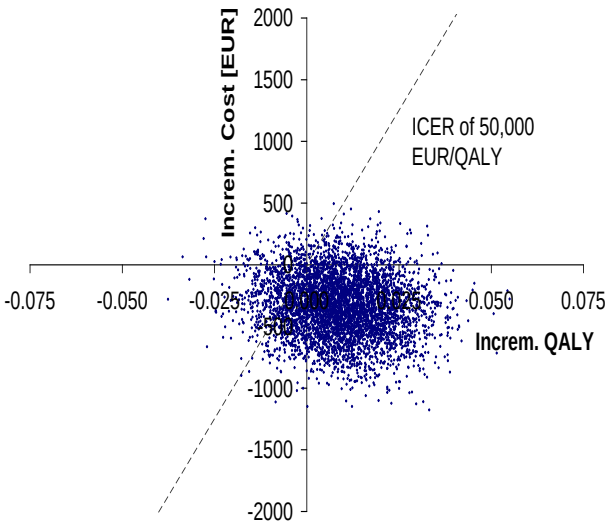
Data

- Original patient-level data of FAME trial (NEJM 2009) with events, quality of life and resources used
- Health outcomes
  - Cardiac events, QALY (based on EQ-5D with country-specific weights)
- Resource utilization (2010 prices)
  - Guiding catheter, regular guide wire, pressure wire, balloon catheter, adenosine, coronary stents, GP 2b3a-inhibitors, contrast agent, hospital days, MI/PCI/CABG during follow-up (DRG-based)
- Population Size
  - Total PCI and fraction of MV pats. Derived from national registries and European Cardiac Catheter Interventions Registry
  - Market uptake: expert estimates and sensitivity analysis 0-100%

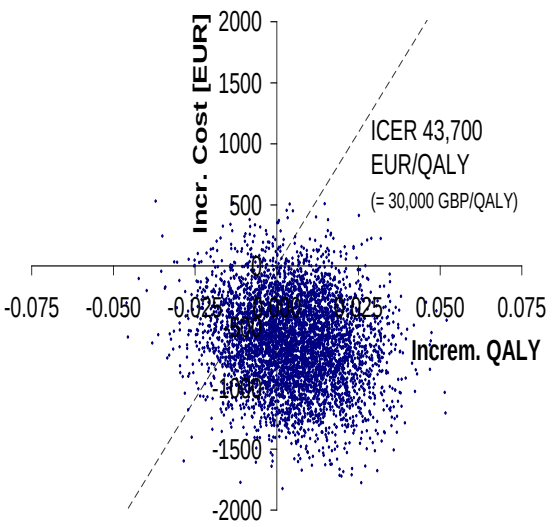
Results Cost-Effectiveness

FFR vs. Angio

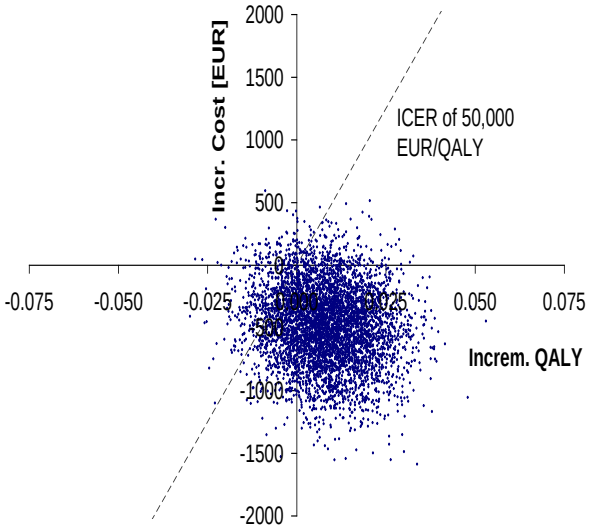
Germany



UK



Italy

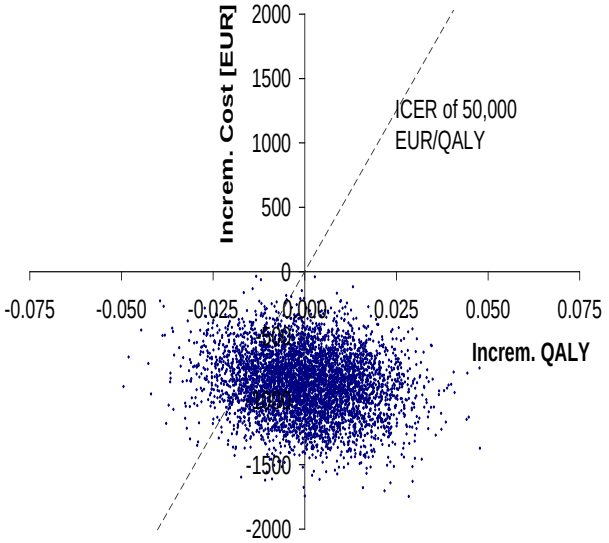


	Germany	UK	Italy
Cost saving:	72%	63%	73%
Cost effective:	89%	90%	92%
Cost savings tot.:	≈300€/pat.	≈600€/pat.	≈500€/pat.
Cost savings init.	≈70 €/pat.	≈400€/pat.	≈90€/pat.

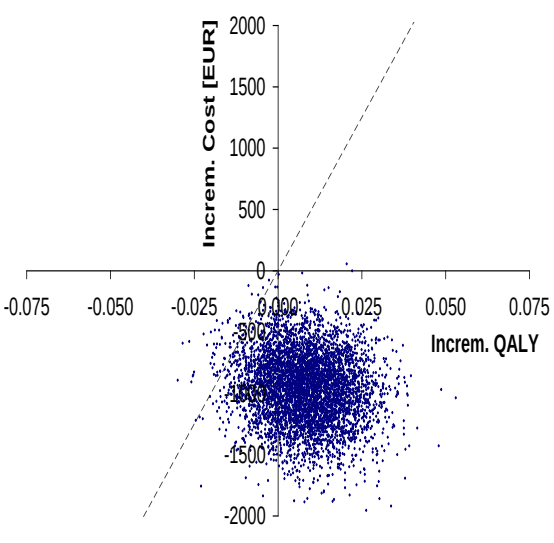
Results Cost-Effectiveness

FFR vs. Angio

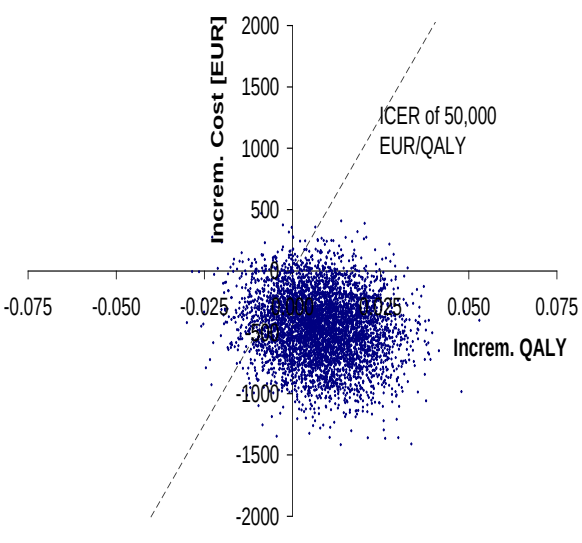
France



Belgium*



Switzerland*



	France	Belgium*	Switzerland*
Cost saving:	52%	>70%	>70%
Cost effective:	90%	>90%	>90%
Cost savings tot.:	≈900€/pat.	≈900€/pat.	≈500€/pat.
Cost savings init.	≈600€/pat.	≈500€/pat.	≈100€/pat.

*preliminary results

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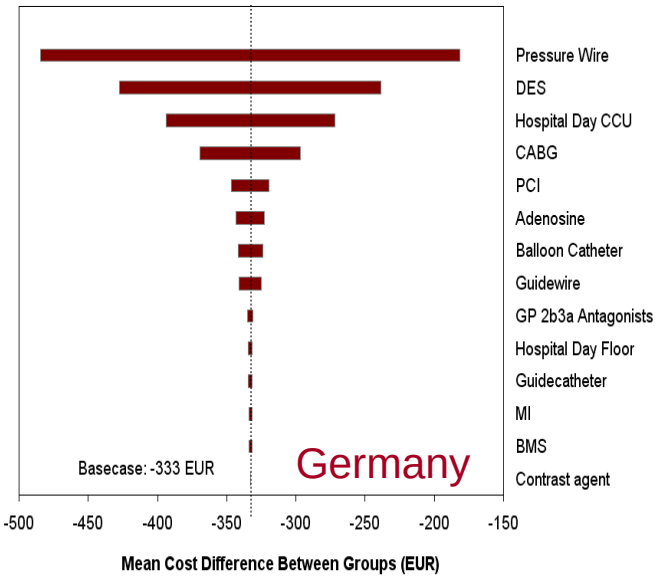
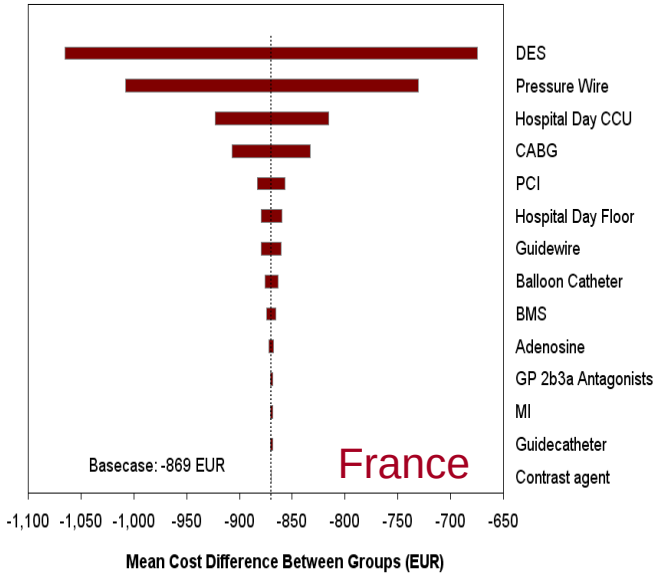
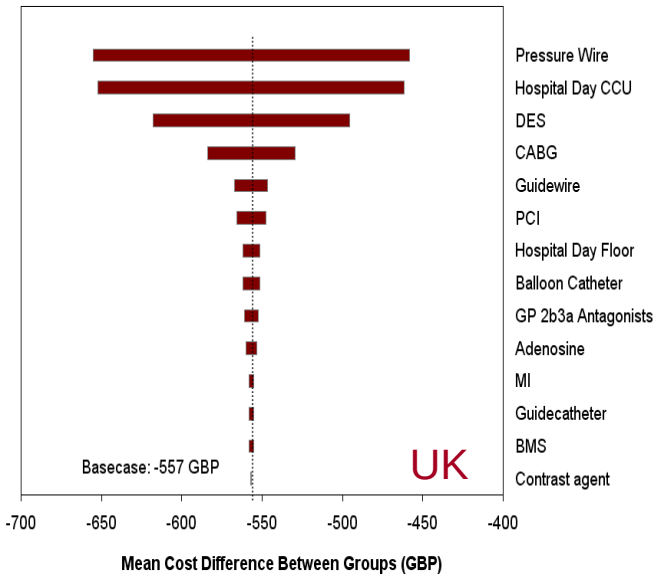
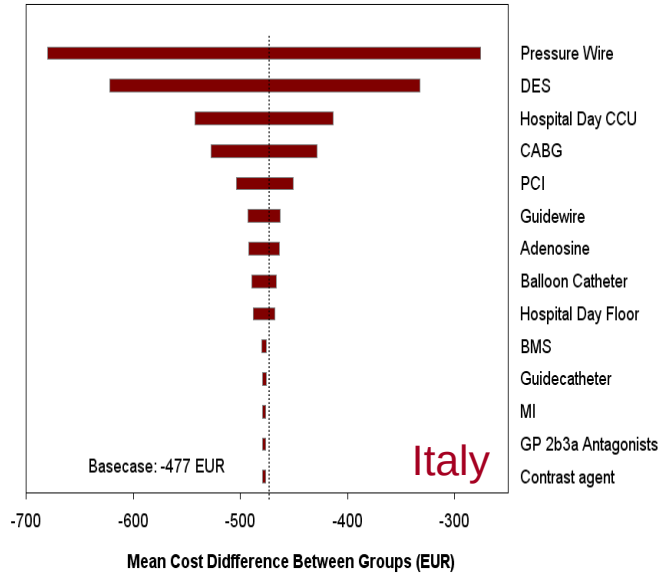
Sensitivity Analysis on Costs

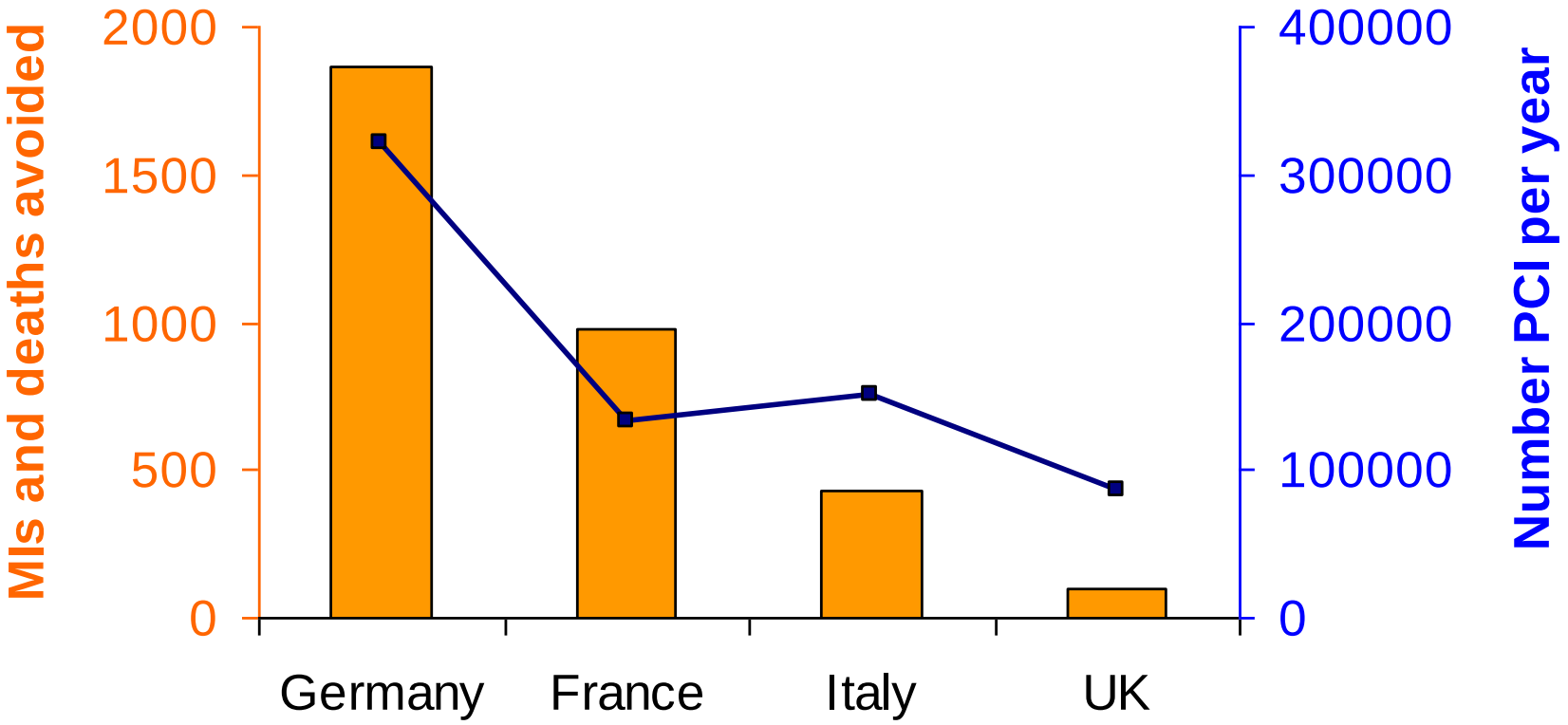




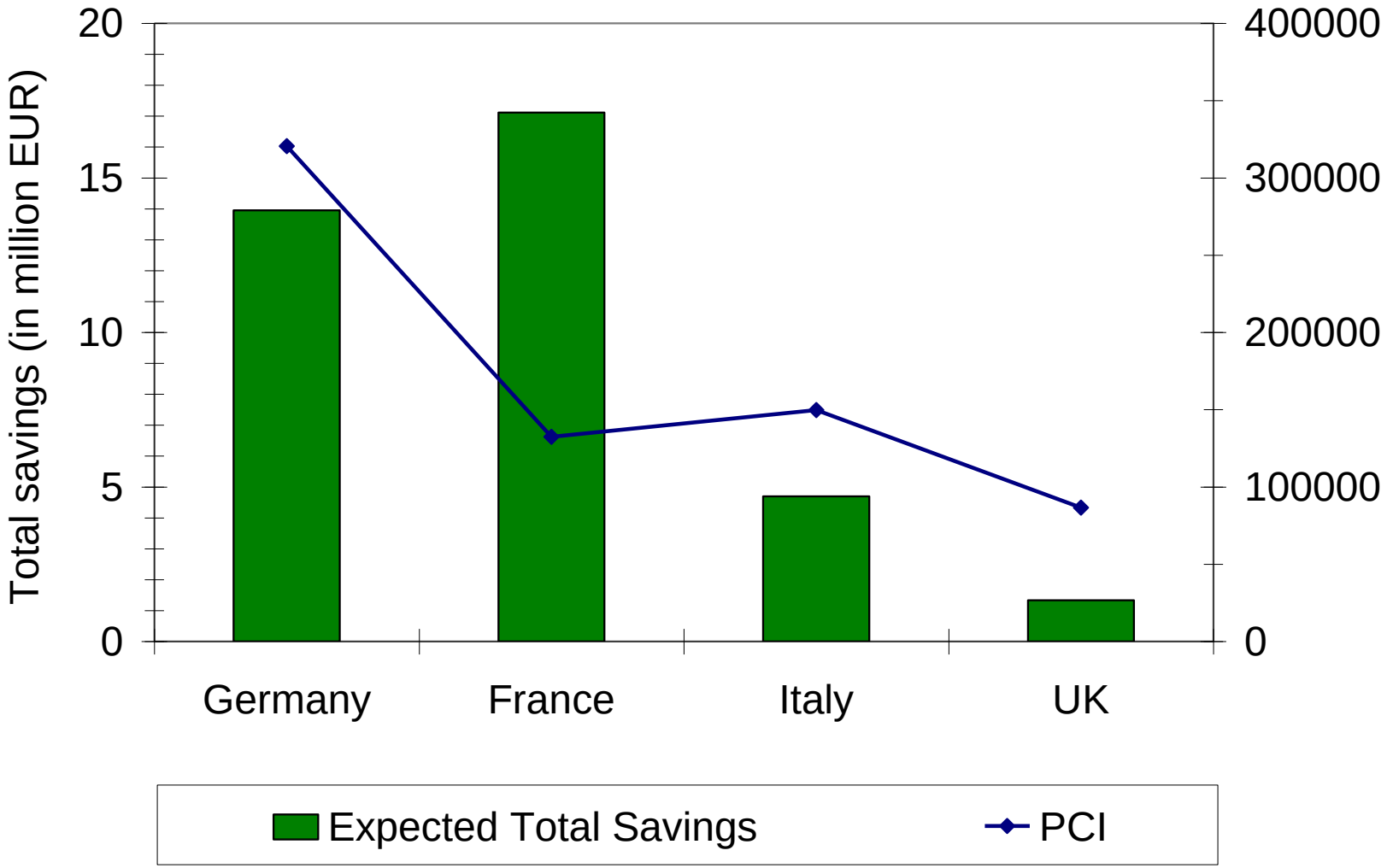




2-Year Health Impact



2-Year Budget Impact



Conclusions

- In the health care systems of Germany, France, UK and Italy, FFR-guided stenting is cost saving compared to angiography-guided alone in multivessel CAD pats.
- Rare situation in cardiology that new technology not only prevents MACEs, MIs, saves lives, and improves quality of life, but also substantially saves resources
- Expected mean savings per patient range from ≈ 300 EUR (Germany) to ≈ 900 EUR (France)
- Further research:
  - Analyses for further countries (e.g., Canada)
  - Evaluation of long-term cost-effectiveness (2 and 5 years)