

Cost-benefit analysis of measures regulating impaired drivers

Second fit to drive conference, Vienna, June 14-15, 2007

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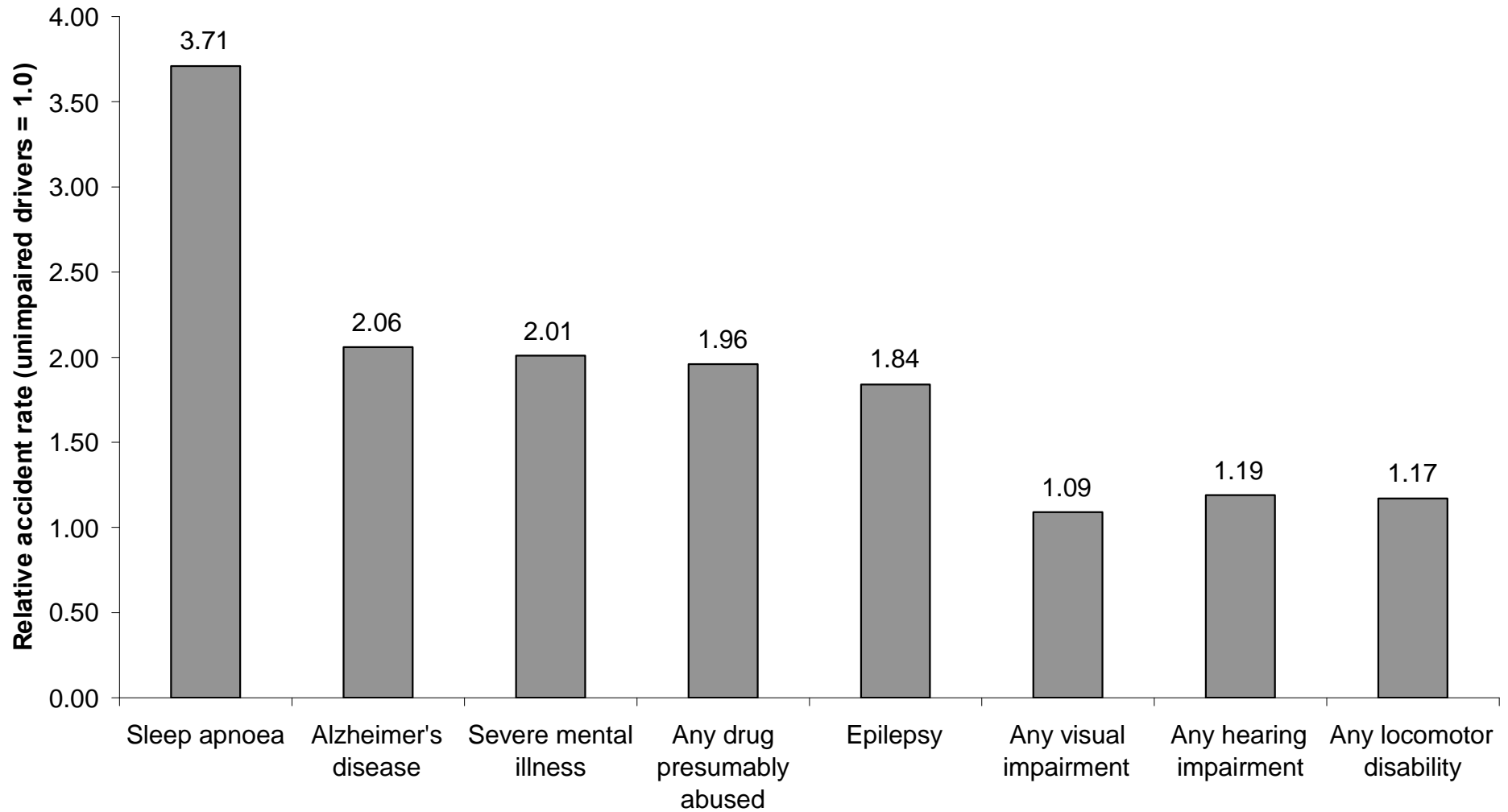
Summary of research in IMMORTAL

- How do various impairments influence accident rates?
- What policy options are available to control risks attributable to driver impairment?
- What are the costs and benefits of various measures to control impaired driving?
- Are there any ethical problems involved in strictly regulating driver fitness to drive?

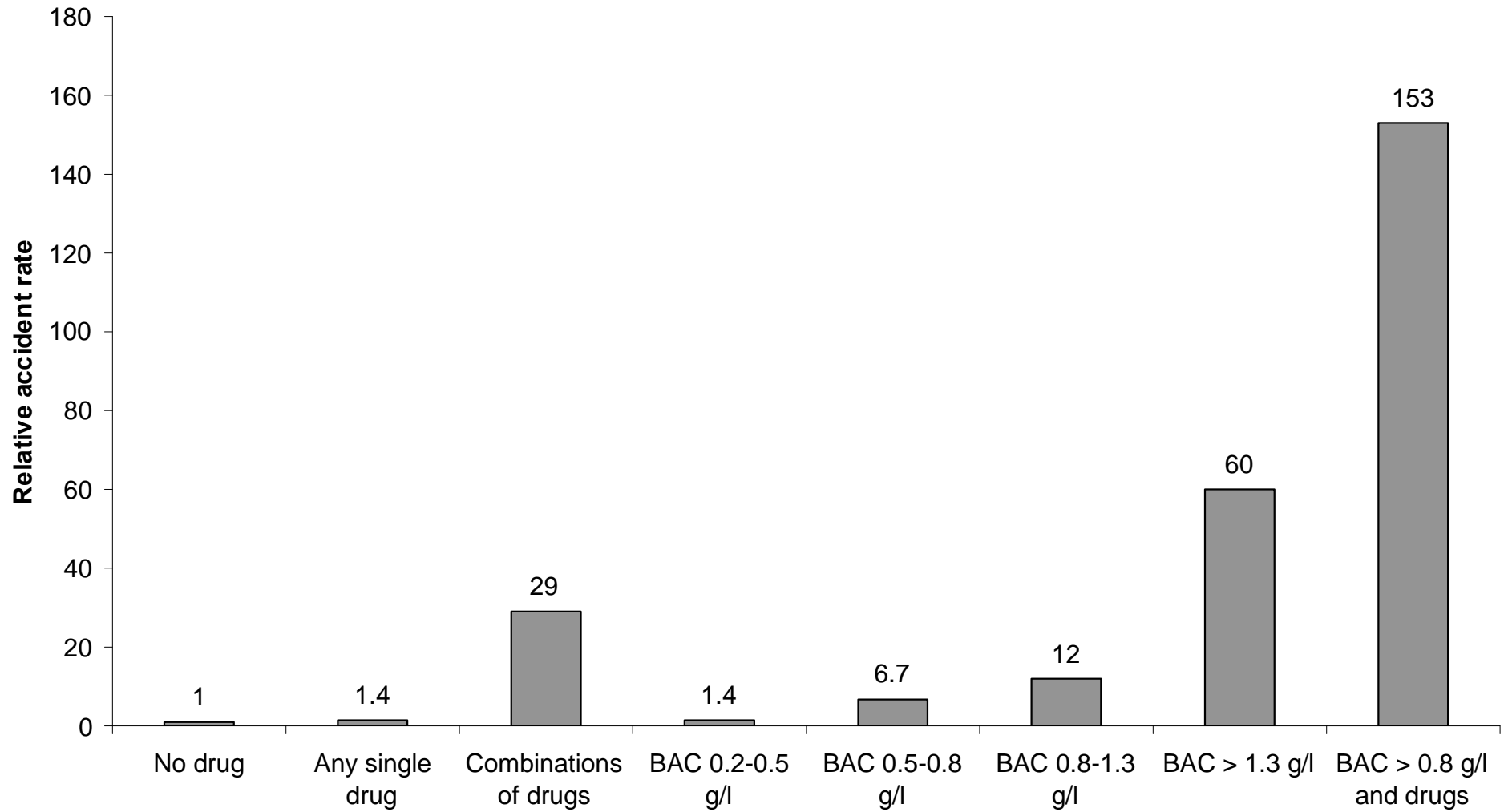
Three studies of risks associated with driver impairment in IMMORTAL

- Vaa 2003: Meta-analysis of about 70 studies of risks associated with a large number of impairments – mostly medical conditions
- Sagberg 2004: Sample survey of drivers providing self-reports of medical conditions
- Assum et al 2005: Roadside survey (case-control study) of acute impairment by alcohol or drugs

Effects of medical conditions on accident rate



Effects of acute impairments on accident rate



Limitations of epidemiological evidence

- Few studies for several of the impairments
- Poor description of medical conditions
- Inadequate measurement of accident rate
- Sampling endogeneity – self-selection bias
- Poor control of confounding factors
- No consideration of accident severity
- No analysis of moderating factors
- Poor knowledge of population incidence

Bias by self-selection

Group	Status	Relative risk	Proportion
Cases	Disqualified	10	0,01
	Ruled fit	4	0,05
Controls	Healthy	1	0,85
	Undiagnosed	2	0,09

Cases = those who seek treatment for a medical condition

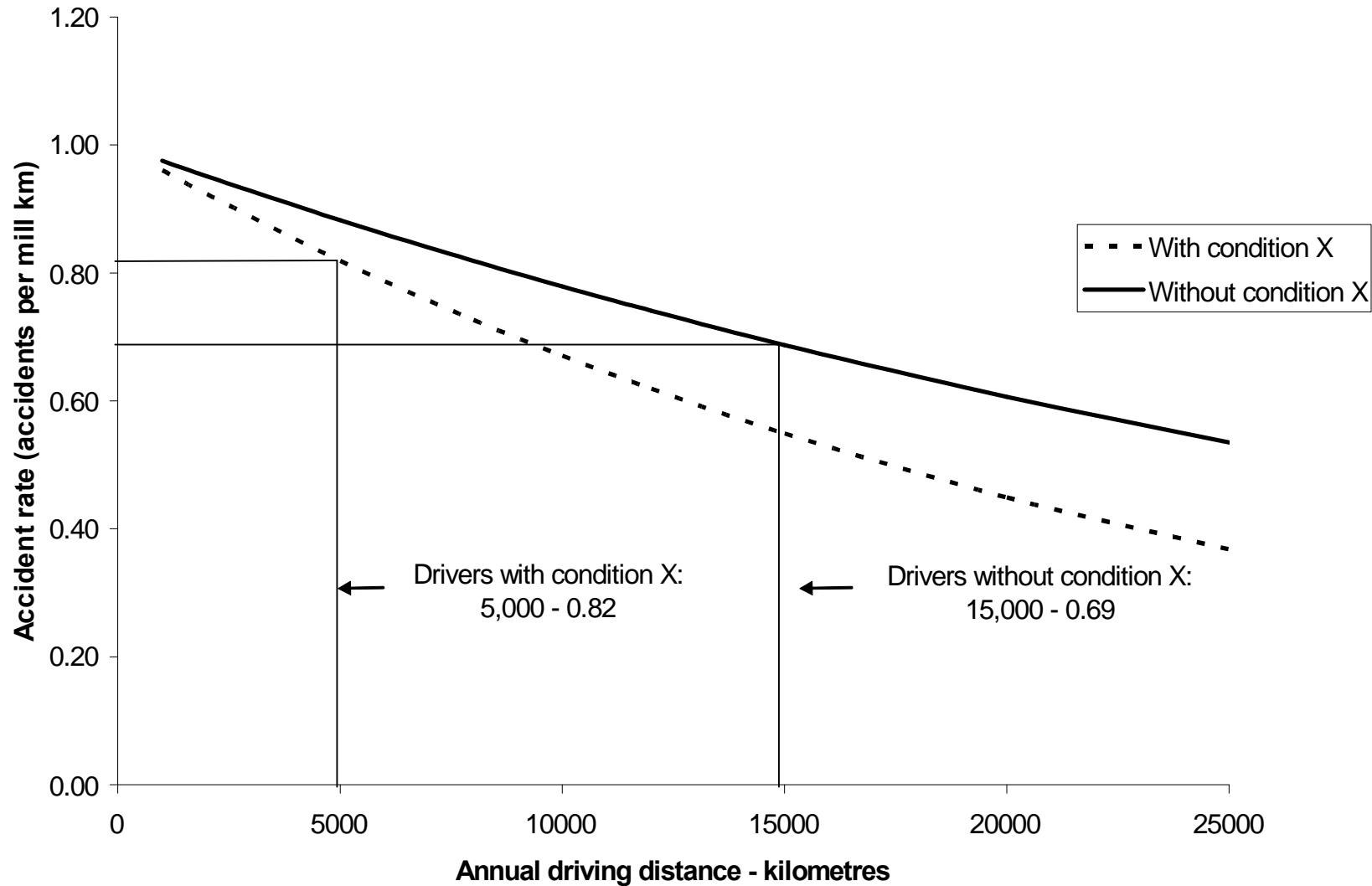
Controls= those who do not seek treatment for a medical condition

Results of bias by self-selection

1. All those who seek treatment continue to drive, even if disqualified: Relative risk = 4.56
2. Those who seek treatment and are disqualified, stop driving: Relative risk = 3.65
3. All those who have the disease are diagnosed and continue to drive: Relative risk = 3.20

Case 1 may be close to present reality, case 3 is the ideal

Accident rates in drivers with and without condition X - hypothetical data



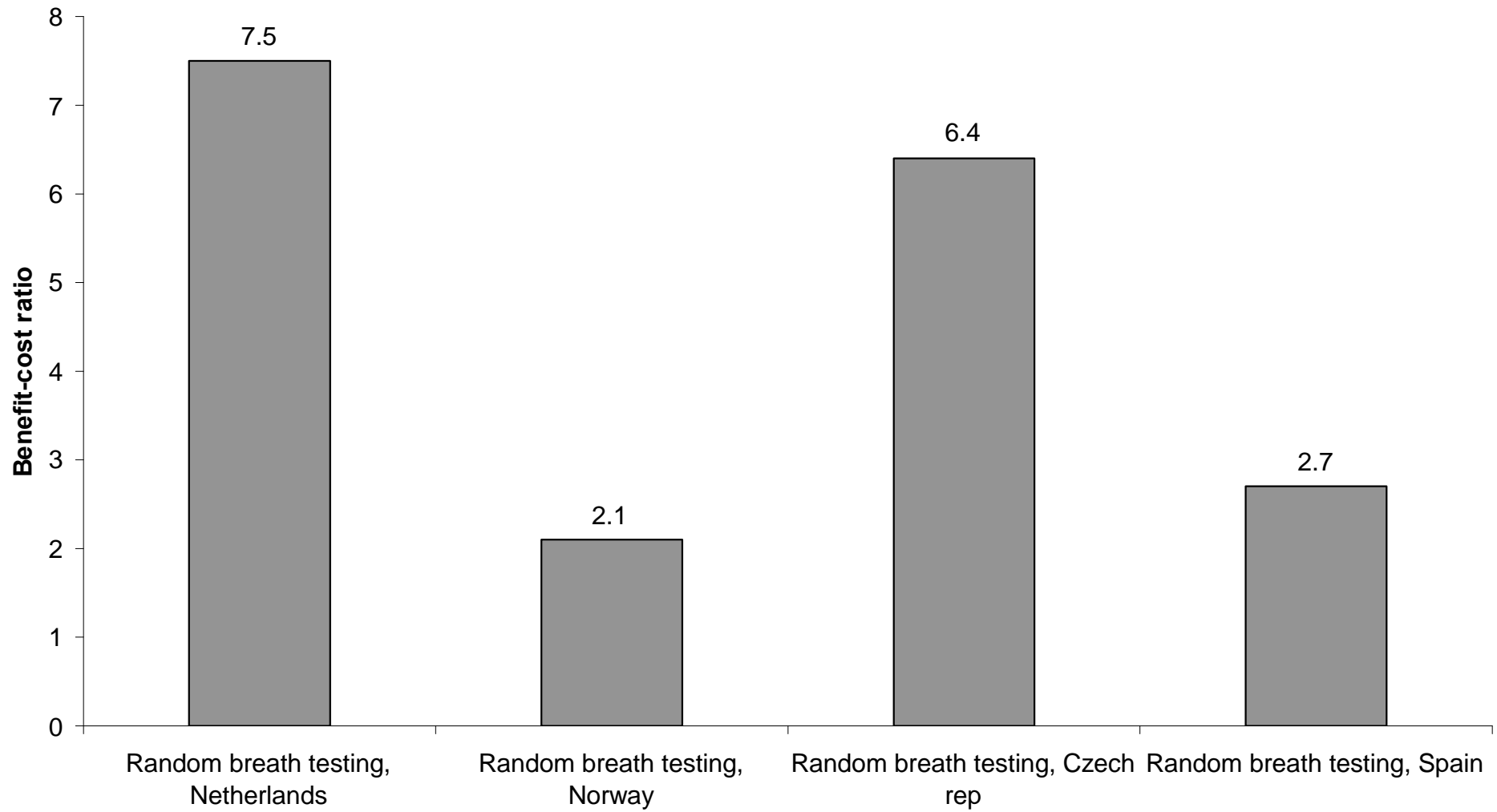
Framework for cost-benefit analysis

- The following countries were selected:
 - Czech republic, Netherlands, Norway, Spain
- The following measures were included:
 - Test of visual acuity
 - Standard eye test
 - Standard eye test including Useful Field Of View (UFOV)
 - Increased random breath testing
 - Random breath testing and 0 BAC limit for young drivers
 - Alcolock in cars for offenders convicted of drink-driving with BAC > 1.3

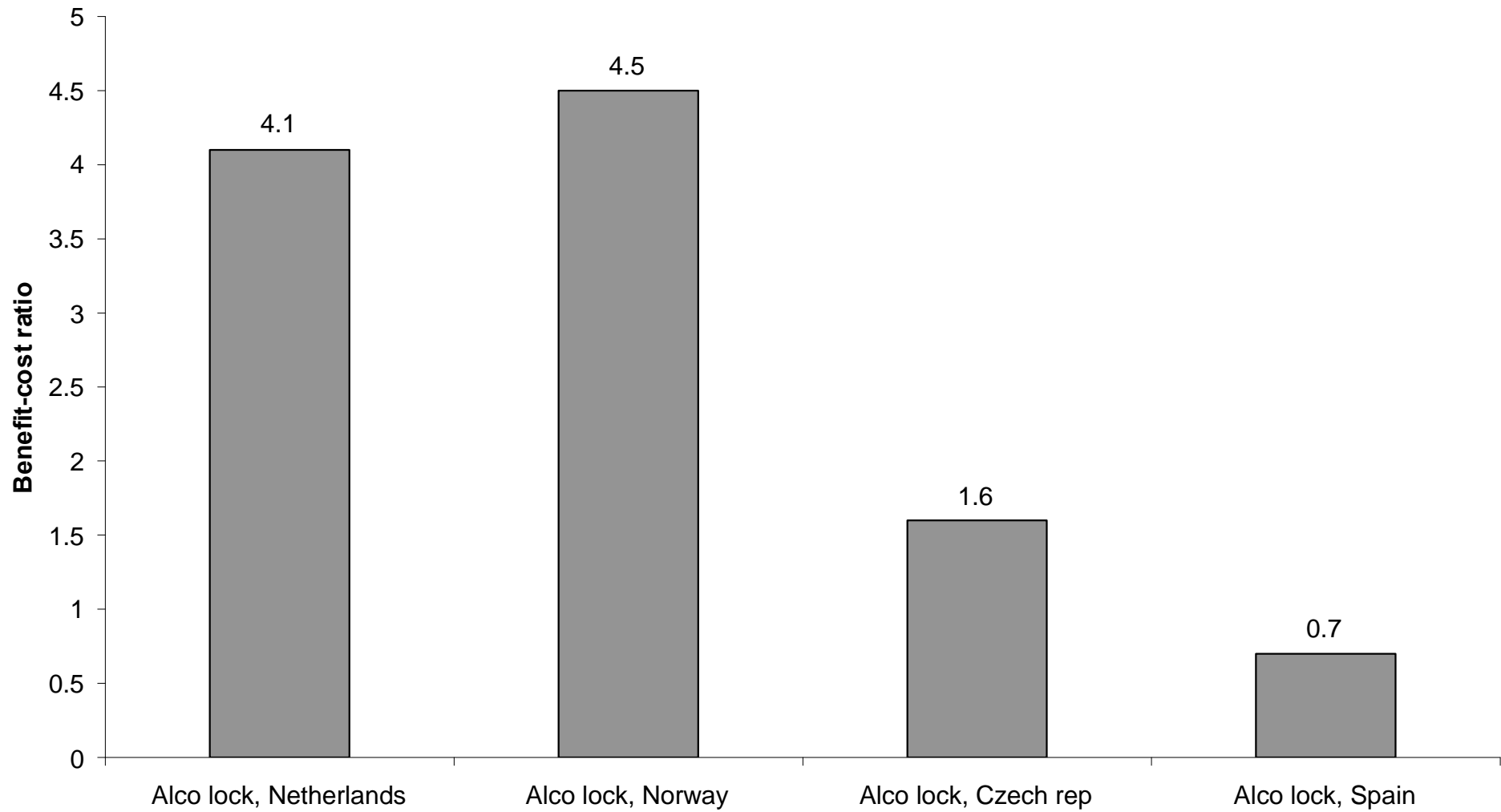
Impacts included in cost-benefit analysis

- Safety impacts: changes in the number of accidents, valued according to the "modified" Euro 1 million test. Separate valuations in each country
- Mobility impacts: changes in the amount of driving and mode switching in case of licence withdrawal
- Environmental impacts: changes in environmental impacts as a result of less driving or mode switching
- Direct costs of implementing measures

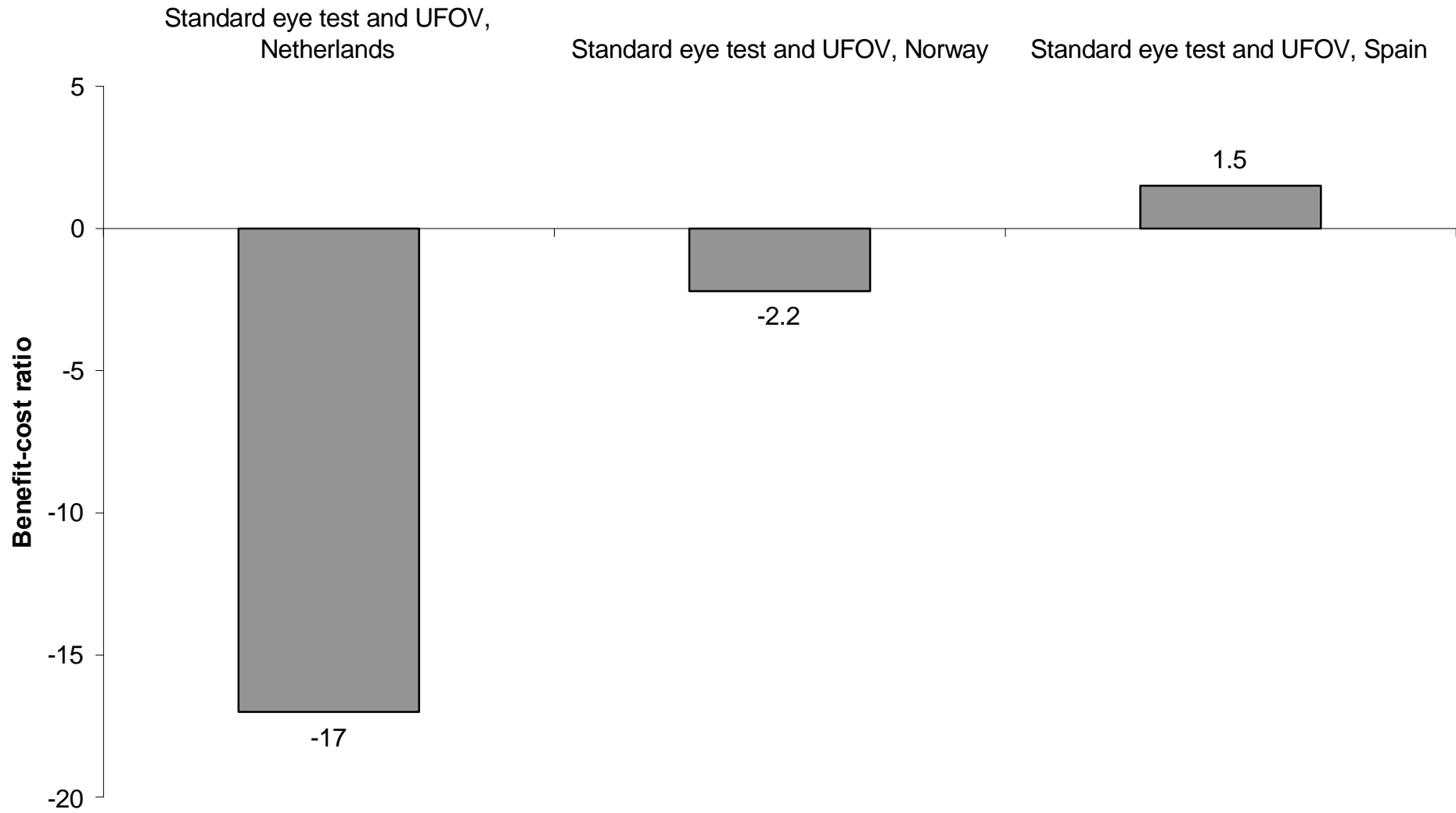
Benefit-cost ratio of random breath testing



Benefit-cost ratio of alco lock for high BAC drivers



Benefit-cost ratio for standard eye test and UFOV



Potential ethical problems

- Unreliable diagnostics creating unfair outcomes
- Counterproductive in terms of overall risk (car driving is comparatively safe)
- Dependencies and external effects created (may need help from others)
- Punish the conscientious, let the less conscientious go free
- Exercise in paternalism
- Grossly inconsistent with permitting other, higher risks