Alcohol and disability with special consideration of traffic injury – Analysis, evaluation and consequences

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Based on data on prevalence provided by
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Thanks!

- To E. Scafato and the ISS for providing the exposure data
- To WHO and IHME, Seattle, for initiating the Comparative Risk Assessment (CRA) where the methods described here were introduced.
- To more than 500 scientists and collaborators in the CRAs for alcohol.
- To Benjamin Taylor for undertaking the the injury calculations

Alcohol, disability and burden of disease the global picture

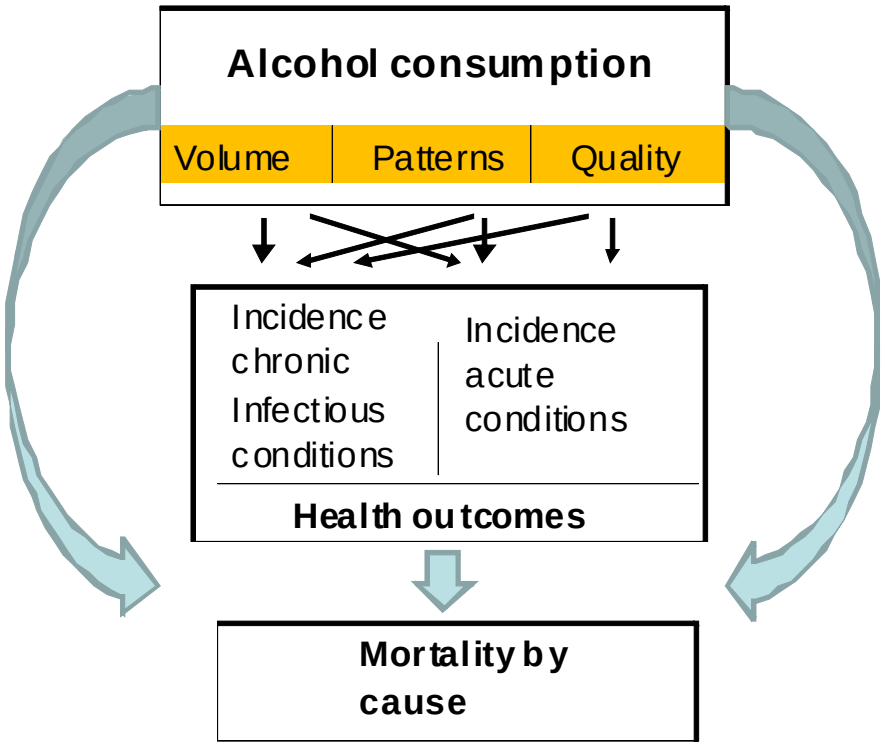
Alcohol consumption is one of the most disabling risk factors

Rehm, J., Mathers, C., Popova, S., Thavorncharoensap, M., Teerawattananon, Y., & Patra, J. (in press). Global burden of disease and injury and economic cost attributable to alcohol use and alcohol use disorders. Lancet.

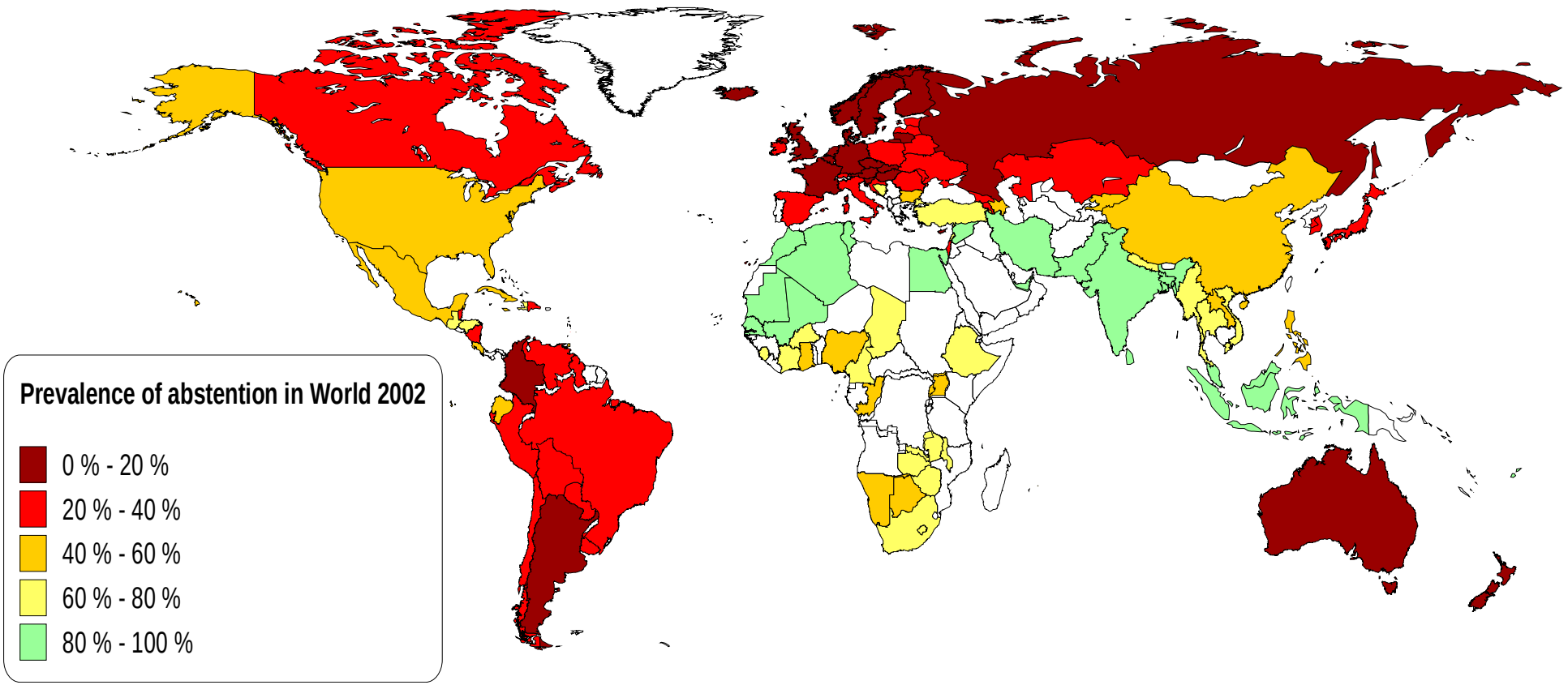
Alcohol is different from other risk factors…

- Acute (e.g. traffic accidents) and chronic (e.g. liver cirrhosis) consequences
- Beneficial vs. detrimental impacts
- More than 200 ICD codes are linked to alcohol
- Three major outcomes have beneficial links to alcohol, restricted to certain age groups (40 plus) and a pattern of regular light to moderate drinking : ischemic heart disease, ischemic stroke
- Different sign and value of impact by different characteristics of alcohol:
  - average volume of alcohol consumption
  - patterns of drinking
- Alcohol level associated to minimum risk depends on disease -> mainly abstention
- Alcohol does not only impact on the drinker itself but also on others (e.g., mothers drinking on unborn, drunk driver on innocent bystander)

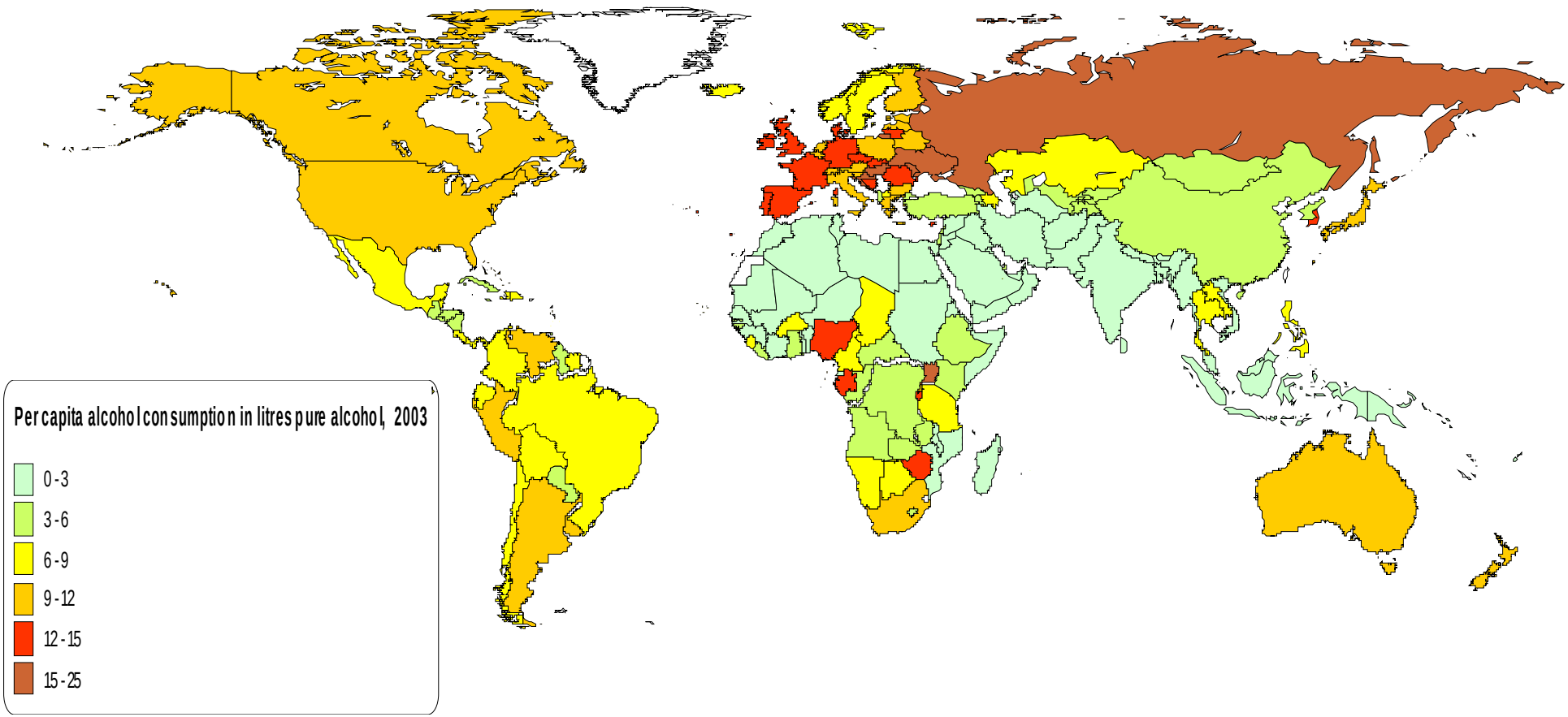
Basic causal model of alcohol consumption, intermediate mechanisms, and long-term consequences (from Rehm et al., 2009)

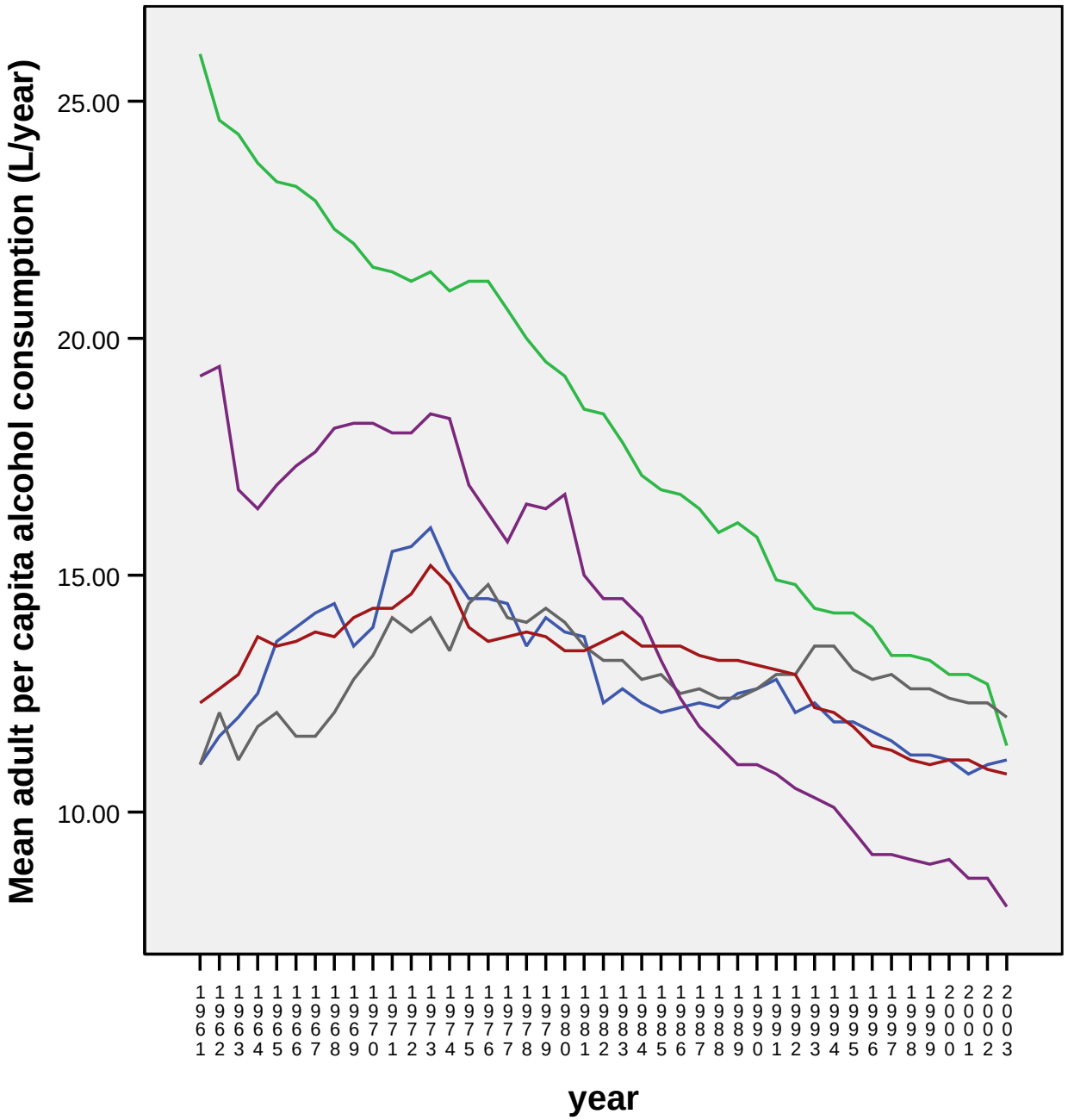


Prevalence of abstention in World 2003



Adult per capita consumption in litre pure alcohol 2003 (based on CRA)

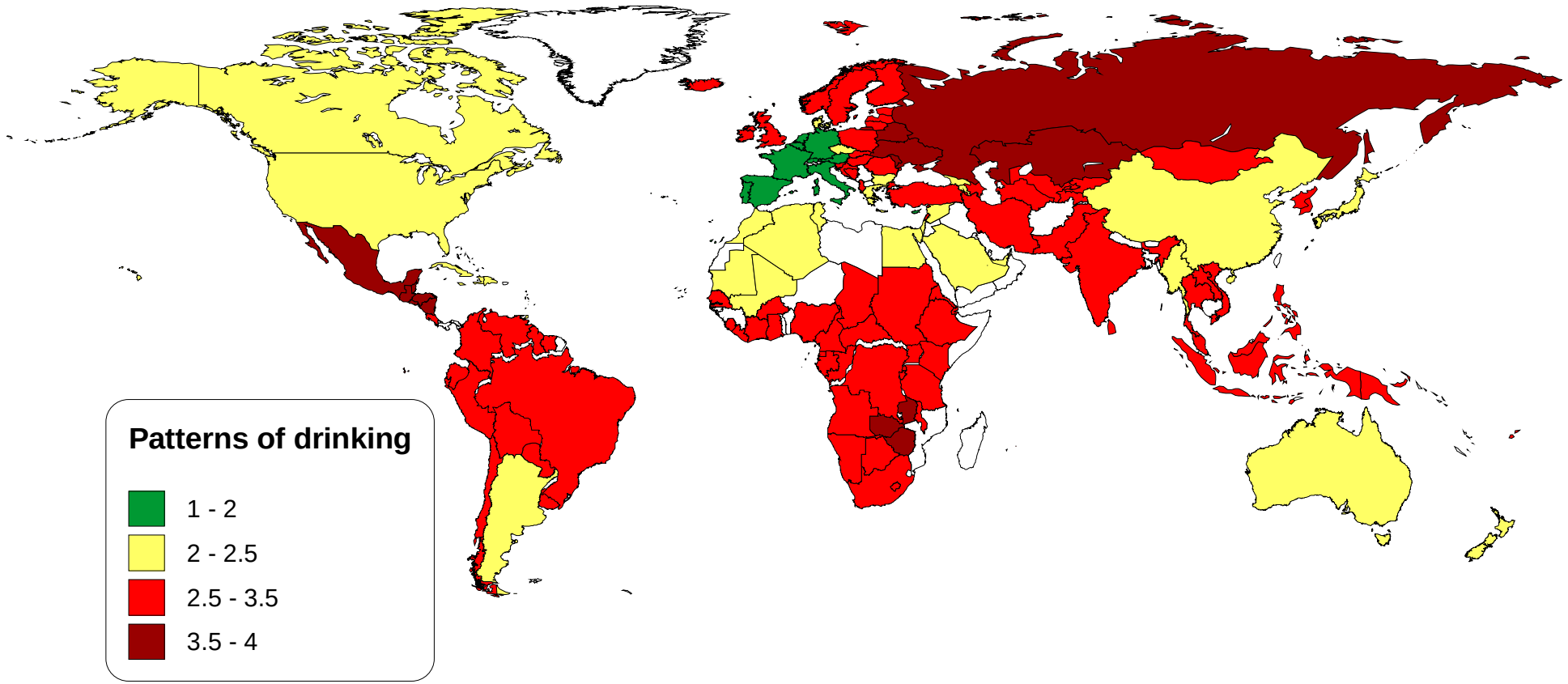




Strong success for prevention in Italy –

Recorded consumption in selected EU countries

Patterns of drinking 2002



Alcohol related disease and injury considered in the analyses

Chronic disease:

Cancer: Mouth & oropharyngeal cancer, esophageal cancer, colorectal cancer, liver cancer, female breast cancer, larynx cancer

Neuropsychiatric diseases: Alcohol use disorders, unipolar major depression, epilepsy

Diabetes

Cardiovascular diseases: Hypertensive diseases, coronary heart disease, stroke

Gastrointestinal diseases: Liver cirrhosis

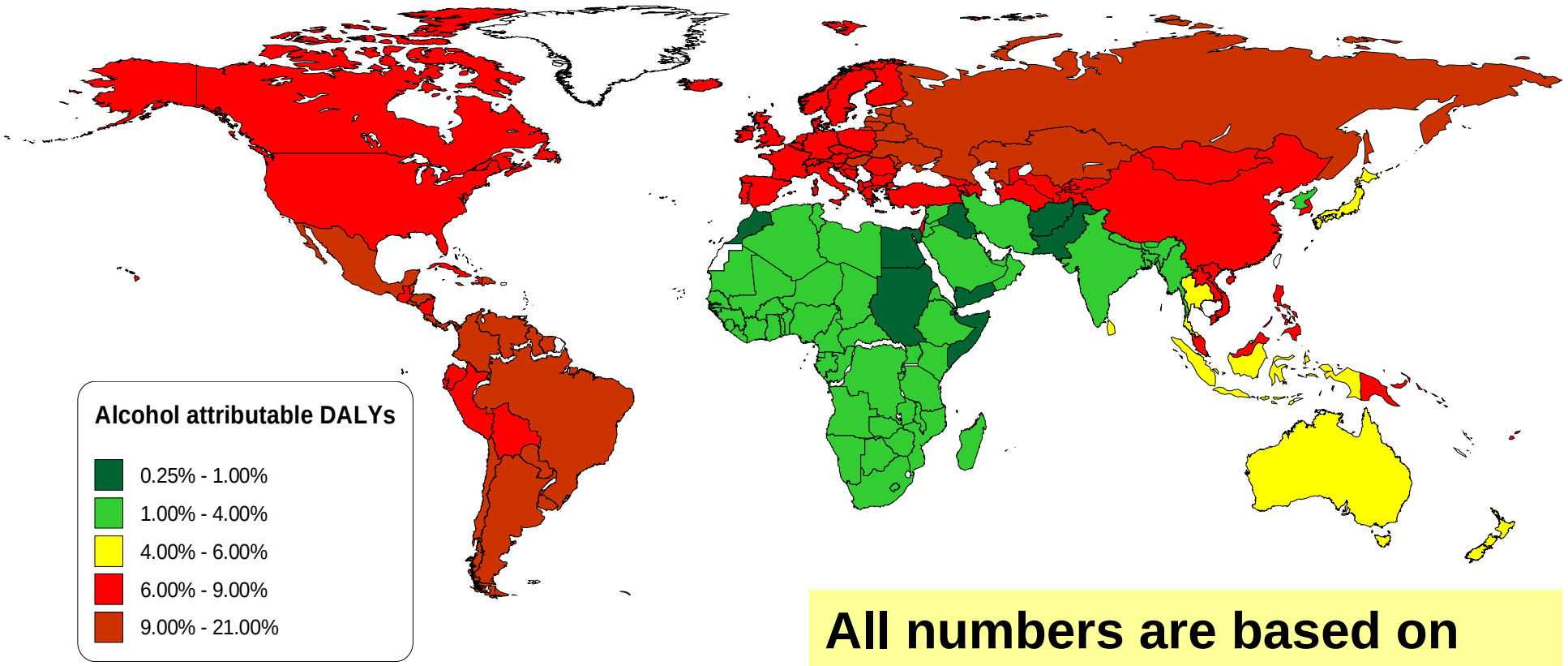
Conditions arising during perinatal period: Prenatal conditions

Injury:

Unintentional injury: Motor vehicle accidents, drownings, falls, poisonings, other unintentional injuries

Intentional injury: Self-inflicted injuries, homicide, other intentional injuries

Alcohol-attributable burden of disease 2004



All numbers are based on net burden! And regional estimates!

Current estimates are likely underestimates

- The impact of unrecorded consumption is estimated similarly as the impact of recorded, although unrecorded consumption, ceteris paribus, may be linked to greater health risk
- In developing countries, alcohol interacts with nutrition and other risk factors, which may create synergistic effects
- The current analyses do not incorporate the impact of alcohol on infectious disease

Alcohol & Infectious Diseases Technical Meeting
15 – 18 July 2008

Vineyard Hotel
Cape Town, South Africa

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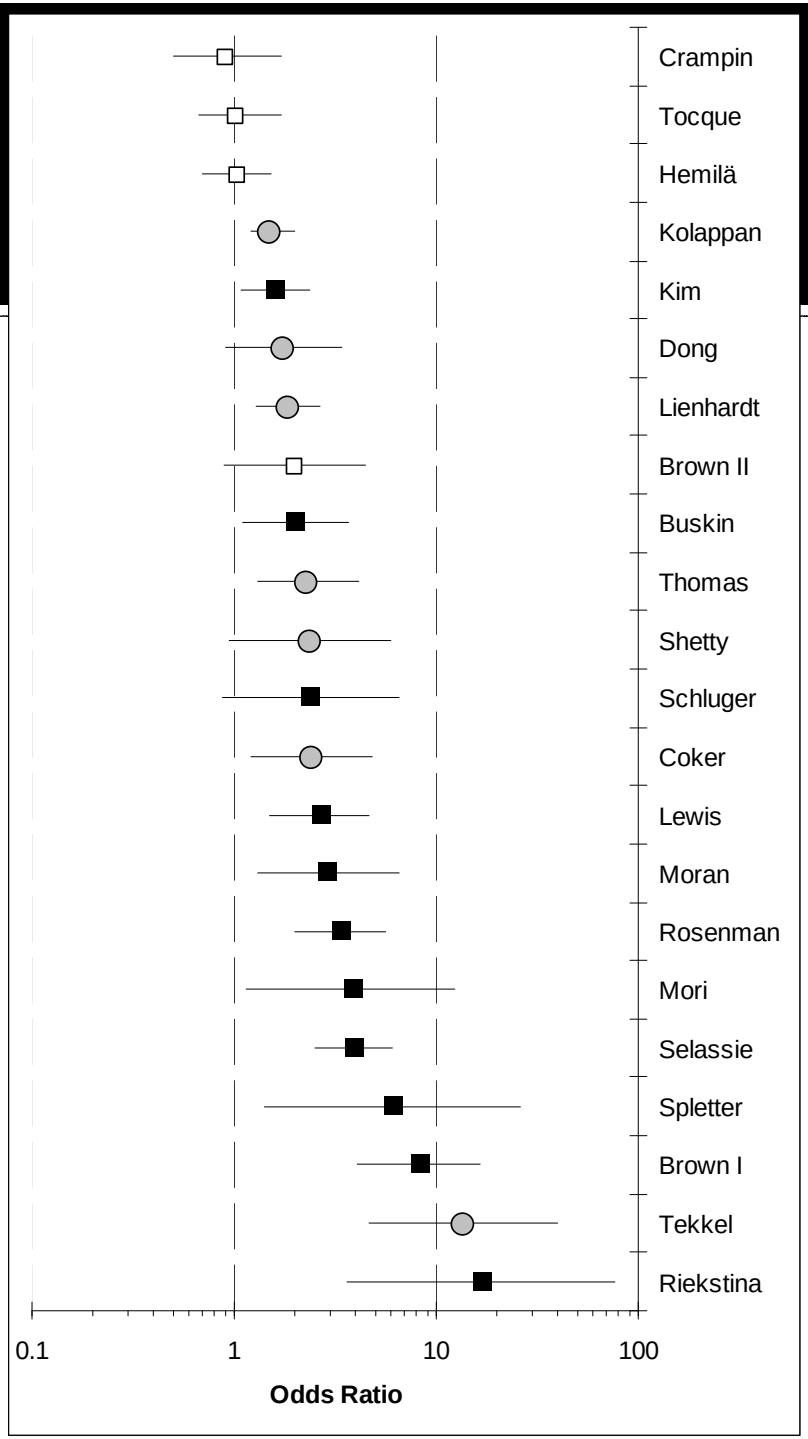
Meta-analysis on alcohol and TB Lönnroth et al., 2008

Low exposure: cut-off for intake set at <40 g alcohol / day

High exposure: cut off for intake set at >=40g/day, or diagnosed alcohol disorder (dependence, abuse, or "heavy drinking")

Exposure not clearly defined



Alcohol-attributable deaths and burden of disease in Italy 2004

Same methodology as in Lancet for the country estimates!

Deaths attributable to alcohol consumption in Italy in 2004 (in 1,000)

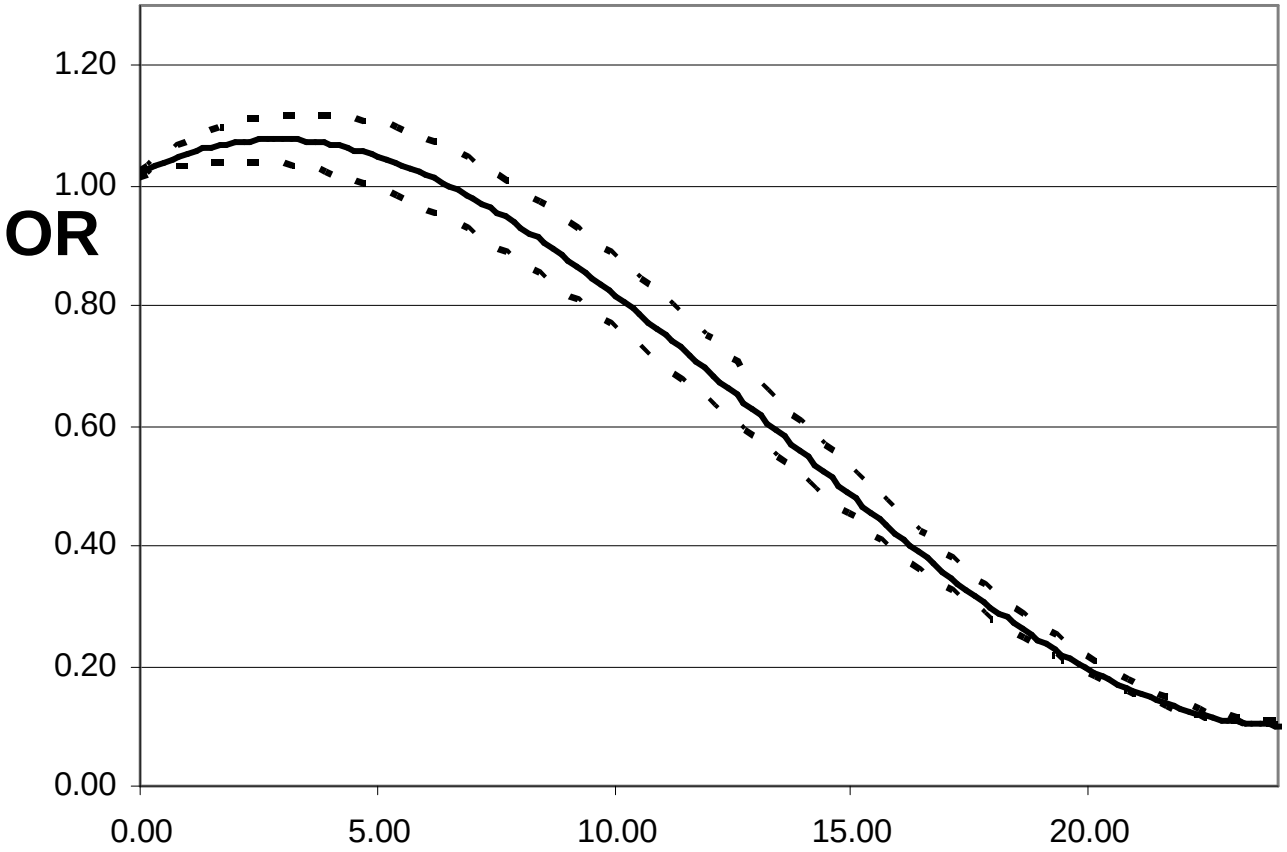
Disease Category	ITALY			EUR		
	M	W	T	M	W	T
Maternal and perinatal conditions (low birth weight)	0.0	0.0	0.0	0.3	0.2	0.5
Cancer	7.1	4.3	11.5	64.5	40.1	104.6
Diabetes mellitus	0.0	0.0	0.0	0.0	0.1	0.1
Neuropsychiatric disorders	0.3	0.1	0.4	27.6	7.7	35.3
Cardiovascular diseases	5.0	2.6	7.6	156.9	47.3	204.2
Cirrhosis of the liver	5.0	3.3	8.3	89.6	44.4	134.0
Unintentional injuries	3.6	1.0	4.5	190.0	34.9	224.9
Intentional injuries	0.6	0.2	0.8	62.9	11.4	74.2
Total 'detrimental effects' attributable to alcohol	21.6	11.5	33.1	591.8	186.2	777.9
Diabetes mellitus	-0.8	-0.4	-1.2	-3.6	-3.3	-6.9
Cardiovascular diseases	-5.9	-4.8	-10.7	-53.8	-98.0	-151.9
Total 'beneficial effects' attributable to alcohol	-6.7	-5.3	-11.9	-57.4	-101.3	-158.8
All alcohol-attributable net deaths	14.9	6.2	21.2	534.3	84.8	619.2
All deaths	280.2	273.2	553.4	4846.7	4646.3	9493.0
Percentage of all net deaths attributable to alcohol	**5.3%**	**2.3%**	**3.8%**	**11.0%**	**1.8%**	**6.5%**

Alcohol-attributable burden of disease in 1,000 DALYS for Italy 2004

Disease Category	ITALY			EUR		
	M	W	T	M	W	T
Maternal and perinatal conditions (low birth weight)	0	0	0	11	9	20
Cancer	67	45	113	782	516	1298
Diabetes mellitus	0	0	0	0	7	7
Neuropsychiatric disorders	40	28	68	4573	1018	5591
Cardiovascular diseases	44	22	66	1927	489	2416
Cirrhosis of the liver	62	37	99	1680	839	2519
Unintentional injuries	84	17	101	4725	738	5463
Intentional injuries	13	3	17	1549	256	1806
Total 'detrimental effects' attributable to alcohol	311	154	465	15246	3872	19118
Diabetes mellitus	-17	-7	-24	-116	-56	-172
Cardiovascular diseases	-54	-42	-96	-488	-832	-1320
Total 'beneficial effects' attributable to alcohol	-71	-49	-120	-604	-889	-1493
All alcohol-attributable net deaths	240	104	345	14642	2983	17625
All deaths	3367	3214	6581	84476	67271	151747
Percentage of all net deaths attributable to alcohol	**7.1%**	**3.2%**	**5.2%**	**17.3%**	**4.4%**	**11.6%**

Why is cancer mortality and morbity still so high in Italy?

Effect of drinking cessation on oesophageal cancer risk by duration



It takes about 20 years before the risks of abstainers are reached (Rehm et al., 2007, IJC)

But cancer is an exception!

Immediate effects of cessation can be seen on:

- Intentional injury
- Unintentional injury

Which are traditionally low in Italy. However, with the increase of binge drinking in Europe among youth and young adults, this picture may change.

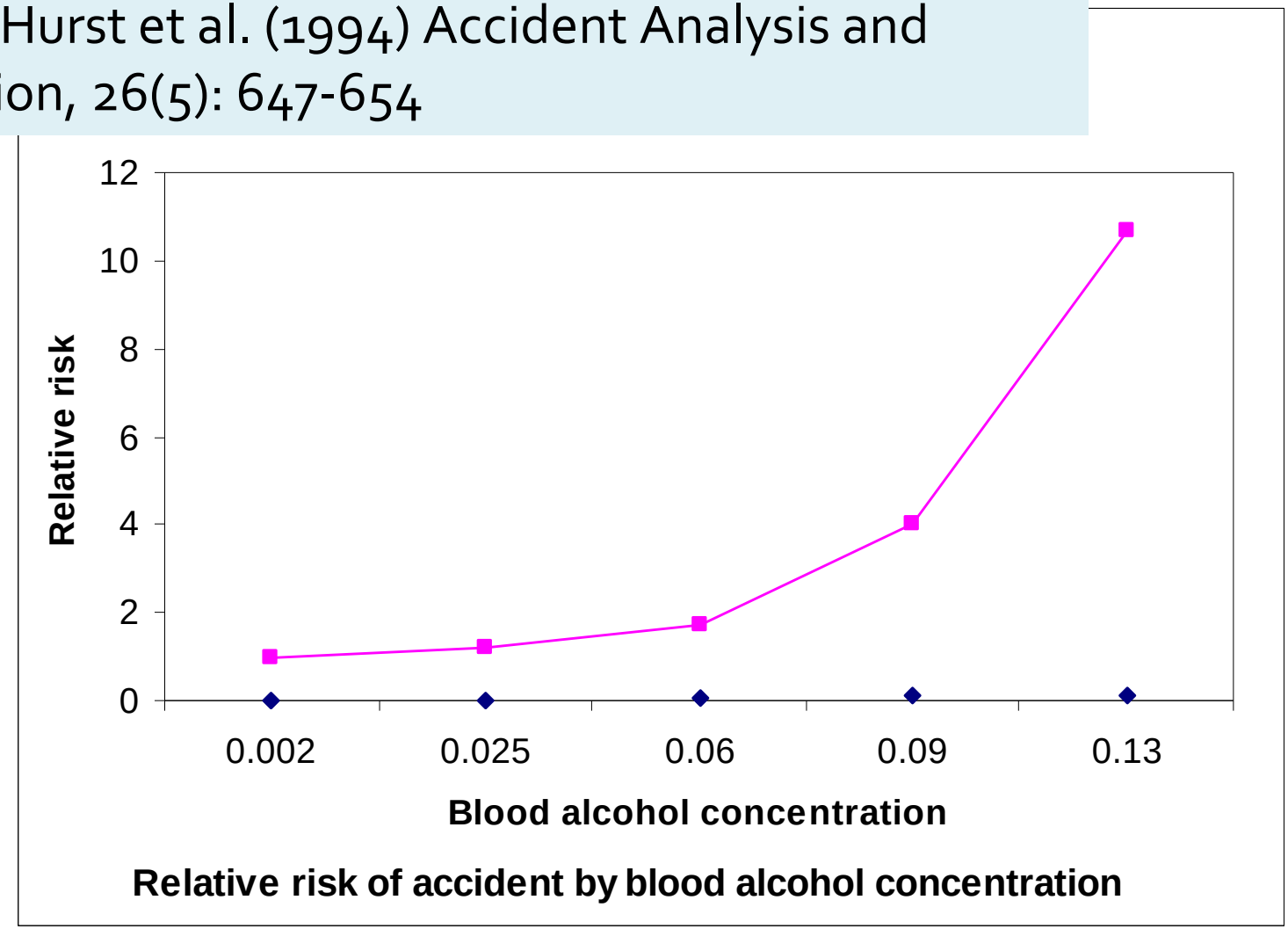
Some facts about alcohol and injury

On the problems of binge drinking!

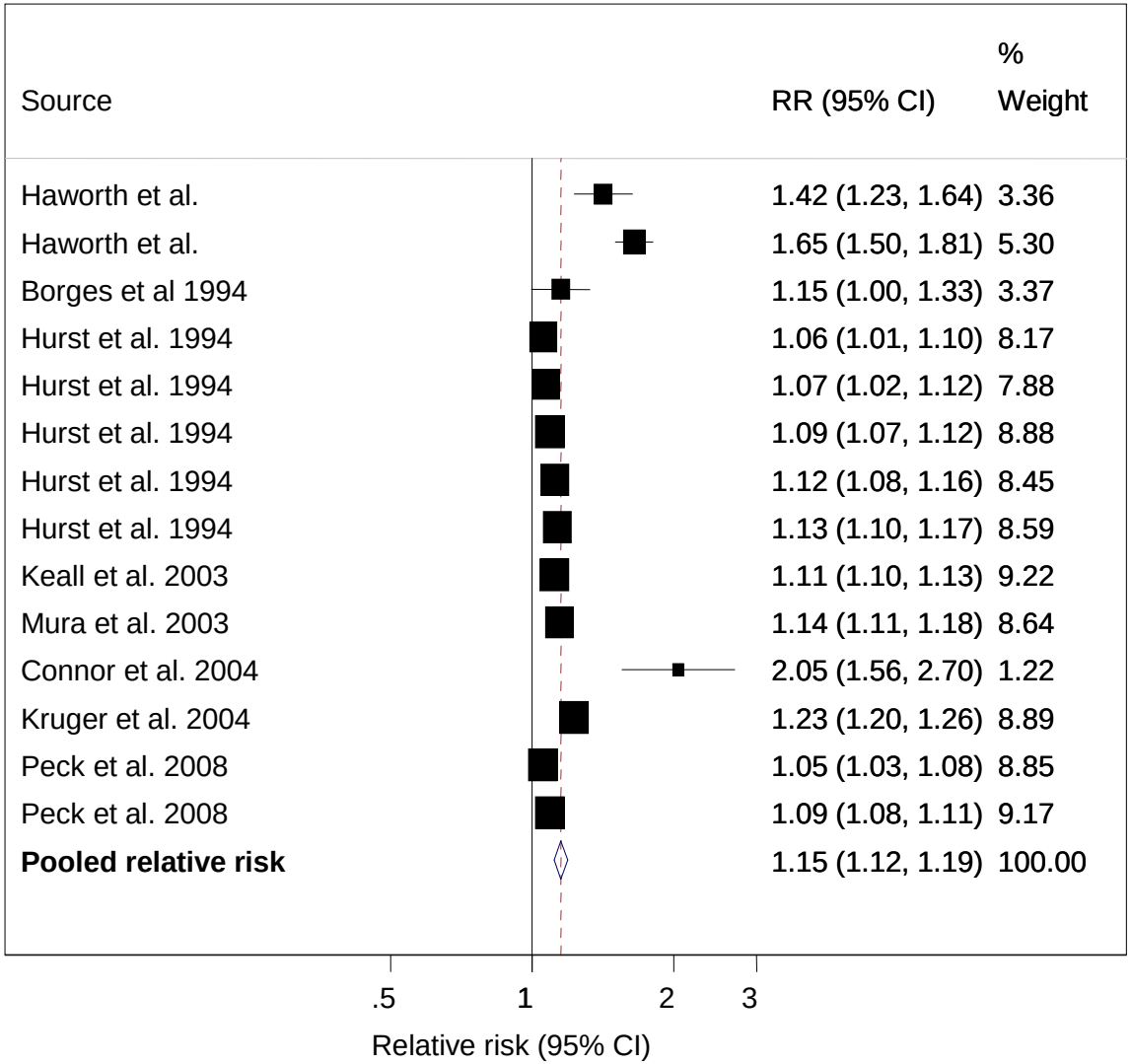
Patterns and acute consequences…. (one example from Germany)

Alcohol and injury – traffic accidents: results of most famous roadside survey

Source: Hurst et al. (1994) Accident Analysis and prevention, 26(5): 647-654

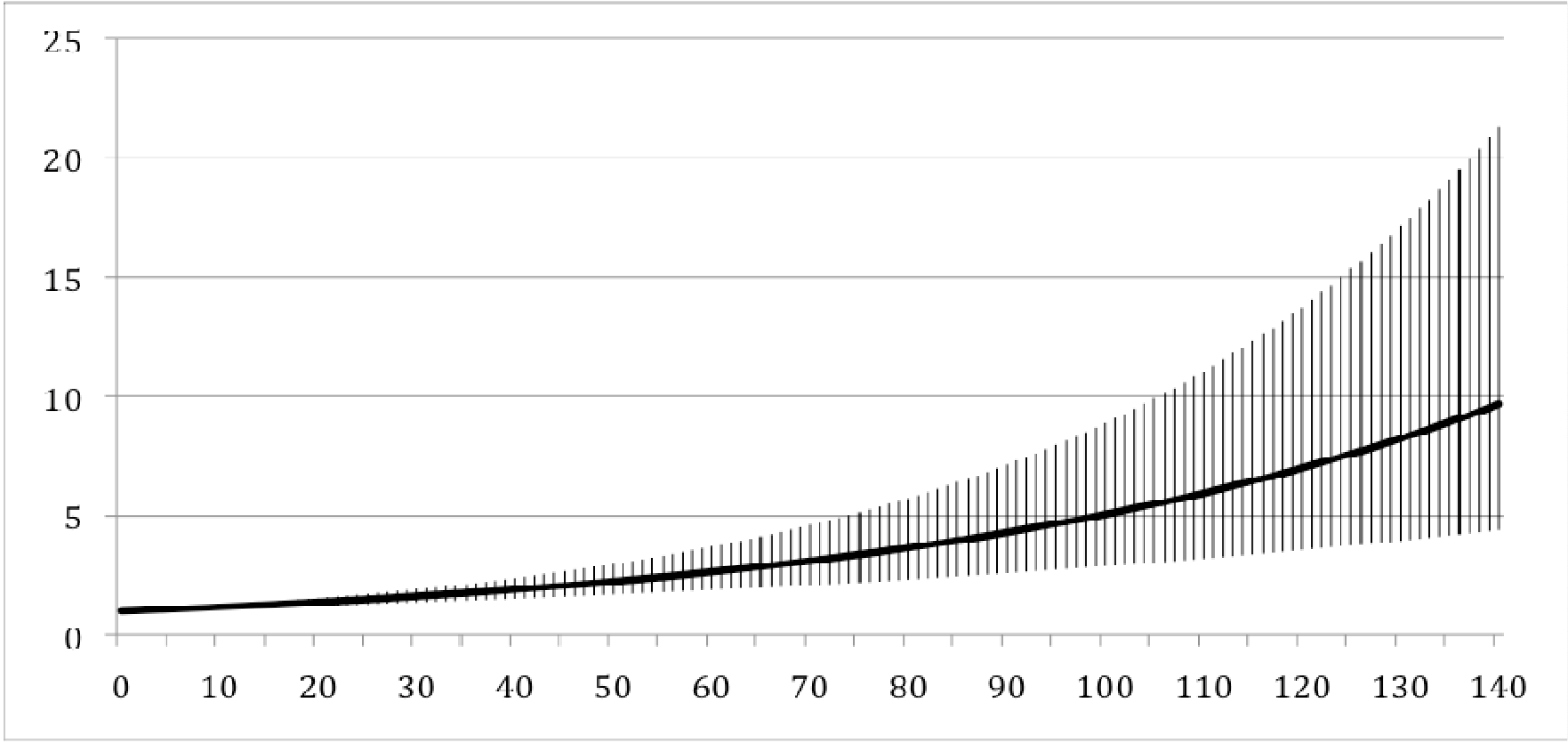


More systematic: meta-analysis



Forest plot for studies of motor vehicle accidents only and estimated relative risks associated with a 10 g/day increase in alcohol consumption: Estimates were derived from a random effects linear model.

Risk curve derived from meta-analysis



Dose-response curve for the amount of alcohol consumed 6 hours prior and the odds of motor vehicle accident injury

Effective countermeasures

But there are ways to reduce alcohol-attributable traffic injury

Evidence for a beneficial effect of no drinking up to 21 years of age BAC laws

- Reduction of up to 25% in the prevalence of self-reported driving after drinking among affected drivers in Ontario (Mann et al., 1997)
- Reduction of up to 40% in fatalities among affected drivers (Lacey et al, 2000)

Evidence supporting a .02% BAC

- Laboratory research clearly demonstrates significant impairment of driving skills at BACs of .02% and below (e.g., Moskowitz and Robinson, 1988)
- Lowering the legal limit from .05% to .02% in Sweden resulted in a reduction of 6% in total driver fatalities (Norstrőm, 1997) -> lives saved

Declines in drinking-driving behaviour in Ontario seen with introduction of specific drinking driving initiatives (Ialomiteanu et al, 2008)

Policy/law introduced:	*Significant declines seen in:*
▪ 1996/97-Administrative License Suspensions	▪ All drivers (but also specifically for females; young adults aged 18-29)
▪ 1998/99-Remedial Measures Program; increased suspensions for multiple offenders	▪ Drivers with less than high school education
▪ 2001-02-Ignition Interlock Program; Increased license suspensions	▪ All drivers (specifically males; drivers who have completed high school)

Thus:

- Alcohol prevention and alcohol policy can have immediate effects
- Burden in Italy can be reduced further with proven effective and cost-effective measures
- Italy should continue its efforts to reduce alcohol-attributable disease burden keep its low alcohol-attributable injury rates