EDCs Why we should be concerned

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Endocrine disrupters and child health

World Health Organization

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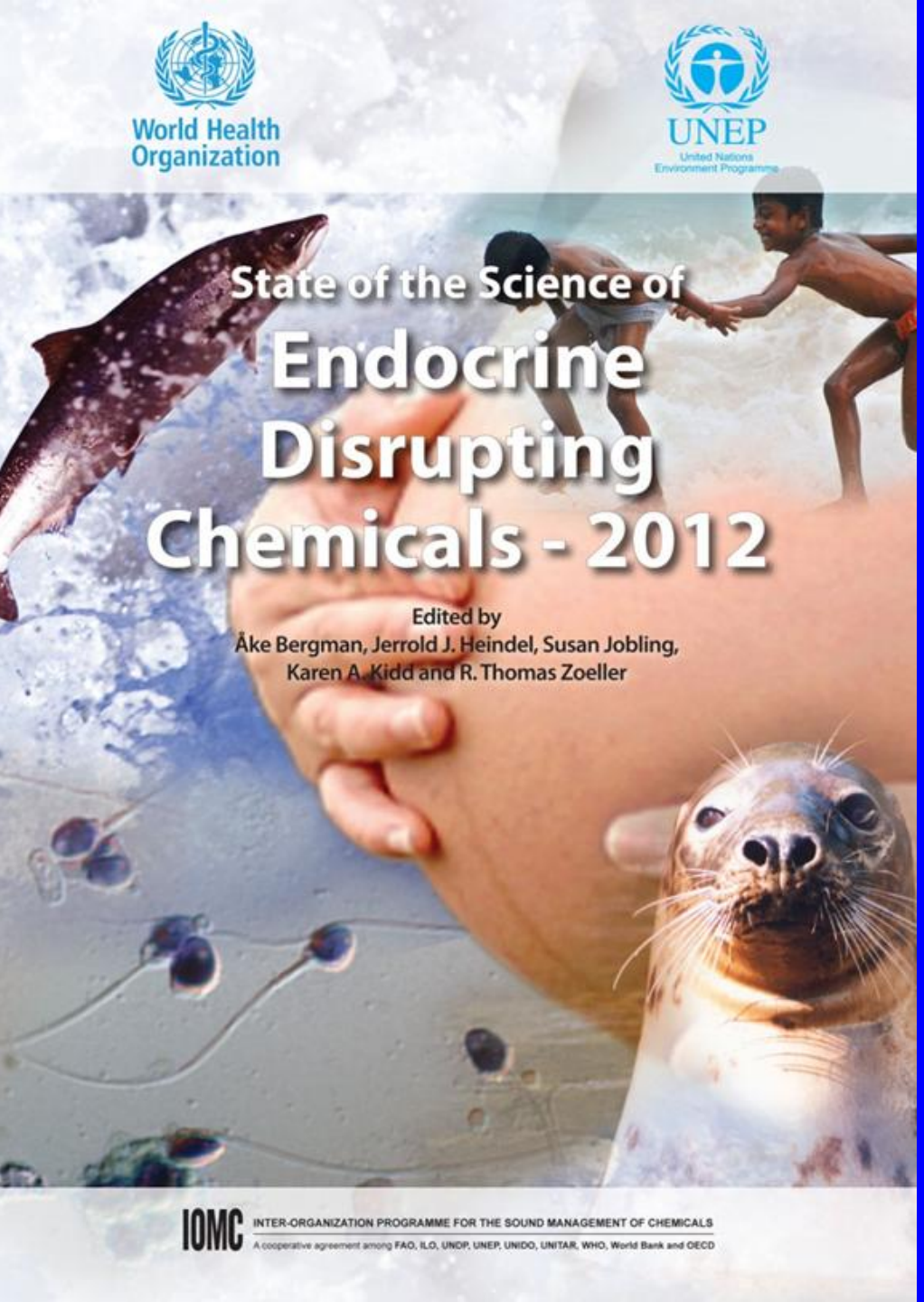

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Trends of male reproductive health related to development

- Cryptorchidism
- Hypospadias
- Semen quality
- Testicular cancer

Carlsen et al. 1992

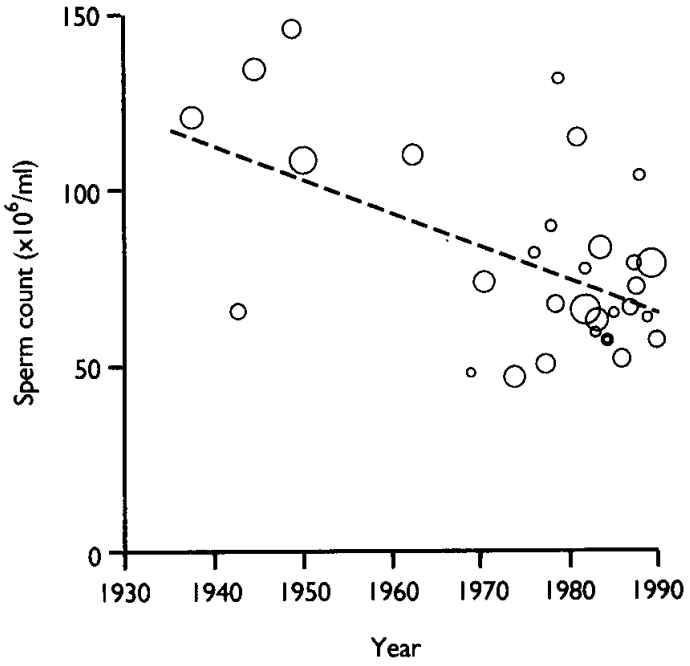


FIG 1—*Linear regression of mean sperm density reported in 61 publications (represented by circles whose area is proportional to the logarithm of the number of subjects in study) each weighted according to number of subjects, 1938-90*

Suominen & Vierula 1993

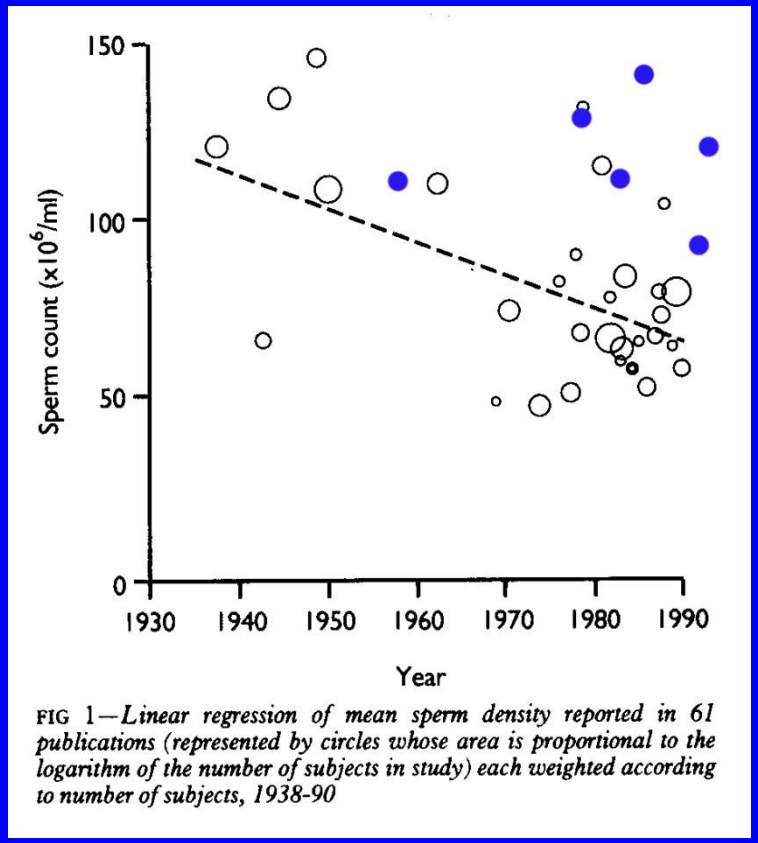
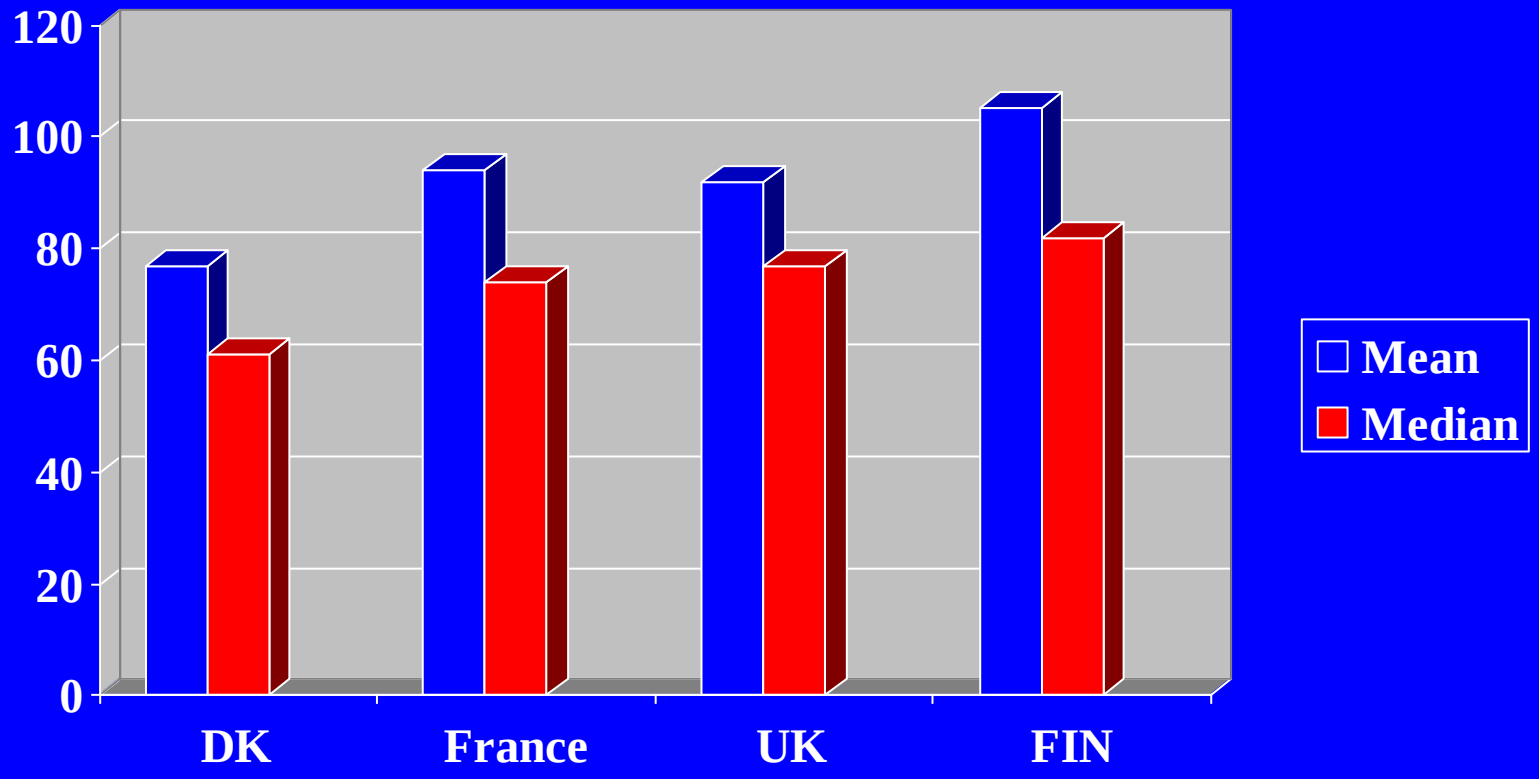


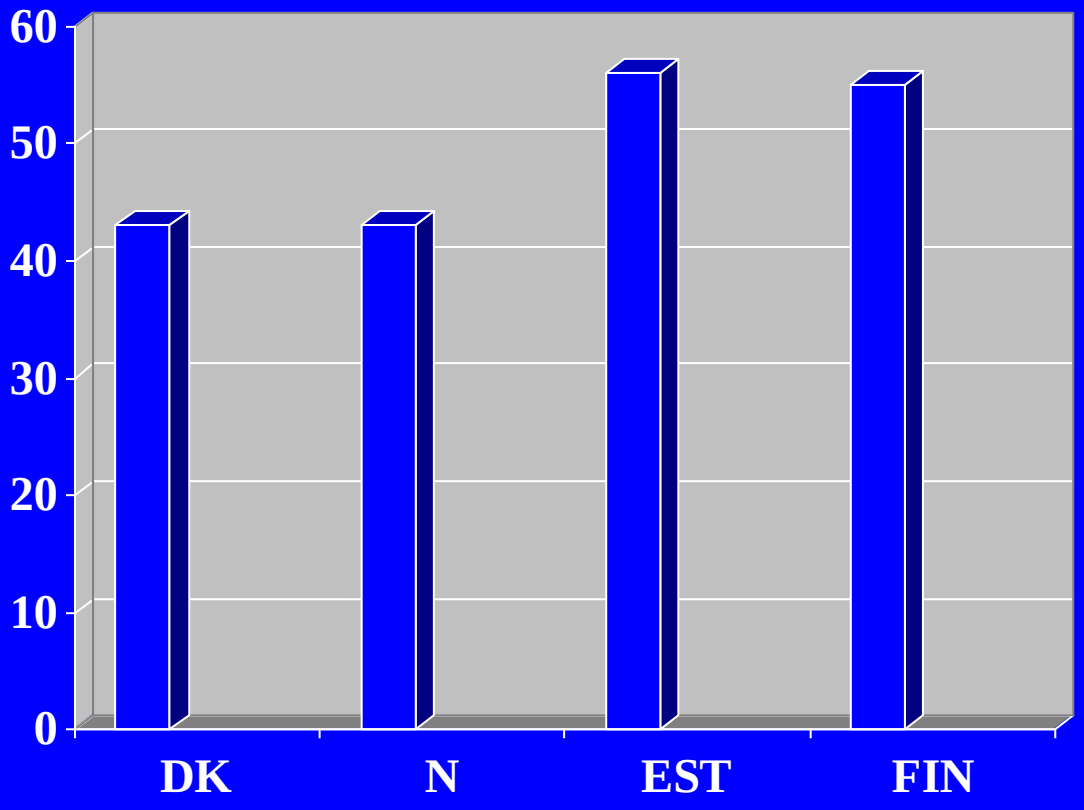
FIG 1—*Linear regression of mean sperm density reported in 61 publications (represented by circles whose area is proportional to the logarithm of the number of subjects in study) each weighted according to number of subjects, 1938-90*

Sperm concentration (million/ml)



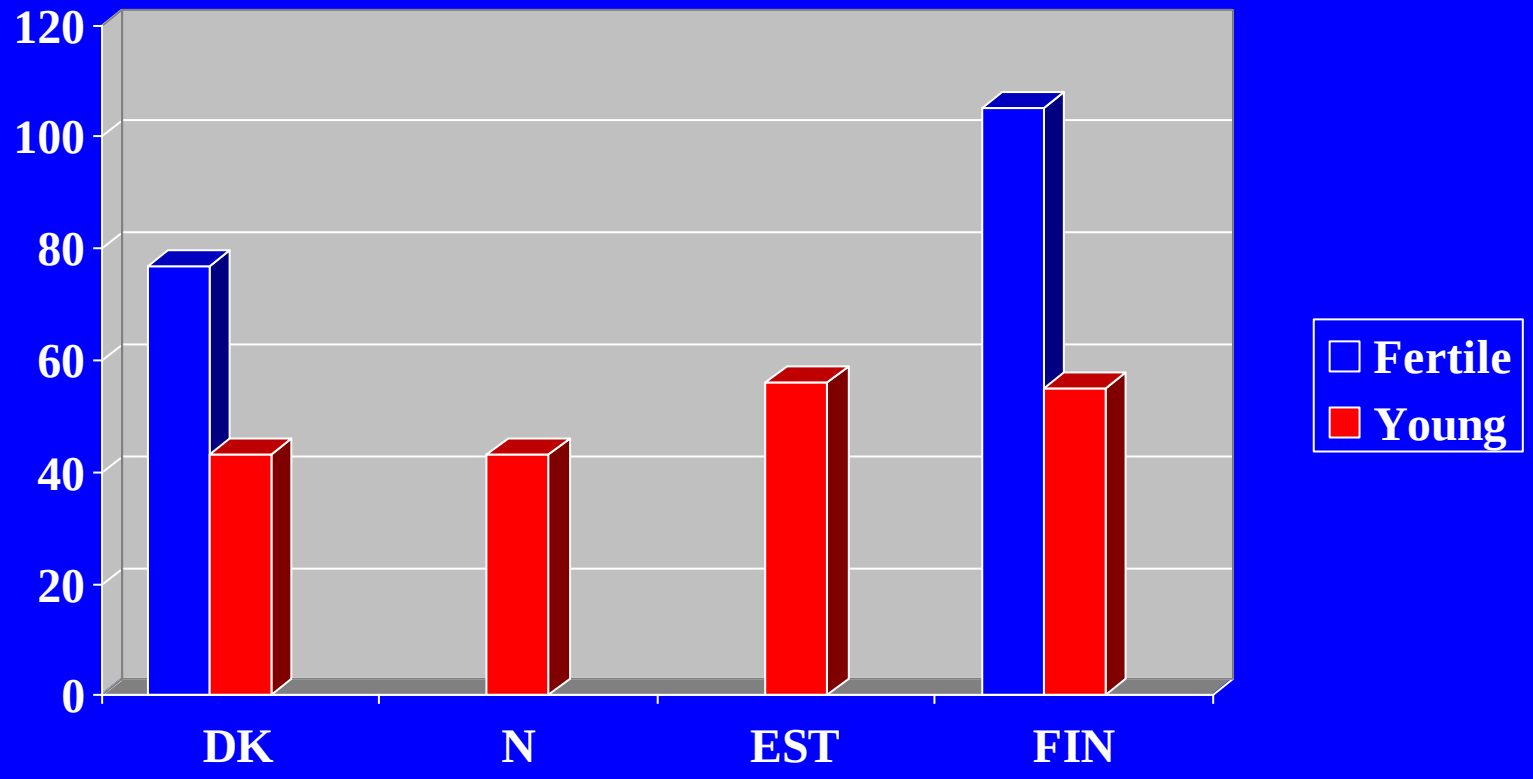
Jørgensen et al. Hum. Reprod. 2001

Sperm concentration (million/ml)



Jørgensen et al., Hum. Reprod. 17:2199, 2002

Sperm concentration (million/ml)



+Jørgensen et al. 2001, 2002

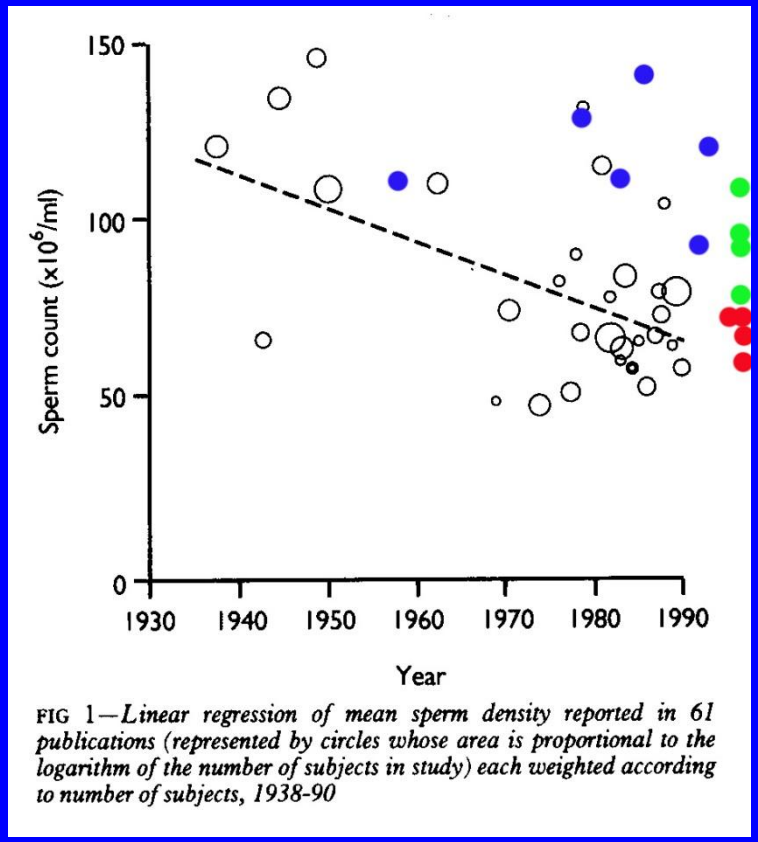
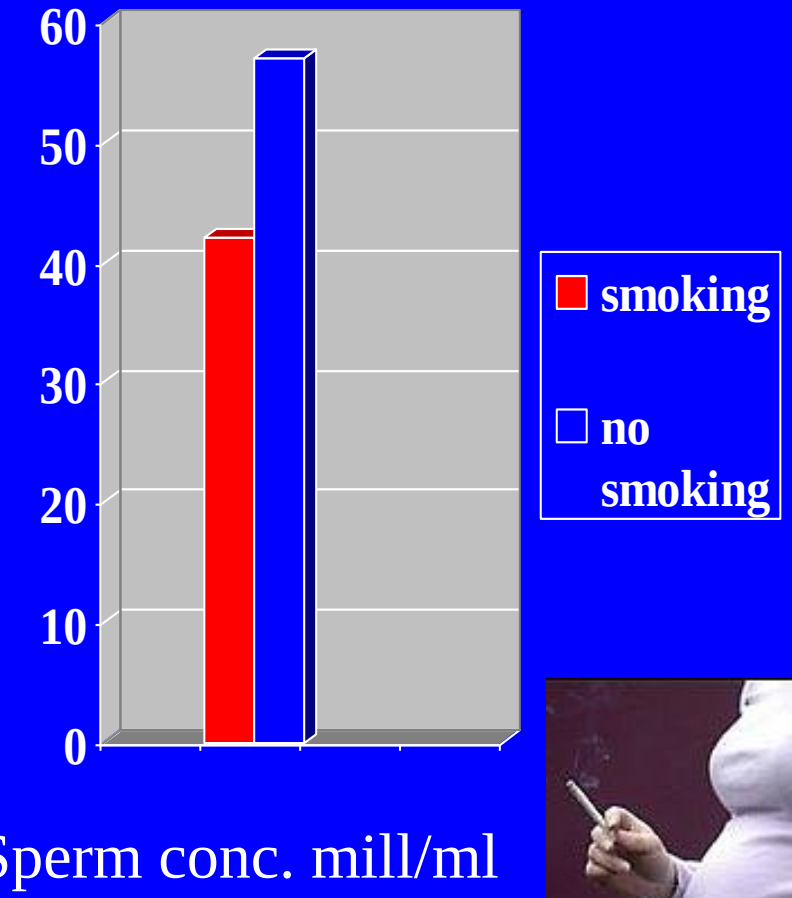


FIG 1—*Linear regression of mean sperm density reported in 61 publications (represented by circles whose area is proportional to the logarithm of the number of subjects in study) each weighted according to number of subjects, 1938-90*

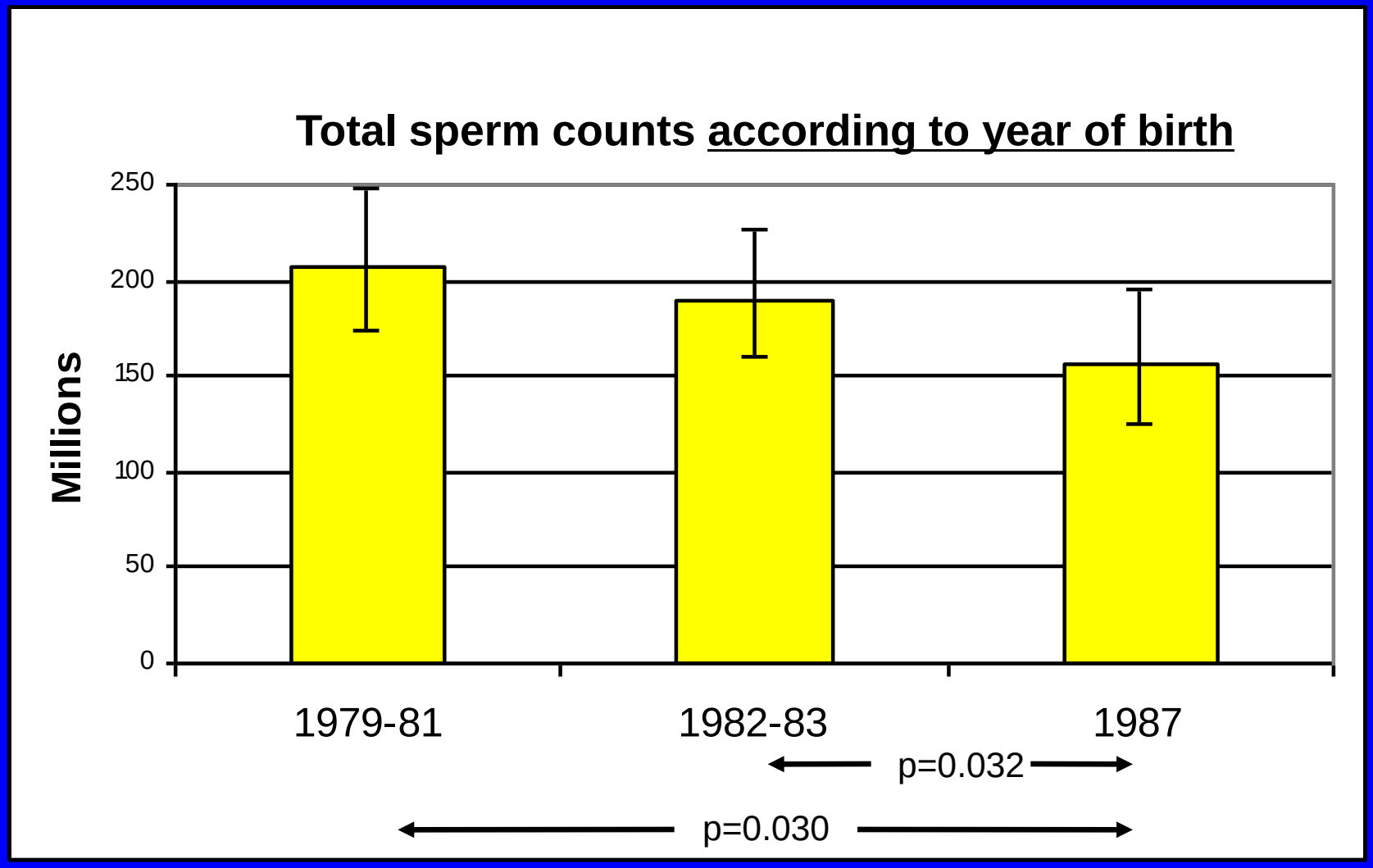
Intrauterine exposure to smoking

- 2069 young men around Baltic sea
- Data on maternal smoking during pregnancy
- Semen analysis



Jensen et al., Am. J. Epid. 2004

Young men from the Finnish general population

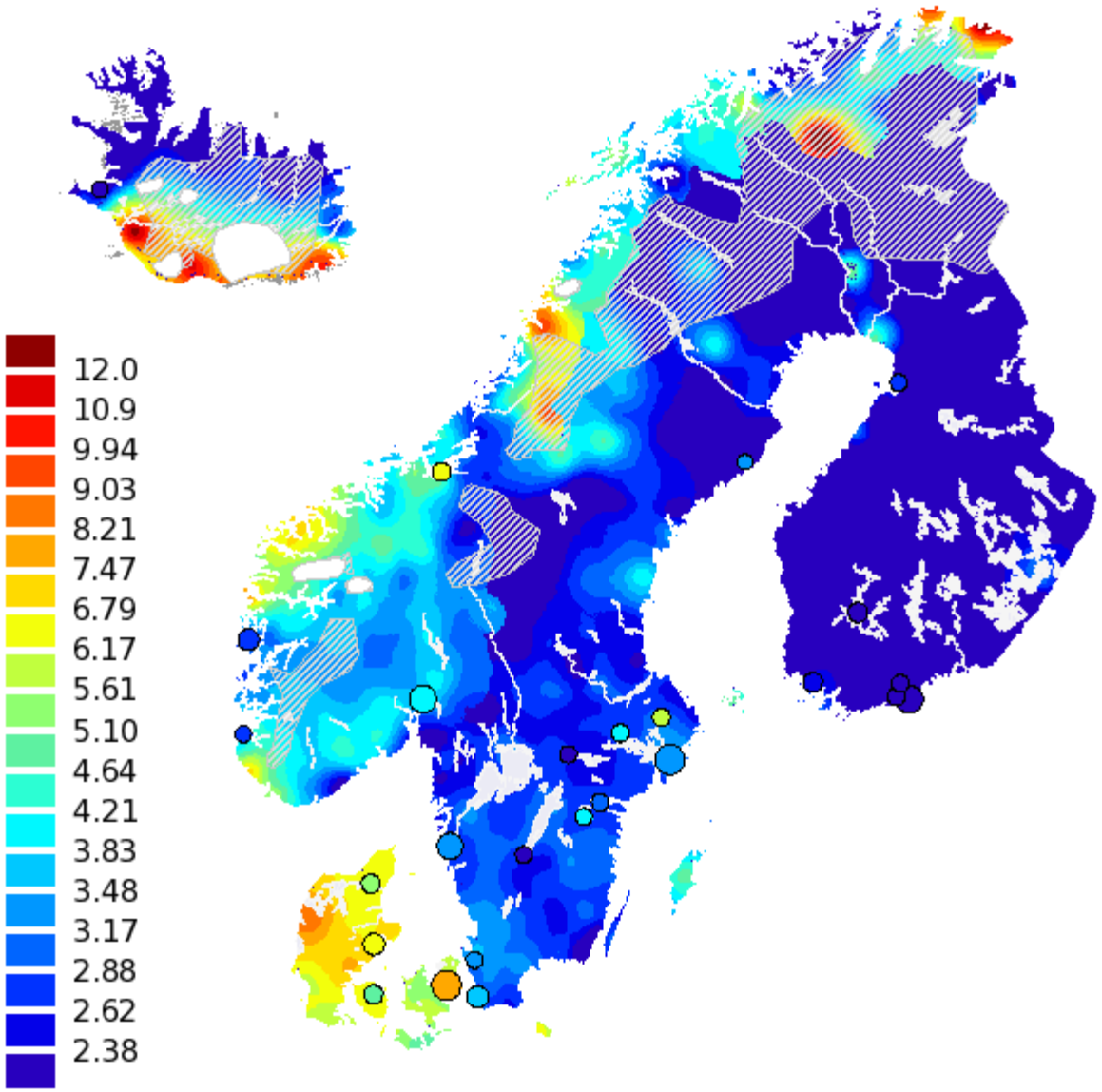


Adjusted for duration of ejaculation abstinence

Jørgensen et al 2011, IJA

Testicular cancer, 1970-1976

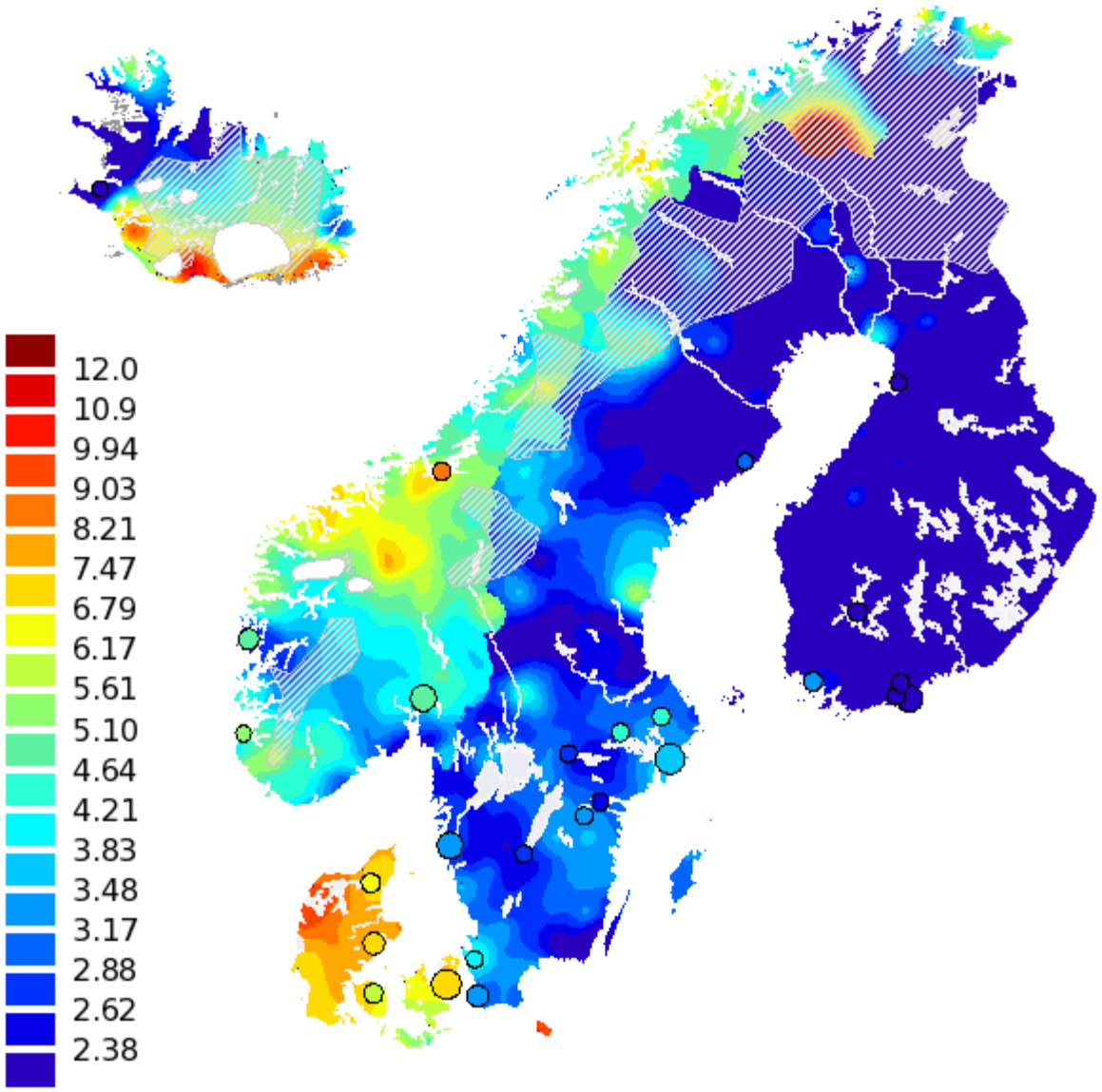
Incidence / 100,000.



Finnish Cancer Registry 21.06.2007

Testicular cancer, 1974-1979

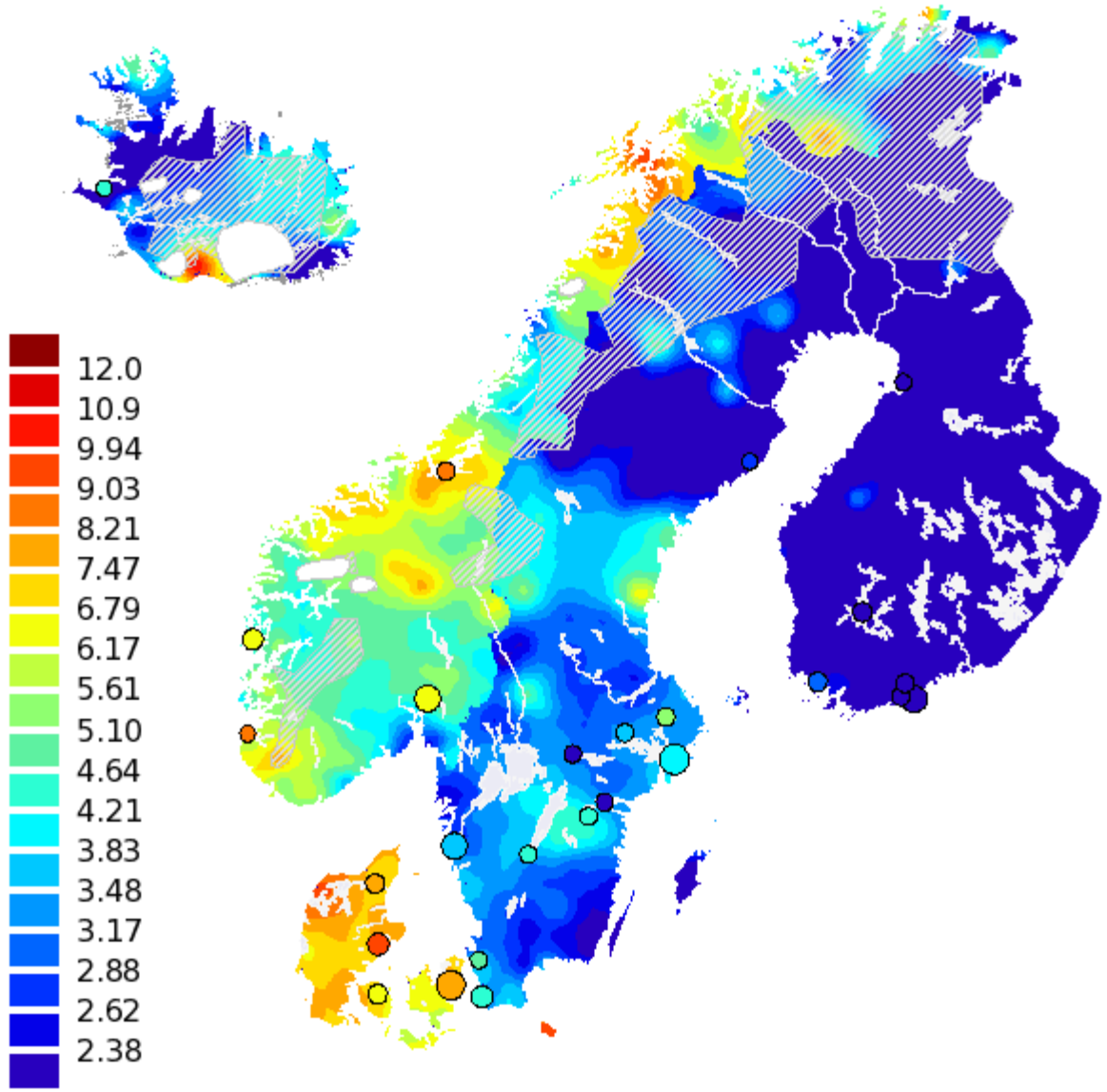
Incidence / 100,000.



Finnish Cancer Registry 21.06.2007

Testicular cancer, 1977-1982

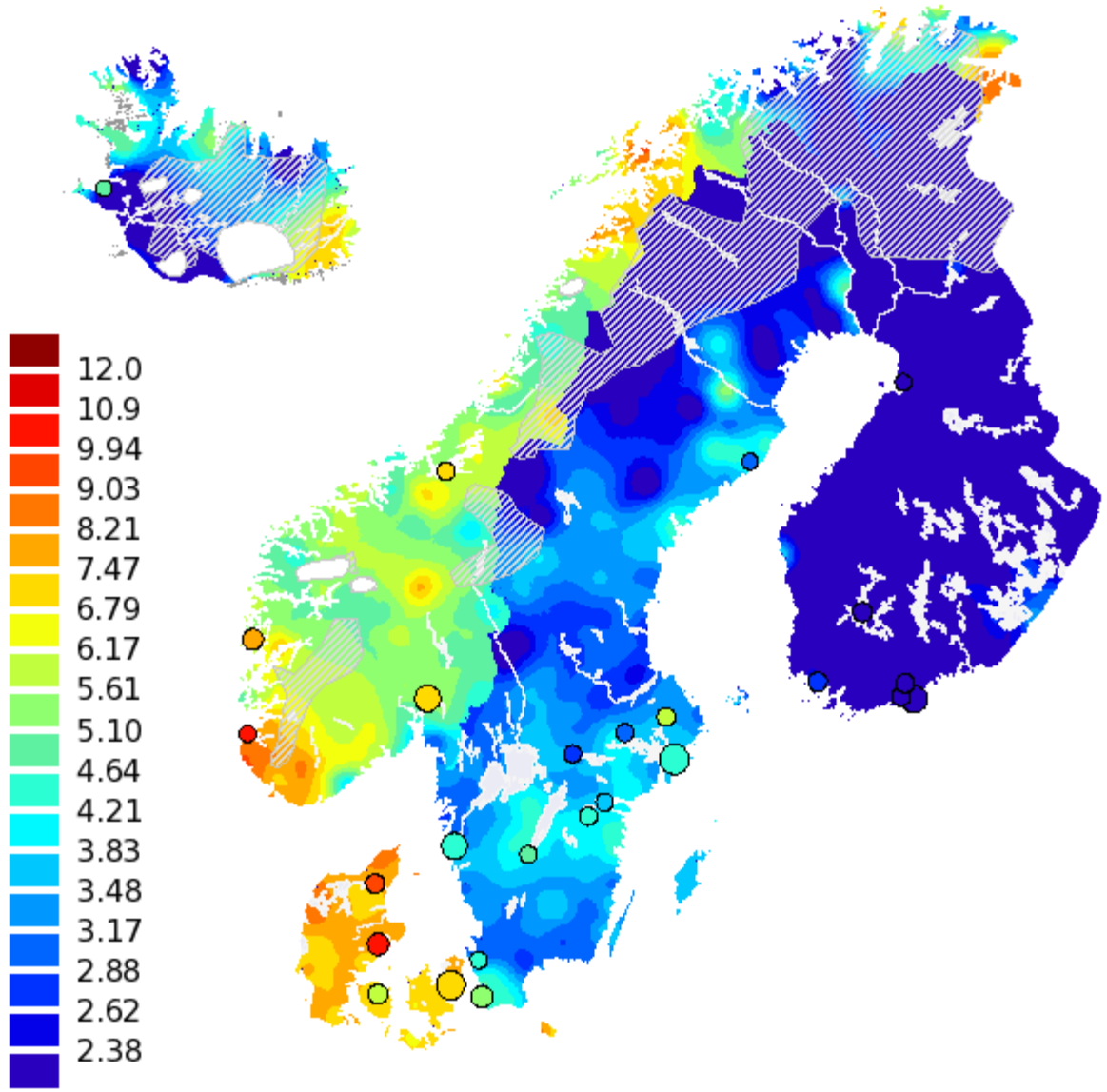
Incidence / 100,000.



Finnish Cancer Registry 21.06.2007

Testicular cancer, 1980-1985

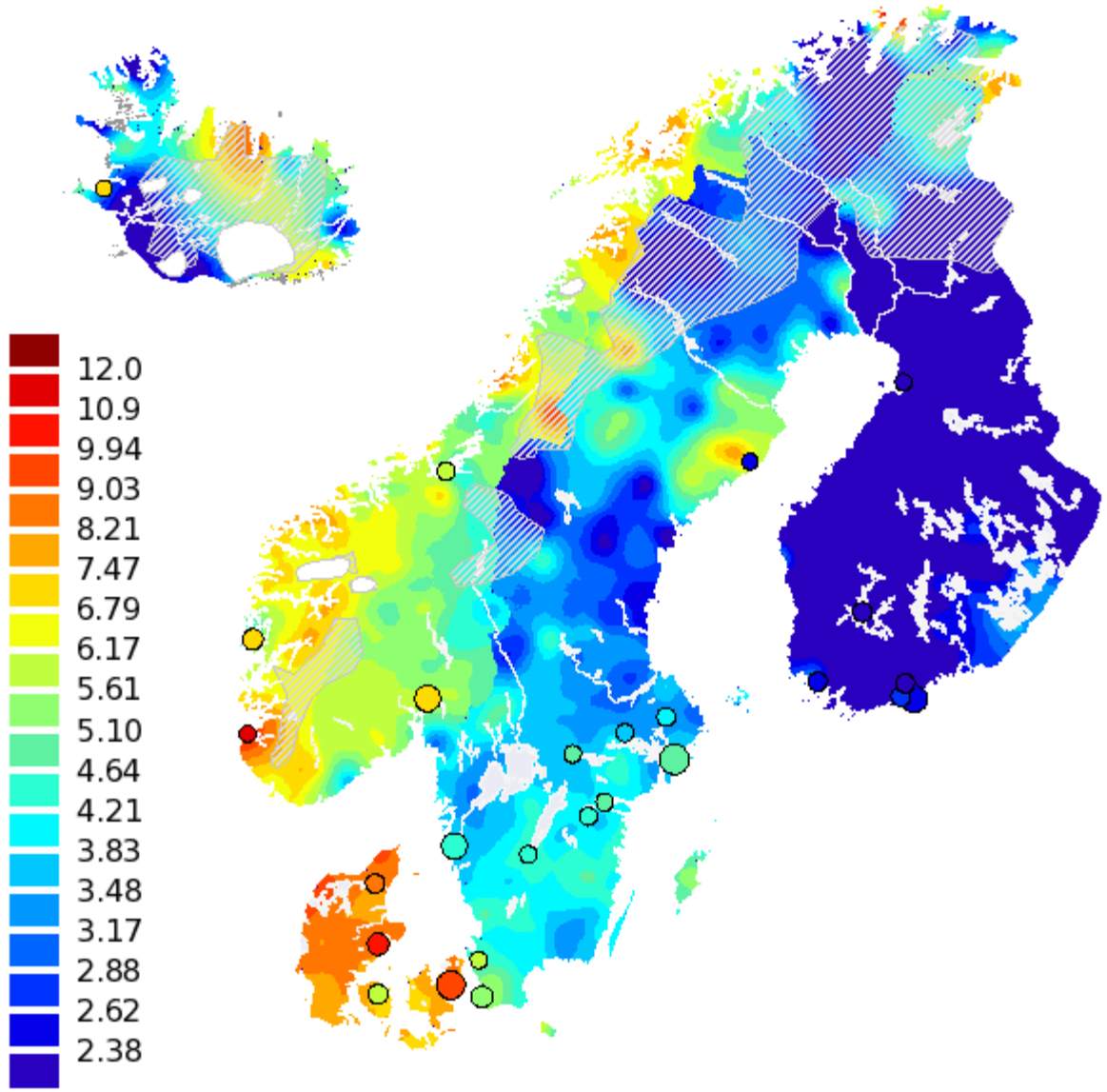
Incidence / 100,000.



Finnish Cancer Registry 21.06.2007

Testicular cancer, 1983-1988

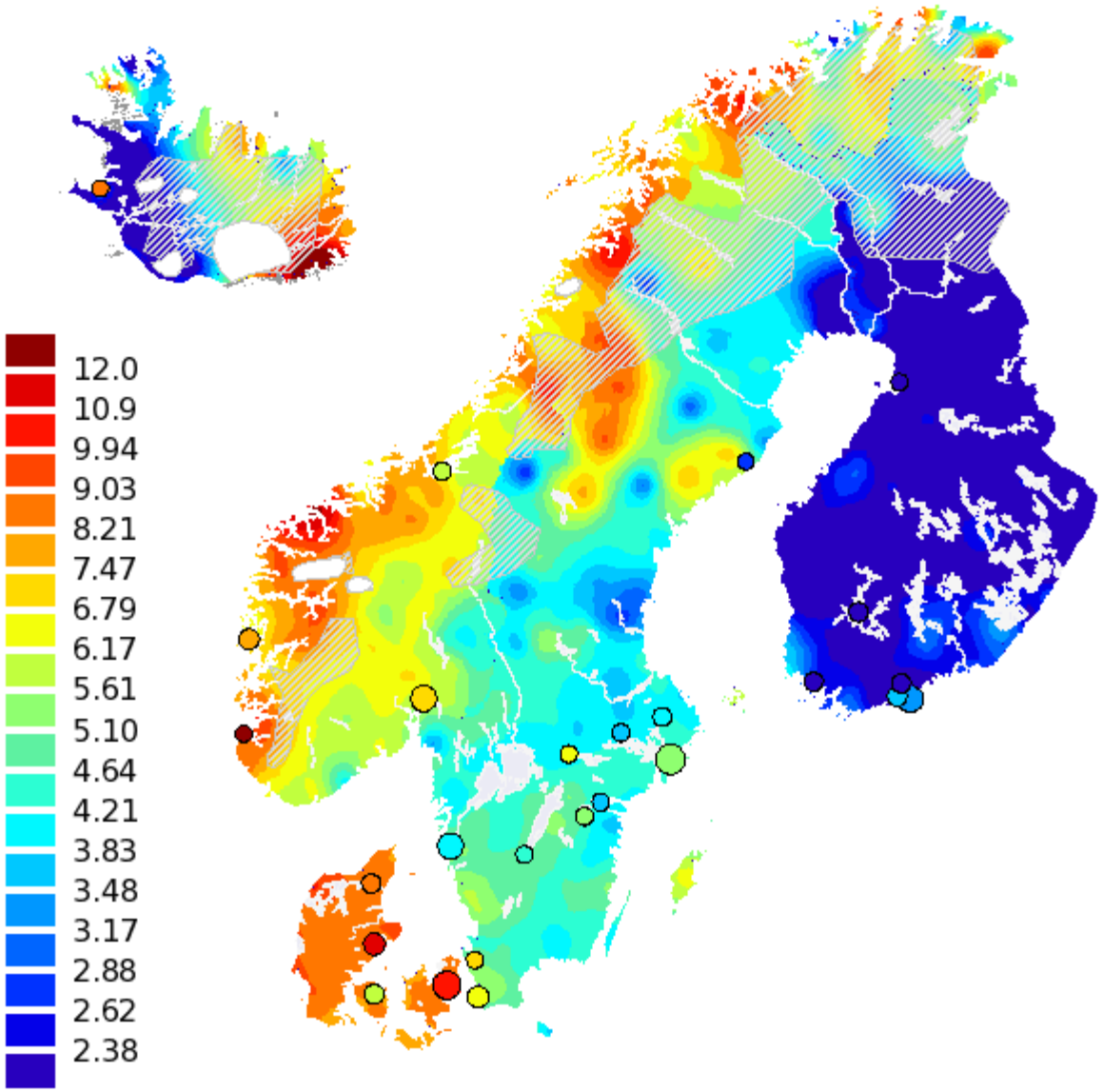
Incidence / 100,000.



Finnish Cancer Registry 21.06.2007

Testicular cancer, 1986-1991

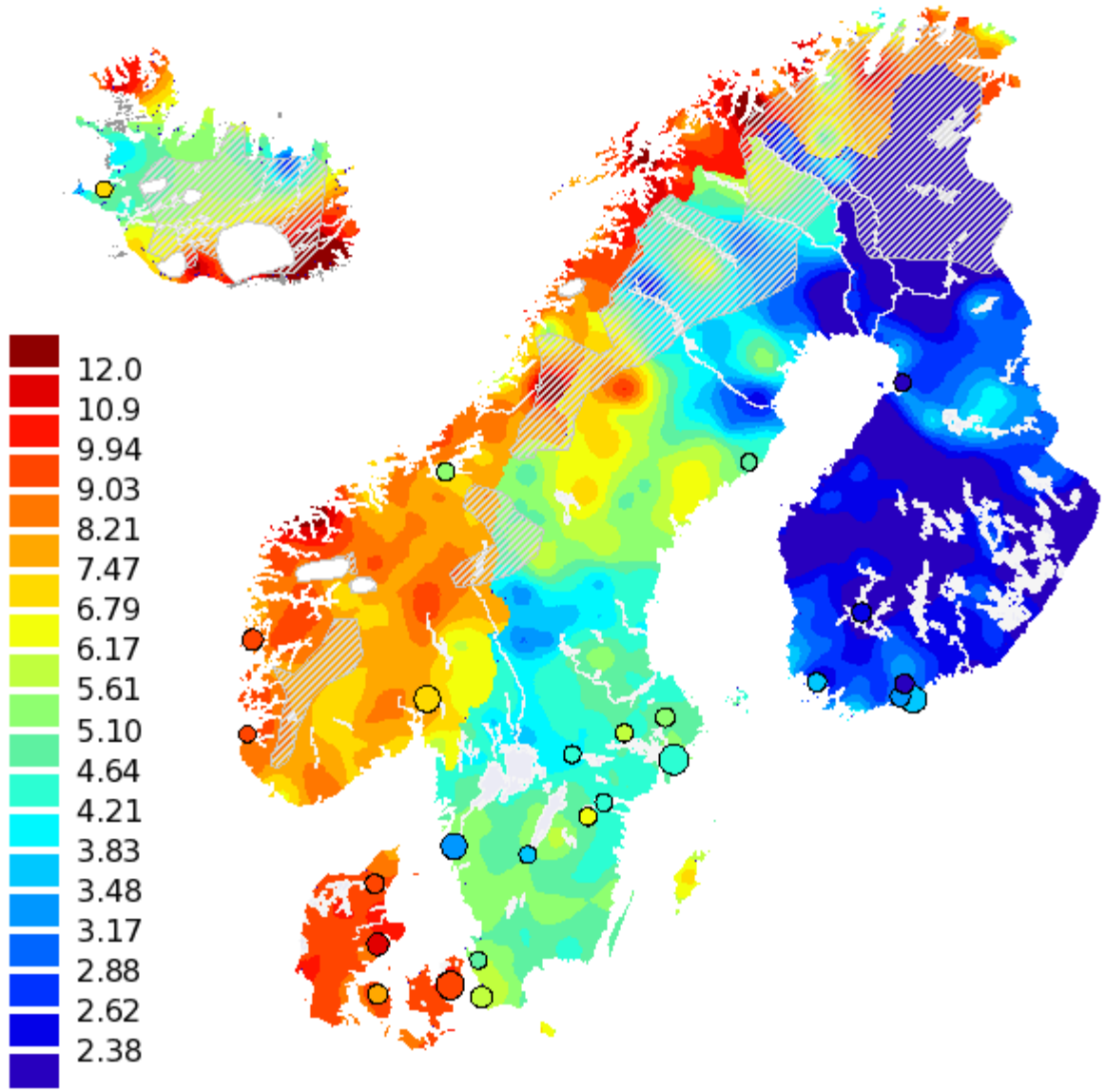
Incidence / 100,000.



Finnish Cancer Registry 21.06.2007

Testicular cancer, 1989-1994

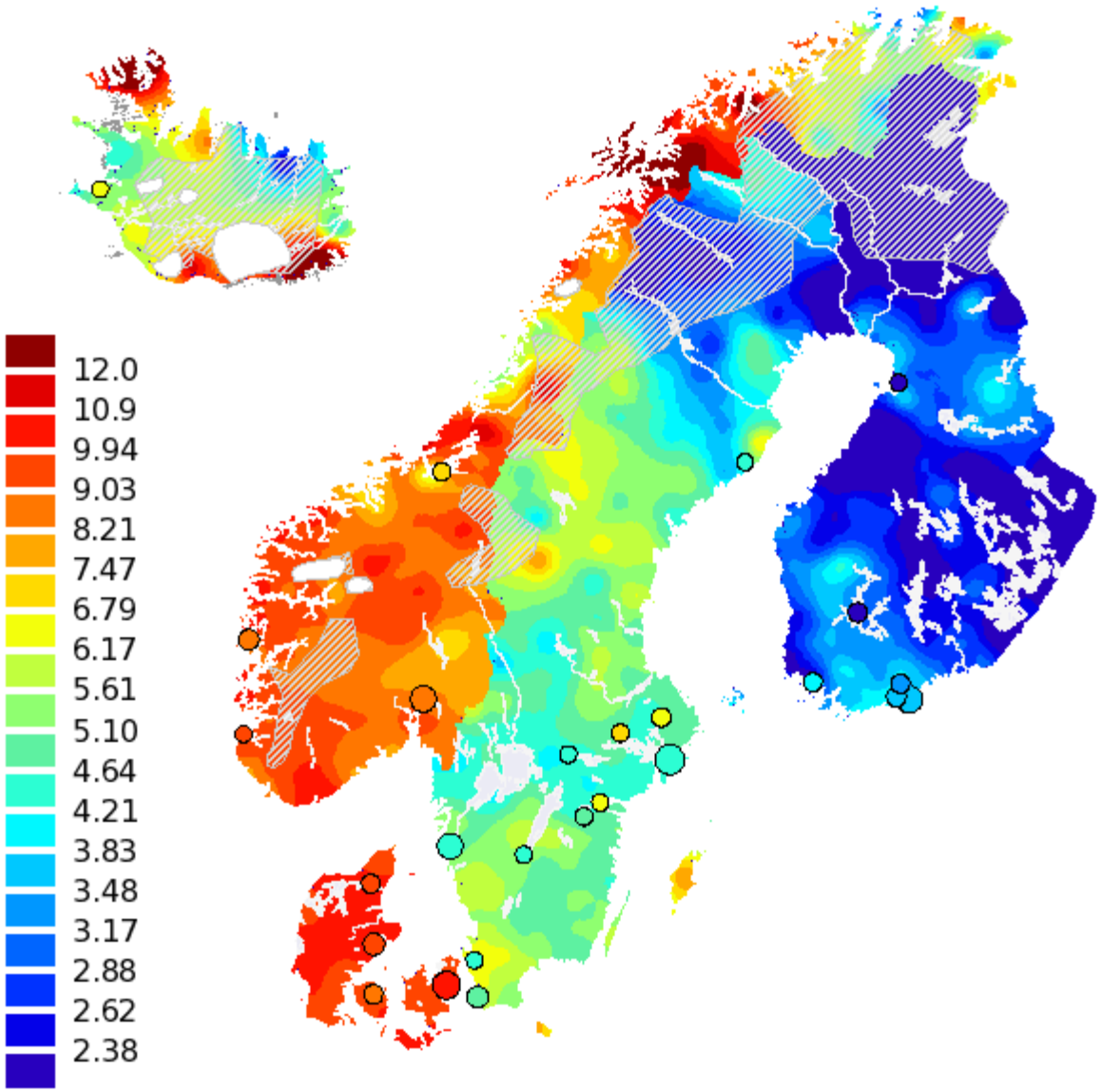
Incidence / 100,000.



Finnish Cancer Registry 21.06.2007

Testicular cancer, 1992-1997

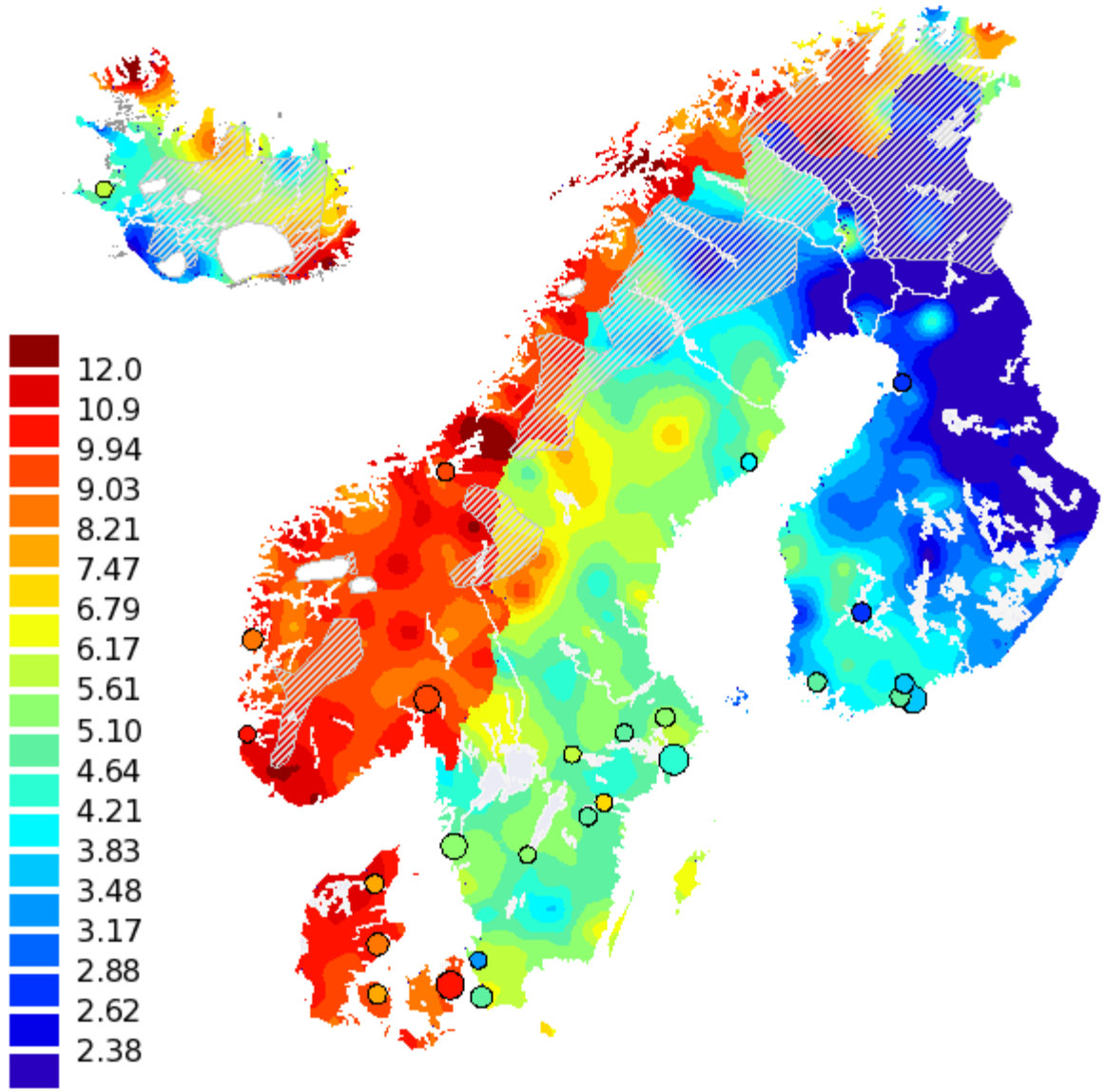
Incidence / 100,000.



Finnish Cancer Registry 21.06.2007

Testicular cancer, 1995-2000

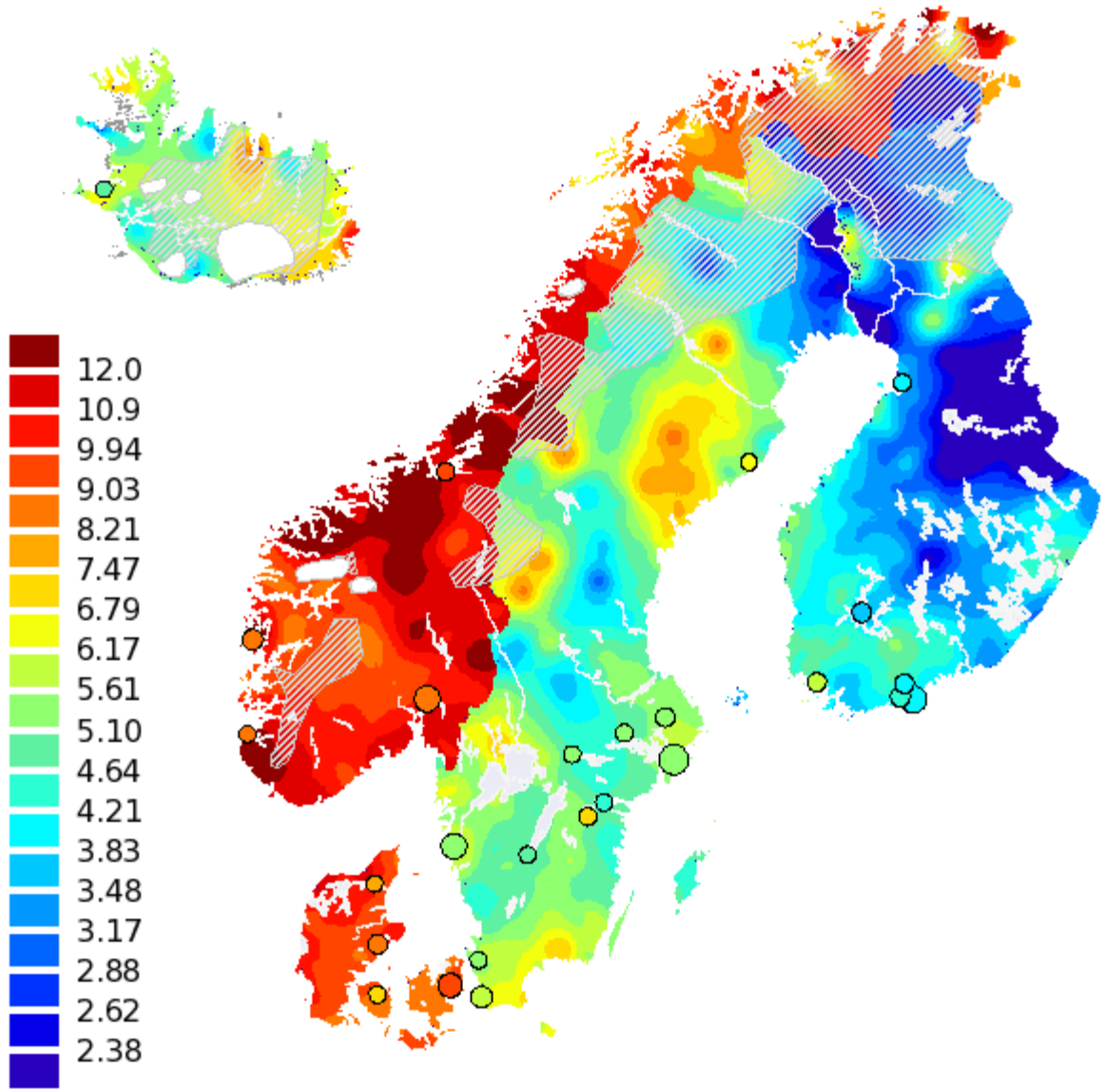
Incidence / 100,000.



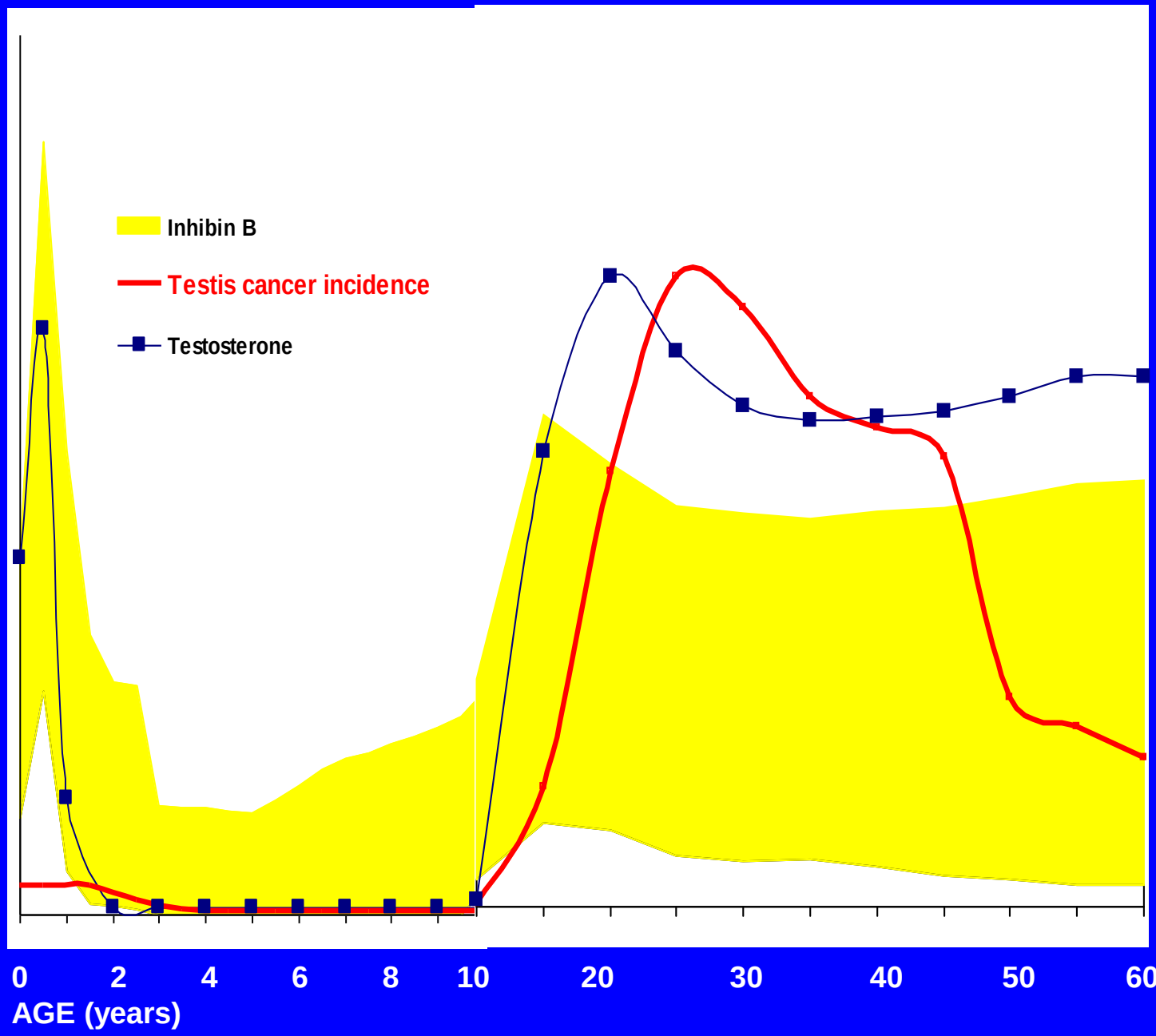
Finnish Cancer Registry 21.06.2007

Testicular cancer, 1998-2003

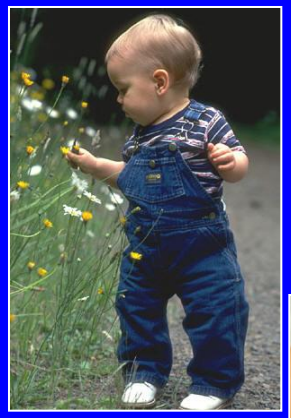
Incidence / 100,000.



Finnish Cancer Registry 21.06.2007


Inhibin B
Testis cancer incidence
Testosterone
0
2
4
6
8
10
20
30
40
50
60
AGE (years)

1997-2001



4957 families
2562 boys

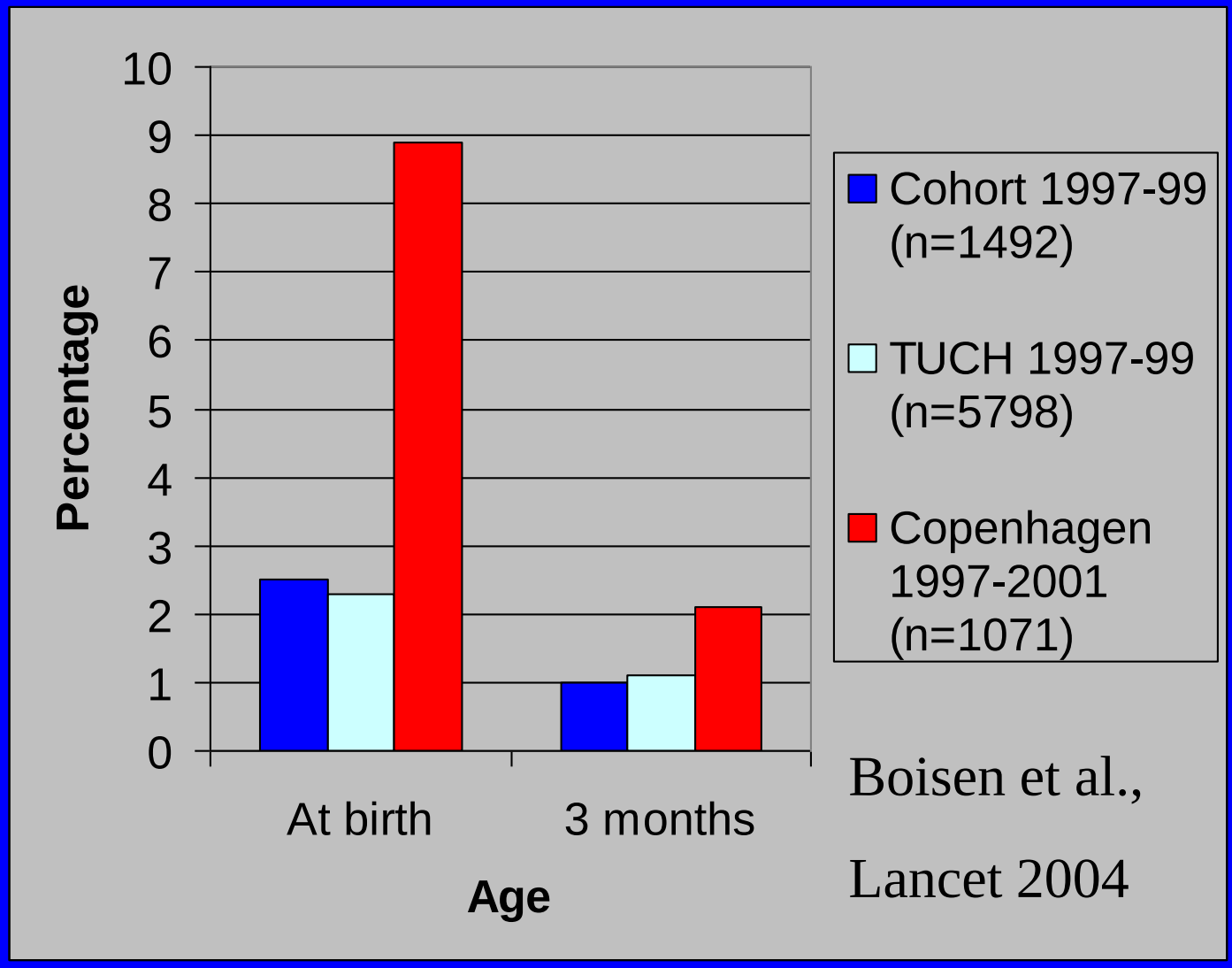
2006-2007

2008 - Katharina Main

Cryptorchidism

- The most common congenital malformation of newborn boys

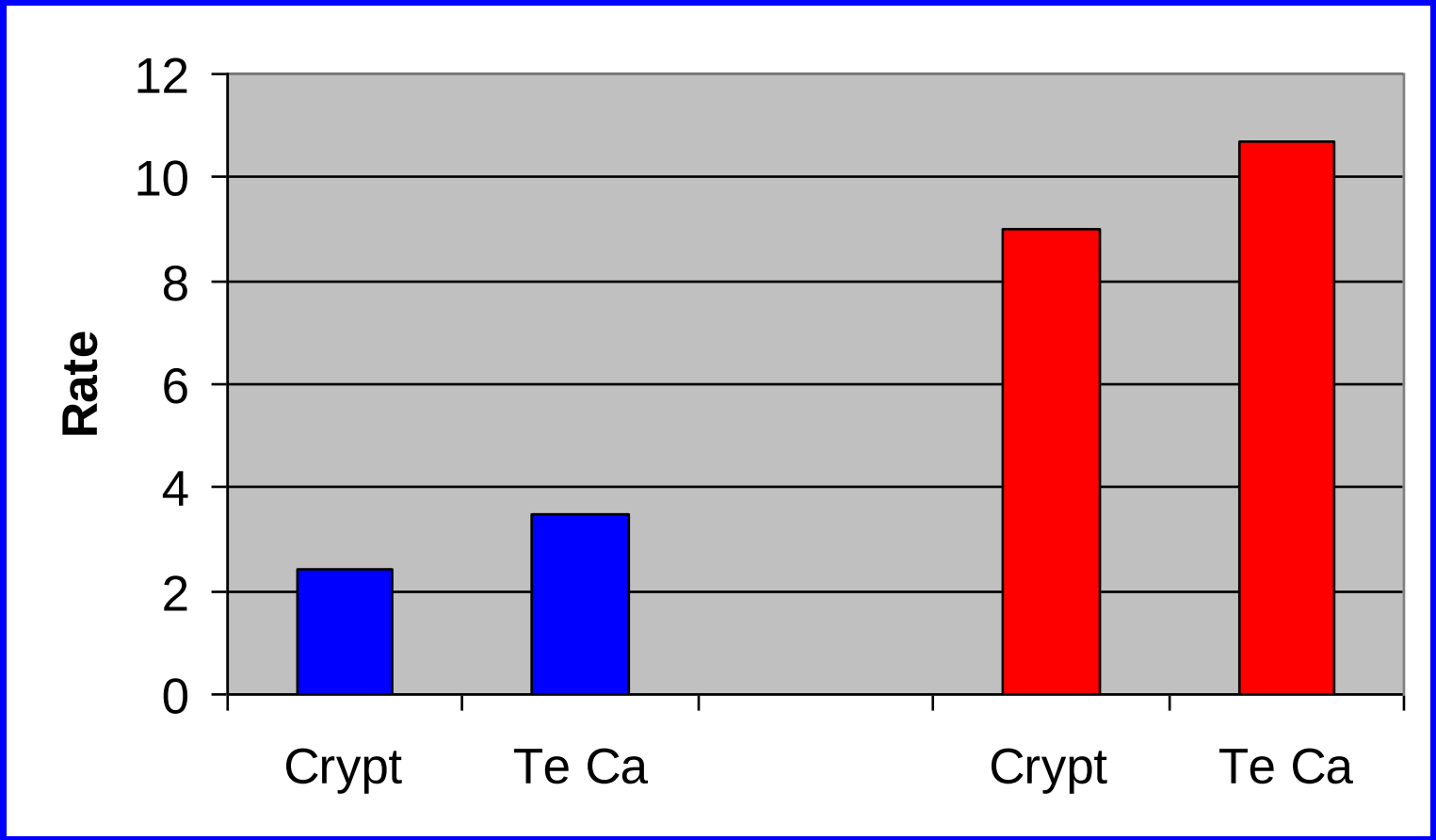
Prevalence of cryptorchidism



Boisen et al.,

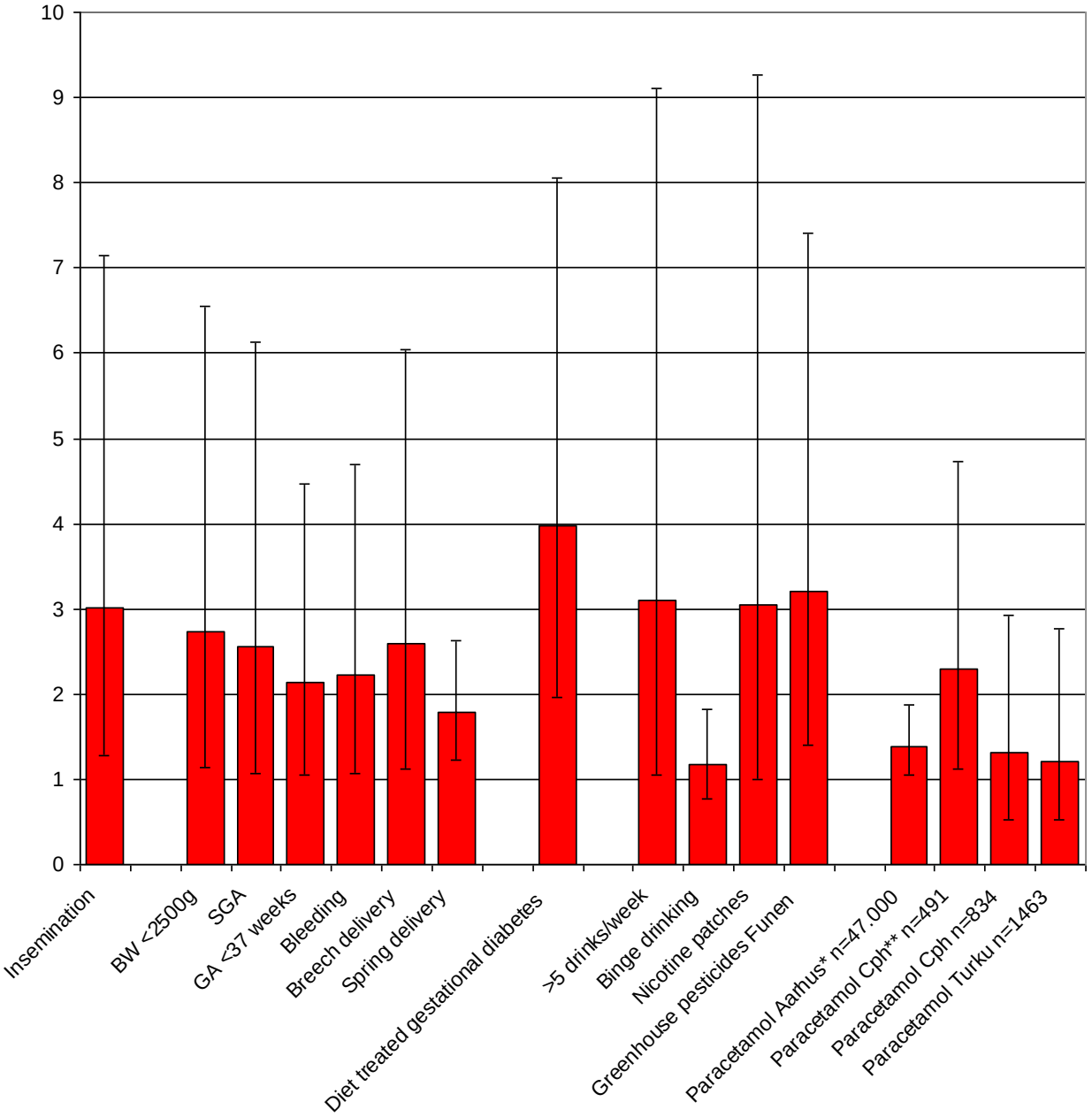
Lancet 2004

Incidence of cryptorchidism (%) and testicular cancer (n/100 000) in Finland and Denmark



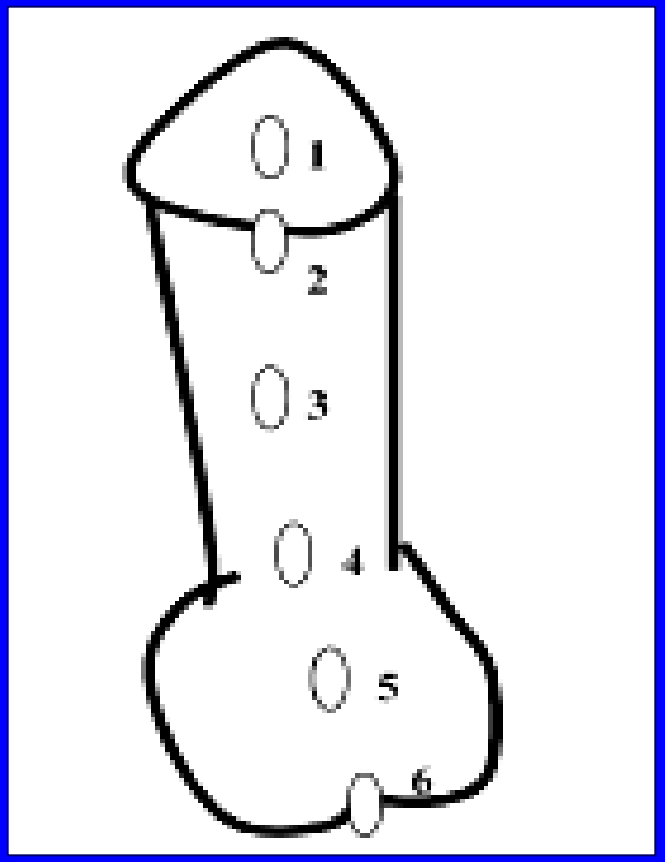
Cryptorchidism data from Boisen et al., Lancet 2004;
Cancer data from WHO/IARC 1998

Adjusted OR's and confidence intervals
(* use > 4 weeks GA 8-14, ** use > 2 weeks in 2nd trimester)

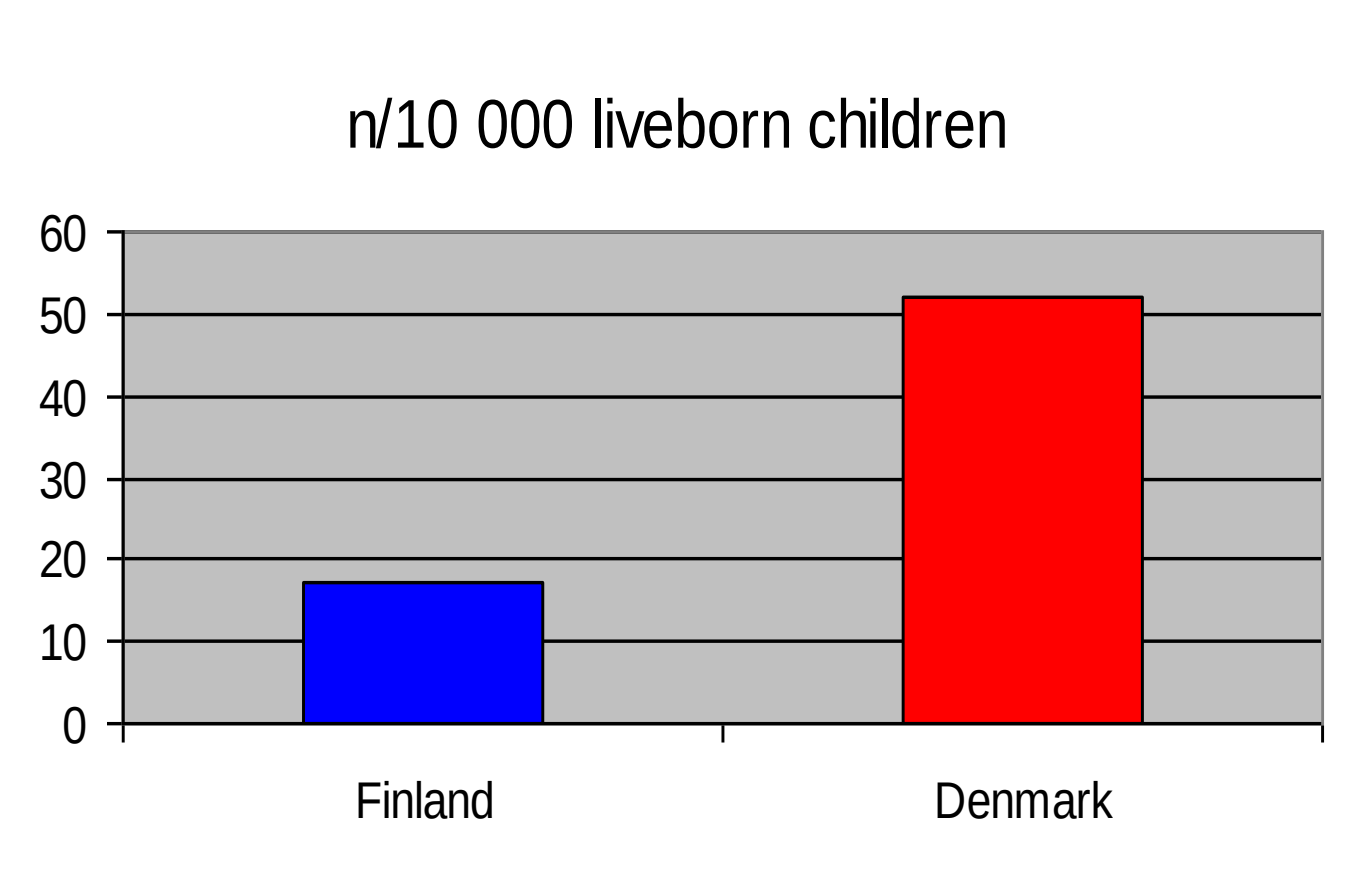


Main

Hypospadias



Prevalence of hypospadias in Finland and Denmark

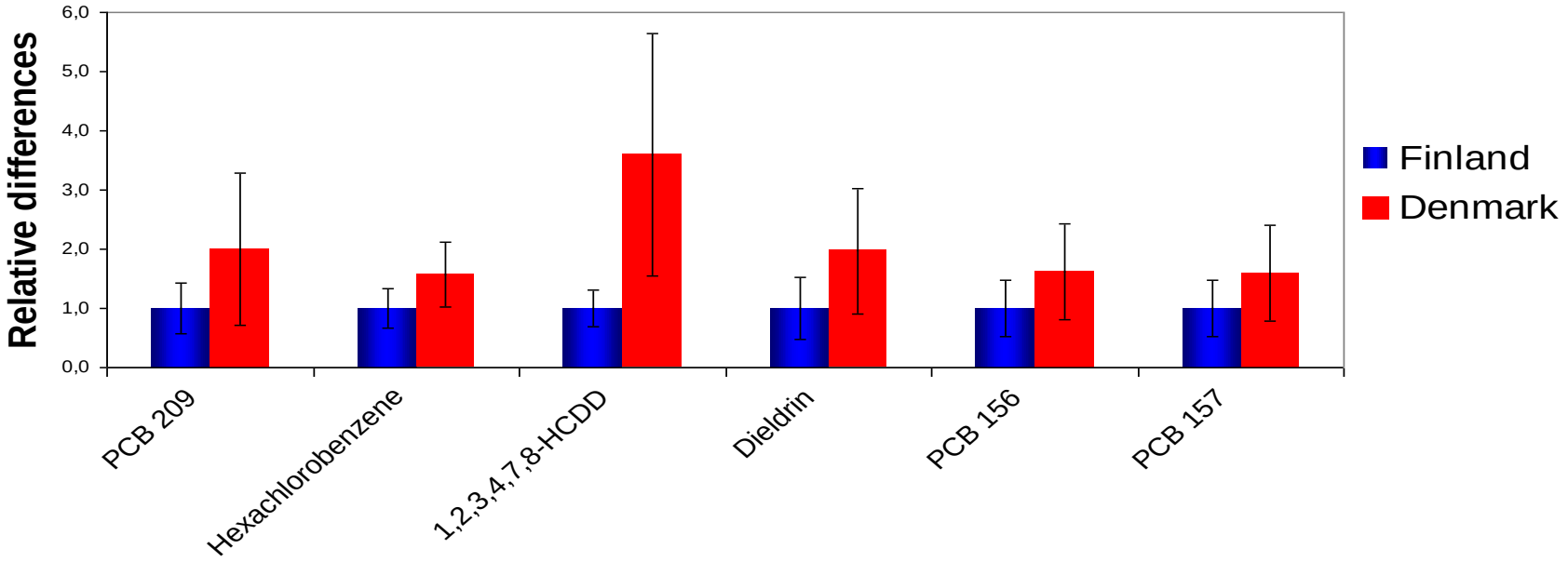


Boisen et al., JCEM 2005

Breast milk as a proxy for fetal exposures

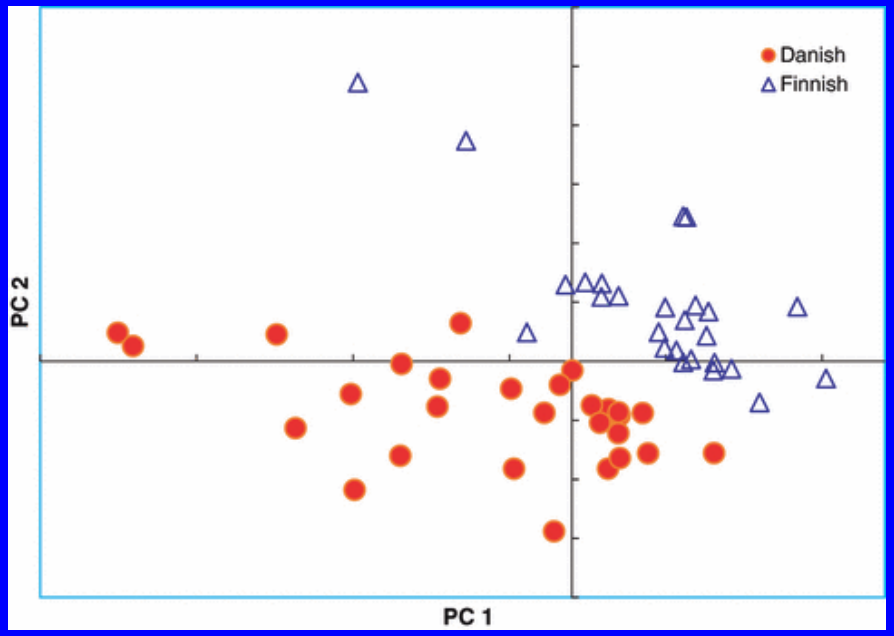
Breast milk (n=130)
non-persistant chemicals: 6 phthalate metabolites
Persistant chemicals:
polybrominated flame retardents (PBDEs), polychlorinated biphenyls (PCBs), dioxins and some polychlorinated pesticides

Six top significant chemicals of a total of 111 chemicals



Concentrations of 58 of 111 chemicals significantly higher in one country
54 of these 58 chemicals showed significantly higher levels in Denmark
Krysiak-Baltyn et al., Int J Androl. 2009 Sep 24.

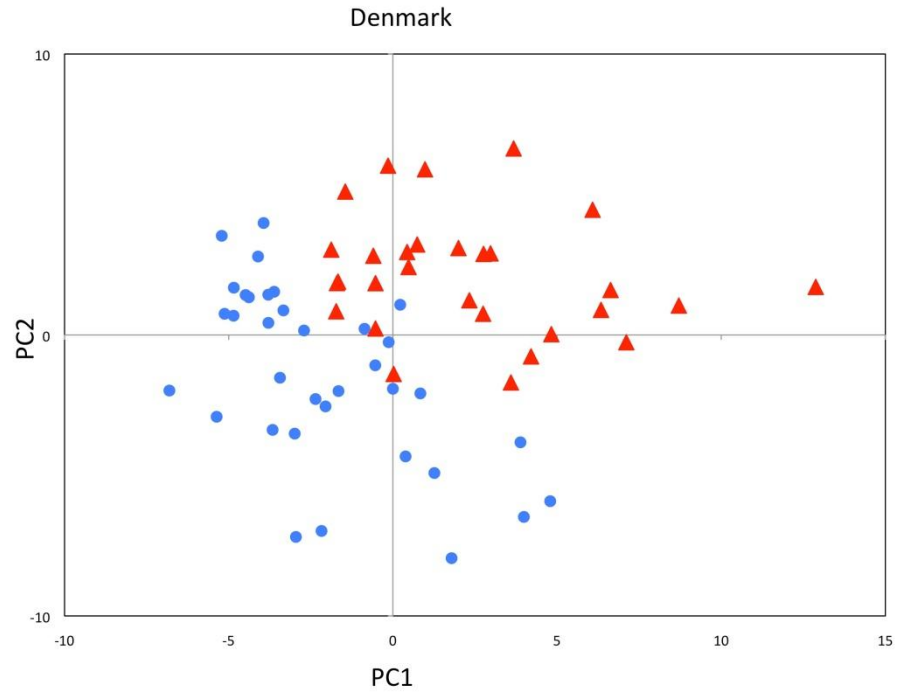
Country-specific chemical signatures of persistent environmental compounds in breast milk

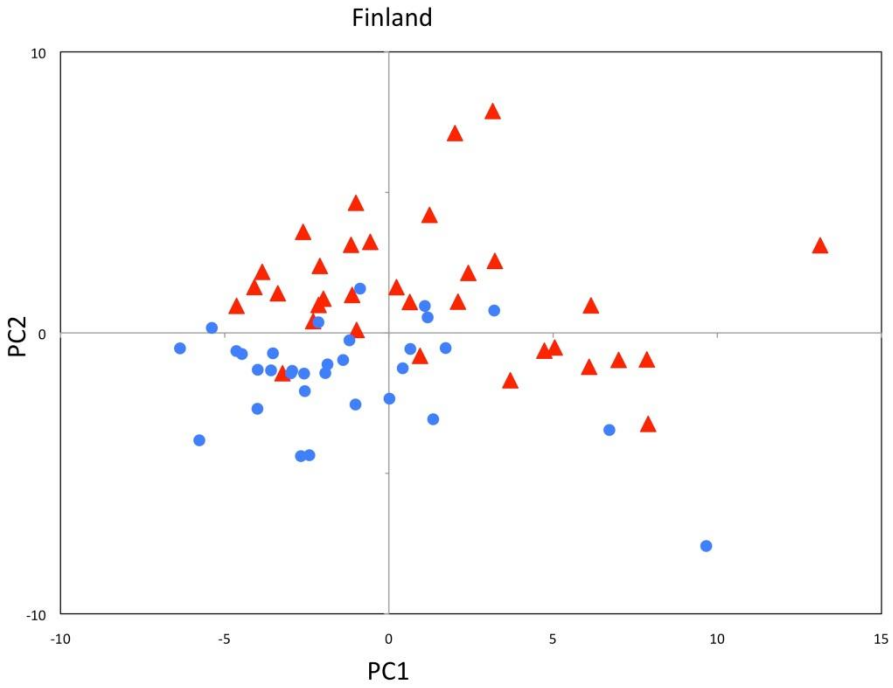


The top 10 most important chemicals in each of the two principal components are listed as follows:
PCI: 1,2,3,4,7,8-HCDD, PCB 209, PCB156, PCB 189, PCB 170, PCB 157, PCB 194,
PCB 180, o.p'-DDE, PCB 81.
PC2: 1,2,3,6,7,8-HCDD, 1,2,3,4,6,7,8-HepCDD, Mirex, 1,2,3,4,6,7,8-HepCDF, OCDD, PeBB, BDE-154,
1,2,3,4,7,8-HCDD, PCB 49, Octachlorostyrene.

International Journal of Andrology
Volume 33, Issue 2, pages 270-278, 24 SEP 2009 DOI: 10.1111/j.1365-2605.2009.00996.x
http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2605.2009.00996.x/full#f2

Scatter plots from the PLS (Partial Least Square): Danish and Finnish breast milk samples



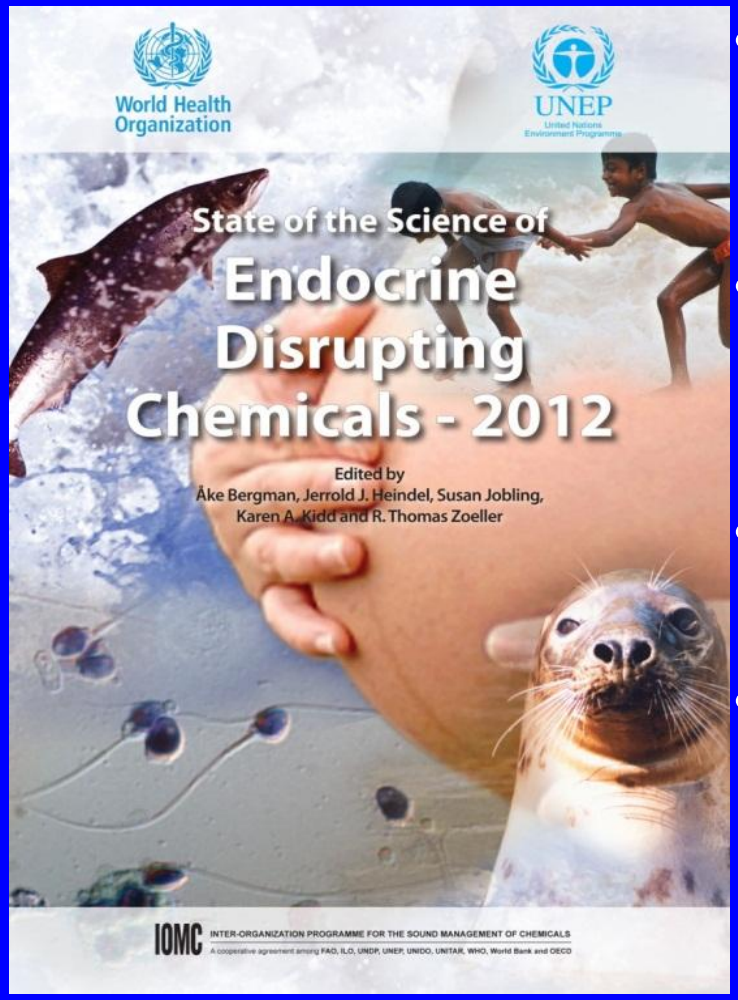


Healthy boy

Cryptorchid boy

Krysiak-Baltyn et al, IJA, in press

Summary: EDCs represent a Global Problem



- There are increasing trends for more diseases in more species in more countries.
- There are more data on more chemical exposures in humans and in wildlife.
- There are stronger data linking exposures to disease.
- Worldwide there has been a failure to adequately address the underlying environmental causes of trends in endocrine diseases and disorders.

Supporting Statements

- Endocrine Society, 2009, 2012
- CRO Forum on EDCs, 2012
- SAICM, Narobi, 2012
- Royal College of Obstetricians and Gynaecologists, 2013
- SAICM, Mexico City, 2013
- American Society for Reproductive Medicine/American Congress of Obstetricians and Gynecologists, 2013