Environment and Radiation (ENV)

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IARC's mission:
-coordinate and conduct research on the causes of human cancer
-develop scientific strategies for cancer prevention and control

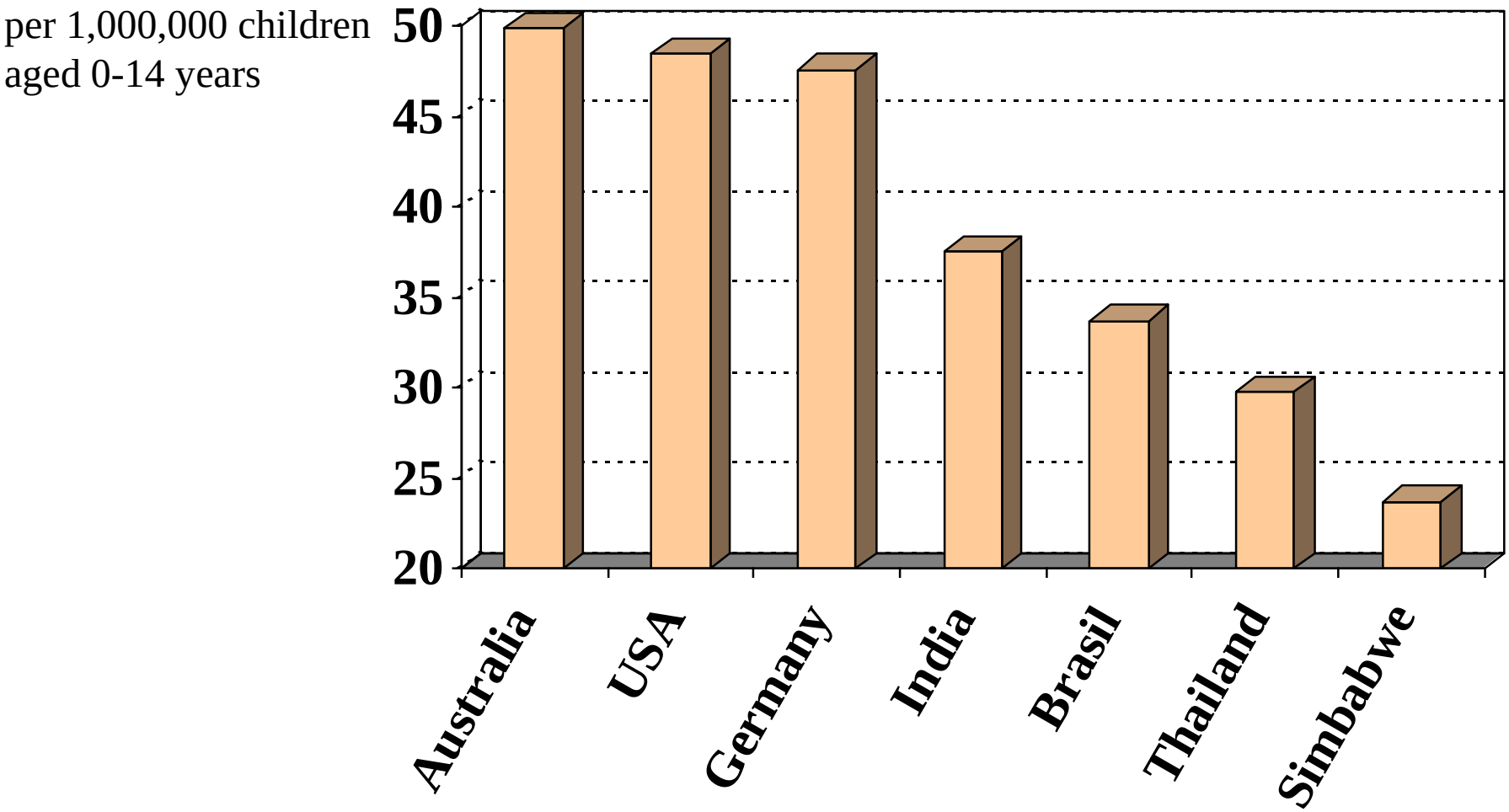
International Agency for Research on Cancer

World Health Organization

Research Areas - ENV

- Lifestyle
  - Tobacco
  - Drugs of abuse
  - Cancer-related
    - Breast
    - UDT
    - Testis
    - Brain
    - Childhood
- Pollutants
  - Chemicals
    - Pesticides
    - Asbestos
    - Soil, water, air
- Occupation
  - Workplace
    - Industries
    - Shift work
    - Lung cancer
- Radiation
  - Ionizing
    - Accidents
    - Occupation
    - Diagnostic
  - Non-Ionizing
    - Mobile phones
    - Power lines

Incidence rates – regional differences



Incidence of childhood leukemia in different regions of the world

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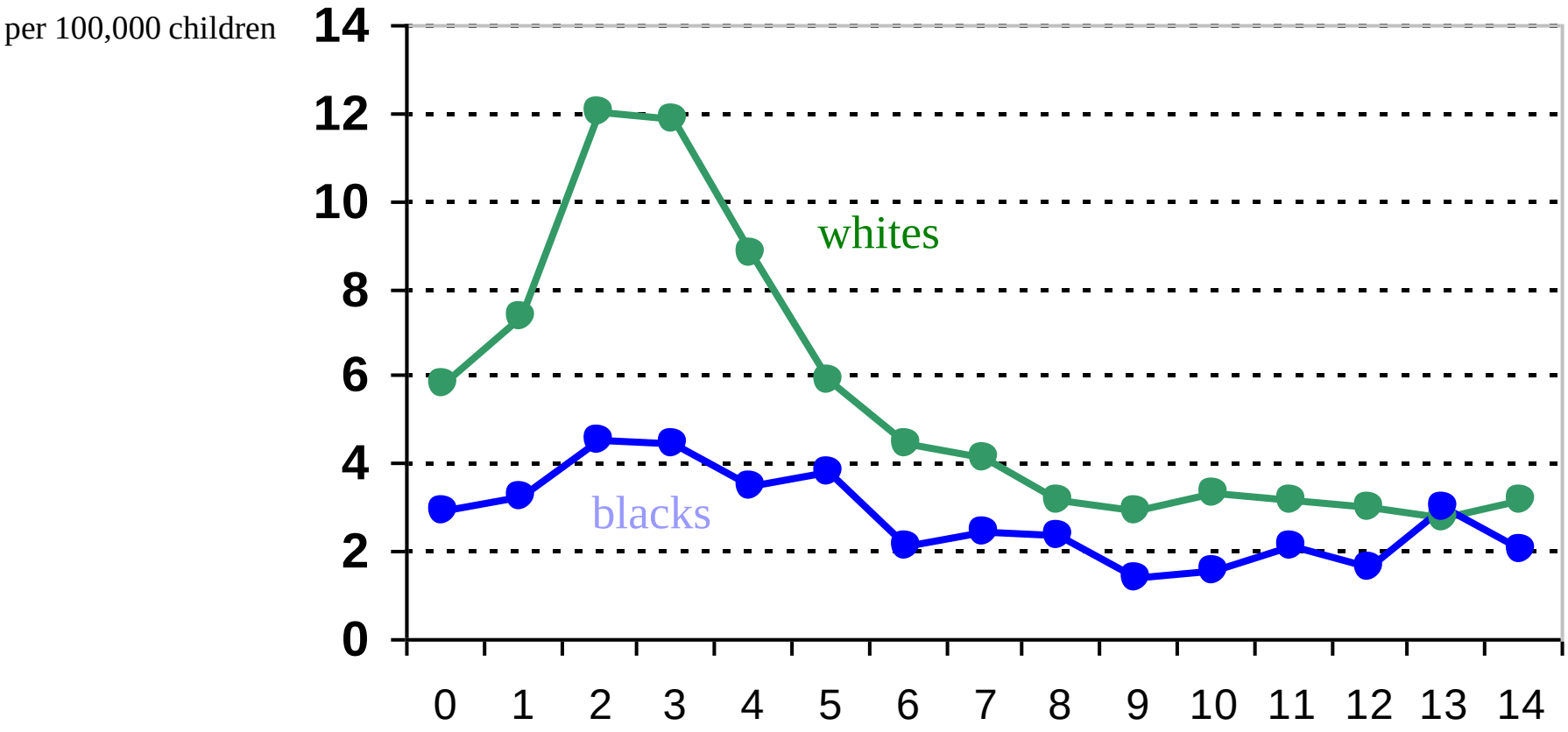
Incidence rates – age distribution



Age-specific incidence of childhood acute lymphocytic leukemia, US, 1986-1994

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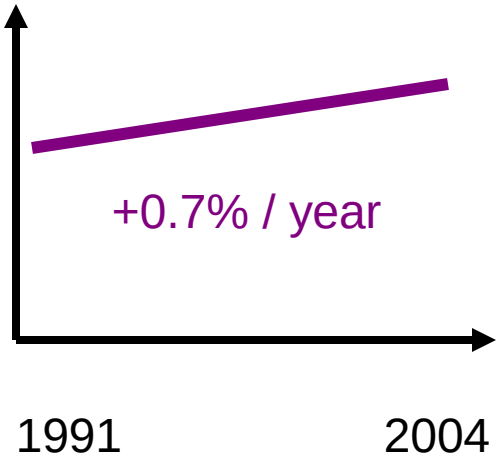
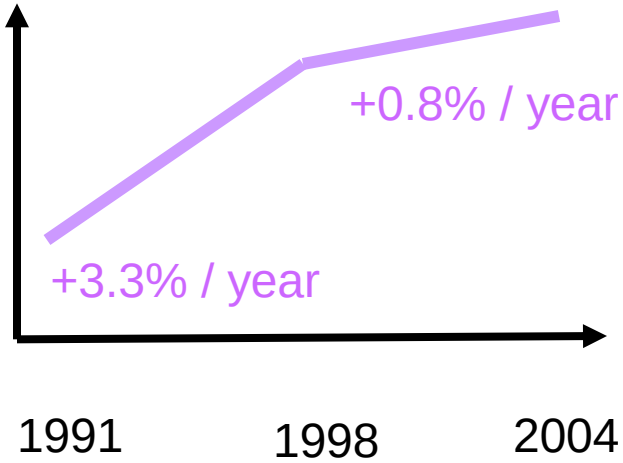
Incidence rates in Germany

Spix et al, Int J Cancer 2008

Increase 1991-2004



Increase 1991-2004

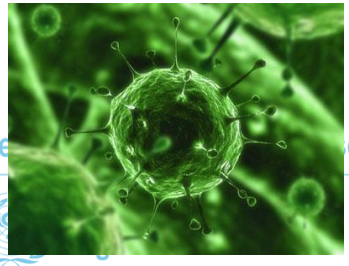


Acute lymphocytic leukemia after the reunification

Research focus of studies from the 90s

Lifestyle factors

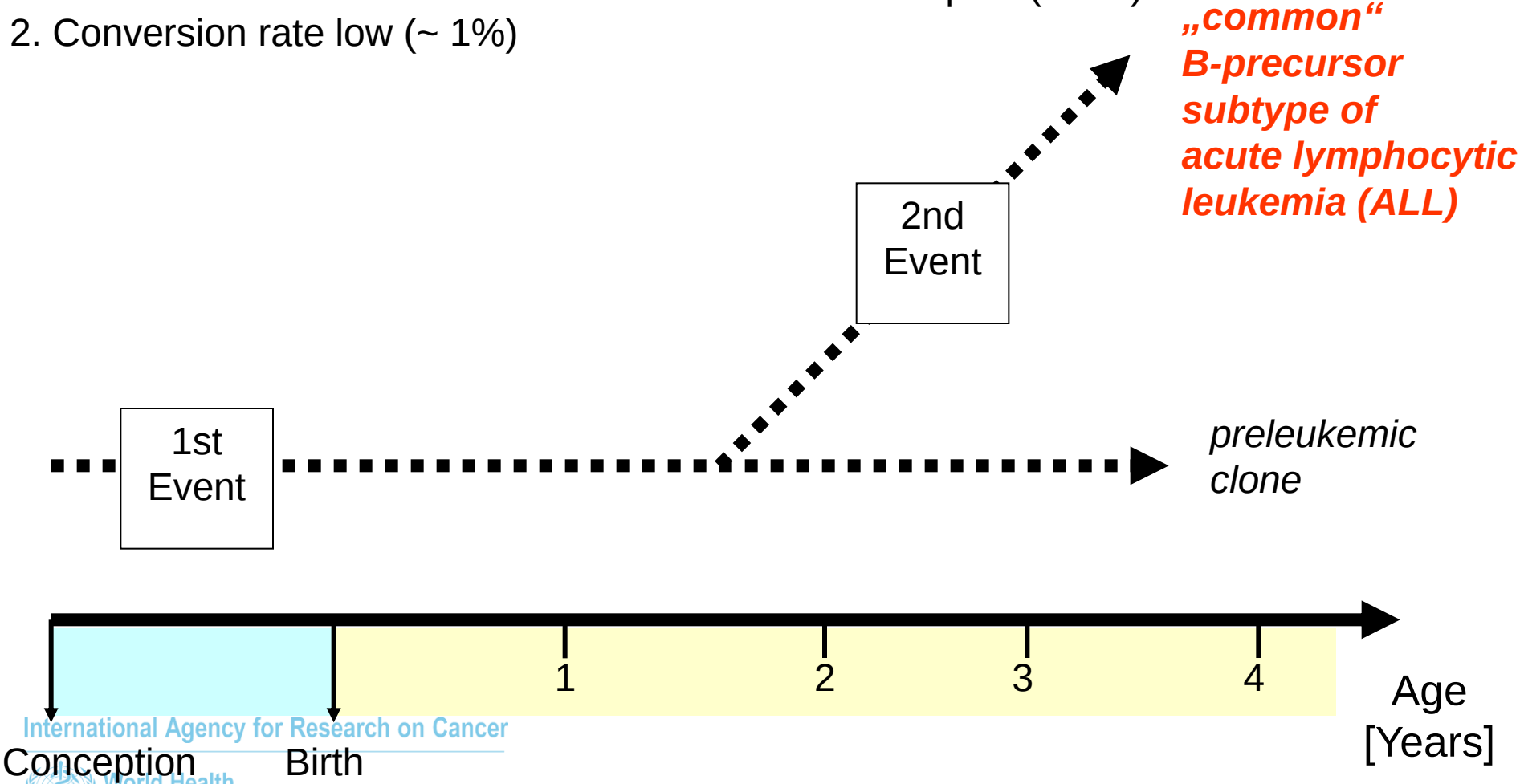
Infections



Environment and industrialization

„Two hit“ model for ALL

Evidence:
1. Chromosomal abberations found in neonatal blood spots (~ 1%)
2. Conversion rate low (~ 1%)



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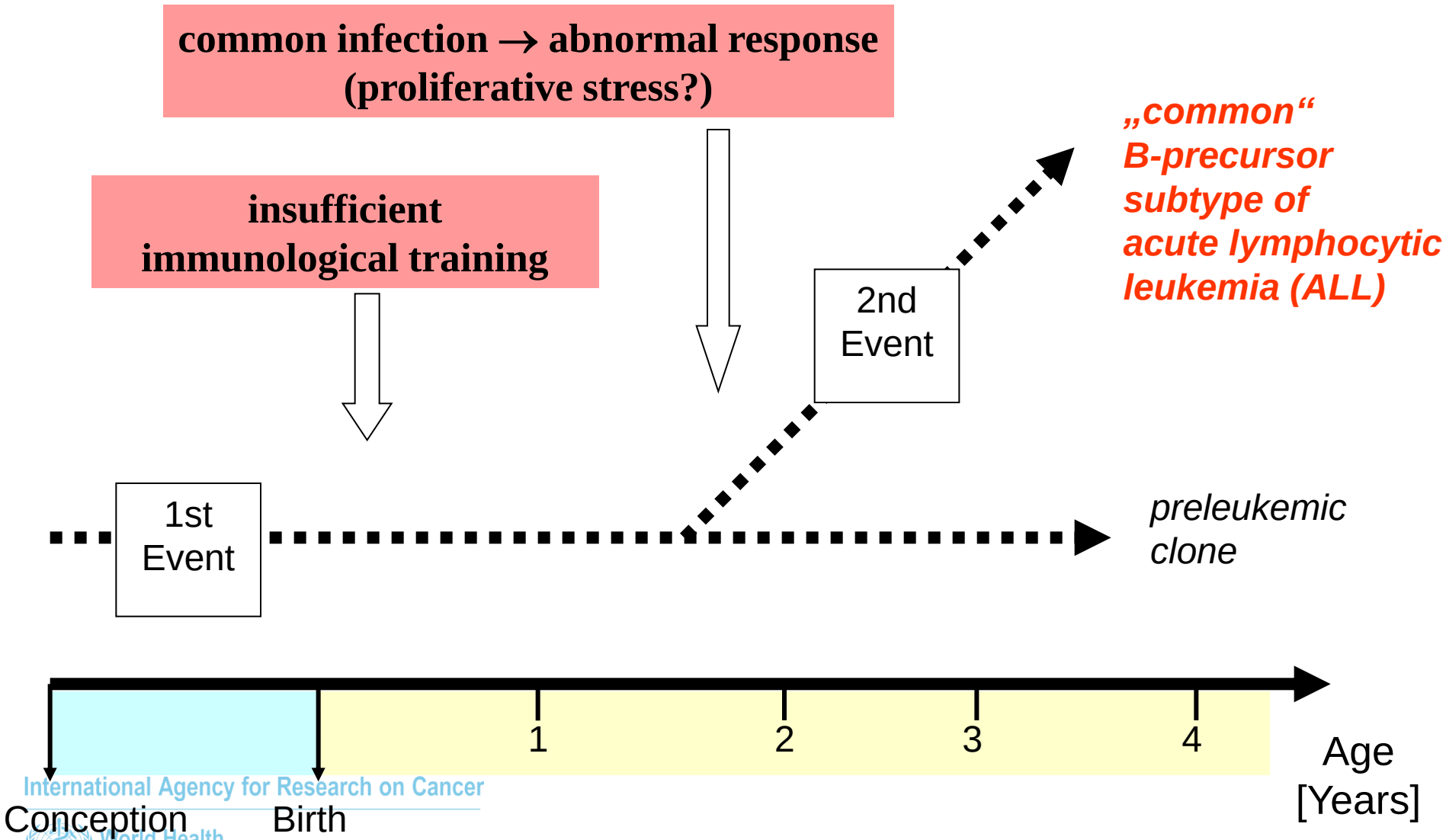
Delayed exposure to infections



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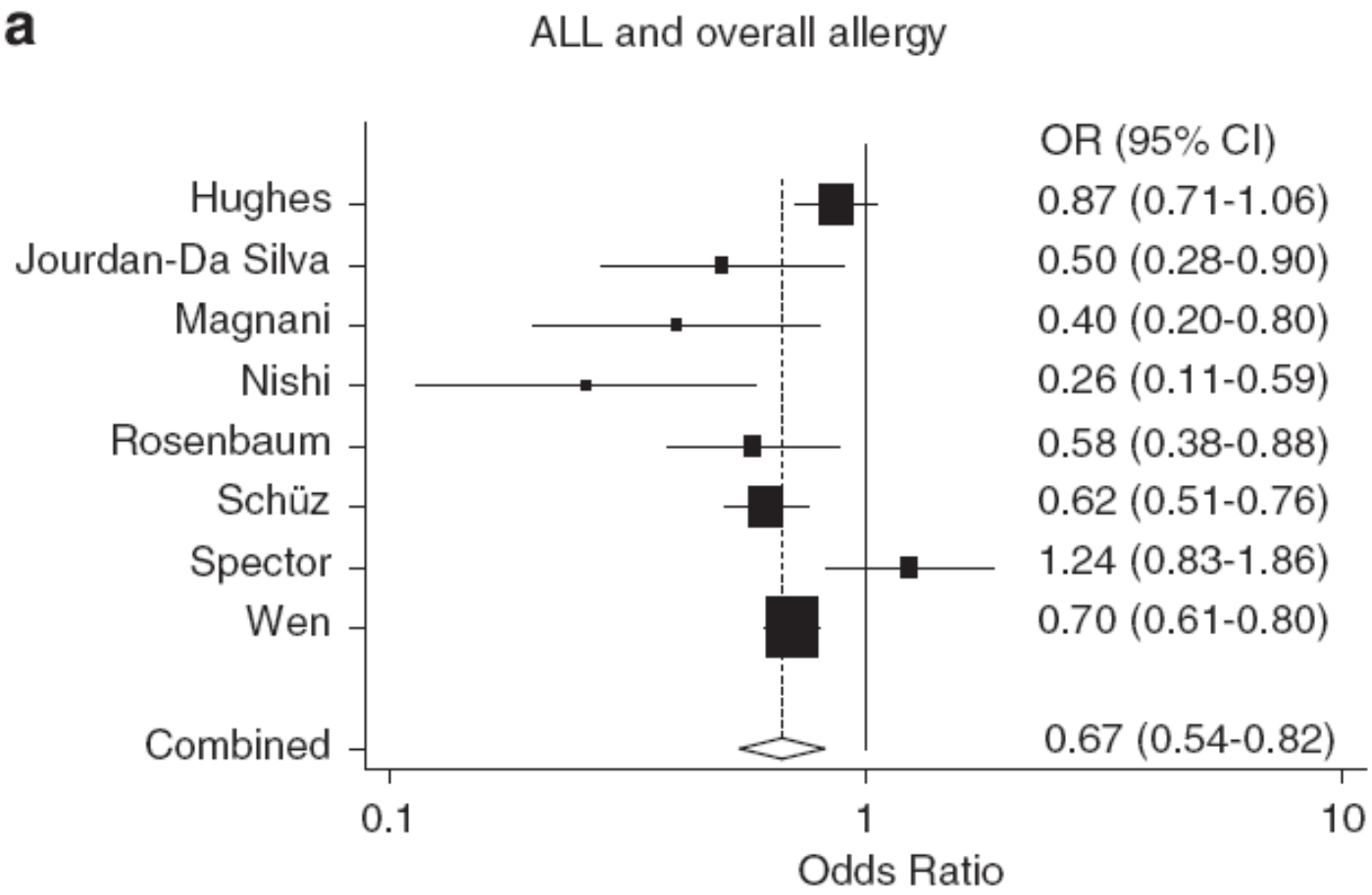
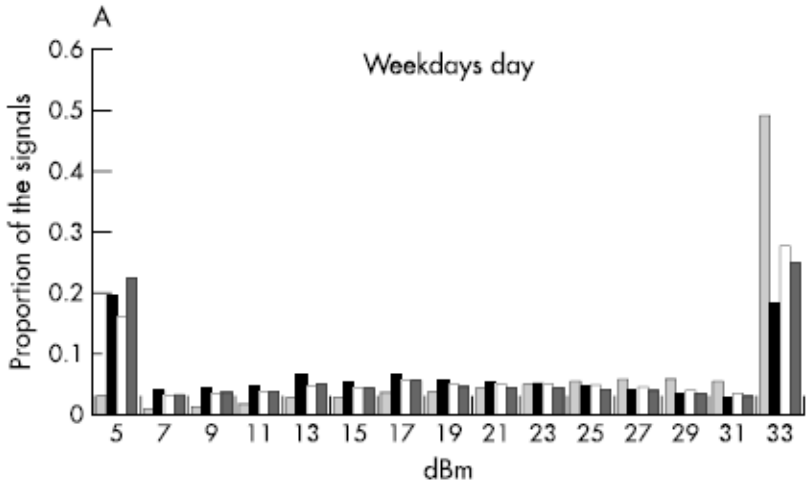
Greaves, Nat Rev Cancer 2006

Allergies and childhood leukemia



Dahl et al, Leukemia 2009



Output power of Swedish cellular telephone base station antennas (900 MHz frequency band)

2 W

~ 666 times

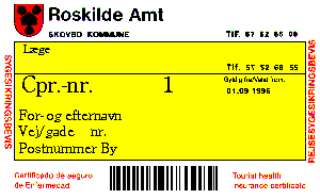
0.003 W

Lönn et al., Occup Environ Med, 2004

1982 — 1995 — 2002

Mobile Phone Operators

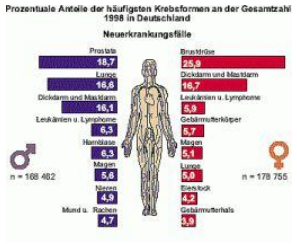
CPR



Exposed

Not exposed

Cancer Registry



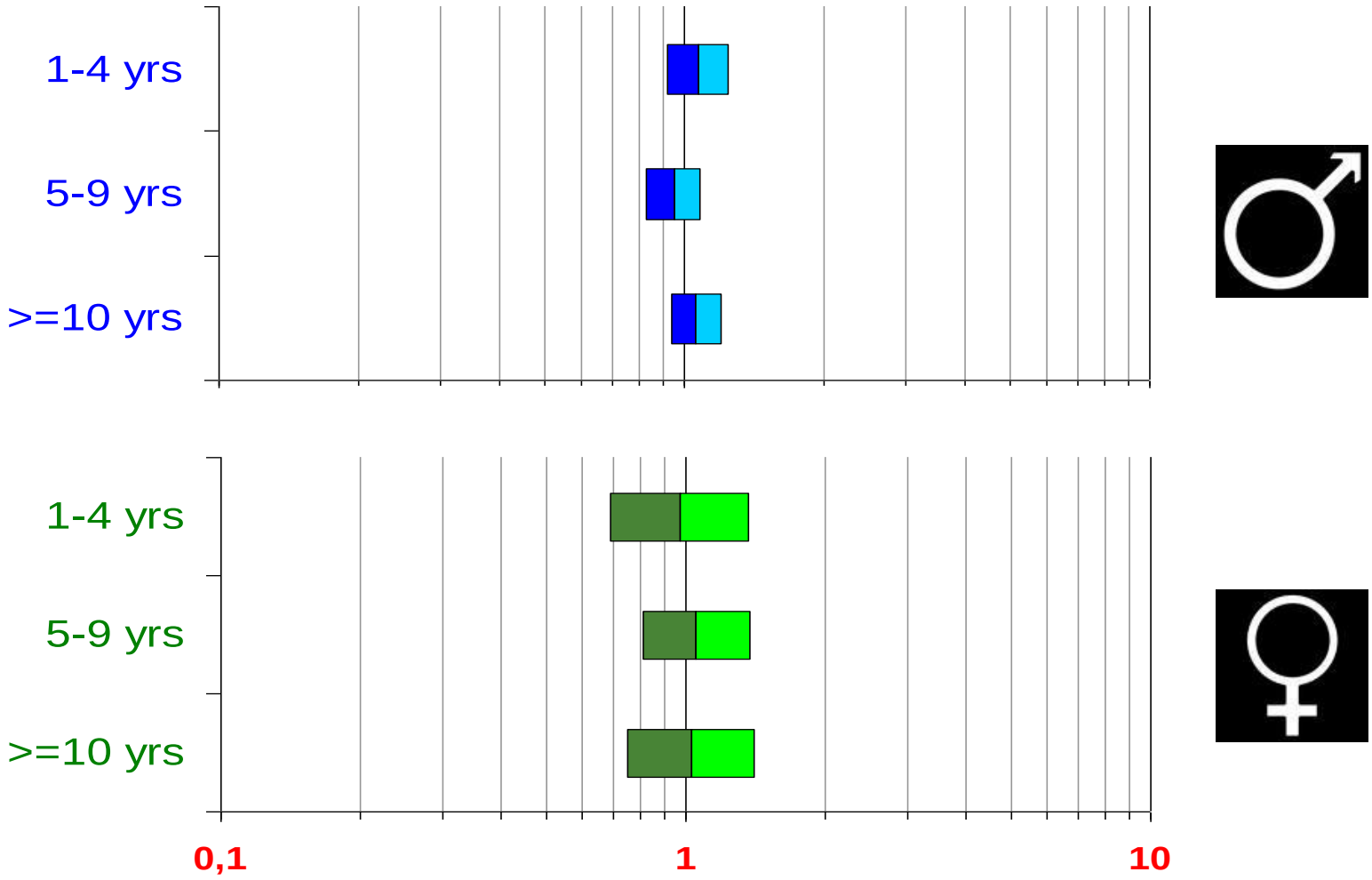
No cancer

Cancer

Cancer

No cancer

~720,000 records ➔ 420,095 individuals ➔ 14,249 cancers



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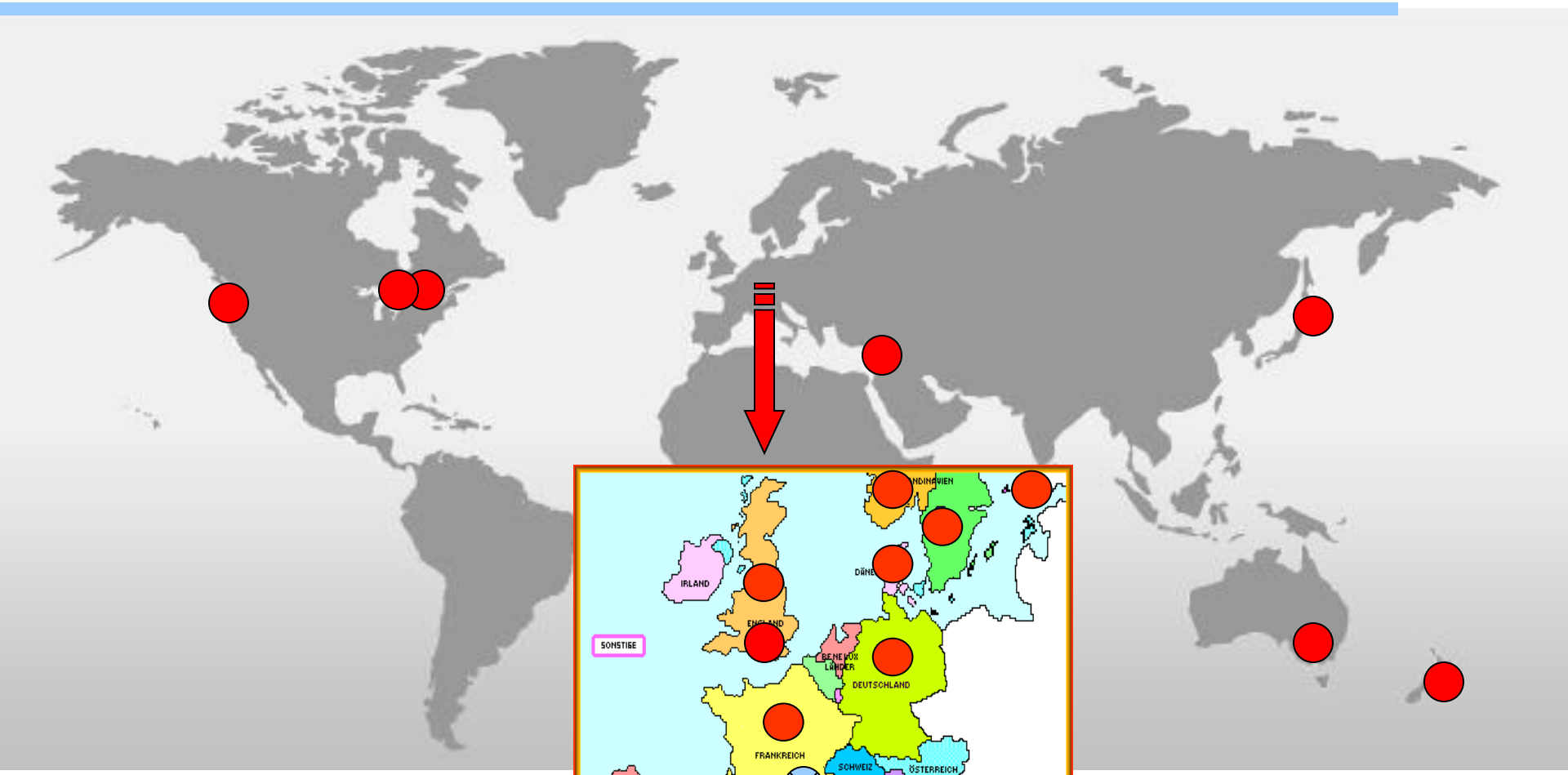
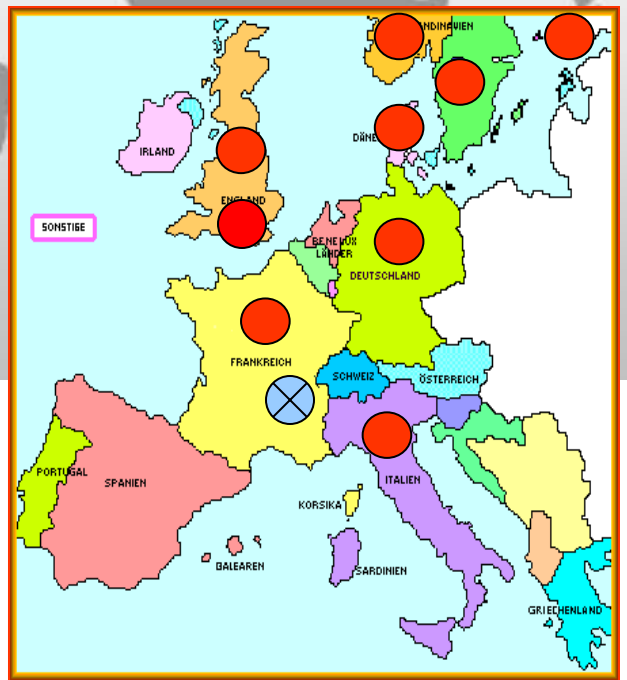
Frei et al., BMJ, 2011 – all CNS tumours

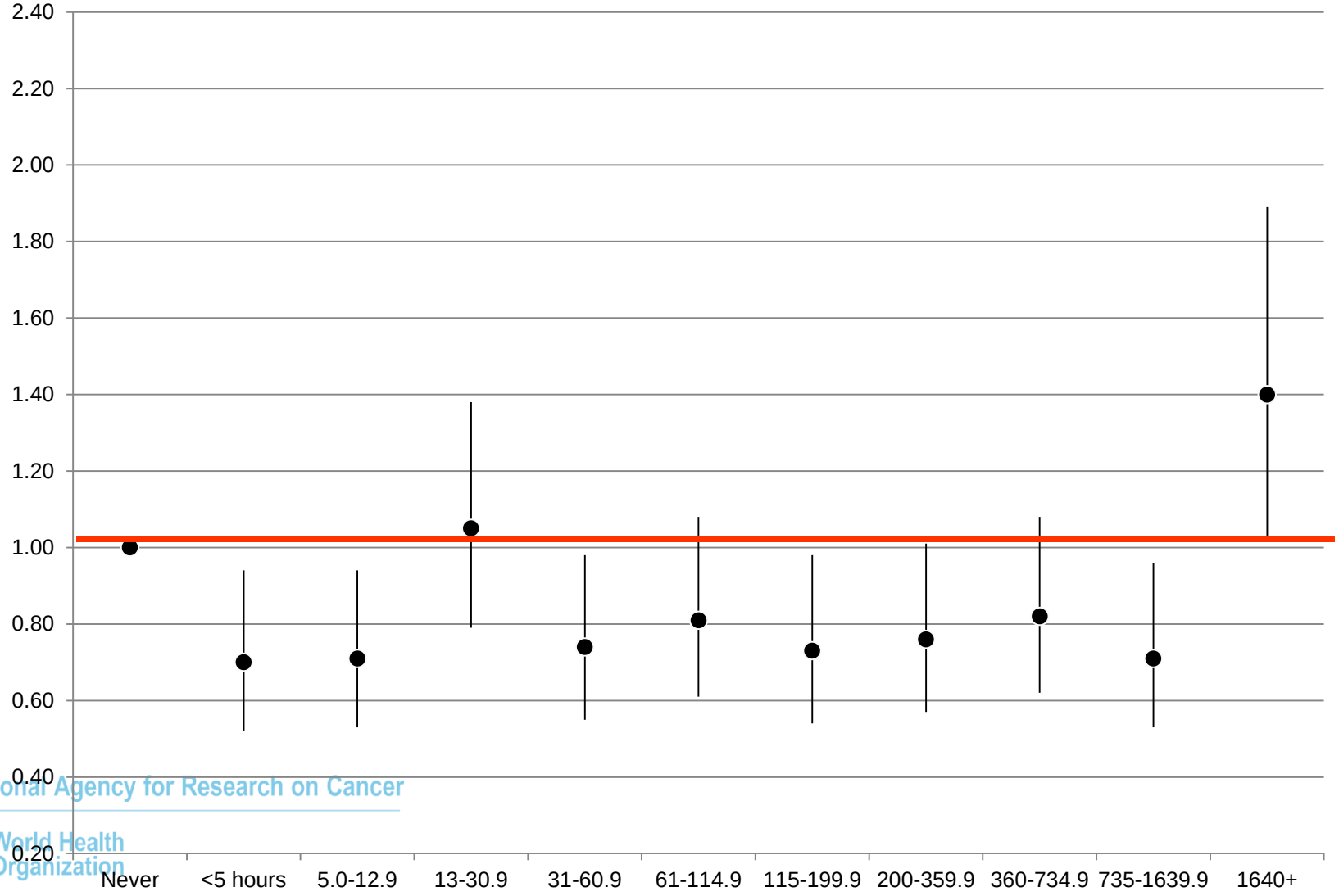


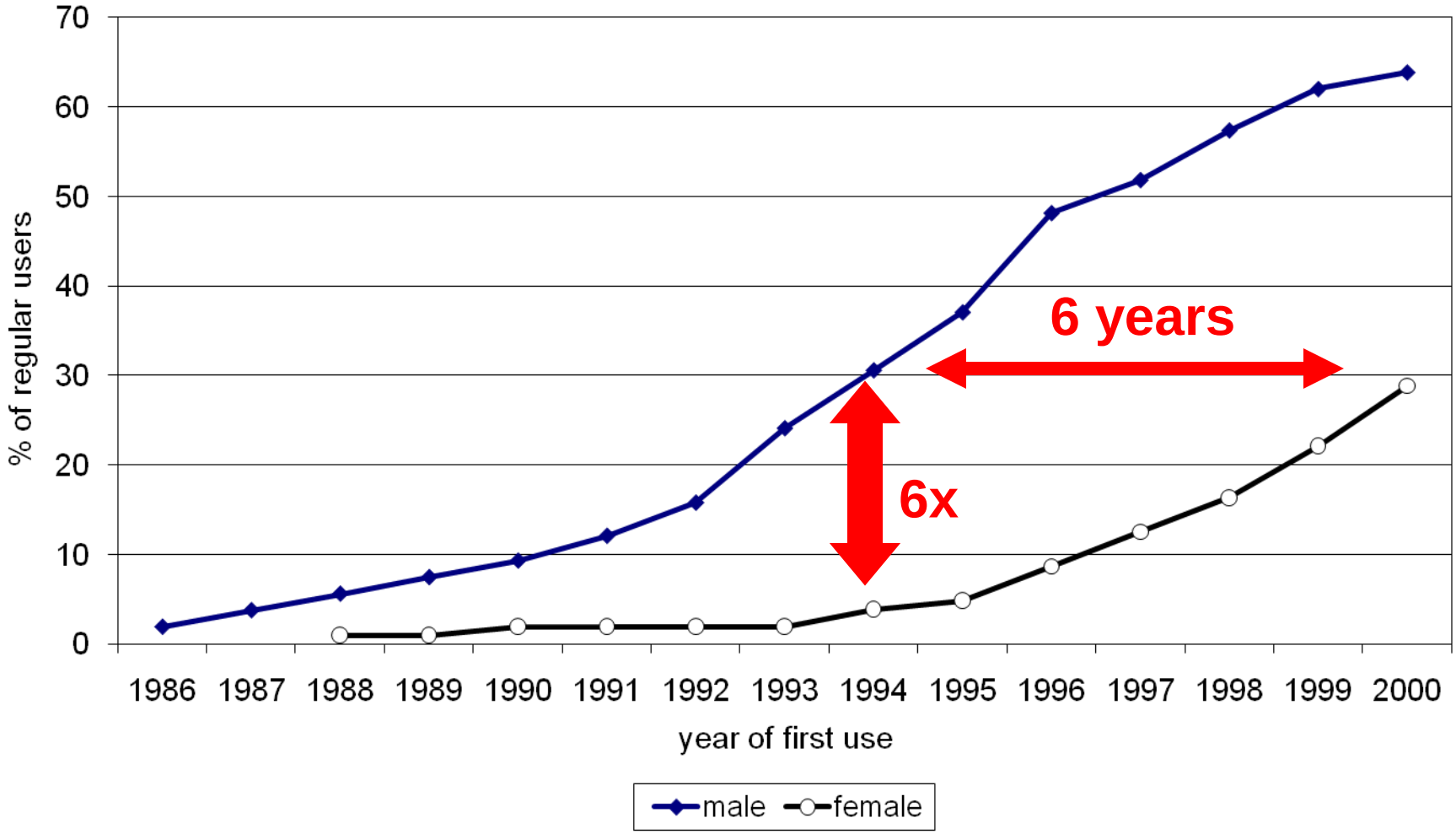


16 centres in
13 countries
coordinated by IARC

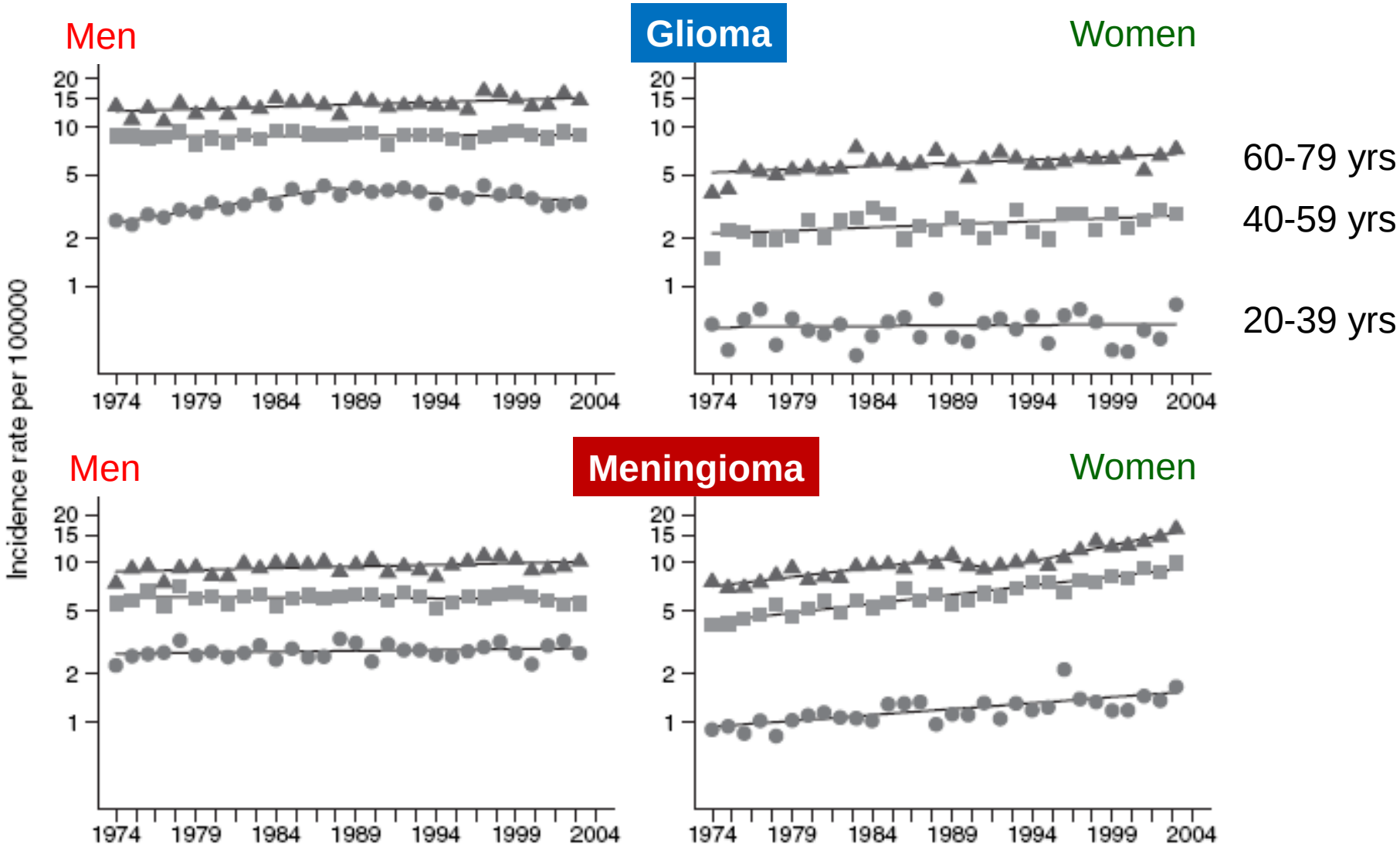
Interphone Study Group, Int J Epidemiol, 2010

Glioma – cumulative hours of use





Christensen et al., Am J Epidemiol, 2005



Deltour et al., J Natl Cancer Inst, 2009