IARC Research Actions on Radiofrequencies

Isabelle Deltour

International Agency for Research on Cancer
Lyon, France

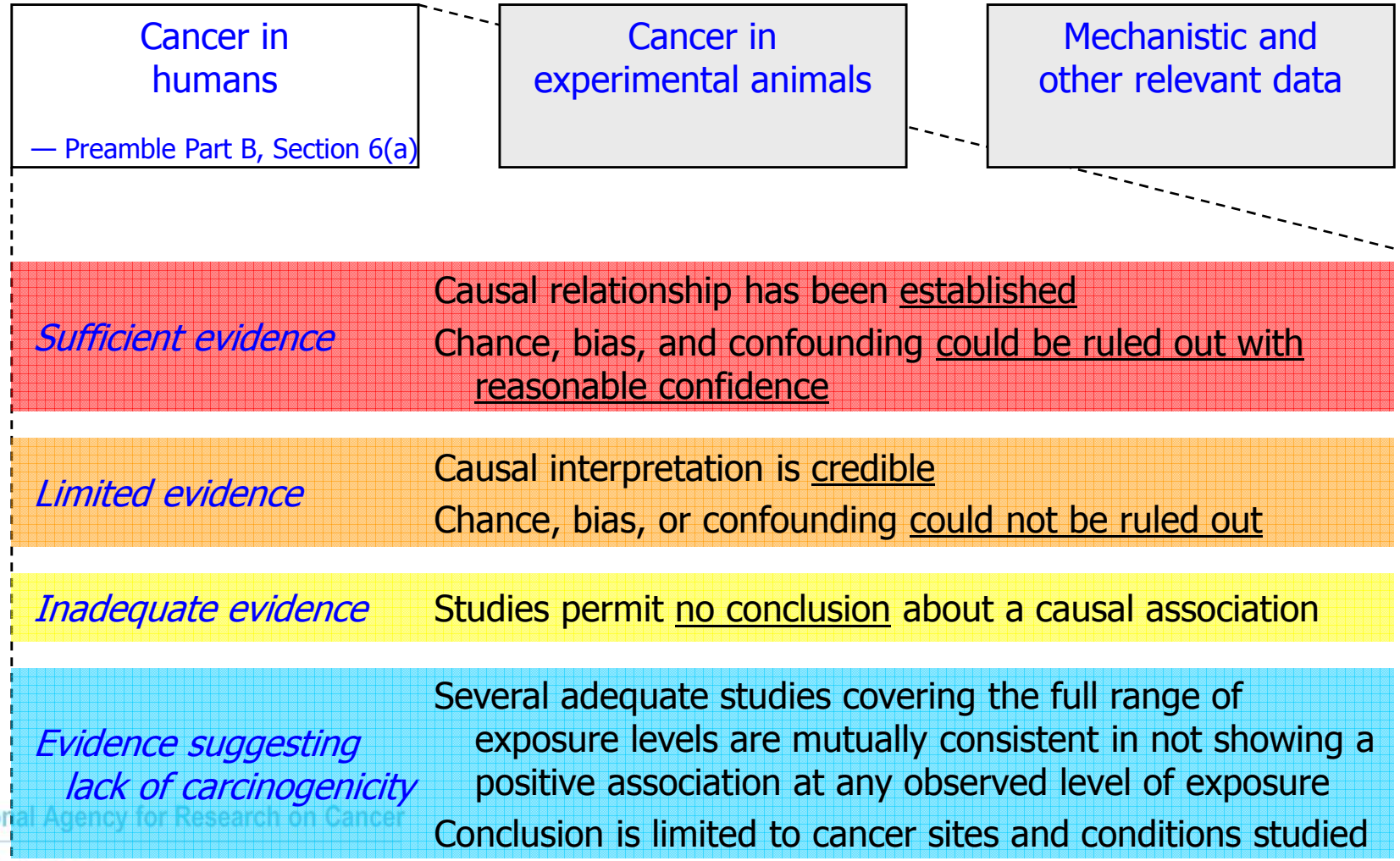
19th EMF-Day, Paris, 20 Dec 2012

IARC Monograph program

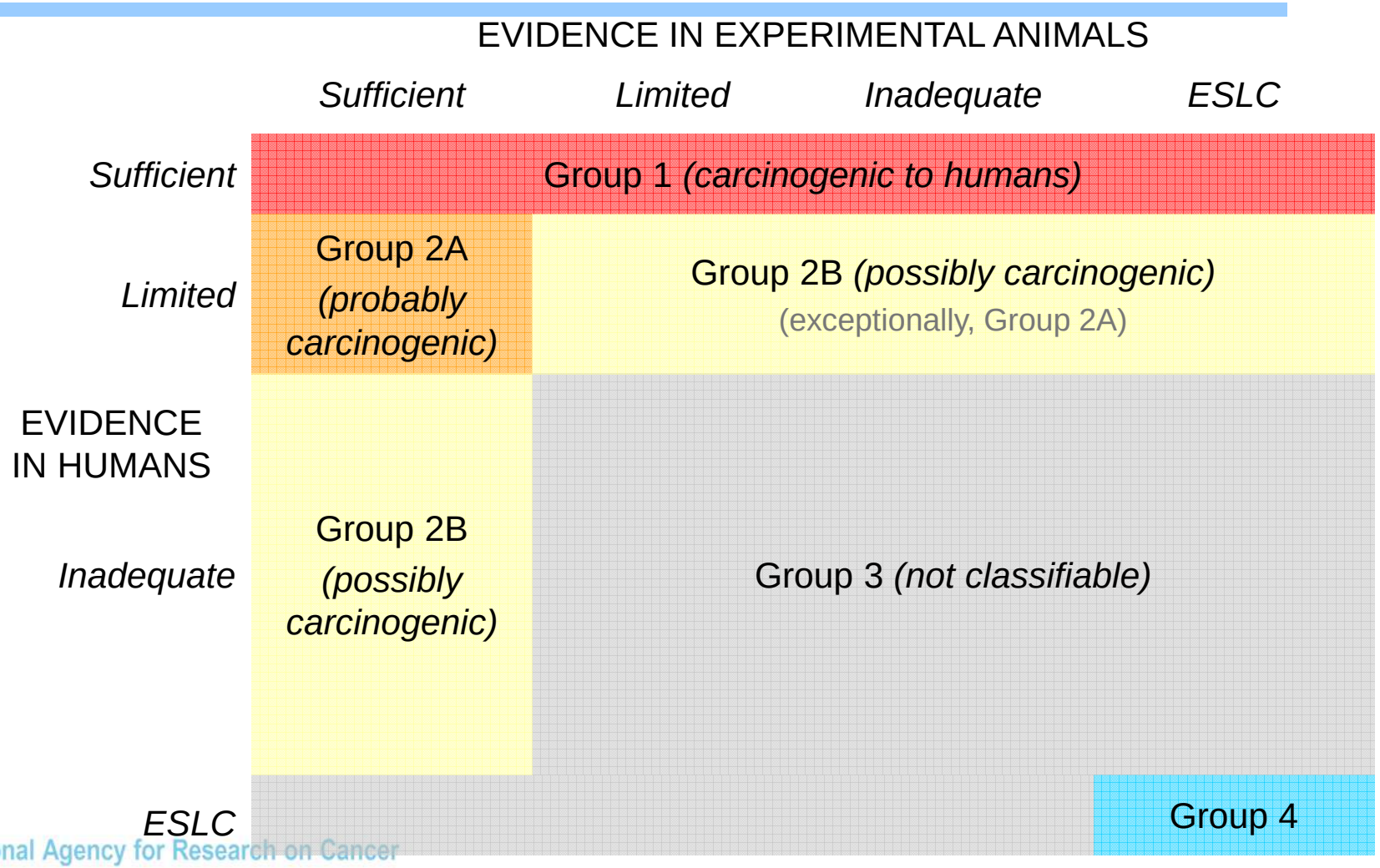
2 to 3 times per year, ad hoc group of expert convenes for 1 week

- Review published literature
  - Sources and exposure mechanisms
  - Studies of carcinogenicity in humans (epidemiology)
  - Studies of carcinogenicity in animals (in vivo)
  - Other relevant data (in vitro, …)

Evaluating human data (Epidemiology)



Combining the human and experimental evaluations

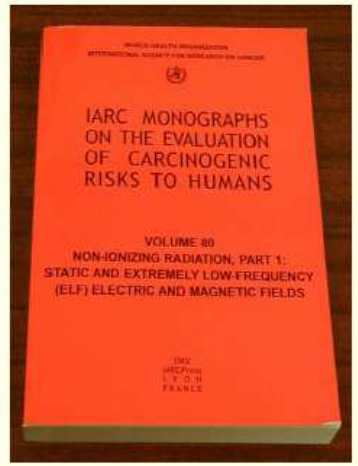


International Agency for Research on Cancer

World Health Organization

http://monographs.iarc.fr/ENG/Classification/ClassificationsAlphaOrder.pdf

IARC Monograph on Radiofrequency electromagnetic fields (May 2011)



"Although both INTERPHONE and Swedish pooled analysis are susceptible to bias—due to recall error and selection for participation— the Working Group concluded that the findings could not be dismissed as reflecting bias alone, and that a causal interpretation between mobile phone RF-EMF exposure and glioma is possible. A similar conclusion was drawn from these two studies for acoustic neuroma,..." -> limited evidence from epi studies

Few members: inadequate evidence from epidemiological studies
(lack of dose response in Interphone, inconsistencies between C-C studies, lack of effect in other epidemiological studies)

Overall classification: Radiofrequency fields: group **2b**

International Agency for Research on Cancer

World Health Organization

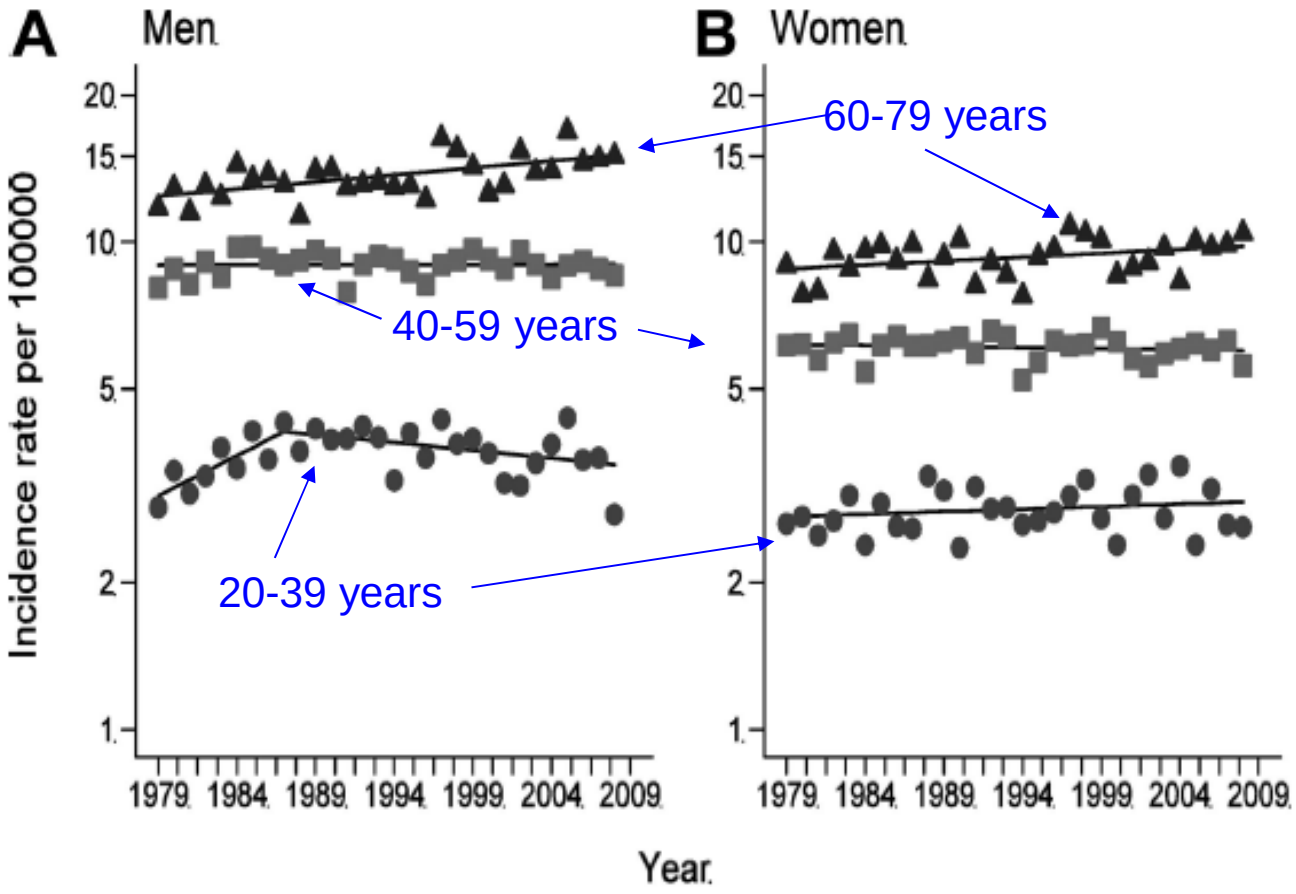
Incidence time trends studies

- Yearly description of number of new cancer cases (after age standardisation to a reference population) occurring in a population
- Based on cancer registry data
- Informative for effects occurring at population scale
  - Screening programmes, introduction of new diagnostic tools, impact of tobacco epidemic
- Not informative for effects occurring in small subgroups of populations, or if other factors are also changing at population scale

=> If mobile phone causes gliomas or other cancers, it will ultimately show up in incidence rates of these diseases

Glioma incidence rates (1979-2008)

Denmark, Finland, Norway and Sweden



- 35,250 cases
- 510 million person-years at risk
- Annual %change:

men: 0.4%

[0.1%;0.6%]

women: 0.3%

[0.1%;0.5%]

International Agency for Research on Cancer

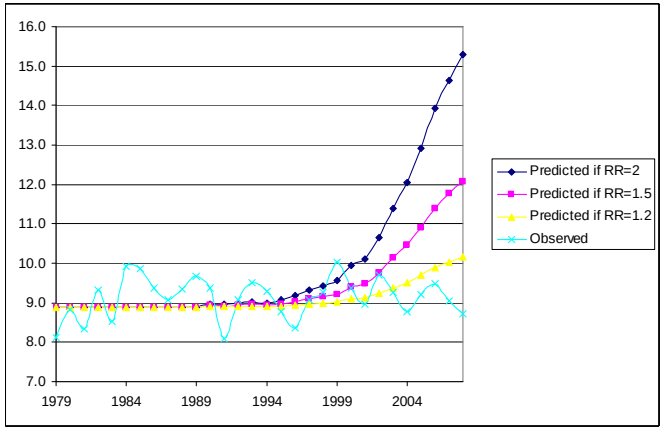
World Health Organization

Deltour et al, Epidemiology, 2012

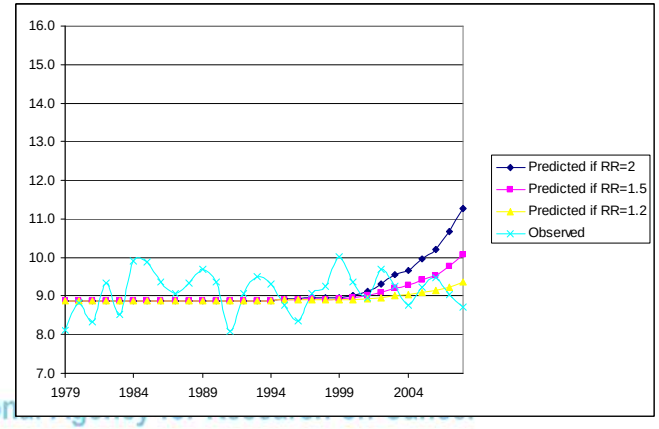
Observed and predicted incidence rates of glioma under scenarios of risk

Among men 40-59 years, Denmark, Finland, Norway, Sweden combined

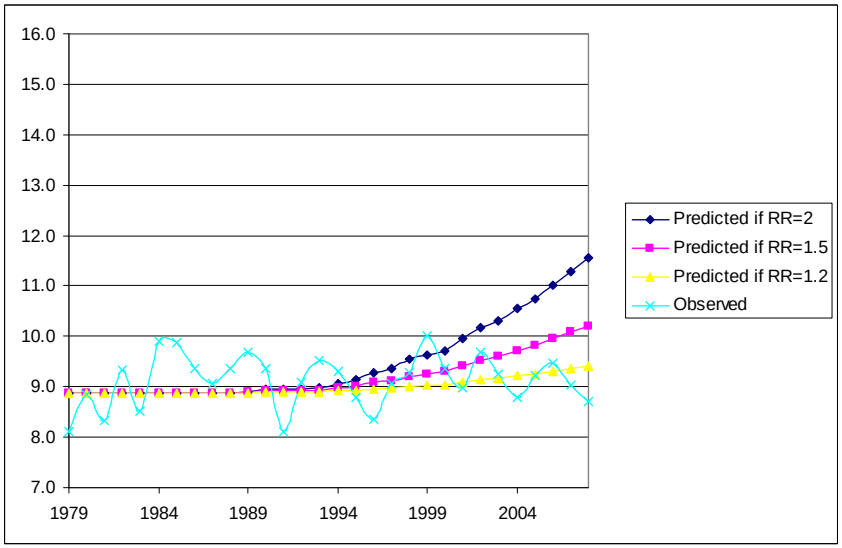
All users at increased risk after 10 yrs



All users at increased risk after 15 yrs



Risk only for heavy users (>1640 h.)



International Agency for Research on Cancer

World Health Organization

Graphs based on data from Deltour et al, Epidemiology, 2012

Simulation study of power to detect increased risks

Relative Risk and Population at Risk	Induction Period (Years)			
	1	5	10	15
All users				
RR = 2.0	100.0	100.0	100.0	100.0
RR = 1.5	100.0	100.0	100.0	84.5
RR = 1.2	100.0	100.0	96.0	21.8
RR = 1.1	86.7	77.6	45.8	8.3
RR = 0.8	100.0	100.0	98.2	25.5
Heavy users[c]				
RR = 2.0	100.0	100.0	68.9	7.2
RR = 1.5	98.0	76.7	23.4	4.4
RR = 1.2	35.9	18.5	6.2	3.0
RR = 1.1	12.2	8.0	4.0	2.9
RR = 0.8	41.7	21.7	7.7	3.9

Proportion of simulated datasets out of 10,000 showing a statistically significant increase/decrease in glioma incidence in men aged 40–59 years

International Agency for Research on Cancer

World Health Organization

Conclusions

- No upward turn in glioma incidence rates observed
- High quality, registry based, time trends
  - 100% incompatible with increased OR MBT in Hardell et al (2005)
  - likely incompatible with Interphone increased OR for glioma

Cohort studies

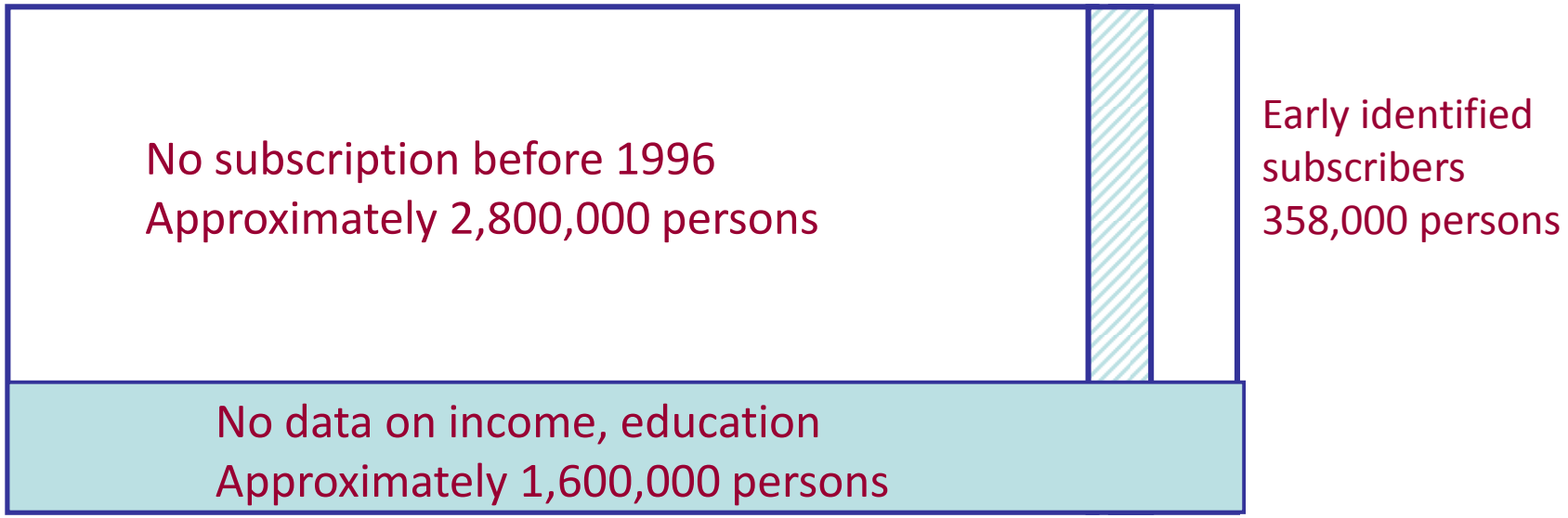
- Follow a group of people over time
- Compare the occurrence of disease among exposed individuals to non exposed individuals

Danish cohort of early mobile phone subscribers: design

From the 2 danish mobile telephone companies , Sonofon and TeleDanmarkMobil, all numbers issued between 1982 and 1995 were obtained, name and address of subscription holder (person or company), date of subscription

Danish cohort study of early mobile phone subscribers

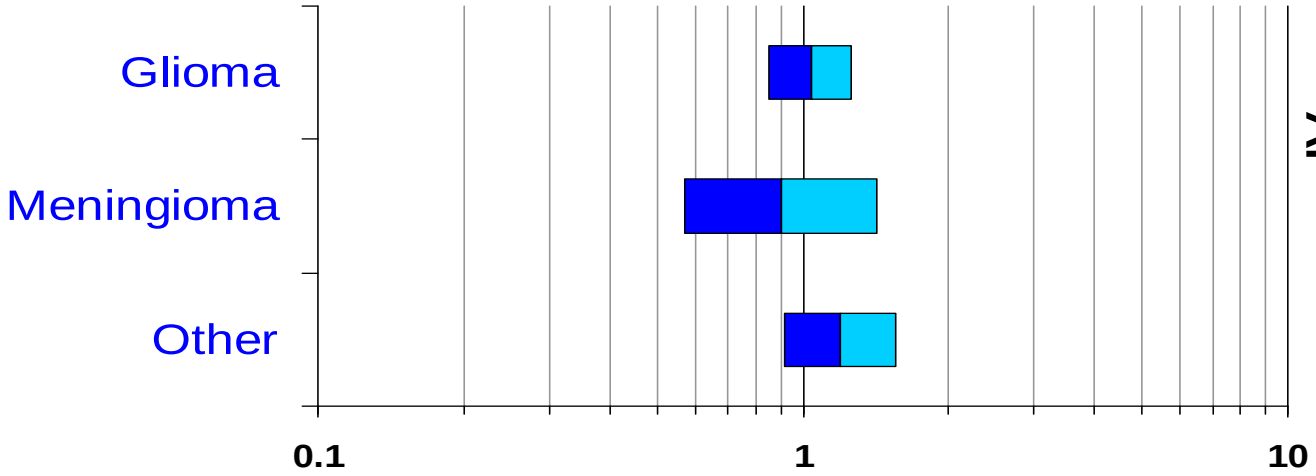
Exclusions: 200 000 corporate subscriptions (no individual user identified) & 100 000 subscriptions (mismatch names, addresses, 2 subscriptions for 1 name,…)
Identification of 420 095 persons who were early subscribers of mobile phones and their date of subscription (1982-1995); exclusion of subscriptions contracted prior to 1987 (mainly car phones); Link with individual data on income, education available for all Danes born after 1925, older than 30, after 1990.



International Agency for Research on Cancer
World Health Organization

Danish cohort study of early mobile phone subscribers

Analysis: number of observed vs expected cases stratified by sex, age, calendar period, education, income



≥ 10 years

356 glioma cases among early subscribers,

Results for glioma risk among men

IRR (10-12 years)=1.06 (0.85-1.34)

IRR (>13 years) =0.98 (0.70-1.36)

International Agency for Research on Cancer

World Health Organization

Frei et al., BMJ, 2011

Research questions

- Unclear if there are effects of RF on risk of glioma and acoustic neuroma after prolonged exposures
- Weakness of existing studies: exposure assessment
- Other diseases and symptoms?

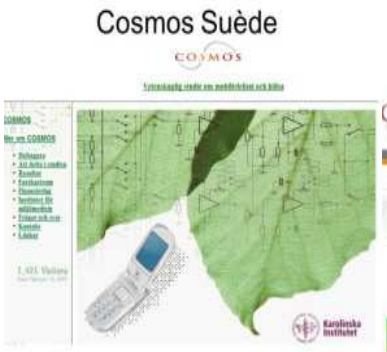
-> Large prospective cohort of mobile phone users with validated exposure assessment : WHO research priorities, SCENHIR (EU-DG SANCO) recommendations, « Grenelle des Ondes »

On-going activities: the Cosmos study

- Prospective European cohort study with validated data on exposure

  Operators: duration of incoming and outgoing calls

Sweden, United Kingdom, Denmark, Finland, Netherlands

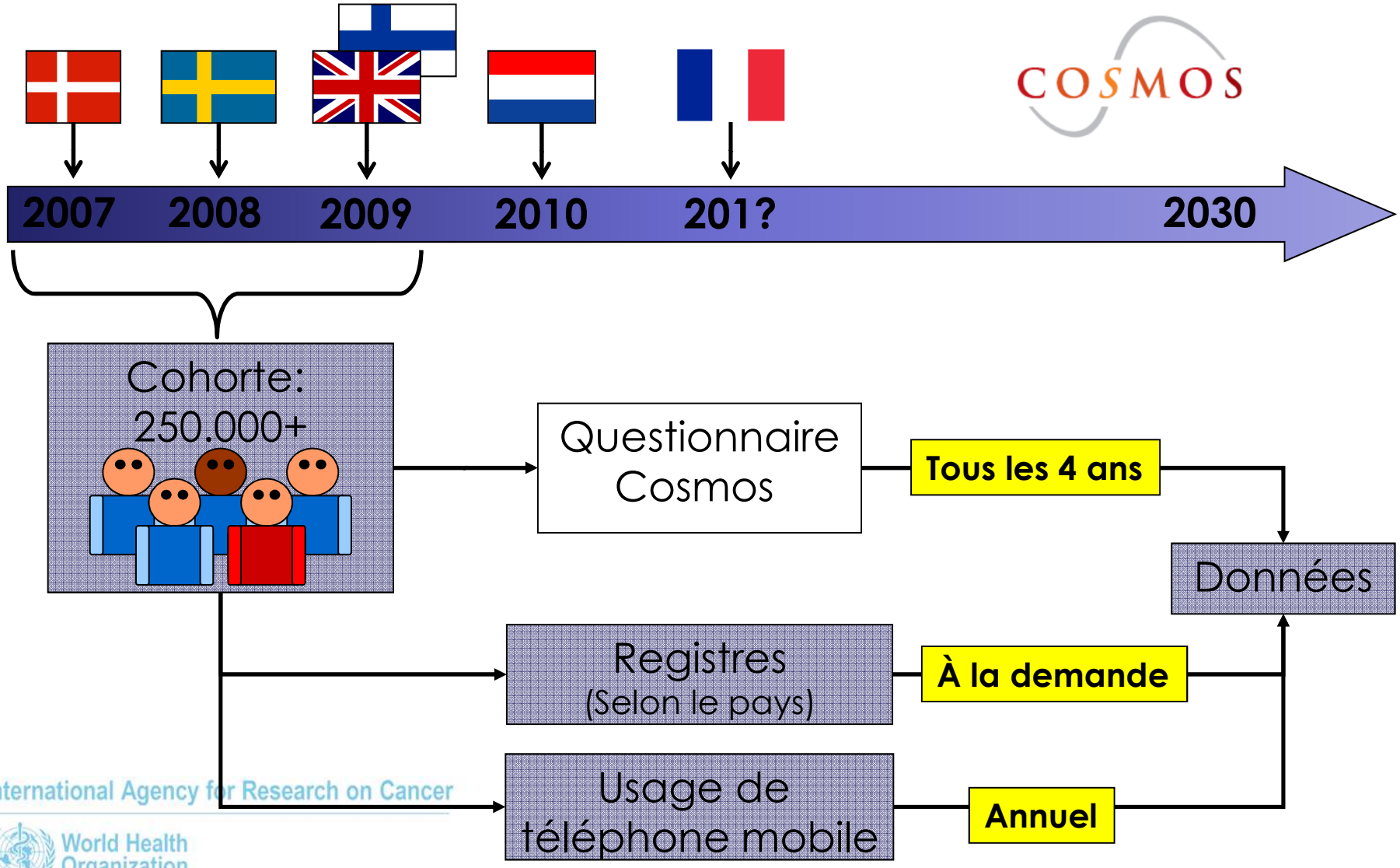


International Agency for Research on Cancer

World Health Organization

COSMOS:

Etude de cohorte internationale téléphonie mobile et santé



International Agency for Research on Cancer

World Health Organization

Groupe Cosmos Danemark

Health events studied in Cosmos

- Cancer (brain tumours, leukaemia, skin cancer)
- Cerebro-vascular diseases
- Neurological diseases: Parkinson, Alzheimer, other dementia, multiple sclerosis, amyotrophic lateral sclerosis
- Symptoms: hearing loss, tinnitus, migraine, sleep problems, well-being
- *Road trafic accidents (Cosmos – France ?)*

Feasibility study for Cosmos-France (1)

- Validated use of mobile phone is needed for the Cosmos study
  -> Round table with the 4 operators (Orange, Bouygues Telecom, SFR, Free)
  - Volume and type of mobile phone traffic are available in databases
  - For the participants who agree, could be communicated to research team

Feasibility study for Cosmos-France (2)

- Cosmos-France based on 2 existing cohorts: *(cheaper, quicker)*

Recruitment, follow-up, recording of health events

www.constances.fr

www.etude-nutrinet-sante.fr

International Agency
World Health Organization

Cosmos-France partners

International Agency Research on Cancer

Environment and Radiation Section
Dr Joachim Schüz, Dr Isabelle Deltour

IFSTTAR (Transports, Aménagement, Réseaux)

UMRESTTE - Dr Martine Hours

INSERM

U 1018 – Constances - Dr Marie Zins
U 557 – Nutrinet-Sante – Dr Serge Hercberg

Centre Leon Berard

Unité Cancer et Environnement - Dr Beatrice Fervers

WHIST Lab: Exposure assessment

RESA/WASA/WAVE - Dr Joe Wiart

- Thank you for your attention

deltouri@iarc.fr

International Agency for Research on Cancer
World Health Organization