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# **Epidemiologic studies of cancer in relation to mobile phone use**

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1

# An Update of a Nationwide Cohort Study In Denmark



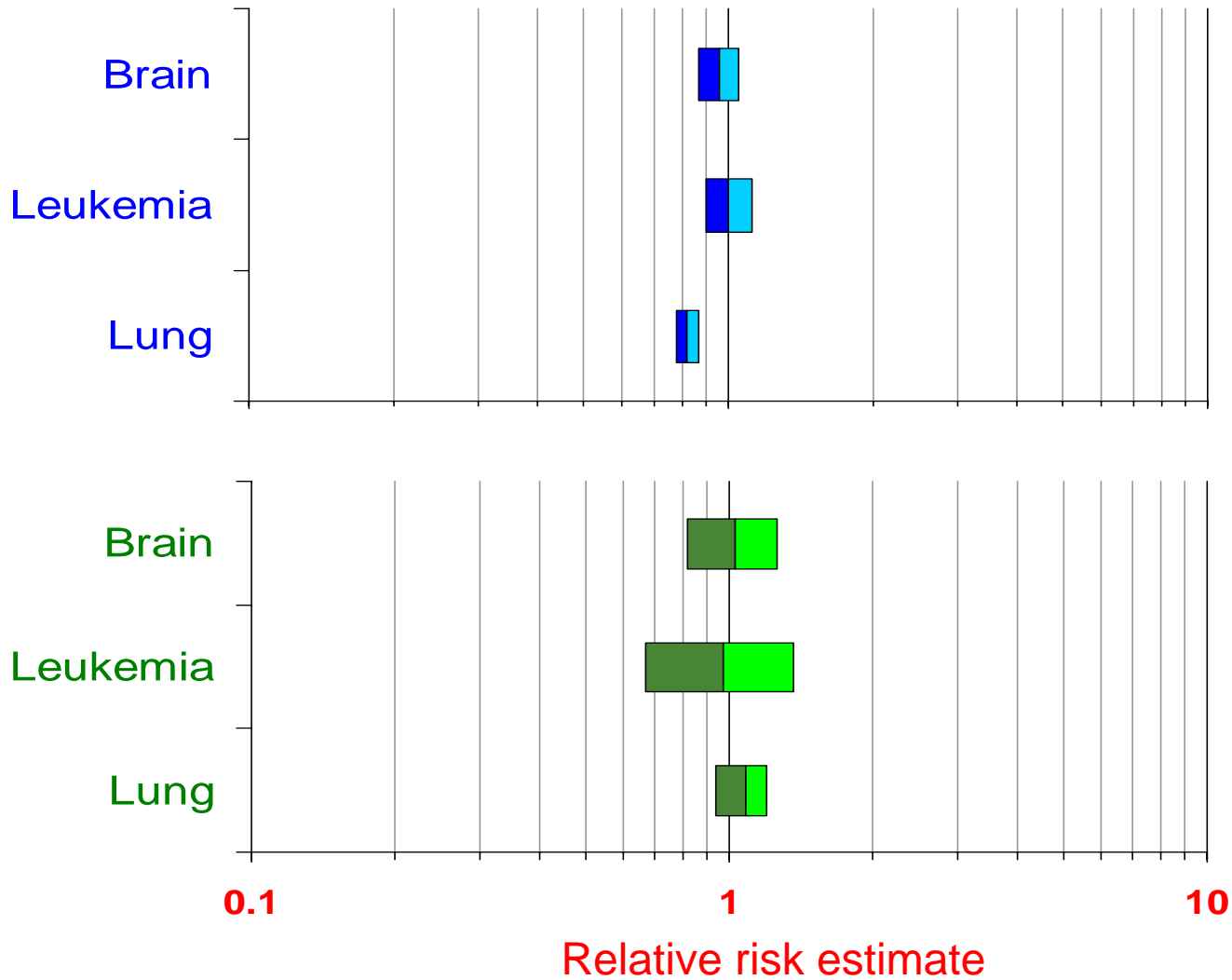
Joachim Schüz  
Rune Jacobsen  
Jørgen H Olsen  
Christoffer Johansen



John D Boice Jr.  
Joseph K McLaughlin



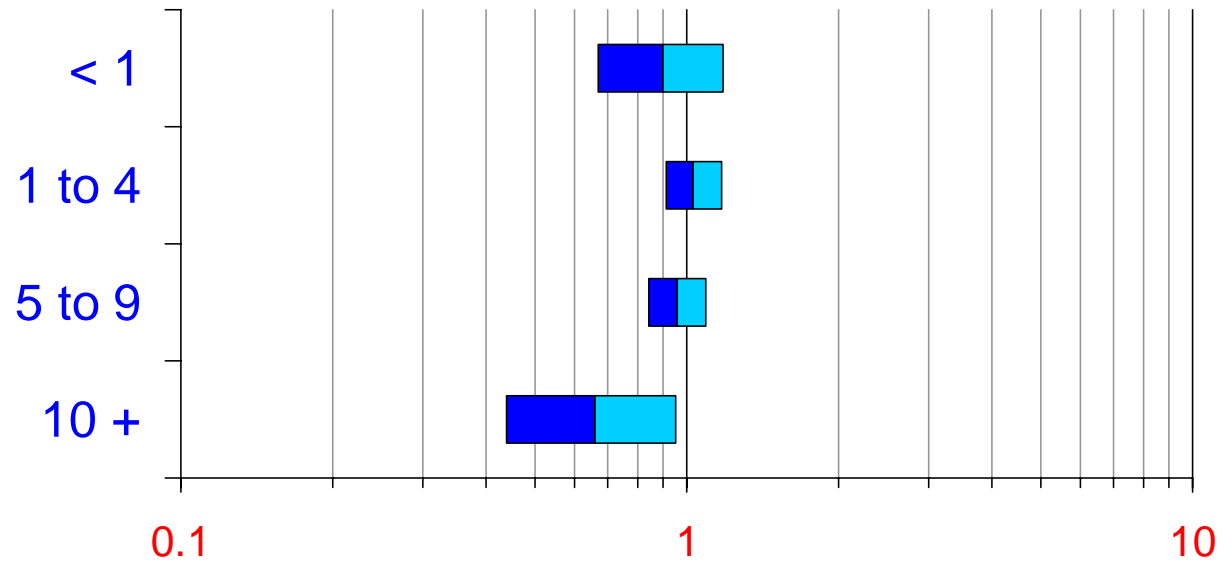
# Results 1



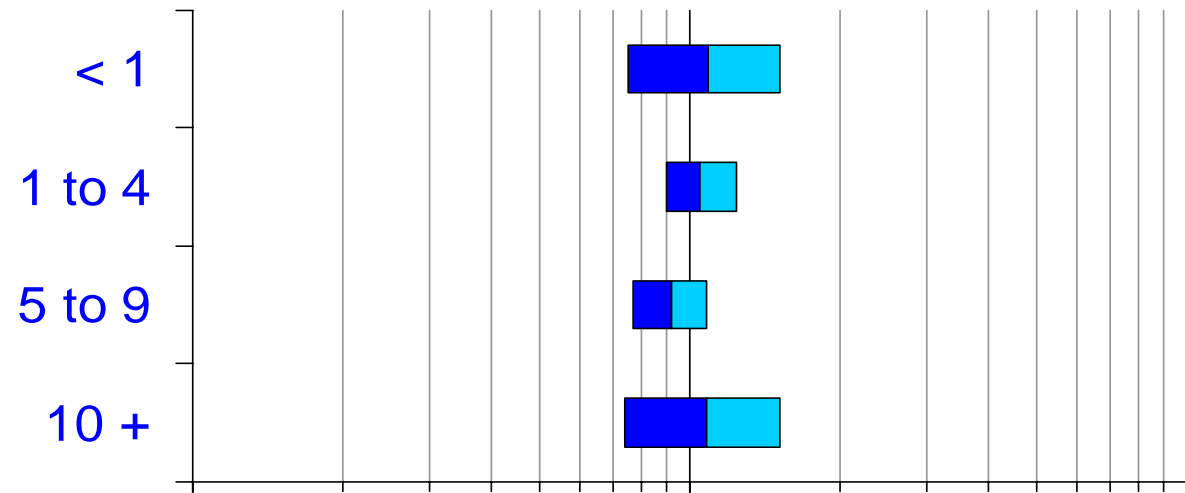
# Results 2



Brain



Leukemia



# Strengths and Limitations



- 
- Generalizability – whole country included
  - Objective exposure metric
  - Linkage of independently collected data
  - Includes all long-term subscribers in Denmark
  
  - Subscription  $\neq$  Usage
    - but: cohort includes 4 times more mobile phone users
  - No subdivision by amount of use or usage patterns
  - No other data (other EMF, possible confounders)
  
  - *Cohort and Case-Control designs have both advantages and disadvantages and complement each other*

# Gaps in Knowledge



- 
- Long-term heavy users of mobile phones –  
steepest increase in the mid 1990s  
amount of use increased over time
  - Other diseases than cancer –  
particularly symptoms  
knowledge on other risk factors important
  - Children using mobile phones –  
more vulnerable group of users?



2



# International Cohort Study of Mobile Phone Use and Health (Cosmos)



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Lissa Churchward  
Jørgen H Olsen  
Christoffer Johansen  
Joachim Schüz



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Institute of Cancer Epidemiology



Anders Ahlbom  
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Paul Elliott  
Imperial College London

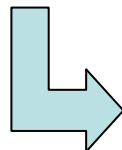
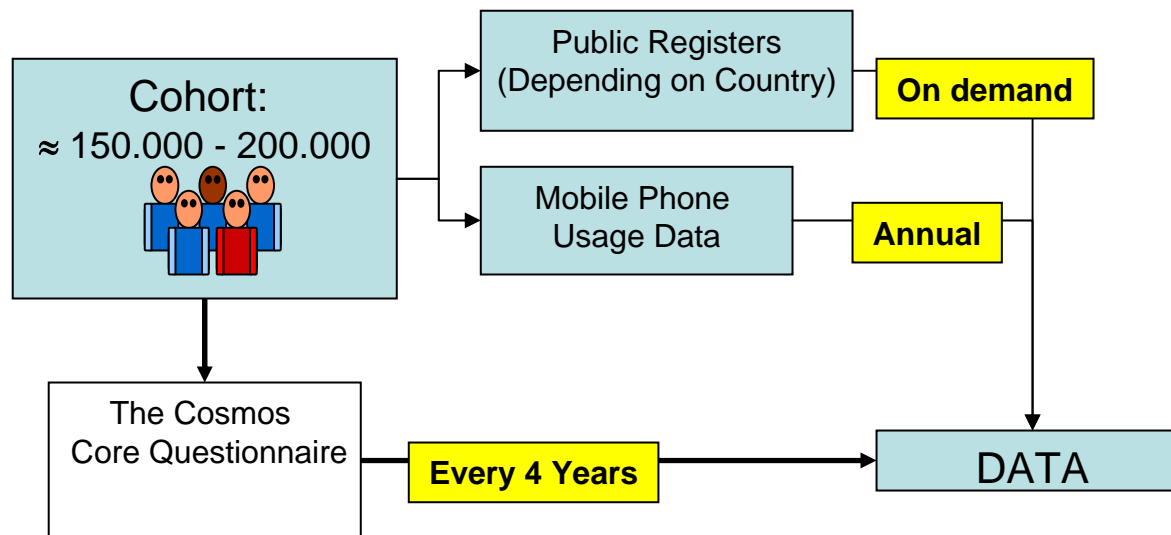


Anssi Auvinen  
STUK + University of Tampere

# Design



Denmark, Sweden, UK, (Finland), (Netherlands)



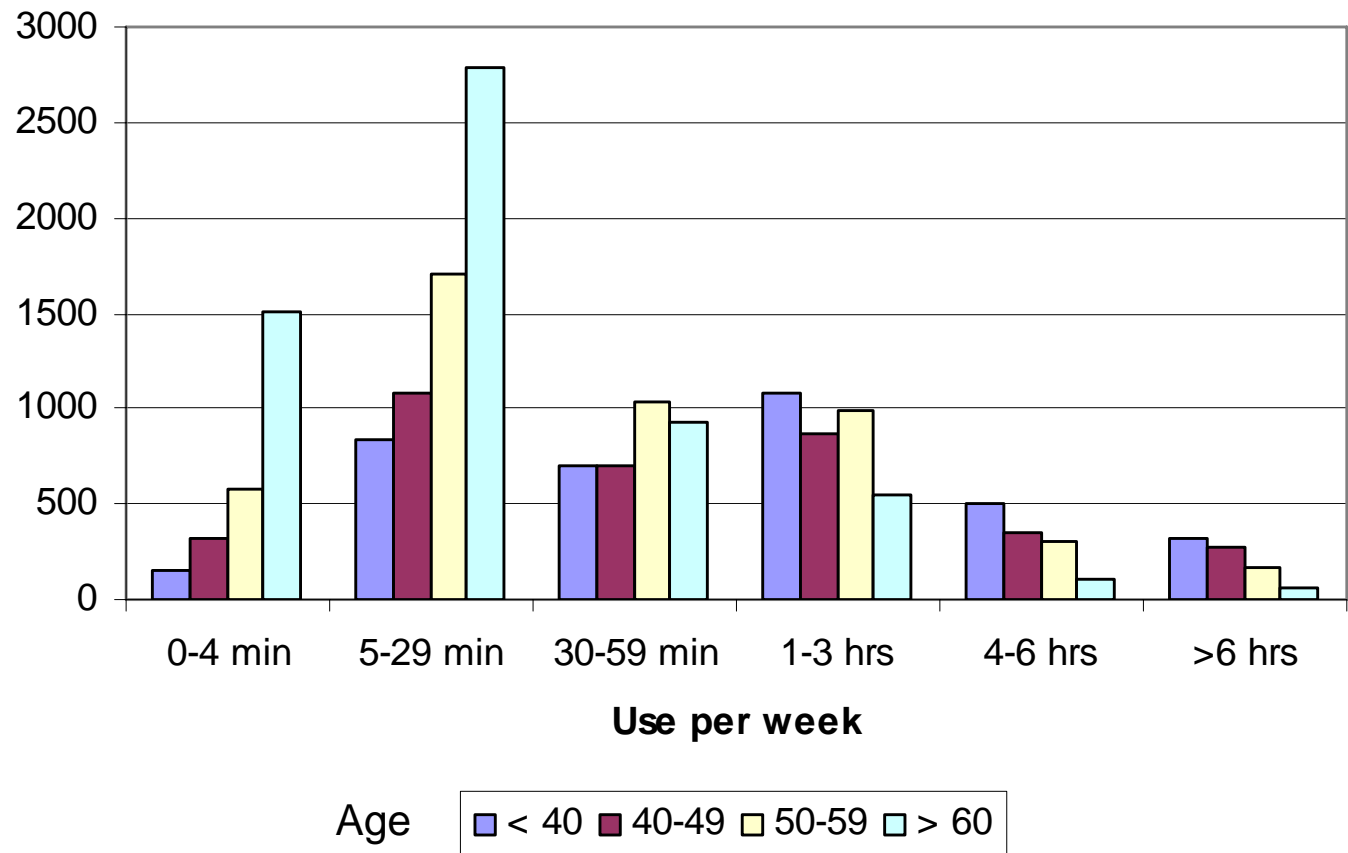
- Mobile Phone Usage Data
- Other EMF exposures
- Other putative risk factors
- Symptoms and well-being

# Status



100,000 → Positive response: 21,147 → Available for analysis: 18,175

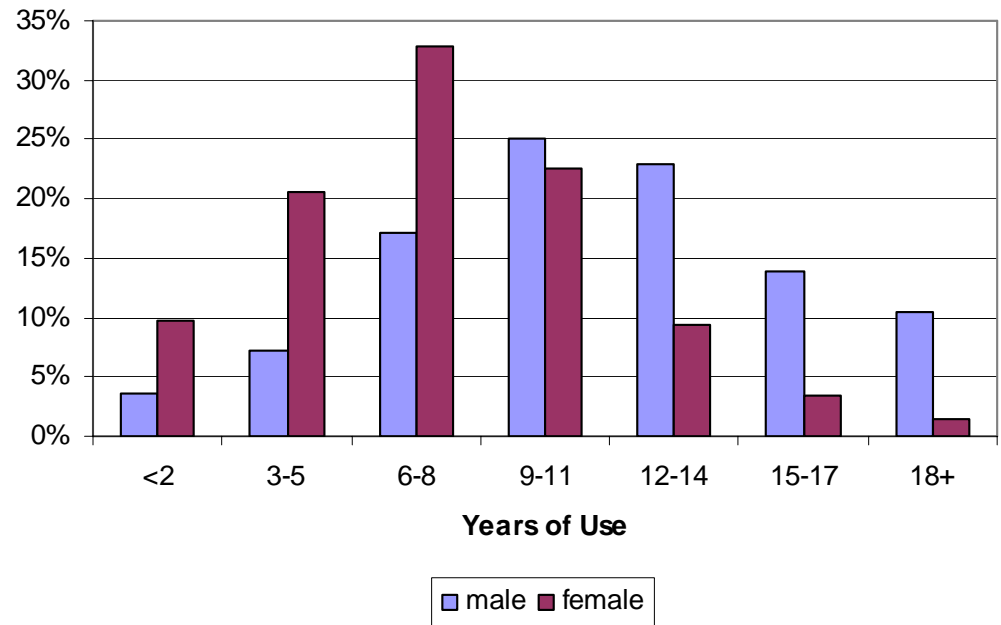
Distribution of users by age and amount of use



# Results



Distribution of  
Years of Use  
by gender



## Users of:

DECT cordless phone	70 %
Wireless LAN	47 %
IP telephony	5 %
Hands-free sets with mobile phones	27 %



3



# The International Childhood Brain Tumor Study (Cefalo)



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Lissa Churchward  
Nick Martinussen  
Astrid Sehested  
Kjeld Schmiegelow  
Jørgen H Olsen  
Christoffer Johansen  
Joachim Schüz



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Norwegian Cancer Registry



Maria Feychting  
Karolinska Institute



Martin Rösli  
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Patricia McKinney  
University of Leeds

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University of Manchester

# Design



- 
- Identify all 7 to 19 year old children and adolescents with a newly diagnosed brain tumour between 3/2004 – 5/2008
  - For each case, sample two matched controls
  - Computer-assisted personal interview with child and mother
  - Download of past traffic records for all mobile phones used by the child
  - Collection of saliva sample

# Status



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	Eligible	Pending	Refusals	Agreed	Rate
Case	78	6	2	70	97 %
Control	188	28	33	127	85 %

Denmark: Expected number of cases 85-90, 1:2 Matching

Cefalo: Expected number of cases ~500, 1:2 Matching

# Results

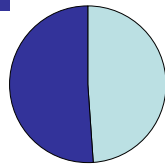


Age group  
[Years]

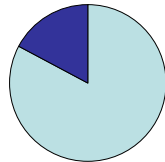
Never / ever Use

never ever

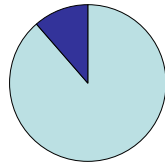
7 – 9



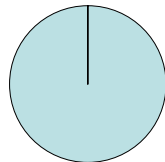
10 – 12



13 – 15

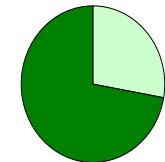
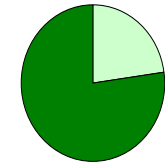
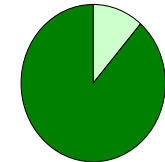
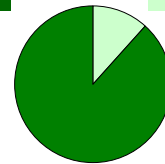


16 - 19



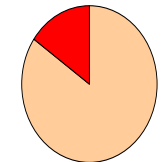
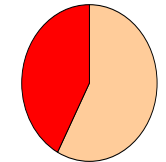
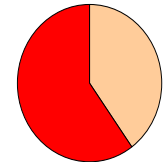
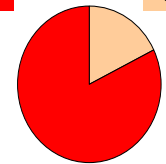
Use  
5 years ago

no yes

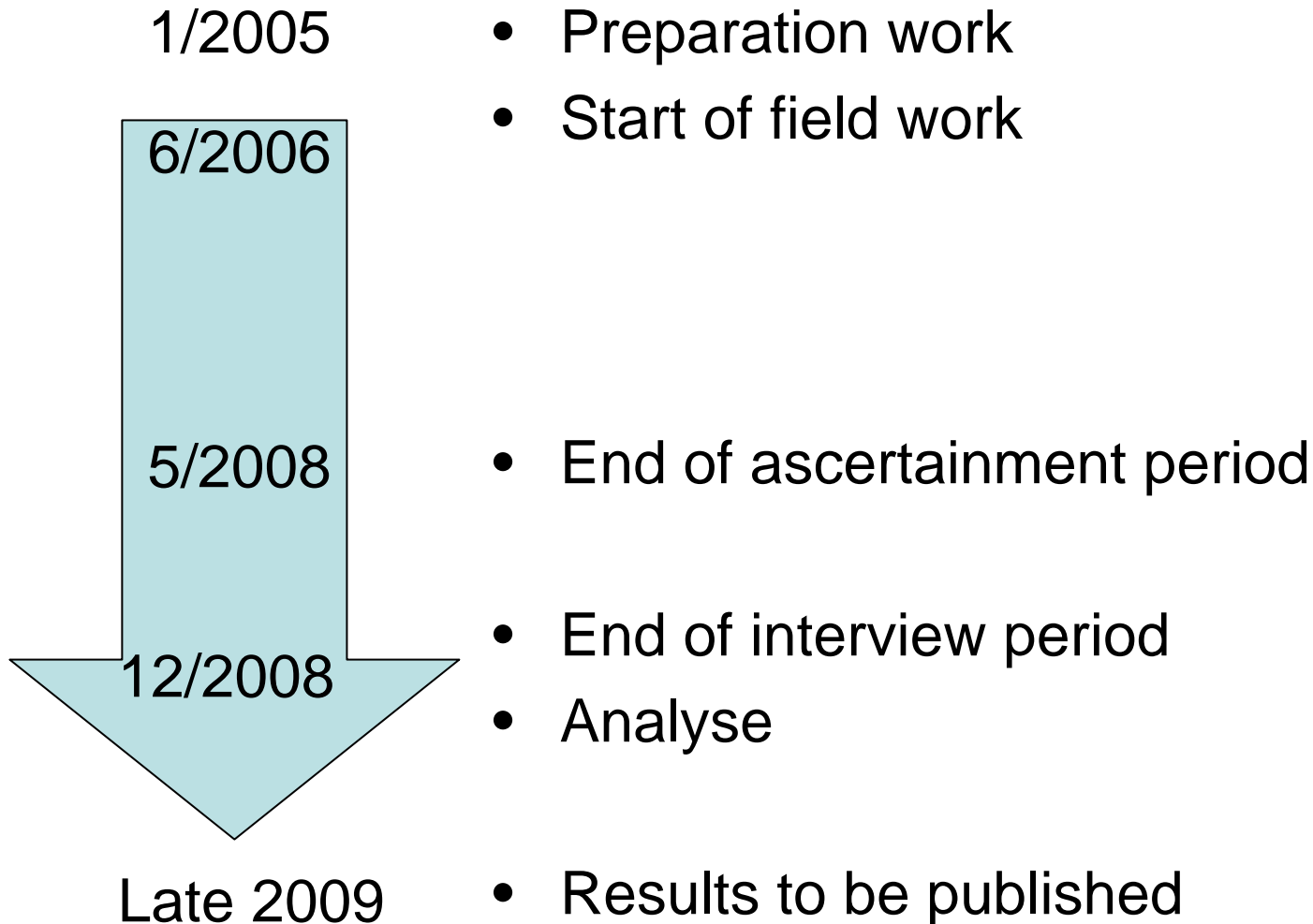


Daily Use

no yes



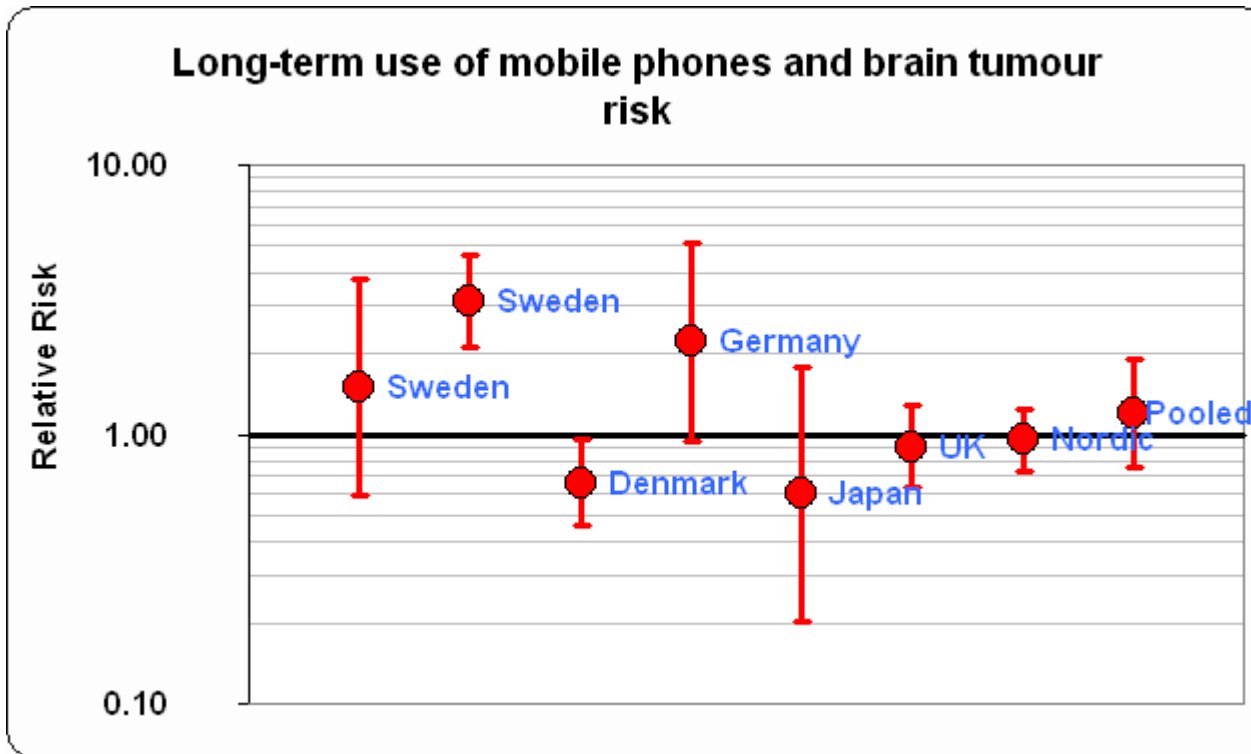
# Schedule



# OVERVIEW 1:



## Studies on long-term mobile phone users



RR = 1.20

CI = (0.75 – 1.90)

Homogeneity  $p < 0.01$

RR (excl. DK cohort)  
= 1.35

RR (excl. Hardell)  
= 0.89

RR (excl. both)  
= 0.99

From: Hardell et al. Occup Env Med 2007; low grade glioma and high grade glioma

From: Schüz et al. J Natl Cancer Inst 2006; all brain tumours

From: Schüz et al. Am J Epidemiol 2006; all glioma

From: Takebayashi et al. Br J Cancer 2008; all glioma, cut-off 6.5 years

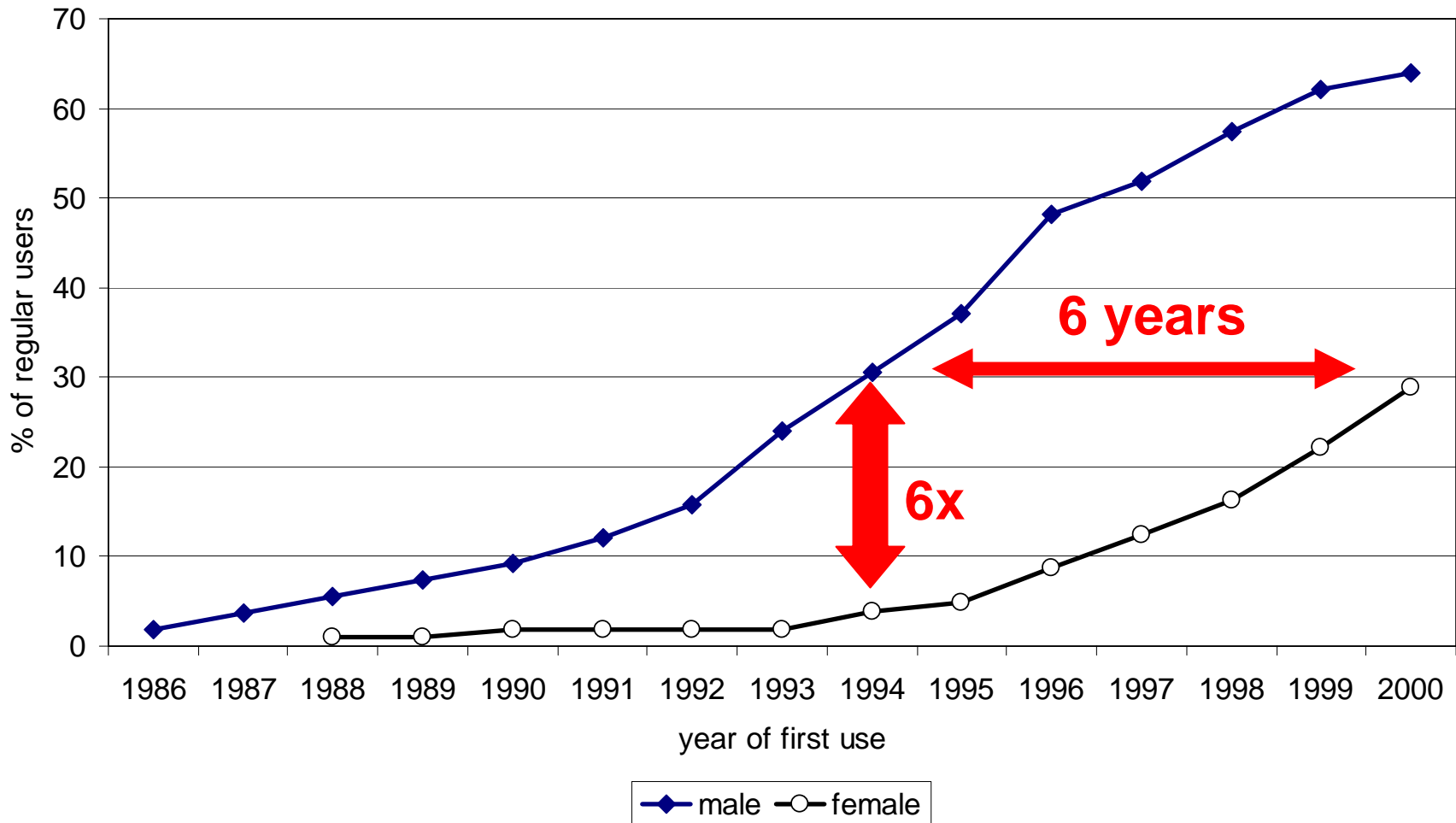
From: Hepworth et al. BMJ 2006; all glioma (overlap with Lahkola)

From: Lahkola et al. Int J Cancer 2007; all glioma

# OVERVIEW 2:



## Age- and gender-specific trends in prevalence

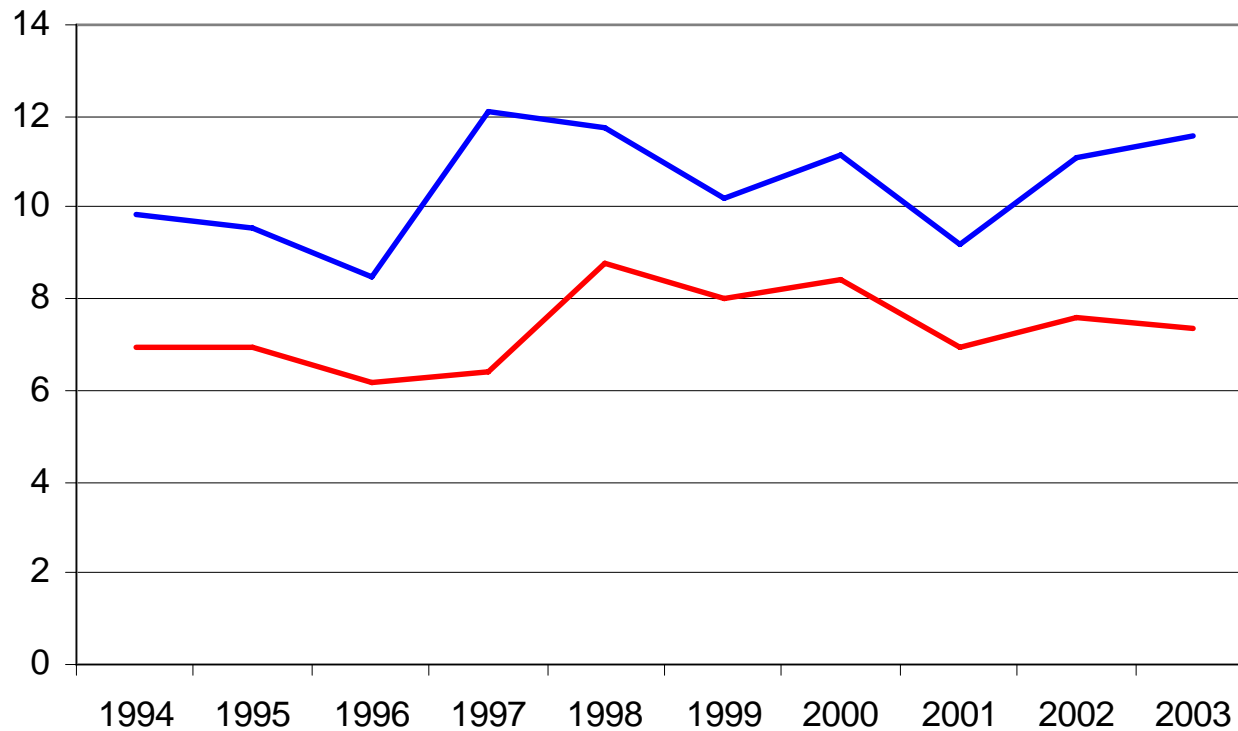


# OVERVIEW 3:



## Time trend in brain cancer incidence

Primary malignant brain tumors in men and women, in Denmark



Ratio:

1.39

1.45

1.45