



IARC Research Actions on Radiofrequencies

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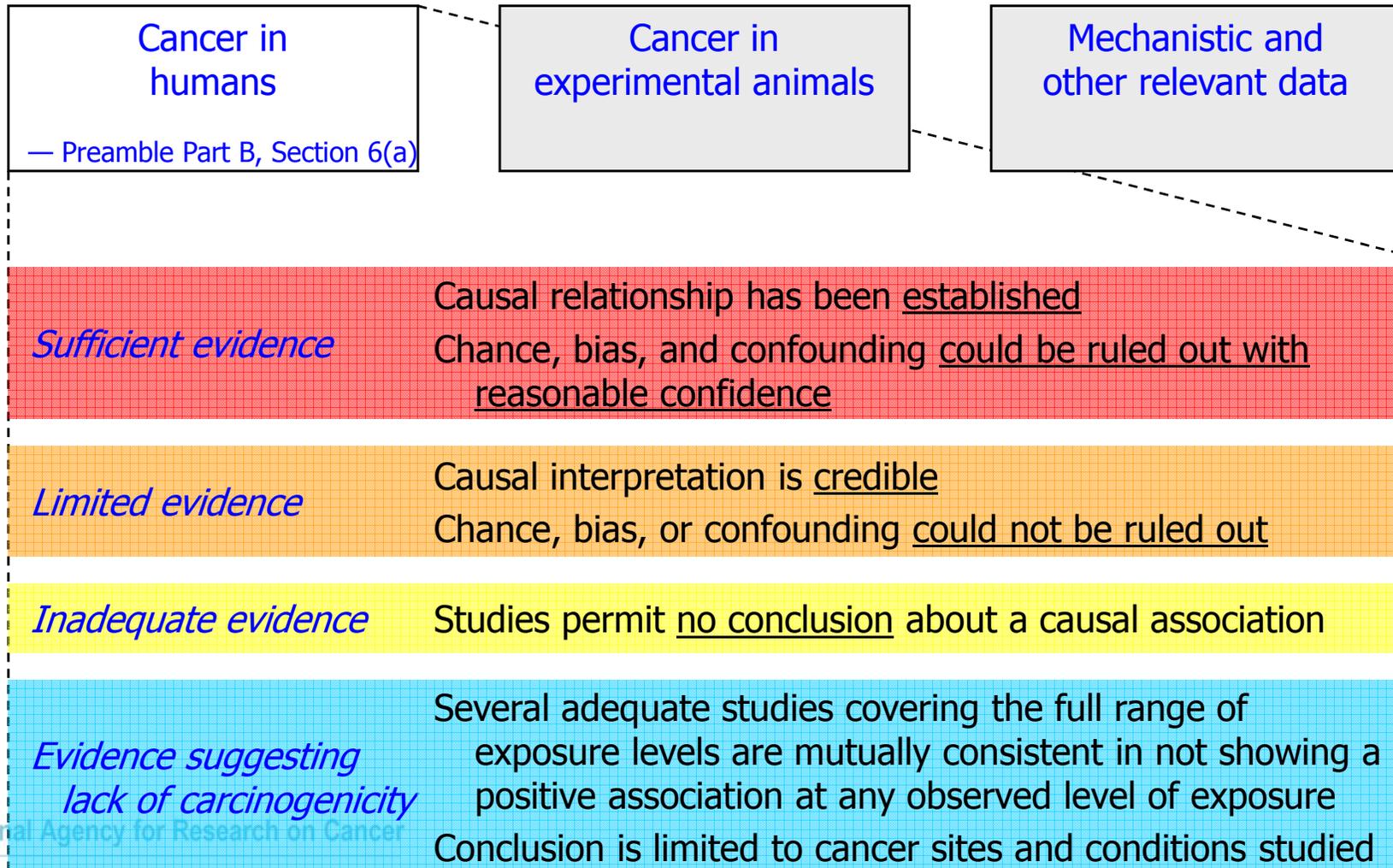
19th EMF-Day, Paris, 20 Dec 2012

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

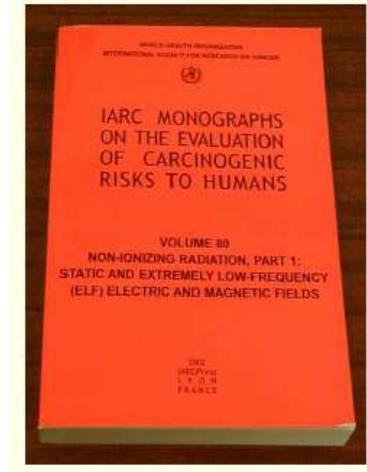
		EVIDENCE IN EXPERIMENTAL ANIMALS			
		<i>Sufficient</i>	<i>Limited</i>	<i>Inadequate</i>	<i>ESLC</i>
EVIDENCE IN HUMANS	<i>Sufficient</i>	Group 1 (<i>carcinogenic to humans</i>)			
	<i>Limited</i>	Group 2A (<i>probably carcinogenic</i>)	Group 2B (<i>possibly carcinogenic</i>) (exceptionally, Group 2A)		
	<i>Inadequate</i>	Group 2B (<i>possibly carcinogenic</i>)	Group 3 (<i>not classifiable</i>)		
	<i>ESLC</i>				Group 4

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<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**

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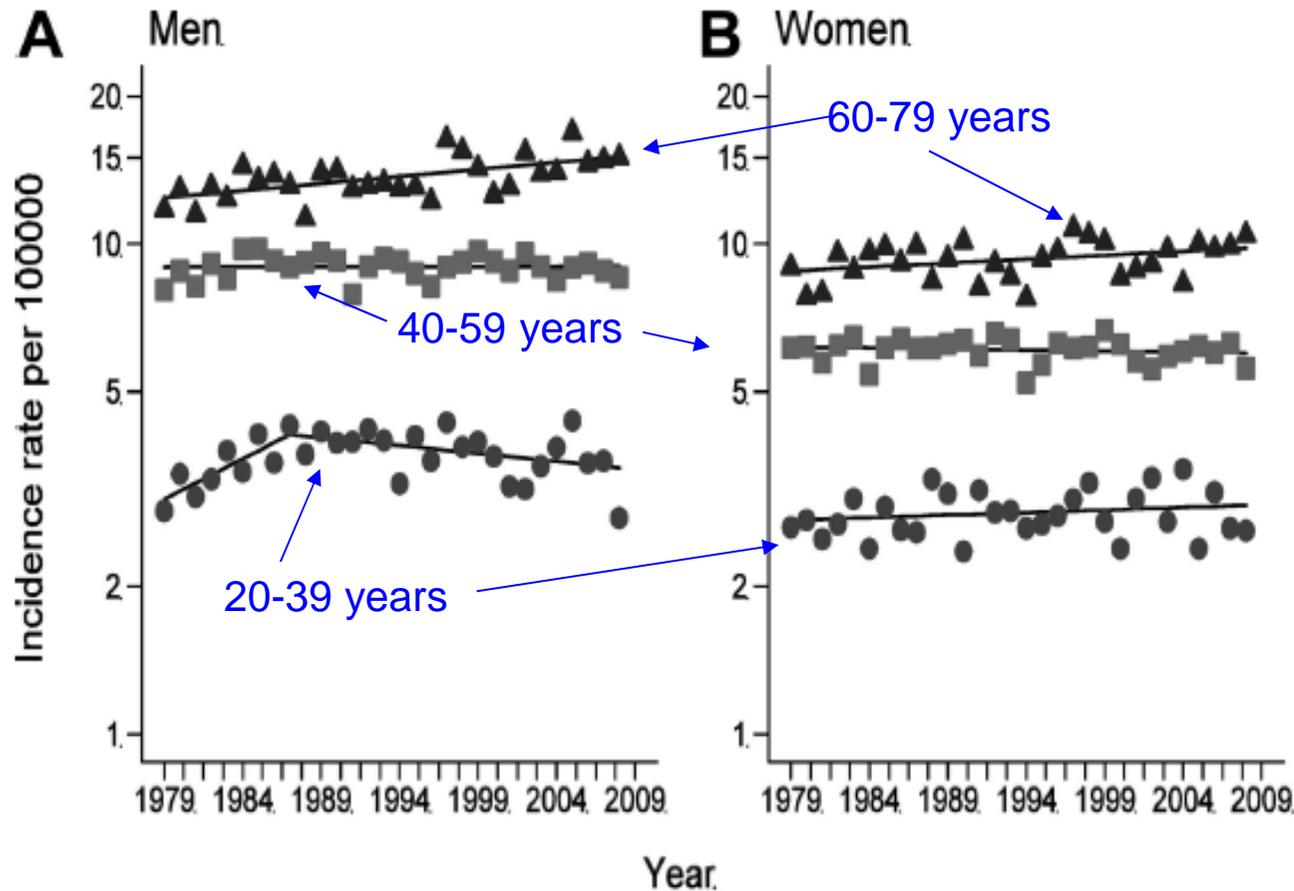
Incidence time trends studies

- 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



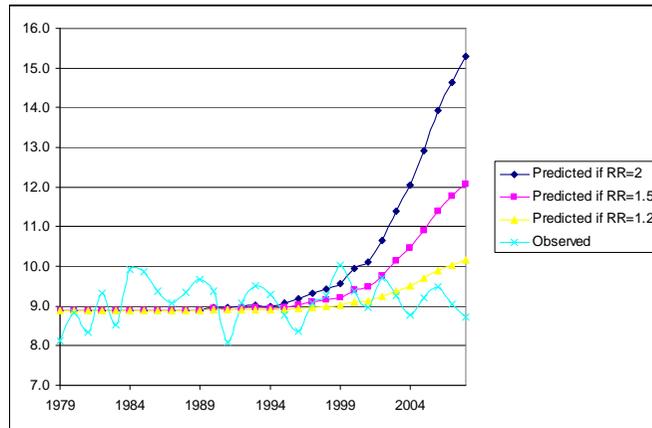
- 35,250 cases
- 510 million person-years at risk
- Annual %change:
men: 0.4%
[0.1%;0.6%]
women: 0.3%
[0.1%;0.5%]

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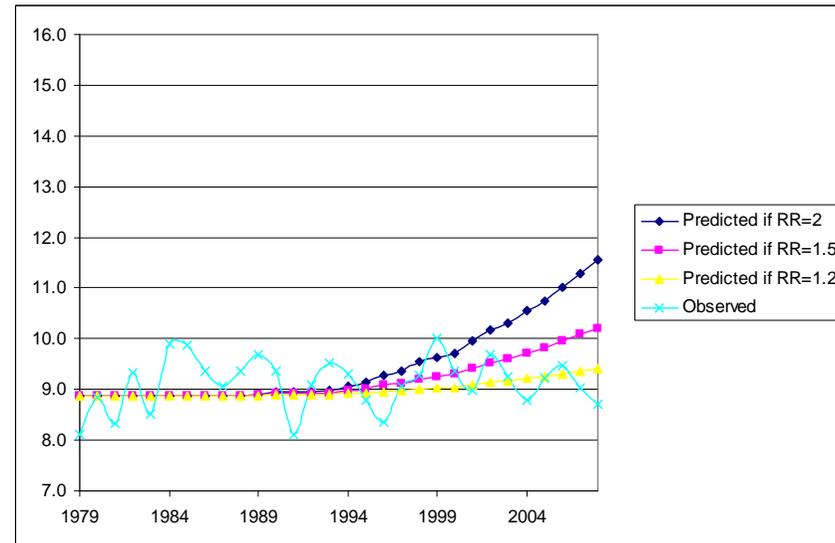
Observed and predicted incidence rates of glioma under scenarios of risk

All users at increased risk after 10 yrs

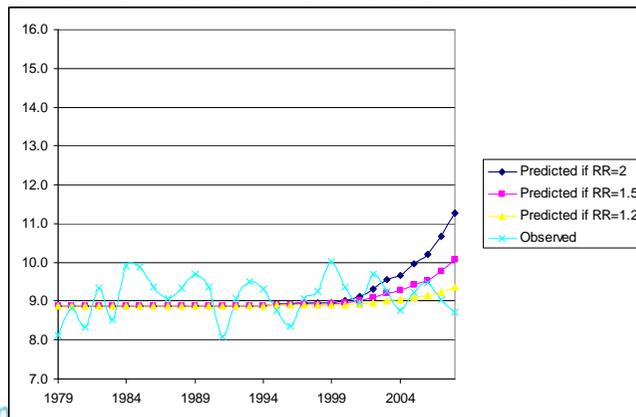


Among men 40-59 years, Denmark, Finland, Norway, Sweden combined

Risk only for heavy users (>1640 h.)



All users at increased risk after 15 yrs



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

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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

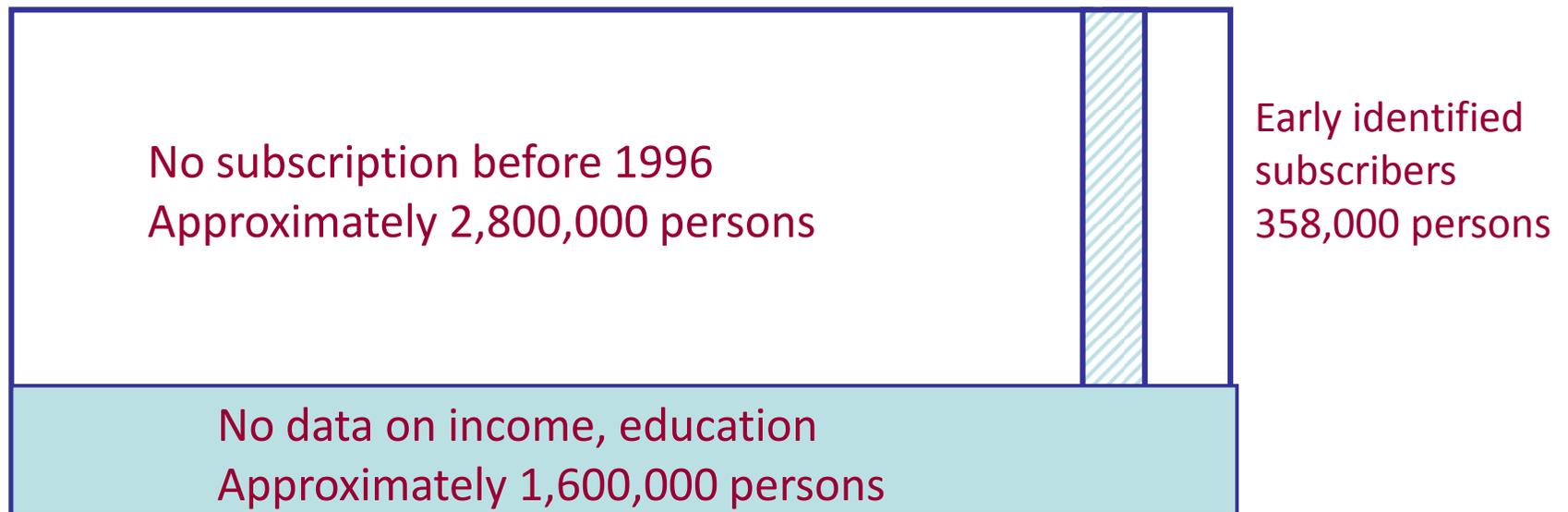
Danish cohort of early mobile phone subscribers: design

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

Unexposed (no subscription bef. 1996) Approximately 4,130,000 persons	E x p o s e d	Early subscribers maximum 720,000 persons
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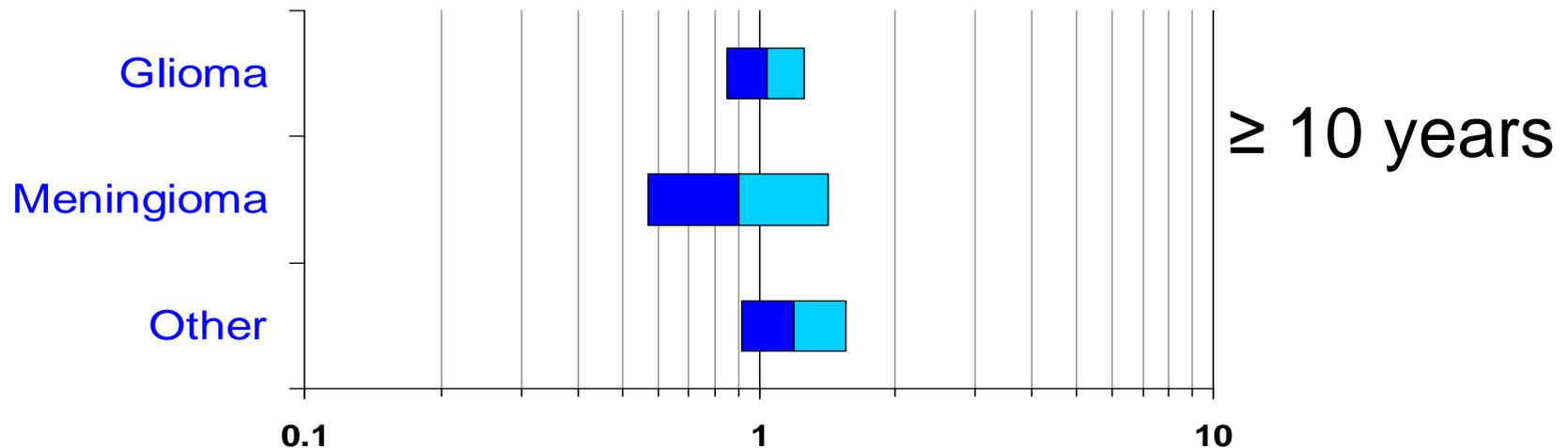
Danish cohort study of early mobile phone subscribers

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.



Danish cohort study of early mobile phone subscribers

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



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)

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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

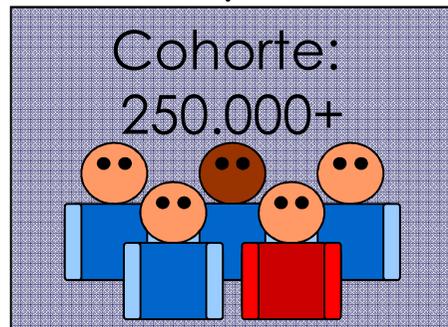
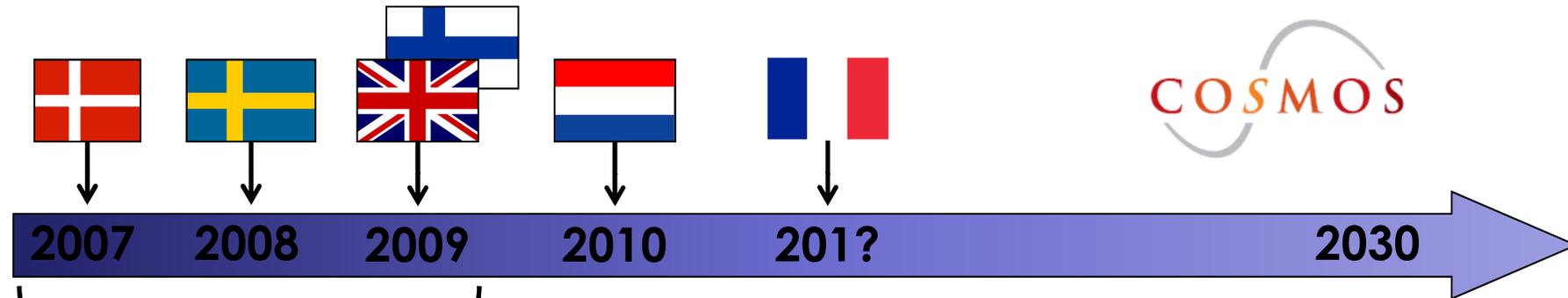
The image displays five screenshots of the COSMOS study website in different languages: Swedish (Cosmos Suede), English (Cosmos Royaume-Uni), Danish (Cosmos Danmark), Finnish (Cosmos Finlande), and Dutch (Cosmos Pays-Bas). Each screenshot shows the local version of the study's recruitment page, featuring the COSMOS logo, a map of Europe, and a 'JOIN NOW' button. The English version (Royaume-Uni) includes a 'TAKE PART' section with the text: 'To take part in the UK COSMOS study, simply complete our online questionnaire by clicking "Join Now" below.' The Dutch version (Pays-Bas) includes a 'Projectzieke' section with the text: 'COSMOS+ Linking the Dutch prospective cohort study on ELF and RF exposure to the international cohort study on mobile phone use and health and creating a central data analysis pipeline.'

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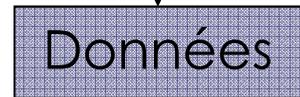


COSMOS:

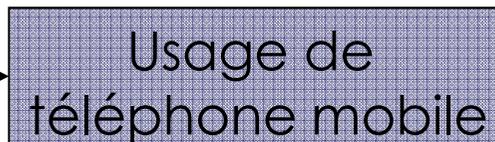
Etude de cohorte internationale téléphonie mobile et santé



Tous les 4 ans



À la demande



Annuel

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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 traffic 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

The screenshot shows the homepage of the Constances cohort website. At the top left is the logo for 'cohorte CONSTANCES' with the tagline 'Améliorer la santé de demain'. Below the logo is a navigation menu with 'ACCUEIL', 'ESPACE SCIENTIFIQUE', and 'CENTRES D'EXAMENS DE SANTE'. The main content area features a large group photo of diverse people. A purple circular callout on the left says 'Constances Observatoire pour la santé de demain'. Below the photo, text reads '200.000 volontaires pour la recherche médicale sur les principaux enjeux de santé...'. A blue arrow points to the right, and a series of dots at the bottom indicates the current page position.

www.etude-nutrinet-sante.fr

The screenshot shows the homepage of the NutriNet-Santé website. At the top left is the logo for 'ETUDE NUTRINET SANTE'. Below it, text reads '500 000 nutrinautes pour étudier les relations entre la nutrition et la santé'. To the right is a login section titled 'ACCÈS MEMBRE' with fields for 'Identifiant' and 'Mot de passe', and buttons for 'OK', 'Identifiant oublié?', 'Mot de passe oublié?', and 'Je m'inscris'. Below the login section is a navigation menu with 'Accueil', 'Pourquoi l'étude NutriNet-Santé?', 'Objectifs de l'étude', 'L'étude NutriNet-Santé en bref', 'Qui peut participer?', 'Pourquoi participer?', 'Comment s'inscrire?', 'Mode d'emploi', 'Qui coordonne?', 'Partenaires? Qui finance?', 'Actualités de l'étude NutriNet-Santé dans la presse', and 'Foire aux questions'. The main content area features a large heading 'Bienvenue sur le site de l'ÉTUDE NUTRINET-SANTÉ' and a sub-heading 'Une cohorte de 500 000 Nutrinautes pour faire progresser la recherche publique sur les comportements alimentaires et les relations Nutrition-Santé'. Below this is a 'Rejoignez-nous ! Inscrivez vous !' section with a 'Je m'inscris' button. To the right is a video player with the text 'L'étude NutriNet-Santé : une inscription simple, confidentielle, et rapide !' and a 'Voir la vidéo de présentation' link. At the bottom, there is a date '12/12/12' and a link to 'télécharger le nouveau communiqué de presse NutriNet-Santé' with a brief description of the study's focus on food packaging labels.

Cosmos-France partners

International Agency Research on Cancer

Environment and Radiation Section

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IFSTTAR (Transports, Aménagement, Réseaux)

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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

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- Thank you for your attention

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