



mobi-kids

Tecnologías de la comunicación,
medioambiente y tumores cerebrales en la gente joven

The Mobi-Kids study

Elisabeth Cardis



**ISGlobal
Alliance**



Use of mobile phones during childhood and adolescence

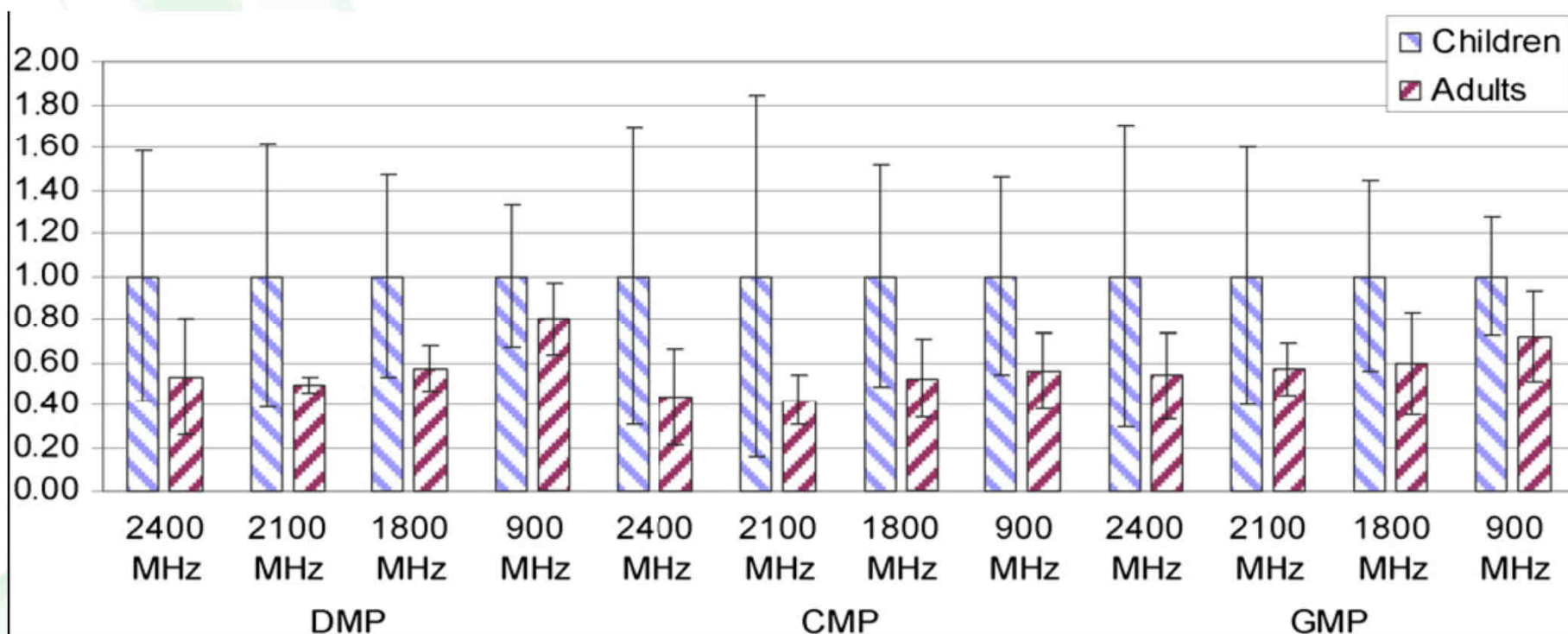
- Benefits – non-negligible
 - Emergencies
 - Communication with family
 - Communication with friends
- What are the potential risks ?
 - Cognitive effects
 - Brain and CNS tumours
- Health effects of RF not demonstrated at this point
... but if there is a risk, it is likely to be greater for exposures in childhood and adolescence ...

Why would the risk be larger?

- Children who start using phones will have much more exposure
 - Many more years of use
 - Greater quantity of use as much cheaper than before
- Children may be more vulnerable

Exposure is greater ...

The relative mean MSAR1g tends to be higher in children than in adult brain tissues
(results normalized to children)



Wart et al, 2008

Brain tumours in young people - CEFALO

- **Aydin et al 2011, JNCI**
 - 352 cases, 646 controls
 - 7-19 years old, 2004-2008
 - Participation rates - 83% cases, 71% controls
 - Results
 - ✓ Ever regular use (194 cases) OR 1.36 (95% CI 0.92-2.02)
 - ✓ No evidence of increase with duration or amount of use
 - ...only 52 cases with subscriptions for 4 years or more*
 - **Interpretation difficult**
 - ✓ Relatively small number of subjects
 - ✓ Subjects young – median 13 years
 - ✓ Very few long term or heavy users
 - *median years of use 2.7*
 - *median cumulative hours of use lifetime: 35*
 - ✓ Most ORs above 1 ...



- Overall objective
 - To assess the risk of brain tumours in young people in relation to:
 - ✓ childhood and adolescent exposure to EMF from communication technologies
 - ✓ other potential environmental and host factors
- Case-control study
 - Cases
 - ✓ Benign and malignant brain tumours
 - ✓ Aged 10-24, 2011-2014
 - ✓ Rapid ascertainment from diagnosing and treatment hospitals
 - Controls
 - ✓ 2 per case
 - ✓ **Appendicitis controls**, to minimise selection bias related to non-participation.
 - ✓ Individually matched on age, sex and region



MobiKids countries – about 1000 cases expected

- EU funding

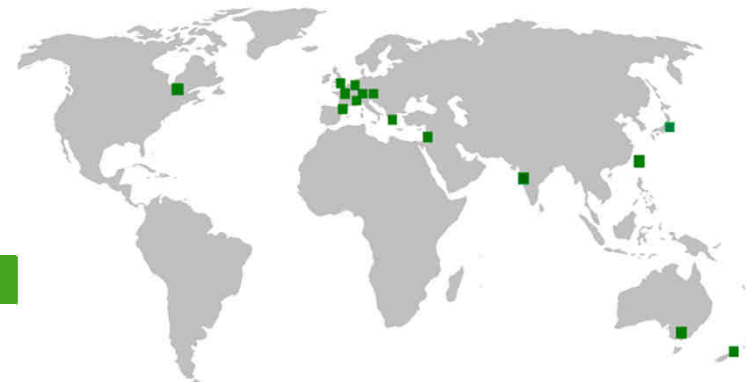
- Austria
- France
- Germany
- Greece
- Israel
- Italy
- The Netherlands
- Spain*



- Separate funding

- Australia
- New Zealand
- Canada
- India
- Korea
- Japan
- *Taiwan*

**CREAL coordinator*



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Detailed study questionnaire



MobiKids - [B. Uso de Teléfono Móbil]

MobiKids Archivo Edición Vista Ayuda



Interview Status Summary

FPrimary 11-01-15-01-0001

Exit

Was the Informed Consent signed? 0 : No 1 : Si

Link Status * Section

- > On-going Follow-Up Registry
- > Completed Appendix A

Index Name:

Link Status * Section

- > Pending Appendix B

Main Questionnaire Status:

Last Section:

Last Field:

Parental Questionnaire Status:

Last Section:

Last Field:

Status * Main Questionnaire Section

- > Completed A. General Information
- > On-going B. Mobile Phone Use
- > Pending C. Other wireless communication devices usage
- > Pending D. Exposure to other (not communication) sources of ELF and RF
- > Pending E. Occupational
- > Pending F. Medical Radiation
- > Pending G. Medical History
- > Pending Index Questions On Water And Disinfection By-Products (country specific)
- > Pending H. Interview responsiveness & status

Status * Parental Questionnaire Section

- > Pending I. Maternal Questionnaire
- > Pending Mother Questions On Water And Disinfection By-Products (country specific)
- > Pending J. Family History of Cancer
- > Pending K. Paternal Questionnaire
- > Pending L. Interview responsiveness (Parental)

Link Status * Section

- > Pending M. Clinical Questionnaire

Validation of self-reported mobile phone use

To characterise and quantify potential recall error

- **Historical traffic/billing records from providers for cases and controls**
 - Frequency and duration of voice and data use
 - Identification of phones (in some countries through IMEI)
- **Laterality**
 - Interview hands a phone to the subject
 - Photograph if not in person
- **Software-modified-smartphones (SMSP) study among volunteers and Mobi-Kids controls with smartphones**
 - Frequency and duration of voice and data use
 - Laterality
 - Hands free
 - Estimated power



ZonWN

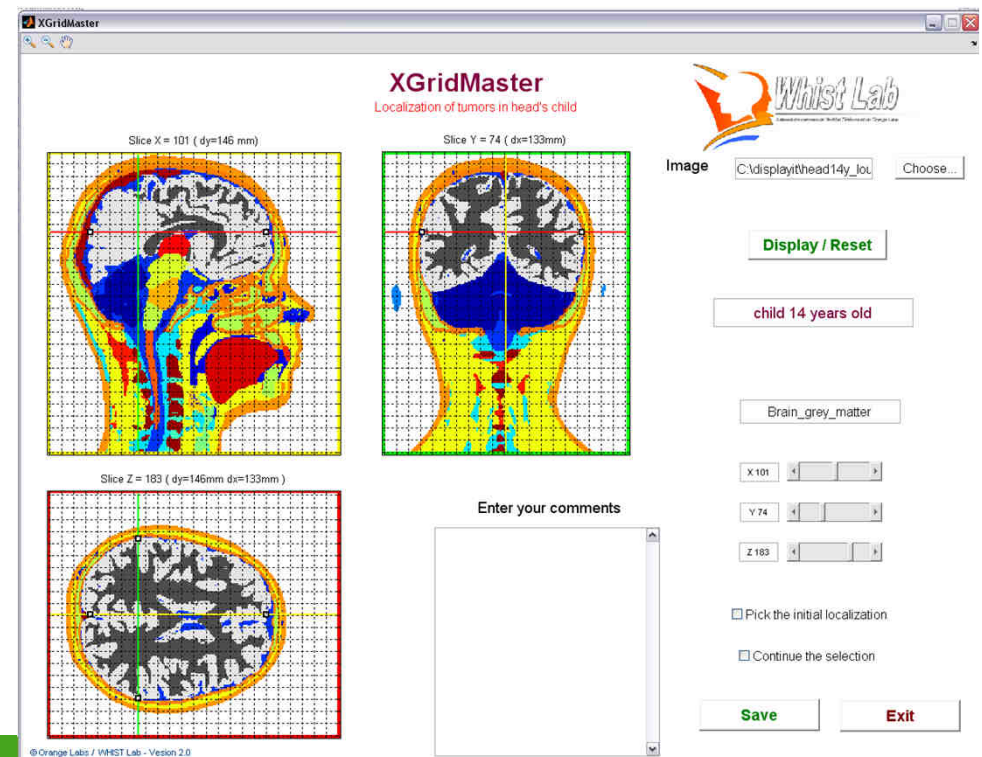


... *Validation and information on use patterns*

Tumour diagnosis and localisation



- Tumour diagnosis:
central review of sample of histological slides
by international panel of neuropathologists to verify diagnosis
- Tumour localisation:
review of MRI/CT scans - mark
precise location of tumour on
specially developed grids





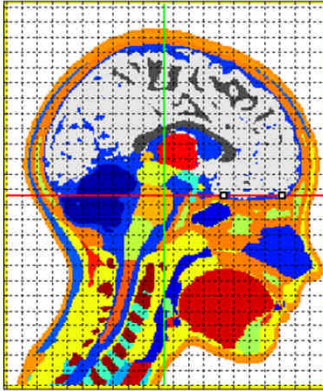
- Exposure assessment subcommittee:
Myron Maslany, Joe Wiart, Hans Kromhout, Malcolm Sim, Ae-Kyoung Lee, Masao Taki, Elisabeth Cardis
- Exposure assessment - EMF
 - Estimation of RF and ELF exposure at different locations of the brain from mobile and DECT phones and other communications technologies
 - Estimation of EMF exposure from other residential and occupational sources



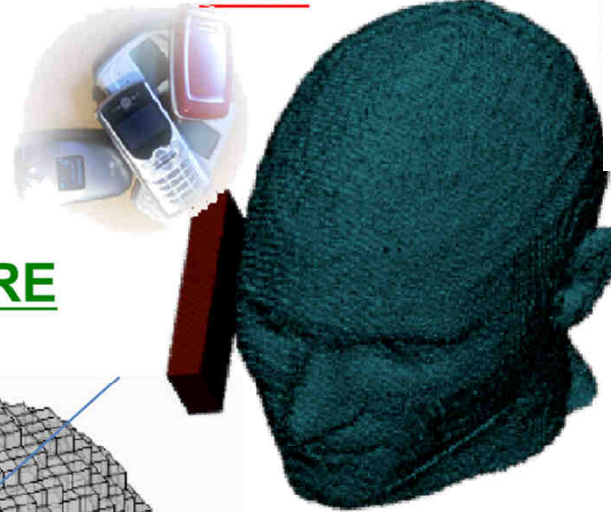


Objective: characterise the exposure

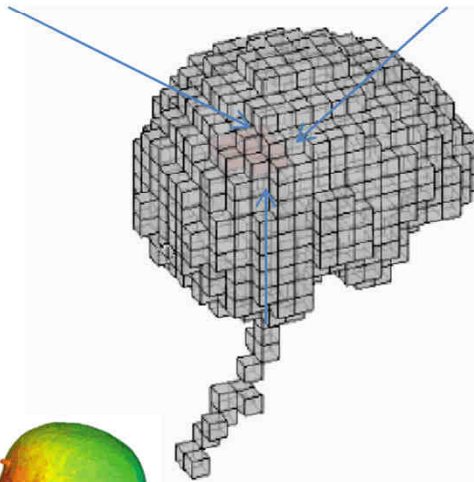
Tumor localisation



SAR

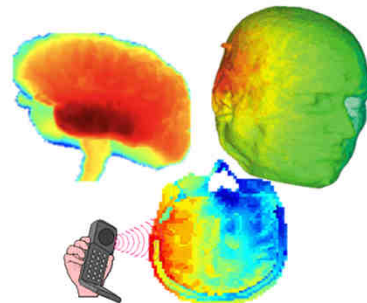


EXPOSURE



SAR distribution in brain :

highly localized



Courtesy: J. Wiert, Whist Labs

Exposure assessment – other environmental factors



- Questions – pets, living on farm, etc.
- Evaluation of availability of geocoded data on other exposures for linkage with *residential and school history of subjects*
 - ✓ land use
 - ✓ water companies
 - ✓ pesticide use
 - ✓ ,,,
- Also occupational history of subjects and their parents

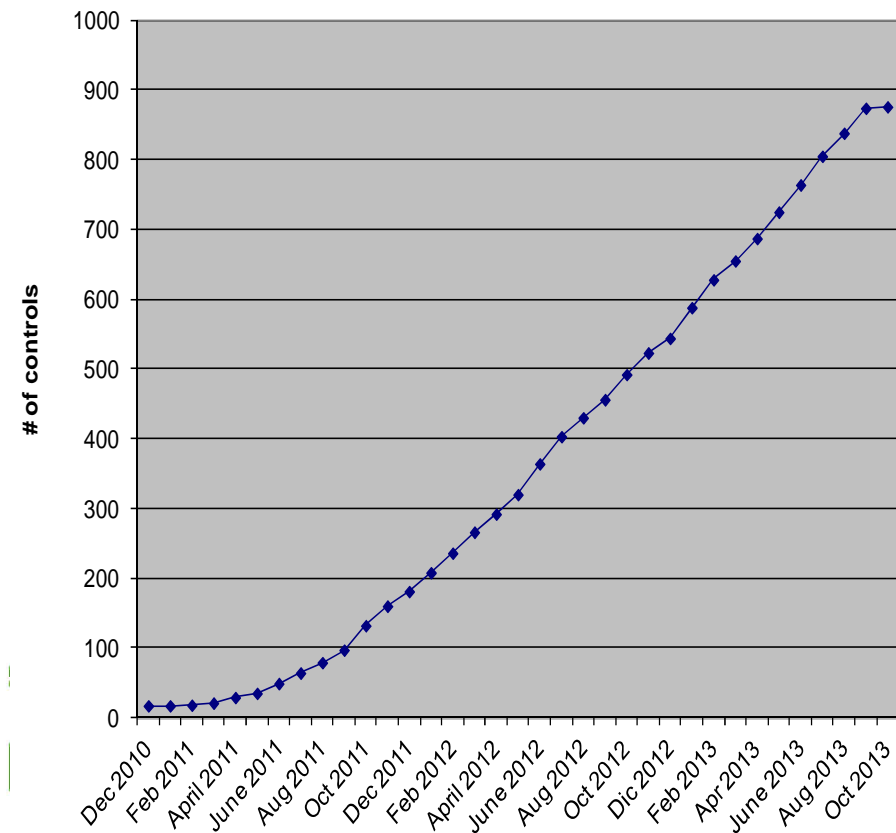
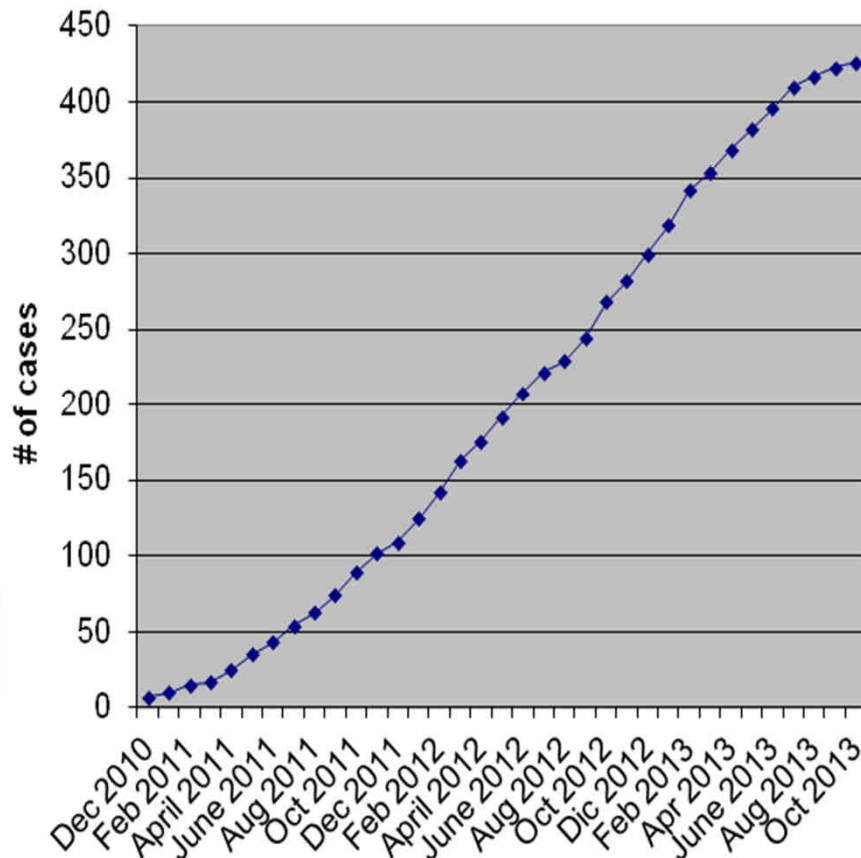
Current status



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- Ethics approvals:
 - Obtained or ongoing in most countries (hundreds of hospitals !)
- First interviews started early 2011
- New countries just started – case ascertainment until Dec 2014





GERoNiMO

Generalized EMF research using novel methods
An integrated approach: from research to risk
assessment and support to risk management

GERoNiMO

E. Cardis

20ème Journée Interactions
Ondes-Personnes





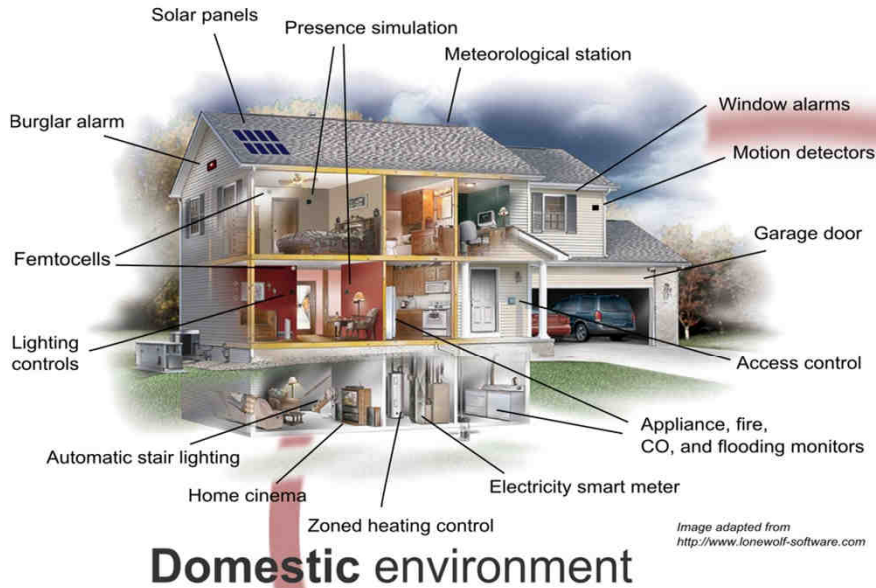
Project rationale

- European population increasingly exposed to new physical and chemical agents in the environment, some potentially detrimental to public health
- EMF are one of the most ubiquitous
- Applications of EMF in new technologies continue to grow and novel uses are actively being developed and commercialised
- Although there is substantial interest, and concern, in the public and among public health professionals about possible health effects related to EMF, previous studies have been inconclusive

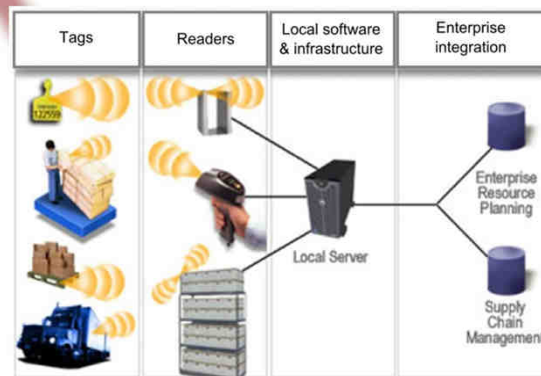




Living in a "smart world"



Commercial environment





Objectives

- To better understand mechanisms underlying possible health effects of EMF;
- To better characterise current and future population levels of EMF exposure in Europe;
- To further the state of knowledge on EMF and health;
- To improve health risk assessment of EMF; and
- To underpin policy development and propose non-technological means to reduce EMF exposure.



A2: List of Beneficiaries

Project Number ¹	603794	Project Acronym ²	GERoNIMO		
List of Beneficiaries					
No	Name	Short name	Country	Project entry month ¹⁰	Project exit month
1	FUNDACIO CENTRE DE RECERCA EN EPIDEMIOLOGIA AMBIENTAL - CREAL	CREAL	Spain	1	60
2	IMINDS VZW	IMINDS	Belgium	1	60
3	AARHUS UNIVERSITET	AU	Denmark	1	60
4	TYOETERVEYSLAITOS	FIOH	Finland	1	60
5	ITÄ-SUOMEN YLIOPISTO	UEF	Finland	1	60
6	Association pour la Recherche Epidemiologique dans les Cancers de l'Enfant et l'Adolescent	ARECEA	France	1	60
7	UNIVERSITE BORDEAUX I	UB1	France	1	60
8	ORANGE SA	ORANGE	France	1	60
9	LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN	LMU	Germany	1	60
10	The Gertner Institute for Epidemiology & Health Policy Research, Ltd	Gertner	Israel	1	60
11	CONSIGLIO NAZIONALE DELLE RICERCHE	CNR	Italy	1	60
12	UNIVERSITA DEGLI STUDI DI TORINO	UNITO	Italy	1	60
13	UNIVERSITEIT UTRECHT	UU	Netherlands	1	60
14	NASJONALT FOLKEHELSEINSTITUTT	NIPH	Norway	1	60
15	INSTITUT ZA NEIONIZIRNA SEVANJA ZAVOD*INSTITUTE OF NONIONIZING RADIATION INIS	INIS	Slovenia	1	60
16	Foundation for Research on Information Technologies in Society	ITIS	Switzerland	1	60
17	SCHWEIZERISCHES TROPEN- UND PUBLIC HEALTH-INSTITUT	SWISS TPH	Switzerland	1	60
18	HEALTH PROTECTION AGENCY HPA	HPA	United Kingdom	1	60
19	CLALIT HEALTH SERVICES	SCMCI	Israel	1	60



Strategy

- GERoNiMO (Generalised EMF Research using Novel Methods) proposes
 - an **integrated pan-European approach**
 - bringing together researchers from **different disciplines, research institutions and member states**
 - to address **key questions identified by recent European projects (e.g. EFHRAN)) and international bodies (e.g. WHO International EMF Project Research Agenda).**





Strategy

- GERoNiMO will **build upon existing European resources** to attain these objectives:
 - large-scale prospective cohort and case-control epidemiological studies of different populations,
 - exposure assessment techniques,
 - mechanistic and animal models,
 - health impact modelling
 - existing expert networks.
 - using, where appropriate, novel methods (including systems biology, innovative exposure assessment instruments, ...)

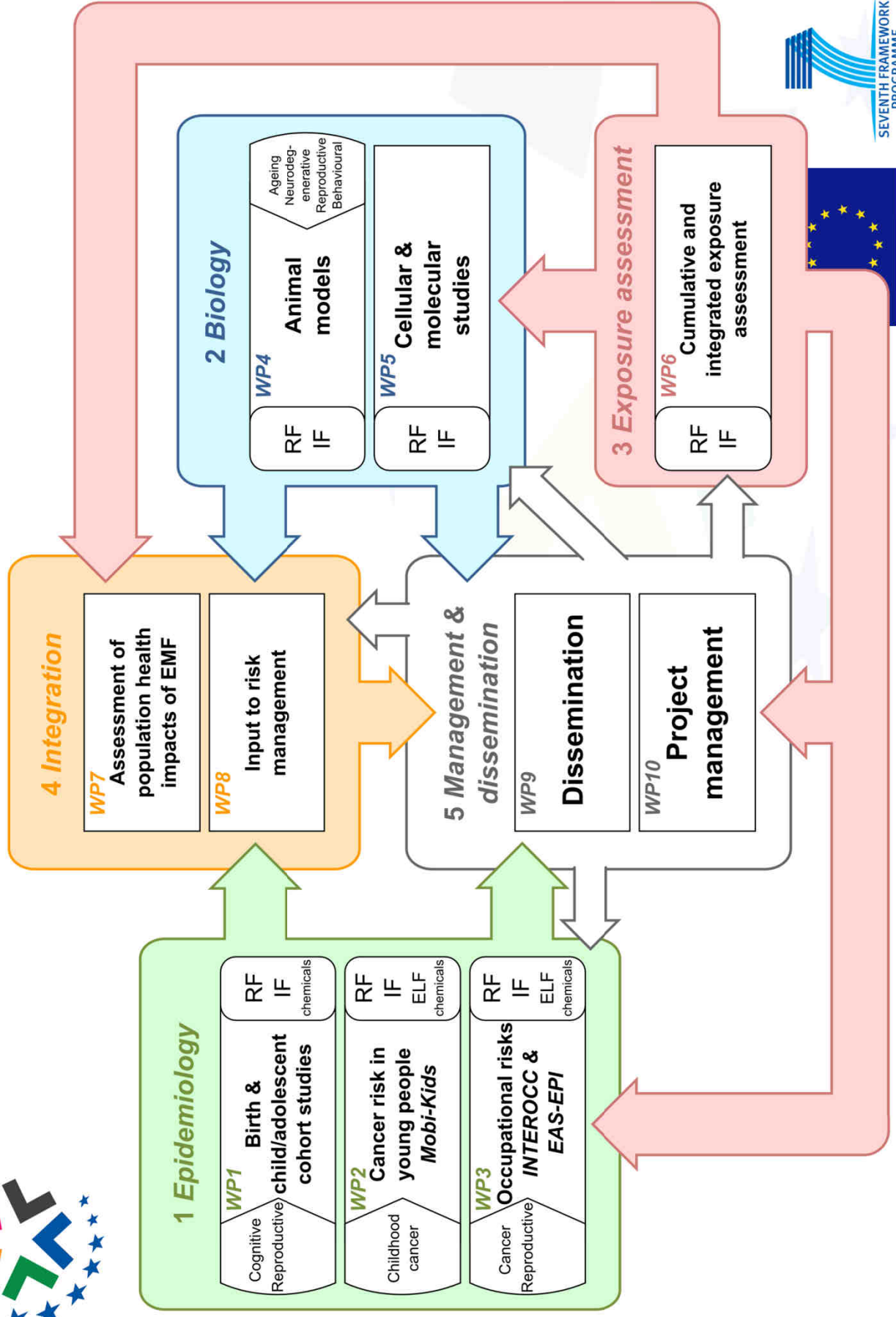




Strategy

- Through the use of different but complementary populations and approaches, GERoNiMO will, in particular, allow the investigation of
 - the potential effects of exposure to
 - radiofrequency (**RF**) and
 - intermediate frequency fields (**IF**)
 - alone and in combination with other environmental agents
 - on the risks of
 - cancer,
 - neurodegenerative diseases,
 - behaviour,
 - reproductive outcomes and
 - aging.







Impacts

- The integrated approach in GERoNiMO will significantly improve the strength, coherence, credibility, visibility and coordination of European research into EMF and health, ultimately **reducing fragmentation and improving the incorporation of evidence-based risk assessment into public health policy development and communication.**
- GERoNiMO will provide **support to the EU and national regulatory bodies** by improving reliability of research data on potential effects of EMF exposures.





Impacts

- Following the lead of EMF-Net and EFHRAN, GERoNiMO will contribute to EU management and communication activities through:
 - improved evaluation of cumulative and integrated personal exposure;
 - evaluation of non-technological means to reduce current and predicted future exposures and their likely health impact; and
 - delivering recommendations for best practice in risk communication and management to support EU policy makers.
- The project will specifically contribute to the objectives of the FP7 Environment Theme by **advancing the state of knowledge of interactions between environmental stressors (EMF and chemicals) and a variety of health outcomes**, providing for improved, sustainable management of environmental health risks at the European level.





Important facts

- Start date: 1/1/2014
- Kick-off: 16-17/1/2014
- Duration: 5 years
- EU funding: 6 million Euros
- Partners: 19

www.geronimo.crealradiation.com



CREST - Characterisation of RF exposure from new mobile communication systems uses and technologies.

- Objective
 - To characterize exposure to RF from new mobile sources (smartphones, tablets, consoles, laptops, ...) in the general population as a function of technology and new usages.
- Double aim:
 - Allow estimation of exposure for epidemiological studies
 - Provide information on population in different contexts to allow risk assessment at the level of the general population
- *Complements GERoNiMO*



CREST - Characterisation of RF exposure from new mobile communication systems uses and technologies.

- 5 complementary WPs
 - WP₁. Characterisation and evaluation of use in the general population
 - WP₂ . Identification and characterisation of networks and systems, existing and future, supporting uses identified in WP₁
 - WP₃ : Evaluation of the power emitted by the sources identified in WP₂
 - WP₄ : Evaluation of exposure from different uses and functions
 - WP₅. Development of pertinent indicators to quantify RF exposure from new devices, uses and technologies



CREST - Characterisation of RF exposure from new mobile communication systems uses and technologies.

- Partners
 - CREAL
 - Orange
 - iMinds
 - IT'IS
 - IRAS
 - Swiss TPH
 - UMRESTTE
- 3 years from end 2013
- 296 601 Euros





QUESTIONS & COMMENTS

Thank you



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en Epidemiologia
Ambiental

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