



UNIVERSITY
OF TAMPERE



HEALTH RISKS FROM MOBILE PHONES – WHAT ARE THE KNOWNNS AND UNKNOWNNS?

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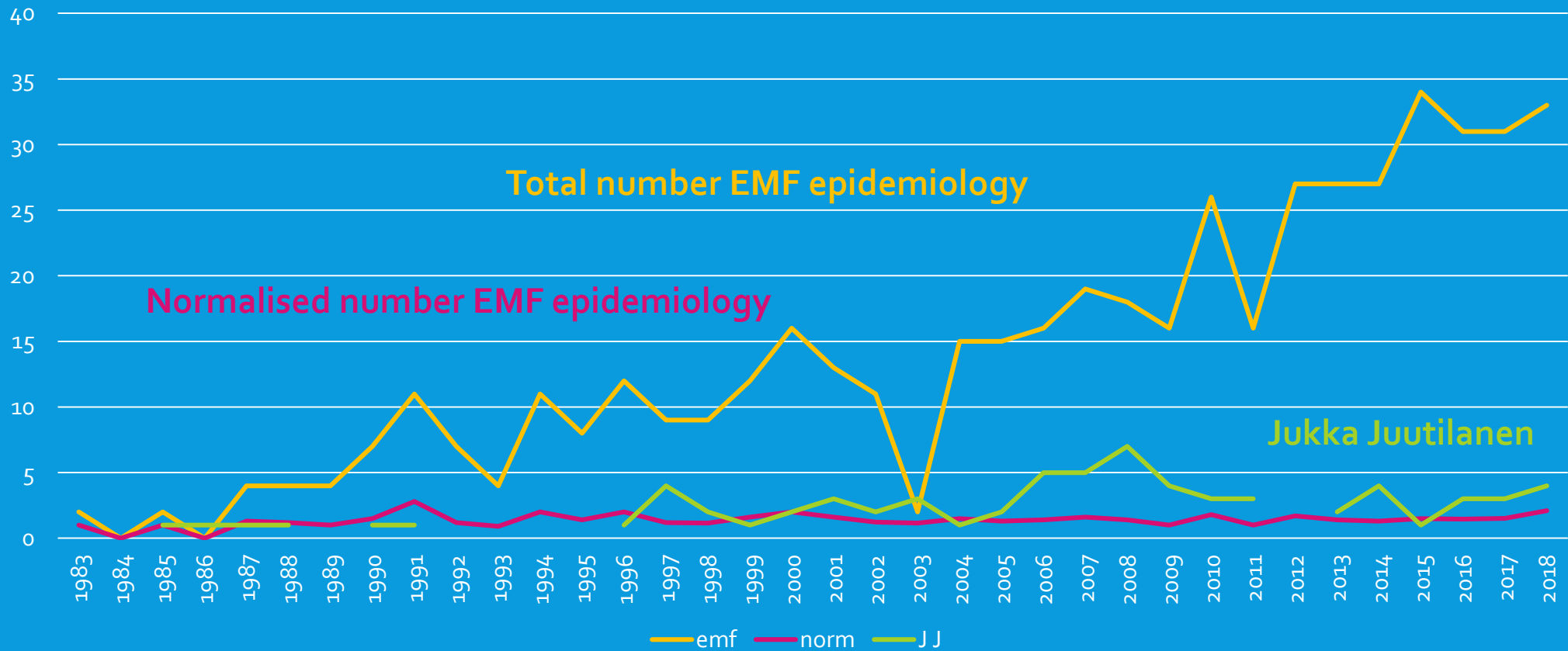
STUK – Radiation and Nuclear Safety Authority

INTRODUCTION

- Health risks from exposure to radiofrequency electromagnetic fields a topic of 'epidemiology wars'
- Highly contested interpretation of the evidence
- Some researchers unfailingly report major increases in risks that are not replicated in other studies
- Are mobile phones the 'new tobacco'? An emerging major threat to public health?
- Comprehensive review of expert panels by AGNIR, SCENIHR, SSM and others



PUBLICATIONS ON EMF



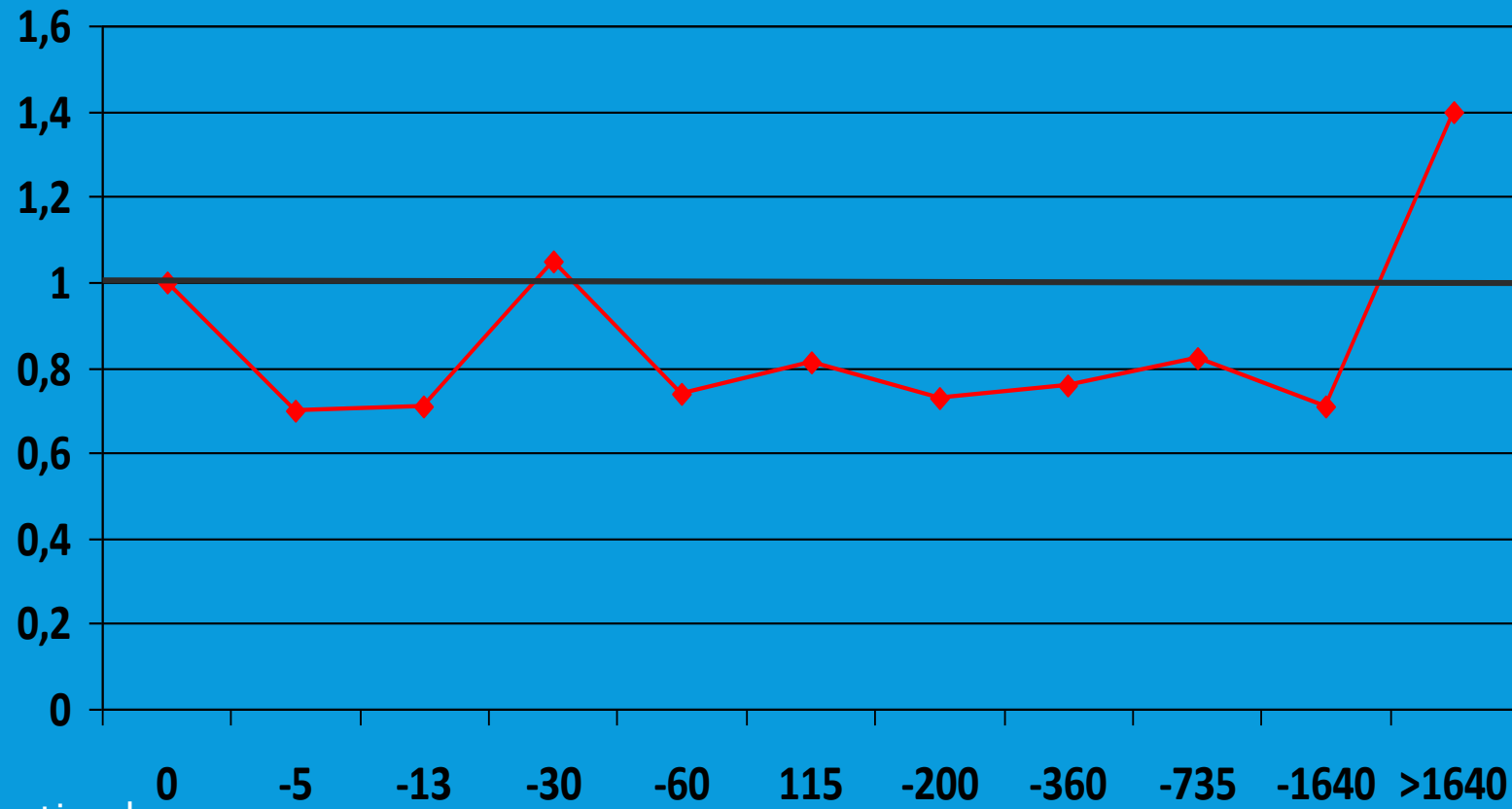
IARC CARCINOGENICITY REVIEW

- Radiofrequency EMF classified in 2012 as 2B – possibly carcinogenic to humans
 - Limited evidence in humans and experimental animals
 - Similar assessment as for ELF-EMF
- Based on epidemiological studies of glioma and acoustic neuroma
 - Interphone: Highest amount of cumulative use, ipsilateral use, temporal lobe tumors
 - Hardell studies and a Japanese case-control study
- Minority opinion suggested 'inadequate evidence' due to null findings in cohort studies and temporal trends

- The jury is still out?
- What are they doing?
- When will they return with the verdict?
- Or are they just about to retire?



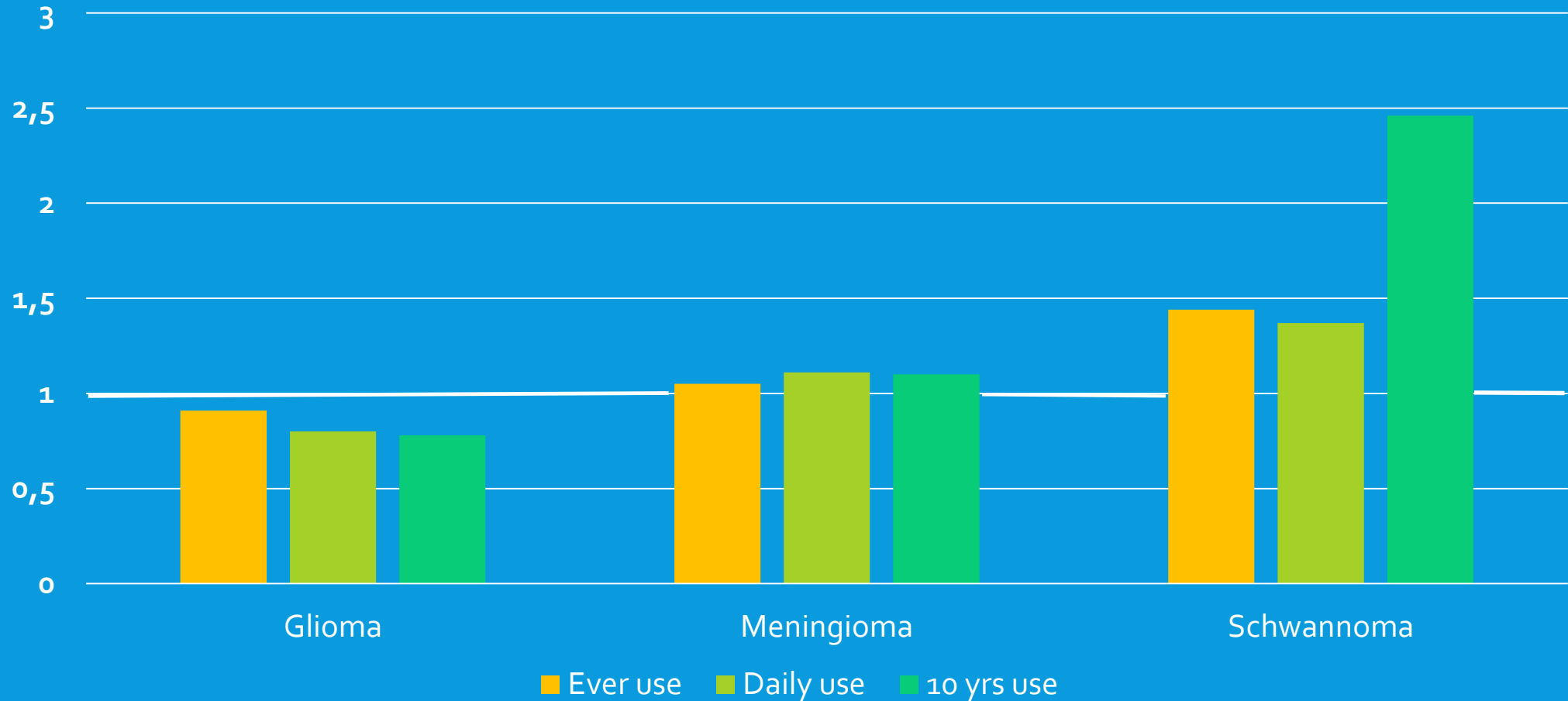
INTERPHONE STUDY: GLIOMA RISK



“Apparent overestimation by cases in more distant time periods could cause positive bias in estimates of disease risk associated with mobile phone use”

Interphone study group, Int J Epid 2010

UK COHORT STUDY (BENSON INT J EPID 2013)



DANISH COHORT STUDY (FREI BMJ 2011)



SIR

1,4

1,2

1

0,8

0,6

0,4

0,2

0

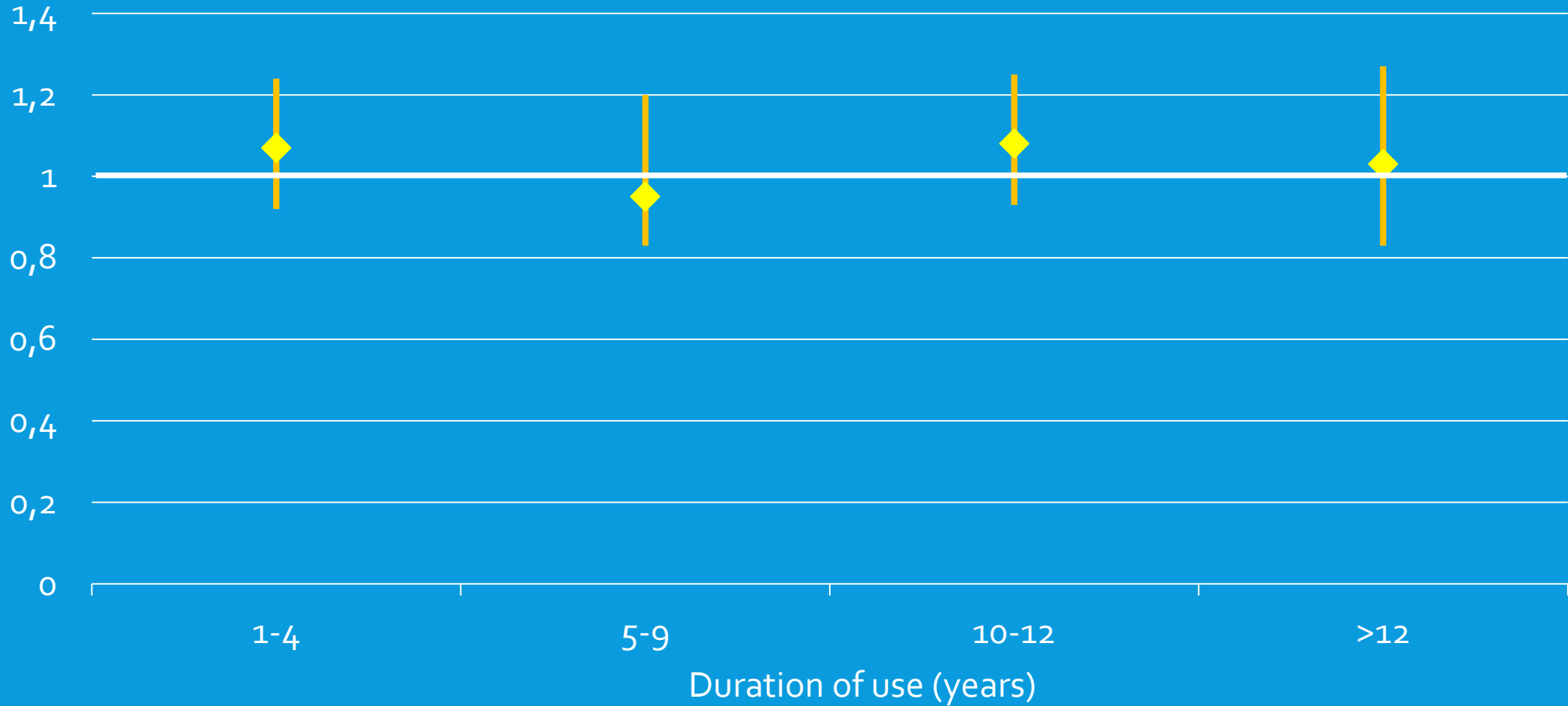
1-4

5-9

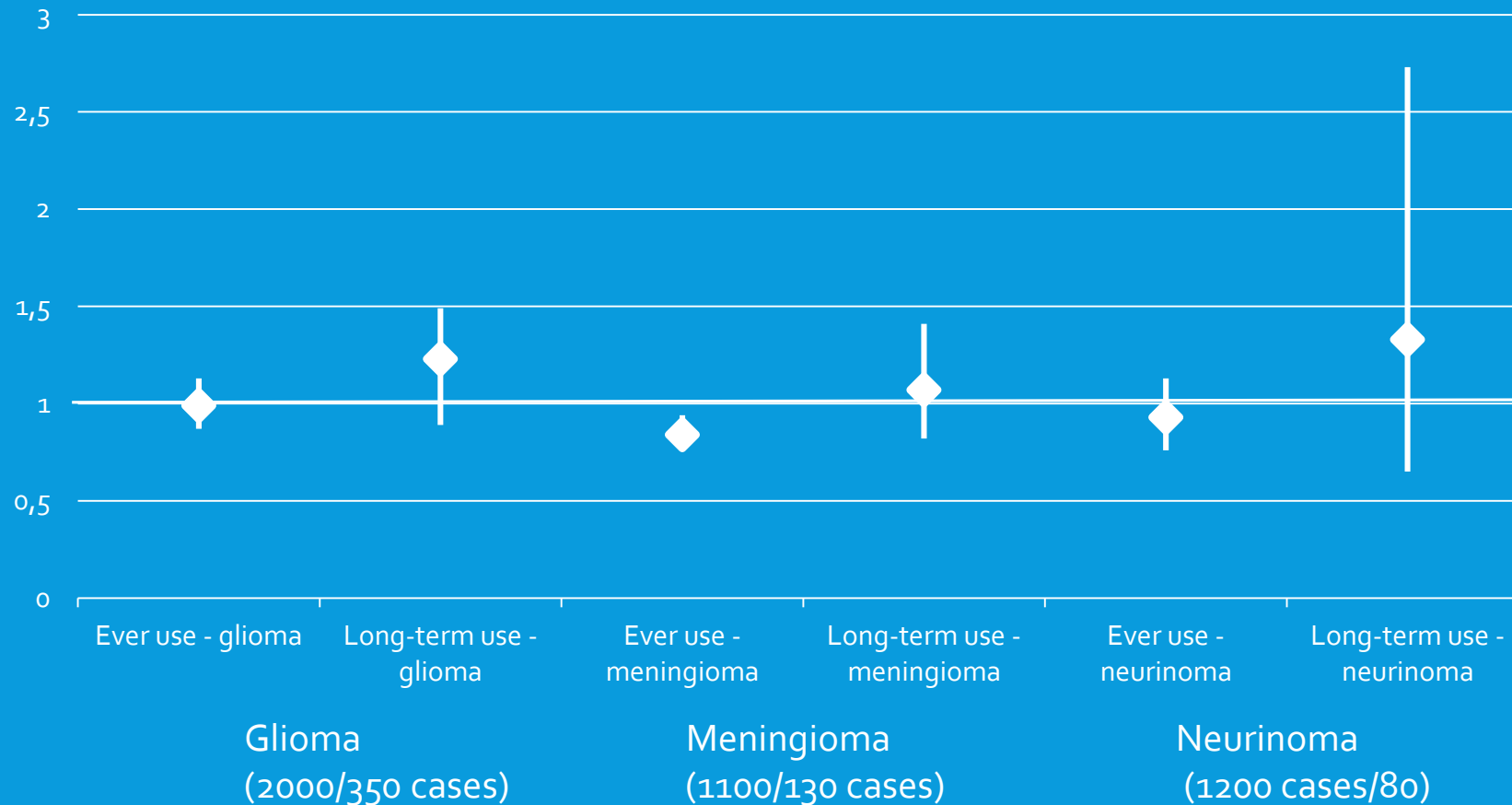
10-12

>12

Duration of use (years)

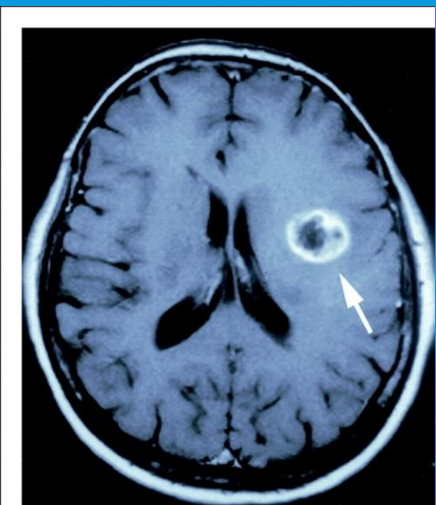


META-ANALYSIS (LAGORIO&RÖÖSLI 2014)



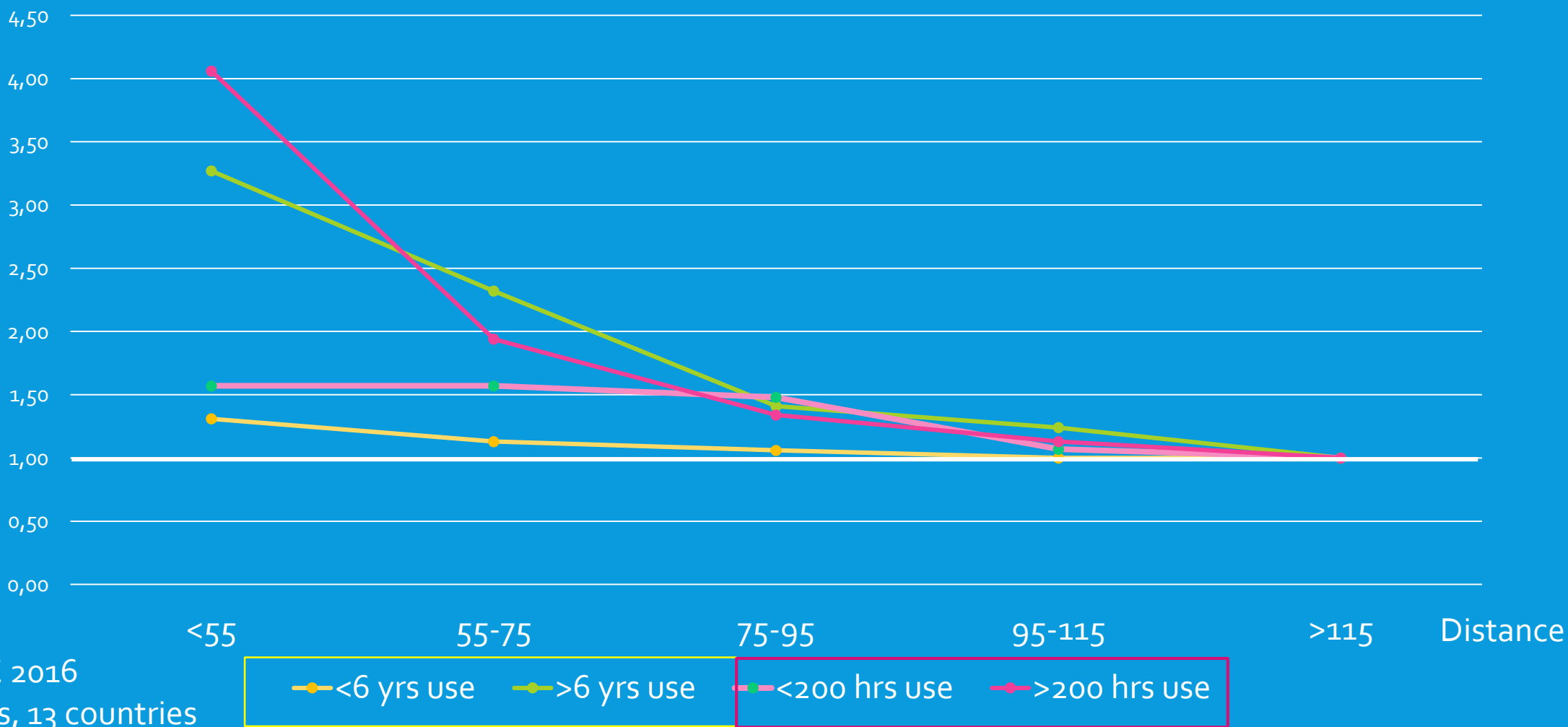
GLIOMA LOCATION (LARJAVAARA AJE 2010)

Exposure metric	Regular users	Never regular users	Odds ratio (95% CI)
Distance <5 cm from typical phone location	22% (107/495)	24% (91/388)	0.90 (0.65-1.26)
Temporal lobe	28% (113/410)	33% (104/313)	0.76 (0.55-1.07)
Frontal lobe	43% (175/410)	37% (115/313)	1.28 (0.94-1.75)
Ipsilateral use	54% (245/450)	52% (170/325)	1.09 (0.81-1.47)

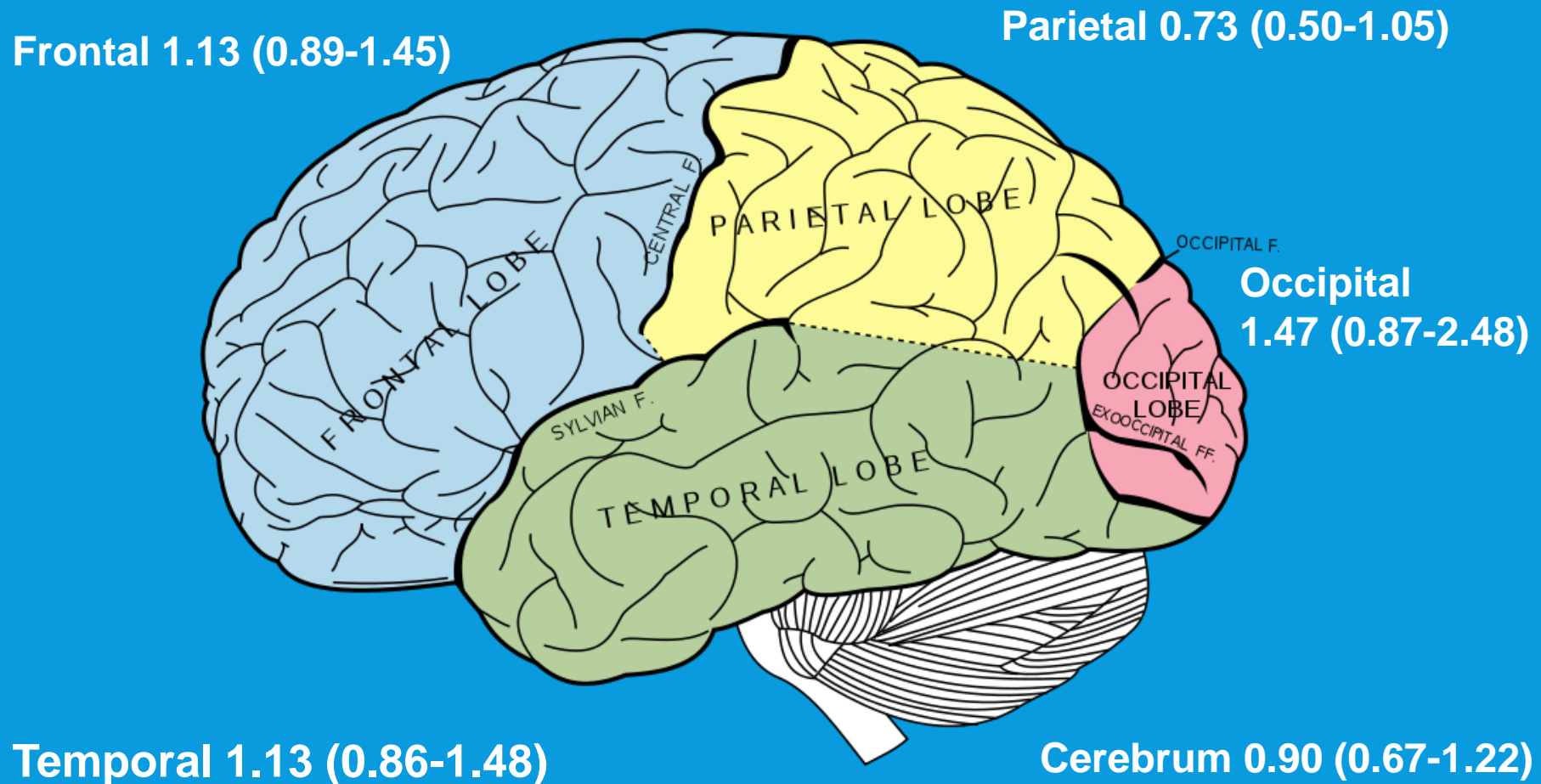


Larjavaara et al. Am J Epid 2010
888 Interphone cases from 7 countries

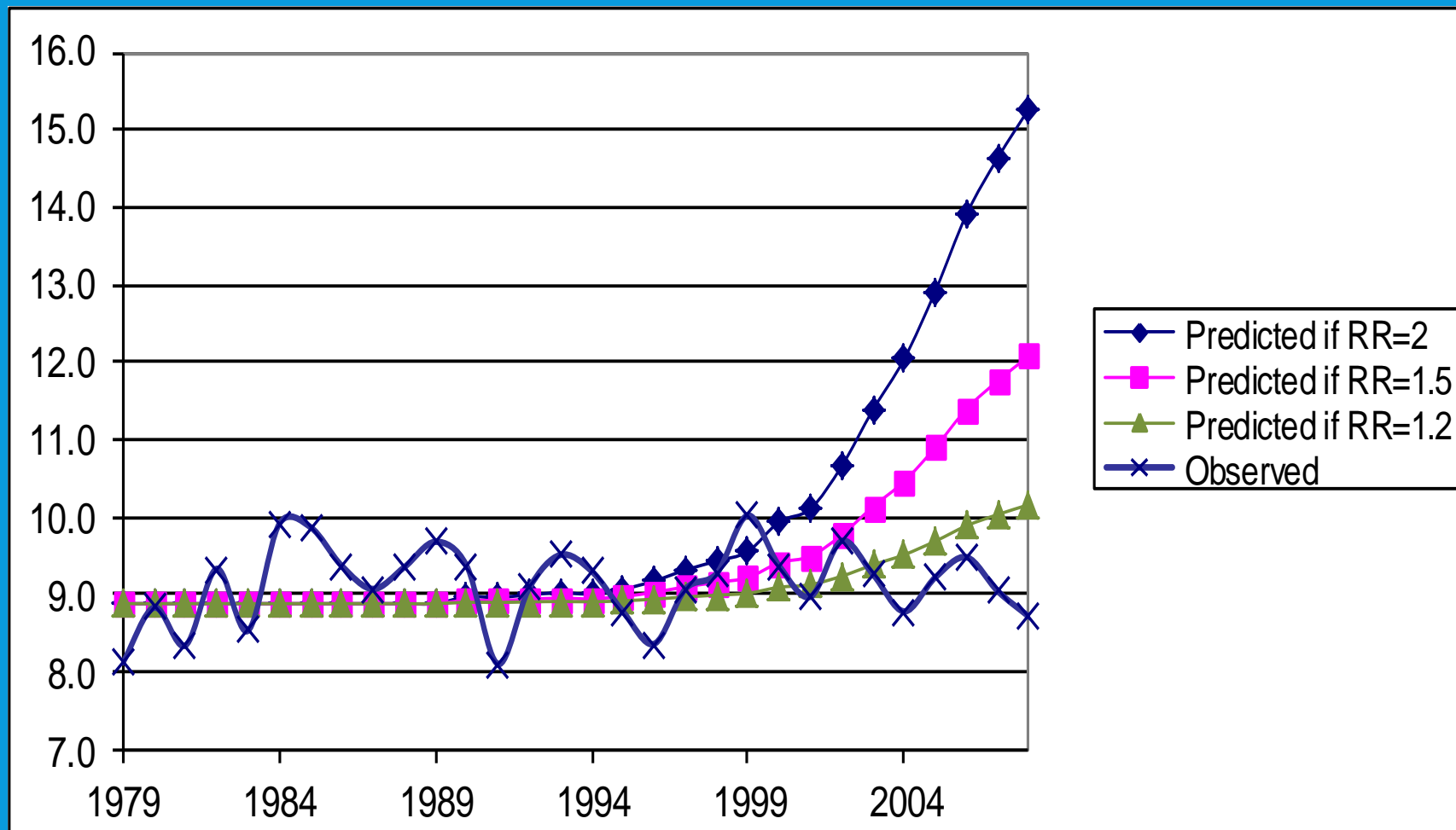
GLIOMA LOCATION (GRELL ET AL AJE 2016)



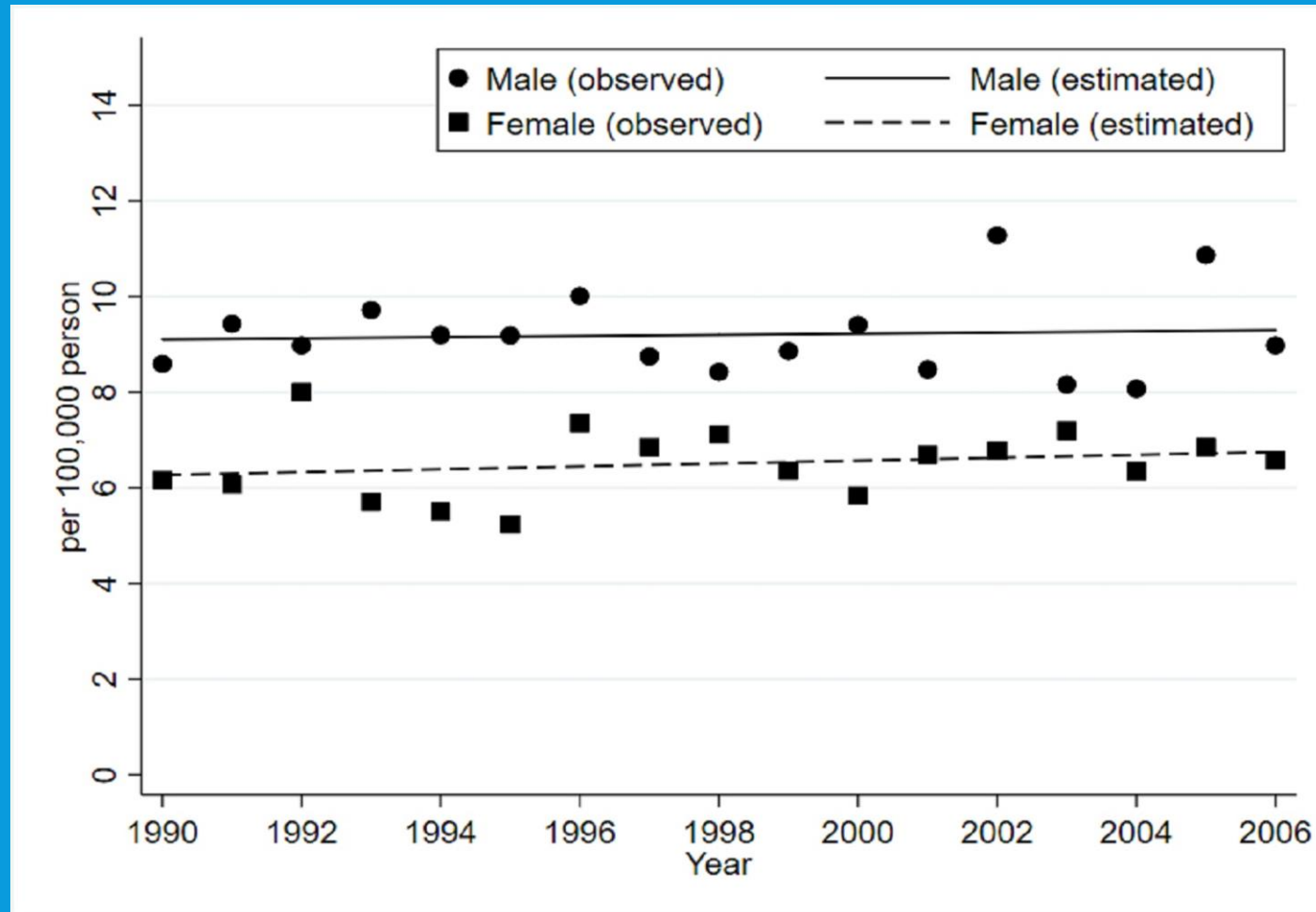
DANISH COHORT: RR BY LOBE



OBSERVED AND PREDICTED INCIDENCE



INCIDENCE OF GLIOMAS IN ADULTS IN FINLAND

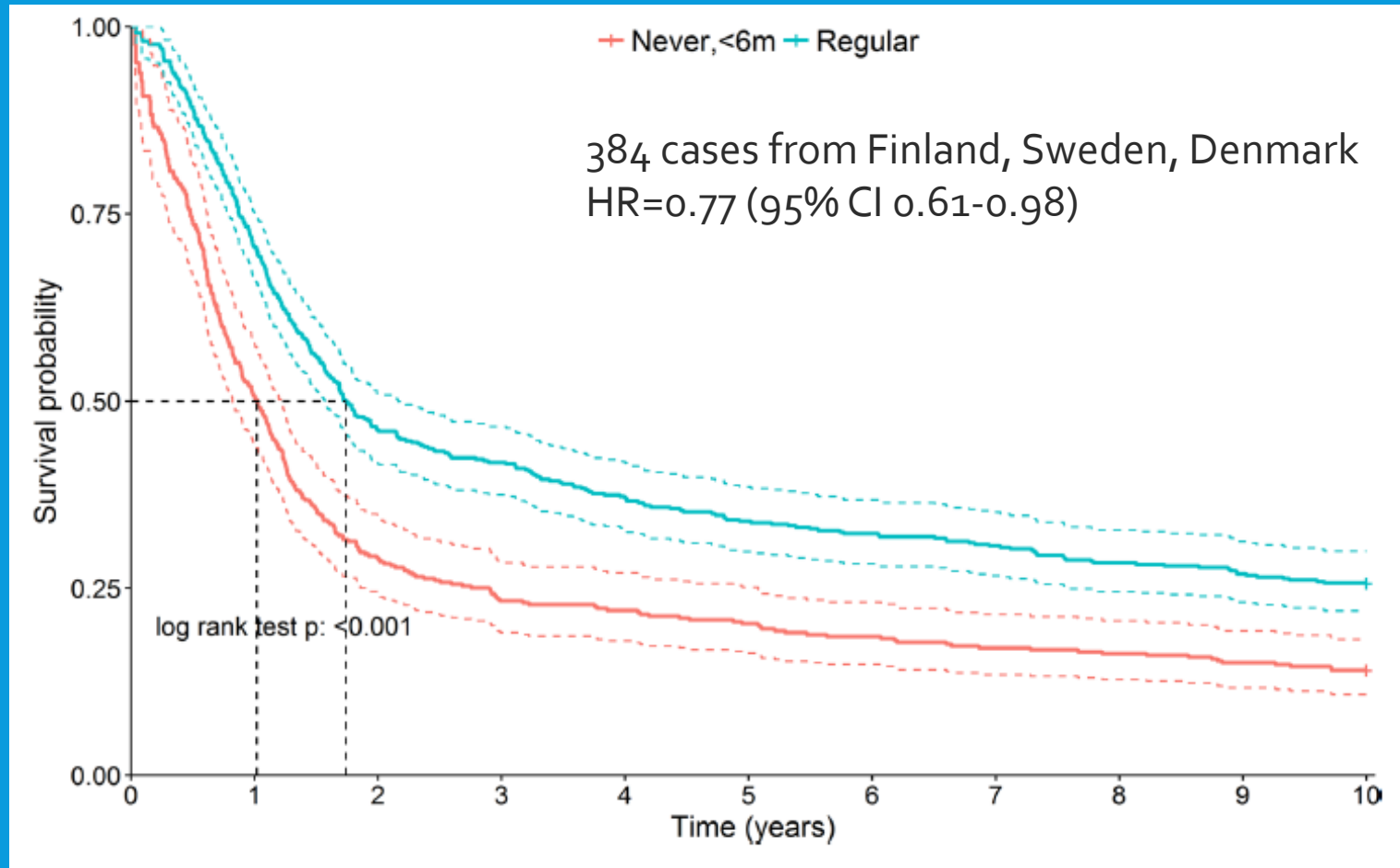


Incidence **7.7/100,000**
Men: 9.3, women: 6.5

No obvious trend
APC: +0.1% (95% CI: -0.5, +0.7)

Natukka et al. submitted

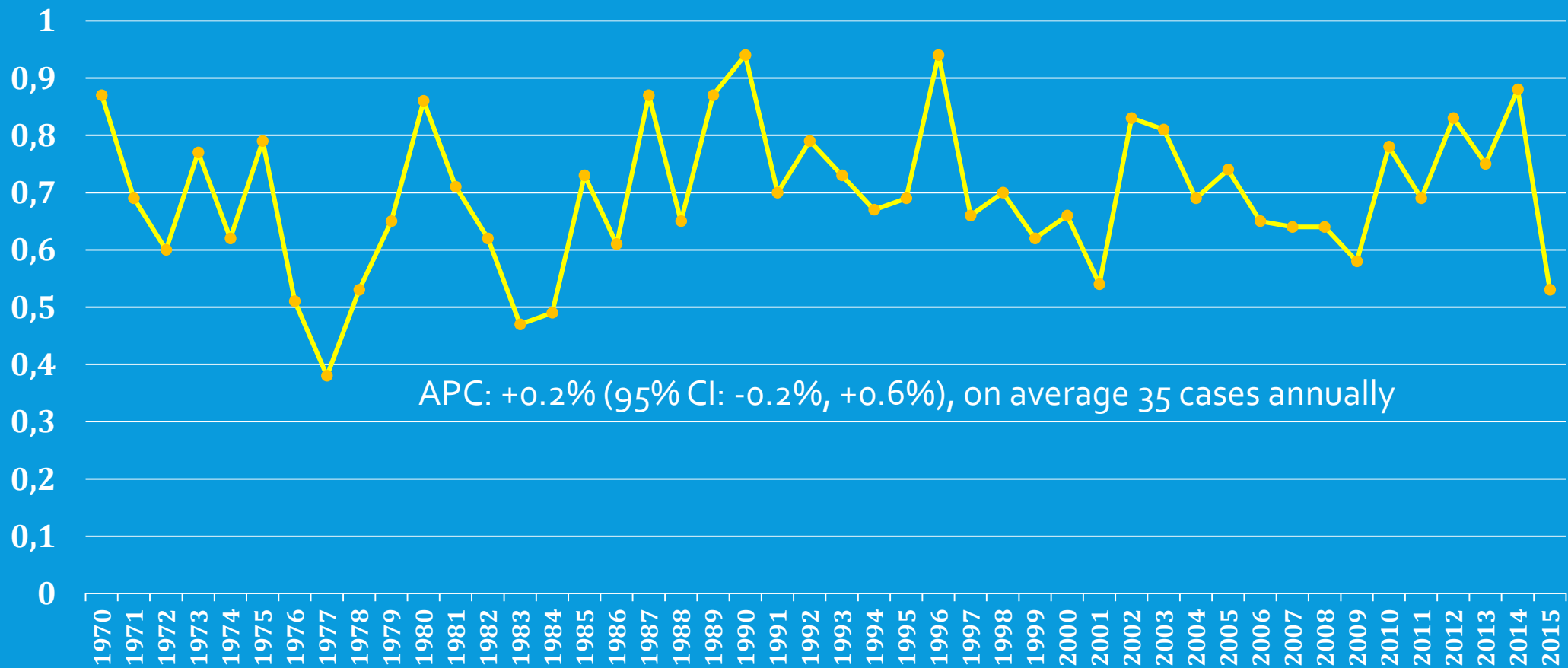
MOBILE PHONE USE AND ASTROCYTOMA SURVIVAL



Olsson et al.
J Neuro-Oncol 2018

INCIDENCE OF BRAIN TUMORS IN FINNISH CHILDREN 1970-2015

Incidence rate



SUMMARY



- Case-control studies have not shown strong evidence for increased brain tumor risk in relation to mobile phone use
 - Some indications of increased risk, but with an inconsistent pattern
 - Location of gliomas not affected by mobile phone use, though some discrepancy in results
- Real world data do not show increases in brain tumor incidence trends <2 decades after large-scale adoption of mobile phones
- Cohort studies show little indication of increased risks
 - COSMOS substantially larger, with quantitative call-time data: Variety of health outcomes
- There are still uncertainties but the balance of evidence post-IARC weighs toward no major health impact
- We need researchers like Jukka, with expertise and insight, determination and persistence to improve our understanding

ICNIRP SUMMARY



- Extensive research has been undertaken in relation to exposure to HF fields used specifically in mobile telephony
- Risk of tumors in close proximity to the ear where the phone is held, e.g. brain tumors, has been a key focus, some studies reporting a slight increase in risk for long-term and heavy mobile phone users
- Reporting biases and weaknesses of the studies may explain the observed findings.
- Several studies have not reported any increase in brain tumors with mobile phone use
- The increased risk observed in some of the epidemiological studies is inconsistent with the stable frequency of occurrence of these cancers in the population
- ***The overall evaluation of all the research on HF fields leads to the conclusion that HF exposure below the thermal threshold is unlikely to be associated with adverse health effects***

