

Swiss TPH



Swiss Tropical and Public Health Institute  
Schweizerisches Tropen- und Public Health-Institut  
Institut Tropical et de Santé Publique Suisse

Department of Epidemiology and Public  
Health

# Predictors of overestimation of recalled mobile phone use among children and adolescents

Denis Aydin, Maria Feychting, Joachim Schüz, Lars Klæboe, and  
Martin Röösli

## Introduction

- Increase of mobile phone ownership and use among children and adolescents in the last 10 years.
- Worries about adverse health effects.
- Until recently: most studies among adults.
- Brain tumours, sleep disturbances, behavioural problems, problematic use of mobile phones etc.

# Example

RESEARCH ARTICLE

Open Access

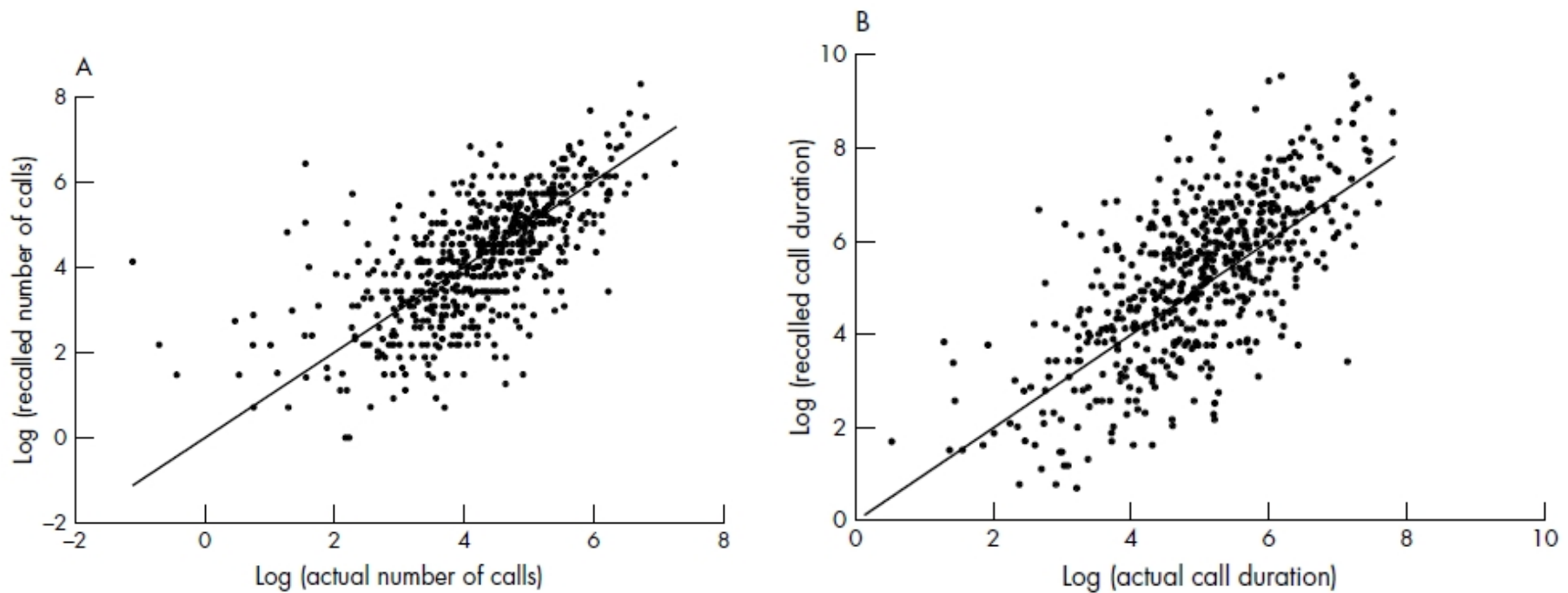
## Mobile phone use and stress, sleep disturbances, Cross-sectional associations

		Sleep disturbances		Symptoms of depression	
		PR	95%-CI	PR	95%-CI
<b>Mobile phone use</b>					
<b>Men</b>	Low	1.0		1.0	
	Medium	1.1	0.87-1.47	1.1	0.90-1.43
	High	<b>1.7</b>	<b>1.40-2.19</b>	<b>1.3</b>	<b>1.02-1.58</b>
<b>Women</b>	Low	1.0		1.0	
	Medium	1.1	0.98-1.31	1.1	0.98-1.26
	High	<b>1.4</b>	<b>1.21-1.56</b>	<b>1.2</b>	<b>1.06-1.34</b>

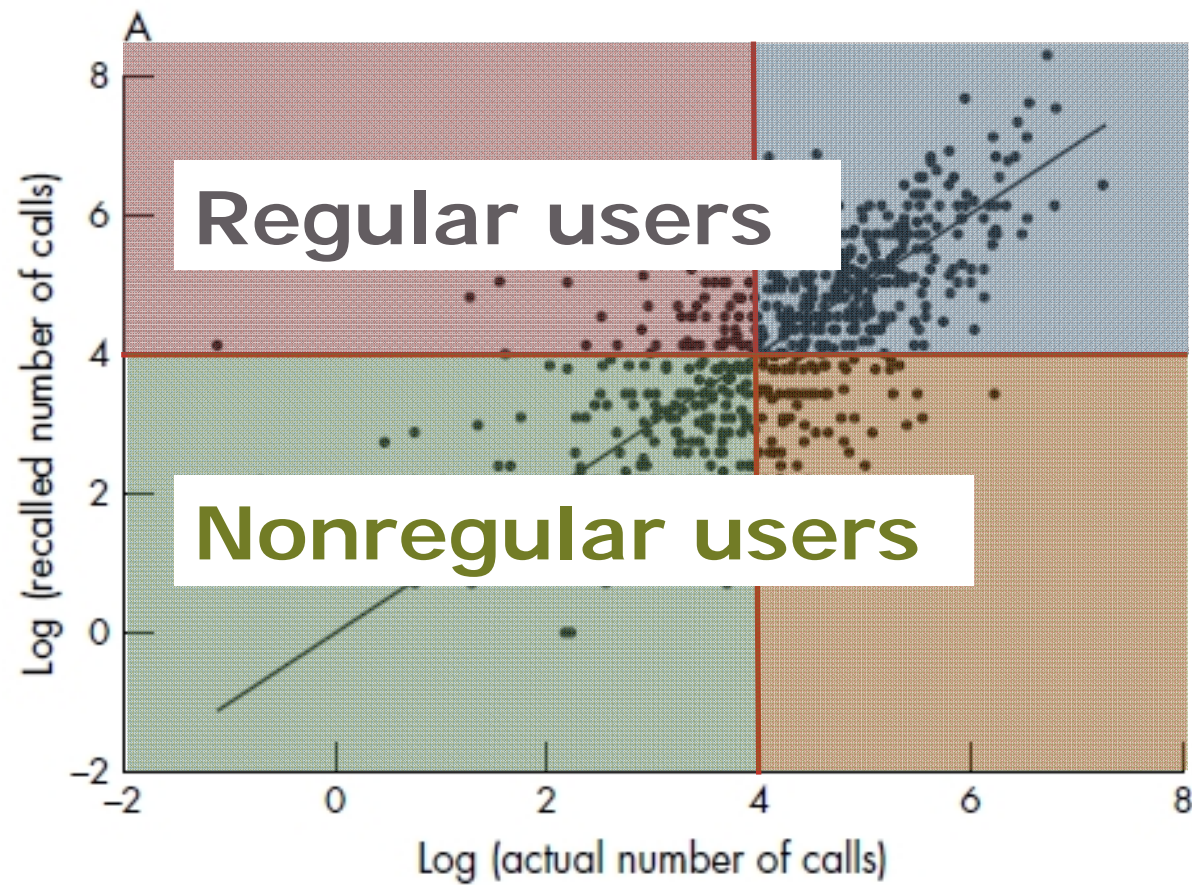
## **Introduction**

- Studies mainly rely on self-reported mobile phone use.
- Accuracy of recall among adults is poor overall.

# Recall accuracy of adults



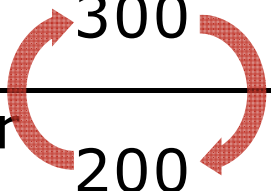
# Exposure misclassification



## How bad is it?

	Case Control	
Regular user	300	600
Nonregular user	200	400

	Case Control	
Regular user	300	600
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$$OR = \frac{300 \times 400}{600 \times 200} = 1 \quad OR = \frac{280 \times 440}{560 \times 220} = 1$$

**20% random misclassification**

## How bad is it?

	Case	Control
Regular user	375	600
Nonregular user	125	400

	Case	Control
Regular user	<del>375</del> <b>325</b>	<del>600</del> <b>560</b>
Nonregular user	<del>125</del> <b>175</b>	<del>400</del> <b>440</b>

$$OR = \frac{375 \times 400}{600 \times 125} = 2$$

$$OR = \frac{325 \times 440}{560 \times 175} = 1.46$$

**20% random misclassification**

## How bad is it?

	Case	Control
Regular user	300	600
Nonregular user	200	400

	Case	Control
Regular user	<del>300</del> <b>340</b>	600
Nonregular user	<del>200</del> <b>160</b>	400

$$OR = \frac{300 \times 400}{600 \times 200} = 1 \qquad OR = \frac{340 \times 400}{600 \times 160} = 1.42$$

**20% differential misclassification**

## Potential problems

- Inaccurately reported mobile phone use could lead to exposure misclassification.
- Random: usually bias towards 1.
- Differential: either direction possible.
- Bias if estimation of mobile phone use is associated with health status (or specific health-related characteristics) of study participants.

## CEFALO



Source: Photocase

Multinational case-control study about mobile phone use and brain tumour risk among children and adolescents aged 7–19 years.



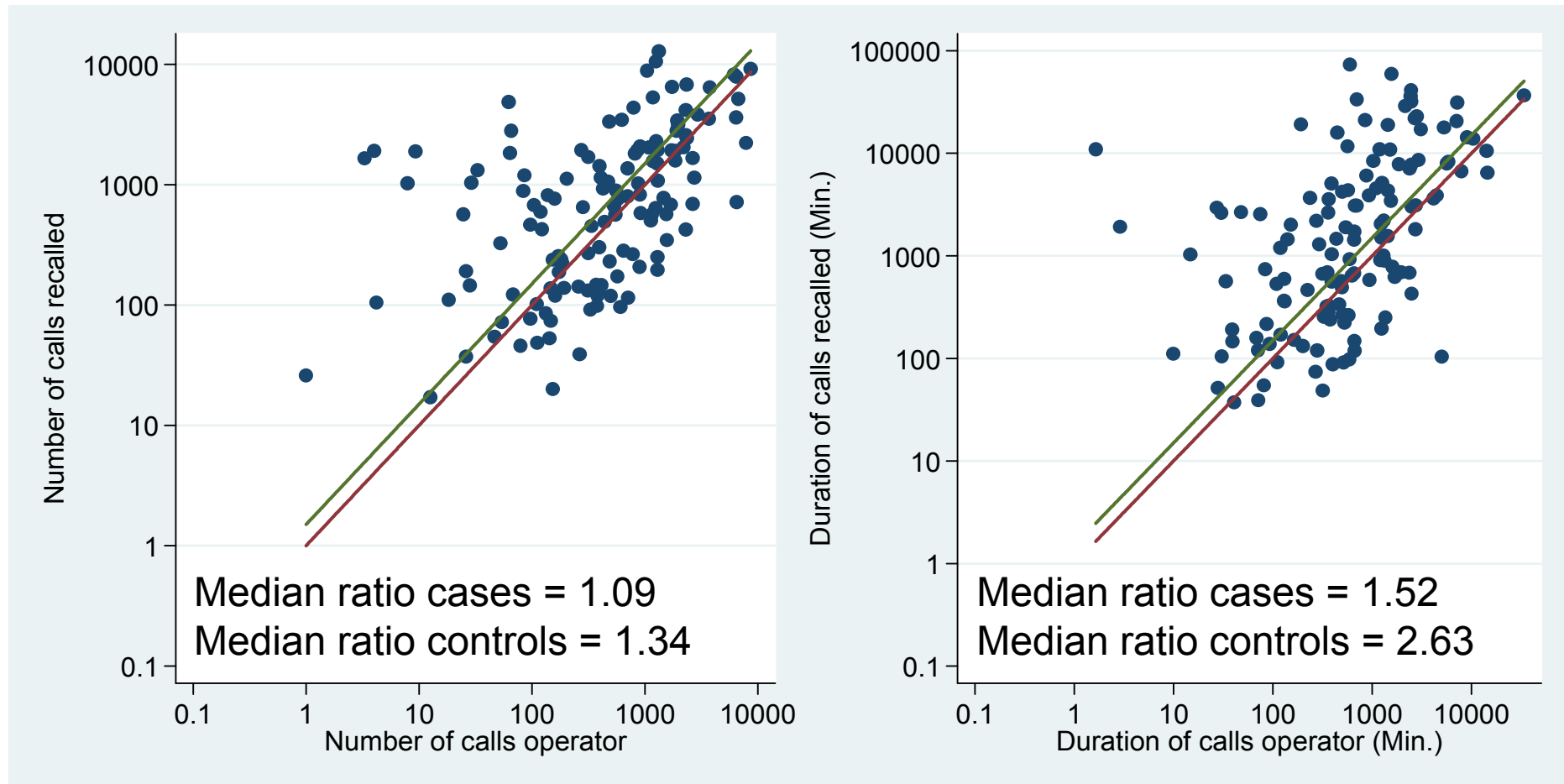
## CEFALO

- Study period: 2004–2008
- Detailed questionnaire about mobile phone use.
- Consent to get network operator data
- Operator data:
  - Sweden & Denmark (59/39% cases, 91/33% controls)
  - Number of calls, duration of calls, subscription start and end dates.

## Methods

- Ratio = recalled/operator-recorded
- Ratio > 1: Overestimation
- Ratio < 1: Underestimation
- Research question:
  - Predictors of overestimation (i.e. ratio  $\geq 1.5$ , logistic regression)

# Recall accuracy of children



# Predictors of overestimation

Variable	Number of calls			Duration of calls		
	Overest.	Other	aOR(95%-CI)	Overest.	Other	aOR(95%-CI)
	No.	No.		No.	No.	
<b>Country</b>						
Denmark	13	36	1.0	31	18	1.0
Sweden	41	44	1.77 (0.71-4.40)	46	39	0.47 (0.18-1.21)
<b>Health status</b>						
Case	17	31	1.0	24	24	1.0
Control	37	49	1.16 (0.52-2.57)	53	33	1.83 (0.83-4.06)
<b>Age group</b>						
7-14	24	46	1.0	33	36	1.0
15-19	30	34	2.34 (1.03-5.32)	44	21	3.13 (1.36-7.18)
<b>Gender</b>						
Male	22	37	1.0	28	30	1.0
Female	32	43	1.09 (0.50-2.38)	49	27	2.67 (1.18-6.01)
<b>SES of parents</b>						
Low	14	12	1.0	15	10	1.0
Intermediate	43	23	0.92 (0.32-2.65)	39	27	0.73 (0.24-2.19)
High	23	19	1.16 (0.38-3.50)	23	20	0.68 (0.22-2.14)
<b>Time between reference and interview date</b>						
< 1.5 years	52	36	1.0	44	44	1.0
≥ 1.5 years	28	18	0.77 (0.31-1.86)	33	13	1.62 (0.66-3.96)
<b>Amount of phone use (operator recorded)</b>						
Low	26	16	1.0	30	12	1.0
Medium	15	30	0.31 (0.12-0.79)	25	20	0.54 (0.20-1.44)
High	13	34	0.21 (0.08-0.56)	22	25	0.27 (0.10-0.78)

## **Strengths & Limitations**

- + First study that used objective operator data.
- Only operator data from Denmark and Sweden, no data from Switzerland and Norway.
- Transferability to other countries?
- Amount of use representative nowadays?

## Summary

- Children and adolescents rather overestimate cumulative number and duration of calls.
- Age, possibly gender and actual amount of mobile phone use are predictors of overestimation.

## Conclusions

- No association between health status and risk of overestimation but health-relevant factors.
- *Don't*: Use only self-reported mobile phone use.
- *Do*: Use objective exposure data.
- Self-reported use only in prospective studies, adjustment needed to prevent confounding.

## Acknowledgements

- Tore Tynes
- Tina Veje Andersen
- Lisbeth Samsø Schmidt
- Aslak Harbo Poulsen
- Christoffer Johansen
- Claudia E. Kuehni
- Michaela Prochazka
- Birgitta Lannering
- Tone Eggen
- Daniela Jenni
- Michael Grotzer
- Nicolas Von der Weid

*Thank you.*