Interphone Brain Tumors Studies To Date

An Examination of Poor Study Design Resulting in an UNDER-ESTIMATION of the Risk of Brain Tumors

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BEMS, San Diego, 12 June 2008

Methodology

What If There Is No Risk of Brain Tumors?

- ORs <1.0 would be ~equal ORs>1.0
  - Think coin tossing
    - OR=1.0 are excluded
  - OR<1.0 implies protection
  - OR>1.0 implies risk
- 13 Interphone brain tumor studies to date
    - 10 Interphone brain tumor studies analyzed
    - 3 excluded: 2 overlapping studies, 1 recent study
- Calculate Protection/Risk ratio (OR<1.0/OR>1.0)
- Calculate binomial p-values

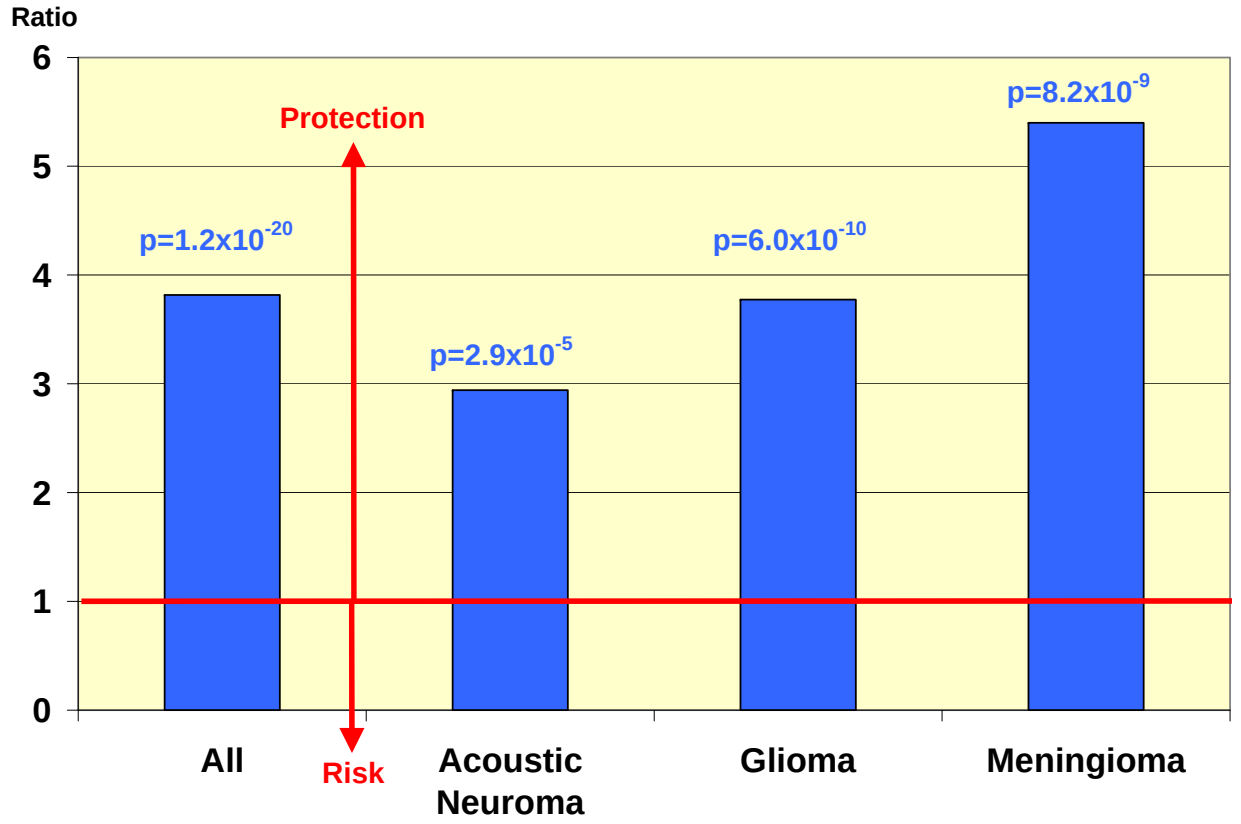
Methodology

Statistical Independence

- Compare between studies, not within studies
  - Comparison categories
    - Brain Tumors
      - All
      - Acoustic Neuroma
      - Glioma
      - Meningioma
    - Years of use (Years)
    - Cumulative hours of use (Hours)
    - Cumulative number of calls (Call #)
    - “Regular” cellphone use (“Regular”)
    - Years of ipsilateral cellphone use (Years Ipsi)
    - Years of contralateral cellphone use (Yrs Contra)
    - Minutes of cellphone use per day (Min/Day)

Results

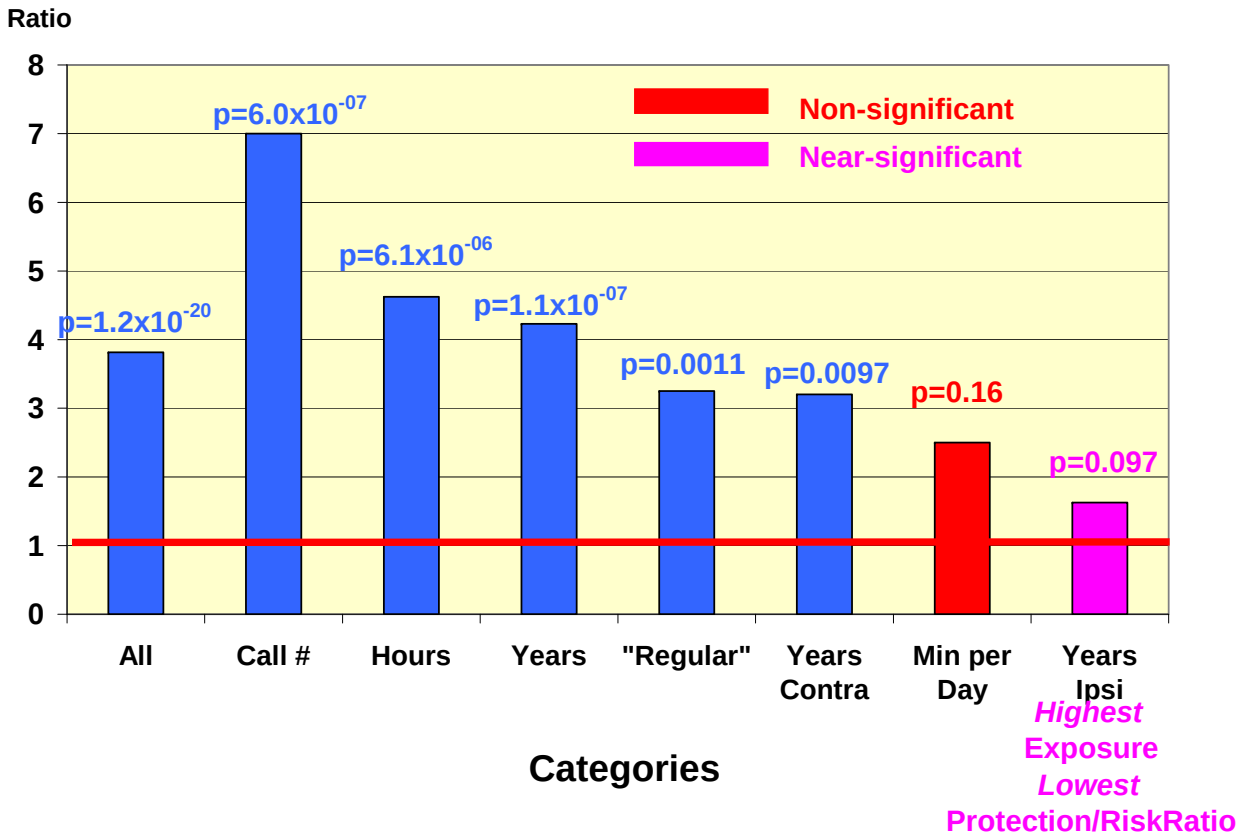
Protection/Risk Ratio by Brain Tumor Type



Results

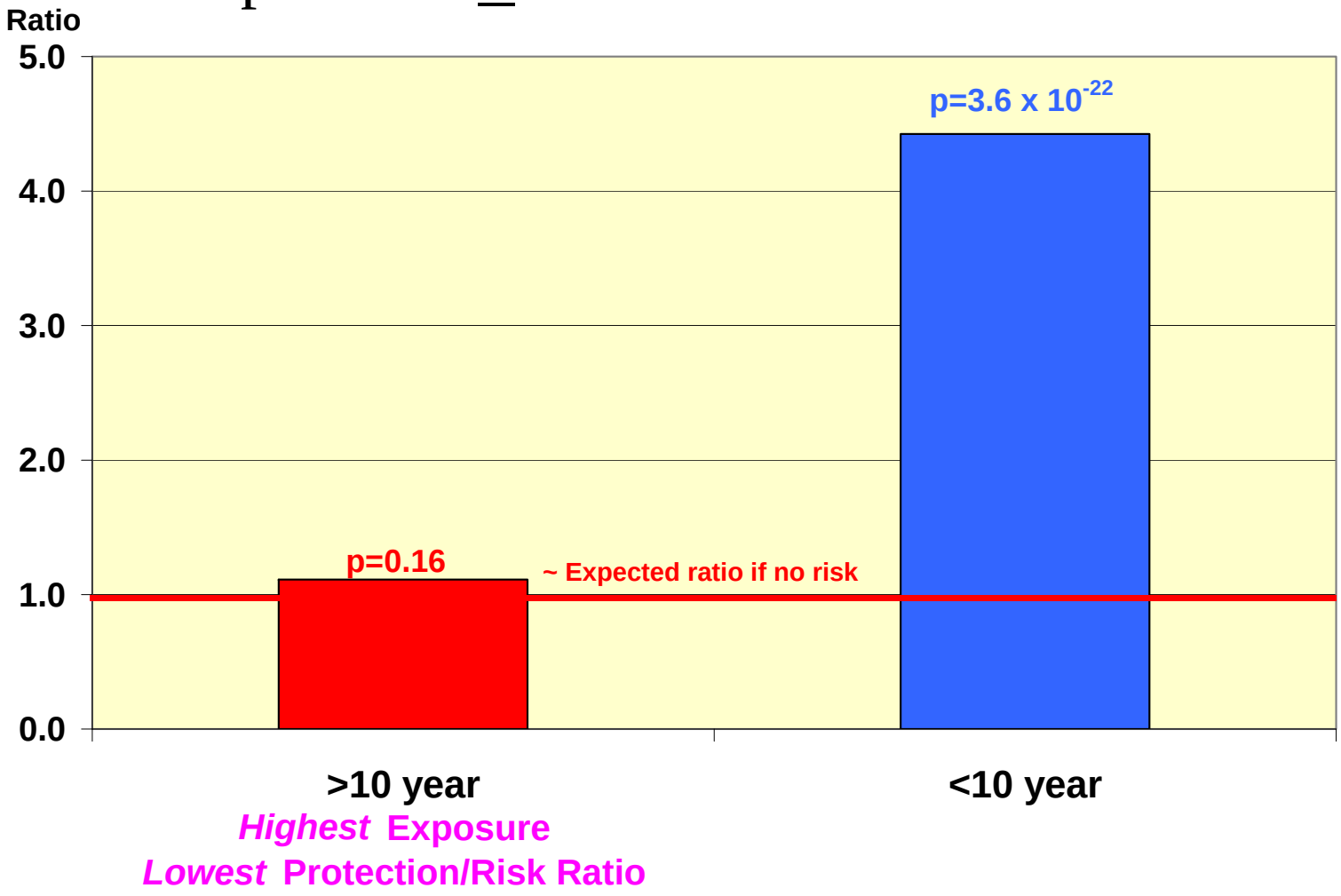
Protection/Risk Ratio by Category

(exclusive of brain tumor types)



Results

Protection/Risk Ratio
Exposures: ≥10 Years and <10 Years



Highest Exposure
Lowest Protection/Risk Ratio

Interphone Protocol Design Flaws

- Flaw 1: Selection Bias
  - Participating controls use cellphones more than non-participating controls
    - Weighted average control participation rate: 59%
      - Controls and cellphone use (Löon 2004)
        - » Participating: 59% used a cellphone
        - » Non-participating: 34% used a cellphone
  - Underestimates risk
- Flaw 2: Tumors outside the radiation plume are treated as “exposed”
  - Underestimates risk

Flaw 2
Tumors Outside Radiation Plume Are "Exposed"

- **Ipsilateral: exposed Contralateral: unexposed**
- **Percentage of absorbed cellphone radiation by anatomical structure**
  - **Ipsilateral temporal lobe: 50-60% ~15% of brain's volume**
  - **"Ipsilateral" cerebellum: 12-25% ~5% of brain's volume**
- **62-85% of absorbed radiation is in ~20% of the brain's volume**

Interphone Protocol Design Flaws

- **Flaw 3:** Short latency times
  - Ionizing radiation & brain tumor: 20-40 years
  - Smoking & lung cancer: ~30 years
  - Asbestos & mesothelioma: 20-40 years
  - Short latency times underestimates risk
- Flaw 4: Definition of "regular" user
  - At least once a week for 6 months or more
  - Definition of "regular" user underestimates risk

Flaws 3 & 4: Latency Time & "Regular" Use

- UK cellphone subscriber data
  - 85% of "regular" use
    - <5 years
  - 98% of "regular" use
    - <10 years
- Years of use (latency time) too short for Dx
- Reporting "regular" use
  - Suppresses finding a risk

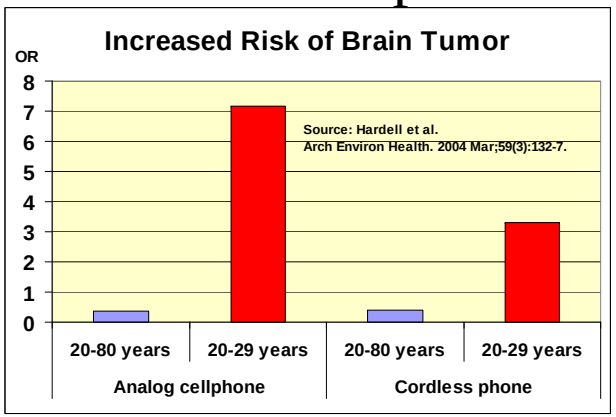
Interphone Protocol Design Flaws

- Flaw 5: Young adults and children are excluded
  - Young adults and children
    - Highest risk group
  - Underestimates risk

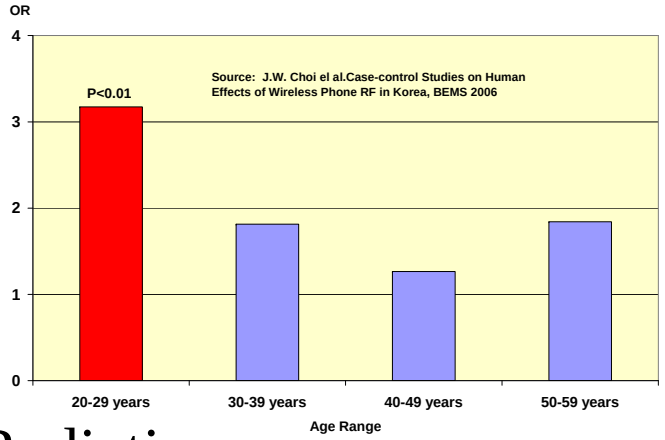
Flaw 5

Young Adults and Children Excluded

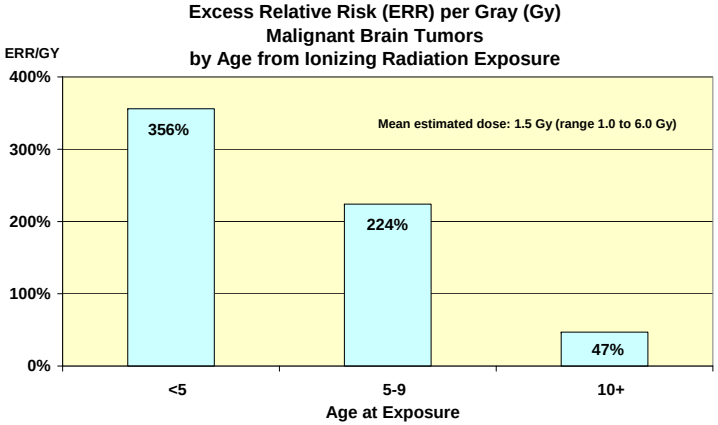
Swedish: Cellphone.



Korean: Cellphone



Israeli: Ionizing Radiation



Source: Sadetzki et al., RADIATION RESEARCH 163, 424–432 (2005)

Interphone Protocol Design Flaws

- Flaw 6: Cellphones radiating higher power levels are not examined (few exceptions)
  - Analog Vs Digital cellphone use
  - Rural Vs Urban cellphone use
  - Without inclusion of cellphones radiating the most power there is an underestimation of risk
    - Requires sufficient number of cases for statistical power
- Flaw 7: Other RF exposures treated as unexposed
  - Cordless phones, walkie-talkies, etc.
  - Underestimation of risk

Interphone Protocol Design Flaws

- Flaw 8: Exclusion of brain tumor types
  - Includes acoustic neuroma, glioma & meningioma
  - Excludes other brain tumor types
  - Underestimates risk
- Flaw 9: Exclusion of brain tumor cases because of death
  - Underestimates risk of the most deadly brain tumors

Flaw Mitigation

- Increase the diagnosis eligibility time
  - Ten Interphone studies: weighted-average 2.6 years
  - Hardell et al. eligibility time: 6 years
- Lower age range to ≤10 years
- Pay controls (and cases?) for participation in study
  - Do not tell controls what is the purpose of the study
- Interview proxies in case of death
- Treat unexposed tumors as unexposed
- Etc., Etc., Etc., …
  - **It could have been done**

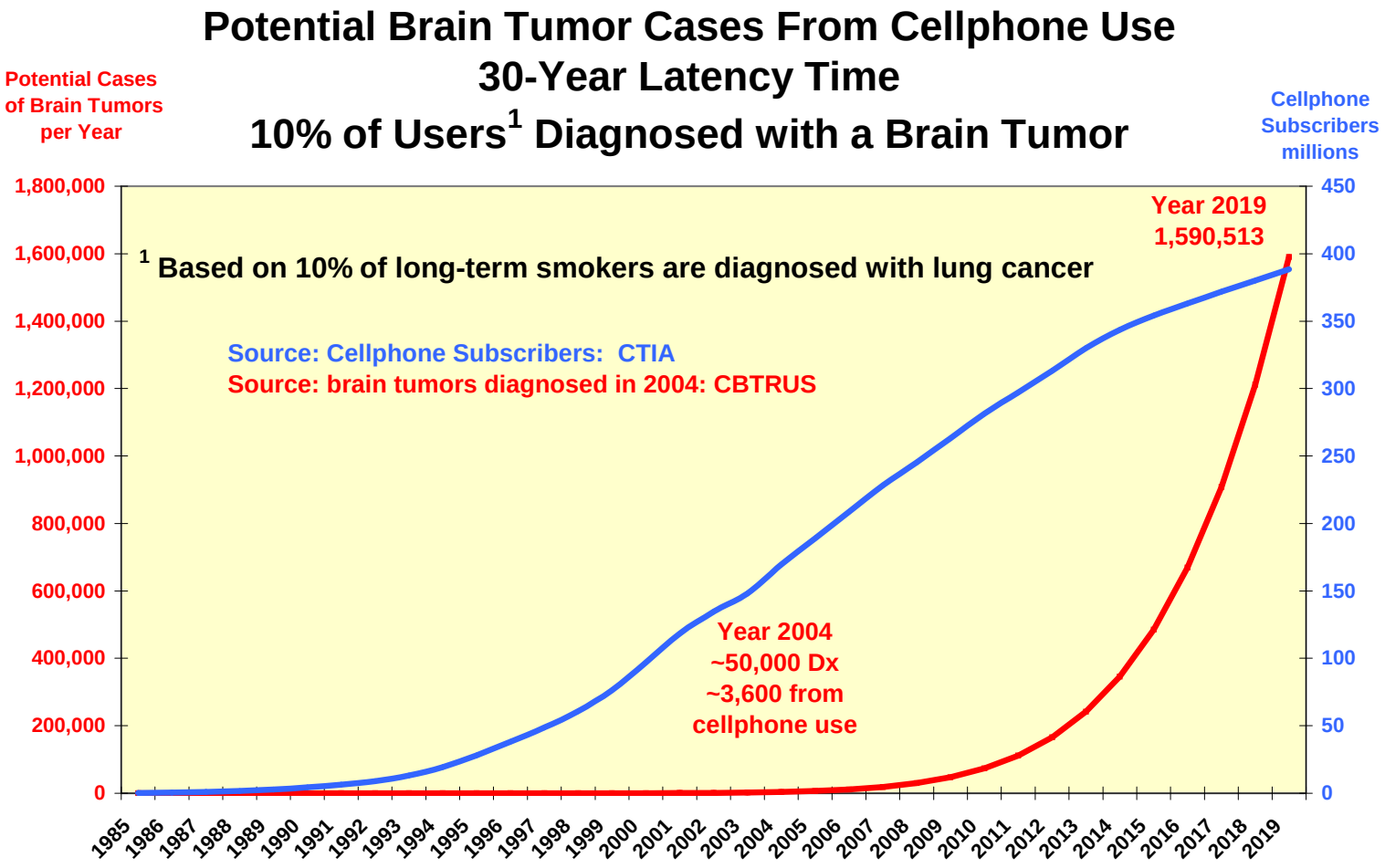
Conflicts-of-Interest

- Cellphone Industry
  - If risk is found: major revenue loss
  - Interphone's funding is inadequate to mitigate flaws
    - Substantial funding from cellphone industry
- Researchers' conflict-of-interest (unconscious?)
  - Source of funds: known in spite of "Firewall"
  - Honest, but "Don't bite the hand that feeds you"
    - **90 significant *protective* results**
      - **Ignored by authors (no commentary in the text)**

Conclusions

- **Either cellphone use is protective, or the study has major flaws**
- The Interphone Protocol *substantially*, underestimates the risk of brain tumors
  - Protection/Risk Ratio is ***lowest*** for ***highest*** exposure
    - Increased exposure counteracts design flaws
  - Significant risk found in the Interphone studies
    - ≥10 years ***and*** ipsilateral use
- Without design flaws, risk would increase substantially
- Cellphone industry's conflict-of-interest is obvious
- **Potential public health impact is enormous**
- Studies independent of industry are required

Potential Public Health Risk



I Pray I'm Wrong!