The cult of science and the culture of fear

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CV Bonneux

- MD (1979)
- MD in the tropics (1980-7)
- MSc epidemiology (1987-8)
- PhD public health (1989-97)
- Academic, mainly demographic epidemiology (1989 – 2012)
- Back to MD elderly care (2012)

Epidemiology

Definition: the study of diseases in populations

- Clinical epidemiology
  - Foundation of evidence based medicine (EBM)
  - Mainly experimental: randomised controled trial
- Epidemiology
  - Mainly observational: messy business in a complex world:
  - Many interests: industry, ideology, religion
    - Easy to manipulate by selective choice of variables, statistics and outcomes

"A Grand Natural Experiment"

John Snow on cholera (edition 1855)

Conflict of interest: Teetotaller, lover of clean water

The science wars on tobacco
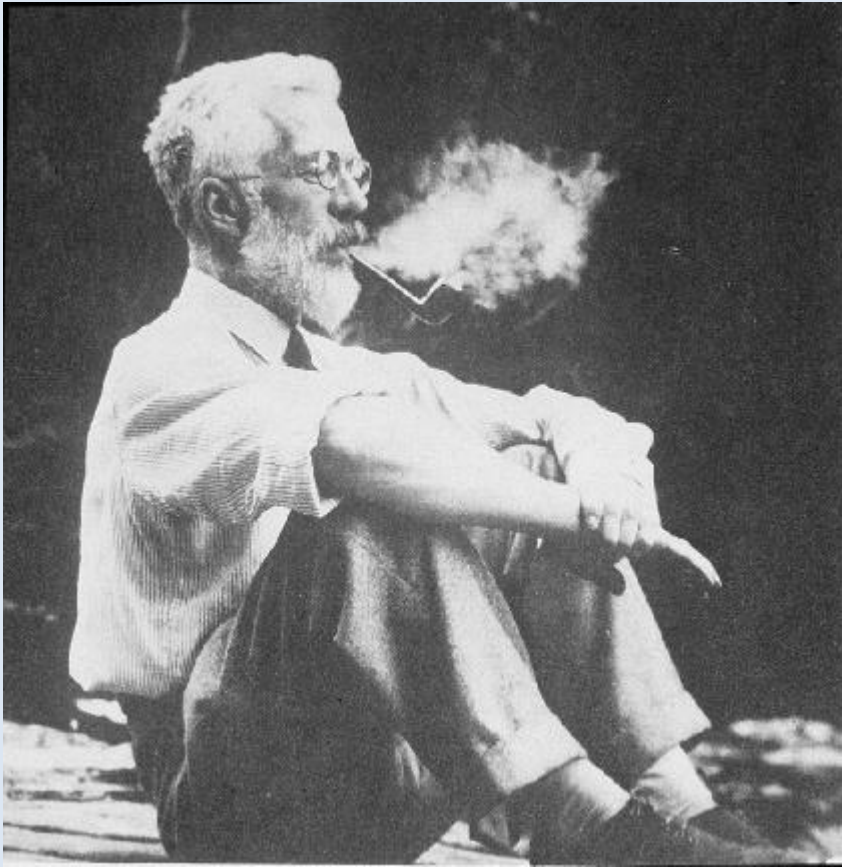
Sir Ronald Fisher
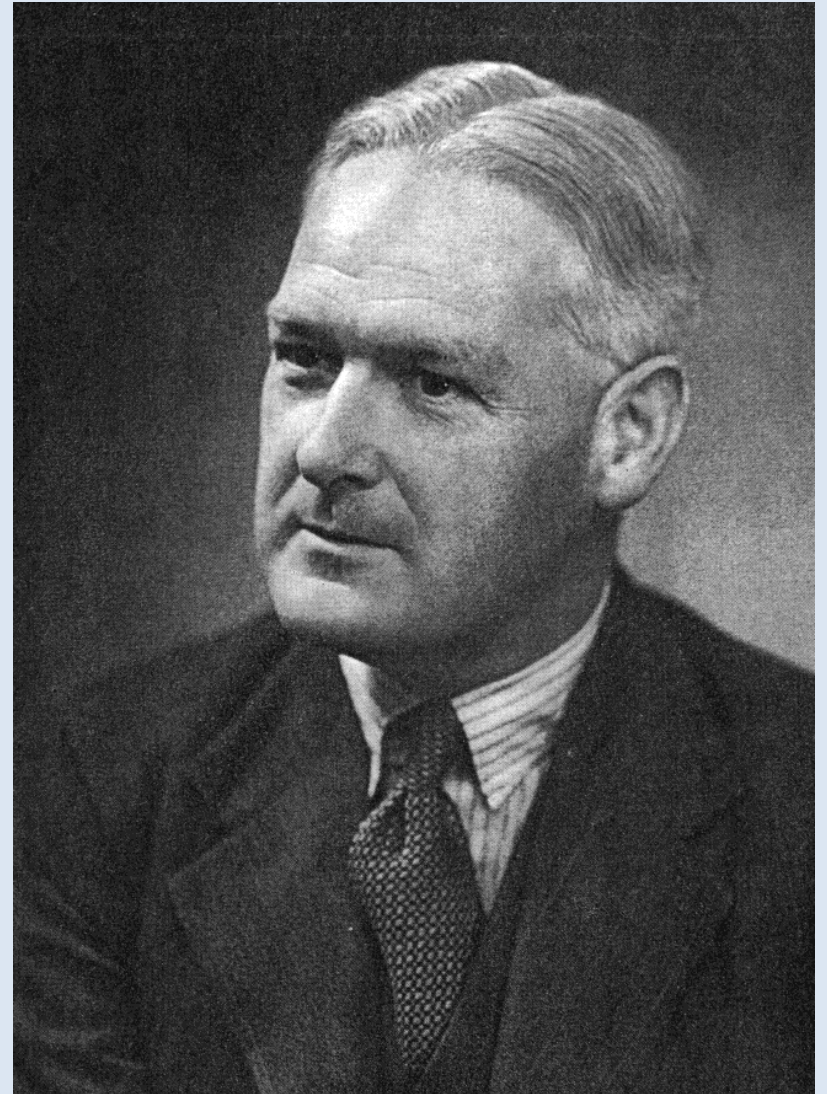
Sir Austin Bradford Hill

Risk of cancer after low doses of ionising radiation: retrospective cohort study in 15 countries

E Cardis, M Vrijheid, M Blettner, E Gilbert, M Hakama, C Hill, G Howe, J Kaldor, C R Muirhead, M Schubauer-Berigan, T Yoshimura, F Bermann, G Cowper, J Fix, C Hacker, B Heinmiller, M Marshall, I Thierry-Chef, D Utterback, Y-O Ahn, E Amoros, P Ashmore, A Auvinen, J-M Bae, J Bernar Solano, A Biau, E Combalot, P Deboodt, A Diez Sacristan, M Eklof, H Engels, G Engholm, G Gulis, R Habib, K Holan, H Hyvonen, A Kerekes, J Kurtinaitis, H Malker, M Martuzzi, A Mastauskas, A Monnet, M Moser, M S Pearce, D B Richardson, F Rodriguez-Artalejo, A Rogel, H Tardy, M Telle-Lamberton, I Turai, M Usel, K Veress

Participants 407 391 workers individually monitored for external radiation with a total follow-up of 5.2 million person years.

Results The excess relative risk for cancers other than leukaemia was 0.97 per Sv, 95% confidence interval 0.14 to 1.97. Analyses of causes of death related or unrelated to
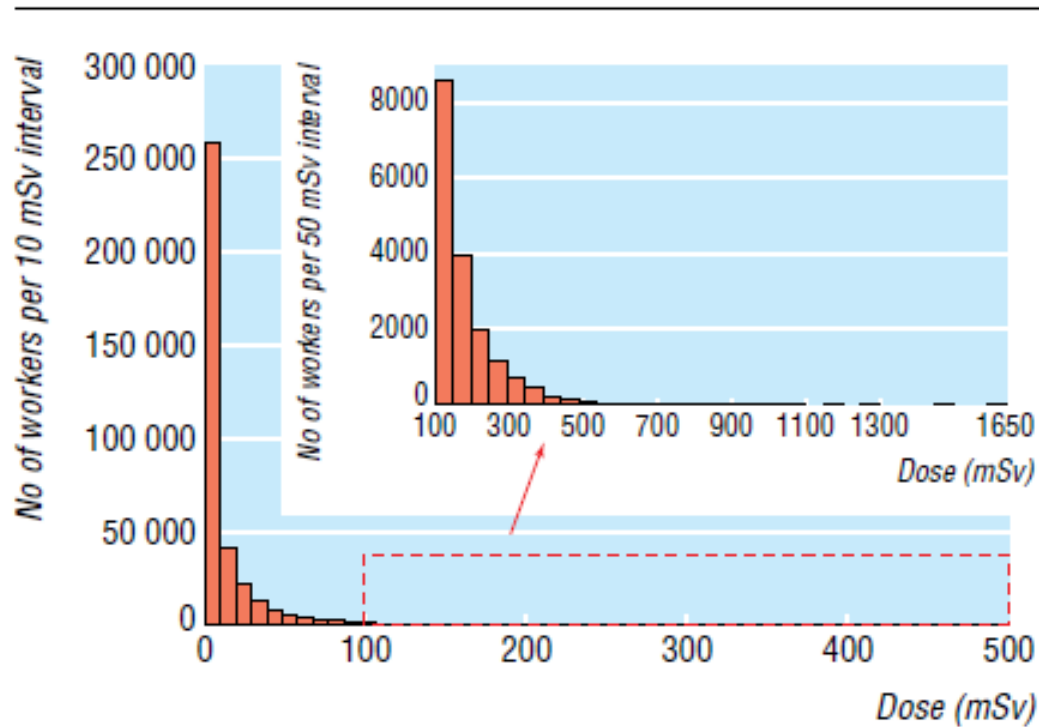
Fig 1 Distribution of cumulative radiation doses among workers included in the analyses

1- There is close to nobody at 1 Sv exposure. In a decent statistical model, the true confidence intervals are between zero and infinity.

2- 250.000 / 400.000 persons had no exposure. These determine the results of the Poisson regression model used.

True results

- Mean exposure was 0.02 Sv

- At 250.000 non-exposed, the mean exposure of exposed was 0.05 Sv, and their excess risk of all cancers was 3.7%, compared to non-exposed

- There was no control for smoking, causing excess risks of 300% on cancer death in male smokers of that period.

In absolute terms

- In 150.000 exposed workers there were 2500 cancer deaths, 88 (95% CL 17-140) more than expected in the non-exposed workers. An excess of 4 deaths was caused by leukemia and exposure.

- In this male population of that period, an excess of smoking attributable cancer mortality of at least 1000 cancer deaths (40%) is expected.
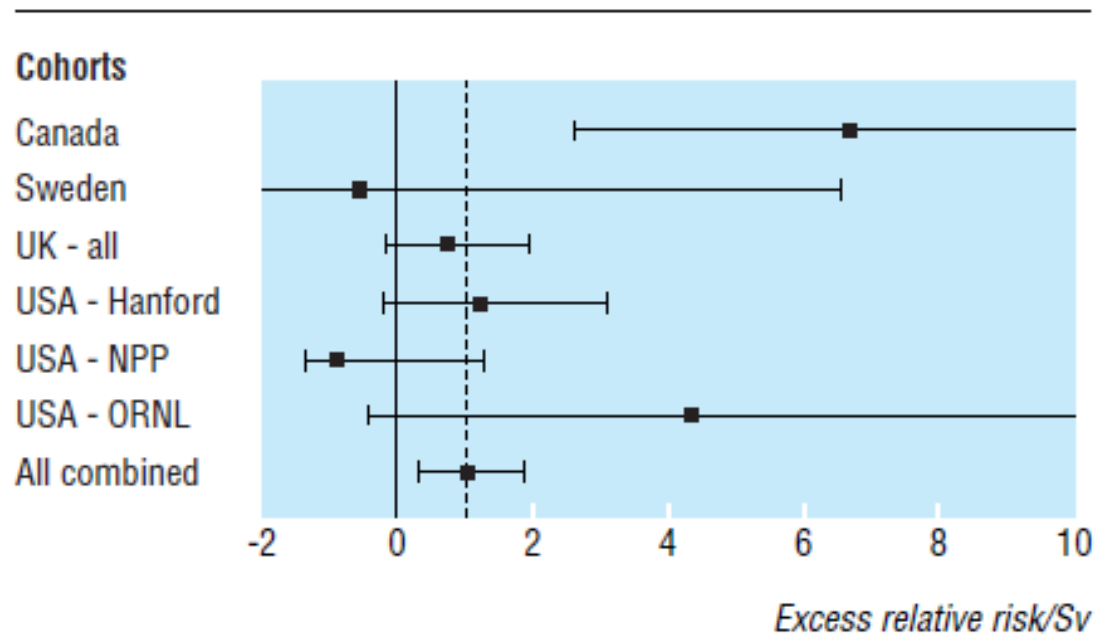
Fig 2 Excess relative risks per Sv for all cancer excluding leukaemia in cohorts with more than 100 deaths (NPP=nuclear power plants, ORNL=Oak Ridge National Laboratory)

Cancer mortality rates in the Canadian cohort were 50% lower than in the total study

Questions

- Where is the argumentation that being exposed or non-exposed is a random event in the nuclear industry

- Where is the stratified analysis (non-exposed versus exposed in tertiles)

- Where are the other causes of death (cardiovascular mortality is very sensitive to socio-economic conditions).

Not a question

- The low risk of exposed workers is hidden by the extrapolation to 1 Sv.

- This avoided the argumentation that a signal of 3.6% is a reliable positive outcome in different populations in different countries

- In the criteria of causation, signals of lower than 30% excess risk in the best prospective cohort studies are not to be trusted.

MOBILES 'PUT KIDS AT RISK OF AUTISM AND BRAIN TUMOURS'

Andrew Mitchell MP, Eileen O'Connor, **Dr George Carlo** and Dr Ian Gibson MP

Direct evidence of *possible* harm

Meet a true professor in (non-ionising) Electromagnetic irradiation and Health

"Subtle effects that could result in possible health damage."

"Results of epidemiological studies are equivocal and leave the possibility of possible adverse health effects

Prof. Hans Kromhout

Institute for Risk Assessment Sciences,

Universiteit Utrecht

Hoogleraar in Electromagnetische straling en Gezondheid

How possible is it that this professor will state:

- There was never anything to fear from non-ionising irradiation from cell phones or masts, based on our knowledge of fysics and carcinogenesis
- We found nothing in tens of thousands of studies
- There is nothing resembling a disease signal in now tens of millions of people using cell phones for more than ten year
- I built my entire career on a non-issue
- Stop funding this silliness

Cell phones are fatal, indeed

A little note on Chernobyl

Male life expectancy at birth

Sweden
Belarus
Russia
Taiwan
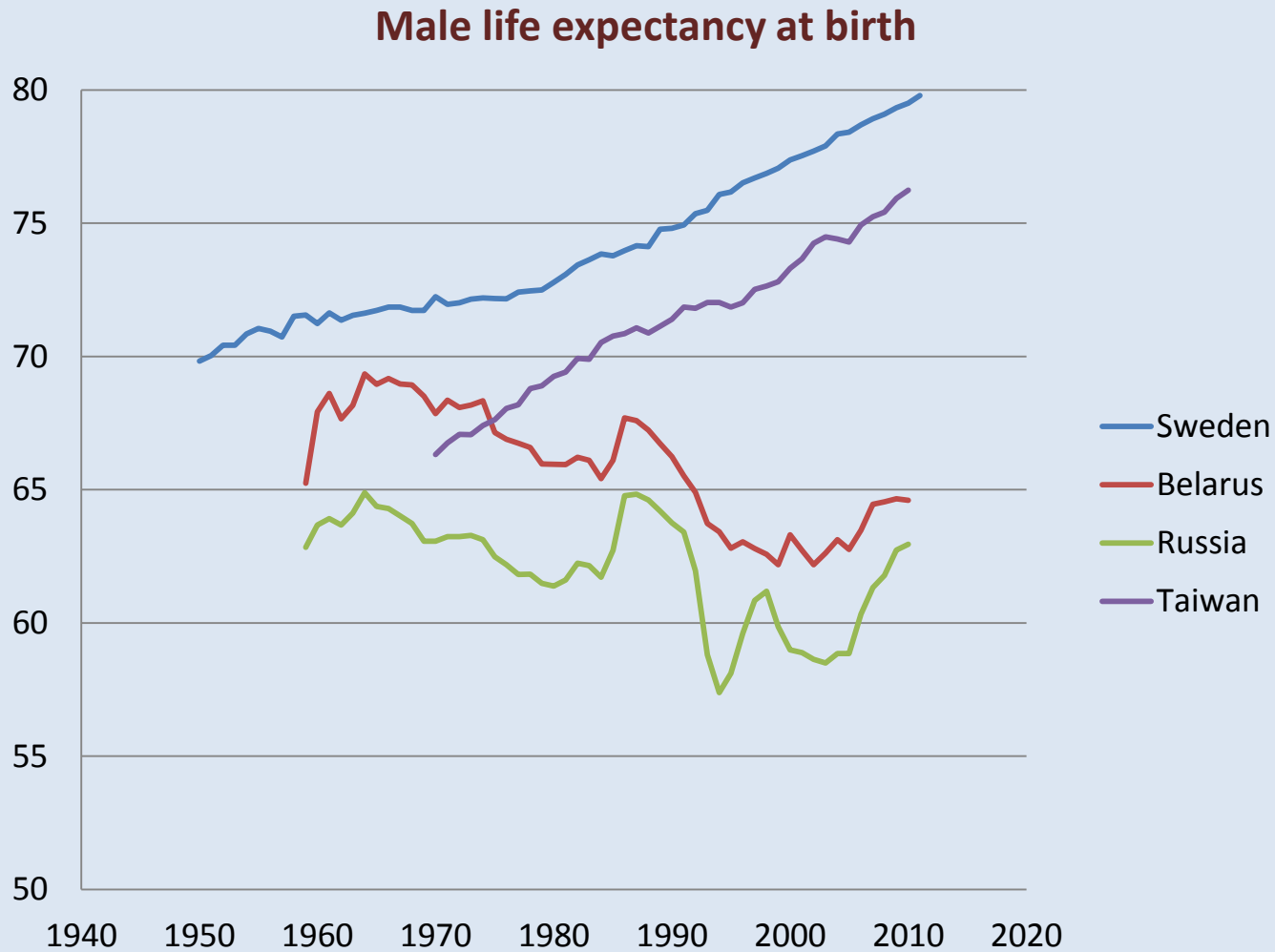
To wrap it up

- The cult of science: You can never prove zero risk, but in epidemiology, you even can not reliably prove excess risks smaller than 30%.

- The culture of fear: academics secure funding for research by marketing fear.

- The main tools are speculation about isolated small signals in noisy studies and models translating these speculations into seemingly facts.

PLEASE FEAR ABSOLUTELY EVERYTHING. THANK YOU.