

# The Danish Cohort study - an example on how science is misused in the interest of the mobile communication industry

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We know for quite a while that the currently valid exposure limits for radiofrequency radiation solely protect the interests of the mobile communication industry, but not the health of the mobile phone users. Applying the methods of institutional corruption the industry succeeded to ensure its acceptance till today by numerous European countries including Germany [1]. And because of profit maximization the true state of research is withheld from the people and the health risks, they are exposed to, are cynically accepted.

A special example of institutional corruption is the Danish Cohort study. In this study the brain tumour risk of persons with mobile phone contracts was investigated, and the possession of such a contract stood for the use of a mobile phone. Contrary to case-control studies a cohort study has the advantage of no statistical bias through selection, participants' memory gaps, and refusal to participate. Therefore, the validity of the results of the latter is supposed to be superior to that of case-control studies.

In the meantime we find four papers from the Danish Cohort study, all published in internationally renowned scientific journals. These papers categorically rule out a link between the use of mobile phones and the development of brain tumours [2,3,4,5]. Of special importance are the last two ones, which quite obviously were intended to immediately respond to the decision of the WHO's International Agency for Research on Cancer (IARC) in May 2011 that radiofrequency radiation has to be classified as 'possibly carcinogenic to humans'. Furthermore, they look like acting against the then published NORDCAN data that showed a significant increase of the brain tumour rate for Denmark between 2001 and 2010.

Now, the Swedish scientists Fredrik Söderqvist, Michael Carlberg, and Lennart Hardell took great trouble to check the scientific quality of the Danish Cohort study [6].

The study was based on 420,095 mobile phone contracts out of 723,421, all signed between January 1982 and December 1995 with mobile communication providers in Denmark. The overall 200,507 company contracts were excluded as an individual assignment was not possible. The study period was from 1990 to 2007. The organizers assumed that the 420,095 contractors were also the users and that, therefore, radiation exposure time was identical with the contract term. There is no proof that this assumption was correct and if, how long and how strong users were indeed exposed to mobile phone radiation during the course of the contract. This grave weakness of the study was approvingly accepted.

Söderqvist and colleagues conclude from their analysis that the Danish Cohort study is a textbook example for all the mistakes one can make in epidemiological research. Numerous shortcomings invalidate the study results to such a degree that a statement on the investigated question is indeed not possible:

- Contrary to the case-control studies the IARC considered for its decision we do not find any information on the actual use of the mobile phone. Two persons with the same contract term – one using the mobile phone once a week for only 5 minutes and the other one for 2 hours a day – are both assigned to the same exposure group. Whether hardly or extremely exposed to mobile phone radiation is not investigated at all, although this is decisive for a brain tumour risk assessment.
- That persons with company contracts - who as we know from experience use mobile phones the most – were assigned to the group of non-exposed ones leads to a misclassification of that control group the exposed ones were compared with. In this way, radiation exposure increased in the supposedly non-exposed control group narrowing at the same time the gap between exposed and non-exposed ones. Because of this methodical mistake, the brain tumour risk of the exposed group decreases, thus distorting the result of the study.
- The misclassification of the control group increased even more as contractors after 1996 were not considered and were assigned to this group right from the beginning. Thus, a person with a contract from 1996 who was diagnosed with a brain tumour in 2007 – that is assuming a mobile phone use for 11 years – is wrongfully assigned to the control group. This methodical mistake too reduced the brain tumour risk of the exposed group and distorted the result of the study.

Shortcomings continue as there is no information – contrary to case-control studies – on which side of the head the mobile phone was used. Not considered was also the fact that no information on the additional use of cordless phones, whose damage potential can easily be compared to that of mobile phones, was available. An especially big problem is that the brain tumour development might take 10 to 40 years. When the study ended only very few contractors had reached a use of 10 years and we have to ask, if one can expect an increase of the brain tumour risk at all - especially in regard of the impact of the misclassification.

Finally, Söderqvist and colleagues wonder, if not from the very beginning the Danish Cohort study was designed in such a way that an increased brain tumour risk through mobile phone use cannot be detected. Besides the way how the study was planned and carried out, indications are:

- The organizers remark already in their first paper in 2006 that, taking into account the calculated narrow confidence intervals, a clear link between cancer risk and mobile phone use can be ruled out. Such a statement was completely absurd at that time when there was no long-term use, a prerequisite that is required.
- The organizers regard their calculated confidence intervals, which in the course of the study became more and more narrow, a confirmation of their statement that there is no cancer risk. Obviously, they do not want to recognize that this statistical finding can be fully explained with bias.
- The organizers of the study try to cover up the role the international mobile communication industry played in the planning, the implementation, and the financing. But considering the available documents there is no doubt that it played its part in the background and that it probably also influenced the dissemination of the results.
- In Denmark a significant increase in tumours of the brain and the central nervous system was found between 2001 and 2010, around 40% in men and 29% in women. Instead of addressing this issue, two authors of an accompanying editorial – one of them a consultant of the international mobile communication industry – try to take people's attention away with compliant findings from elsewhere.

In spite of their scientific irrelevance, the results from the Danish Cohort study have been upgraded in the media to the good news that mobile communication radiation and, thus, the use of mobile phones are safe. Politics and industry regard the study as a solid argument that mobile communication radiation does not increase the brain tumour risk and that, therefore, lowering the exposure limits is not justified.

The German government can refer to the Federal Office for Radiation Protection and its Commission on Radiological Protection, which both regard the Danish Cohort study a further proof of their claim that mobile communication radiation is harmless [7]. Just as in Germany, in other countries too, the impression was given that with this largest of all studies – and moreover a cohort study – finally the necessary certainty has been established, so that national preventive health measures can be refrained from.

Dariusz Leszczynski, professor at the Radiation and Nuclear Safety Authority in Finland, publicly urged the editors of the *British Medical Journal* [8] to withdraw the paper from Frei et al. from its journal, because the reported results from the Danish Cohort study do not nearly meet scientific standards and, despite of this, they are used by politics and mobile communication industry to deny a risk from mobile communication radiation. Just as Söderqvist and colleagues, he wonders what made the editors of renowned scientific journals accept such a pseudo-scientific paper for publication.

Institutional corruption, a carcinoma in society, is the answer.

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