

## EDITORIALS

## Mobile telephones and brain tumours

Evidence is reassuring, but continued monitoring of health registers and prospective cohorts is still warranted

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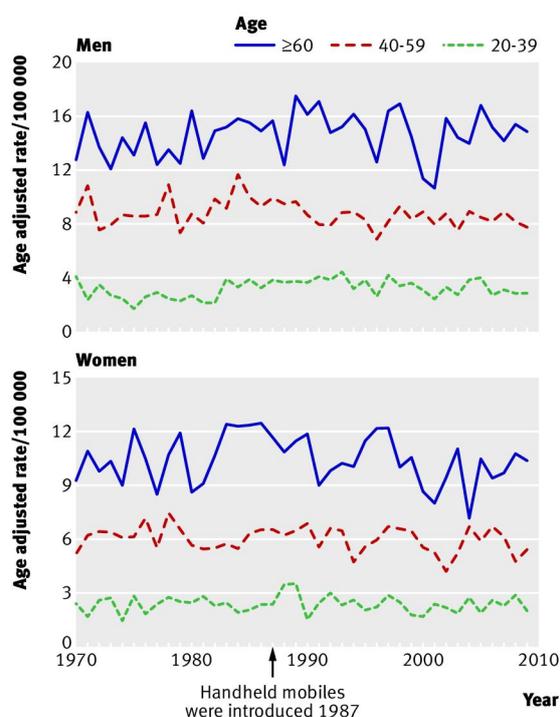
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In the linked cohort study (doi:10.1136/bmj.d6387), Frei and colleagues found no evidence that the risk of brain tumours was raised in 358 403 Danish mobile phone subscribers.<sup>1</sup> This was also true when the cohort was restricted to people who had been subscribing for more than 10 years, when gliomas and meningiomas were analysed separately, and when tumours in the anatomical region closest to the handset were analysed.

The study has two important methodological advantages over most other studies. Firstly, it was based on a computerised cohort that was followed passively in registries, so it avoided the need to contact people. Consequently the problem of non-response and selection bias—which has been of considerable concern in studies with other designs—was eliminated. Secondly, it used digitised subscriber data obtained from the operators rather than retrospective questionnaire or interview information obtained from users. This circumvented the recall bias that is present in other studies.

One weakness, however, was that having a mobile phone subscription is not equivalent to using a mobile phone and conversely some users will be non-subscribers. The resulting misclassification would dilute any association between mobile phone use and cancer risk, and this is important for a negative study like the current one. However, for long term users, this misclassification would have only a small effect: long term users who did not hold personal subscriptions would make up a small proportion of the reference population.

Frei and colleagues' results may seem reassuring, but they must be put into the context of the 15 or so previous studies on mobile telephones and cancer. Although most of these studies were also negative, there are a few exceptions.<sup>2</sup> A Swedish group has repeatedly reported that mobile phone use is associated with an increased risk of brain tumours.<sup>3 4</sup> Among the results reported by this group were increased risks after only five years of mobile phone usage. This is a problematic finding because with such a short time between the start of phone use and clinical disease, an effect—if there were any—would have been detectable in national cancer statistics, but it was not (figure).<sup>5 6</sup> This casts doubt on the methodology used by this research group.



Glioma incidence in Sweden 1970-2009. Adapted from National Board of Health and Welfare, cancer registry

The other major divergences from the overall negative literature are some findings in the Interphone Study, a multicentre brain tumour case-control study carried out in 14 countries.<sup>7</sup> Overall, and in most subanalyses, mobile phone users were not at increased risk of cancer. However, an increased risk was seen in the highest exposure category (the top tenth). In contrast, risk was decreased in the second to highest exposure category, being among the lowest of all categories.<sup>8</sup>

National cancer statistics for Sweden are available up to and including 2009 (figure).<sup>9</sup> Generally, aggregate data are much less informative than data from analytical studies. But in the case of mobile phone use, the proportion of users has increased

so rapidly and reached such high numbers that aggregate data are highly informative. The graphs show that the incidence rates for glioma have not risen since 1970. Handheld mobile phones were introduced in Sweden in 1987 and usage spread quickly. In fact, 87% of 16-75 year olds were mobile phone users in 2002.<sup>10</sup> Thus, almost 90% of the population had been using mobile phones for at least seven years in 2009, and the proportion that had been using them for 10 years or even 15 years must have been substantial. Hence, the absence of a trend in the incidence of brain tumours in national statistics is reassuring.

The search for an association between mobile telephone use and cancer risk should be viewed in the context of its origin. It did not originate from a particular biophysical hypothesis or results of a seminal study but from a concern that some aspect of the interaction between radiofrequency fields and human physiology has been overlooked or misunderstood. The research that has been conducted for the safety of public health with regard to this new and rapidly spreading technology is now extensive. The question is how much more research is needed. Continued monitoring of health registers and prospective cohorts is warranted, but more case-control or other studies with built in selection and recall bias are not needed.

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from public institutions made available to these funders by the industry, with contracts guaranteeing the researchers' independence; the authors are or have been members of the International Commission on Non-Ionizing Radiation Protection, an independent non-governmental organisation developing guidelines for non-ionising radiation protection, and they serve on several public advisory groups concerning the potential health effects of exposure to non-ionising radiation. Provenance and peer review: Commissioned; not externally peer reviewed.

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