

## Science commentary: Power to confuse

Geoff Watts

Ever since Nancy Wertheimer of the University of Colorado reported her 1979 findings of an excess of cancer in children living near overhead power lines, seldom has a year passed without a flurry of public debate over the safety or otherwise of these ugly (the one thing all parties agree on) but essential installations.

Much of the argument has been about the very existence of the alleged hazard. As recently as last month, the organisers of the 15 year UK childhood cancer study declared that “perceived risk factors such as living near sources of electromagnetic fields . . . are not principal causes, if at all, of leukaemia in children.” But a clutch of studies reporting a positive association—of which this week’s by Draper and colleagues is the most recent<sup>1</sup>—has encouraged researchers to continue investigating possible mechanisms.

Electrical and magnetic fields can induce currents that might alter the voltages across cell membranes. Magnetic fields might cause the movement of ferromagnetic particles within cells. They might also influence free radicals: atoms with unpaired electrons that are highly reactive and play a part in all sorts of biochemical processes. Low frequency electromagnetic fields have been said to alter the progress of cells through the cell cycle and reduce the effectiveness of the immune system. Power lines might even deflect and concentrate cosmic rays on people living within their vicinity. Evidence to support these and other ideas, however, is at best thin and at worst non-existent.

One of the more recent attempts at identifying a mechanism sidesteps the need to invoke direct effects. For the past 10 years or so, Bristol University physicist Dennis Henshaw has been working on the influence of powerful electric fields on the deposition of airborne particles. The relevance of this to power lines entered public consciousness in 1999 with the publication of two papers by Henshaw and colleagues.<sup>2,3</sup> High energy power systems, they pointed out, cause some breakdown in the surrounding air molecules and so generate positive or negative ions. The systems are designed to minimise this effect, but it does still occur—and any aerosol pollutants that pass through these ion clouds can acquire an electrical charge.

If particles with a charge are inhaled, more of them will stick to the lining of the respiratory system. The data are limited, but one study that used a model of the human airway suggests that deposition could be increased by a factor of around three. A 2004 report by the (then) National Radiological Protection Board conceded the plausibility of the mechanism and suggested some further experiments.<sup>4</sup> Draper and colleagues refer to the Henshaw hypothesis but add that more work will be necessary to rule it in or out.<sup>1</sup>

Like the fluoridation of drinking water and the genetic modification of crops, the debate over power lines seems destined to be with us for a while yet. So, in these risk averse times, and before activists begin blowing up pylons, a bit of perspective might help. In 2002, according to the Child Accident Prevention Trust, more than 36 000 children were hurt in road accidents

and around 200 were killed. Another 32 died in house fires. Draper and colleagues reckon that five cases annually of childhood leukaemia may be associated with power lines.

- 1 Draper G, Vincent T, Kroll ME, Swanson J. Childhood cancer in relation to distance from high voltage power lines in England and Wales: a case-control study. *BMJ* 2005;330:1290-2.
- 2 Fews AP, Henshaw DL, Keitch PA, Close JJ, Wilding RJ. Increased exposure to pollutant aerosols under high voltage powerlines. *Int J Radiat Biol* 1999;75:1505-21.
- 3 Fews AP, Henshaw DL, Wilding RJ, Keitch PA. Corona ions from powerlines and increased exposure to pollutant aerosols. *Int J Radiat Biol* 1999;75:1523-31.
- 4 National Radiological Protection Board. Particle deposition in the vicinity of power lines and possible effects on health. *Documents of NRPB* 2004;15(1).

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### Corrections and clarifications

#### *Half of patients in intensive care receive suboptimal care*

Several inaccuracies occurred in this News article by Zosia Kmietowicz (*BMJ* 330;2005:1101, 14 May).

The report by the National Confidential Enquiry into Patient Outcome and Death (NCEPOD) on which the article was based was at times somewhat confusing, and this seems to have contributed to the resulting errors. In the second paragraph, we should have said that “Nearly half of all patients admitted to hospital [not “admitted to intensive care” as we implied] who later died in intensive care received care that was judged to be less than good practice.” And the following sentence should have said that poor care may have contributed to the deaths of a third of those whose care was deemed less than good practice. We also reported in the fourth paragraph, rather ambiguously, that “in nearly 6 out of 10 cases, consultants had no knowledge or input into the referral [to intensive care]”—we should have specified “consultant physicians.” In some places in the NCEPOD report, the use of the term consultant was ambiguous—it was not clear whether it meant consultant physician or consultant intensivist. Finally, the graph referred to the standard of care that the patients received in the period from admission to hospital up to, but not including, the first ward round (not, as we said, the standard of care in intensive care only).

#### *Short Cuts: A single computed tomogram can rule out pulmonary embolus*

A missing zero in the page reference to the original article described in this item may have confused readers in their search for the article (*BMJ* 2005;330:1045, 7 May). The correct reference is *JAMA* 2005;293:2012-7.

#### *President Bush and Congress intervene in “right to die” case*

In this News article by Fred Charatan we should have more correctly described Terri Schiavo as having received tube feeding (not “been on a life support machine”) since a cardiac arrest 15 years previously (*BMJ* 2005;330:687, 26 Mar). We repeated the error in the relevant News article in the following week’s issue.

#### *GMC and the future of revalidation: building on the GMC’s achievements*

We slipped up in the spelling of Graeme Catto in his paper in the Education and Debate section (*BMJ* 2005:1205-7, 21 May). The mistake has been corrected on [bmj.com](http://bmj.com).