The actions of the Centers for Disease Control and Prevention are scrutinized regarding the misallocation of $8.8 million dollars that was to support research on chronic fatigue syndrome. Suggestions are offered for improving the analysis of factors potentially contributing to childhood cancer. An idea for a Hippocratic oath for scientists described in a previous editorial draws comments on how much responsibility scientists should have, if any, for how their research is used: "[T]he misuse of scientific knowledge cannot occur without the activity or complicity of other people." And an idea to apply manure to arable lands as a means to sequester carbon is discussed.

Misallocation of CDC Funds

According to the Centers for Disease Control and Prevention (CDC), the reason for the misallocation of $8.8 million (plus another $4.1 million that is impossible to trace) mandated by Congress for the study for chronic fatigue syndrome is because some "brilliant scientists" are "not very good managers" (News of the Week article by Martin Enserink, 7 Jan., p. 22). But the use of this "dizzy scientist" stereotype by the CDC as an explanation seems to be an attempt to conceal what is a more serious problem—a government scientist apparently arrogating to himself the choice of what is to be studied after Congress has decided otherwise. That the acting director of the CDC provided Congress, in the words of the inspector general of the Department of Health and Human Services, with "inaccurate and potentially misleading" information supports this view. The fundamental problem is the tension between "experts" and elected officials, and the publics they represent, about what is or is not an important health problem.

What makes this report more troubling is that William Reeves, the whistle-blower, is the one who appears to be in trouble with the CDC, rather than the administrator-scientist who misallocated the funds or the acting director who misled Congress or its representatives. Perhaps the scientific community could hear more about what administrative and personnel actions the CDC and other federal health agencies are taking to clarify the difference between the authority to select problems and the authority to select appropriate scientific procedures to study those problems.

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Childhood Cancer

I would like to clarify and comment on some of the issues raised in the article "The elusive causes of childhood cancer" by Jocelyn Kaiser (3 Dec., p. 1833), which accompanied Kaiser's News Focus article "No meeting of minds on childhood cancer" (p. 1832). First, the hypothesis regarding a possible link between infant leukemia and chemotherapy drugs that are topoisomerase II inhibitors did not develop from the "genetic shuffle...common in infants whose mothers were treated during pregnancy with chemotherapy drugs." Rather, mixed linkage leukemias that arise after chemotherapy for a primary malignancy fueled this hypothesis (*1*) (see Corrections and Clarifications at the end of this section).

Second, I agree with Frederica Perera's statement regarding the need for the collection of direct biological evidence of exposure (rather than relying primarily on parents' memories of food or chemical exposures). However, several of the agents that we are interested in (for example, specific dietary constituents and alcohol) have an extremely short half-life in vivo and do not necessarily create a biological fingerprint to be measured years later. Furthermore, it is problematic to retrospectively assess the habits and exposures during pregnancy of a mother whose child develops leukemia at the age of 10. One way to explore the potential problems associated with our analytic approach and perhaps discover appropriate biological markers would be to identify large groups of pregnant women (thousands), conduct interviews, collect blood samples, and perform environmental monitoring. Subsequent interviews could be conducted after the birth to determine the validity and reliability of their responses regarding pregnancy-related exposures (when compared with responses obtained while they were pregnant), as well as the usefulness of potential biological markers of exposure.

Finally, to Perera's comment regarding the need to assess inherited variations in genes that may predispose children to cancer, I would add "within biologically defined subgroups." The lack of consistent information with respect to the etiology of childhood cancer can partly be attributed to the heterogeneity of the disease and insufficient study power to test hypotheses within more homogenous subgroups. In many cases, the traditional diagnostic categories are collections of etiologically distinct entities. As an example, most of the childhood leukemia epidemiology studies have been conducted on either childhood leukemia as a whole, or have included two disease stratifications within analyses: acute myeloid leukemia or acute lymphoblastic leukemia. It is becoming apparent, however, that biologically distinct subgroups of leukemia exist (for example, infants and children with Down syndrome). Studies suggest that focused, epidemiologic investigations of these rare subgroups might provide new answers (*2*).

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2. M. W. Yeazel *et al.*, *Cancer* **75**, 1718 (1995); J. A. Ross *et al.*, *Cancer Causes Control* **7**, 581 (1996); D. Satge *et al.*, *Am. J. Med. Genet.* **78**, 207 (1998).

Societal Responsibilities

The position Sir Joseph Rotblat takes in his Editorial "A Hippocratic oath for scientists" (*Science*'s Compass, 19 Nov., p. 1475) seems to have an underlying assumption that scientists are aware of all the implications and ramifications of their research. On the basis of such reasoning, neither Isaac Newton, Albert Einstein, Pierre and Marie Curie, nor a number of other great scientists should have ever worked in their fields or made their discoveries known because of all the harmful effects that eventually arose from them. It is not a scientist's fault if a discovery ultimately has manifold effects. After publication of research results is when scientists should be concerned with what the public does with the information. Scientists should become involved in public debates just as all citizens should, either directly, or indirectly through their representatives. What are the ethical considerations and conclusions when society is confronted by conflicting uses of a given discovery? Scientists whose research is at the heart of such debates may have a greater obligation to con-

The Curies, 1896

Albert Einstein, 1914

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