

## Re: The Use of Offspring Sex Ratios in the Search for Endocrine Disruptors

Crisp et al. (1) reviewed the methods of detecting endocrine-disrupting chemicals, but did not mention the use of offspring sex ratios (proportions male) in this context.

The nematocide dibromochloropropane (DBCP) depresses men's sperm counts and lowers their testosterone/gonadotropin ratios (2). There is overwhelming evidence that mammalian hormone levels around the time of conception are associated with the sex of the resulting offspring (3). In accordance with this hypothesis, the offspring sired by men during exposure to, or recovery from, DBCP showed a highly significant female excess (4).

Another well-established endocrine disruptor, dioxin, has the same hormonal effect on men (5) and the same effect on the offspring of exposed men (6). Mocarelli et al. (6) reported highly significant excesses of daughters. The fungicide vinclozolin is also known to have the same hormonal effect on men (7) and has been suspected of being associated with excess daughters (8).

The finding of a low testosterone/gonadotropin ratio is characteristic of many nonendocrine illnesses in men (9,10), and I have summarized the offspring sex ratios of ill men (3).

Such sex ratios are a highly useful, noninvasive alternative to sperm counts and hormone assays in the search for endocrine disruptors. Moreover, offspring sex ratios are a permanent marker of such disruption; the fact that dioxin causes low offspring sex ratios was discovered after the Seveso disaster of 1976 only by examining (20 years later) the offspring of those most heavily exposed (6).

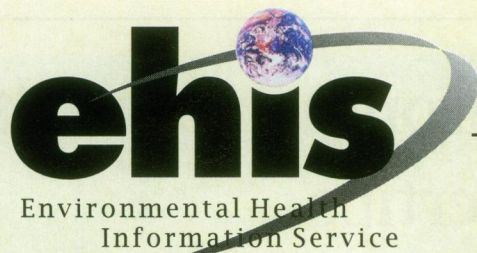
It has been suggested that the contemporary widespread declines in population sex ratios at birth may be due to endocrine disruptors (11). However, this seems not to be a useful suggestion because the declines are so slight as to be interpretable as homeostatic responses to the slowly increasing adult sex ratios brought about by medical improvements during this century (12). Nevertheless, offspring sex ratios of selected groups of men exposed to suspected endocrine disruptors may be highly informative.

The effects of compounds such as dioxin, vinclozolin, and DBCP have been studied more in men than women. It would be useful to know the offspring sex ratios of exposed females.

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