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Breast cancer and environmental risk factors: an appraisal of the scientific evidence

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Breast Cancer Res 2008, 10(Suppl 2):P45 (doi: 10.1186/bcr 1929)

With a few exceptions, the number of new breast cancer cases among women is increasing in almost all western countries. Although lifestyle, life choices, genetics and the diet are shown to contribute to the increase in breast cancer, the sheer number of newly diagnosed cases cannot solely be explained by these factors. The present review aims to evaluate evidence that environmental factors, including chemical exposure, also play a role.

Studies among identical twins have shown that the most important contributor to the causation of breast cancer is the environment not shared by the pair, even under circumstances where the genetic predisposition is very similar. Similarly, in families with a heritable predisposition to breast cancer, time of birth, physical activity and obesity can profoundly influence risk.

There is overwhelming evidence that oestrogens are strong determinants of breast cancer risks. This is not limited to natural oestrogens formed in a woman's body, but extends to synthetic hormones used as pharmaceuticals, such as those used for the alleviation of menopausal symptoms. The demonstration of breast cancer risks from oestrogen-only and, more pronounced, from combined oestrogen-progesterone regimens is a case in point. Very recent decreases in breast cancer incidence in the USA and in parts of Germany could even be linked to a dropping off of hormone therapy use.

To date, studies carried out to examine whether certain environmental chemicals are implicated in breast cancer could neither prove nor rule out a possible link. But to avoid wrongly dismissing a role for chemicals in breast cancer, two issues must be addressed. First, the available studies have largely focused on single chemicals and have ignored the possibility that large numbers of agents may act in concert. Recent evidence from Spain strongly suggests that cumulative exposure to oestrogenic chemicals is associated with breast cancer risks. Second, instead of looking at exposures later in a woman's life, when the breast tissue is less vulnerable, critical periods of vulnerability during puberty and development in the womb must be considered. Very recent studies demonstrating breast cancer risks from exposure to the pesticide DDT during puberty and from exposure to the oestrogenic anti-miscarriage drug DES further underline the importance of chemical exposure in breast cancer.

Taken together, there is a case for abandoning the view of breast cancer as solely a lifestyle and genetic disease. It is necessary to take account of the role of environmental factors, especially chemical exposures. With UK breast cancer incidence at an all time high, risk reduction will not be achievable without considering preventable causes, such as exposure to chemicals.