

Breast Cancer UK submission to the APPG Cancer Inquiry into the implementation of the England Cancer Strategy

1. Introduction

Breast Cancer UK welcomes the opportunity to submit to the APPG Cancer Inquiry into the implementation of the England Cancer Strategy. Breast Cancer UK is dedicated to the primary prevention of breast cancer, and our submission will focus on the prevention aspects of the Strategy.

2. What progress has been made in implementing the Cancer Strategy?

The lifetime risk of a woman developing breast cancer is now 1 in 8 – up from 1 in 12 in 1996.¹ The age standardised rate of breast cancer rose 24% in women between 1993-1995 and 2012-2014.²

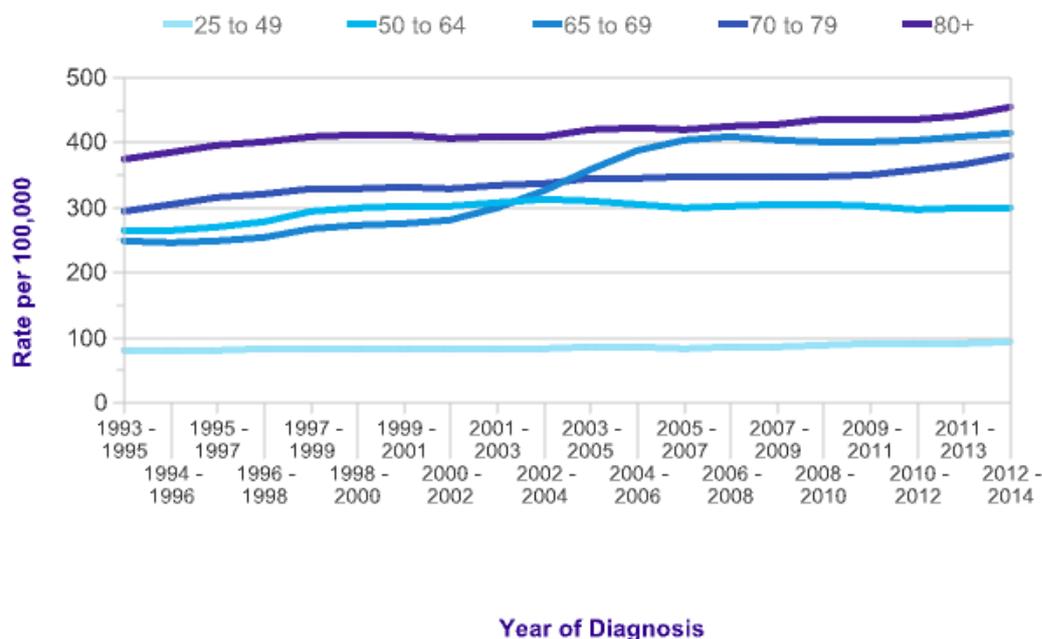


Figure 1. Breast Cancer, European Age-Standardised Incidence Rates, Females, by Age, UK, 1993-2014³

¹ Cancer Research UK, <http://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/breast-cancer/incidence-invasive#heading-Two> (accessed 31/05/2017)

² Cancer Research UK. *Breast Cancer (C50): 1993-2014*. http://www.cancerresearchuk.org/sites/default/files/cstream-node/inc_asr_uk_breast_l14.pdf (accessed 23/05/2017)

³ Cancer Research UK, <http://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/breast-cancer/incidence-invasive#heading-Two> (accessed 25/07/2017)

Rising incidence rates (figure 1) are partly a result of an ageing population. However, the rise in age standardised rates is due to other factors, such as women having fewer children and at an older age, alcohol consumption, obesity, and occupational and environmental exposure to carcinogenic and hazardous chemicals.

Data suggests that breast cancer risk has increased over time. One study found that the risk of getting breast cancer by age 50 for women carrying a *BRCA* mutation born before 1940 is 24%, and for those born after 1940 it is 67%⁴. Similarly, a more recent study demonstrated the risk of getting breast cancer by age 40 for women carrying a *BRCA2* mutation who were born before 1958 is 11%, and for those born after 1958 it is 46%.⁵

The Strategy recognises that there is a need for a “radical upgrade in prevention and public health to prevent cancers” and identifies a need “to significantly reduce the 40% of cancers associated with behavioural, lifestyle and environmental factors”. It aims to achieve the beginning of “a discernible fall in age-standardised incidence.”

We support lifestyle intervention strategies that promote awareness of the risks of tobacco, alcohol consumption and obesity. However, neither the Panel’s report nor the NHS England Five Year Forward plans address the need to tackle the broader environmental and exogenous causes of cancer. If real progress in prevention is to be made it will be important for the Department of Health, Public Health England and the NHS to work together to promote a healthier environment, as well as healthier lifestyles. This is key to reducing the incidence of breast cancer.

3. What are the key challenges in implementing the Cancer Strategy, and how well are these being addressed?

“Worldwide, there has been a failure to adequately address the underlying environmental causes of trends in endocrine diseases and disorders. Health-care systems do not have mechanisms in place to address the contribution of environmental risk factors to endocrine disorders. The benefits that can be reaped by adopting primary preventive measures for dealing with these diseases and disorders have remained largely unrealized.”

WHO/UNEP Report 2012⁶

It is widely accepted that biological and environmental factors contribute and interact with one another to increase cancer risk. For breast cancer, known biological factors which increase risk include lifetime exposure to oestrogens. Environmental oestrogens can exert

⁴ King, M.C. *et al.* (2003) Breast and ovarian cancer risks due to inherited mutations in *BRCA1* and *BRCA2*. *Science* 302(5645):643-6

⁵ Tea, M.K. *et al.* (2014). Central European *BRCA2* mutation carriers: Birth cohort status correlates with onset of breast cancer. *Maturitas* 77:68–72.

⁶ WHO/UNEP (2012) State of the science of endocrine disrupting chemicals <http://www.who.int/ceh/publications/endocrine/en/> (Accessed June 16, 2016)

similar effects to endogenous oestrogens (e.g. oestrogen mimics) and so may increase the risk of breast cancer in a similar manner.

Environmental oestrogens belong to a group of chemicals known as Endocrine Disrupting Chemicals (EDCs).⁷ In addition to acting as oestrogen mimics, some EDCs exert their effects by acting as hormone “antagonists”, so prevent hormone-receptor binding, thus blocking subsequent actions. Others can alter the concentration of naturally circulating hormones or cause heritable changes through “epigenetic” modification, which changes gene expression without altering the underlying DNA gene sequence.⁸

Several synthetic oestrogens are already recognized as increasing the risk of breast cancer including Hormone Replacement Therapy (HRT)⁹ and the oral contraceptive pill¹⁰. There is evidence that other chemicals known to act as oestrogen mimics, such as bisphenols¹¹ used in plastics and till receipts, and phthalates¹² used in plastics and fragrances, may also contribute to breast cancer risk.

A key challenge is to strengthen our understanding of environmental pollutants such as EDCs, and how they interact with other chemicals in the environment and within our bodies. This will help us to identify and take steps to reduce the environmental causes of breast cancer.

4. Has sufficient funding been allocated and made available for delivery of the Strategy?

"The increasing number of known or suspected environmental carcinogens compels us to action, even though we may currently lack irrefutable proof of harm."

Dr. LaSalle D. Lefall, Jr., chair of the President's Cancer Panel¹³

Successful prevention is reliant on a good understanding of cancer aetiology. In general, when the underlying cause of a disease is identified, steps can be taken to reduce its

⁷ IPCS. (2002). Global assessment of the state-of-the-science of endocrine disruptors. Geneva, Switzerland, World Health Organization, International Programme on Chemical Safety.

http://www.who.int/ipcs/publications/new_issues/endocrine_disruptors/en/ (Accessed June 16, 2016)

⁸ Diamanti-Kandarakis E, et al. (2009). Endocrine-disrupting chemicals: an Endocrine Society scientific statement. *Endocrine Reviews*, 30(4): 293–342. <http://www.ncbi.nlm.nih.gov/pubmed/19502515>

⁹ Jones, M. E. et al. (2016). Menopausal hormone therapy and breast cancer: what is the true size of the increased risk? *British Journal of Cancer* (2016) 115, 607–615. <http://www.ncbi.nlm.nih.gov/pubmed/27467055/>

¹⁰ Chlebowski, R. T. et al. (2015). Breast Cancer after use of Estrogen Plus Progestin and Estrogen Alone Analyses of Data From 2 Women's Health Initiative Randomized Clinical Trials. *JAMA Oncology* 1(3): 296-305. <http://oncology.jamanetwork.com/article.aspx?articleid=2250347>

¹¹ Wang, Z. et al. (2016). Low-Dose Bisphenol A Exposure: A Seemingly Instigating Carcinogenic Effect on Breast Cancer. *Advanced Science News* 4, 1600248. <https://www.ncbi.nlm.nih.gov/pubmed/28251049>

¹² Chen, F.-P. et al. (2016). Impact of low concentrations of phthalates on the effects of 17beta-estradiol in MCF-7 breast cancer cells. *Taiwanese Journal of Obstetrics & Gynecology* 55: 826-834. <https://www.ncbi.nlm.nih.gov/pubmed/28040128>

¹³ President's Cancer Panel (2010). Reducing Environmental Cancer Risk: What We Can Do Now. https://deainfo.nci.nih.gov/advisory/pcp/annualreports/pcp08-09rpt/pcp_report_08-09_508.pdf

incidence. This has been the case for interventions where there are strong associations between cancer and infectious agents (e.g. introduction of a human papilloma vaccine to reduce cervical cancer), or established environmental pollutants (e.g. reducing asbestos exposure and the incidence of mesothelioma).

The percentage of UK cancer research funding that goes towards the aetiology of cancer has more than halved over the last 10 years. In 2005/2006, 14% (over £52 million) of total research spending went towards research to identify the causes or origins of cancer – genetic, environmental and lifestyle, and their interactions. This has decreased steadily over the last ten years and in 2015/2016, this figure stood at less than £35 million, representing just 6.1% of total research funding.¹⁴

Within this classification only a very small percentage goes towards the exogenous factors that contribute to cancers. According to the NCRI, in 2015/2016 cancer research funding into the exogenous causes of the disease (CSO2.1) accounted for just 1.3% (significantly down from 3.4% in 2005/2006)¹⁵ and for breast cancer research, spending in this area (in 2013) accounted for only 0.6% of the budget, compared to a far greater proportion (5.1%) in 2002.¹⁶ If we are to prevent cancer, we must invest further in finding out what causes it.

In 2015/2016, 5.4% of the UK cancer research funding (£31.6 million) went on cancer prevention (CSO3). This category includes interventions that reduce risk by reducing exposure to risks and increasing protective factors. Preventing cancer should be a key focus of any cancer strategy. Although this figure is not inconsiderable we believe it should be higher.

There needs to be an increase in cancer research funding into prevention and aetiology, over the next 5 years. We urge the APPG to call for an increase in research funding into prevention (CSO3) and into ‘Exogenous Factors in the Origin and Cause of Cancer’ (CSO 2.1).

5. What should the priorities be for the Cancer Transformation Board and the National Cancer Advisory Group in the next 12 months with regards to delivering the Cancer Strategy?

“We cannot treat our way out of the cancer problem. More commitment to prevention and early detection is desperately needed in order to complement improved treatments and address the alarming rise in cancer burden globally.”
Dr Chris Wild, World Cancer Report 2014¹⁷

¹⁴ All data (2015) <http://www.ncri.org.uk/what-we-do/research-database> (Last accessed 30 July 2017)

¹⁵ *ibid.*

¹⁶ Data on top 6 cancers by research funding (2014) <http://www.ncri.org.uk/what-we-do/research-database>

¹⁷ IARC (2014) Press Release 224; ‘Global battle against cancer won’t be won with treatment alone Effective prevention measures urgently needed to prevent cancer crisis’ http://www.iarc.fr/en/media-centre/pr/2014/pdfs/pr224_E.pdf (Accessed June 16, 2016)

The Cancer Transformation Board and National Cancer Transformation Group should prioritise the Strategy’s goal of delivering “a discernible fall in age-standardised incidence.” This will mean addressing all cancer risk factors: lifestyle risk factors and reducing exposure to hazardous substances.

Reducing occupational exposure

Evidence suggests that exposure to hazardous chemicals in the workplace contribute to increased risk of cancer. The Board and Group should work with HSE to reduce occupational exposure to cancer causing agents and hazardous chemicals.

Reducing *in utero* exposure

There is growing concern amongst scientists and clinicians, including the Royal College of Obstetricians and Gynaecologists, about the potentially adverse and long-term health effects of early exposures to harmful chemicals during critical moments of development, for example in the womb, during early infancy, childhood or into puberty which could also increase the risk of developing diseases and cancers later in life.^{18 19 20 21 22}

Health departments of other countries have released publications expressing concern that early exposures to certain harmful chemicals could be increasing human vulnerability to diseases and have either provided further information to pregnant women to try and help them reduce unnecessary exposures or are carrying out further research to try and assess how pre-natal exposure to environmental chemicals may increase the risk of breast cancers.²³

6. Breast Cancer UK recommendations

- To date the UK invests only a small proportion of its significant cancer research budget into understanding the exogenous causes of the disease. An independent task force should review national research efforts and develop a comprehensive national strategy on environmental and genetic factors related to cancer.
- We need to develop and implement a primary cancer prevention strategy which commits to the improvement of our understanding of the aetiology of cancer and acknowledges the links between certain cancers and environmental pollutants.
- We ask that the APPG call for an increase in cancer research funding over the next 5 years by NCRI research partners into “Exogenous Factors in the Origin and Cause of

¹⁸ Report of the Interagency Breast Cancer and Environmental Research Coordinating Committee (IBCERCC) (2013). ‘Breast Cancer and the Environment Prioritising Prevention Prioritising Breast Cancer’. http://www.niehs.nih.gov/about/assets/docs/ibcercc_full_508.pdf.

¹⁹ Barouki, R, et al. (2012). Developmental origins of non-communicable disease: Implications for research and public health. http://www.toxicology.org/AJ/MEET/cct_pptoxiii/pptoxiii_consensus_paper.pdf

²⁰ Knower, KC, et al., (2014). Endocrine disruption of the epigenome: a breast cancer link *Endocrine Related Cancer* 21(2): T33-55. <http://www.ncbi.nlm.nih.gov/pubmed/24532474>

²¹ Darbre, PD and Charles, AK (2010). Environmental Oestrogens and Breast Cancer: Evidence for Combined Involvement of Dietary, Household and Cosmetic Xenoestrogens. *Anticancer Research* 30: 815-828. <http://www.ncbi.nlm.nih.gov/pubmed/20393002>

²² Soto, A.M. et al. (2013). Does cancer start in the womb? Altered mammary gland development and predisposition to breast cancer due to in utero exposure to endocrine disruptors. *Journal of Mammary Gland Biology Neoplasia* 18(2): 199-208. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3933259/>

²³ See for example; <http://www.chdstudies.org/research/index.php#study1> (Accessed June 16, 2016)

Cancer” (CSO 2.1) and “Prevention” (CSO 3), to help reflect the urgent need to identify interventions to help reduce cancer risk.

For further information or to discuss our submission please contact Jack Brown, Policy and Campaigns Officer, Breast Cancer UK at jack.brown@breastcanceruk.org.uk or 0845 680 1322.

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