

## Breast Cancer UK submission to the APPG Cancer Inquiry into the England Cancer Strategy

### 1. Introduction

We at Breast Cancer UK welcome the opportunity to feed into the APPG Cancer Inquiry into the England Cancer Strategy. Breast Cancer UK is dedicated to the prevention of breast cancer and as such, our submission will focus on the prevention and public health aspects of the Strategy. In particular, on how the Cancer Strategy could more effectively tackle the challenges posed by society's increasing exposure to environmental pollutants and what role these might play in increasing our risk of cancers, and especially hormonal cancers such as breast cancer.

### 2. Has progress been made to improve prevention?

Breast Cancer UK welcomes the Strategy's recognition that there is a need for a "radical upgrade in prevention and public health to prevent cancers" and welcomes reference to the objective "to significantly reduce the 40% of cancers caused by behavioural, lifestyle and environmental factors". Such a focus is drastically needed. As has been widely reported, cancer incidence rates continue to rise at an alarming rate, and as Dr Chris Wild noted in the World Cancer Report in 2014: *"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."*<sup>1</sup>

According to Cancer Research UK statistics, incidence rates for all cancers in Great Britain increased by 17% in males during the period 1979-1981 to 2011-2013 and by 37% in females<sup>2</sup>. It is predicted that 1 in 2 people living in the UK will get cancer at some point in their lives.<sup>3</sup> Put simply, we are failing to prevent cancers and far more must be done to help prevent people from getting cancer in the first place.

Of particular concern to us, is the rising incidence rate of hormonal cancers such as breast cancer. The lifetime risk of a woman developing the disease is 1 in 8 – up from 1 in 9 in 2001 and 1 in 12 in 1996<sup>4</sup>. Approximately 60,000 women in the UK were diagnosed with breast

---

<sup>1</sup> 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](http://www.iarc.fr/en/media-centre/pr/2014/pdfs/pr224_E.pdf) (Accessed June 16, 2016)

<sup>2</sup> Cancer Research UK (2016). <http://www.cancerresearchuk.org/cancer-info/cancerstats/incidence/all-cancers-combined/> (Accessed June 16, 2016)

<sup>3</sup> Ahmad et al. (2015). Trends in the lifetime risk of developing cancer in Great Britain: comparison of risk for those born from 1930 to 1960. *British Journal of Cancer* (2015): 1-5. Advance Online Publication: 3 February 2015.

<sup>4</sup> Cancer Research UK (2014). Breast Cancer. Breast Cancer Key Stats. [http://publications.cancerresearchuk.org/downloads/Product/CS\\_KF\\_BREAST.pdf](http://publications.cancerresearchuk.org/downloads/Product/CS_KF_BREAST.pdf) (Accessed June 16, 2016)

cancer in 2015<sup>5</sup> and around 1 in 5 is were under the age of 50<sup>6</sup>. Moreover, 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%<sup>7</sup>. 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 was 11%, and for those born after 1958 it is 46%.<sup>8</sup>

Over the past decade, the focus on improving cancer services has ensured that we are getting better at diagnosing and treating cancer and people are living longer with the disease. But this has come at a cost - the cost to the UK of breast cancer alone, is an estimated £1.5 billion each year<sup>9</sup> with the average 15-month cumulative health-care costs estimated to be £12,595 per-patient<sup>10</sup>. The NHS is already under tremendous pressure and will not be able to cope with the rising numbers of people being diagnosed and living longer with the disease. The best way to relieve pressure on the NHS is to prevent as many incidences of the cancer as possible. It is vital that we pay more than lip service to prevention and make every effort to make a serious effort to tackle all of the preventable risk factors for cancer.

Whilst we note the inclusion of environmental risk factors in the NHS strategy, there was little of substance in the strategy to demonstrate how environmental pollutants (beyond UV radiation) will be tackled and what measures will be put in place to “radically” and effectively reduce unnecessary public exposures.

We fully 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, such as exposure to harmful chemicals including those that mimic or interfere with the human hormone system.

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 the key to reducing the incidence of cancer, and reducing the burden on the NHS.

---

<sup>5</sup> MacMillan Cancer Support (2016). Facts and Statistics 2016. <https://www.breastcancercare.org.uk/about-us/media/press-pack-breast-cancer-awareness-month/facts-statistics> (Accessed June 16, 2016)

<sup>6</sup> Cancer Research UK (2014). *op.cit.*

<sup>7</sup> King, M.C. *et al.* et al. (2003) Breast and ovarian cancer risks due to inherited mutations in *BRCA1* and *BRCA2*. *Science* 302(5645):643-6

<sup>8</sup> Tea, M.K. *et al.* (2014). Central European *BRCA2* mutation carriers: Birth cohort status correlates with onset of breast cancer. *Maturitas* 77:68–72.

<sup>9</sup> NCRI (2012). Lung Cancer UK price tag eclipses the cost of any other cancer. [http://conference.ncri.org.uk/archive/2012/press-releases/LUNG\\_CANCER\\_UK\\_PRICE\\_TAG\\_ECLIPSES\\_THE\\_COST\\_OF\\_ANY\\_OTHER\\_CANCER.pdf](http://conference.ncri.org.uk/archive/2012/press-releases/LUNG_CANCER_UK_PRICE_TAG_ECLIPSES_THE_COST_OF_ANY_OTHER_CANCER.pdf) (Accessed June 16, 2016)

<sup>10</sup> Hall et al (2014). Costs of cancer care for use in economic evaluation: a UK analysis of patient-level routine health system data. *British Journal of Cancer* 112: 948-956.

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

If we are to prevent more cancers, prevention strategies must move beyond their current focus on lifestyle, behaviours and genetics. To date, previous strategies for cancer prevention in the UK have focused on reducing alcohol consumption, encouraging active lifestyles, discouraging smoking and identifying genetic predispositions to the disease.<sup>11</sup> Whilst we agree that encouraging healthy lifestyles is important, it can only have a limited impact on hormonal cancers such as breast, ovarian or prostate.

One comprehensive study found lifestyle factors, including alcohol and obesity, together with reproductive and post-menopausal hormones, ionising radiation and occupational exposures only account for an estimated 27% of all breast cancer cases.<sup>12</sup> Most studies suggest hereditary factors are associated with around 20- 30% of all breast cancer cases (e.g.<sup>13,14,15,16</sup>), with only 5-10% due to inherited single gene mutations (e.g.in *BRCA*, *TP53* *PTEN* genes).

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 similar effects to endogenous oestrogens (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).<sup>17</sup> In addition to acting as oestrogen mimics, some EDCs exert their effects by acting as androgen (or other 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.<sup>18</sup>

A number of synthetic oestrogens are already recognized as increasing the risk of breast cancer including Hormone Replacement Therapy (HRT) and the oral contraceptive pill<sup>19</sup>.

---

<sup>11</sup> e.g see Improving Outcomes: A Strategy for Cancer (2011); Better Cancer Care, An Action Plan (2008); Together for Health, Cancer Delivery Plan for the NHS to 2016; Regional Cancer Framework: A Cancer Control Programme for Northern Ireland (2006).

<sup>12</sup> Parkin et al. (2011). The fraction of cancer attributable to lifestyle and environmental factors in the UK in 2010 Summary and conclusions. *British Journal of Cancer* 10: S77 – S81.

<sup>13</sup> Shiovitz, S. and Korde, L. A. (2015). Genetics of breast cancer: a topic in evolution. *Annals of Oncology* 00: 1–9, 2015 published online, February 19.

<sup>14</sup> Economopoulou P., et al. (2015). Beyond BRCA: New hereditary breast cancer susceptibility genes. *Cancer Treatment Reviews* 41 (2015) 1–8.

<sup>15</sup> Lichtenstein P, et al. Environmental and heritable factors in the causation of cancer: analyses of cohorts of twins from Sweden, Denmark, and Finland. (2000). *The New England Journal of Medicine* 343(2):78–85

<sup>16</sup> Shiovitz, S. and Korde, L. A. (2015). Genetics of breast cancer: a topic in evolution. *Annals of Oncology* 00: 1–9, 2015 published online, February 19.

<sup>17</sup> 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/](http://www.who.int/ipcs/publications/new_issues/endocrine_disruptors/en/) (Accessed June 16, 2016)

<sup>18</sup> 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>

<sup>19</sup> Travis, R.C. and Key, T.J. (2003). Oestrogen exposure and breast cancer risk. *Breast Cancer Research* 5: 239-247.

There is now increasing evidence that other chemicals known to act as oestrogen mimics, including parabens used as preservatives in food and cosmetics, bisphenol A used in plastics, and phthalates used in plastics and fragrances may also contribute to breast cancer risk.

A major 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 eliminate some of the chemical causes of cancers. Only when we have done this will we begin to make progress towards stopping the tidal wave of cancer cases that will swamp the NHS in the next decade.

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

Current research funding into prevention is inadequate. 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 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 halved over the last 10 years. In 2005, over £52 million (15% 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 2013 this figure stood at less than £38 million (just 7.6% of total research funding).<sup>20</sup> Within this classification only a very small percentage goes towards the exogenous factors that contribute to cancers. According to the NCRI, in 2015 cancer research funding into the exogenous causes of the disease (CSO2.1) accounted for just 1.4% (significantly down from 4.2% in 2002)<sup>21</sup> 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.<sup>22</sup> If we are to stop cancer before it starts, we must invest further in finding out what causes it.

Breast Cancer UK believes that there is an urgent need to increase 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) so that it is at least 5% of total funding

---

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC314432/>

<sup>20</sup> All data (2015) <http://www.ncri.org.uk/what-we-do/research-database> (Last accessed June 16, 2016)

<sup>21</sup> *ibid.*

<sup>22</sup> Data on top 6 cancers by research funding (2014) <http://www.ncri.org.uk/what-we-do/research-database>

and for funding into 'Exogenous Factors in the Origin and Cause of Cancer (CSO 2.1) to be increased from 1.3% to 5%(returning it to the same level of funding as in 2002).

## 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?

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 chemicals.

### Reducing occupational exposure

The Board and Group should work with HSE to reduce occupational exposure to cancer causing agents and hazardous chemicals.

Evidence<sup>23</sup> from North America suggests that hazardous chemicals contribute to increased risk of cancer: a study found higher rates of breast cancer in premenopausal women employed in automotive plastics and food canning work.<sup>24</sup> Another study suggested breast cancer risk among male workers in the plastics and rubber industries is almost quadruple.<sup>25</sup> Chemicals commonly present in the production of plastics include mammary carcinogens and EDCs and it has been shown that the work-environment in this sector is heavily contaminated with ingredient, by-product, and product dusts, vapours, and fumes<sup>26</sup>.

### 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.<sup>27 28 29 30 31</sup>

---

<sup>23</sup> *Ibid.*

<sup>24</sup> Brophy J.T. et al. (2012). Breast cancer risk in relation to occupations with exposure to carcinogens and endocrine disruptors: a Canadian case-control study. *Environmental Health* 11(87): 1–17

<sup>25</sup> Ewertz M, et al. (2001). Risk factors for female breast cancer—a case–control study from Scandinavia. *Acta Oncologica* 40:467–471

<sup>26</sup> DeMatteo R, et al. (2012) Chemical exposures of women workers in the plastics industry with particular reference to breast cancer and reproductive hazards. *New Solutions* 22: 427–448

<sup>27</sup> 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](http://www.niehs.nih.gov/about/assets/docs/ibcercc_full_508.pdf).

<sup>28</sup> Barouki, R, et al. (2012). Developmental origins of non-communicable disease: Implications for research and public health. [http://www.toxicology.org/AI/MEET/cct\\_pptoxiii/pptoxiii\\_consensus\\_paper.pdf](http://www.toxicology.org/AI/MEET/cct_pptoxiii/pptoxiii_consensus_paper.pdf)

<sup>29</sup> Kowner. 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>

<sup>30</sup> 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>

<sup>31</sup> 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/>

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.<sup>32</sup>

Efforts to prevent cancer must start at the earliest opportunity. It is vital that more is done to prevent future generations from becoming increasingly vulnerable to disease. Breast Cancer UK believe that the NHS should provide advice to pregnant women acknowledging the potential risk of unnecessary exposures to harmful chemicals, and provide tips and advice on how to reduce exposures as part of their Pregnancy Planning Toolkit.<sup>33</sup>

## 6. What needs to be in place to ensure successful delivery of the Cancer Strategy?

*“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 2012<sup>34</sup>

If the Strategy is to be delivered successfully then the incidence rates for cancer must be reduced. In order for incidence rates to be reduced the implementation of the Strategy must account for the danger that exposure to harmful chemicals and particularly hormone disrupting chemicals, are contributing to an increased risk of many diseases including cancers.

Scientists<sup>35</sup>, cancer NGOs<sup>36</sup>, politicians<sup>37</sup> and international health organisations<sup>38</sup> have made statements supporting the need to curb the use of EDCs in an effort to protect public health.

---

<sup>32</sup> See for example; <http://www.chdstudies.org/research/index.php#study1> (Accessed June 16, 2016)

<sup>33</sup> See for example the NHS Pregnancy and Baby Guide at <http://www.nhs.uk/conditions/pregnancy-and-baby/pages/pregnancy-and-baby-care.aspx#close> (Accessed June 16, 2016)

<sup>34</sup> WHO/UNEP (2012) State of the science of endocrine disrupting chemicals <http://www.who.int/ceh/publications/endocrine/en/> (Accessed June 16, 2016)

<sup>35</sup> See for example the Berlaymont Declaration:

[http://www.brunel.ac.uk/data/assets/pdf\\_file/0005/300200/The\\_Berlaymont\\_Declaration\\_on\\_Endocrine\\_Disruptors.pdf](http://www.brunel.ac.uk/data/assets/pdf_file/0005/300200/The_Berlaymont_Declaration_on_Endocrine_Disruptors.pdf) (Accessed June 16, 2016)

<sup>36</sup> <http://env-health.org/news/latest-news/article/top-policy-makers-support-curbing> (Accessed June 16, 2016)

<sup>37</sup> Parliament Magazine (January 2015) ‘Europe-wide cancer group calls for action on hormone disruptors’ <https://www.theparliamentmagazine.eu/articles/opinion/europe-wide-cancer-group-calls-action-hormone-disruptors#.VK-fMDQmWks.twitter> (Accessed June 16, 2016)

<sup>38</sup> WHO/UNEP (2012) *Op. cit.*

In 2012, the World Health Organisation and United Nations Environment Programme published an assessment of the state of the science of endocrine disruptors<sup>39</sup>.

It noted three key areas of concern: –

- that many endocrine related diseases and disorders (include cancers) were on the increase;
- that endocrine-related effects had been observed in wildlife populations; and,
- that the identification of chemicals with endocrine disrupting properties had been increasingly linked to disease.

For age-standardised incidence to be reduce, stricter regulation of EDCs and other chemicals linked to cancer is required. There must also be more funding directed towards to identifying which chemicals pose a risk and how to best negate that risk. Without that regulation and funding efforts at prevention will be hampered.

## 7. Breast Cancer UK conclusions and recommendations

A greater focus on the links between harmful chemicals and ill health is required. The National Cancer action plan of France provides a good example of to achieve this. In addition to reducing known risk factors such as smoking, obesity and alcohol it also aims to protect populations from the risk of “occupational and environmental cancers”. They state that “Knowledge, observation and surveillance of cancers related to environmental exposure will be developed, for both known and potential carcinogens”.

- To date the UK invests only a small proportion of its significant cancer research budget into understanding the exogenous causes of the disease. This has led to prevention policies that ignore the links between exposures to harmful exogenous chemicals and majors cancers like breast cancer. An independent task force should be established to 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 and other exogenous chemicals that are harmful;
- 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 Cancer” (CSO 2.1) from 1.3% to 5% of total funding, returning it to levels seen in 2002, and that funding into “Prevention” (CSO 3) is increased from 3.4% to at least 5% to help reflect the urgent need to identify interventions to help reduce cancer risk; and that

---

<sup>39</sup> WHO/UNEP (2012) *Op. cit.*

- The NHS publish advice for pregnant women on reducing *in utero* exposures to hazardous chemicals, including endocrine disrupting chemicals.

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](mailto:jack.brown@breastcanceruk.org.uk) or 0845 680 1322.

17 June 2016