

Submission from Breast Cancer UK to the Health Select Committee Inquiry on Public Health England

1. Summary

- Breast Cancer incidence rates continue to escalate. We need to get better at preventing the disease. Public Health England has a major role to play in this respect.
- It is currently unclear how Public Health England's strategic priorities and work plans address mounting scientific concerns about the associations between exposure to carcinogenic and toxic chemicals used in everyday products and the increased risk of breast cancers.
- Public Health England needs to acknowledge the public health risks of routine exposure to carcinogenic and toxic chemicals used in everyday products and include them as preventable risk factors for breast cancers and public health in a similar way to their approach to alcohol, tobacco, obesity and diet.
- There is a strong need for Public Health England to develop its capacity and capability in the area of public exposure to carcinogenic and toxic chemicals in order to better protect the country's overall health. This should include:
 - The development of a programme of work that addresses exposure to carcinogenic, toxic and Endocrine Disrupting Chemicals (EDCs) and takes the necessary steps to reduce public exposure;
 - The development and implementation of a comprehensive program of education and practical advice for pregnant and breast feeding women to help them reduce exposure to carcinogenic and toxic chemicals;
 - A review of workplace exposures to carcinogenic and toxic chemicals; and
 - Raising awareness and understanding amongst public health professionals of the risks associated with routine exposure to harmful chemicals.

2. About Breast Cancer UK

- 2.1 Breast Cancer UK is dedicated to the prevention of breast cancer by reducing public exposure to carcinogenic and hazardous chemicals in our environment and everyday products.
- 2.2 Breast Cancer UK believes that there is enough scientific data on the harmful effects of carcinogenic hazardous and Endocrine Disrupting Chemicals (EDCs) to warrant the need for a precautionary approach to regulation and public health policy.

3. The need for better breast cancer prevention policies

- 3.1 Whilst improved treatment and early diagnosis has helped to reduce death rates from breast cancers, incidence levels continue to escalate. Rates in women have risen by 90% since 1971 and in men by 60%¹; more than 50,000 people are diagnosed with breast cancers every year²;

¹ Data by Office for National Statistics. 'Breast Cancer: Incidence, Mortality and Survival, 2010'. <http://www.ons.gov.uk/ons/rel/cancer-unit/breast-cancer-in-england/2010/sum-1.html> (Accessed September 2013)
² Data by Cancer Research UK. 'Breast Cancer Incidence Statistics': <http://www.cancerresearchuk.org/cancer-info/cancerstats/types/breast/incidence/> (Accessed September 2013).

more women under 50 are getting the disease³; and the cost of treating breast cancers is estimated to be more than £1.5 billion a year⁴. It is clear that we need to get better at preventing breast cancers. Public Health England has a major role to play in this respect.

- 3.2 The majority of breast cancers appear have no attributable cause⁵. However, we do know that the hormone oestrogen is an important factor in breast cancer development⁶. Women with high levels of naturally occurring oestrogen have over twice the average risk of developing breast cancers⁷. It follows therefore, that exposure to synthetic oestrogens is also likely to be an additional risk factor. It is vital that the work of Public Health England begins to address this area of public health policy in the same way it approaches tobacco, alcohol, obesity and diet.

4. The Role of Public Health England

- 4.1 Breast Cancer UK welcomes Public Health England's priorities as outlined in the document 'Our Priorities for 2013/14'. We support the need to; reduce preventable deaths; focus on prevention; protect the country from environmental hazards; give young people the best start in life; and; improve the health of people in the work place. However, Public Health England does not adequately tackle routine exposure to carcinogenic and toxic chemicals in any of these work streams. This is particularly worrying as exposure to harmful chemicals and their adverse effect on public health is relevant to each and every one.

5. 'Reducing preventable deaths' and 'Reducing the burden of disease'

- 5.1 There is widespread scientific concern and numerous studies that show exposure to EDCs, many of which are used in everyday products and present in food, water and air via pollution, disrupt hormones (including oestrogen), adversely affect the development of the mammary gland, increase malignancy in cells and disrupt DNA, all making the breast more vulnerable to breast cancers^{8,9,10,11}. Such chemicals include Bisphenol A¹², phthalates^{13,14,15}, atrazine^{16,17,18}, 2,

3 Data by Cancer Research UK. 'Breast cancer in women under 50 tops 10,000 cases for first time': <http://www.cancerresearchuk.org/cancer-info/news/archive/pressrelease/2013-05-02-breast-cancer-in-women-under-50-tops-10,000> (Accessed September 2013).

4 Data by Leal, J. (2012). 'The Economic Burden of cancer across the European Union: Oxford University': http://www.ox.ac.uk/media/news_stories/2012/121107.html.

5 Parkin, D. et al. (2010). 'The fraction of cancer attributable to lifestyle and environmental factors in the UK in 2010.' *British Journal of Cancer* (2011) 105, S77-S81.

6 Kelsey, Gammon, et al. (1993). 'Reproductive factors and breast cancer.' *Epidemiological Review* 15: 36-47. Bernstein & Ross (1993). 'Endogenous hormones and breast cancer risk.' *Epidemiol. Rev.* 15: 48-65.

7 Data from Cancer Research UK: 'Hormones and Cancer': <http://www.cancerresearchuk.org/cancer-info/healthyliving/hormones/hormones-and-cancer> (Accessed September 2013).

8 Darbre, P., Fernandez, M. (2013). 'Environmental oestrogens and breast cancer: Long term low dose effects of mixtures of various chemical combinations.' *J Epidemiol Community Health* 2013; 67: 203-205.

9 Darbre P. (2006). 'Environmental oestrogens, cosmetics and breast cancer'. *Best Pract Res Clin Endocrinol Metab.* 2006 Mar; 20 (1):121-43.

10 Kortenkamp, A. (2008). 'Breast Cancer and exposure to hormonally active chemicals: An appraisal of the scientific evidence 2008.' CHEM Trust.

11 European Environment Agency (2012). *The Weybridge+15 (1996-2011) Report: 'The impacts of endocrine disrupters on wildlife, people and their environments.'* <http://www.eea.europa.eu/publications/the-impacts-of-endocrine-disrupters>.

12 Vandenberg, L.N. Colborn, T. et al. (2012). 'Hormones and endocrine-disrupting chemicals: low dose effects and non-monotonic dose responses'. *Endocr Rev* 33 (3): 378-455.

13 Moral, R., Wang, R., Russo, I., Mailo, D., Lamartiniere, C., & Russo, J. (2007). 'The plasticizer butyl benzyl phthalate induces genomic changes in rat mammary gland after neonatal/prepubertal exposure.' *BMC Genomics*, 8, 453.

14 Moral, R., Santucci-Pereira, J., Wang, R., Russo, I. H., Lamartiniere, C. A., & Russo, J. (2011). 'In utero exposure to butyl benzyl phthalate induces modifications in the morphology and the gene expression profile of the mammary gland: An experimental study in rats'. *Environ Health*: 10(1), art. No. 5.

15 Gwinn, M., Whipkey, D., Tennant, L., & Weston, A. (2007). 'Gene expression profiling of di-n-butyl phthalate in normal human mammary epithelial cells.' *J Environ Pathol Toxicol Oncol*, 26, 51-61.

4-D¹⁹, and Polybrominated Diphenyl Ether (PBDE)^{20,21}, used in articles such as plastics, cosmetics, cleaning products, pesticides and flame retardants.

- 5.2 Exposure to such chemicals is not only associated with increased risk of breast cancers, but also an increased risk of a range of other adverse health conditions such as high blood pressure, cardiovascular disease, obesity, diabetes, recurrent miscarriage and behavioural disorders²².
- 5.3 However, despite increasing concern about the associations between breast cancers and exposure to carcinogens and EDCs, Public Health England's strategic priorities, outcomes framework and the UK's National Cancer Plans²³ fail to reflect this.
- 5.4 Current prevention policy focuses almost entirely on raising awareness of the symptoms, screening and early diagnosis and whilst this is important, it has been incorrectly promoted to the public as being the best prevention, whereas it actually does nothing to prevent the disease from developing in the first place.
- 5.5 In order to tackle the primary prevention of breast cancer, reduce the burden of the disease and reduce preventable deaths, Public Health England must address all possible causes of breast cancers which includes exposure to hazardous chemicals. Breast Cancer UK is calling for a Breast Cancer Prevention Strategy that prioritises the primary prevention of breast cancer and broadens the current focus on secondary prevention, early diagnosis and the search for a cure.
- 5.6 Public Health England must acknowledge the public health risks of routine exposure to carcinogenic and hazardous chemicals used in everyday products and include them, along with tobacco and alcohol, as preventable risk factors for breast cancers and public health.

6. 'Protecting the country's health'

- 6.1 Whilst Public Health England has a remit to protect the public from environmental hazards, this appears to be confined to acute threats to public health such as chemical spills or public health incidents. There is little, to no, publicly available information on how Public Health England might address our, allegedly, innocuous but hazardous chronic and routine exposure to a wide array of harmful chemicals on a daily basis.

16 Muir, K., Rattanamongkolgul, S., Smallman-Raynor, M., Thomas, M., Downer, S., & Jenkinson, C. (2004). 'Breast cancer incidence and its possible spatial association with pesticide application in two counties of England.' *Public Health*, 118(7), 513–520.

17 Enoch, R., Stanko, J., & Greiner, S. (2007). 'Mammary gland development as a sensitive end point after acute prenatal exposure to an atrazine metabolite mixture in female Long-Evans rats.' *Environ Health Persp*, 115, 541–547.

18 Ueda, M., Imai, T., Takizawa, T., Onodera, H., Mitsumori, K., Matsui, T., & Hirose, M. (2005). 'Possible enhancing effects of atrazine on growth of 7, 12-dimethylbenz(a) anthracene-induced mammary tumors in ovariectomized Sprague-dawley rats.' *Cancer Sci*, 96, 19–25.

19 Mills, P., & Yang, R. (2005). 'Breast cancer risk in Hispanic agricultural workers in California.' *Int J Occup Environ Health*, 11, 123–131.

20 Meerts, I., Letcher, R., Hoving, S., Marsh, G., Bergman, A., Lemmen, J., ... Brouwer, A. (2001). 'In vitro estrogenicity of polybrominated diphenyl ethers, hydroxylated PBDEs, and polybrominated bisphenol A compounds.' *Environ Health Persp*, 109, 399–407.

21 Yu, L., & Zhan, P. (2009). 'Molecular mechanisms underlying proliferation and apoptosis in breast cancer MCF-7 cells induced by pentabrominated diphenyl ethers.' *Toxicol Environ Chem*, 91, 665–670.

22 WHO/UNEP (2013). 'State of the Science of Endocrine Disrupting Chemicals 2012'.

23 'Improving Outcomes: A Strategy for Cancer' (2011): <https://www.gov.uk/government/publications/the-national-cancer-strategy>.

- 6.2 There is now significant and increasing scientific concern that exposure to multiple EDCs can cause combination effects^{24,25,26}. We are all exposed to a cocktail of chemicals via a multitude of sources from cosmetics, food packaging and textiles to cleaning products, garden pesticides and electronic gadgets. We routinely inhale, digest and absorb a wide variety of chemicals, some of which have been shown in scientific tests to have adverse health effects but most of which have never been properly tested for their hormone disrupting effects at all.
- 6.3 Public Health England needs to develop a programme of work that addresses public exposure to carcinogenic and hazardous chemicals and takes the necessary steps to reduce public exposure in order to help better protect the country's overall health.

7. 'Giving children and young people the best start in life'

- 7.1 Breast Cancer UK has grave concerns about the adverse health effect of early exposure to chemicals and, in particular, EDCs. Scientific evidence suggests that if exposure to EDCs takes place during sensitive periods of development such as in the womb or during puberty the risk of developing breast cancers later in life may increase – even when exposure levels are considered to be extremely low^{27,28,29,30}.
- 7.2. Chemicals pass easily from mother to unborn child and it is widely acknowledged that exposure to alcohol, drugs and smoking during pregnancy can have detrimental effects on the developing foetus³¹. There is now increasing concern that certain chemical exposures during pregnancy can also have a detrimental effect on foetal development³². Yet, as the Royal College of Obstetricians and Gynaecologists recently highlighted, there is no antenatal advice or guidance available, for women who are pregnant, about the potential risks that exposure to certain chemicals could pose for their baby³³.
- 7.3 Public Health England must take steps to reduce antenatal and in-utero exposure to carcinogenic and hazardous chemicals by developing and implementing a comprehensive programme of education and practical advice available from public health specialists and clinicians for pregnant and breast feeding women to help them reduce exposure to hazardous chemicals.

24 Barouki 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.

25 Kortenkamp, A. (2007). 'Ten Years of Mixing Cocktails: A Review of Combination Effects of Endocrine-Disrupting Chemicals Environ Health Perspect.' 2007 December; 115(Suppl 1): 98–105. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2174407/>.

26 Payne, J., Scholze, M. and Kortenkamp, A., (2001). 'Mixtures of four organochlorines enhance human breast cancer cell proliferation'. *Environmental Health Perspectives*, 109 (4) 391–397. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240280/>.

27 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.

28 European Environment Agency (2012). *Op.cit.*

29 WHO/UNEP (2013). 'State of the Science of Endocrine Disrupting Chemicals 2012'.

30 Barouki 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.

31 Bellingham, M. Sharpe, R.M. (2013). 'Chemical Exposures During Pregnancy: Dealing with Potential, but Unproven, Risks to Child Health'. *Royal College of Obstetricians and Gynaecologists, Scientific Impact Paper No. 37*.

32 Barouki et al. (2012). *Op.cit.*

33 Bellingham, M. Sharpe, R.M. (2013). *Op.cit.*

8. 'Improving health in the workplace'

- 8.1 Research reveals that women who have worked for 10 years or more in industries where exposure to man-made chemicals is high, have an estimated 42% increased risk of breast cancers. In particular women working in the plastics, farming, food canning, metal working and bar industry have an elevated risk of breast cancer³⁴. Women working as hairdressers and beauticians have also been associated with having an increased risk of breast cancer³⁵
- 8.2 Low dose exposure to EDCs does not mean low risk. Even when each chemical used in the production process may well be present at a level below the approved threshold considered to cause harm on its own, together a combination of chemicals can form a toxic cocktail in the human body.
- 8.3 Therefore, Public Health England must do more to address and advise on workplace exposures to carcinogenic and hazardous chemicals. There is a need for Public Health England to carry out a review how workplace exposures to chemicals are assessed and evaluated.

9. 'Promoting place based public health systems'

- 9.1 Breast Cancer UK supports Public Health England's objective for promoting wellbeing and prevention to help improve the public's health. However, again, far more could be done to help educate and raise awareness amongst Directors of public health, public health professionals and clinicians to ensure they are aware of the public health risks associated with harmful chemicals and what people can do to reduce their own risks.

10. 'Developing our own capacity and capability'

- 10.1 The adverse effect to public health of exposure to chemicals such as carcinogens and EDCs straddles the whole range of priorities and directorates at Public Health England. However, it is unclear how Public Health England intends to tackle this complex and challenging area of public health policy. It is also unclear how Public Health England interacts and feeds into the discussion and policy making process of other bodies such as the Hazardous Substances Advisory Committee (HSAC), Food Standards Agency (FSA) or the Chemicals Stakeholder Forum.
- 10.2 In short there is a need for Public Health England to develop its capacity and capability in the area of public exposure to carcinogenic and toxic chemicals in order to better protect public health.

³⁴ 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* 2012, 11:87.

³⁵ Pollan, M. and P. Gustavasson (1999). 'High-risk occupations for breast cancer in the Swedish female working population.' *American Journal of Public Health* 89(6): 875-881.

11. Conclusions

- 11.1 There is mounting scientific evidence that associates our routine exposure to harmful chemicals to breast cancers and other adverse health conditions. Despite this, it is an area of public health policy that is at best under-exploited and at worst downplayed. Given Public Health England's own priorities which acknowledge the need to focus on prevention and to help communities to be as healthy as they can be, it is a worrying omission. Moreover, given the prevalence of breast cancers amongst women, it is imperative that this gap in public health policy is addressed and more done to tackle all the causes of breast cancers so we can prevent as many people as possible from getting the disease in the first place.

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