THE CANCER ASSOCIATION OF SOUTH AFRICA’S POSITION STATEMENT ON CANCER AND THE ENVIRONMENT

FACT SHEET ON BISPHENOL A

WHY SHOULD I CARE ABOUT BISPHENOL A (BPA)?

• Because BPA was detected in the urine of 92% of the U.S. population in 2003-2004 and it is most likely to be in an average South African’s urine as well.

• Because BPA is not essential and provides no known benefit to human health and appears to be harmful to human health.

• Because on April 18, 2008, the Canadian Government moved to ban polycarbonate infant bottles as it officially declared one of it’s ingredients (bisphenol A) toxic.

• Because in 2007 Prof Fred vom Saal of the University of Missouri-Columbia found that low level exposure of BPA (1 nM) harms the prostate.

• Because between 1997 and 2008, over 100 publications linked low level exposure of BPA with prostate damage, breast and prostate cells predisposed to cancer, decline in testosterone, changes in breast tissue that predispose cells to hormones and carcinogens, early puberty, behavioral problems and other effects.

• Because these effects have been found at BPA concentrations up to 25 times lower than the U.S. Environmental Protection Agency’s (EPA) “safe” dose of 50 micrograms per kilogram (body weight) per day.

• Because 38 independent BPA scientists (Chapel Hill Panel) completed an assessment of BPA safety in 2007 and concluded that BPA exposure at current levels presents a clear risk to human health.

• Because in a New York Times editorial (May 20th 2008), a ban on BPA in the U.S. is called for in terms of items such as baby bottles and cups.

• Because BPA induces a profile of tumor aggressiveness in high-risk cells from breast cancer patients.

• Because prenatal exposure to BPA induces early cancerous changes in the breast tissue of rats.

• Because a prima facie case is being established that links PBA exposure to prostate and breast cancers which account for 26% of cancers in the U.S. and the causes of which have not yet been “officially” found.
WHAT IS BISPHENOL A?

- Bisphenol A (abbreviated BPA) does not occur as such in nature. It is a man-made molecule and was invented in 1891.
- It is a relatively small synthetic, organic compound with a molecular weight of 228. It is a white powder and is an estrogen mimicker, and can cause hormone disrupting effects.
- BPA was investigated in the 1930’s as a possible synthetic estrogen. Although it had estrogenic properties it was not developed further because another synthesized compound, diethylstilbestrol (DES), turned out to be a much more powerful estrogen substitute. (Subsequently it was found that DES is as a drug in millions of American women, caused vaginal cancer in daughters of mothers who used the drug and that the drug could also cause malformations (teratogenesis).
- Bisphenol A is mainly used as a bifunctional monomer in the manufacture of polycarbonate plastic and epoxy resins and as an antioxidant in PVC.

WHAT DOES BISPHENOL A LOOK LIKE?

- **Bisphenol A** – man-made
  - Structure only partially related to estradiol.

- **Estradiol** – natural
  - Structure of the natural female sex hormone.

- **Diethylstilbestrol** – man-made
  - Closely related to bisphenol A.
WHERE IS BISPHENOL A FOUND?

- Hard, clear, near shatterproof plastic—polycarbonate.
- Epoxy resin coating in metal food cans
- Plastic bottles and cups for babies
- Precursor of flame-retardant—tetrabromobisphenol A
- Bicycle helmets
- Car safety seats
- Water coolers
- Medical devices
- CD’s, credit cards, cell phones, computers, cars
- Sports equipment
- Household electronics
- Some drinking water
- Global production in 2003 was 3 million metric tones (This is 3 000 000 000 kg or 461 grams for every man, women and child on earth per year!)\(^{11}\)
- There is ubiquitous human exposure to BPA

WHAT SOURCE OF BPA POSES THE GREATEST THREAT?

- Exposure to boiling water increased the rate of BPA migration by up to 55-fold from polycarbonate drinking bottles, as especially those used by babies\(^{12,13}\).
- BPA found in the liquid contents of various tinned food products\(^{14}\).

HOW CAN THE POTENTIAL CANCER RISK OF BISPHENOL A BE REDUCED?

- By banning the production of BPA-containing products from which BPA can migrate into food and drink in concentrations known to cause adverse biological effects.
- By developing BPA-free alternatives for baby drinking bottles and the lining of tin cans.
- By ensuring that drinking water is BPA free\(^{15,16,17,18}\).
- By investigation the multiple uses of BPA and ascertaining which uses may pose a health threat to man.
• By lobbying governments to protect citizens from untoward exposure to BPA.

WHY DO MANUFACTURERS LIKE TO USE BISPHENOL A?

• Out of patent
• Relatively cheap to make
• Good bifunctional monomer for polycarbonate plastics and epoxy resins
• Antioxidant in plastics
• Amphoteric – soluble in water and organic solvents
• Colourless, tasteless, odorless.

SELECTED QUOTATIONS:

• “We know a women’s lifetime risk of breast cancer is directly linked to her lifetime exposure to estrogen – both natural and synthetic estrogen. It’s outrageous that manufacturers of some baby bottles are exposing little girls to BPA, a synthetic plasticizer that mimics estrogen, and possibly increasing that little girl’s risk of breast cancer later in life, especially when safe alternatives are available.”

  Janet Nudelman, Director, Program and Policy for the Breast Cancer Fund.

  http://www.safemilk.org/article.php?id=520

• BPA alone is “worth at least a million dollars every hour”.


• “If a chemical is biologically active and interacts with our receptors, it’s probably no good. Ban it.”

  Tufts University Sheldon Krimsky, author of “Hormonal Chaos: The scientific and social origins of the Environmental Endocrine Hypothesis”

• “If I were a pregnant woman, I would try hard to avoid exposure to BPA”

  Randy Jirtle, Duke University geneticist (DISCOVER, May, 2008, pg 50).
REFERENCES:


10. Opinion of Dr Carl Albrecht


12. Bisphenol A is released from polycarbonate drinking bottles and mimics the neurotoxic actions of estrogen in developing cerebellar neurons, Hoa HL et al., Toxicol Lett., 2008, 176, 149-156.


