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# EDC Insights No.3 - Bisphenol A

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## What is Bisphenol A? [bis-fen-ol]

**Bisphenol (BPA) is a chemical compound of two chemical groups – phenol and acetone. It is the most widely used bisphenol with millions of tonnes manufactured each year. It's been used since the 1950's to harden plastics, and in combination with other chemicals to make polycarbonate and PVC plastics and epoxy resins. It is exceptionally durable and breaks down very slowly.**

**Other bisphenols are denoted by adding a letter to denote the chemical reactant, e.g., bisphenol B, S, or P. The Swedish Chemicals agency has identified over 200 other chemicals that are similar to BPA.**

## Is bisphenol the same as phenol?

Phenol is an aromatic organic compound, also known as carbolic acid. It is a white or colourless crystal with a slightly sweet 'medical' aroma, which transfers mostly by air.

## What about alkylphenols?

Alkylphenols are a group of organic compounds created by the alkylation (chemical reaction) of phenols. They are used as emulsifiers in the production of detergents, enabling other ingredients to be suspended in liquids.

## Health risks of bisphenols

Bisphenol was identified as an endocrine disruptor by the European Chemicals Agency in 2017 due to its ability to mimic the actions of hormones and disrupt the endocrine system.

The body usually rids itself of bisphenols quite quickly, but because they are so widely used, they are a chemical group of concern to our health. In addition, detoxification pathways may be impaired in some people thereby further increasing their health risks.

Bisphenols are widely used in the food industry, but the lack of evidence does not mean it is safe to use. It's been found in the urine of 90% of adults in the US.

### FERTILITY, PREGNANCY, AND FOETAL DEVELOPMENT



BPA is a known endocrine disruptor thought to have an adverse oestrogenic effect during pregnancy. It has been detected in amniotic fluid, placental tissue, maternal and foetal blood.

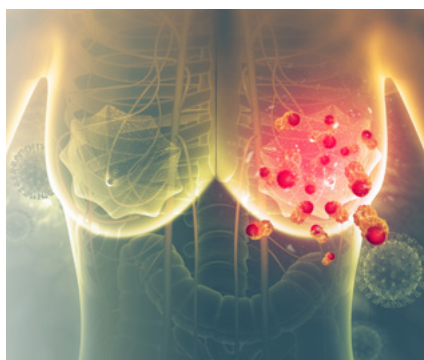
BPA has been associated with slower rates of development resulting in **lower birth weight**. It can interfere with the development of the hormonal system of unborn children during pregnancy resulting in potential problems with health later in life.

## MALE FERTILITY

BPA has been identified as a key risk in declining sperm quality levels in animal studies, addressing uncertainty about the risk to human health. A **systematic risk assessment** based on animal and epidemiological studies concluded that there is, “convincing evidence of bisphenol A and poor semen quality in animal studies after gestational exposures.”

Leading scientist Shanna Swan published her book ‘Count Down’ in 2021 where she revealed that sperm counts in Western countries have dropped by 50% in the past four decades. She advocates that endocrine disrupting chemicals, including BPA play a significant role in this rapid decline.

Watch her talk about it here: [Shanna Swan | Count Down: The Future of the Human Race | Talks at Google](#)



## CANCER

Bisphenols have been associated with breast cancer, because of their ability to mimic the actions of hormones that govern breast tissue. A comprehensive review of recent studies investigating the **relationship to BPA exposure and breast cancer** can be found here.

A recent study using healthy breast tissue gathered from women undergoing breast reduction surgery concluded that **BPA can increase the probability of the production of cancerous tumours** (protumorigenic effects) on mammary glands.

**Animal studies** have demonstrated increased susceptibility of developing cancerous cells following low levels of exposure to BPA, and therefore making it more probable that BPA may contribute to the development human prostate cancer.

The debate continues about the extent to which BPA has a carcinogenic effect on breast and other types of cancer, or whether it can only be identified as a risk factor but given the prevalence of BPA in our lives BPA is a great concern to our health.

## CARDIOVASCULAR, OBESITY, AND DIABETES HEALTH RISKS

Countless animal and vitro studies have already identified the increased health risk of BPA exposure to serious health conditions including **cardiovascular disease**. It's not yet known what the mechanism are, but the relationships are being closely examined.

BPA can disrupt the metabolic system by mimicking its actions, increasing the risk of obesity and diabetes. **A study published in April 2022** concluded that, “the analysis of the articles allows us to conclude that Bisphenol A is an additional risk factor to consider in the development of diabetes and obesity.”

## Where are bisphenols found?

BPA is widely used in food containers, drinking straws, plastic cutlery, transparent plastic bottles, linings in metal food tins, toys, CDs, and DVDs. It was banned for use in children's bottles in 2011 and thermal (till receipt) paper in 2020.

When BPA breaks down into microplastic particles tiny amounts can leach into food and liquid stored in plastics, so we absorb bisphenols mostly in our food and drinks.

It is also pervasive in our waterways, affecting marine life and agriculture, and passing via the food chain to humans.

Phenols are used in a wide variety of applications including the manufacture of synthetic fibres, antiseptic products such as mouthwash, toothpaste, throat sweets, and in cleaning products. It's also used in pesticides and as a food additive. Phenol is **permitted for use up to 2.5%** in products sold in the UK and 1% in the EU. At high concentrations it is an irritant and can cause burns.

## Can bisphenols be detected in the body?

This chemical group can be detected in urine.

## Does the body store bisphenols?

Bisphenol is usually removed by the liver within 24 hours and excreted in urine, but some studies suggest that it can linger and be stored in body fat tissue.

## Can reduce your exposure to bisphenols?



### FOOD PREPARATION

Buying fewer pre-packaged foods will reduce the chances of the small particles leaching from packaging into your food and liquids. Remove food from plastic packaging before cooking to prevent leaching during the heating process, especially when using a microwave. Use glass or metal instead when cooking.



## FOOD AND WATER STORAGE

Buy fewer tinned products storage and look for produce packaged in glass jars instead. Frozen foods or dried foods such as pulses are good alternatives.

Avoid plastic water bottles where possible, and do not re-use them. Store water in steel or glass bottles instead.

Never re-use old baby feeding bottles.

## FIND OUT MORE ABOUT WHAT'S IN THE PRODUCTS YOU BUY

Look for packaging marked BPA free and check further by downloading an app to check the chemicals used in products for your personal or household use. We recommend [Yuka](#) which provides a helpful breakdown and rating of 1000's of products and recommends alternatives in some cases, and it's free to use.

Products advertised as 'BPA Free' may not necessarily be less of a health risk; chemical alternatives to BPA have not been extensively tested.

## TOYS

Toys made with PVC contain bisphenols so the only way to avoid them is to buy fewer plastic toys. Small children tend to put most things into their mouths, further raising the risk of exposing children to this group of EDCs. Many toys also use [phthalates](#) to soften the materials, so the best advice is to avoid plastic toys wherever possible.

## How are bisphenols regulated?

BPA is classed as a reproductive toxicant in the EU. It is banned for use in baby's bottles and drinks containers in most countries across the world. It is still widely used at permitted levels.

## THE UK SVHC list

The Health and Safety Executive (HSE) enforces a list of [Substances of Very High Concern](#) (SVHCs) for substances known to have detrimental effects on human health. Substances on the list are legally restricted on how can be used. Manufacturers must apply for permission to use chemicals on the list.

Bisphenol is one of 38 phenols including BPA appear on the UK list; they are classed as SVHCs because they are known to be toxic for reproduction or known to have endocrine disrupting properties in human health.

## Chemical substitutions - the SIN list

ChemSec, the International Chemical Secretariat, is an independent non-profit organisation that advocates for substitution of toxic chemicals to safer alternatives.

They operate the [SIN list](#) which details chemicals of concern. More than 50 phenols are on the SIN list, including bisphenol which was one of the first chemicals to be added in 2008. There are 53 alkylphenols on the list. They are all classed as endocrine disruptors by the European Chemicals Agency.

## Further reading:

WHO & UN Environment Programme '[The State of the Science, Endocrine Disrupting Chemicals](#)'