CHEMTrust
Chemicals, Health & Environment Monitoring Trust

An Overview

Protecting humans and wildlife from harmful chemicals

Registered Charity: 1118182
Company Number: 5933897

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First born calves of Florida bottlenose dolphins get most pollutants from their mothers and have lower survival rates than subsequent offspring.

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The Problem

There is a growing and alarming body of evidence suggesting that humans and wildlife, as well as fragile ecosystems, are seriously affected by a significant number of man-made chemicals. We are all, often unknowingly, exposed to a variety of these chemicals and the long term consequences of such exposure are of increasing concern.

Certain classes of man-made chemicals can undermine the health of humans and wildlife by affecting behaviour, intelligence, ability to reproduce and immunity to disease.

Diseases and other health issues that we now think may be linked to such chemicals include some cancers, reproductive problems, birth defects, asthma, allergies, behavioural problems, disruption of infant brain development, cardiovascular disease, diabetes and obesity. The impacts on wildlife includes decreased fertility in birds, fish, shellfish and mammals; decreased hatching success and gross birth abnormalities in birds, fish and turtles; and metabolic abnormalities and/or gender disruption effects in birds, fish and some mammals. Valuable ecosystems are affected too, including the serious contamination of our seas and iconic areas such as the Arctic.

Understanding how chemicals in products and from other sources, such as pesticide use and emissions from industrial processes, may be undermining human and wildlife health is a complex challenge.

What chemicals are involved?

Man-made chemicals are an integral and vital part of our modern lifestyles. They are used in a vast range of consumer products; furniture, clothing, toiletries, electrical appliances, TVs, phones, car interiors, construction materials, food & food packaging, cleaning products and sporting equipment – to name a few.

No one knows how many man-made chemicals there are; though estimates are in the region of 100,000 globally. Of even greater concern, there is little knowledge on the impact of most of these chemicals. For many years there were no requirements for them to be tested before being placed on the market and many are still in use today. An initial assessment by the European Commission is that of the approximately 30,000 that will fall under new legislation, those with potentially dangerous properties that could lead to serious health implications could be in the region of 1,500.

CHEM Trust gratefully acknowledges the support of Print Guy who generously donated their services in producing this brochure.

PRINT GUY

Designed and printed September 2009 by
www.printguy.co.uk
on 100% recycled paper using vegetable based ink.

“We see the work of CHEM Trust as being highly significant. The actual impact of man made chemicals on wildlife, ecosystems and humans is poorly understood despite there being a growing body of evidence of the damage they cause. At Esmée Fairbairn Foundation, we are delighted to support CHEM Trust to highlight this issue and work to bring about the necessary changes to provide better and more adequate protection for wildlife and humans.”

Danyal Sattar

Head of Environment, Esmée Fairbairn Foundation

There are two groups of chemicals that are particularly unsafe when humans and wildlife are exposed to them.

- ***PBT Chemicals*** – which stands for Persistent (chemicals that do not break down, and therefore remain in the environment for long periods), Bioaccumulative (chemicals that remain in our fatty tissues and are not excreted) and Toxic (capable of causing injury or death; poisonous). Examples would be polychlorinated biphenyls (PCBs) - industrial chemicals once used in many industrial appliances - and the pesticide DDT. Although banned in many countries, DDT is still used in parts of the world for the control of malaria. Although phased out many years ago in the EU, its effects live on, because it persists and accumulates in the environment and food chain.

- ***Hormone / Endocrine Disrupting Chemicals (EDCs)*** - certain classes of chemicals have the ability to disrupt our hormone systems by blocking their action, mimicking them or having an opposing effect. Because miniscule levels of hormones have significant effects on the body, hormone disrupting chemicals can play havoc with nature, particularly at crucial stages of development and during the vulnerable stage before birth.

  Many PBT chemicals are also hormone disruptors resulting in ecosystems worldwide being contaminated with a cocktail of man-made chemicals that persist in the environment and bioaccumulate in the bodies of people and wildlife. It is unlikely that any ecosystem, human or animal in the world is not contaminated. No one knows exactly what they are doing to our long-term health, though more and more research indicates that chemical contaminants are connected to an ever growing list of diseases.

Other issues include:

- ***The “cocktail effect” -*** there can be additive effects when exposure to several chemicals occurs; chemicals may not appear to cause ill effects on their own, but when combined they may be extremely detrimental to our health.

- ***Inadequate chemicals legislation.*** On a global scale, legislation and regulation are both weak and inconsistent, aided by the powerful lobbying influence wielded by the chemical industry. For example, even with the certainty that PBTs and EDCs can cause harm, chemicals with similar hazard profiles are still being produced in large volumes and added to many products without adequate testing and regulation.

In 2007, the EU introduced new chemicals legislation called REACH (Regulation, Evaluation and Authorisation of CHemicals). The aim of this legislation is to protect human health and the environment, whilst not undermining the competitiveness of the EU chemical industry. This legislation breaks ground in two ways: it requires data gathering on all chemicals that may be harmful to our health and it requires that the chemical industry demonstrate greater responsibility, putting chemicals on the market only after they have been tested for safety. Unfortunately REACH implementation is slow, and only a very small proportion of the most worrying chemicals have been prioritised for tighter controls.

"Although only established for a relatively short period, CHEM Trust has had astonishing success in influencing European chemicals legislation. CHEM Trust achieves this by meticulous work based strictly on scientific evidence. To work together with this organisation has often stimulated my own scientific work. I wish CHEM Trust all the success they need in the future and will work to give them continued support."

Professor Andreas Kortenkamp
Head of the Centre for Toxicology, School of Pharmacy, University of London

What are the impacts?

Male polar bears in East Greenland with higher levels of organochlorine pollutants were found to have smaller testes and shorter baculums (penis bone).
[©2009 iStockphoto LP / Tatiana Mironenko]

There are many examples of the harm that these chemicals cause to humans, wildlife, and ecosystems. Studies have shown that:

- Polar bears are heavily contaminated with chemicals, including those found in household items, such as brominated flame retardants (BFRs) and fluorochemicals (used in non-stick cook wear and weather-proofing for clothing). Their contamination is linked with depression of the immune system, hormone alterations and decreased bone mineral density.
- Flame retardants, which are in use today in many consumer articles from bedding and clothing to electronic products, have been found to cause neurological impairment in laboratory experiments. Babies are exposed to these chemicals via their mothers and this may have implications for their neurological development.
- Male fish have become feminised and produce female egg protein in their testes rather than developing sperm as a result of exposure to man-made chemicals in many EU rivers. Similarly the lake trout population in Lake Ontario crashed as a result of man-made chemicals impacts. Reduced spawning success has also been noted in populations of polluted marine fish, for example Baltic herring and flounder.
- Both human and wildlife male reproductive health disorders are common. Studies suggest that these disorders are induced by, or associated with, exposure to certain hormone disrupting chemicals in the womb.
- Certain chemicals including some preservatives and synthetic fragrances, which may be found, for example, in certain cosmetics, personal care products and other fragranced products, are known to cause breast cancer cells to proliferate in the laboratory. This is of concern as women apply many of these products directly to their skin where they are easily absorbed. The fact that breast cancer rates are rising in the EU, could be related.
- Many chemicals with hormone disrupting properties have been detected in young children as well as adults, and in some cases at higher levels in children than in adults.
- The Arctic region is now polluted with high levels of many of the most toxic chemicals on the planet, as are the people and wildlife that live there. Global air and ocean currents send pollution from Europe and North America, and other regions, and it concentrates in the Arctic. Both humans and wildlife are now showing signs of negative health trends associated with chemicals exposures, including reduced immunological response and an increase in childhood respiratory problems. The increase in some cancers might also be linked in some cases to chemicals exposures.

> *“What makes CHEM Trust an invaluable partner for HEAL is its capacity to coordinate scientific reviews that produce clear information for policy makers and the public, and articulate the evidence on hazardous chemicals and links to ill health.”*
>
> ***Genon Jensen***
> *Executive Director, HEAL (Health and Environment Alliance)*

The Challenges

Government policy on man-made chemicals lags many years behind the rigorous new science linking chemicals to ill health. It is not dissimilar to the linkages that were found between smoking and cancer many years ago.

Scientists researching the relationship between chemicals and health tend to work in isolation to chemical regulators and there is little cross fertilisation between the two. Also, over the past decade, medical doctors in the EU have had very little input into the development of the new EU chemicals legislation, and have made little attempt to address the adverse trends in disease and the possible links to chemicals. Legislation is significantly influenced by the large numbers of chemical industry lobbyists determined to protect business as usual. They claim that the system is safe and there is no need for change. To voice opposing views and counter such positions is a major challenge.

The Solution

Understanding how chemicals in products may be undermining human and wildlife health is complex, but that should not be an obstacle to developing effective regulation of chemicals, based on the most up-to-date scientific evidence. In parallel, further investigation and research programmes are needed to ensure that all the risks and dangers are understood.

This is what CHEM Trust is working to achieve. Our role in communicating widely the potential role chemicals play in generating adverse effects on wildlife and human health is essential. With this knowledge and information, sound public health policy can be introduced to safeguard children and future generations.

Without our work, the chemical threat to biodiversity, and the early warning signals provided by wildlife will go unnoticed. The public will remain unaware that many consumer products contain harmful chemicals and that even in supposed pristine habitats animals are being contaminated.

Priorities and Achievements to date

CHEM Trust staff have over 30 years of experience in working on chemicals and health issues. Therefore CHEM Trust has considerable scientific and technical expertise. One of its key roles is to advise and work collaboratively with other environmental and human health organisations in Europe, particularly Brussels, and elsewhere. These collaborations allow CHEM Trust to reach a much greater audience than it would by acting alone..

Founded in 2007, CHEM Trust has been active in pursuit of several key priorities and has achieved many successes by positively influencing decisions made on chemicals legislation in both the UK and the EU. CHEM Trust's priorities are:

Priority
To raise awareness of the role that certain man-made chemical exposures play in ill health and highlight the relevant wildlife and human research

Achievement
The first CHEM Trust report, launched in 2007, addressed the relationship between chemicals and breast cancer. The report was widely circulated to chemicals policy decision-makers, doctors, sufferers and the general public in the UK and the EU.

Priority
To review and summarise the scientific data, produce relevant reports and distribute widely to decision-makers.

Achievements
In 2008 CHEM Trust produced a report on the deterioration of wildlife male reproductive health and the links to chemicals.

This report set the scene for CHEM Trust's subsequent report addressing the relationship between chemicals and male reproductive health problems in humans. This has also been widely distributed within the medical community, chemicals policy decision-makers, sufferers and the general public in the UK and the EU.

Priority
To improve legislation on man-made chemicals (both industrial chemicals and pesticides) and thereby protect the health of future generations of humans and wildlife

Achievement
Several policy papers on REACH and its implementation have been produced; e.g. briefing papers on the need to replace PBT chemicals and the collective impacts of chemicals. These have been produced with strategic partners to facilitate wide outreach.

Priority
To mobilise the medical community, a hitherto un-tapped lobbying group that could influence chemicals policy from a disease prevention perspective.

Achievement
CHEM Trust has written a briefing for doctors explaining how better control of chemicals would lead to significant disease prevention and reduce health care budgets.

Future generations need to be protected from harmful chemicals.
[© 2009 iStockphoto LP]

Future Priorities:

To lobby for more chemicals to be included on the European Chemicals Agency (ECHA) Candidate List of priority chemicals.

To highlight the importance of the combined effects of several chemicals that damage human and wildlife health, and ensure this is addressed in the implementation of chemicals legislation.

To provide information to consumers to inform their buying choices. It is hoped that this will influence manufacturers to find safer alternatives to the harmful chemicals they now market.

To highlight one common human disease and its links with hormone disrupting chemicals every two years, as a mechanism to lobby for improved chemical regulation. We anticipate producing a report on one of the following issues; chemicals and links to immunosuppression in wildlife; chemicals and the links to neurological impairment in children; or chemicals and the links to diabetes and/or obesity.

To produce a compelling body of evidence in time for a review of hormone disrupting chemicals under the EU chemicals legislation in 2013, with the hope that this results in rigorous legislation and stricter controls.

Future Developments

CHEM Trust can achieve a greater impact with more resources. This complex work requires a high level of qualified and skilled individuals. With more resources we can achieve greater benefits, both for human and wildlife health, and also protect our vital ecosystems.

Many of the policy goals that CHEM Trust is seeking in the EU REACH chemicals legislation are vital, and moreover, if achieved would have substantial impact on other legislation under development, including that on pesticides and the quality of indoor air.

Further, those same REACH policy goals need to be extrapolated across the globe. Additionally, when high-profile opportunities arise, for example media interest in hormone disrupting chemicals in babies' bottles, CHEM Trust needs additional capacity to highlight the issue, and provide the necessary policy responses.

To continue to highlight the role that chemical exposures may play in other common diseases.

There is much to do, and CHEM Trust's commitment is unwavering. However, we require financial support to enable us to continue our specialised and crucial work for the long term benefit of humans, wildlife and the wider environment.

CHEM Trust Publications

All of these reports and briefings are available on the CHEM Trust website - **www.chemtrust.org.uk**

Neurological Impairment in Children
Written by CHEM Trust. Available in English, German, Italian, Russian.

What will new EU chemicals legislation deliver for public health? A Briefing for Doctors
Written by CHEM Trust. Available in English, Italian, French, Czech, Slovenian, Hungarian, German.

Breast Cancer and exposure to hormonally active chemicals: An appraisal of the scientific evidence.
Written by Professor Andreas Kortenkamp, Head of the Centre for Toxicology, London School of Pharmacy.

Factors influencing the risk of breast cancer - established and emerging
Written by CHEM Trust. Available in English, French, German, Spanish, Italian.

Breast Cancer: Preventing the preventable
Written by CHEM Trust. Available in English, French, German, Spanish, Russian, Czech.

Portfolio - of peer review, scientific papers supporting the breast cancer publications
Compiled by CHEM Trust.

Effects of pollutants on the reproductive health of male vertebrate wildlife - Males under threat
Written by CHEM Trust. Available in English and German.

Male reproductive health disorders and the potential role of exposure to environmental chemicals
Written by Professor Richard Sharpe, Human Reproductive Sciences Unit, Medical Research Council.

Men under threat: The decline in male reproductive health and the potential role of exposure to chemicals during in-utero development
Written by CHEM Trust.

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