EDF
ENVIRONMENTAL DEFENSE FUND
Finding the ways that work

Report

Chemical Detection Project: New Technology Sheds Light on Chemicals in Our Environment

Chemical Detecting Wristbands Show Americans Can't Avoid Toxic Chemicals

A simple looking wristband can shed new light on the previously invisible problem of toxic chemicals in our midst. Environmental Defense Fund (EDF) conducted a pilot project asking 28 individuals to wear the wristbands for one week. The project's findings make clear the power of this technology to detect the presence of chemicals in our everyday lives and to advance our understanding of the health effects of exposures.

Thousands of chemicals are used in the products that surround us every day—from our couches, to our carpets and even the clothes on our backs. Chemicals are used to make 96% of all products sold in America, and some 85,000 chemicals are available for use on the market.

Scientific research is increasingly linking chemicals in common use to some cancers, infertility, diabetes, Parkinson's and other illnesses. Pregnant woman, infants, and children are especially vulnerable. National CDC studies routinely detect hundreds of chemicals in the blood and urine of virtually all Americans tested, and many babies are born with hundreds of chemicals already in their bodies.

Key findings from 28 wristbands

- ***100%*** *detected PBTs.*
- ***86%*** *detected flame retardants chemicals.*
- ***93%*** *detected one or more pesticides.*
- ***100%*** *detected the fragrance* ***galaxolide****.*

Yet, we still have a very limited understanding of the chemicals in our own lives and little assurance of their safety.

Harnessing a new technology to overcome an environmental health challenge

A cutting edge monitor from MyExposome, Inc., developed by researchers at Oregon State University (OSU), promises to transform our understanding of environmental exposures to chemicals—to make the invisible, visible—and, in so doing, open up new opportunities for reducing exposures.

The monitors are surprisingly simple: Silicone wristbands, like the ones worn in support of various causes, are specially prepared to act as a sponge to absorb hundreds of different chemicals (current analytic methods detect over 1,400) in our environment—the air, water, and even personal care products. (Detailed background on the wristbands is at myexposome.com.)

The simplicity of this new technology opens a range of opportunities to empower individuals with information about what chemicals are present in the environment. They also offer the possibility to explore important questions about the efficacy of interventions to reduce exposures.

To better understand the potential and limitations of this technology, EDF conducted a small pilot project to engage individuals to become "environmental sensors" for a week. Detailed findings follow.

Key Findings

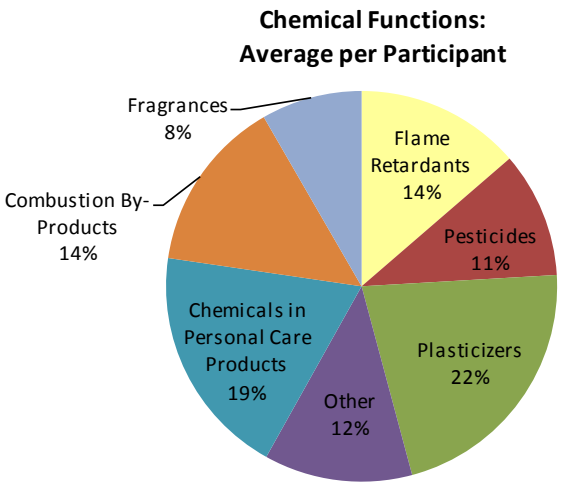
Summary Results

- **28** people participated in this project.
- The wristbands were analyzed for a total of **1,418** chemicals.
- A total of **57** chemicals were detected in all the wristbands.
- Each wristband detected an average of **15** chemicals (range: **10-27**).
- All of the wristbands detected persistent, bioaccumulative and toxic chemicals ("**PBTs**").
- **86%** of the wristbands (24 of 28) detected one or more flame retardants.
- **93%** of the wristbands (26 of 28) detected one or more pesticides.
- Every wristband detected **galaxolide**, a common fragrance used in cleaning and beauty products.

Where might these chemicals be found?

The wristbands detected chemicals used in a wide variety of consumer products – from plastics and personal care products to furniture. The primary functions of the chemicals detected in this project include:

- **13** combustion by-products
- **12** pesticides
- **9** plasticizers
- **7** flame retardants
- **4** chemicals in personal care products*
- **4** fragrances



Are any of these chemicals hazardous**?

- The most common hazards associated with the **57** chemicals detected in this project are **cancer** (35%), **developmental** and/or **reproductive effects** (28%), **endocrine disruption activity** (61%), **respiratory effects** (28%) and **skin sensitization** and/or **skin irritation** (42%).

- Of the **8** phthalates detected, **2** (**DEHP** and **BPP**) have been permanently banned by Congress for use in toys and certain children's products due to their adverse effects on the male reproductive system. Bans are pending for **3** additional phthalates detected: **DCHP**, **DIBP**, and **DHEXP**. These phthalates remain legal for many other uses.

- Several hazardous flame retardant chemicals were detected, including **TCEP**, banned in the EU due to its toxicity to the reproductive system.

- A number of polycyclic aromatic hydrocarbons (PAHs) detected are persistent in the environment and associated with health effects such as cancer, including **naphthalene**, **phenanthrene**, and **anthracene**.

* The chemicals in personal care products category includes preservatives, antimicrobials, UV filters and fragrance enhancers. Plasticizers and fragrances may also be found in personal care products.

** The hazard of a chemical refers to its intrinsic ability to cause harm or induce a toxic effect. Risk is a function of both hazard and exposure, the amount of the chemical substance that enters a person's body.

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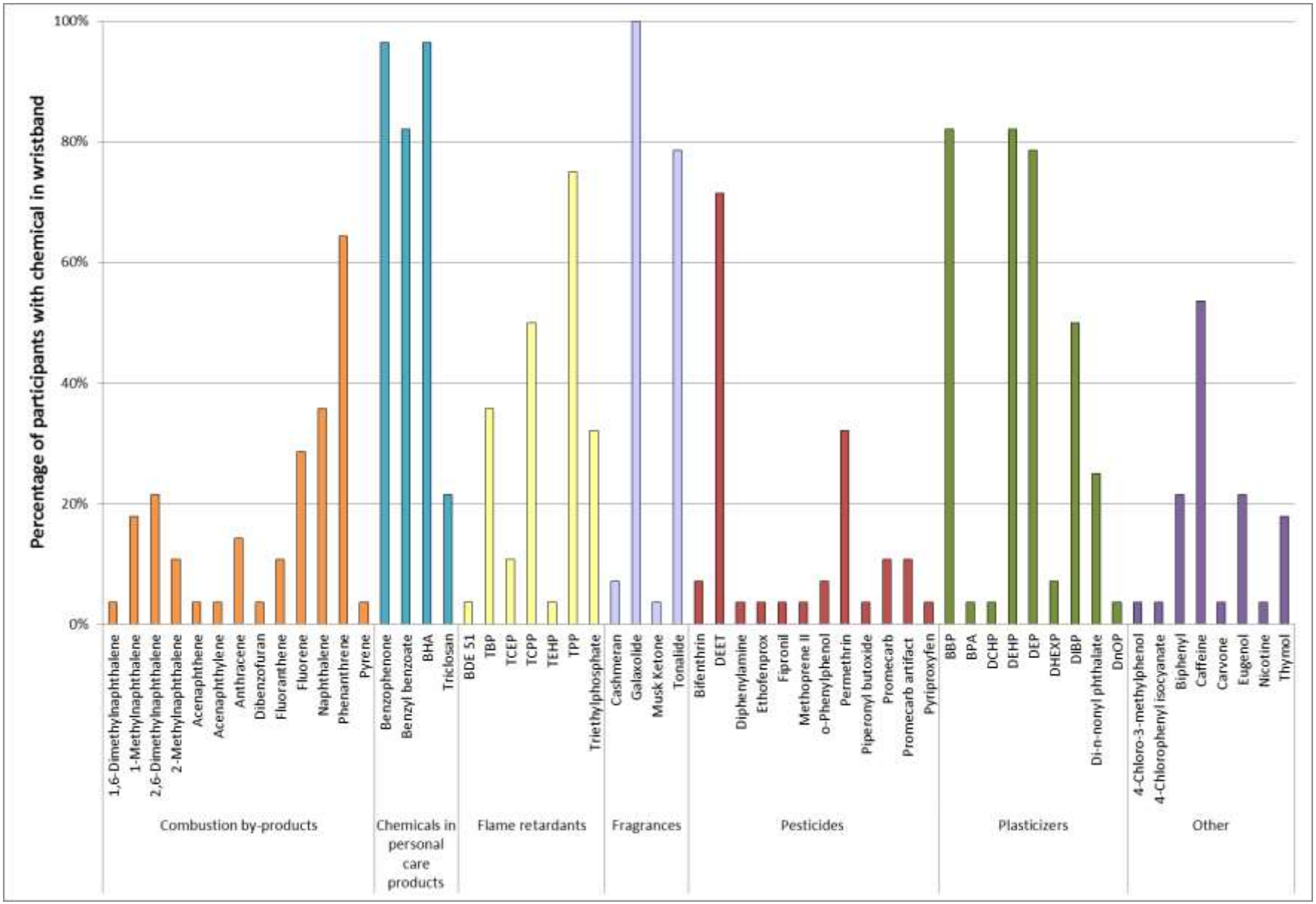
Chemicals Detected



Appendix

I. Definitions

Hazard – The hazard of a chemical refers to its intrinsic ability to cause harm or induce a toxic effect, such as those listed below in "Chemical Hazard Types." Risk is a function of both *hazard* and *exposure*, the amount of the chemical substance that enters a person's body. Assuming a constant exposure, chemicals will differ in the type and magnitude of toxic effect(s) that they may induce.

Persistent bioaccumlative toxic chemicals ("PBTs") – Chemicals that do not break down readily from natural processes, accumulate in organisms – concentrating as they move up the food chain, and are harmful in small quantities.

Chemical Hazard Types[1]

Cancer (i.e., carcinogenicity) – Can cause or increase the risk of cancer.

Developmental effects – Can harm the developing child; effects may include birth defects, low birth weight, and biological or behavioral problems that appear as the child grows.

Reproductive effects – Can disrupt the male or female reproductive systems, changing sexual development, behavior or functions, decreasing fertility, or resulting in loss of the fetus during pregnancy.

Endocrine disruption activity – Can interfere with hormone communication and production, which controls metabolism, development, growth, reproduction, and behavior.

Respiratory effects – Can result in high sensitivity such that small quantities trigger asthma, rhinitis or other allergic reactions in the respiratory system.

Skin sensitization – Can trigger allergic reactions on the skin.

Skin irritation – Can irritate or seriously damage the skin.

Functions & Uses

Chemicals in personal care products – Chemicals added to personal care products (e.g., lotions, soaps, and cosmetics), such as preservatives and antimicrobials. Plasticizers and fragrances (see below) are excluded from this category.

Combustion by-products – Chemicals formed from the incomplete burning of coal, oil, gas, garbage, or other organic substances. Most chemicals included in this category are polycyclic aromatic hydrocarbons (PAHs).

Flame retardants – Chemicals added to a variety of materials, including textiles, electronics, plastics, and foam to reduce flammability.

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[1] Chemical hazard type definitions are based on the Pharos Project, available here: https://www.pharosproject.net/

Fragrances – Chemicals with an inherent odor. These chemicals are often added to personal care products, cleaning products, food products, and more.

Pesticides – Chemicals designed to kill, repel, or mitigate any pest (insects, rodents, weeds, fungi, and microorganisms). This category excludes antimicrobials designed for use in personal care products.

Plasticizers – Chemicals used to provide plasticity and flexibility to plastics, such as polyvinylchloride (PVC). This category includes phthalate chemicals, which are added to a variety of items, including construction materials, personal care products, toys, food packaging, medical devices, and more.

Other – The "Other" category includes food additives, tobacco derivatives, chemical intermediates, and chemicals that cannot be classified due to many overlapping functions.

II. Full List of Chemicals Detected

1,6-DIMETHYLNAPHTHALENE *(CASRN: 575-43-9)*
Specific Hazards:[2] No data
Primary Function(s): Combustion by-product
Found in or Used in the Manufacture of:[3] Air
Government Resource: http://toxnet.nlm.nih.gov/ (search term: 1,6-dimethylnaphthalene)

1-METHYLNAPHTHALENE *(CASRN: 90-12-0)*
Specific Hazards: Little human data available; harmful if swallowed
Primary Function(s): Combustion by-product, chemical intermediate
Found in or Used in the Manufacture of: Air; pesticides (inert ingredient); food packaging and additives; ink, pigments, and dyes
Government Resource: http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=43

2,2',4,6'-TETRABROMODIPHENYL ETHER (BDE 51) *(CASRN: 189084-57-9)*
Specific Hazards: Medium hazard for endocrine disruption activity
Primary Function(s): Flame retardant
Found in or Used in the Manufacture of: Building materials; fabric, furniture, and upholstery; electronics
Government Resource: http://www.toxtown.nlm.nih.gov/text_version/chemicals.php?id=79

2,6-DIMETHYLNAPHTHALENE *(CASRN: 581-42-0)*
Specific Hazards: No data
Primary Function(s): Combustion by-product
Found in or Used in the Manufacture of: Air; food packaging and additives
Government Resource: Not available

2-METHYLNAPHTHALENE *(CASRN: 91-57-6)*
Specific Hazards: Little human data available; harmful if swallowed
Primary Function(s): Combustion by-product, chemical intermediate
Found in or Used in the Manufacture of: Air; pesticides (inert ingredient); building materials; ink, pigments, and dyes; petroleum products/fuels
Government Resource: http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=43

[2] Chemical hazards data is based on the Pharos Project database, available here: https://www.pharosproject.net/
[3] Chemical uses data is based primarily on EPA's CPCat database (http://actor.epa.gov/cpcat/faces/home.xhtml), ATSDR's Substance List (http://www.atsdr.cdc.gov/substances/indexAZ.asp), and EPA's InertFinder database (http://iaspub.epa.gov/apex/pesticides/f?p=101:1).

4-CHLORO-3-METHYLPHENOL *(CASRN: 59-50-7)*
Specific Hazards: High hazard for skin sensitization; medium hazard for endocrine disruption activity, skin irritation
Primary Function(s): Preservative in personal care products (antimicrobial), antiseptic, pesticide (industrial preservative) ("Other")
Found in or Used in the Manufacture of: Personal care products; pesticides; food packaging and additives; cleaning products; building materials; fabric, furniture, and upholstery; ink, pigments, and dyes; pharmacological products
Government Resource: Not available

4-CHLOROPHENYL ISOCYANATE *(CASRN: 104-12-1)*
Specific Hazards: High hazard for skin irritation; medium hazard for cancer, respiratory effects, organ toxicity
Primary Function(s): Chemical intermediate in manufacture of pesticides and pharmaceuticals ("Other")
Found in or Used in the Manufacture of: Pesticides (inert ingredient); pharmacological products
Government Resource: http://toxnet.nlm.nih.gov/ (search term: 4-Chlorophenyl isocyanate)

ACENAPHTHENE *(CASRN: 83-32-9)*
Specific Hazards: PBT; high hazard for cancer
Primary Function(s): Combustion by-product
Found in or Used in the Manufacture of: Air; pesticides (manufacture); building materials; ink, pigments, and dyes; pharmacological products
Government Resource: http://www.epa.gov/osw/hazard/wastemin/minimize/factshts/pahs.pdf

ACENAPHTHYLENE *(CASRN: 208-96-8)*
Specific Hazards: PBT; high hazard for cancer
Primary Function(s): Combustion by-product
Found in or Used in the Manufacture of: Air
Government Resource: http://www.epa.gov/osw/hazard/wastemin/minimize/factshts/pahs.pdf

ANTHRACENE *(CASRN: 120-12-7)*
Specific Hazards: PBT; high hazard for cancer, skin sensitization; medium hazard for endocrine disruption activity, respiratory effects, skin irritation
Primary Function(s): Combustion by-product
Found in or Used in the Manufacture of: Air; pesticides (manufacture); building materials; manufacture/maintenance of vehicles; ink, pigments, and dyes; pharmacological products
Government Resource: http://www.epa.gov/osw/hazard/wastemin/minimize/factshts/anthrace.pdf

BENZOPHENONE *(CASRN: 119-61-9)*
Specific Hazards: High hazard for cancer; medium hazard for endocrine disruption activity
Primary Function(s): UV filter and fragrance enhancer in personal care products, food additive
Found in or Used in the Manufacture of: Personal care products; pesticides (inert ingredient); food packaging and additives; cleaning products; building materials; fabric, furniture, and upholstery; paper products; ink, pigments, and dyes; toys and children's products; electronics; cigarette chemicals; pharmacological products
Government Resource: http://hpd.nlm.nih.gov/cgi-bin/household/brands?tbl=chem&id=570&query=119-61-9&searchas=TblChemicals

BENZYL BENZOATE *(CASRN: 120-51-4)*
Specific Hazards: Little human data available; harmful if swallowed
Primary Function(s): Fragrance fixative and preservative in personal care products, food additive, antiparasitic (treats scabies), pesticide, solvent, plasticizer
Found in or Used in the Manufacture of: Personal care products; air fresheners; pesticides (inert ingredient); food packaging and additives; cleaning products; building materials; manufacture/maintenance of vehicles; cigarette chemicals; pharmacological products
Government Resource: http://hpd.nlm.nih.gov/cgi-bin/household/brands?tbl=chem&id=2881&query=120-51-4&searchas=TblChemicals

BIFENTHRIN *(CASRN: 82657-04-3)*
Specific Hazards: PBT; high hazard for organ toxicity; medium hazard for cancer, endocrine disruption activity, respiratory effects, skin irritation
Primary Function(s): Pesticide
Found in or Used in the Manufacture of: Pesticides
Government-Academic Collaboration: http://npic.orst.edu/factsheets/biftech.pdf

BIPHENYL *(CASRN: 92-52-4)*
Specific Hazards: High hazard for skin irritation; medium hazard for cancer, endocrine disruption activity, respiratory effects, organ toxicity
Primary Function(s): Chemical intermediate ("Other")
Found in or Used in the Manufacture of: Air; personal care products; pesticides (inert ingredient); food packaging and additives; building materials; paper products
Government Resource: http://www.epa.gov/ttnatw01/hlthef/biphenyl.html

BIS(2-ETHYLHEXYL)PHTHALATE (DEHP) *(CASRN: 117-81-7)*
Specific Hazards: High hazard for cancer, developmental effects, reproductive effects; medium hazard for endocrine disruption activity, respiratory effects, organ toxicity, skin irritation; potential concern for neurotoxicity
Primary Function(s): Plasticizer
Found in or Used in the Manufacture of: Air; personal care products; pesticides (inert ingredient); food packaging and additives; cleaning products; building materials; fabric, furniture, and upholstery; manufacture/maintenance of vehicles; ink, pigments, and dyes; arts, crafts, hobby materials; toys and children's products; electronics; pharmacological products
Government Resource: http://www.atsdr.cdc.gov/phs/phs.asp?id=376&tid=65

BISPHENOL A (BPA) *(CASRN: 80-05-7)*
Specific Hazards: High hazard for developmental effects, reproductive effects, skin sensitization; medium hazard for endocrine disruption activity, respiratory effects, organ toxicity, skin irritation
Primary Function(s): Plasticizer
Found in or Used in the Manufacture of: Food packaging and additives; building materials; manufacture/maintenance of vehicles; paper products; ink, pigments, and dyes; arts, crafts, hobby materials; toys and children's products; electronics; petroleum products/fuels
Government Resource: https://www.niehs.nih.gov/health/assets/docs_a_e/bisphenol_a_bpa_508.pdf

BUTYL BENZYL PHTHALATE (BBP) (CASRN: 85-68-7)
Specific Hazards: High hazard for developmental effects, reproductive effects; medium hazard for cancer, endocrine disruption activity, respiratory effects, skin irritation
Primary Function(s): Plasticizer
Found in or Used in the Manufacture of: Air; personal care products; pesticides (inert ingredient); food packaging and additives; building materials; manufacture/maintenance of vehicles; paper products; ink, pigments, and dyes; arts, crafts, hobby materials; toys and children's products
Government Resource: http://www.epa.gov/oppt/existingchemicals/pubs/actionplans/phthalates.html

BUTYLATED HYDROXYANISOLE (BHA) *(CASRN: 25013-16-5)*
Specific Hazards: High hazard for cancer, skin sensitization; medium hazard for developmental effects, reproductive effects, endocrine disruption activity
Primary Function(s): Preservative (antioxidant) in personal care products and food
Found in or Used in the Manufacture of: Personal care products; pesticides (inert ingredient); food packaging and additives; building materials; toys and children's products; pharmacological products
Government Resource: https://ntp.niehs.nih.gov/ntp/roc/content/profiles/butylatedhydroxyanisole.pdf

CAFFEINE *(CASRN: 58-08-2)*
Specific Hazards: Medium hazard for endocrine disruption activity
Primary Function(s): Food additive ("Other")
Found in or Used in the Manufacture of: Personal care products; pesticides (inert ingredient); food packaging and additives; cigarette chemicals; pharmacological products
Government Resource: http://www.fda.gov/downloads/UCM200805.pdf

CARVONE *(CASRN: 99-49-0)*
Specific Hazards: Little human data available; harmful if swallowed
Primary Function(s): Preservative (antimicrobial) in personal care products, food additive, fragrance, pesticide (insect repellent) ("Other")
Found in or Used in the Manufacture of: Personal care products; pesticides; food packaging and additives; cleaning products; cigarette chemicals
Government Resource: http://toxnet.nlm.nih.gov/ (search term: carvone)

CASHMERAN *(CASRN: 33704-61-9)*
Specific Hazards: Medium hazard for endocrine disruption activity
Primary Function(s): Fragrance
Found in or Used in the Manufacture of: Personal care products; pesticides (inert ingredient); cleaning products
Government Resource: Not available

DIBENZOFURAN *(CASRN: 132-64-9)*
Specific Hazards: PBT
Primary Function(s): Combustion by-product
Found in or Used in the Manufacture of: Air
Government Resource: http://www.epa.gov/ttnatw01/hlthef/di-furan.html

DICYCLOHEXYL PHTHALATE (DCHP) *(CASRN: 84-61-7)*
Specific Hazards: High hazard for reproductive effects; medium hazard for endocrine disruption activity, respiratory effects
Primary Function(s): Plasticizer
Found in or Used in the Manufacture of: Food packaging and additives; building materials; ink, pigments, and dyes
Government Resource: http://www.cdc.gov/biomonitoring/DCHP_BiomonitoringSummary.html

DIETHYL PHTHALATE (DEP) *(CASRN: 84-66-2)*
Specific Hazards: High hazard for reproductive effects, skin sensitization; medium hazard for endocrine disruption activity, respiratory effects, skin irritation
Primary Function(s): Plasticizer
Found in or Used in the Manufacture of: Personal care products; pesticides (inert ingredient); food packaging and additives; cleaning products; building materials; manufacture/maintenance of vehicles; ink, pigments, and dyes; toys and children's products; pharmacological products
Government Resource: http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=112

DIISOBUTYL PHTHALATE (DIBP) *(CASRN: 84-69-5)*
Specific Hazards: High hazard for developmental effects, reproductive effects; medium hazard for endocrine disruption activity, respiratory effects
Primary Function(s): Plasticizer
Found in or Used in the Manufacture of: Food packaging and additives; building materials; fabric, furniture, and upholstery; manufacture/maintenance of vehicles; paper products; ink, pigments, and dyes; toys and children's products
Government Resource: http://toxtown.nlm.nih.gov/text_version/chemicals.php?id=24

DI-N-HEXYL PHTHALATE (DHEXP) *(CASRN: 84-75-3)*
Specific Hazards: High hazard for reproductive effects; medium hazard for developmental effects, endocrine disruption activity, respiratory effects
Primary Function(s): Plasticizer
Found in or Used in the Manufacture of: Pesticides (inert ingredient); food packaging and additives; building materials; manufacture/maintenance of vehicles; toys and children's products
Government Resource: http://toxtown.nlm.nih.gov/text_version/chemicals.php?id=24

DI-N-NONYL PHTHALATE *(CASRN: 84-76-4)*
Specific Hazards: Little human data available; harmful if swallowed
Primary Function(s): Plasticizer
Found in or Used in the Manufacture of: Data unavailable
Government Resource: http://toxtown.nlm.nih.gov/text_version/chemicals.php?id=24

DI-N-OCTYL PHTHALATE (DnOP) *(CASRN: 117-84-0)*
Specific Hazards: High hazard for skin sensitization; medium hazard for developmental effects, endocrine disruption activity, respiratory effects; low hazard for reproductive effects
Primary Function(s): Plasticizer
Found in or Used in the Manufacture of: Personal care products; pesticides (inert ingredient); food packaging and additives; building materials; manufacture/maintenance of vehicles; arts, crafts, hobby materials; toys and children's products; electronics; pharmacological products
Government Resource: http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=204

DIPHENYLAMINE *(CASRN: 122-39-4)*
Specific Hazards: High hazard for skin sensitization; medium hazard for cancer, developmental effects, reproductive effects, organ toxicity
Primary Function(s): Pesticide (antioxidant)
Found in or Used in the Manufacture of: Pesticides; food packaging and additives; building materials; manufacture/maintenance of vehicles; ink, pigments, and dyes; petroleum products/fuels
Government Resource: http://www.epa.gov/opp00001/reregistration/REDs/factsheets/2210fact.pdf

ETHOFENPROX *(CASRN: 80844-07-1)*
Specific Hazards: High hazard for developmental effects; medium hazard for endocrine disruption activity
Primary Function(s): Pesticide (used to repel bed bugs)
Found in or Used in the Manufacture of: Pesticides
Government Resource: http://householdproducts.nlm.nih.gov/cgi-bin/household/brands?tbl=chem&id=2105&query=80844-07-1&searchas=TblChemicals

EUGENOL *(CASRN: 97-53-0)*
Specific Hazards: High hazard for respiratory effects, skin sensitization; medium hazard for skin irritation
Primary Function(s): Fragrance, food additive, antiseptic, analgesic ("Other")
Found in or Used in the Manufacture of: Personal care products; air fresheners; pesticides (active and inert ingredient); food packaging and additives; cleaning products; building materials; manufacture/maintenance of vehicles; pharmacological products; petroleum products/fuels
Government Resource: http://householdproducts.nlm.nih.gov/cgi-bin/household/brands?tbl=chem&id=1925&query=97-53-0&searchas=TblChemicals

FIPRONIL *(CASRN: 120068-37-3)*
Specific Hazards: PBT; high hazard for organ toxicity; medium hazard for reproductive effects, endocrine disruption activity; potential concern for neurotoxicity
Primary Function(s): Pesticide
Found in or Used in the Manufacture of: Pesticides
Government-Academic Collaboration: http://npic.orst.edu/factsheets/fipronil.html

FLUORANTHENE *(CASRN: 206-44-0)*
Specific Hazards: PBT; high hazard for cancer; medium hazard for endocrine disruption activity
Primary Function(s): Combustion by-product
Found in or Used in the Manufacture of: Air; building materials
Government Resource: http://www.epa.gov/osw/hazard/wastemin/minimize/factshts/pahs.pdf

FLUORENE *(CASRN: 86-73-7)*
Specific Hazards: PBT; high hazard for cancer; medium hazard for endocrine disruption activity
Primary Function(s): Combustion by-product
Found in or Used in the Manufacture of: Air; pesticides (manufacture); building materials; ink, pigments, and dyes
Government Resource: http://www.epa.gov/osw/hazard/wastemin/minimize/factshts/flourene.pdf

GALAXOLIDE *(CASRN: 1222-05-5)*
Specific Hazards: PBT; high hazard for developmental effects[4]; medium hazard for endocrine disruption activity
Primary Function(s): Fragrance
Found in or Used in the Manufacture of: Personal care products; air fresheners; pesticides (inert ingredient); cleaning products; building materials; manufacture/maintenance of vehicles
Government Resource: http://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryID=245534

[4] Evidence for reproductive/developments effects for galaxolide is based on preliminary studies. The majority of research demonstrates that galaxolide exerts its toxic effects on the environment; there is limited data to indicate that this chemical is toxic to humans.

METHOPRENE II *(CASRN: 999045-03-3)*
Specific Hazards: Medium hazard for endocrine disruption activity
Primary Function(s): Pesticide
Found in or Used in the Manufacture of: Pesticides
Government-Academic Collaboration: http://npic.orst.edu/factsheets/methogen.html#whatis

MUSK KETONE *(CASRN: 81-14-1)*
Specific Hazards: PBT; medium hazard for cancer, endocrine disruption activity
Primary Function(s): Fragrance
Found in or Used in the Manufacture of: Personal care products; pesticides (inert ingredient); food packaging and additives; cleaning products
Government Resource: http://toxnet.nlm.nih.gov/cgi-bin/sis/search/a?dbs+hsdb:@term+@DOCNO+7694

N,N-DIETHYL-M-TOLUAMIDE (DEET) *(CASRN: 134-62-3)*
Specific Hazards: High hazard for skin irritation
Primary Function(s): Pesticide (insect repellent)
Found in or Used in the Manufacture of: Personal care products; pesticides;
Government Resource: http://www2.epa.gov/insect-repellents/deet

NAPHTHALENE *(CASRN: 91-20-3)*
Specific Hazards: PBT; high hazard for cancer, organ toxicity, skin sensitization; medium hazard for endocrine disruption activity, skin irritation
Primary Function(s): Combustion by-product, chemical intermediate (manufacture of plastic and moth repellants)
Found in or Used in the Manufacture of: Air; pesticides (inert ingredient); cleaning products; building materials; fabric, furniture, and upholstery; manufacture/maintenance of vehicles; ink, pigments, and dyes; petroleum products/fuels; pharmacological products
Government Resource: http://www.epa.gov/ttnatw01/hlthef/naphthal.html

NICOTINE *(CASRN: 54-11-5)*
Specific Hazards: High hazard for developmental effects; medium hazard for reproductive effects, endocrine disruption activity; potential concern for neurotoxicity
Primary Function(s): Tobacco derivative ("Other")
Found in or Used in the Manufacture of: Cigarette chemicals; pharmacological products
Government Resource:
http://www.fda.gov/TobaccoProducts/default.htm?utm_campaign=Google2&utm_source=fdaSearch&utm_medium=website&utm_term=tobacco&utm_content=1

O-PHENYLPHENOL *(CASRN: 90-43-7)*
Specific Hazards: High hazard for cancer, skin irritation; medium hazard for endocrine disruption activity, respiratory effects, organ toxicity
Primary Function(s): Pesticide
Found in or Used in the Manufacture of: Personal care products; pesticides; food packaging and additives; cleaning products; building materials; fabric, furniture, and upholstery; paper products
Government Resource: http://www.cdc.gov/biomonitoring/Orthophenylphenol_BiomonitoringSummary.html

PERMETHRIN *(CASRN: 52645-53-1)*
Specific Hazards: High hazard for respiratory effects; medium hazard for endocrine disruption activity, organ toxicity, skin sensitization, skin irritation
Primary Function(s): Pesticide
Found in or Used in the Manufacture of: Personal care products; pesticides; building materials; fabric, furniture, and upholstery; paper products; pharmacological products
Government Resource: http://www.epa.gov/oppsrrd1/reregistration/REDs/factsheets/permethrin_fs.htm

PHENANTHRENE *(CASRN: 85-01-8)*
Specific Hazards: PBT; high hazard for cancer, skin sensitization; medium hazard for endocrine disruption activity
Primary Function(s): Combustion by-product
Found in or Used in the Manufacture of: Air; pesticides (manufacture); building materials; ink, pigments, and dyes; pharmacological products; explosives
Government Resource: http://www.epa.gov/osw/hazard/wastemin/minimize/factshts/phenanth.pdf

PIPERONYL BUTOXIDE *(CASRN: 51-03-6)*
Specific Hazards: Medium hazard for endocrine disruption activity, skin irritation
Primary Function(s): Pesticide (synergist)
Found in or Used in the Manufacture of: Personal care products; pesticides (inert ingredient); pharmacological products
Government-Academic Collaboration: http://npic.orst.edu/factsheets/pbotech.pdf

PROMECARB *(CASRN: 2631-37-0)*
Specific Hazards: Little human data available; harmful if swallowed
Primary Function(s): Pesticide
Found in or Used in the Manufacture of: Pesticides
Government Resource: Not available

PROMECARB ARTIFACT [5-isopropyl-3-methylphenol] *(CASRN: 485106)*
Specific Hazards: Little human data available; harmful if swallowed
Primary Function(s): Pesticide
Found in or Used in the Manufacture of: Pesticides
Government Resource: Not available

PYRENE *(CASRN: 129-00-0)*
Specific Hazards: PBT; high hazard for cancer; medium hazard for endocrine disruption activity
Primary Function(s): Combustion by-product
Found in or Used in the Manufacture of: Air; pesticides (manufacture); personal care products; cleaning products; building materials; manufacture/maintenance of vehicles; ink, pigments, and dyes
Government Resource: http://www.epa.gov/osw/hazard/wastemin/minimize/factshts/pyrene.pdf

PYRIPROXYFEN (CASRN: 95737-68-1)
Specific Hazards: Medium hazard for endocrine disruption activity
Primary Function(s): Pesticide
Found in or Used in the Manufacture of: Pesticides
Government Resource: http://hpd.nlm.nih.gov/cgi-bin/household/search?queryx=95737-68-1&tbl=TblChemicals&prodcat=all

THYMOL *(CASRN: 89-83-8)*
Specific Hazards: Very high hazard for skin irritation; medium hazard for respiratory effects
Primary Function(s): Preservative (antimicrobial) in personal care products, food additive, fragrance, pesticide ("Other")
Found in or Used in the Manufacture of: Personal care products; pesticides; food packaging and additives; cleaning products; building materials; cigarette chemicals; pharmacological products
Government Resource: http://hpd.nlm.nih.gov/cgi-bin/household/brands?tbl=chem&id=437&query=thymol&searchas=TblChemicals

TONALIDE *(CASRN: 1506-02-1)*
Specific Hazards: Medium hazard for endocrine disruption activity
Primary Function(s): Fragrance
Found in or Used in the Manufacture of: Personal care products; pesticides (inert ingredient); cleaning products; building materials
Government Resource: http://toxnet.nlm.nih.gov/ (search term: tonalide)

TRIBUTYL PHOSPHATE (TBP) *(CASRN: 126-73-8)*
Specific Hazards: High hazard for skin irritation; medium hazard for cancer, developmental effects; potential concern for neurotoxicity
Primary Function(s): Flame retardant, plasticizer, solvent
Found in or Used in the Manufacture of: Pesticides (inert ingredient); food packaging and additives; cleaning products; building materials; fabric, furniture, and upholstery; manufacture/maintenance of vehicles; ink, pigments, and dyes; electronics; toys and children's products; petroleum products/fuels
Government Resource: http://www.atsdr.cdc.gov/phs/phs.asp?id=1118&tid=239

TRICLOSAN *(CASRN: 3380-34-5)*
Specific Hazards: PBT; high hazard for skin irritation; medium hazard for endocrine disruption activity
Primary Function(s): Preservative (antimicrobial) in personal care products and other consumer products, pesticide
Found in or Used in the Manufacture of: Personal care products; pesticides; cleaning products; building materials; fabric, furniture, and upholstery; pharmacological products
Government Resource: http://www.fda.gov/ForConsumers/ConsumerUpdates/ucm205999.htm

TRIETHYLPHOSPHATE *(CASRN: 78-40-0)*
Specific Hazards: Little human data available; harmful if swallowed
Primary Function(s): Flame retardant, plasticizer, chemical intermediate, solvent
Found in or Used in the Manufacture of: Pesticides (inert ingredient); food packaging and additives; building materials; electronics
Government Resource: http://toxnet.nlm.nih.gov/ (search term: triethylphosphate)

TRIPHENYL PHOSPHATE (TPP) *(CASRN: 115-86-6)*
Specific Hazards: Medium hazard for endocrine disruption activity; potential concern for neurotoxicity
Primary Function(s): Flame retardant
Found in or Used in the Manufacture of: Pesticides (inert ingredient); food packaging and additives; building materials; fabric, furniture, and upholstery; manufacture/maintenance of vehicles; paper products; ink, pigments, and dyes; arts, crafts, hobby materials; toys and children's products; electronics
Government Resource: http://www.atsdr.cdc.gov/phs/phs.asp?id=1118&tid=239

TRIS(2-CHLOROETHYL) PHOSPHATE (TCEP) *(CASRN: 115-96-8)*
Specific Hazards: PBT; high hazard for cancer, reproductive effects; medium hazard for skin irritation
Primary Function(s): Flame retardant
Found in or Used in the Manufacture of: Personal care products; building materials; manufacture/maintenance of vehicles; toys and children's products
Government Resource: http://www.atsdr.cdc.gov/phs/phs.asp?id=1118&tid=239

TRIS(2-CHLORO-1-METHYLETHYL) PHOSPHATE (TCPP) *(CASRN: 13674-84-5)*
Specific Hazards: PBT
Primary Function(s): Flame retardant
Found in or Used in the Manufacture of: Pesticides (inert ingredient); building materials; fabric, furniture, and upholstery; electronics
Government Resource: http://www.atsdr.cdc.gov/phs/phs.asp?id=1118&tid=239

TRIS(2-ETHYLHEXYL) PHOSPHATE (TEHP) *(CASRN: 78-42-2)*
Specific Hazards: Medium hazard for skin irritation
Primary Function(s): Flame retardant, plasticizer, solvent
Found in or Used in the Manufacture of: Pesticides (inert ingredient); food packaging and additives; building materials; fabric, furniture, and upholstery
Government Resource:
http://oehha.ca.gov/prop65/public_meetings/CIC101211/101211Tris2ethylhexylphosphate.pdf

III. Additional Information on the Wristband Technology

EDF partnered with MyExposome, Inc. on this project using the wristband technology and analytic methods from MyExposome. You can find more information here: www.MyExposome.com.

The personal environmental monitors used in this project are designed to detect organic chemical compounds in the environment. The monitors cannot detect metals (e.g., lead and mercury) or inorganic air pollutants (e.g., ozone and sulfur dioxide).

See here for the full list of chemicals the wristbands are able to detect:
http://www.myexposome.com/testedchems