

# Chemicals in the Fourth Report

CDC's Fourth National Report on Human Exposure to Environmental Chemicals provides exposure data on the following chemicals or classes of chemicals. The Fourth Report contains data from national samples collected in 1999–2000, 2001–2002, and 2003–2004. Not all chemicals were measured in each national sample. The full report text is available at [www.cdc.gov/exposurereport](http://www.cdc.gov/exposurereport). An asterisk (\*) denotes a chemical presented for the first time in the Fourth Report.

## Acrylamide

Acrylamide hemoglobin adducts \*  
Glycidamide hemoglobin adducts \*

## Cotinine

## N,N-Diethyl-*meta*-toluamide (DEET)

## Environmental Phenols

Benzophenone-3 (2-Hydroxy-4-methoxybenzophenone) \*  
Bisphenol A (2,2-*bis*[4-Hydroxyphenyl] propane) \*  
4-*tert*-Octylphenol (4-[1,1,3,3-Tetramethylbutyl] phenol) \*  
Triclosan (2,4,4'-Trichloro-2'-hydroxyphenyl ether) \*

## Perchlorate \*

## Pesticides

### Fungicides

Pentachlorophenol  
*ortho*-Phenylphenol

### Herbicides

Acetochlor mercapturate  
Alachlor mercapturate  
Atrazine mercapturate  
2,4-Dichlorophenoxyacetic acid  
Metolachlor mercapturate  
2,4,5-Trichlorophenoxyacetic acid

### Carbamate Insecticides

Carbofuranphenol  
2-Isopropoxyphenol

### Organochlorine Pesticides

Aldrin  
Dieldrin  
Endrin  
*o,p'*-Dichlorodiphenyltrichloroethane  
*p,p'*-Dichlorodiphenyldichloroethene (DDE)  
*p,p'*-Dichlorodiphenyltrichloroethane (DDT)  
Heptachlor epoxide  
Hexachlorobenzene  
*beta*-Hexachlorocyclohexane  
*gamma*-Hexachlorocyclohexane (Lindane)  
Mirex  
*trans*-Nonachlor  
Oxychlorodane  
2,4,5-Trichlorophenol  
2,4,6-Trichlorophenol

### Organophosphorus Insecticides: Dialkyl Phosphate Metabolites

Diethyldithiophosphate (DEDTP)  
Diethylphosphate (DEP)  
Diethylthiophosphate (DETP)  
Dimethyldithiophosphate (DMDTP)  
Dimethylphosphate (DMP)  
Dimethylthiophosphate (DMTP)

### Organophosphorus Insecticides: Specific Metabolites

3-Chloro-7-hydroxy-4-methyl-2H-chromen-2-one/ol  
2-(Diethylamino)-6-methylpyrimidin-4-ol/one  
2-Isopropyl-4-methyl-6-hydroxypyrimidine  
Malathion dicarboxylic acid  
*para*-Nitrophenol  
3,5,6-Trichloro-2-pyridinol

### Pyrethroid Pesticides

*cis*-3-(2,2-Dibromovinyl)-2,2-dimethylcyclopropane carboxylic acid  
*cis*-3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid  
*trans*-3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid  
4-Fluoro-3-phenoxybenzoic acid  
3-Phenoxybenzoic acid

## Metals

Antimony  
Arsenic, Total \*  
    Arsenic (V) acid \*  
    Arsenobetaine \*  
    Arsenocholine \*  
    Arsenous (III) acid \*  
    Dimethylarsinic acid \*  
    Monomethylarsonic acid \*  
    Trimethylarsine oxide \*  
Barium  
Beryllium  
Cadmium  
Cesium  
Cobalt  
Lead  
Mercury  
Molybdenum  
Platinum  
Thallium  
Tungsten  
Uranium

## Perfluorochemicals

Perfluorobutane sulfonic acid (PFBS) \*  
Perfluorodecanoic acid (PFDeA) \*  
Perfluorododecanoic acid (PFDoA) \*  
Perfluoroheptanoic acid (PFHpA) \*  
Perfluorohexane sulfonic acid (PFHxS) \*  
Perfluorononanoic acid (PFNA) \*  
Perfluorooctane sulfonamide (PFOSA) \*  
Perfluorooctane sulfonic acid (PFOS) \*  
2-(N-Ethyl-perfluorooctane sulfonamido) acetic acid (Et-PFOSA-AcOH) \*  
2-(N-Methyl-perfluorooctane sulfonamido) acetic acid (Me-PFOSA-AcOH) \*  
Perfluorooctanoic acid (PFOA) \*  
Perfluoroundecanoic acid (PFUA) \*

## Phthalates

Mono-benzyl phthalate (MBzP)  
Mono-*n*-butyl phthalate (MnBP)  
Mono-(3-carboxypropyl) phthalate (MCPP)  
Mono-cyclohexyl phthalate (MCHP)  
Mono-ethyl phthalate (MEP)  
Mono-(2-ethyl-5-carboxypentyl) phthalate (MECPP) \*  
Mono-(2-ethyl-5-hydroxyhexyl) phthalate (MEHHP)  
Mono-(2-ethyl-5-oxohexyl) phthalate (MEOHP)  
Mono-2-ethylhexyl phthalate (MEHP)  
Mono-isobutyl phthalate (MiBP)  
Mono-isononyl phthalate (MiNP)  
Mono-methyl phthalate (MMP)  
Mono-*n*-octyl phthalate (MOP)

## Phytoestrogens

Daidzein  
Enterodiol  
Enterolactone  
Equol  
Genistein  
O-Desmethylangolensin

## Brominated Fire Retardants

2,2',4-Tribromodiphenyl ether (BDE 17) \*  
2,4,4'-Tribromodiphenyl ether (BDE 28) \*  
2,2',4,4'-Tetrabromodiphenyl ether (BDE 47) \*  
2,3',4,4'-Tetrabromodiphenyl ether (BDE 66) \*  
2,2',3,4,4'-Pentabromodiphenyl ether (BDE 85) \*  
2,2',4,4',5-Pentabromodiphenyl ether (BDE 99) \*  
2,2',4,4',6-Pentabromodiphenyl ether (BDE 100) \*  
2,2',4,4',5,5'-Hexabromodiphenyl ether (BDE 153) \*  
2,2',4,4',5,6'-Hexabromodiphenyl ether (BDE 154) \*  
2,2',3,4,4',5,6-Heptabromodiphenyl ether (BDE 183) \*  
2,2',4,4',5,5'-Hexabromobiphenyl (BB 153) \*

## Chemicals in the Fourth Report, continued

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### Non-Dioxin-Like Polychlorinated Biphenyls

2,4,4'-Trichlorobiphenyl (PCB 28)  
 2,2',3,5'-Tetrachlorobiphenyl (PCB 44) \*  
 2,2',4,5'-Tetrachlorobiphenyl (PCB 49) \*  
 2,2',5,5'-Tetrachlorobiphenyl (PCB 52)  
 2,3',4,4'-Tetrachlorobiphenyl (PCB 66)  
 2,4,4',5-Tetrachlorobiphenyl (PCB 74)  
 2,2',3,4,5'-Pentachlorobiphenyl (PCB 87)  
 2,2',4,4',5-Pentachlorobiphenyl (PCB 99)  
 2,2',4,5,5'-Pentachlorobiphenyl (PCB 101)  
 2,3,3',4',6-Pentachlorobiphenyl (PCB 110)  
 2,2',3,3',4,4'-Hexachlorobiphenyl (PCB 128)  
 2,2',3,4,4',5' and 2,3,3',4,4',6-Hexachlorobiphenyl (PCB 138 & 158)  
 2,2',3,4',5,5'-Hexachlorobiphenyl (PCB 146)  
 2,2',3,4',5',6-Hexachlorobiphenyl (PCB 149)  
 2,2',3,5,5',6-Hexachlorobiphenyl (PCB 151)  
 2,2',4,4',5,5',6-Hexachlorobiphenyl (PCB 153)  
 2,2',3,3',4,4',5-Heptachlorobiphenyl (PCB 170)  
 2,2',3,3',4,5,5'-Heptachlorobiphenyl (PCB 172)  
 2,2',3,3',4,5,6'-Heptachlorobiphenyl (PCB 177)  
 2,2',3,3',5,5',6-Heptachlorobiphenyl (PCB 178)  
 2,2',3,4,4',5,5'-Heptachlorobiphenyl (PCB 180)  
 2,2',3,4,4',5,6-Heptachlorobiphenyl (PCB 183)  
 2,2',3,4',5,5',6-Heptachlorobiphenyl (PCB 187)  
 2,2',3,3',4,4',5,5'-Octachlorobiphenyl (PCB 194)  
 2,2',3,3',4,4',5,6-Octachlorobiphenyl (PCB 195)  
 2,2',3,3',4,4',5,6' and 2,2',3,4,4',5,5',6-Octachlorobiphenyl (PCB 196 & 203)  
 2,2',3,3',4,5,5',6-Octachlorobiphenyl (PCB 199)  
 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (PCB 206)  
 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl (PCB 209) \*

### Dioxin-Like Chemicals

#### Polychlorinated Dibenzo-p-dioxins

1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)  
 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)  
 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)  
 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)  
 1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)  
 1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)  
 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)

#### Polychlorinated Dibenzofurans

1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)  
 1,2,3,4,7,8-Heptachlorodibenzofuran (HpCDF)  
 1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)  
 1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)  
 1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)  
 2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)  
 1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)  
 1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)  
 2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)  
 2,3,7,8-Tetrachlorodibenzofuran (TCDF)

#### Coplanar Polychlorinated Biphenyls

3,4,4',5-Tetrachlorobiphenyl (PCB 81)  
 3,3',4,4',5-Pentachlorobiphenyl (PCB 126)  
 3,3',4,4',5,5'-Hexachlorobiphenyl (PCB 169)

#### Mono-ortho-substituted Polychlorinated Biphenyls

2,3,3',4,4'-Pentachlorobiphenyl (PCB 105)  
 2,3',4,4',5-Pentachlorobiphenyl (PCB 118)  
 2,3,3',4,4',5-Hexachlorobiphenyl (PCB 156)  
 2,3,3',4,4',5'-Hexachlorobiphenyl (PCB 157)  
 2,3',4,4',5,5'-Hexachlorobiphenyl (PCB 167)  
 2,3,3',4,4',5,5'-Heptachlorobiphenyl (PCB 189)

### Polycyclic Aromatic Hydrocarbons (PAHs)

2-Hydroxyfluorene  
 3-Hydroxyfluorene  
 9-Hydroxyfluorene  
 1-Hydroxynaphthalene (1-Naphthol)  
 2-Hydroxynaphthalene (2-Naphthol)  
 1-Hydroxyphenanthrene  
 2-Hydroxyphenanthrene  
 3-Hydroxyphenanthrene  
 4-Hydroxyphenanthrene  
 1-Hydroxypyrene

### Disinfection By-Products (Trihalomethanes)

Bromodichloromethane \*  
 Dibromochloromethane (Chlorodibromomethane) \*  
 Tribromomethane (Bromoform) \*  
 Trichloromethane (Chloroform) \*

### Volatile Organic Compounds (VOCs)

Benzene \*  
 Chlorobenzene (Monochlorobenzene) \*  
 1,2-Dibromo-3-chloropropane (DBCP) \*  
 Dibromomethane \*  
 1,2-Dichlorobenzene (*ortho*-Dichlorobenzene) \*  
 1,3-Dichlorobenzene (*meta*-Dichlorobenzene) \*  
 1,4-Dichlorobenzene (*para*-Dichlorobenzene) \*  
 1,1-Dichloroethane \*  
 1,2-Dichloroethane (Ethylene dichloride) \*  
 1,1-Dichloroethene (Vinylidene chloride) \*  
*cis*-1,2-Dichloroethene \*  
*trans*-1,2-Dichloroethene \*  
 Dichloromethane (Methylene chloride) \*  
 1,2-Dichloropropane \*  
 2,5-Dimethylfuran (DMF) \*  
 Ethylbenzene \*  
 Hexachloroethane \*  
 Methyl *tert*-butyl ether (MTBE) \*  
 Nitrobenzene \*  
 Styrene \*  
 1,1,2,2-Tetrachloroethane \*  
 Tetrachloroethene (Perchloroethylene) \*  
 Tetrachloromethane (Carbon tetrachloride) \*  
 Toluene \*  
 1,1,1-Trichloroethane (Methyl chloroform) \*  
 1,1,2-Trichloroethane \*  
 Trichloroethene (Trichloroethylene, TCE) \*  
*meta*- and *para*-Xylene \*  
*ortho*-Xylene \*