

Chemicals in the *Fourth Report: Updated Tables, January 2019*

CDC's *Fourth National Report on Human Exposure to Environmental Chemicals: Updated Tables* provides exposure data on the following chemicals or classes of chemicals. The *Updated Tables* contain cumulative data from national samples collected beginning in 1999–2000 and as recently as 2015–2016. Not all chemicals were measured in each national sample. The data tables are available at <https://www.cdc.gov/exposurereport>. An asterisk (*) indicates the chemical has been added since publication of the *Fourth Report* in 2009.

Adducts of Hemoglobin

Acrylamide
Glycidamide

Tobacco Metabolites

Cotinine
Hydroxycotinine*
NNAL*

Disinfection By-Products

Bromodichloromethane
Dibromochloromethane
Tribromomethane (Bromoform)
Trichloromethane (Chloroform)

Personal Care and Consumer Product Chemicals and Metabolites

Benzophenone-3
Bisphenol A
Bisphenol F*
Bisphenol S*
4-tert-Octylphenol
Triclocarban*
Triclosan
Butyl paraben*
Ethyl paraben*
Methyl paraben*
n-Propyl paraben*
2,4-Dichlorophenol*
2,5-Dichlorophenol*

Flame Retardant Metabolites

Bis(1-chloro-2-propyl) phosphate (BCPP)*
Bis(2-chloroethyl) phosphate (BCEtP)*
Bis(1,3-dichloro-2-propyl) phosphate (BDCPP)*
Dibenzyl phosphate (DBzP)*
Dibutyl phosphate (DBuP)*
Di-o-cresylphosphate (DoCP)*
Di-p-cresylphosphate (DpCP)*
Diphenyl phosphate (DPhP)*
2,3,4,5-Tetrabromobenzoic acid (TBBA)*

Fungicides and Metabolites

ortho-Phenylphenol

Ethylene thiourea*
Pentachlorophenol
Propylene thiourea*

Herbicides and Metabolites

Atrazine*
Atrazine mercapturate*
Desethyl atrazine*
Desisopropyl atrazine*
Desisopropyl atrazine mercapturate*
Diaminochlorotriazine*
2,4-Dichlorophenoxyacetic acid
2,4,5-Trichlorophenoxyacetic acid

Sulfonyl Urea Herbicides

Bensulfuron-methyl*
Chlorsulfuron*
Ethametsulfuron-methyl*
Foramsulfuron*
Halosulfuron*
Mesosulfuron-methyl*
Metsulfuron-methyl*
Nicosulfuron*
Oxasulfuron*
Primisulfuron-methyl*
Prosulfuron*
Rimsulfuron*
Sulfometuron-methyl*
Sulfosulfuron*
Thifensulfuron-methyl*
Triasulfuron*
Triflusulfuron-methyl*

Insect Repellent and Metabolites

N,N-Diethyl-meta-toluamide (DEET)
3-(Diethylcarbamoyl) benzoic acid (DCBA)*
N,N-Diethyl-3-(hydroxymethyl) benzamide (DHMB)*

Carbamate Pesticide Metabolites

Carbofuranphenol
2-Isopropoxyphenol

Organochlorine Pesticide Metabolites

2,4,5-Trichlorophenol
2,4,6-Trichlorophenol

Organophosphorus Insecticides: Specific Metabolites

Acephate*
Dimethoate*
Methamidophos*
Omethoate*
Malathion dicarboxylic acid

2-Isopropyl-4-methyl-pyrimidinol (IMPY)
para-Nitrophenol
3,5,6-Trichloro-2-pyridinol

Organophosphorus Insecticides: Dialkyl Phosphate Metabolites

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

Pyrethroid Metabolites

trans-3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid (trans-DCCA)
cis-3-(2,2-Dibromovinyl)-2,2-dimethylcyclopropane carboxylic acid (cis-DBCA)
4-Fluoro-3-phenoxy-benzoic acid
3-Phenoxybenzoic acid

Metals and Metalloids

Antimony
Arsenic, Total
Inorganic Arsenic-related Species*
Arsenic (V) acid
Arsenobetaine
Arsenocholine
Arsenous (III) acid
Dimethylarsinic acid
Monomethylarsonic acid
Trimethylarsine oxide
Barium
Beryllium
Cadmium (blood; urine)
Cesium
Chromium*
Cobalt (blood*; urine)
Copper*
Lead (blood; urine)
Manganese* (blood; urine)
Mercury (blood total; inorganic; ethyl* and methyl species;* urine)
Molybdenum
Platinum
Selenium* (blood; serum)
Strontium*
Thallium
Tin*
Tungsten
Uranium
Zinc*

Perchlorate and Other Anions

Nitrate*
Perchlorate
Thiocyanate*

Perfluoroalkyl and Polyfluoroalkyl Substances: Surfactants

Perfluorobutane sulfonic acid (PFBS)
Perfluorodecanoic acid (PFDA)
Perfluorododecanoic acid (PFDoA)
Perfluoroheptanoic acid (PFHpA)
Perfluorohexane sulfonic acid (PFHxS)
Perfluorononanoic acid (PFNA)
Perfluorooctanoic acid (PFOA)
n-Perfluorooctanoic acid (n-PFOA)*
Branched Perfluorooctanoic isomers (Sb-PFOA)*
Perfluorooctane sulfonic acid (PFOS)
n-Perfluorooctane sulfonic acid (n-PFOS)*
Perfluoromethylheptane sulfonic acid isomers (Sm-PFOS)*
Perfluorooctane sulfonamide (PFOSA or FOSA)
2-(N-Ethyl-perfluorooctane sulfonamido) acetic acid (EtFOSAA)
2-(N-Methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)
Perfluoroundecanoic acid (PFUnDA)

Phthalate and Phthalate Alternative Metabolites

Mono-benzyl phthalate (MBzP)
Mono-3-hydroxybutyl phthalate (MHBP)*
Mono-n-butyl phthalate (MnBP)
Mono-2-methyl-2-hydroxypropyl phthalate (MHiBP)*
Mono-isobutyl phthalate (MiBP)
Mono-cyclohexyl phthalate (MCHP)
Mono-ethyl phthalate (MEP)
Mono-2-ethylhexyl phthalate (MEHP)
Mono-(2-ethyl-5-hydroxyhexyl) phthalate (MEHHP)
Mono-(2-ethyl-5-oxohexyl) phthalate (MEOHP)
Mono-(2-ethyl-5-carboxypentyl) phthalate (MECPP)
Mono-(carboxynonyl) phthalate (MCNP)*
Mono-isononyl phthalate (MiNP)
Mono-oxoisononyl phthalate (MONP)*
Mono-(carboxyoctyl) phthalate (MCOP)*
Mono-methyl phthalate (MMP)
Mono-(3-carboxypropyl) phthalate (MCP)
Mono-n-octyl phthalate (MOP)
Cyclohexane-1,2-dicarboxylic acid mono hydroxyisononyl ester (MHNCH)*
Cyclohexane-1,2-dicarboxylic acid mono carboxyisooctyl ester (MCOCH)*
Mono-2-ethyl-5-carboxypentyl terephthalate (MECPTP)*
Mono-2-ethyl-5-hydroxyhexyl terephthalate (MEHHTP)*

Phytoestrogens and Metabolites

Daidzein
Enterodiol
Enterolactone
Equol
Genistein
O-Desmethylangolensin

Polycyclic Aromatic Hydrocarbon Metabolites

2-Hydroxyfluorene
3-Hydroxyfluorene
9-Hydroxyfluorene
1-Hydroxyphenanthrene
2-Hydroxyphenanthrene
3-Hydroxyphenanthrene
4-Hydroxyphenanthrene

1-Hydroxypyrene
1-Hydroxynaphthalene (1-Naphthol)
2-Hydroxynaphthalene (2-Naphthol)

Heterocyclic Amines

3-Amino-1,4-dimethyl-5H-pyrido[4,3-b]indole (Trp-P-1)*
2-Amino-3-methyl-9H-pyrido[2,3-b]indole (MeA- α -C)*
2-Amino-1-methyl-6-phenylimidazo[4,5-b]pyridine (PhIP)*
2-Amino-9H-pyrido[2,3-b]indole (A- α -C)*
2-Amino-3-methylimidazo[4,5-f]quinoline (IQ)*
2-Amino-6-methyldipyrido[1,2-a:3',2'-d]imidazole (Glu-P1)*
2-Aminodipyrido[1,2-a:3',2'-d]imidazole (Glu-P2)*
1-Methyl-9H-pyrido[3,4-b]indole (Harman)*
1-Methyl-3-amino-5H-pyrido[4,3-b]indole (Trp-P-2)*
9H-pyrido[3,4-b]indole (Norharman)*

Volatile Organic Compounds (VOCs)

1,1,1-Trichloroethane (Methyl chloroform)
1,1,1,2-Tetrachloroethane*
1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane
1,2,3-Trichloropropane*
1,1-Dichloroethane
1,1-Dichloroethene (Vinylidene chloride)
1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane*
1,2-Dichlorobenzene (o-Dichlorobenzene)
1,2-Dichloroethane (Ethylene dichloride)
cis-1,2-Dichloroethene
trans-1,2-Dichloroethene
1,2-Dichloropropane
1,3-Dichlorobenzene (m-Dichlorobenzene)
1,4-Dichlorobenzene (Paradichlorobenzene)
1,4-Dioxane*
2,5-Dimethylfuran
Benzene
Benzonitrile*
Chlorobenzene (Monochlorobenzene)
Chloroethane*
Cyclohexane*
Dibromomethane
Dichloromethane (Methylene chloride)
Diethylether*
Ethyl acetate*
Ethylbenzene
Furan*
Heptane*
Hexachloroethane
Hexane*
Isobutyronitrile*
Isopropylbenzene (Cumene)*
Methyl-tert-butyl ether (MTBE)
Methylcyclopentane*
Nitrobenzene
Nitromethane*
Octane*
Styrene

Tetrachloroethene (Perchloroethylene)
Tetrachloromethane (Carbon tetrachloride)
Tetrahydrofuran*
Toluene
Trichloroethene (Trichloroethylene)
αα-Trifluorotoluene*
Vinyl bromide*
m-/p-Xylene
o-Xylene

Volatile Organic Compound (VOC) Metabolites

N-Acetyl-S-(2-carboxyethyl)-L-cysteine*
N-Acetyl-S-(3-hydroxypropyl)-L-cysteine*
N-Acetyl-S-(2-carbamoyl-ethyl)-L-cysteine*
N-Acetyl-S-(2-carbamoyl-2-hydroxyethyl)-L-cysteine*
N-Acetyl-S-(2-cyanoethyl)-L-cysteine*
N-Acetyl-S-(2-hydroxyethyl)-L-cysteine*
N-Acetyl-S-(phenyl)-L-cysteine*
N-Acetyl-S-(n-propyl)-L-cysteine*
N-Acetyl-S-(3,4-dihydroxybutyl)-L-cysteine*
N-Acetyl-S-(1-hydroxymethyl-2-propenyl)-L-cysteine*
N-Acetyl-S-(2-hydroxy-3-butenyl)-L-cysteine*
N-Acetyl-S-(4-hydroxy-2-butenyl)-L-cysteine*
2-Thioxothiazolidine-4-carboxylic acid*
N-Acetyl-S-(3-hydroxypropyl-1-methyl)-L-cysteine*
2-Aminothiazoline-4-carboxylic acid*
N-Acetyl-S-(N-methylcarbamoyl)-L-cysteine*
Phenylglyoxylic acid*
N-Acetyl-S-(2-hydroxypropyl)-L-cysteine*
N-Acetyl-S-(phenyl-2-hydroxyethyl)-L-cysteine*
Mandelic acid*
N-Acetyl-S-(trichlorovinyl)-L-cysteine*
N-Acetyl-S-(benzyl)-L-cysteine*
N-Acetyl-S-(1,2-dichlorovinyl)-L-cysteine*
N-Acetyl-S-(2,2-dichlorovinyl)-L-cysteine*
N-Acetyl-S-(dimethylphenyl)-L-cysteine*
2-Methylhippuric acid*
3- & 4-Methylhippuric acid*

Organochlorine Pesticides and Metabolites (Pooled Samples after 2004)

Aldrin
Dieldrin
Endrin
Heptachlor epoxide
Oxychlorane
trans-Nonachlor
p,p'-DDT
p,p'-DDE
o,p'-DDT
Hexachlorobenzene
beta-Hexachlorocyclohexane
gamma-Hexachlorocyclohexane
Mirex

Polybrominated Diphenyl Ethers and PBB 153 (Pooled Samples after 2004)

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',3,3',4,4',5,5',6,6'-Decabromodiphenyl ether (BDE 209)*
2,2',4,4',5,5'-Hexabromobiphenyl (PBB 153)

Polychlorinated Dibenzo-p-dioxins (Pooled Samples after 2004)

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 (Pooled Samples after 2004)

1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)
1,2,3,4,7,8,9-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)

Dioxin-like Polychlorinated Biphenyls: coplanar PCBs (Pooled Samples after 2004)

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

Dioxin-like Polychlorinated Biphenyls: mono-ortho-substituted PCBs (Pooled Samples after 2004)

2,3,3',4,4'-Pentachlorobiphenyl (PCB 105)
2,3,3',4,4'-Pentachlorobiphenyl (PCB 114)*
2,3',4,4',5-Pentachlorobiphenyl (PCB 118)
2',3,4,4',5-Pentachlorobiphenyl (PCB 123)*
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)

Polychlorinated Biphenyls: Non-Dioxin-Like (Pooled Samples after 2004)

2,4,4'-Trichlorobiphenyl (PCB 28)
2,2'3,5'-Tetrachloro biphenyl (PCB 44)

2,2',4,5'-Tetrachloro biphenyl (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' & 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'-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' & 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)