***Attachment 5a***

***Laboratory Assessments***

***2017-18***

**NHANES Laboratory Assessments**

**Laboratory Analytes by Age Group**

| **Test Name** | **Sample** | **Matrix** |
| --- | --- | --- |
| **Ages 1-2** |  |  |
| Complete Blood Count | Full | Whole blood |
| Congenital Cytomegalovirus (CMV) | Full | Serum |
| C-reactive Protein (CRP) | Full | Serum |
| Erythrocyte Folate | Full  | Whole blood |
| Ferritin | Full | Serum |
| Hepatitis B Surface Antibody (Anti-HBs) 2 years and older | Full | Serum |
| Serum Total and Folate Forms | Full | Serum |
| Transferrin Receptor  | Full | Serum |
| Vitamin D | Full | Serum |
| **Ages 3-5** |  |  |
| Complete Blood Count | Full | Whole blood |
| Congenital Cytomegalovirus (CMV) | Full | Serum |
| C-reactive Protein (CRP) | Full | Serum |
| Erythrocyte Folate | Full  | Whole blood |
| Ferritin  | Full | Serum |
| Hepatitis Profile\*\* | Full | Serum |
| Serum Total and Folate Forms | Full | Serum |
| Transferrin Receptor  | Full | Serum |
| Urine Flow Rate | Full | Urine |
| Vitamin D | Full | Serum |
| **Ages 6-11** |  |  |
| Albumin/Creatinine  | Full | Urine |
| Cholesterol (Total)/ High Density Lipoprotein Cholesterol (HDL) | Full | Serum |
| Complete Blood Count | Full | Whole blood |
| C-reactive Protein (CRP) | Full | Serum |
| Erythrocyte Folate | Full  | Whole blood |
| Hepatitis Profile\*\* | Full | Serum |
| Serum Total and Folate Forms | Full | Serum |
| Urine flow rate | Full | Urine |
| Vitamin D | Full | Serum |
| **Ages 12-19** |  |  |
| Albumin/Creatinine | Full | Urine |
| Biochemistry Profile\* | Full | Serum |
| Chlamydia trachomatis (14-19 years) | Full | Urine |
| Cholesterol (Total)/ High Density Lipoprotein Cholesterol (HDL) | Full | Serum |
| Complete Blood Count | Full | Whole blood |
| C-reactive Protein (CRP) | Full | Serum |
| Erythrocyte Folate | Full  | Whole blood |
| Ferritin | Full | Serum |
| Glucose, fasting | One-half  | Plasma Na2F |
| Glycohemoglobin | Full | Whole blood |
| Hepatitis Profile\*\* | Full | Serum |
| Herpes Simplex Virus (HSV) (14-19 years) | Full | Serum |
| Human Immunodeficiency Virus Antibody (18-19 years) | Full | Serum |
| Human Papilloma Virus (14-19 years) | Full | Serum |
| Human Papilloma Virus (Females and Males 14-19 years) | Full | Swab |
| Insulin | One-half  | Serum |
| Serum Iron (Frozen) | Full | Serum |
| Serum Total and Folate Forms | Full | Serum |
| Transferrin Receptor (females) | Full | Serum |
| Triglycerides/Low Density Lipoprotein Cholesterol  | One-half  | Serum |
| Trichomonas vaginalis (14-19 years) | Full | Urine |
| Unsaturated Iron-Binding Capacity (UIBC) | Full | Serum |
| Urine flow rate | Full | Serum |
| Vitamin D | Full | Serum |
| **Ages 20 and older** |  |  |
| Albumin/Creatinine  | Full | Urine |
| Biochemistry Profile\* | Full | Serum |
| Chlamydia trachomatis (20-39 years) | Full | Urine |
| Cholesterol (Total)/ High Density Lipoprotein Cholesterol (HDL) | Full | Serum |
| Complete Blood Count | Full | Whole blood |
| C-reactive Protein (CRP) | Full | Serum |
| Erythrocyte Folate | Full  | Whole blood |
| Ferritin | Full | Serum |
| Glucose, fasting | One-half  | Plasma Na2F |
| Glycohemoglobin | Full | Whole blood |
| Hepatitis Profile \*\* | Full | Serum |
| Herpes Simplex Virus (HSV) (20-49 years) | Full | Serum |
| Human Immunodeficiency Virus antibody (20-59 years) | Full | Serum |
| Human Papilloma Virus (20-59 years) | Full | Serum |
| Human Papilloma Virus (Females and Males 20-59 years) | Full | Swab |
| Insulin | One-half  | Serum |
| Serum Iron (Frozen) | Full | Serum |
| Serum Total and Folate Forms | Full | Serum |
| Transferrin Receptor (females 20-49 yrs) | Full | Serum |
| Triglycerides/Low Density Lipoprotein Cholesterol  | One-half | Serum |
| Trichomonas vaginalis (20-59 years) | Full | Urine |
| Unsaturated Iron-Binding Capacity (UIBC) | Full | Serum |
| Urine flow rate | Full | Urine |
| Vitamin D | Full | Serum |
| **\*Biochemistry Profile** |  |  |
| Albumin  |  |  |
| Alkaline phosphatase |  |  |
| Aspartate aminotransferase (AST) |  |  |
| Alanine aminotransferase (ALT) |  |  |
| Blood urea nitrogen (BUN) |  |  |
| Bicarbonate (HCO3) |  |  |
| Total calcium |  |  |
| Total cholesterol |  |  |
| Chloride  |  |  |
| CPK |  |  |
| Creatinine  |  |  |
| Globulin  |  |  |
| Glucose |  |  |
| v-glutamyltransferase (GGT) |  |  |
| Iron |  |  |
| Potassium  |  |  |
| Lactate dehydrogenase (LDH) |  |  |
| Sodium  |  |  |
| Osmolality  |  |  |
| Phosphorus  |  |  |
| Total Bilirubin  |  |  |
| Total protein |  |  |
| Triglycerides  |  |  |
| Uric acid  |  |  |
| \*\***Hepatitis Profile** |  |  |
|  Hepatitis A antibody (Anti-HAV) |  |  |
|  Hepatitis B Core antibody (Anti-HBc) |  |  |
|  Hepatitis B Surface Antibody (Anti-HBs) |  |  |
|  Hepatitis B Surface Antigen (HbsAg) |  |  |
|  Hepatitis C Antibody (Anti-HCV) |  |  |
|  Hepatitis C HCV genotype |  |  |
|  Hepatitis C Ribonucleic Acid (HCV-RNA) |  |  |
|  Hepatitis D antibody (anti-HDV) |  |  |
|  Hepatitis E antibody (anti-HEV) |  |  |

**Attachment 5 – NHANES Laboratory Assessments**

**Attachment 5b - Laboratory Analytes by Survey Year**

|  |
| --- |
| This list of chemicals represents those chemicals currently or planned as biomonitoring measurements by CDC. A blank cell indicates that the analyte will not be measured or reported in that NHANES cycle. WD=results were withdrawn d=cycled out (not measured) |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Chemical / Metabolite Name** | **Matrix** | **05-06** | **07-08** | **09-10** | **11-12** | **13-14** | **15-16** | **17-18** | **Branch** | **Lab Contact** |
| **Adducts of Hemoglobin** |
| Acrylamide | packed rbcs | ● | **d** | **d** | no prbc | ● | ● | ● | CCB | Vesper |
| Glycidamide | packed rbcs | ● | **d** | **d** | no prbc | ● | ● | ● | CCB | Vesper |
| Ethylene Oxide | packed rbcs |   |   |   |   | ● | ● | ● | CCB | Vesper |
| Formaldehyde | packed rbcs |   |   |   |   | ● | ● | ● | CCB | Vesper |
| **Personal Care and Consumer Product Chemicals and Metabolites** |
| Butyl paraben | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Ye |
| Ethyl paraben | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Ye |
| Methyl paraben | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Ye |
| Propyl paraben | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Ye |
| Triclocarban  | urine |   |   |   |   | ● | ● | ● | OAT | Ye |
| Triclosan | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Ye |
| Bisphenol A | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Ye |
| Bisphenol F  | urine |   |   |   |   | ● | ● | ● | OAT | Ye |
| Bisphenol S  | urine |   |   |   |   | ● | ● | ● | OAT | Ye |
| Benzophenone-3 | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Ye |
| 4-*tert*-Octyl phenol | urine | ● | ● | ● | **d** |   |   |   | OAT | Ye |
| 2,4-Dichlorophenol | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Ye |
| 2,5-Dichlorophenol | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Ye |
| **Disinfection By-Products** |
| Bromodichloromethane | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| Bromodichloromethane | water | ● | ● | ● | **d** |   |   |   | TVB | Chambers |
| Dibromochloromethane (Chlorodibromomethane) | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| Dibromochloromethane (Chlorodibromomethane) | water | ● | ● | ● | **d** |   |   |   | TVB | Chambers |
| Tribromomethane (Bromoform) | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| Tribromomethane (Bromoform) | water | ● | ● | ● | **d** |   |   |   | TVB | Chambers |
| Trichloromethane (Chloroform) | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| Trichloromethane (Chloroform) | water | ● | ● | ● | **d** |   |   |   | TVB | Chambers |
| **Flame Retardant Metabolites** |
| Bis(1-chloro-2-propyl) phosphate (BCPP) | urine |   |   |   |  | ●surplus |   | ● | OAT | Calafat |
| Bis(2-chloroethyl) phosphate (BCEtP) | urine |   |   |   |  | ●surplus |   | ● | OAT | Calafat |
| Bis(1,3-dichloro-2-propyl) phosphate (BDCPP) | urine |   |   |   |  | ●surplus |   | ● | OAT | Calafat |
| Dibenzyl phosphate (DBzP) | urine |   |   |   |  | ●surplus |   | ● | OAT | Calafat |
| Dibutyl phosphate (DBuP) | urine |   |   |   |  | ●surplus |   | ● | OAT | Calafat |
| Di-p-cresylphosphate (DpCP) | urine |   |   |   |  | ●surplus |   | ● | OAT | Calafat |
| Di-o-cresylphosphate (DoCP) | urine |   |   |   |  | ●surplus |   | ● | OAT | Calafat |
| Diphenyl phosphate (DPhP) | urine |   |   |   |  | ●surplus |   | ● | OAT | Calafat |
| 2,3,4,5-Tetrabromobenzoic acid (TBBA) | urine |   |   |   |  | ●surplus |   | ● | OAT | Calafat |
| **Fungicides and Metabolites** |
| Ethylenethiourea (ETU) | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| *ortho*-Phenylphenol | urine | ● | ● | ● | **d** |   |   |   | OAT | Calafat |
| Pentachlorophenol | urine | **d** |  |  |  |  |   |   | OAT | Calafat |
| Propylenethiourea (PTU) | urine | ● | **●** | **d** |  |  |   |   | OAT | Calafat |
| **Herbicides and Metabolites** |
| Atrazine | urine | Not measured | ● | **d** |  |  |  |  | OAT | Calafat |
| Atrazine mercapturate | urine | Not measured | ● | **d** |  |  |  |  | OAT | Calafat |
| Desethyl atrazine | urine | Not measured | ● | **d** |  |  |  |  | OAT | Calafat |
| Desethyl atrazine mercapturate | urine | Not measured | ● | **d** |  |  |  |  | OAT | Calafat |
| Desisopropyl atrazine | urine | Not measured | ● | **d** |  |  |  |  | OAT | Calafat |
| Desisopropyl atrazine mercapturate | urine | Not measured | ● | **d** |  |  |  |  | OAT | Calafat |
| Diaminochlorotriazine | urine | Not measured | ● | **d** |  |  |  |  | OAT | Calafat |
| 2,4-Dichlorophenoxyacetic acid | urine | Not measured | ● | ● | ● | ● | ● | ● | OAT | Ospina |
| 2,4,5-Trichlorophenoxyacetic acid | urine | Not measured | ● | ● | **d** | ~~●~~ | ~~●~~ | ~~●~~ | OAT | Ospina |
| **Herbicides: Substituted Ureas** |
| Bensulfuron-methyl | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Chlorsulfuron | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Ethametsulfuron-methyl | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Foramsulfuron | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Halosulfuron | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Mesosulfuron-methyl | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Metsulfuron-methyl | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Nicosulfuron | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Oxasulfuron | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Primisulfuron-methyl | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Prosulfuron | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Rimsulfuron | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Sulfometuron-methyl | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Sulfosulfuron | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Thifensulfuron-methyl | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Triasulfuron | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Triflusulfuron-methyl | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| **Insect Repellent** |
| N,N-Diethyl-*meta*-toluamide (DEET) | urine | Not measured | ● | ● | ● | ● | ● | ● | OAT | Ospina |
| 3-(Diethylcarbamoyl)benzoic acid (DEET acid) | urine | Not measured | ● | ● | ● | ● | ● | ● | OAT | Ospina |
| N,N-Diethyl-3-(hydroxymethyl)benzamide (Desethyl hydroxy DEET) | urine | Not measured | ● | ● | ● | ● | ● | ● | OAT | Ospina |
| 3-(Ethylcarbamoyl)benzoic acid | urine |   |   |   |   |   |   | ● | OAT | Ospina |
| **Insecticides and Pesticides** |
| **Organochlorine Pesticides and Metabolites** |
| Aldrin | serum | **d** |   |   |   |   |   |   | OAT | Sjodin |
| Dieldrin | serum | **d** |   |   |   |   |   |   | OAT | Sjodin |
| Oxychlordane | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| Heptachlor Epoxide | serum | **d** |   |   |   |   |   |   | OAT | Sjodin |
| *trans*-Nonachlor | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| *p,p'-*DDT | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| *p,p'*-DDE | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| *o,p'*-DDT | serum | **d** |   |   |   |   |   |   | OAT | Sjodin |
| Endrin  | serum | **d** |   |   |   |   |   |   | OAT | Sjodin |
| Hexachlorobenzene | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| *beta*-Hexachlorocyclohexane | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| *gamma*-Hexachlorocyclohexane | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| Mirex | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,4,5-Trichlorophenol | urine | **●** | **●** | **●** | **d** |   |   |   | OAT | Ye |
| 2,4,6-Trichlorophenol | urine | **●** | **●** | **●** | **d** |   |   |   | OAT | Ye |
| **Organophosphorus Insecticides:  Dialkyl Phosphate Metabolites** |
| Dimethylphosphate | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Ospina |
| Dimethylthiophosphate | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Ospina |
| Dimethyldithiophosphate | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Ospina |
| Diethylphosphate | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Ospina |
| Diethylthiophosphate | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Ospina |
| Diethyldithiophosphate | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Ospina |
| **Organophosphorus Insecticides: Specific Pesticides and Metabolites** |
| Malathion dicarboxylic acid | urine | not measured | ● | ● | ● | ● | ● | ● | OAT | Ospina |
| 3,5,6-Trichloro-2-pyridinol (TCPy) | urine | not measured | ● | ● | ● | ● | ● | ● | OAT | Ospina |
| 2-diethylamino-6-methyl pyrimidin-4-ol  | urine | not measured | **d** |  |  |  |  |  | OAT | Ospina |
| 2-Isopropyl-4-methyl-6-hydroxypyrimidine  | urine | not measured | ● | ● | ● | ● | ● | ● | OAT | Ospina |
| *para-*Nitrophenol | urine | not measured | ● | ● | ● | ● | ● | ● | OAT | Ospina |
| Dimethoate | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Omethoate | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Acephate | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| Methamidaphos | urine | ● | ● | **d** |   |   |   |   | OAT | Calafat |
| **Pyrethroid Pesticides** |
| *cis*-3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid (cis-DCCA) | urine | not measured | **method in dev** | **d** |   |   |   |   | OAT | Ospina |
| *trans*-3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid (trans-DCCA) | urine | not measured | ● | ● | ● | ● | ● | ● | OAT | Ospina |
| 3-Phenoxybenzoic acid (3PBA) | urine | not measured | ● | ● | ● | ● | ● | ● | OAT | Ospina |
| 4-Fluoro-3-phenoxybenzoic acid (4F3PBA) | urine | not measured | ● | ● | ● | ● | ● | ● | OAT | Ospina |
| *cis*-3-(2,2-Dibromovinyl)-2,2-dimethylcyclopropane carboxylic acid (cis-DBCA) | urine | not measured | ● | ● | ● | ● | ● | ● | OAT | Ospina |
| **Other Pesticide Metabolites**  |
| Carbofuranphenol | urine | **d** |   |   |   |   |   |   | OAT | Calafat |
| 2-Isopropoxyphenol | urine | **d** |   |   |   |   |   |   | OAT | Calafat |
| **Metals and Metalloids** |
| Antimony | urine | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Arsenic (total) | urine | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Arsenic (V) acid | urine | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Arsenobetaine | urine | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Arsenocholine | urine | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Arsenous (III) acid | urine | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Dimethylarsinic acid | urine | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Monomethylarsonic acid | urine | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Trimethylarsine oxide | urine | ● | ● | ● | **●** | **d** |   |   | IRAT | Caldwell |
| Barium | urine | ● | ● | ● | **●** | **●** | ● | ● | IRAT | Caldwell |
| Beryllium | urine | ● | ● | ● | **d** |  |   |   | IRAT | Caldwell |
| Cadmium | whole blood | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Cadmium  | urine | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Cesium | urine | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Chromium | urine |   |   |   |   |   |   | ● | IRAT | Caldwell |
| Chromium | whole blood |   |   |   |   |   | ● | ● | IRAT | Caldwell |
| Cobalt  | whole blood |   |   |   |   |   | ● | ● | IRAT | Caldwell |
| Cobalt  | urine | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Copper | serum |   |   |   | ● | ● | ● | ● | IRAT | Caldwell |
| Lead | whole blood | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Lead | urine | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Manganese | whole blood |   |   |   | ● | ● | ● | ● | IRAT | Caldwell |
| Manganese | urine |   |   |   | ● | ● | ● | ● | IRAT | Caldwell |
| Mercury (total) | whole blood | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Mercury (inorganic) | whole blood | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Mercury (ethyl) | whole blood |   |   |   | ● | ● | ● | ● | IRAT | Caldwell |
| Mercury (methyl) | whole blood |   |   |   | ● | ● | ● | ● | IRAT | Caldwell |
| Mercury  | urine | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Molybdenum | urine | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Nickel | urine |   |   |   |   |   |   | ● | IRAT | Caldwell |
| Platinum | urine | ● | ● | ● | **d** |   |   |   | IRAT | Caldwell |
| Selenium | whole blood |   |   |   | ● | ● | ● | ● | IRAT | Caldwell |
| Selenium | serum |   |   |   | ● | ● | ● | ● | IRAT | Caldwell |
| Strontium | urine |   |   |   | ● | ● | ● | ● | IRAT | Caldwell |
| Thallium | urine | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Tin | urine |   |   |   | ● | ● | ● | ● | IRAT | Caldwell |
| Tungsten | urine | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Uranium | urine | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| Zinc | serum |   |   |   | ● | ● | ● | ● | IRAT | Caldwell |
| Iodine  | urine | ● | ● | ● | ● | ● | ● | ● | IRAT | Caldwell |
| **Perchlorate and Other Anions** |
| Perchlorate  | urine | ● | ● | ● | ● | ● | ● | ● | TVB | Morel |
| Perchlorate  | water | ● | ● | **d** |   |   |   |   | TVB | Morel |
| Thiocyanate | urine | ● | ● | ● | ● | ● | ● | ● | TVB | Morel |
| Nitrate | urine | ● | ● | ● | ● | ● | ● | ● | TVB | Morel |
| Nitrate | water | ● | ● | **d** |   |   |   |   | TVB | Morel |
| Iodide | water | ● | ● | **d** |  |  |  |  | TVB | Morel |
| **Perfluoroalkyl and Polyfluoroalkyl Substances: Surfactants** |
| Perfluorobutane sulfonic acid (PFBuS) | serum | ● | ● | ● | ● | ● | **d** |   | OAT | Ye |
| Pefluorodecanoic acid (PFDeA) | serum | ● | ● | ● | ● | ● | ● | ● | OAT | Ye |
| Perflurododecanoic acid (PFDoA) | serum | ● | ● | ● | ● | ● | ● | ● | OAT | Ye |
| Perfluoroheptanoic acid (PFHpA) | serum | ● | ● | ● | ● | ● | **d** |   | OAT | Ye |
| Perfluorohexane sulfonic acid (PFHxS) | serum | ● | ● | ● | ● | ● | ● | ● | OAT | Ye |
| Perfluorononanoic acid (PFNA) | serum | ● | ● | ● | ● | ● | ● | ● | OAT | Ye |
| Perfluorooctanoic acid (PFOA) | serum | ● | ● | ● | ● | **d** |   |   | OAT | Ye |
| Perfluorooctane sulfonic acid (PFOS) | serum | ● | ● | ● | ● | **d** |   |   | OAT | Ye |
| Perfluorooctane sulfonamide (PFOSA) | serum | ● | ● | ● | ● | **d** |   |   | OAT | Ye |
| 2-(N-Ethyl- Perfluorooctane sulfonamido) acetic acid (Et-PFOSA-AcOH) | serum | ● | ● | ● | ● | **d** |   |   | OAT | Ye |
| 2-(N-Methyl-perfluorooctane sulfonamido) acetic acid (Me-PFOSA-AcOH) | serum | ● | ● | ● | ● | ● | ● | ● | OAT | Ye |
| Perfluoroundecanoic acid (PFUA) | serum | ● | ● | ● | ● | ● | ● | ● | OAT | Ye |
| n-Perfluorooctanoic acid (n-PFOA) | serum |   |   |   |   | ●surplus | ● | ● | OAT | Ye |
| Branched Perfluorooctanoic acid isomers (Sb-PFOA)\* | serum |   |   |   |   | ●surplus | ● | ● | OAT | Ye |
| n-Perfluorooctane sulfonic (n-PFOS) | serum |   |   |   |   | ●surplus | ● | ● | OAT | Ye |
| Perfluoromethylheptane sulfonic acid isomers (Sm-PFOS)\* | serum |   |   |   |   | ●surplus | ● | ● | OAT | Ye |
| Perfluorodimethylhexane sulfonic acid isomers (Sm2-PFOS)\* | serum |   |   |   |   | ●surplus | ● | ● | OAT | Ye |
| **Phthalate Metabolites and Phthalate Alternatives** |
| Mono-benzyl phthalate (MBzP) | urine | **●** | **●** | **●** | **●** | **●** | **●** | **●** | OAT | Ye |
| Mono-2-hydroxybutyl phthalate (MHBP) | urine |  |  |  |  | ●surplus | **●** | **●** | OAT | Ye |
| Mono-n-butyl phthalate (MnBP) | urine | **●** | **●** | **●** | **●** | **●** | **●** | **●** | OAT | Ye |
| Mono-iso-butyl phthalate (MiBP) | urine | **●** | **●** | **●** | **●** | **●** | **●** | **●** | OAT | Ye |
| Mono-2-hydroxyisobutyl phthalate (MHiBP) | urine |  |  |  |  | ●surplus | **●** | **●** | OAT | Ye |
| Mono-cyclohexyl phthalate (MCHP) | urine | **●** | **●** | **●** | **d** |  |  |  | OAT | Ye |
| Mono-ethyl phthalate (MEP) | urine | **●** | **●** | **●** | **●** | **●** | **●** | **●** | OAT | Ye |
| Mono-2-ethylhexyl phthalate (MEHP) | urine | **●** | **●** | **●** | **●** | **●** | **●** | **●** | OAT | Ye |
| Mono-(2-ethyl-5-hydroxyhexyl) phthalate (MEHPP) | urine | **●** | **●** | **●** | **●** | **●** | **●** | **●** | OAT | Ye |
| Mono-(2-ethyl-5-oxohexyl) phthalate (MEOHP) | urine | **●** | **●** | **●** | **●** | **●** | **●** | **●** | OAT | Ye |
| Mono-(2-ethyl-5-carboxypentyl) phthalate (MECPP) | urine | **●** | **●** | **●** | **●** | **●** | **●** | **●** | OAT | Ye |
| Mono-carboxyisononyl phthalate (MCNP) | urine |  | **●** | **●** | **●** | **●** | **●** | **●** | OAT | Ye |
| Mono-hydroxyisodecyl phthalate (MHDP) | urine |  |  |  |  |  |  | **●** | OAT | Ye |
| Mono-oxoisodecyl phthalate (MODP) | urine |  |  |  |  |  |  | **●** | OAT | Ye |
| Mono-isononyl phthalate (MiNP) | urine | **●** | **●** | **●** | **●** | **●** | **●** | **●** | OAT | Ye |
| Mono-oxoisononyl phthalate (MONP) | urine |  |  |  |  |  |  | **●** | OAT | Ye |
| Mono-carboxyisoctyl phthalate (MCOP) | urine |  | **●** | **●** | **●** | **●** | **●** | **●** | OAT | Ye |
| Mono-methyl phthalate (MMP) | urine | **●** | **●** | **●** | **●** | **d** |  |  | OAT | Ye |
| Mono-(3-carboxypropyl) phthalate (MCPP) | urine | **●** | **●** | **●** | **●** | **●** | **●** | **●** | OAT | Ye |
| Mono-n-octyl phthalate (MOP) | urine | **●** | **●** | **●** | **d** |  |  |  | OAT | Ye |
| Cyclohexane 1,2-dicarboxylic acid mono hydroxy isononyl ester (MHNCH®) | urine |  |  |  | **●** | **●** | **●** | **●** | OAT | Ye |
| Cyclohexane-1,2-dicarboxylic acid-mono(carboxyoctyl) ester(MCOCH) | urine |  |  |  |  | **●** | **●** | **●** | OAT | Ye |
| **Phytoestrogens** |
| Daidzein | urine | **●** | **●** | **●** | **d** |   |   |   | NBB | Ryback |
| Enterodiol | urine | **●** | **●** | **●** | **d** |   |   |   | NBB | Ryback |
| Enterolactone | urine | **●** | **●** | **●** | **d** |   |   |   | NBB | Ryback |
| Equol | urine | **●** | **●** | **●** | **d** |   |   |   | NBB | Ryback |
| Genistein | urine | **●** | **●** | **●** | **d** |   |   |   | NBB | Ryback |
| O-Desmethylangolensin | urine | **●** | **●** | **●** | **d** |   |   |   | NBB | Ryback |
| **Polybrominated Diphenyl Ethers and Brominated Biphenyl 153** |
| 2,2',4’-Tribromodiphenyl ether (BDE 17) | serum | **P** | **P** | **P** | **●** | **●** | **●** | **●** | OAT | Sjodin |
| 2,4,4’-Tribromodiphenyl ether (BDE 28) | serum | **P** | **P** | **P** | **●** | **●** | **●** | **●** | OAT | Sjodin |
| 2,2’,4,4’-Tetrabromodiphenyl ether (BDE 47) | serum | **P** | **P** | **P** | **●** | **●** | **●** | **●** | OAT | Sjodin |
| 2,3',4,4'-Tetrabromodiphenyl ether (BDE 66)  | serum | **P** | **P** | **P** | **●** | **●** | **●** | **●** | OAT | Sjodin |
| 2,2’,3,4,4’-Pentabromodiphenyl ether (BDE 85) | serum | **P** | **P** | **P** | **●** | **●** | **●** | **●** | OAT | Sjodin |
| 2,2’,4,4’,5-Pentabromodiphenyl ether (BDE 99) | serum | **P** | **P** | **P** | **●** | **●** | **●** | **●** | OAT | Sjodin |
| 2,2’,4,4’,6-Pentabromodiphenyl ether (BDE 100) | serum | **P** | **P** | **P** | **●** | **●** | **●** | **●** | OAT | Sjodin |
| 2,2’,4,4’,5,5’-Hexabromodiphenyl ether (BDE 153) | serum | **P** | **P** | **P** | **●** | **●** | **●** | **●** | OAT | Sjodin |
| 2,2’,4,4’,5,6’-Hexabromodiphenyl ether (BDE 154) | serum | **P** | **P** | **P** | **●** | **●** | **●** | **●** | OAT | Sjodin |
| 2,2’,3,4,4’,5’,6-Heptabromodiphenyl ether (BDE 183) | serum | **P** | **P** | **P** | **●** | **●** | **●** | **●** | OAT | Sjodin |
| 2,2',3,3',4,4',5,5',6,6'-Decabromodiphenyl ether (BDE 209)  | serum | **P** | **P** | **P** | **●** | **●** | **●** | **●** | OAT | Sjodin |
| 2,2’,4,4’,5,5’-Hexabromobiphenyl (BB 153) | serum | **P** | **P** | **P** | **●** | **●** | **●** | **●** | OAT | Sjodin |
| **Polychlorinated Dibenzo-*p*-dioxins**  |
| 1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin (HpCDD)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 1,2,3,4,7,8-Hexachlorodibenzo-*p*-dioxin (HxCDD) | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 1,2,3,6,7,8-Hexachlorodibenzo-*p*-dioxin (HxCDD)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 1,2,3,7,8,9-Hexachlorodibenzo-*p*-dioxin (HxCDD)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 1,2,3,4,6,7,8,9-Octachlorodibenzo-*p*-dioxin (OCDD)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 1,2,3,7,8-Pentachlorodibenzo-*p*-dioxin (PeCDD)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin (TCDD)   | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| **Polychlorinated Dibenzofurans**  |
| 1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)   | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF) | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,3,7,8-Tetrachlorodibenzofuran (TCDF)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| **Dioxin-like Polychlorinated Biphenyls: Coplanar PCBs** |
| 3,3',4,4'-Tetrachlorobiphenyl (PCB 77) | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 3,4,4',5-Tetrachlorobiphenyl (PCB 81)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 3,3',4,4',5-Pentachlorobiphenyl (PCB 126)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 3,3',4,4',5,5'-Hexachlorobiphenyl (PCB 169)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| **Dioxin-like Polychlorinated Biphenyls: Mono-*ortho-*Substituted PCBs** |
| 2,3,3',4,4'-Pentachlorobiphenyl (PCB 105)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,3,3',4,4'-Pentachlorobiphenyl (PCB 114) | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,3',4,4',5-Pentachlorobiphenyl (PCB 118)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2',3,4,4',5-Pentachlorobiphenyl (PCB 123) | serum | **P** | **P** | **d** |  |  |  |  | OAT | Sjodin |
| 2,3,3',4,4',5-Hexachlorobiphenyl (PCB 156)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,3,3',4,4',5'-Hexachlorobiphenyl (PCB 157)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,3',4,4',5,5'-Hexachlorobiphenyl (PCB 167)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,3,3’,4,4’,5,5’-Heptachlorobiphenyl (PCB 189) | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| **Polychlorinated Biphenyls: Non-Dioxin-Like**  |
| 2,4,4'-Trichlorobiphenyl (PCB 28)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,2'3,5'-Tetrachloro biphenyl (PCB 44) | serum | **P** | **P** | **d** |  |  |  |  | OAT | Sjodin |
| 2,2',4,5'-Tetrachloro biphenyl (PCB 49) | serum | **P** | **P** | **d** |  |  |  |  | OAT | Sjodin |
| 2,2',5,5'-Tetrachlorobiphenyl (PCB 52)  | serum | **P** | **P** | **d** |  |  |  |  | OAT | Sjodin |
| 2,3',4,4'-Tetrachlorobiphenyl (PCB 66)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,4,4',5-Tetrachlorobiphenyl (PCB 74)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,2’,3,4,5’-Pentachlorobiphenyl (PCB 87) | serum | **P** | **P** | **d** |  |  |  |  | OAT | Sjodin |
| 2,2',4,4',5-Pentachlorobiphenyl (PCB 99)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,2',4,5,5'-Pentachlorobiphenyl (PCB 101)  | serum | **P** | **P** | **d** |  |  |  |  | OAT | Sjodin |
| 2,3,3’,4’,6-Pentachlorobiphenyl (PCB 110) | serum | **P** | **P** | **d** |  |  |  |  | OAT | Sjodin |
| 2,2',3,3',4,4'-Hexachlorobiphenyl (PCB 128)  | serum | **P** | **P** | **d** |  |  |  |  | OAT | Sjodin |
| 2,2',3,4,4',5' and 2,3,3’,4,4’,6-Hexachlorobiphenyl (PCB 138 & 158)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,2',3,4',5,5'-Hexachlorobiphenyl (PCB 146)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,2’,3,4’,5’,6-Hexachlorobiphenyl (PCB 149) | serum | **P** | **P** | **d** |  |  |  |  | OAT | Sjodin |
| 2,2’,3,5,5’,6-Hexachlorobiphenyl (PCB 151) | serum | **P** | **P** | **d** |  |  |  |  | OAT | Sjodin |
| 2,2',4,4',5,5'-Hexachlorobiphenyl (PCB 153)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,2',3,3',4,4',5-Heptachlorobiphenyl (PCB 170)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,2',3,3',4,5,5'-Heptachlorobiphenyl (PCB 172)  | serum | **P** | **P** | **d** |  |  |  |  | OAT | Sjodin |
| 2,2',3,3',4,5',6'-Heptachlorobiphenyl (PCB 177)  | serum | **P** | **P** | **d** |  |  |  |  | OAT | Sjodin |
| 2,2',3,3',5,5',6-Heptachlorobiphenyl (PCB 178)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,2',3,4,4',5,5'-Heptachlorobiphenyl (PCB 180)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,2',3,4,4',5',6-Heptachlorobiphenyl (PCB 183)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,2',3,4',5,5',6-Heptachlorobiphenyl (PCB 187)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,2’,3,3’,4,4’,5,5’-Octachlorobiphenyl (PCB 194) | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,2’,3,3’,4,4’,5,6-Octachlorobiphenyl (PCB 195) | serum | **P** | **P** | **d** |  |  |  |  | OAT | Sjodin |
| 2,2’,3,3’,4,4’,5,6’ and 2,2’,3,4,4’,5,5’,6-Octachlorobiphenyl (PCB 196 & 203) | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,2’,3,3’,4,5,5’,6-Octachlorobiphenyl (PCB 199)  | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,2’,3,3’,4,4’,5,5’,6-Nonachlorobiphenyl (PCB 206) | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| 2,2',3,3',4,4',5,5',6,6'-Decachloro biphenyl (PCB 209) | serum | **P** | **P** | **P** | **P** | **P** | **P** | **P** | OAT | Sjodin |
| **Polycyclic Aromatic Hydrocarbons** |
| 2-Hydroxyfluorene  | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Calafat |
| 3-Hydroxyfluorene | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Calafat |
| 9-Hydroxyfluorene | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Calafat |
| 1-Hydroxyphenanthrene   | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Calafat |
| 2-Hydroxyphenanthrene | urine | ● | ● | ● | ● | **d** |   |   | OAT | Calafat |
| 3-Hydroxyphenanthrene | urine | ● | ● | ● | ● | **d** |   |   | OAT | Calafat |
| 2 & 3-Hydroxyphenanthrene | urine |   |   |   |   | ● | ● | ● | OAT | Calafat |
| 4-Hydroxyphenanthrene | urine | ● |  | ● | ● | ● | ● | ● | OAT | Calafat |
| 1-Hydroxypyrene | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Calafat |
| 1-Hydroxynapthalene (1-Naphthol) | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Calafat |
| 2-Hydroxynapthalene (2-Naphthol) | urine | ● | ● | ● | ● | ● | ● | ● | OAT | Calafat |
| **Volatile Organic Compounds (VOCs)** |
| Benzene | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| Chlorobenzene | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| 1,2-Dichlorobenzene | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| 1,3-Dichlorobenzene | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| 1,4-Dichlorobenzene (Paradichlorobenzene) | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| 1,2-dibromo-3-chloropropane (DBCP) | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| 2,5-Dimethylfuran | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| Ethylbenzene | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| Dichloromethane (Methylene chloride) | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| Trichloroethene (Trichloroethylene) | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| Tetrachloroethene (Perchloroethylene) | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| Dibromomethane | whole blood | ● | ● | ● | ● | **d** |   |   | TVB | Chambers |
| 1,1-Dichloroethane | whole blood | ● | ● | ● | ● | **d** |   |   | TVB | Chambers |
| 1,2-Dichloroethane (Ethylene dichloride) | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| 1,1-Dichloroethene (Vinylidene chloride) | whole blood | ● | ● | ● | ● | **d** |   |   | TVB | Chambers |
| *cis*-1,2-Dichloroethene | whole blood | ● | ● | ● | ● | **d** |   |   | TVB | Chambers |
| *trans*-1,2-Dichloroethene | whole blood | ● | ● | ● | ● | **d** |   |   | TVB | Chambers |
| 1,2-Dichloropropane | whole blood | ● | ● | ● | ● | **d** |   |   | TVB | Chambers |
| 1,1,1-Trichloroethane (Methyl chloroform) | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| 1,1,2-Trichloroethane | whole blood | ● | ● | ● | ● | **d** |   |   | TVB | Chambers |
| 1,1,2,2-Tetrachloroethane | whole blood | ● | ● | ● | ● | **d** |   |   | TVB | Chambers |
| Tetrachloromethane (Carbon tetrachloride) | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| Hexachloroethane | whole blood | ● | ● | ● | ● | **d** |   |   | TVB | Chambers |
| Diethylether | whole blood |   |   |   |   | ● | ● | ● | TVB | Chambers |
| Isobutyronitrile | whole blood |   |   |   |   | ● | ● | ● | TVB | Chambers |
| Methyl-*tert*-butyl ether (MTBE) | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| Nitrobenzene | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| Styrene | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| Toluene | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| *m-/p*-Xylene | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| *o*-Xylene | whole blood | ● | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| Isopropylbenzene (Cumene) | whole blood |   | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| 1,2-Dibromoethane | whole blood |   | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| 1,4-Dioxane | whole blood |   | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| Furan | whole blood |   | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| *n*-Hexane | whole blood |   | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| Nitromethane | whole blood |   | ● | ● | ● | **d** |   |   | TVB | Chambers |
| 1,1,1,2-Tetrachloroethane | whole blood |   | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| 1,2,3-Trichloropropane | whole blood |   | ● | ● | ● | ● | ● | ● | TVB | Chambers |
| AAA-Trifluorotoluene/α,α,α-Trifluorotoluene | whole blood |   |   |   |   | ● | ● | ● | TVB | Chambers |
| Benzonitrile | whole blood |   |   |   |   | ● | ● | ● | TVB | Chambers |
| 1-Bromopropane/Propyl bromide | whole blood |   |   |   |   | ● | ● | ● | TVB | Chambers |
| Chloroethane | whole blood |   |   |   |   | ● | ● | ● | TVB | Chambers |
| Cyclohexane | whole blood |   |   |   |   | ● | ● | ● | TVB | Chambers |
| Ethyl acetate | whole blood |   |   |   |   | ● | ● | ● | TVB | Chambers |
| Heptane | whole blood |   |   |   |   | ● | ● | ● | TVB | Chambers |
| Methyl isobutyl ketone | whole blood |   |   |   |   | ● | ● | ● | TVB | Chambers |
| Methylcyclopentane | whole blood |   |   |   |   | ● | ● | ● | TVB | Chambers |
| Octane | whole blood |   |   |   |   | ● | ● | ● | TVB | Chambers |
| Tetrahydrofuran | whole blood |   |   |   |   | ● | ● | ● | TVB | Chambers |
| Vinyl bromide | whole blood |   |   |   |   | ● | ● | ● | TVB | Chambers |
| **Volatile Organic Compound Metabolites (VOC metabolites)**  |
| N-Acetyl-S-(2-carbamoylethyl)-L-cysteine (AAMA) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis/Chambers |
| N-Acetyl-S-(N-methylcarbamoyl)-L-cysteine (AMCA) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| 2-Aminothiazoline-4-carboxylic acid (ATCA) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S-(benzyl)-L-cysteine (BMA) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S-(n-propyl)-L-cysteine (BPMA) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S- (2-carboxyethyl)-L-cysteine (CEMA) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-acetyl-S-(1-cyano-2-hydroxyethyl)-L-cysteine (CYHA)) | urine |   |   |   |   |   | ● | ● | TVB |  Alwis |
| N-Acetyl-S-(2-cyanoethyl)-L-cysteine (CYMA) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S-(1,2-dichlorovinyl)-L-cysteine (1DCV) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S-(2,2-dichlorovinyl)-L-cysteine (2DCV) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S- (3,4-dihydroxybutyl)-L-cysteine (DHBM) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S-(dimethylphenyl)-L-cysteine (DPMA) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S-(2-carbamoyl-2-hydroxyethyl)-L-cysteine (GAMA) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S- (2-hydroxyethyl)-L-cysteine (HEMA) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S- (3-hydroxypropyl)-L-cysteine (HPMA) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S- (2-hydroxypropyl)-L-cysteine (HPM2) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S-(3-hydroxypropyl-1-methyl)-L-cysteine (HPMM) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S- (1-hydroxymethyl-2-propenyl)-L-cysteine (MHB1)  | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S- (2-hydroxy-3-butenyl)-L-cysteine (MHB2) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S- (4-hydroxy-2-butenyl)-L-cysteine (MHB3) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S-(phenyl-2-hydroxyethyl)-L-cysteine (PHEM) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S-(phenyl)-L-cysteine (PMA) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S-(trichlorovinyl)-L-cysteine (TCVM) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| Mandelic acid (MADA) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| 2-Methylhippuric acid (2MHA) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| 3- & 4-Methylhippuric acid (34MH) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| t,t-Muconic acid (MUCA) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| Phenylglyoxylic acid (PHGA) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| 2-Thioxothiazolidine-4-carboxylic acid (TTCA) | urine | ● |   |   | ● | ● | ● | ● | TVB |  Alwis |
| *N*-Acetyl-S-(2-hydroxy-2-methyl-3-buten-1-yl)-L-cysteine (IPM2) + N-Acetyl-S-(2-hydroxy-3-methyl-3-buten-1-yl)-L-cysteine (IPM1) | urine |   |   |   |   | ● | ● | ● | TVB |  Alwis |
| N-Acetyl-S-(4-hydroxy-2-methyl-2-buten-1-yl)-L-cysteine (IPMA3) | urine |   |   |   |   |   | ● | ● | TVB |  Alwis |
| N-Acetyl-S(((4-[Methylsulfinyl]butyl)amino)thioxomethyl)-L-cysteine (SUMA) | urine |   |   |   |   |   |   | ● | TVB |  Alwis |
| **Diisocyanate metabolites and urinary amines**  |
| 2,4-Diaminotoluene (4TDA) | urine |  |  |  | ●surplus |  | ● | ● | TVB |  Alwis/Chambers |
| 2,6-Diaminotoluene (6TDA) | urine |  |  |  | ●surplus |  | ● | ● | TVB |  Alwis |
| 4,4'-Diaminodiphenylmethane (4MDA) | urine |  |  |  | ●surplus |  | ● | ● | TVB |  Alwis |
| 1,5-Diaminonaphthalene (5NDA) | urine |  |  |  | ●surplus |  | ● | ● | TVB |  Alwis |
| *o-*Phenylenediamine (OPDA) | urine |  |  |  | ●surplus |  | ● | ● | TVB |  Alwis |
| *p*-Phenylenediamine (PPDA) | urine |  |  |  | ●surplus |  | ● | ● | TVB |  Alwis |
| 5-Amino-1,3,3-trimethylcyclohexanemethylamine (IPDA) | urine |  |  |  | ●surplus |  | ● | ● | TVB |  Alwis |
| Hexamethylenediamine (HAD) | urine |  |  |  | ●surplus |  | ● | ● | TVB |  Alwis |
| β-N-Methylamino-L-alanine (BMAA) | urine |  |  |  | ●surplus |  | ● | ● | TVB |  Alwis |
| Trimethylamine N-oxide (TMAO) | urine |  |  |  | ●surplus |  | ● | ● | TVB |  Alwis |
| **Tobacco Biomarkers: Cotinine and Nicotine Analogs**  |
| Anabasine | urine |   |   |   |   | ● | ● | ● | TVB | Feng/Wang |
| Anatabine | urine |   |   |   |   | ● | ● | ● | TVB | Feng/Wang |
| Cotinine | serum | ● | ● | ● | ● | ● | ● | ● | TVB | Sosnoff |
| Cotinine | urine |   |   |   |   | ● | ● | ● | TVB | Feng/Wang |
| Cotinine-n-oxide | urine |   |   |   |   | ● | ● | ● | TVB | Feng/Wang |
| Hydroxycotinine | serum |   |   |   |   | ● | ● | ● | TVB | Sosnoff |
| Hydroxycotinine | urine |   |   |   |   | ● | ● | ● | TVB | Feng/Wang |
| Norcotinine | urine |   |   |   |   | ● | ● | ● | TVB | Feng/Wang |
| Nicotine-1'N-oxide | urine |   |   |   |   | ● | ● | ● | TVB | Feng/Wang |
| Nornicotine | urine |   |   |   |   | ● | ● | ● | TVB | Feng/Wang |
| Nicotine | urine |   |   |   |   | ● | ● | ● | TVB | Feng/Wang |
| 4-Hydroxy-4-(3-pyridyl) butanoic acid | urine |   |   |   |   |   |   | ● | TVB | Feng/Wang |
| **Tobacco Biomarkers: Aldehydes**  |
| Acetaldehyde  | serum |  |  |  |  | ● | ● | ● | TVB | Silva/Chambers |
| Acrolein | serum |   |   |   |   | ● | ● | ● | TVB | Silva |
| Benzaldehyde | serum |   |   |   |   | ● | ● | ● | TVB | Silva |
| Butyraldehyde | serum |   |   |   |   | ● | ● | ● | TVB | Silva |
| Crotonaldehyde | serum |   |   |   |   | ● | ● | ● | TVB | Silva |
| Decanal | serum |   |   |   |   | ● | ● | ● | TVB | Silva |
| Furaldehyde | serum |   |   |   |   | ● | ● | ● | TVB | Silva |
| Heptanal | serum |   |   |   |   | ● | ● | ● | TVB | Silva |
| n-Hexanal | serum |   |   |   |   | ● | ● | ● | TVB | Silva |
| Isobutyraldehyde | serum |   |   |   |   |   | ● | ● | TVB | Silva |
| Isovaleraldehyde (isopentaldehyde) | serum |   |   |   |   | ● | ● | ● | TVB | Silva |
| Nonanal | serum |   |   |   |   | ● | ● | ● | TVB | Silva |
| Octanal | serum |   |   |   |   | ● | ● | ● | TVB | Silva |
| o-Tolualdehyde | serum |   |   |   |   | ● | ● | ● | TVB | Silva |
| Pentanal | serum |   |   |   |   | ● | ● | ● | TVB | Silva |
| Propionaldehyde | serum |   |   |   |   | ● | ● | ● | TVB | Silva |
| **Tobacco Biomarkers: Aromatic Amines**  |
| 1-Aminonaphthalene | urine |   |   |   |   |   |   | ● | TVB | Seyler/Wang |
| 2-Aminonaphthalene | urine | surplus |   |   |   | ● | ● | ● | TVB | Seyler/Wang |
| 4-Aminobiphenyl | urine | surplus |   |   |   | ● | ● | ● | TVB | Seyler/Wang |
| Anisidine | urine |   |   |   |   | ● | ● | ● | TVB | Seyler/Wang |
| 2,6-Dimethylaniline | urine |   |   |   |   | ● | ● | ● | TVB | Seyler/Wang |
| Quinoline | urine |   |   |   |   | ● | ● | ● | TVB | Seyler/Wang |
| *o*-Toluidine | urine | surplus |   |   |   | ● | ● | ● | TVB | Seyler/Wang |
| **Tobacco Biomarkers: Heterocyclic Amines**  |
| 3-Amino-1,4-dimethyl-5H-pyrido[4,3-b]indole (Trp-P-1) | urine |   |   |   |   | ● | **d** | ● | TVB | Xia/Wang |
| 2-Amino-3-methyl-9H-pyriodo[2,3-b]indole (MeA-α-C) | urine |   |   |   |   | ● | **d** | ● | TVB | Xia |
| 2-Amino-1-methyl-6-phenylimidazo[4,5-b]pyridine (Ph1P) | urine |   |   |   |   | ● | **d** | ● | TVB | Xia |
| 2-Amino-9H-pyrido[2,3-b]indole (A-α-C) | urine |   |   |   |   | ● | **d** | ● | TVB | Xia |
| 2-Amino-3-methylimidazo[4,5-f]quinoline (IQ) | urine |   |   |   |   | ● | **d** | ● | TVB | Xia |
| 2-Amino-6-methyldipyrido[1,2-a:3',2'-d]imidazole (Glu-P1) | urine |   |   |   |   | ● | **d** | ● | TVB | Xia |
| 2-Aminodipyrido[1,2-a:3',2'-d] imidazole (GLU-P2) | urine |   |   |   |   | ● | **d** | ● | TVB | Xia |
| Harman | urine |   |   |   |   | ● | **d** | ● | TVB | Xia |
| 1-Methyl-3-amino-5H-pyrido[4,3-b]indole (Trp-P-2) | urine |   |   |   |   | ● | **d** | ● | TVB | Xia |
| Norharman | urine |   |   |   |   | ● | **d** | ● | TVB | Xia |
| **Tobacco Biomarkers: TSNAs**  |
| 4-(Methylnitrosamino)-1-(3-pyridyl)-1-Butanol (NNAL) | urine |   | ● | ● | ● | ● | ● | ● | TVB | Xia/Wang |
| 4-(Methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK) | urine |   |   |   |   | ● | ● | ● | TVB | Xia |
| N'-Nitrosanabasine (NAB) | urine |   |   |   |   | ● | ● | ● | TVB | Xia |
| N'-Nitrosanatabine (NAT) | urine |   |   |   |   | ● | ● | ● | TVB | Xia |
| N'-Nitrosonornicotine (NNN) | urine |   |   |   |   | ● | ● | ● | TVB | Xia |
| **Tobacco Biomarkers: Volatile N-Nitrosamines**  |
| N-Nitrosodiethylamine (NDEA) | urine |   |   | surplus |   | ● | **d** | ● | TVB | Seyler/Wang |
| N-nitrosodimethylamine (NDMA) | urine |   |   | surplus |   | ● | **d** | ● | TVB | Seyler/Wang |
| N-Nitrosoethylmethylamine (NMEA) | urine |   |   | surplus |   | ● | **d** | ● | TVB | Seyler/Wang |
| N-nitrosomorpholine (NMOR) | urine |   |   | surplus |   | ● | **d** | ● | TVB | Seyler/Wang |
| N-Nitrosopiperidine (NPIP) | urine |   |   | surplus |   | ● | **d** | ● | TVB | Seyler/Wang |
| N-Nitrosopyrrolidine (NPYR) | urine |   |   | surplus |   | ● | **d** | ● | TVB | Seyler/Wang |
| ***trans* Fatty Acids** |
| *trans*-9-Hexadecenoic acid | plasma |   |   | ● | **d** |   |   |   | CCB | Vesper |
| *trans*-9-Octadecenoic acid | plasma |   |   | ● | **d** |   |   |   | CCB | Vesper |
| *trans,trans*-9,12-Octadecadienoic acid | plasma |   |   | ● | **d** |   |   |   | CCB | Vesper |
| *trans-*11-Octadecanoic acid | plasma |   |   | ● | **d** |   |   |   | CCB | Vesper |
| **Caffeine and Metabolites** |
| 5-acetylamino-6-amino-3-methyluracil | urine |   |   | ● | ● | ● | **d** |  | NBB | Ryback |
| 1-methyluric acid | urine |   |   | ● | ● | ● | **d** |  | NBB | Ryback |
| 3-methyluric acid | urine |   |   | ● | ● | ● | **d** |  | NBB | Ryback |
| 7-methyluric acid | urine |   |   | ● | ● | ● | **d** |  | NBB | Ryback |
| 1,3-dimethyluric acid | urine |   |   | ● | ● | ● | **d** |  | NBB | Ryback |
| 1,7-dimethyluric acid | urine |   |   | ● | ● | ● | **d** |  | NBB | Ryback |
| 3,7-dimethyluric acid | urine |   |   | ● | ● | ● | **d** |  | NBB | Ryback |
| 1,3,7-trimethyluric acid | urine |   |   | ● | ● | ● | **d** |  | NBB | Ryback |
| 1-methylxanthine | urine |   |   | ● | ● | ● | **d** |  | NBB | Ryback |
| 3-methylxanthine | urine |   |   | ● | ● | ● | **d** |  | NBB | Ryback |
| 7-methylxanthine | urine |   |   | ● | ● | ● | **d** |  | NBB | Ryback |
| 1,3-dimethylxanthine (theophylline)  | urine |   |   | ● | ● | ● | **d** |  | NBB | Ryback |
| 1,7-dimethylxanthine (paraxanthine)  | urine |   |   | ● | ● | ● | **d** |  | NBB | Ryback |
| 3,7-dimethylxanthine (theobromine)  | urine |   |   | ● | ● | ● | **d** |  | NBB | Ryback |
| 1,3,7-trimethylxanthine (caffeine)  | urine |   |   | ● | ● | ● | **d** |  | NBB | Ryback |
| **Iron-Status and Inflammation Indicators** |
| Ferritin | serum | ● | ● | ● | **d** |  | ● | ● | NBB | Pfeiffer |
| Transferrin receptor | serum | ● | ● | ● | **d** |  | ● | ● | NBB | Pfeiffer |
| Iron | serum |  |  |  |  |  |  |  | NBB | Pfeiffer |
| TIBC | serum |  |  |  |  |  |  |  | NBB | Pfeiffer |
| Transferrin saturation | serum |  |  |  |  |  |  |  | NBB | Pfeiffer |
| Protoporphyrin | serum |  |  |  |  |  |  |  | NBB | Pfeiffer |
| **Water Soluble Vitamins and Related Compounds** |
| Folate (serum) | serum | ● | ● | ● | **d** |   |   |   | NBB | Pfeiffer |
| Folate (RBC) | RBC | ● | ● | ● | ● | ● | ● | ● | NBB | Pfeiffer |
| Folate forms by LC-MS/MS (serum) |   |   |   |   |   |   |   |   |   |   |
|  Total folate (calculated) |   |   |   |   | ● | ● | ● | ● | NBB | Pfeiffer |
|  5-Methyltetrahydrofolate | serum |   | ● |   | ● | ● | ● | ● | NBB | Pfeiffer |
|  Folic acid | serum |   | ● |   | ● | ● | ● | ● | NBB | Pfeiffer |
|  5-Formyltetrahydrofolate | serum |   |   |   | ● | ● | ● | ● | NBB | Pfeiffer |
|  Tetrahydrofolate | serum |   |   |   | ● | ● | ● | ● | NBB | Pfeiffer |
|  5,10-Methenyltetrahydrofolate | serum |   |   |   | ● | ● | ● | ● | NBB | Pfeiffer |
|  MeFox oxidation product | serum |   |   |   | ● | ● | ● | ● | NBB | Pfeiffer |
| Homocysteine | plasma | ● | **d** |  |  |  |  |  | NBB | Pfeiffer |
| Methylmalonic acid | plasma/serum | **d** |  |  | ● | ● | **d** |  | NBB | Pfeiffer |
| Vitamin B12 | serum | ● |  |  | ● | ● | **d** |  | NBB | Pfeiffer |
| Vitamin B6 (pyridoxal-5'-phosphate) | serum | ● | ● | ● | **d** |  |  |  | NBB | Pfeiffer |
| Vitamin B6 (4-pyridoxic acid) | serum | ● | ● | ● | **d** |  |  |  | NBB | Pfeiffer |
| Vitamin C (ascorbic acid) | serum | ● | **d** |  |  |  |  | ● | NBB | Pfeiffer |
| **Fat-Soluble Vitamins and Micronutrients** |
| Vitamin A | serum | ● | **d** |  |  |  |  | ● | NBB | Schleicher |
| Vitamin E | serum | ● | **d** |  |  |  |  | ● | NBB | Schleicher |
| Retinyl palmitate | serum | ● | **d** |  |  |  |  | ● | NBB | Schleicher |
| Retinyl stearate | serum | ● | **d** |  |  |  |  | ● | NBB | Schleicher |
| *gamma-*Tocopherol | serum | ● | **d** |  |  |  |  | ● | NBB | Schleicher |
| *alpha*-carotene | serum | ● | **d** |  |  |  |  | ● | NBB | Schleicher |
| *trans-beta-*Carotene | serum | ● | **d** |  |  |  |  | ● | NBB | Schleicher |
| *cis-beta-*Carotene | serum | ● | **d** |  |  |  |  | ● | NBB | Schleicher |
| *alpha-*Cryptoxanthin | serum |   |  |  |  |  |  | ● | NBB | Schleicher |
| *beta-*Cryptoxanthin | serum | ● | **d** |  |  |  |  | ● | NBB | Schleicher |
| Lutein/zeaxanthin | serum | ● | **d** |  |  |  |  | ● | NBB | Schleicher |
| *trans-*Lycopene | serum | ● | **d** |  |  |  |  | ● | NBB | Schleicher |
| Total lycopene | serum | ● | **d** |  |  |  |  | ● | NBB | Schleicher |
| 25-OH Vitamin D (D2 + D3) | serum | ● | ● | ● | ● | ● | ● | ● | NBB | Schleicher |
| 25-OH Vitamin D2 | serum |   | ● | ● | ● | ● | ● | ● | NBB | Schleicher |
| 25-OH Vitamin D3 | serum |   | ● | ● | ● | ● | ● | ● | NBB | Schleicher |
| epimer-25-OH Vitamin D3 | serum |   | ● | ● | ● | ● | ● | ● | NBB | Schleicher |
| **Fatty acids (30)** |
| Capric acid (C10:0)  | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Lauric acid (C12:0)  | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Myristic acid (14:0) | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Pentadecanoic acid (C15:0)  | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Palmitic acid (16:0) | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Margaric acid (C17:0)  | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Stearic acid (18:0)  | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Arachidic acid (20:0)  | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Docosanoic acid (22:0)  | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Tricosanoic acid (C23:0)  | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Lignoceric acid (24:0)  | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Myristoleic acid (14:1n-5)  | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Palmitoleic acid (16:1n-7) | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| cis-Vaccenic acid (18:1n-7) | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Oleic acid (18:1n-9) | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Eicosenoic acid (20:1n-9) | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Docosenoic acid (22:1n-9) | plasma /serum |   |   |   | **d** |  |  |  | NBB | Schleicher |
| Nervonic acid (24:1n-9) | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Linoleic acid (18:2n-6) | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| alpha-Linolenic acid (18:3n-3) | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| gamma-Linolenic acid (18:3n-6) | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Stearidonic acid (C18:4n-3)  | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Eicosadienoic acid (20:2n-6)  | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| homo-gamma-Linolenic acid (20:3n-6) | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Eicosatrienoic acid (C20:3n-9) | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Arachidonic acid (20:4n-6) | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Eicosapentaenoic acid (20:5n-3) | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Docosatetraenoic acid (22:4n-6)  | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Docosapentaenoic acid (22:5n-3) | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Docosapentaenoic acid (22:5n-6) | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| Docosahexaenoic acid (22:6n-3) | plasma /serum |   |   |   | ● | ● | **d** |  | NBB | Schleicher |
| **Hormones and Binding Protein** |
| Estradiol | serum |   |   |   |   | ● | ● | **d** | CCB | Vesper |
| Testosterone | serum |   |   |   | ● | ● | ● | **d** | CCB | Vesper |
| Steroid Hormone Binding Globulin | serum |   |   |   |   | ● | ● | **d** | CCB | Vesper |