Attachment 6

Additional Information on Biospecimens

June 18, 2013

PATH Biospecimen Analytes by Specimen and Biomarker

Analyte	Preferred Matrix	Biomarker
Tobacco Biomarkers In Tobacco Users and Non-tobacco Users		
Nicotine and nicotine metabolites **Tobacco user:** cotinine and trans-3'-hydroxycotinine **Non-tobacco user**: cotinine	Serum	Exposure
Nicotine and nicotine metabolites **Tobacco user:** cotinine, trans-3'-hydroxycotinine, cotinine N-oxide, nicotine N-oxide, nornicotine, norcotinine; analogues: anabasine, anatabine **Non-tobacco user:** cotinine and trans-3'-hydroxycotinine	Urine	Exposure
Tobacco specific nitrosamines (TSNAs): NNAL, NNN, NNA, NAT, NAB, NNK	Urine	Exposure
Polycyclic aromatic hydrocarbons (pyrene, naphthalene, phenanthrene, fluorene)	Urine	Combustion
Cadmium, cobalt, uranium, lead, strontium, beryllium, manganese, and thallium	Urine, prescreened container	Toxicity
Speciated arsenic (As III, As V, dimethylarsinic acid (DMA), and monomethylarsonic acid (MMA))	Urine, prescreened container	Toxicity
Creatinine	Urine	For correction
4-ABP hemoglobin	Red blood cells, EDTA	Toxicity
VOCs metabolites	Urine	Combustion
Volatile nitrosamines	Urine	Combustion
Aromatic amines	Urine	Combustion
Cyanide	Urine	Combustion
Other Biomarkers in Tobacco Users and Non-tobacco Users		
C-reactive protein	Serum, red top or SST	Inflammation; Cardiovascular risk
Fibrinogen	Plasma, citrate	Cardiovascular risk
Interleukin 6	Plasma	Inflammation
sICAM (soluble intercellular adhesion molecule)	Plasma, EDTA or Serum, SST	Cardiovascular risk
F2-isoprostane / 8-epi-prostaglandin F2a	Urine	Oxidative stress
MicroRNA profile	Plasma	Epigenetic effects

Metabolomic profile	Plasma, EDTA	Metabolic effects
Proteomic profile	Plasma	Toxicity, risk, stress
DNA (genotyping, sequencing)	Buffy coat	Role of genetics
RNA (gene expression)	PAXgene	Epigenetic effects
Metabolomic profile	Urine	Metabolic effects
microRNA, total RNA	Buccal cells	Epigenetic effects
Epigenetic marks	Buccal cells	Epigenetic effects