

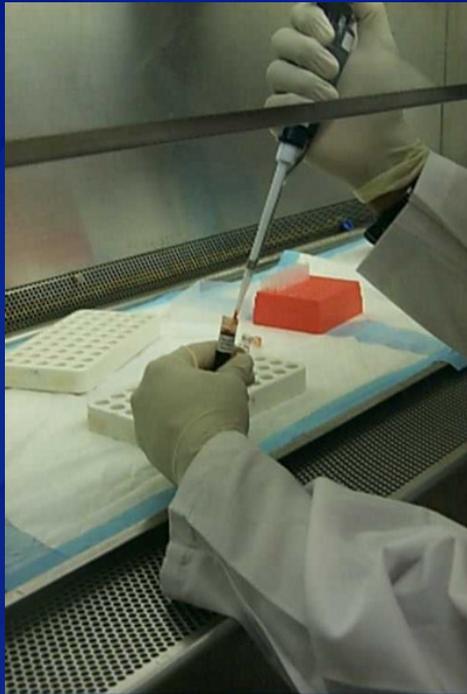
# **CDC's National Biomonitoring Program and NHANES: 2015 Update**

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# National Biomonitoring Program: Goal

To provide laboratory science that improves the diagnosis, detection, treatment, and prevention of disease resulting from exposure to environmental chemicals



# National Biomonitoring Program: Objectives

- ❑ To assess the exposure of the U.S. population to priority environmental chemicals every two years.
- ❑ Provide biomonitoring measurements for studies of exposure of vulnerable population groups and for studies investigating the relationship between human biomonitoring levels and adverse health effects.
- ❑ Develop new and improved biomonitoring methods for priority environmental chemicals.
- ❑ To provide effective laboratory support for CDC emergency responses that involve known or potential exposure to environmental chemicals.
- ❑ Provide analytical support, training and technology transfer to state and local laboratories to support investigations of known and potentially unsafe exposures.



# NHANES: How we assess exposure of the U.S. population to priority environmental chemicals

## □ National Health and Nutrition Examination Survey

- Began in 1971
- Continuous survey since 1999 (survey cycle = 2 years)
- Stratified, multistate national probability sample
- About 10,000 participants in 30 locations every 2 years

## □ Methods

- Face-to-face and computer-assisted interviews:
  - Demographics
  - Socioeconomic
  - Dietary
  - Health-related topics
- Physical examination
- Biological specimen collection



More at : [http://www.cdc.gov/nchs/nhanes/about\\_nhanes.htm](http://www.cdc.gov/nchs/nhanes/about_nhanes.htm)

# National Health and Nutrition Examination Survey (NHANES) Mobile Examination Centers



# Adding New Chemical Measurements to the *National Reports*

- ❑ Formal process for nominations announced in 2002  
<https://www.federalregister.gov/articles/2002/10/07/02-25374/final-selection-criteria-and-solicitation-of-nominations-for-chemicals-or-categories-of>
- ❑ Criteria for consideration include:
  - Evidence that US population exposure may be changing
  - Seriousness of known or suspect health effects
  - Exposure of a proportion of US population
  - Need to evaluate effectiveness of interventions
  - Analytical method available and feasible
  - \*Analytical cost (preference for adding to existing methods)

\*Costs include NHANES specimen collection and method development

# Adding New Chemical Measurements to NHANES

- ❑ Justification (e.g., request, potential widespread exposure)
- ❑ Analyte and Matrix selection
- ❑ Method Development or Modification (availability of reference standard)
- ❑ Feasibility study (e.g., NHANES surplus sample study)
  - Submit proposal to NHANES for surplus blood/serum/urine
  - Must have validated analytical method
- ❑ Submit Letter of Intent (LOI) to NHANES to measure chemical(s) as part of ongoing NHANES
- ❑ LOI deadline is ~2 years before start of NHANES cycle when measurement is planned (e.g., by mid-2015 for measurements in NH 2017-18)

# NHANES Update

- ❑ Racial/ethnic groups
  - All Hispanic
  - Asian
  - non-Hispanic white
  - non-Hispanic Black
  - Mexican American
- ❑ Urine collection age lowered to 3 years (starting 2015)—full sample planned

## NHANES Update (continued 2)

- ❑ DEET and metabolites (new method) starting 2007; data release pending
- ❑ Personal Care and Consumer Product Chemicals and Metabolites (2013-14)
  - Bisphenol F, Bisphenol S, Triclocarban (new)
  - BPA, Benzophenone-3, Triclosan, 2,4- and 2,5-Dichlorophenol, Parabens (all previously measured)
- ❑ Blood cobalt, chromium ages 40+ years (2015-16)
- ❑ New phthalate-alternative metabolite (2015-16; possibly 2013-14)
  - Carboxy-MHNCH (in addition to the DINCH metabolite, MHNCH)
- ❑ 2 additional DBP metabolites (2015-16; possibly 2013-14)
  - Mono-2-hydroxy-isobutyl phthalate (2OH-MHiBP)
  - Mono-2-hydroxy-n-butyl phthalate (2-OH-MHBP)

## NHANES Update (continued 3)

- ❑ Specific PFOA, PFOS isomers (2015-16; possibly 2013-14)
  - n-PFOA, branched PFOA isomers ( $\Sigma$ b-PFOA)
  - n-PFOS, branched PFOS isomers mixture 1 ( $\Sigma$ m-PFOS), branched PFOS isomers mixture 2 ( $\Sigma$ m2-PFOS)
- ❑ Blood metals ages 12 + years sample reduced to ½ (rather than full (2013-14))
- ❑ Urine and serum tobacco biomarkers (2013-14)
  - VOC metabolites (2011-12)
  - Serum aldehydes
  - Tobacco-specific n-nitrosamines (TSNAs)
  - Volatile nitrosamines
  - Heterocyclic amines
  - Aromatic amines
  - Cotinine and nicotine analogs

# Dropping Chemical Measurements from the *National Reports*

- ❑ Formal process to remove chemicals announced in 2008: <http://www.gpo.gov/fdsys/granule/FR-2008-03-28/E8-6350>
- ❑ Criteria include:
  - Replacement chemical is a better measure (e.g., metabolite)
  - Detection rate for 3 cycles is <5% (all chemicals in a group)
  - Chemical concentrations for 3 cycles are unchanged or falling, unless the chemical has established biomonitoring threshold (e.g., blood lead) or health concern (e.g., blood mercury)

## NHANES Update (continued 4)

Analytes no longer reported after 2010:

- ❑ Beryllium, platinum
- ❑ Phytoestrogens and metabolites
- ❑ 2,4,5- and 2,4,6-Trichlorophenol
- ❑ Phthalate metabolites: mono-n-octyl phthalate (MOP) and mono-cyclohexyl phthalate (MCHP)
- ❑ 4-*tert*-Octylphenol
- ❑ *ortho*-Phenylphenol

## Future Directions for the *National Reports*

- ❑ Considering a *Fifth Report* (electronic only)
- ❑ Considerations for ease of use:
  - Separate volumes for:
    - US population
    - Adult smoker/nonsmoker biomarkers
    - Pooled samples (PDBEs, POPs)
    - Chemicals no longer measured (?)
  - To present all cycles of available data for a given chemical and accommodate new categories, tables are split; data up to NH 2009-2010 and data starting with NH 2011-012 are in separate tables.

# Where to Look for the Latest Information:



**NEW [Updated Tables, February 2015](#) [PDF - 67,343 KB]**

**Revised February 2015**

**This *Updated Tables, February 2015*, provides nationally representative biomonitoring data that became available since the publication of the *Fourth National Report on Human Exposure to Environmental Chemicals, 2009*. This report includes data made available from NHANES survey periods 2005-2006, 2007-2008, 2009-2010, 2011-2012, and pooled samples using corrected NHANES sampling weights. It also includes previous updates to the tables and provides new data for some metals, phthalates, and volatile organic compounds (VOCs).**

# Thank You!

# Questions?

**For more information please contact Centers for Disease Control and Prevention**

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