

# **Agency for Toxic Substances and Disease Registry (ATSDR)**

**Haven Well  
Community Advisory Board Meeting  
City of Portsmouth, NH**

**October 14, 2015**

# **ATSDR Presentation will focus on**

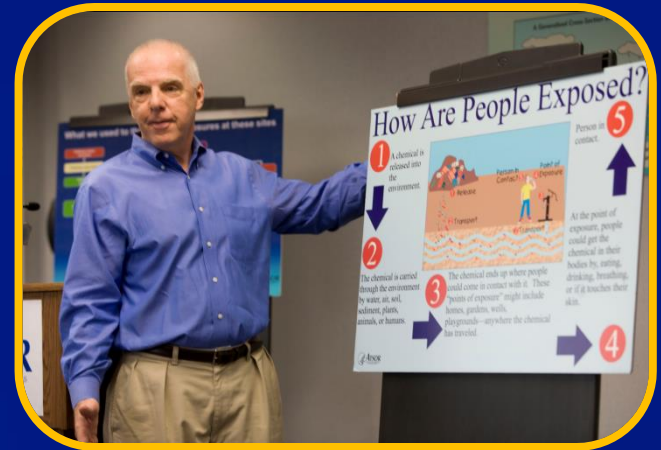
- **Who we are and what we do**
- **How we got involved**
- **What we are doing**
- **What we know about PFCs**
- **Health Studies (types, questions to consider, etc.,)**

**ATSDR is involved with the Pease site  
and committed to working with you**

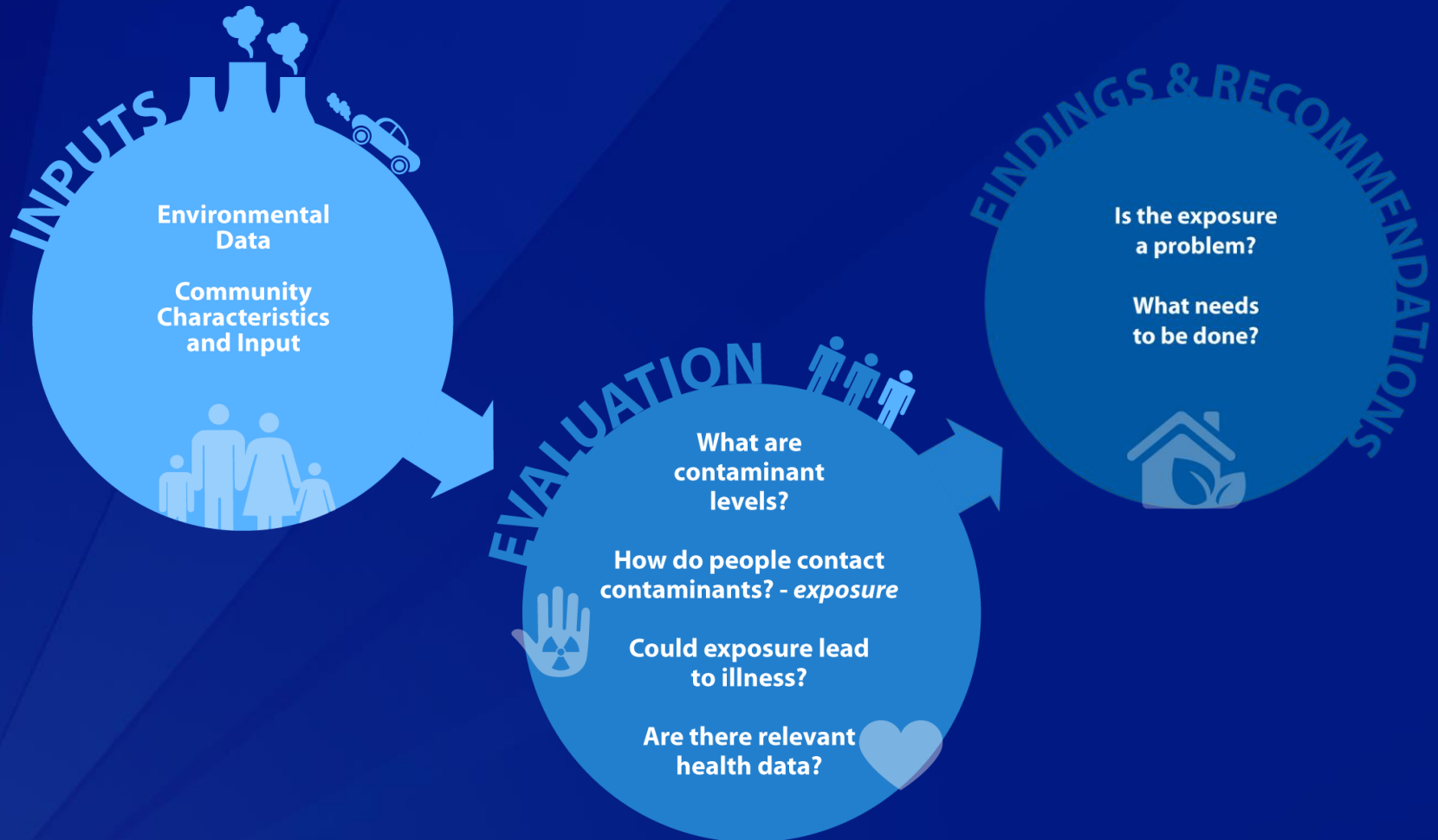
# **WHO IS ATSDR AND WHAT DO WE DO?**

# *ATSDR works with communities to protect people from environmental exposures*

**ATSDR does this by investigating chemical exposures, recommending actions to protect people, educating the public, and conducting research to protect health**



# ATSDR Public Health Consultation Process





# Public Health Consultation

## Conclusions

- Can the exposure cause harm?
- To whom?

## Recommendations

- How can exposures be reduced?
- Do we need more information?
- Do we need to educate the community about what exposures (past or current) mean to them?
- Are other actions needed?

**HOW DID ATSDR GET  
INVOLVED?**



- ❑ **New Hampshire Department of Health and Human Services (NH DHHS) requested**
  - scientific and technical assistance
  - comments on their biomonitoring protocol and
  - CDC laboratory analysis of serum samples collected in the community
  
- ❑ **New Hampshire Department of Environmental Services (NH DES) identified**
  - a need to evaluate people's exposures to Perfluorinated Chemicals (PFCs) contamination in drinking water

**WHAT IS ATSDR DOING?**

# Biomonitoring

- ❑ New Hampshire Department of Human Services (NH DHHS )
  - lead for the collection and analysis of the bio-monitoring data
- ❑ CDC/ATSDR
  - providing scientific and technical assistance to NH DHHS



# Drinking Water Evaluation

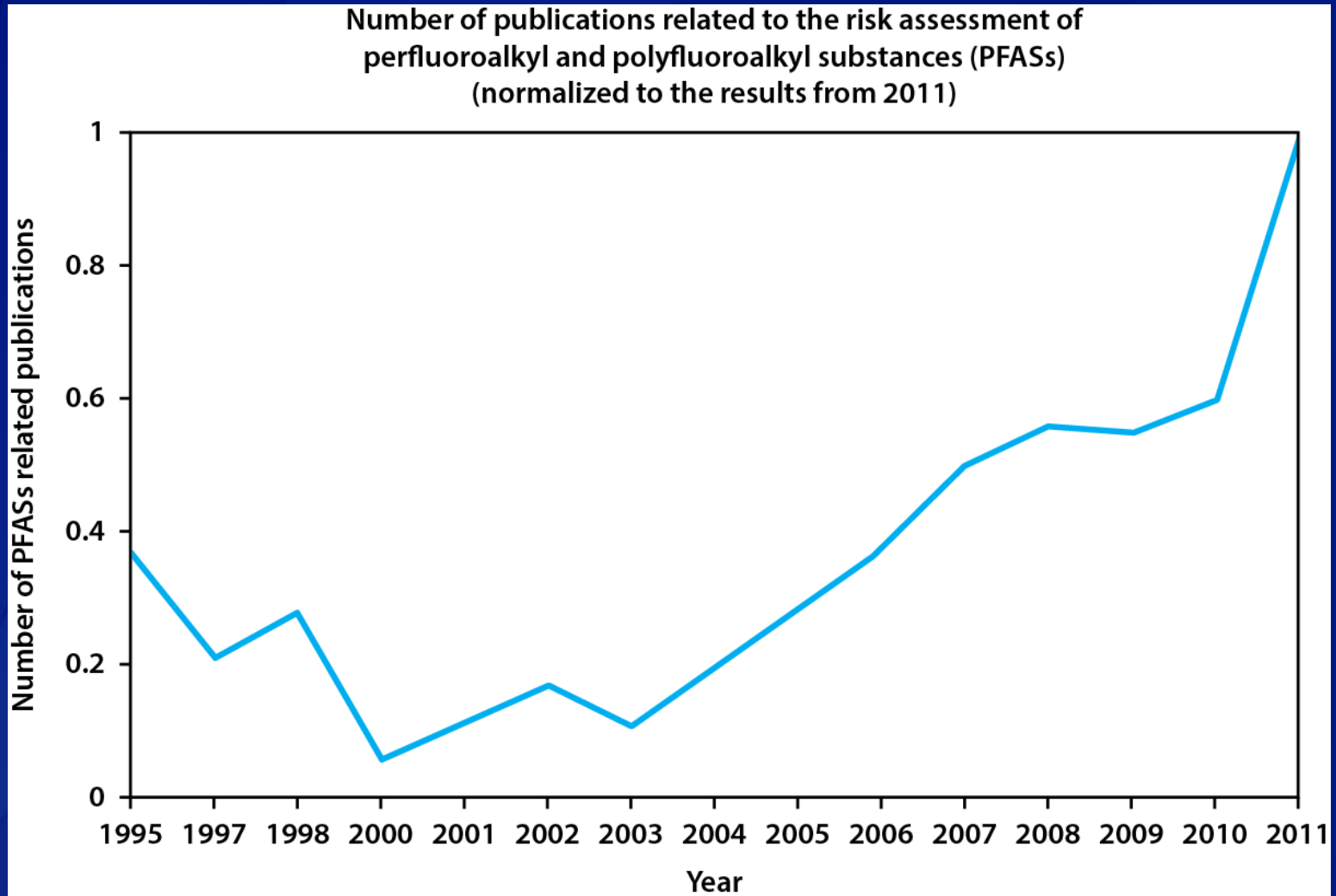
## ATSDR and the New Hampshire Department of Environmental Services (NH DES) Health Consultations

- Private Well Evaluation
- Public Water Supply Evaluation



**WHAT RESEARCH IS KNOWN  
ABOUT EXPOSURE TO PFCs?**

# What research is ongoing?



Source: DeWitt, J (editor), Toxicological Effects of Perfluoroalkyl and Polyfluoroalkyl Substances, Humana Press, 2015

# Human Health Effects – What has been studied?

## Occupational Studies

- Pulmonary function
- Cardiotoxicity
- Cerebrovascular disease
- All heart disease
- Ischemic heart disease
- Gastric ulcer
- Colon polyps
- Hematological parameters (hematocrit, hemoglobin, red blood cells, white blood cells, platelets)
- Liver disease
- Liver enzymes (ALT, GGT, AST)
- Serum lipids (total cholesterol, non-HDL cholesterol, HDL-cholesterol, triglycerides, LDL-cholesterol, VLDL-cholesterol)
- Chronic renal disease
- Nonmalignant kidney disease
- Blood urea nitrogen
- Serum creatinine
- Hormones (cortisol, estradiol, testosterone, FSH, LH, TSH, etc...)
- Thyroid function (TSH, T4, free T4, T3, etc...)
- Serum uric acid
- Pregnancy outcome
- Birth weight
- Prostate cancer
- Liver cancer
- Pancreatic cancer
- Respiratory cancer
- Bladder and urinary organ cancer
- Kidney cancer
- Mesothelioma
- Colon cancer
- Melanoma
- Ulcerative colitis
- Chron's disease
- Rheumatoid srthritis

- Diabetes
- Lupus
- Multiple sclerosis

## Exposed Communities

- Pregnancy-induced hypertension
- Hematological parameters
- Osteoarthritis
- Liver enzymes (ALT, GGT, bilirubin)
- Serum lipids (total cholesterol, non-HDL cholesterol, HDL-cholesterol, triglycerides, LDL-cholesterol, VLDL-cholesterol)
- Renal function
- Thyroid function (TSH, T4, free T4, T3, etc...)
- Diabetes
- Uric acid
- Ulcerative colitis
- Chron's disease
- Rheumatoid arthritis
- Diabetes
- Lupus
- Multiple sclerosis
- Antibody response following vaccination
- Neurological effects (memory loss, confusion)
- Onset of menopause
- Fetal growth (low birth weight, birth length, abdominal circumference, small for gestational age, ponderal index, head circumference)
- ADHD, impulsivity
- Age of puberty
- Birth defects
- Stillbirth
- Premature Birth
- Thyroid cancer
- Kidney cancer
- Testicular cancer
- Prostate cancer
- Ovarian cancer
- Non-Hodgkin's Lymphoma

- Colorectal cancer

## General Population

- Asthma
- Cardiovascular effects (stroke, angina, blood pressure, myocardial infarction)
- Osteoarthritis
- Serum lipids (total cholesterol, non-HDL cholesterol, HDL-cholesterol, triglycerides, LDL-cholesterol, VLDL-cholesterol)
- Glomerular filtration
- Kidney disease
- Thyroid function (TSH, T4, free T4, T3, etc...)
- Diabetes
- Uric acid
- Antibody response following vaccination
- Infectious disease incidence
- Neurological effects (memory loss, confusion)
- Hormones (cortisol, estradiol, testosterone, FSH, LH, TSH, etc...)
- Sperm quality (motility, morphology)
- Endometriosis
- Fertility
- Fetal growth (low birth weight, birth length, abdominal circumference, small for gestational age, ponderal index, head circumference)
- Neurodevelopment
- ADHD, impulsivity
- Age of puberty
- Atopic dermatitis
- Birth defects
- Stillbirth
- Premature Birth
- Bladder cancer
- Pancreatic cancer
- Liver cancer
- Prostate cancer
- Breast cancer

## Human Health Effects with Strong Supporting Evidence

- Lipids (high cholesterol)
- Uric Acid (hypertension, kidney)
- Liver Function and Disease
- Low Birth Weight



# ATSDR's PFC-related Activities

- ❑ **ATSDR has updated the Toxicological Profile for PFCs – public comment draft is available via ATSDR's Toxic Substances Portal**
  - Includes Minimum Risk Levels (MRLs) – screening values for daily exposure – for PFOA and PFOS
  - Public comment period ends December 1, 2015
  - <http://www.atsdr.cdc.gov/ToxProfiles/tp.asp?id=1117&tid=237>

The screenshot shows the ATSDR website interface for the Toxicological Profile of Perfluoroalkyls. The page is titled "Toxic Substances Portal - Perfluoroalkyls" and includes a search bar, navigation links, and a main content area with a "Draft for Public Comment" notice. A sidebar on the left contains a "Toxic Substances Portal" menu and an "Environmental Health Substances Map" section. A right sidebar lists "On This Page" and "Contact Us" information.

**ATSDR** Agency for Toxic Substances & Disease Registry

A-Z Index A B C D E F G H I J K L M N O P Q R S T U V W X Y Z #

Toxic Substances Portal - Perfluoroalkyls

**Toxic Substances Portal**  
Perfluoroalkyls  
ToxFQAQs  
Public Health Statement  
► **Toxicological Profile**  
ToxGuide  
... More Resources

**Toxicological Profile for Perfluoroalkyls**  
Draft for Public Comment  
Public Comment Period Ends on December 1, 2015

PDF Version, 9.7 MB

**Toxicological Profile Information**  
The ATSDR toxicological profile succinctly characterizes the toxicologic and adverse health effects information for the hazardous substance described here. Each peer-reviewed profile identifies and reviews the key literature that describes a hazardous substance's toxicologic properties. Other pertinent literature is also presented, but is described in less detail than the key studies. The complete list of topics covered (chapter titles) is shown at the left and in more detail further down this page.

The focus of the profile is on health and toxicologic information. Therefore, each profile begins with a **Public Health Statement** that summarizes in nontechnical language, a substance's relevant properties.

A useful two page information sheet, the **ToxFQAQs™**, is also available.

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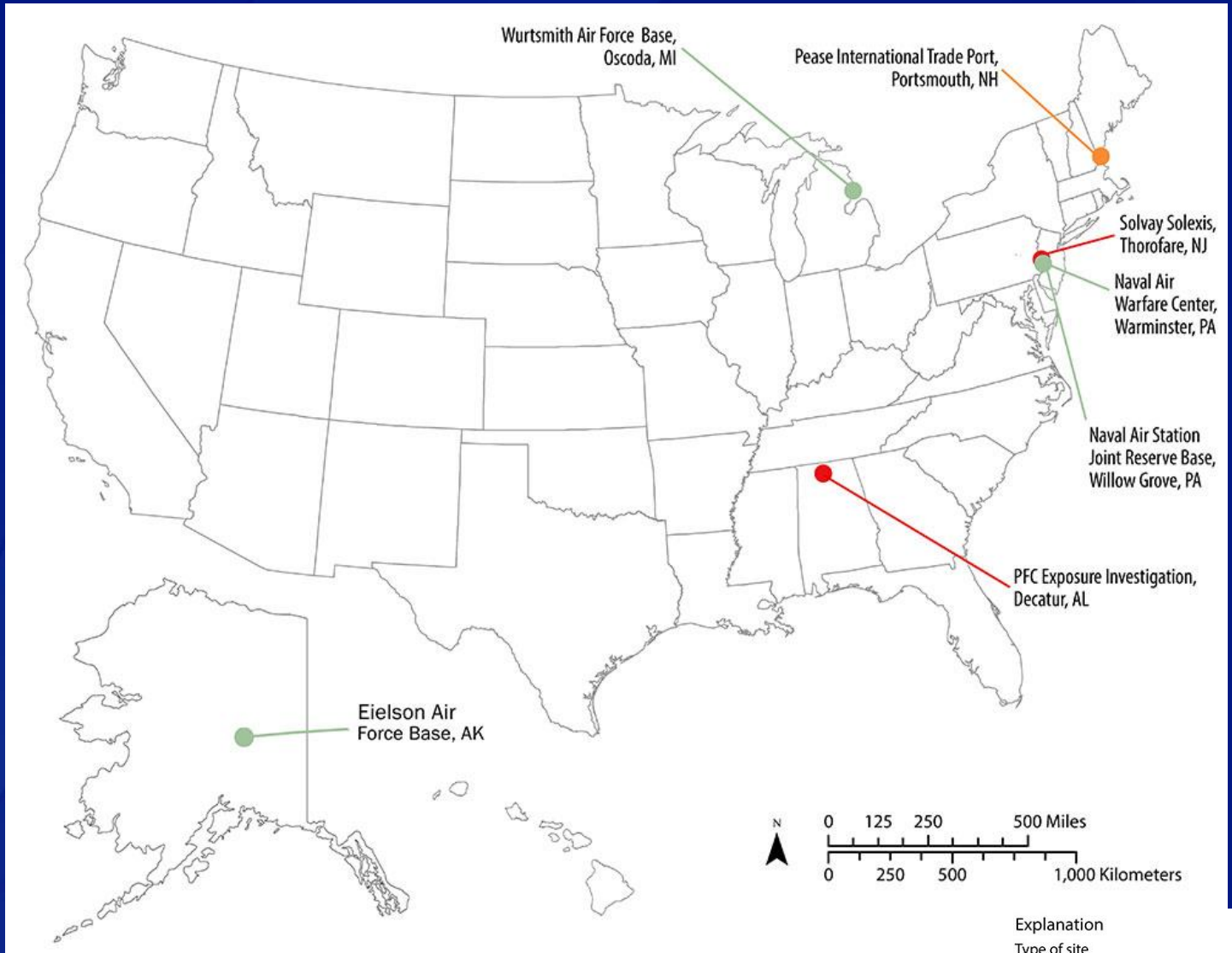
**Toxicological Profile Access**  
In order to access the ATSDR toxicological profiles' PDF files below, you must have **Adobe Acrobat Reader**.  
You may download that program for free from this link to **Adobe** and then use it to access (open) the files below that are labeled as PDF files.

**On This Page**

- Toxicological Profile Information
- Toxicological Profile Access
- Complete Profile
- Individual Chapters
  - Preface
  - Public Health Statement
  - Relevance to Public Health
  - Health Effects
  - Chemical and Physical Information
  - Production, Import, Use, and Disposal
  - Potential for Human Exposure
  - Analytical Methods
  - Regulations, Advisories, and Guidelines
- References
- Glossary
- Appendices

**Contact Us:**  
Agency for Toxic Substances and Disease Registry  
4770 Buford Hwy NE  
Atlanta, GA 30341  
800-CDC-INFO (800-232-4636)  
TTY: (888) 232-6348  
New Hours of Operation  
8am-8pm ET/Monday-Friday  
Closed Holidays  
Contact CDC-INFO

# ATSDR's PFC-related Activities



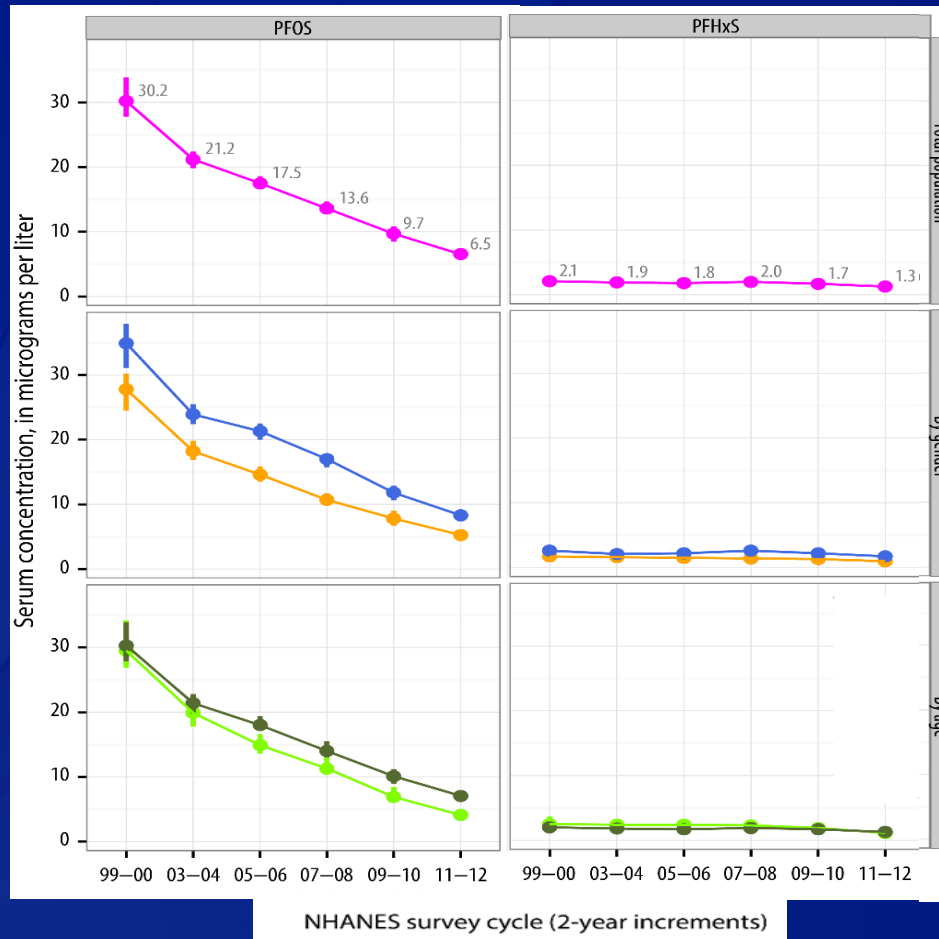
**Explanation**

Type of site

- Perfluorinated compound (PFC) manufacturing
- Airport/Fire training
- Military, commonly associated with fire training areas

# CDC/NCEH's PFC-related Activities

- CDC/NCEH continues to monitor PFC concentrations in the general US population via the National Health and Nutrition Examination Survey (NHANES).



## Explanation

95% upper confidence level

30.2 Median value

95% lower confidence level

## Category

● Total population

● Females

● Males

● Teens

● Adults

**WHAT IS A HEALTH STUDY?**

# What is a health study?

## Exposure

e.g., blood PFC levels; PFCs in drinking water; chemical plant worker exposure to PFOS



## Outcome

e.g., cancers, low birth weight, birth defects, ADHD, cholesterol levels, immune system biomarkers

**WHAT ARE THE TYPES OF  
STUDIES?**

# Types of Studies

## Studies of Exposure

- Environmental monitoring and modeling
- Biomonitoring

## Studies of health outcome occurrence

- Cancer and birth defect registries (analysis of registry data)
- Community surveys (e.g., determining the prevalence of autism or ADHD in a community)

# Types of Studies

## Epidemiological studies of exposure-outcome relationships

- **Ecologic study**
  - assessing exposure at the level of geographical unit such as census tract or zip-code level and comparing disease rates among these geographical units
- **Cohort and case-control studies**
  - assessing exposures to individuals and comparing disease rates among groups of exposed and unexposed individuals and among groups with different levels of exposure



**WHAT QUESTIONS SHOULD  
BE CONSIDERED BEFORE  
DECIDING TO CONDUCT A  
HEALTH STUDY?**

# Questions to consider before deciding to conduct a health study

1. Can a study answer the question?
2. Is there a complete exposure pathway, well-defined exposed population, and ability to assign levels of exposure with adequate accuracy?
3. Is there justification for studying the specific health outcome(s) being considered? (e.g., is there suggestive biological evidence? A finding in a previous study?)
4. Can the health effect(s) be validly ascertained or measured?

# Questions to consider before deciding to conduct a health study

5. Is there an appropriate comparison population?
6. Is the exposed population sufficiently large so that risks can be estimated with precision?
7. Can information on other risk factors that need to be taken into account be obtained?

# Pros and Cons of Conducting a Health Study

Positive things a health study might do:	Negative things a health study might do:
Document disease and/or exposure	Document no significant relationship between a disease and exposure
Demonstrate a relationship between exposure and disease	Appear to show that there is no problem
Educate residents about environmental health concerns	Give permission to polluters to continue polluting
Create an opportunity for members of your community to get involved	Identify health problems that you are unprepared to deal with
Be useful in community efforts to protect the health of future generations	Delay action while waiting for results

Excerpted from: Is a health study the answer for your community? A guide for making informed decisions.

[http://www.bu.edu/sph/files/2015/03/HSG\\_5-14-2015\\_nocover.pdf](http://www.bu.edu/sph/files/2015/03/HSG_5-14-2015_nocover.pdf)

# Moving Forward

- ❑ We're here to listen.
- ❑ We want to make sure the community participates in our public health activities.
- ❑ We are committed to working with you and will keep you apprised of our evaluations and recommendations.

# Questions

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# Thank You!

For more information please contact  
Agency for Toxic Substance and Disease Control /  
National Center for Environmental Health  
4770 Buford Hwy, NE, Atlanta, GA 30341  
Telephone: 1-800-CDC-INFO (232-4636) | TTY: 1-888-232-6348  
Visit: [www.atsdr.cdc.gov](http://www.atsdr.cdc.gov) | [www.cdc.gov](http://www.cdc.gov)

The findings and conclusions in this presentation are those of the authors and do not necessarily represent the official position of CDC/ATSDR.

National Center for Environmental Health  
Agency for Toxic Substances and Disease Registry

