

A globe of the Earth is shown, held by several hands of different skin tones (white, yellow, brown, black) against a solid blue background. The hands are positioned around the bottom and sides of the globe, suggesting a collective effort to care for the planet. The globe shows the Americas in green and the oceans in blue.

# Environmental Threats to Reproductive Health and Human Fertility

Jeanne Ann Conry, MD, PhD  
President-elect  
The International Federation of  
Gynecology and Obstetrics  
February 23, 2021



# Maternal Mortality Well-Woman Health The Environment





# HOW DID OBGYNS BECOME INVOLVED?





# What is “The Environment”?

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# “ENVIRONMENT” Includes:

- Personal and industrial chemicals

**BPA Phthalates PFOA  
PBDE**

- Agricultural chemicals  
**glyphosate, chlorpyrifos**
- Physical agents  
**heat, radiation**
- By-products of combustion and industrial processes  
**dioxin, P2.5**



- Foods and nutrients  
**Blood glucose**
- Prescription drugs  
**teratogens**
- Lifestyle choices and substance abuse  
**tobacco, alcohol, drugs**
- Social and economic factors  
**social determinants of health**







# GLOBAL HEALTH EXPOSURES

➤ **AIR POLLUTION**

➤ **WATER  
POLLUTION**

➤ **PESTICIDES**

➤ **ENVIRONMENTAL  
TOXICS FROM  
PERSONAL  
PRODUCTS**

➤ **MINING  
POLLUTION**

➤ **DEFORESTATION**

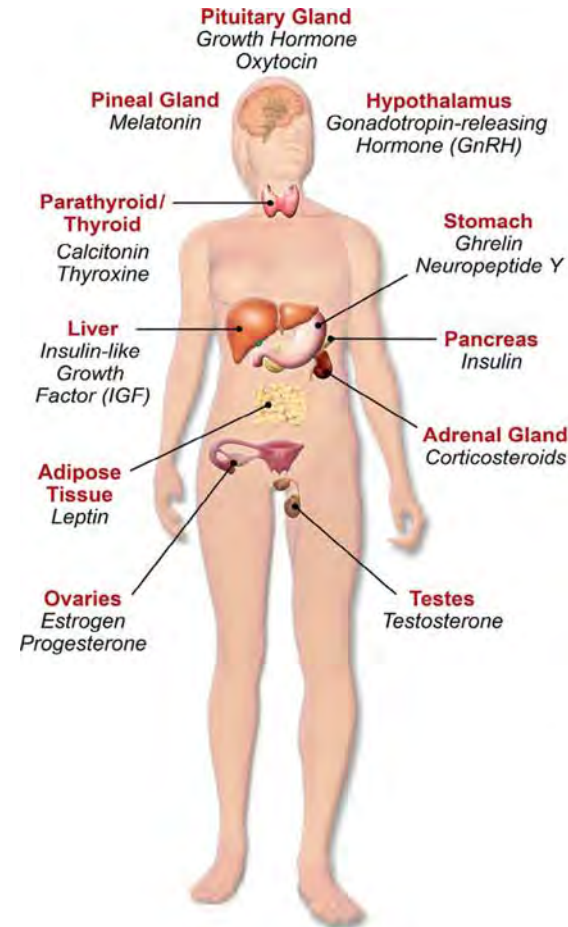
➤ **CLIMATE  
CHANGE**



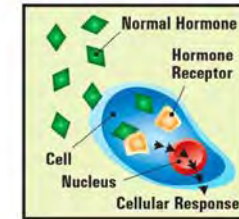


# ENDOCRINE DISRUPTORS

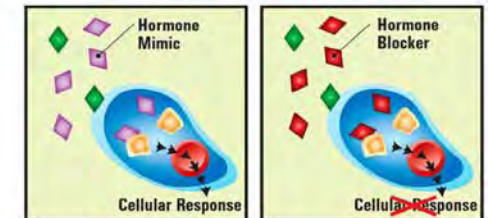
*Endocrine disruptors are chemicals that interfere in some way with hormone action and in so doing can alter endocrine function such that it leads to adverse effects on human and wildlife health.*



**Normal Endocrine Signaling**



**Endocrine Disrupting Chemicals\***



\* Other EDC mechanisms of action may include disruption of hormone synthesis, impairment of cell signaling, and other effects.

WHO. State of the Science of Endocrine Disrupting Chemicals.  
[https://apps.who.int/iris/bitstream/handle/10665/78102/WHO\\_HSE\\_PHE\\_IHE\\_2013.1\\_eng.pdf;jsessionid=0C7857520F1A5A028955B6BBE7BA758C?sequence=1/](https://apps.who.int/iris/bitstream/handle/10665/78102/WHO_HSE_PHE_IHE_2013.1_eng.pdf;jsessionid=0C7857520F1A5A028955B6BBE7BA758C?sequence=1/)



# OUR HISTORY

## ENDOCRINE DISRUPTORS

- Lead
- Diethyl Stilbestrol (DES)
- Methylmercury
- Thalidomide



U.S.

## High Lead Levels In Michigan Kids After City Switches Water Source

Updated October 5, 2015 · 6:19 AM ET

### Michigan AG: Flint water not even safe to 'bathe a newborn'



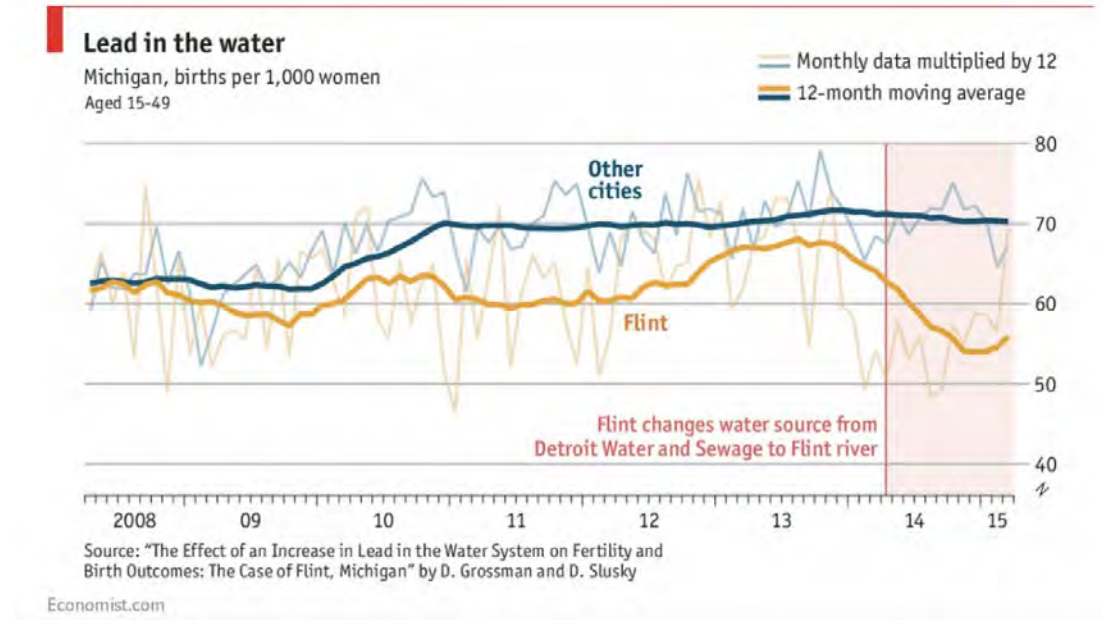
Note  
This  
Sept.

Source: Dr. Mona Hanna-Attisha, Hurley Medical Center



# The water crisis in Flint, Michigan has had terrible consequences for residents' health

*Fertility rates fell by 12%, while fetal deaths increased*



# IMPACT OF LEAD on health

- **FERTILITY FELL BY 12% IN JUST A FEW YEARS**
- **FETAL DEATHS INCREASED by 58%**



# Chemicals in the International Environment



- There are **70-100,000** chemicals in global commerce
- Production is **increasing** about 3.4% annually
- 4800 chemicals are “**high volume**” or exceed 1million pounds of use a year
- In 2020, **LOW RESOURCE countries took the lead** in high volume chemical production

# THE ENVIRONMENT





# GLOBAL LEADERSHIP





- ACOG eModules
- Articles & Resources
- Clinical Review
- Committee Opinions
- Department Publications
- Episiotomy
- Green Journal
- Guidelines for Adolescent Health Care
- Guidelines for Perinatal Care
- Guidelines for Women's Health Care
- The Ob-Gyn Workforce
- Obstetric Care Consensus Series
- Patient Education FAQs



The American College of  
Obstetricians and Gynecologists  
WOMEN'S HEALTH CARE PHYSICIANS



# COMMITTEE OPINION

Number 575, October 2013

**The American College of Obstetricians and Gynecologists Committee on Health Care for Underserved Women  
American Society for Reproductive Medicine Practice Committee**

**The University of California, San Francisco Program on Reproductive Health and the Environment**

*This Committee Opinion was developed by the American College of Obstetricians and Gynecologists Committee on Health Care for Underserved Women and the American Society for Reproductive Medicine Practice Committee with the assistance of the University of California, San Francisco (UCSF) Program on Reproductive Health and the Environment. The Program on Reproductive Health and the Environment endorses this document. This document reflects emerging clinical and scientific advances as of the date issued and is subject to change. This information should not be construed as dictating an exclusive course of treatment or procedure to be followed.*

[PDF Format](#)

## Exposure to Toxic Environmental Agents

**ABSTRACT:** Reducing exposure to toxic environmental agents is a critical area of intervention for obstetricians, gynecologists, and other reproductive health care professionals. Patient exposure to toxic environmental chemicals and other stressors is ubiquitous, and preconception and prenatal exposure to toxic environmental agents can have a profound and lasting effect on







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## SPECIAL COMMUNICATION

### International Federation of Gynecology and Obstetrics opinion on reproductive health impacts of exposure to toxic environmental chemicals☆

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## ARTICLE INFO

**Keywords:**  
Developmental health  
Environmental chemicals  
Reproductive environmental health  
Toxic chemicals  
Women's health

## ABSTRACT

Exposure to toxic environmental chemicals during pregnancy and breastfeeding is ubiquitous and hampers healthy human reproduction. There are tens of thousands of chemicals in global commerce, and exposures to toxic chemicals during pregnancy can trigger adverse health consequences. Exposure to environmental chemicals and related health outcomes are inequitably distributed within and between communities. On the basis of accumulating robust evidence of exposures and adverse health impacts related to environmental chemicals, the International Federation of Gynecology and Obstetrics (FIGO) joins other reproductive and other health professional societies in calling for timely action to prevent harm. FIGO recommends that reproductive and other health professionals advocate for policies to prevent exposure to toxic chemicals, work to ensure a healthy food system for all, make environmental health part of their practice, and champion environmental justice.

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# OUR CONCERNS

## ENDOCRINE DISRUPTORS

- Pesticides
- Flame Retardants
- Climate Change
- Plastic Pollution



726



## Endocrine Disruptors and Your Health

Endocrine disruptors are natural or human-made chemicals that may mimic or interfere with the body's hormones, known as the endocrine system.

Hormone-like chemicals had harmful effects on the organs and bodily functions of test animals, according to an independent panel of scientific experts organized by the National Toxicology Program (NTP), which is located at NIEHS.<sup>1</sup> The Endocrine Society stated in 2015 that endocrine-disrupting chemicals may affect health and disease in people.<sup>2</sup>

### How do we encounter these chemicals?

Endocrine disruptors are found in everyday products, including some food and beverage packaging, cosmetics, toys, flame retardants, and pesticides. Your contact with these chemicals may occur through diet, air, skin, and water.

### Chemicals that may disrupt your endocrine system

- **Bisphenol A (BPA)** is used to make polycarbonate plastics and epoxy resins found in many plastic products, including food storage containers.
- **Dioxins** are a byproduct of some manufacturing processes, such as herbicide production and paper bleaching, and are released into the air from waste burning and wildfires.
- **PFAS** (per- and polyfluoroalkyl substances) are a large group of chemicals used widely in industrial applications, such as firefighting foam, nonstick pans, paper, and textile coatings.
- **Phthalates** are used to make plastics more flexible; they are found in some food packaging, cosmetics, fragrances, children's toys, and medical devices.
- **Phytoestrogens** are naturally occurring substances in plants that have hormone-like activity, such as genistein and daidzein in soy products like tofu and soy milk.
- **Polybrominated diphenyl ethers (PBDE)** are used to make flame retardants for products such as furniture foam and carpet.
- **Polychlorinated biphenyls (PCBs)** are used to make electrical equipment, such as transformers, and are in hydraulic fluids, heat transfer fluids, lubricants,



## WARNING:

This product can expose you to chemicals, which are known to the State of California to cause cancer. For more information, visit [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

- Cancers
- Thyroid
- Obesity and metabolism
- Neurodevelopment

### Related research includes:

- Developing new models and tools to better understand how endocrine disruptors work.
- Improving ways to identify endocrine-disrupting substances.
- Understanding linkages between exposure to endocrine disruptors and health effects.
- Identifying and forming strategies to reduce or prevent

(KEEP A BREAST)



Know your environment.  
Protect your health.

# DIRTY DOZEN

## LIST OF ENDOCRINE DISRUPTORS

12 HORMONE-ALTERING  
CHEMICALS AND HOW TO  
AVOID THEM

[keep-a-breast.org](http://keep-a-breast.org)

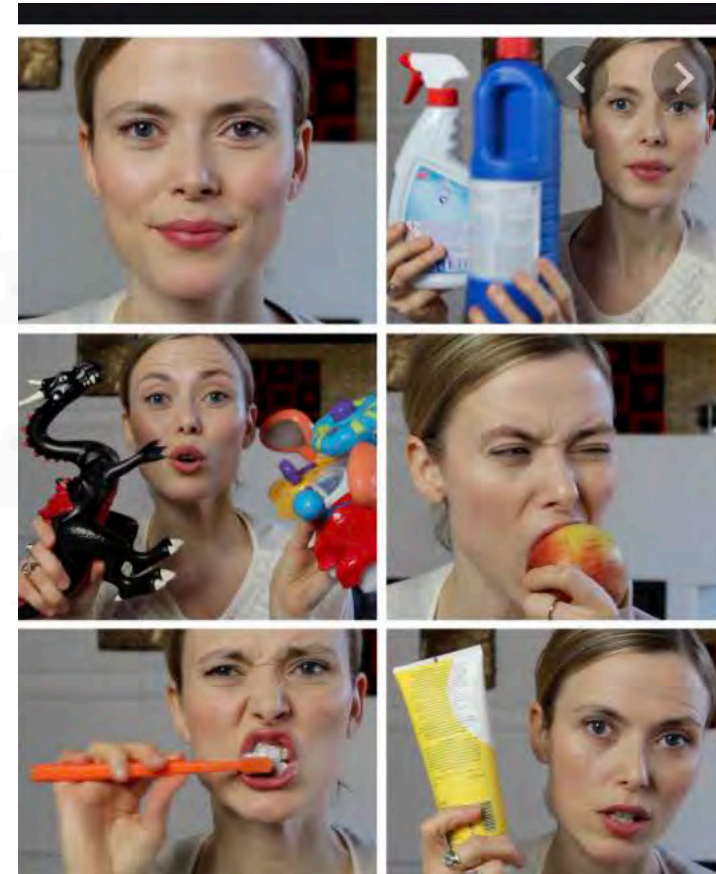
[ewg.org](http://ewg.org)



## What have NIEHS and NTP discovered?

Recent NIEHS-supported research shows links between endocrine-disrupting chemicals and the ways in which well-being may be harmed, for example:

- **Attention.** The drug diethylstilbestrol (DES) may be linked to an increased chance of attention deficit hyperactivity disorder (ADHD) in grandchildren of women who used it during pregnancy.<sup>4</sup>
- **Immunity.** Children exposed to high levels of PFAS had a diminished immune response to vaccines.<sup>5</sup>
- **Metabolism.** Long-term exposure to arsenic can disrupt metabolism, increasing the risk of diabetes and other metabolic disorders.<sup>6</sup>
- **Puberty.** Chemicals in lavender oil and tea tree oil were associated with premature breast development in girls,<sup>7</sup> and abnormal breast development in boys.<sup>8</sup>
- **Reproduction.** DES can alter the way genes are turned on and off in reproductive organs of mice, potentially affecting fertility and reproduction.<sup>9</sup>





# Pesticides as EDC

## Proximity to agricultural activity:

- epidemiological studies of low birth weight
- fetal death
- childhood cancers
- higher prevalence of cryptorchidism and hypospadias found in areas with extensive farming and pesticide use and in sons of women working as gardeners
- Relation has been reported between cryptorchidism and persistent pesticide concentration in maternal breast milk
- The impact of endocrine disruptor pesticides on fertility with ovulatory dysfunction and sperm function

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3138025/>

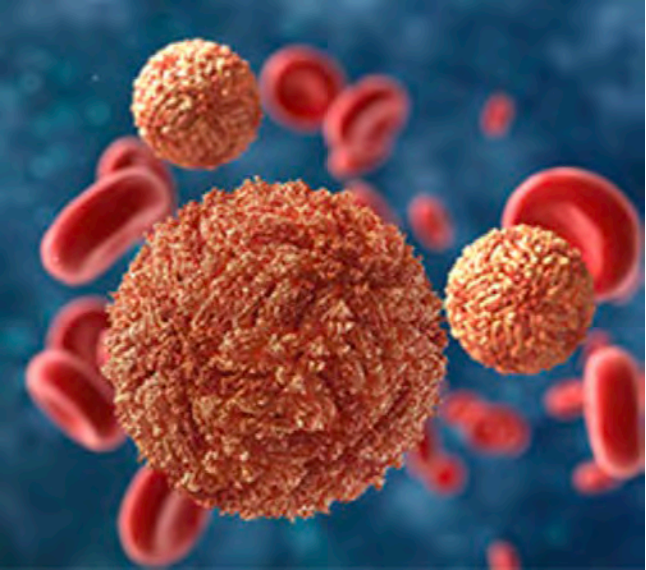
# IT'S COMPLICATED!

ZIKA



# Zika outbreak: What you need to know

© 31 August 2016



HEALTH NEWS





Andre Penner

## Zika Virus a 'Serious Threat' to Pregnancy

New Results

[Comment on this paper](#)

## **ZIKA virus effects on neuroprogenitors are exacerbated by the main pyriproxyfen metabolite via thyroid hormone signaling disruption**

Petra Spirhanzlova,  Anthony Sébillot, Pieter Vancamp,  Jean-David Gothié,  Sébastien Le Mével,  Michelle Leemans, Karn Wejaphikul, Marcel Meima, Bilal B. Mughal, Lucile Butruille, Pierre Roques, Sylvie Remaud, Jean-Baptiste Fini, Barbara A. Demeneix

**doi:** <https://doi.org/10.1101/2020.11.03.366468>

This article is a preprint and has not been certified by peer review [what does this mean?].

[Abstract](#)

**[Full Text](#)**

[Info/History](#)

[Metrics](#)

 [Preview PDF](#)



## ZIKA and Insecticide Pyriproxyfen

North-Eastern Brazil saw intensive application of the insecticide pyriproxyfen (PPF) during the microcephaly outbreak caused by the Zika virus. Initially the pesticide itself was implicated in the microcephaly seen, but research quickly led to the identification of the Zika Virus. Dr Barbara Demeniex lab in France has led research to determine whether in fact the pesticide affects the ZIKA induction of microcephaly. What have they found:

1. ZIKV requires the protein Musashi-1 to replicate.
2. Thyroid hormone represses Musashi1.
3. The insecticide Pyriproxyfen is a Thyroid hormone disruptor, in other words, it is an endocrine disruptor
4. Pyriproxyfen significantly induces Musahi-1
5. Pyriproxyfen dysregulates thyroid signals that are crucial for brain development-the actual neural cells proliferate LESS and have MORE Musashi-1, which ZIKA needs to replicate
6. Infecting stem cells pre-exposed to the endocrine disruptor did not amplify viral replication, but aggravated expression of genes implicated in brain development.
7. Our results suggest the insecticide is particularly deleterious to brain development in areas with ZIKA virus prevalence.

# WHAT CAN HEALTH CARE PROVIDERS DO?

**EDUCATE. ADVOCATE. RESEARCH**



# Ob-Gyns & Prevention



## Food Matters: What to Eat?

Your health depends on the food you eat.

The health of communities and the environment we depend on for life are also impacted by how food is grown and how it gets to your dinner plate.

This brochure provides tips for making food choices to protect your health and the health of your family and community.

The brochure also provides many more resources to learn more about how the food we eat impacts our health. For more information, visit: <http://www.prhe.ucsf.edu/prhe/foodmatters.html>

There are many ways to make a difference. Here are some suggestions to get started.

Ob-gyns don't need to be experts in environmental health to provide useful information to patients. However, they should:

1. Be **familiar** with their geographic area
2. Take an exposure **history** early
3. Provide **information** about how the food system affects health
4. **Communicate** the science and areas of uncertainties about environmental exposures



How can we  
help  
clinicians?



# PROVIDE GUIDANCE

DON'T HEAT IN	DON'T HEAT IN PLASTIC!
USE	USE CERAMIC and IRON COOKWARE, NOT TEFLON OR NON-STICK
CONSIDER	CONSIDER WATER PURIFIER FOR HOME
EVEN	ORGANIC FOOD: EVEN SELECTIVE, AND KNOW YOUR PRODUCE SOURCE, BUT KNOW LABELING!
KNOW	KNOW PERSONAL CARE PRODUCTS: AVOID PHTHALATES, PARABENS, OXYBENZONE, TRICLOSAN AND LOOK FOR A LINE OF PRODUCTS THAT AVOIDS TOXICS (JUICE BEAUTY)
USE	USE EWG AS A REFERENCE SITE! <a href="https://www.ewg.org/skindeep/">https://www.ewg.org/skindeep/</a>

# WHAT CAN CLINICIANS DO?

- **Educate yourself and your patients**
- **Learn about your particular environment and risks**
- **Get the online links: UCSF PRE, eBook**
- **Advocate for improved environmental conditions**
- **Volunteer to give Grand Rounds to the hospital and community**



# INTERNATIONAL FEDERATION OF GYNECOLOGY AND OBSTETRICS

# SUBCOMMITTEES



RESEARCH: IDENTIFY  
RESEARCH CENTERS BUT  
MORE IMPORTANTLY  
TRANSLATE THE SCIENCE FOR  
FIGO



ADVOCACY : TO ESTABLISH  
CLOSE TIES TO OTHER  
ADVOCACY GROUPS AND TO  
ASSIST MEMBER SOCIETIES



EDUCATION: DEVELOP  
EDUCATION PROGRAMS AND  
TRAINING OPPORTUNITIES





# THE INTERNATIONAL FEDERATION OF GYNECOLOGY AND OBSTETRICS



PREPARED TO **CREATE** GLOBAL TRAIN-THE-TRAINER PROGRAMS TO INCREASE AWARENESS OF ENVIRONMENTAL EFFECTS



ALREADY **AMPLIFYING** THE MESSAGES ABOUT MATERNAL MORTALITY AND WELL WOMAN HEALTH CARE



WHAT DOES RESEARCH TELL US?: BIOBANKS, ELECTRONIC RECORDS, MEASURE OF TOXIC LEVELS?



YOU ARE DOING THE RESEARCH... *WHAT WOULD YOU TELL A PATIENT SEEKING ADVICE TO IMPROVE HER HEALTH AND THAT OF HER CHILDREN?*

# PREGNANCY and CLIMATE CHANGE

## The PROBLEM

Climate change worsens air pollution and extreme weather which can have severe impacts on health during and after pregnancy including:



PRETERM BIRTH



LOW BIRTHWEIGHT



STILL BIRTH

EFFECTS ON BRAIN  
DEVELOPMENT



# INFOGRAPHICS



# The PROBLEMS with PFAS



## HOW DOES IT GET INTO OUR BODIES?



Cooking with nonstick pans



Products containing PFAS



PFAS-contaminated water



PFAS in air or dust



## HEALTH PROBLEMS LINKED TO PFAS

Kidney and testicular cancer

High blood pressure and pre-eclampsia

Higher cholesterol

Lower infant birth weights

Decreased vaccine response in children

## PFAS

is short for **per- and poly-fluoroalkyl substances** used in non-stick cookware, water

ENVIRONMENT AND HEALTH

# THE EXPOSOME AND WOMEN'S HEALTH

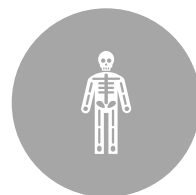
*Paradigm to encompass the totality of human environmental exposures from conception onwards, complementing the genome*



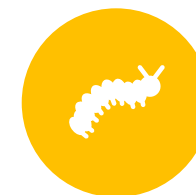
# Where does the Exposome fit in and where do measurements of toxic substances fit in?



**First:** *What data base should be used to determine which toxics to measure?*



**Second:** *IF a patient has measurements of toxics where does she go to interpret results and what do the results mean?*



**AND:** *Are we looking at the “Toxics-equivalent” of 23 and Me?*



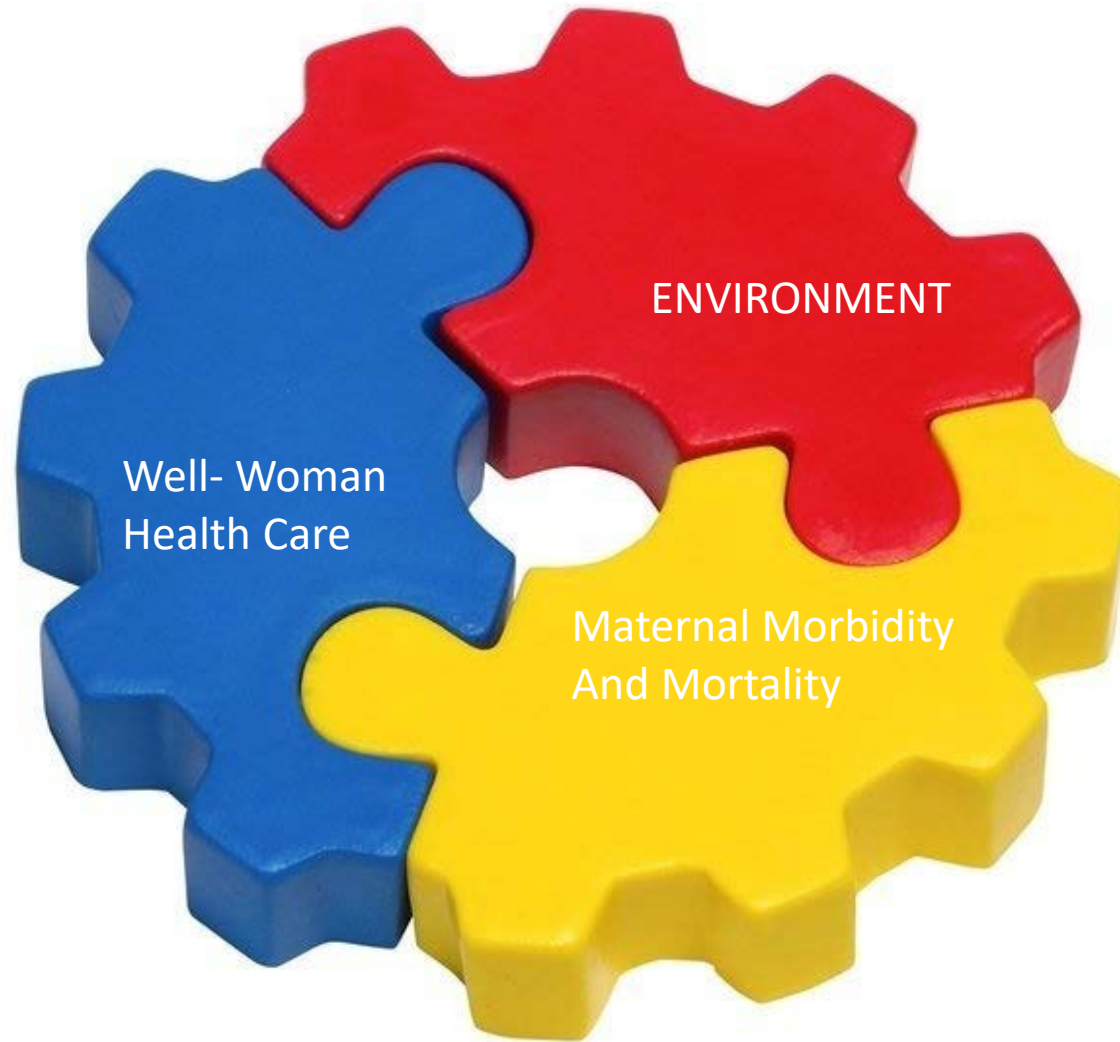
*Will behavioral changes decrease toxics...and will such testing drive a market to fewer exposures to toxic substances?*



*Will patients electively test and retest to determine their “Toxics Level”?*







**EVERY WOMAN...  
EVERY TIME...  
EVERY WHERE**



**THANK  
YOU**