PRE-CONGRESS WORKSHOP

Summit on Shaping Our Planetary Legacy: Setting an Agenda for Environmental Reproductive Health
Recommendation 1: Advocate for policies to prevent exposure to toxic environmental chemicals

Recommendation 2: Work to ensure a healthy food system for all

Recommendation 3: Make environmental health part of health care

Recommendation 4: Champion environmental justice
The Ostrich and the OBGYN: A Look at Reproductive Health and the Environment

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Past President
The American Congress of Obstetricians and Gynecologists
2015
I have no conflicts of interest to declare
Educational Goals

- Describe major reasons that OBGYNs do not discuss reproductive health and the environment with patients
- Describe the difference between tests on pharmaceuticals and potential toxicants before they are released in the environment
- Explain the concept of the Precautionary Principle and women's health
- What are elements of an occupational or exposure history
- Describe resources for practicing OBGYNs when faced with potential environmental exposures and patients health
Lead in Lipstick
What is “The Environment”?
“ENVIRONMENT” Includes:

- Industrial chemicals
- Agricultural chemicals
- Physical agents (heat, radiation)
- By-products of combustion and industrial processes (dioxin)
- Foods and nutrients
- Prescription drugs
- Lifestyle choices and substance abuse
- Social and economic factors
Why Do We Not Address Environmental Issues?

Medical Providers do not discuss Environmental Impacts on Health because

A. The research is lacking
B. We are not comfortable with the topic
C. There are no data to support the topic historically
D. We have more important topics to discuss
E. We follow the ostrich approach: we hide our heads unless we can give a full and complete answer, or solve the problem
F. We really are unaware that there is a problem
G. We do, we just have not realized it (blood sugar, hypertension)
How do we get the attention of all clinicians?
We need to **translate** the science
Should We Be Concerned?

- Testicular Cancer
  - Age adjusted incidence per 10,000 population
  - Year: 1973 '77 '81 '85 '89 '93 '97

- Breast Cancer
  - Age adjusted incidence per 10,000 population
  - Year: 1973 '77 '81 '85 '89 '93 '97

- Hypospadias
  - Rate per 10,000 births
  - Year: 1970 '73 '76 '79 '82 '85 '88 '91

- Sperm Count
  - Count (x10^9/ml)
  - Year: 1920 '40 '60 '80 '2000

Dr. Birnbaum: NIEHS, Sharpe and Irvine, 2004
Gene-Environment and Disease

- Why have some diseases increased in incidence over the past 40 years?
- Genes have not changed over that time
- Recent “epidemics” of diabetes, asthma, ADHD, obesity due to environmental, dietary and behavioral changes
- We will never understand the etiology of diseases without an understanding of the role of “environment”
Should We Be Concerned?

Increase in Diabetes (1980-2010)

Increase in Autism Prevalence

Increase in Asthma

Increase in ADHD

Dr. Birnbaum: NIEHS, Data from CDC / National Center for Health Statistics
We have forgotten the history

- Diethylstilbestrol in the 1950’s
- Methyl mercury in the 1960’s

...And Endocrine Disruptors of the twenty-first century
DIETHYLDIETHYLSTILBESTROL
INTERACTIVE DES SELF-ASSESSMENT GUIDE

The following assessment will help you determine your risk for DES exposure and the appropriate steps you should take to minimize your risk. This self-assessment is part of the Centers for Disease Control and Prevention’s DES Update — information for you, your family, and your health care provider.

Please read the following information and then complete the short quiz. This assessment is for your own personal use. Your answers are confidential, and no personal information is collected or stored on this site.

Who Should Use this Self-Assessment Guide?
- **Women** who were pregnant in the years 1938 through 1971
- **Women** who were born during 1938-1971
- **Men** who were born during 1938-1971

What is DES?
Diethylstilbestrol (DES) is a synthetic estrogen that was developed to supplement a woman’s natural estrogen production. First prescribed by physicians in 1938 for women who experienced miscarriages or premature deliveries, DES was originally considered effective and safe for both the pregnant woman and the developing baby.

In the United States, an estimated 5-10 million persons were exposed to DES during 1938-1971, including women who were prescribed DES while pregnant and the female and male children born of these pregnancies. In 1971, the Food and Drug Administration (FDA) issued a Drug Bulletin advising physicians to stop prescribing DES to pregnant women because it was linked to a rare vaginal cancer in female offspring.

More than 30 years of research have confirmed that health risks are associated with DES exposure. However, not all exposed persons will experience DES-related health problems. CDC’s DES Update has more information about the health risks associated with DES exposure.

Is There a Medical Test for DES Exposure?
No known medical test (such as blood, urine or skin analysis) has been developed that can detect DES exposure. However, the DES Self-Assessment Guide is designed to help you assess whether you might have been exposed to DES.

Note: DES is sometimes confused with the drug Thalidomide that caused birth defects. Thalidomide was never approved for prescription in the United States. DES was called by different labels. Some of the most common were stilbestrol and DESplex.
Yes...

desPLEX® to prevent ABORTION, MISCARRIAGE and PREMATURE LABOR

recommended for routine prophylaxis in ALL pregnancies...

96 per cent live delivery with desPLEX in one series of 1200 patients — bigger and stronger babies, too.¹

No gastric or other side effects with desPLEX — in either high or low dosage.² ³ ⁴ ⁵

(Each desPLEX tablet contains 25 mg of diethylstilbestrol, U.S.P., which is then ultramicrocrystallized to smooth and accelerate absorption and activity. A portion of this ultramicrocrystallized diethylstilbestrol is even included in the tablet coating to assure prompt help in emergencies. desPLEX tablets also contain vitamin C and certain members of the vitamin B complex to aid detoxification in pregnancy and the extraction of estrogen.)

For further data and a generous trial supply of desPLEX, write to:

Medical Director

RECOMMENDATIONS

GRANT CHEMICAL COMPANY, INC., Brooklyn 26, N.Y.
Diethylstilbestrol and Transgenerational Results

529 Families in France

1180 Pregnancies

1000 DES exposure

105 sons

8 of 97 (8%) with hypospadias

180 NO DES exposure

360 sons

0 of 156 with hypospadias

Fertil Steril, published early online 4 April 2011
METHYL MERCURY
Mercury

Excessive amounts in high risk populations can lead to numbness sensation and ultimately nervous system damage.

Mercury is released into air.

Bacteria in water changes mercury to methylmercury, the toxic form of mercury.

Methylmercury is passed into our bodies when we eat fish.

Fish absorbs methylmercury as they feed on aquatic organisms and small fish. This can build up over time.
Developmental Outcomes

- Neurologic changes
- Ataxia
- Seizures
- Hearing and vision loss
- Cerebral palsy
- Language deficit
- Loss of fine motor function

Exposure to mercury decreased the ability to reproduce, reduced fertilization, and altered sex ratios in the **OFFSPRING** of fish exposed to Mercury.

WE NEED TO SHARE THE INFORMATION ABOUT RISKS
Chemicals in the US environment

- In the United States alone, 84,000 chemicals are listed by the Environmental Protection Agency
- 700 new chemicals released annually
- 3000 chemicals are “high volume” or exceed 1 million pounds of use a year
- The vast majority have not had research or been subjected to standard studies

U.S. Environmental Protection Agency. TSCA Chemical Substance Inventory. 2012 Available from: http://www.epa.gov/oppt/existingchemicals/pubs/tscainventory/basic.html.

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 1 million pounds of use a year
- By 2020, LOW INCOME countries will lead the world in high volume production

The “Alphabet Soup” of Synthetic Chemicals

- Polychlorinated Biphenyls (PCB)
- Polybrominated Biphenyls (PBB)
- Dioxin
- BPA
- PFOA
- Phthalate
- Pesticides (DDT)
- Pharmaceutical (DES)
- Soy (baby formula)
Too Big To Punish?
Quick Read | Comments

West Virginia Chemical Spill Likely Caused By Holes In Tank
Quick Read | Comments

Feds: No More Animal Tests On Spilled Chemical
Quick Read | Comments
Endocrine disruptors are chemicals that may interfere with the body’s endocrine system and produce adverse developmental, reproductive, neurological, and immune effects in both humans and wildlife.
Endocrine Disruptors

- Metals
- Industrial Chemicals
- Synthetic & Naturally Occurring Hormones
- Pharmaceutical Drugs
- Personal Care Products
- Pesticides, Herbicides, Fungicides

SUSPECTED ENDOCRINE DISRUPTING CHEMICALS
Endocrine Disruptors

- Male and Female Reproduction
- Breast development and cancer
- Prostate Cancer
- Neuroendocrinology
- Thyroid
- Metabolism and obesity

Diameti-Kandarikis et al. Endocrine Disrupting Chemicals: an endocrine society scientific statement
Abnormal DNA methylation in the \textit{Hoxa10} gene after \textit{in utero} BPA exposure leads to altered developmental programming of \textit{Hoxa10} expression after birth

DES works on the Hoxa 10 gene also, but the opposite direction

PERFLUOROOCTANOIC ACID = PFOA: Teflon, carpets, stain resistant, even dust and cooking utensils

It persists INDEFINITELY in the environment, and takes 3 years to clear from our bodies. NOW not on the market (but its cousins are) Gore-tex eliminated it in 2013 - KNOWN toxin and carcinogen

Found in blood samples from about 98% of the population

Workers: kidney cancer, testicular cancer, ulcerative colitis, thyroid disease and pregnancy induced hypertension
Environmental Exposures

- Every pregnant woman in the U.S. has at least 43 toxic exogenous chemicals in her body
- Virtually all pregnant women have measured levels of lead, mercury, toluene, perchlorate, bisphenol A (BPA)
- Studies have documented that each of these chemicals can be harmful to human reproduction and/or development

Pharmaceuticals must show efficacy and safety *prior to* exposing humans

Manufactured chemicals need to show evidence of harm *prior to removing human exposure*

How Do We Interpret the Research

- The Navigation Guide
  - 22 clinicians and scientists
  - National and International
  - UCSF
  - Developed a methodology to evaluate the science and to grade the recommendations so that we can better understand the research
Navigation Guide Work Group
Systematic Review of PFOA and Low Birth Weight

Human and animal evidence

**Conclusion**

Human exposure to PFOA is known to be toxic to human reproduction and development based on sufficient evidence of decreased fetal growth in both human and non-human mammalian species.
The Navigation Guide Systematic Review Methodology: A Rigorous and Transparent Method for Translating Environmental Health Science into Better Health Outcomes

Tracey J. Woodruff and Patrice Sutton

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ROLE OF THE CLINICIAN
All exposures are not created equal

Women of reproductive age with occupational exposure to toxic chemicals are highly vulnerable to adverse reproductive health outcomes.
REPRODUCTIVE HEALTH PROFESSIONALS

"Yes" respondents (%)

Environmental Exposures

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

- Be familiar with their geographic area
- Take an exposure history early
- Provide information about how the food system affects health
- Communicate the science and areas of uncertainties about environmental exposures
Individual Action Alone is Not Enough

MEET MOLLY GRAY.

- Nine pregnant women tested from Washington, Oregon, and California, during the second trimester had detectable:
  - Bisphenol A
  - Mercury
  - At least four phthalates
  - At least two and up to 4 perfluorinated chemicals
HOW CAN WE HELP CLINICIANS?
Our Vision

- Wouldn’t it be great to open the “environmental equivalent” of Drugs in Pregnancy and Lactation?
- Wouldn’t it be great to have an easy on-line resource, click on bisphenol a and see what to recommend?
- Wouldn’t it be great for clinicians to even KNOW to ask about exposures?
What do physicians want?

To be able to give sound advice to patients regarding the impact of environmental toxicants on reproductive health
What do we need?

- Clinicians must understand that we will NEVER see double-blinded case controlled studies.
- If that is what we hold out for as a “Gold Standard” when evaluating ENVIRONMENTAL exposure, we will always be dealing with pennies *not gold*.
Precautionary Principle

If a chemical exposure has a suspected risk of causing harm, in the absence of scientific consensus that the chemical is harmful, the burden of proof that it is not harmful falls on those who expose the public.
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.

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
Chemical Exposures During Pregnancy: Dealing with Potential, but Unproven, Risks to Child Health
SPECIAL COMMUNICATION

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

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ABSTRACT

Exposure to toxic environmental chemicals during pregnancy and breastfeeding is ubiquitous and is a threat to healthy human reproduction. There are tens of thousands of chemicals in global commerce, and even small exposures to toxic chemicals during pregnancy can trigger adverse health consequences. Exposure to toxic environmental chemicals and related health outcomes are inequitably distributed within and between countries; universally, the consequences of exposure are disproportionately borne by people with low incomes. Discrimination, other social factors, economic factors, and occupation impact risk of exposure and harm. Documented links between prenatal exposure to environmental chemicals and adverse health outcomes span the life course and include impacts on fertility and pregnancy, neurodevelopment, and cancer. The global health and economic burden related to toxic environmental chemicals is in excess of millions of deaths and billions of dollars every year. On the basis of accumulating robust evidence of exposures and adverse health impacts related to toxic environmental chemicals, the International Federation of Gynecology and Obstetrics (FIGO) joins other leading reproductive 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 environmental chemicals, work to ensure a healthy food system for all, make environmental health part of health care, and champion environmental justice.

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In the case of pharmaceuticals, the onus is on the pharmaceutical company to do the research with toxicity testing, randomized control trials and post-exposure observational studies,"

"With environmental chemicals, the manufacturer puts out a product, and the onus is on the regulatory bodies, environmental groups and lay public to find problems and study the effects.”
How Can We Lead?

- Support legislation on environmental health
- Create educational opportunities at all levels
- Share information with our patients
- Address the needs of the Underserved throughout the world
- Collaborate with colleagues in backing a “green agenda” in our homes, workplace and communities
- Apply evaluation of research so that Medical organizations can advocate on behalf of women to reduce exposure to potential toxicants
What Can Clinicians Do?

- Take an occupational intake on all patients: how can we integrate environmental information into the electronic record
- Anticipatory Guidance for all patients
- Provide resources for patients: no need to “reinvent the wheel”
  - [http://prhe.ucsf.edu/prhe/workmatters.html](http://prhe.ucsf.edu/prhe/workmatters.html)
  - [http://prhe.ucsf.edu/prhe/pdfs/pesticidesmatter_readable.pdf](http://prhe.ucsf.edu/prhe/pdfs/pesticidesmatter-readable.pdf)
  - [http://prhe.ucsf.edu/prhe/pdfs/foodmatters_readable.pdf](http://prhe.ucsf.edu/prhe/pdfs/foodmatters-readable.pdf)
  - [http://www.doh.wa.gov/CommunityandEnvironment/Food/Fish/HealthyFishGuide.aspx](http://www.doh.wa.gov/CommunityandEnvironment/Food/Fish/HealthyFishGuide.aspx)
  - [http://www.arhp.org/publications-and-resources/clinical-proceedings/RHE/Publication-Information-and-Post-Test](http://www.arhp.org/publications-and-resources/clinical-proceedings/RHE/Publication-Information-and-Post-Test)
- Make information easily accessible
Can We Change the Responses?

Medical Providers do not discuss **Environmental Impacts** on Health because !!

A. The research is lacking: *PRHE and the Navigation Guide*

B. We are not comfortable with the topic: *Educate*

C. Where are no data to support the topic historically: *DES, Mercury*

D. We have more important topics to discuss: *Well woman health*

E. We follow the ostrich approach: we hide our heads unless we can give a full and complete answer, or solve the problem: *Human Nature*

F. We really are unaware that there is a problem: *No longer!!*
We share a common goal: we want healthy mothers, healthy infants, and a healthy future.

If there was no doubt about research, if there was no cost impact for implementing change, if there was a uniformity of agreement in all the discussions, we would have no work.

So finding points of agreement has got to be where we start, educating our clinicians, the public and the governing bodies then is the ideal next step so that finally we see that we have implemented change.
GUIDING PRINCIPLES

- Women represent a vulnerable population with the potential to conceive: preconception and prenatal time periods are particularly important.
- Underserved women bear a higher risk of exposure and need protection: race, place and environment.
- The human reproductive system is particularly sensitive to exposure because of critical windows of "development". A corollary is that exposure can be both cumulative OR reflective of multiple sources of contamination. Any risk assessment must consider exposures from multiple sources.
Support the "Precautionary Principle" that in the absence of evidence that a chemical is safe, precaution should prevail even if there is no evidence of cause and effect. A chemical should never be released if a concern exists about its safety.

Health care providers should face no risk for evaluating patients, providing care, and providing advice.

The onus of SHOWING HARM MUST SHIFT from the public to the chemical industry.

We must have preemption addressed directly: Just as in medical liability reform we have NOT wanted to undermine the advances states have made legislatively, it is incumbent upon us to maintain the advances in environmental stewardship and health that leaders have set in the individual states AND countries.
FIGO Opinion: Reproductive Health Impacts of Exposure to Toxic Environmental Chemicals

ENDORSED BY THE FOLLOWING HEALTH PROFESSIONAL SOCIETIES

NACM National Aboriginal Council of Midwives
Royal College of Obstetricians & Gynaecologists
American College of Nurse-Midwives
Canadian Association of Menstrual Association (CAM-ACSF)
Endocrine Society
AWHONN Promoting the Health of Women and Newborns
European Society of Human Reproduction and Embryology

SUPPORTED BY THE FOLLOWING HEALTH PROFESSIONAL SOCIETIES

ACOG The American Congress of Obstetricians and Gynecologists
Society for Maternal-Fetal Medicine Publications Committee
FOR …
EVERY WOMAN
EVERY TIME