

National Environmental Public Health Tracking Conference

Biomonitoring Panel “Overview”

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Overview

Environmental Health Tracking
and Biomonitoring.....

***Is the a marriage made in
heaven?***

Or is it a shotgun wedding?

Overview

Epidemiologists
and Laboratory Scientists.....

***Is the a marriage made in
heaven?***

Or is it a shotgun wedding?

Epidemiology and Laboratory

In the last analysis....

**“It takes a laboratory to tell
the truth”**

Pasteur

(If he didn't say it he should have)

Biomonitoring

Biomonitoring is the assessment of human exposure to chemicals by measuring the chemicals or their metabolites in human specimens such as blood or urine.

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Basically a CDC invention in the late 90's.

Environmental Chemical

“For this report, an environmental chemical means a chemical compound or chemical element present in air, water, food, soil, dust, or other environmental media (e.g., consumer products).”

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NHANES 1999-2000 (a.k.a. "second report")

NHANES

“National Health and Nutrition Examination Survey”

National Report on Human Exposure to Environmental Chemicals

NHANES

National Report on Human Exposure to Environmental Chemicals

Provides an ongoing assessment of the U.S. population's exposures to environmental chemicals using biomonitoring.

NHANES Second Report

Released January 2003

Presents biomonitoring exposure data for 116 environmental chemicals ...for the US population over the 2 year period 1999 & 2000.

from the Capitol Times 3/11/04

"I'm outraged. I never gave permission to use my body as a toxic waste site."

Sharyle Patton, 59, environmental activist from rural California, who discovered that her body harbors 105 industrial chemicals when she participated in a study in the Wall Street Journal.

What happened to the other 9?

<i>NHANES 2</i>	<i>116</i>
<i>Sharyle</i>	<i>105</i>
<i>Missing (?)</i>	<i>11</i>

What happened to the other 9?

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For the record, the "11" is meant to be facetious, not a scientific, observation.

NHANES first report (27)

Pb, Hg, Cd and other metals

dialkyl phosphate metabolites or
organo-phosphate pesticides

cotinine, phthalates.

NHANES Second Report (116)

Polycyclic aromatic hydrocarbons (PAHs)

Dioxins, furans and coplaner polychlorinated biphenyls (PCBs)

Non-coplaner PCBs

Phytoestrogens

Selected Organophosphate pesticides

Organochlorine pesticides

Carbamate pesticides

Herbicides

Pest repellents and disinfectants

NHANES Second Report (116)

Milligram, microgram, picogram,
fentogram. (.000 000 000 001)

Parts per million, parts per billion,
parts per trillion, parts per quadrillion
(fg/L)

NHANES Second Report (116)

milligram, microgram, picogram,
femtogram. (.000 000 000 001)

parts per million, parts per billion,
parts per trillion, parts per quadrillion
ppm = 1 mg/liter

one part per million --

***one mouthful in a lifetime of
eating***

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one mouthful in a lifetime of eating

Describe a fg/L!

How do they do that?

The “Devil is in the Details”



"The Devil is in the Details"



How do they do that?

Exceptionally competent chemists at the NCEH at CDC!

Advances in instrumentation

Micro-methodologies

Computerization of technologies

Sophisticated Data Processing

How did they do that?

- Exceptionally competent chemists at the NCEH at CDC!

Adapt the instrumentation

Develop the methodologies

Run the determinations

Collect, collate, report data

How did they do that?

□ Advances in Instrumentation

“Chromatographic Methods”

Mass Spectrometry

Computer controlled instruments

“Hands off” Automation

How did they do that?

□ Micro-methodologies

Chromatography, ICP, PCR, etc
Mass Spectrometry,

Computer acquisition of raw data
Automated Pre Processing

How did they do that?

□ Computerization of Technologies

Hundreds of Measurements/dp

Sophisticated Interpretation

Automated Processing

Complex Calculations

How did they do that?

- Sophisticated data processing

 - Hundreds of Measurements

 - Electronic Acquisition, Storage

 - Detailed records, comparisons

 - Long term reassessment

Big Deal!

Bottom line -- it still does not mean much!



"The Devil is in the Details"



We can measure hundreds of chemicals

We can do it at very low concentrations

We can detect and monitor chemicals in the environment

We can detect chemicals or their sequelae in humans

"The Devil is in the Details"



We can measure hundreds of chemicals

We can do it at very low concentrations

We can detect and monitor chemicals in the environment

We can detect chemicals or their sequelae in humans

Therefore we need laboratoires

“The Devil is in the Details”



**But, it does not mean “diddly”
unless you can relate it to
health effects in humans.**

“The Devil is in the Details”



**It does not mean “diddly”
unless you can relate it to
health effects in humans.**

Therefore we need epidemiologists
to design experiments.

"The Devil is in the Details"



It does not mean "diddly" unless you can relate it to health effects in humans.

We need laboratories to measure

We need epidemiologists to design experiments.

We ***really need*** environmental tracking to tie it all together.

Environmental Tracking

- *That's what its all about*
- *That's why we are here in Philadelphia today*
- *Are we, in 2004, having the pieces come together?*

Environmental Tracking Needs

- *Chemists to measure*
- *Toxicologists to understand*
- *Epidemiologists to design*
- *Epidemiologists to assess*
- *Public Health to create policy*
- *Environmental Tracking --- the tie that binds it together*

Environmental Public Health Tracking

EPHT is the ongoing collection, integration, analysis, interpretation, and dissemination of data on environmental hazards; exposures to those hazards; and related health effects.

Rethinking the idea

In the last analysis....

**“It takes Environmental
Tracking to tell the truth”**

Pasteur

*(We know he didn't say that --- but today
probably would agree)*

Chinese Curse:

- ***"May you live in interesting times"***
- ***Speaking for Laboratories -- these are interesting times***
- ***Synergistic Opportunities***

What's Missing from this Presentation?



What's Missing from this Presentation?

What about Chemical Terrorism (Focus D)



Chemical Terrorism

- *Same laboratory skills*
- *Same Equipment (Dual Use?)*
- *Ties strongly to routine environmental testing*
- *Emergency vs Routine*
- *(SPHL's can decide)*

State Public Health Labs 2004

- ❑ Complex Mission
- ❑ Collaborate with CDC
- ❑ Exquisite Capabilities, Support
- ❑ A true, and vital partner
- ❑ “Bring it on”