Utilizing LRN-C Resources for Biomonitoring in the 4-Corner States

SPokesman for 4C SBC:

Jason Mihalic
Chemistry Office Chief
Arizona Dept. of Health Services
Biomonitoring is the Study of Contaminants in the Environment and in Clinical Samples of People who live Amongst said Contaminants
In Practice Biomonitoring is a Relationship between Laboratory and Epidemiology
The Relationship of Biomonitoring to the LRN-C

- Point of View from a Current CDC Biomonitoring Grantee
- History
- Support from LRN-C
- Discuss Where We are Today
  - 4CSBC
  - Other State Grantees
- A Look to the Future
History: The Year is 2005…..

- On the Public Health Front
  - Hurricane Katrina
- On the Terrorism Front
  - London 7/7 Subway Bombings
- In Arizona
  - I was hired as the Assistant CT Coordinator
- At the CDC
  - Chuck Buxton gave a Talk on Utilizing LRN-C Resources on Biomonitoring
"The purpose of the (grants) is to expand state laboratory based biomonitoring programs to assess human exposure to environmental toxicants……and to determine estimates of background exposure to naturally occurring and industrial chemicals that have the potential to cause harm"
Excerpts from Chuck Buxton’s 5/24/05 Presentation

On CT Resources to Aid Biomonitoring:

- Program Instrumentation
  - ICP-MS DRC II
  - GC-MSD
  - HPLC-MS/MS

- Examples from State Grantees
  - New York and Serum Cotinine
  - New Hampshire and Total Mercury in Freshwater Fish
  - RMBC Metals in Well Water Study
Rocky Mountain Biomonitoring Consortium

- The RMBC was led by New Mexico and included Colorado, Utah, Arizona, Wyoming, and Montana
- Start-up Biomonitoring for Arizona
- Main focus was Metals in Well Water (Arsenic MCL change from 50ug/L to 10ug/L)
Every State (except WY) had Lab Capacity and each Utilized LRN-C

- Staff
- PerkinElmer Elan DRC II ICP-MS
- Urine Metals Method
Biomonitoring is Public Health Laboratory Practice
“CDC realizes that LRN-C infrastructure provides critical capacity for addressing diverse public health needs. The LRN-C program would like to reiterate that the use of chemical threat resources such as calibrators, QC materials, instrumentation, and staff is permitted in support of all public health laboratory testing services”
2014-2019 CDC Biomonitoring Grantees
Laboratory Response Network – Chemical

Level 1 States:
- California Republic
- New Mexico
- Virginia

Level 2 States:
- Arizona
- Colorado
- New Hampshire
- Vermont
- New Jersey
- New York
Where We Are Today......
4 Corner States Biomonitoring Consortium
4C SBC: Utah

Grant PI for 4C SBC
- Uses CT Staff
- Uses CT Instruments
  - PerkinElmer Elan DRC II ICP-MS
  - Agilent 6460 Triple Quadrupole MS with Agilent 1200 LC
- Analytical Methods
  - Modified Urine Metals Method

“Every instrument we are using is on loan from the CT collection”
Jackie Patel, 4C SBC and CT Chemist
Uses CT staff

Uses CT Instruments
- Agilent 7500 ICP-MS with 1200 LC
- ABSciex API 4000 MS/MS with Agilent 1200 LC

Analytical Methods
- Modified Urine Metals
- Revco -70C Deep Freezer

“We use CT staff for everything. We’re all the same people”
Mike Smith, 4CSBC and CT Chemist
4C SBC: New Mexico

- Uses CT Staff
  - Training
  - Data Review
- Instruments
  - ABSciex API 4000 w/1260 Agilent LC
  - PerkinElmer Nexion ICP-MS
  - PerkinElmer Elan DRC II
- Freezer Space
- Pooled Urine
- Analytical Methods
  - Modified Urine Metals

“Technical knowledge of CT staff really helps biomonitoring”
Huijuan (Jane) Zhang, CTAR Staff Manager
4C SBC: Arizona

- Uses CT Staff
- Uses Instrumentation
  - ABSciex API 4000 MS/MS with 1200 Agilent LC
  - PerkinElmer Nexion ICP-MS
  - PerkinElmer Elan DRC II LC - ICP-MS
- Accessioning Space
- Analytical Methods
  - Modified Urine Metals

“Why wouldn’t we be involved. We PT on (urine metals) three times a year”
Miranda Schaab, CT Chemist
State Grantee: California

The Exception to the Rule
- No Staffing Support
- No Instrument Support
- No Shared Analytical Methods

“Due to the size of the CDPH the labs (CT, Biomonitoring) are in different centers...makes it very difficult for working together”

James Chithalen, CT Lab Coordinator
State Grantee: Massachusetts

- Uses CT staff
- Uses CT Instruments
  - PerkinElmer ELAN DRC II ICP-MS
  - Agilent GC/MS/MS
- Method Development
- Analytical Methods
  - Modified LRN-C Urine Metals Method
- Deep Freezers
- Sample Collection/Packaging/Transport

“I plan to go to the first sample collection event to help out; much in the same way would if there were a real CT event and help was needed”

Jennifer Jenner, MA CT Coordinator
State Grantee: New Hampshire

- Uses CT Staff Indirectly
  - Assisting with the PFAS Response (Perfluoroalkyl Substances)
  - Cross Training on Instrumentation
- LRN-C Instruments Back-up
  - Biomonitoring Instruments
    - AB Sciex 5500Q-Trap LC/MS/MS with Shimadzu HPLC
- Analytical Methods
  - Blood and Urine Metals
- Shares Storage / Freezers / Supplies

"Since there is so much synergy between (CT & Biomonitoring) there is a natural sharing of resources, talent, and expertise"

Julie Nassif, Biomonitoring Lab Supervisor
State Grantee: New Jersey

- **Uses CT Staff**
  - One Split Funded Organic Chemist
  - In-Kind Metals Support and Method Development

- **Uses CT Instruments**
  - PerkinElmer Elan DRC II ICP-MS

- **Analytical Methods**
  - Blood and Urine Metals

- **LRN-C Blood/Urine QC Materials**

“A lot of our staff efforts have been in-kind and wide-spread ranging from sample receiving, setting up new method, and outreach”

Eric Bind, Trace Metals Lab Supervisor
State Grantee: Virginia

- Used CT Assets in Initial Start-up Phase
  - Staff, Instruments, Method Development
  - Trained Biomonitoring Staff
- Continues to Use Instruments
  - PerkinElmer ELAN DRC II ICP-MS
  - Agilent 6890/5975 GC/MS
- Analytical Methods
  - Toxic Elements in Urine
  - Blood Cyanide
- CT Staff Participates in Field Work

“The CT and Biomonitoring program are part of the same organizational group and report to the same manager”
Shane Wyatt, CT Coordinator
LRN-C Instruments / Staff / Support Equipment
Future of LRN-C / Biomonitoring Partnership

- Sustainable Laboratory Model
- Clinical Aspect of LRN-C is a Natural Fit for Biomonitoring
  - Trained Staff
  - Analytical Instruments
  - Support Equipment
  - Specimen Type
- Symbiotic Relationship Between CDC Grantees
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