Fighting a Lead Crisis with Collaborations
Lessons and Challenges of Implementing a Prenatal Screening and Intervention Program

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Metals Laboratory

Biomonitoring
Chemical Terrorism
Drinking water
Environmental

Medicinal Marijuana
Food
Radiation
Consumer Products
**Lead**

- Toxic metal commonly found in older buildings, old toys, pre-1980’s paint, small plane exhaust, foreign goods, etc.

- **Exposure:**
  - Breathing in or swallowing dirt, soil, or dust
  - Drinking contaminated water
  - Eating food or nonfood items with lead
  - Cultural: lead-containing pottery

- **Effects on body:**
  - Abdominal pain
  - Fatigue
  - Mood disorders
  - Difficulty sleeping
  - Increased BP
  - Constipation
  - Joint pain
  - Memory loss

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**Mercury**

- Toxic metal commonly found in fish, coal plant emissions, bodies of water, cosmetics, CFL light bulbs, thermometers, etc.

- **Exposure**
  - Eating contaminated fish/food/non-foods
  - Exposing skin to mercury
  - Breathing mercury vapors
  - Cultural: skin-lightening cream, religious

- **Effects on body**
  - Anxiety
  - Hair loss
  - Mood disorders
  - Depression
  - Muscle weakness
  - Impaired motor skills
  - Nausea and vomiting
  - Memory loss

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Medical News Today / www.cdc.gov/nceh/lead/
Medical News Today / www.cdc.gov/biomonitoring/Mercury_FactSheet.html
Prenatal Exposure

- Pb and Hg readily cross placental barrier resulting in negative birth, early childhood, and lifelong outcomes.

- Fetal mercury levels are 50-70% higher than maternal

- Current screening is very limited

- Prenatal intervention is rare

- Select effects:

  **Lead**
  - Decreased brain, kidney, nervous system function
  - Learning disabilities, lower IQ
  - Antisocial/aggressive behavior
  - Reduced attention span
  - Decreased muscle and bone growth
  - Preterm birth, loss of fetus

  **Mercury**
  - Decreased brain, bone, nervous system growth
  - Learning disabilities, lower IQ
  - Behavioral and neurological disorders
  - Decreased coordination and attention span
  - Kidney failure, blindness, deafness
  - Preterm birth, loss of fetus
Health Disparities

Maternal and Infant Health

Causes*
- Transportation
- Childcare
- Housing instability
- Linguistic issues
- Awareness of services
- Mental distress
- Racial Stigma

Consequences
- Delayed health care – 1st prenatal visit
- Negative health outcomes
- Country’s worst disparity in black maternal and infant mortality rates
- Overall 47th among states for maternal mortality; however 60% are women of color

*https://www.njspotlight.com/stories/18/05/23/newark-health-centers-working-to-reduce-health-disparities/
Newark vs. New Jersey

Population*: 

• **New Jersey**
  - 9,000,000 residents
  - 15% Black, 20% Hispanic, 55% White (NH), 10% Asian
  - Median age is 39
  - 89.7% are citizens
  - 22.1% Foreign born population
  - 10% lives in poverty; $76,475 median income

• **Newark**
  - ~300,000 residents
  - 50% Black, 36% Hispanic, 11% White (NH), 2% Asian, and 1% “other”
  - Median age is 32.3
  - 84.5% are citizens
  - 29.4% Foreign born population
  - 28.3% lives in poverty; $34,826 median income

*US Census Bureau
Prevalence of childhood lead exposure in NJ cities is higher than in Flint, MI.

Women of childbearing age of Asian descent have up to 4x higher blood mercury levels.

Data from NJ Biomonitoring Program Study 2015-2018.
Maria Doe

Independent small pilot project

- Test expecting mothers for lead
- 33-weeks pregnant
- 96 µg/dL lead
- Monmouth County - case management and inspection
- Chelated delivered at 38 weeks @ 38 µg/dL
- Baby chelated too

Background

- Immigrated from Mexico
- Drank coffee from Mexico
  ...from incorrectly glazed mug
- Cultural pica
- Dr. Wang from Johns Hopkins Center on Early Life Origins of Disease and Maryland Department of Health and Mental Hygiene
  - Boston Birth Cohort is a long-standing, NIH funded, predominantly urban, low-income minority population
  - ~8600 mother/infant pairs enrolled at birth at birth; ~3600 followed up to age 21

- Analyzed mother-baby pairs for toxic metals in blood

- Demonstrated metals transfer and lead to negative outcomes

- Not possible to provide prenatal care - collection at birth

- Not possible to provide assistance – analyzed years later

- Collaboration continues
Project Design

Target populations:
Low-income, urban expectant mothers (higher Cd and Pb risk)
Expectant mothers of Asian descent (higher Hg, PCB, and PFAS risk)

Recruitment and consent:
Through local urban clinics
Through local OBGYN offices

Interventions:
Through local DOH
Through medical provider

Birth outcomes:
Collected from medical providers
First Steps

Research, research, research:
- Previous models / subject matter experts
- Potential partners
- Background on exposure / interventions
- Identify suitable target cities/subpopulations

Construct a draft work plan and materials to share with partners:
- Background on exposures
- Procedures and protocols
- Consent forms and questionnaires

Contact local departments of health
- Phone calls with Directors and Pb programs
- In-person meetings (individual/regional)

Contact local OBGYNs and clinics
- Phone calls with Medical and OBGYN Directors
- In-person meetings
Great support for the concept... but,

DOH Concerns:
- New Pb regulations
- Cd, Hg, PCB, PFAS exclusions
- Jurisdiction of pregnant women vs. kids
- Remediations/abatements not part of duties
- Adding to current work loads

OBGYN/Clinic Concerns:
- Compensating doctors for time
- Who will pay for medical treatment
- Time/effort needed
- Not seeing as concern
- Adding to current work loads

Happy with status quo
No precedent
Newark

Great support for the concept

Newark Department of Health & Community Wellness
- Has prenatal clinic
- Conducts inspections and case management
- Has HUD grant for abatement and Pb-safe housing
- Will provide services to pregnant women

Newark Community Health Center
- Prenatal clinic at all 7 branches (3 in Newark)
- Has prenatal support group with routine meetings
- Willing to implement testing
- Will consider recruitment and consenting
General concern about analytes shared by all

Newark Community Health Center
- Has turnover (3 separate Medical Directors/CEO)
- Cannot provide personnel for recruitment/consenting
- Will allow NJDOH/Rutgers to recruit and consent
- Relies on LabCorp for phlebotomy services

Newark Department of Health & Community Wellness
- Has turnover (New Director/WIC Coordinator)
- Closes prenatal clinic
- Willing to do all recruitment through WIC
- Cannot do anything interpretable as research
- Backtracks under new management
University Hospital

Embraces project concept
- Has prenatal clinic
- Delivers most of babies in-house
- Willing to do recruitment as part of intake process
- Has phlebotomy services in-house

Submit IRB for UH and NCHC sites
- Agreements with UH, NCHC, NDOH, & LabCorp pending IRB
- Generate educational materials
- Finalize protocols and procedures
- Look into accessing electronic medical records
- Set up encrypted communications
- Set up courier service
IRB and Legal Issues

Delays

Partners internal bureaucracy generating letters
UH has a separate “research” group dedicated to IRB
Delays in partner submissions
Delays in multiple IRB processes compound
Limited extensions available

Legal

UH Legal determined intake staff cannot perform recruitment and consent – only the separate “research” group who is short-staffed.
Current Status

University Hospital
Standard of care screening for all expectant mothers during first prenatal visit
Standard of care calcium, folate, iron, and vitamin D for all expectant mothers
Standard of care cord blood screening for all deliveries
Screening ~5000 women and babies per year
***Start Date – June 10, 2019***

Newark Community Health Center
All plans in place to go standard of care in all branches pending funding
Screening ~1000 women per year

New Jersey Biomonitoring Program
Linked Prenatal Screening Program to State initiative: FHS, FLO, Pb program
Pursuing federal, private, and state funding to expand model
Expanding academic collaborations

Capital Health
In talks to go standard of care adopting Newark model pending funding

Trenton Health and Human Services
Committed to support Capital Health patients

East Orange, Irvington, and other local HDs
Actively seeking additional funds to provide abatements
Lessons Learned

Personal Level

- Understand the rules, regulations, and general lay of land
- Do your research and find a precedent if possible
- Be flexible and adaptable
- Persistence pays off

Organizational Level

- Recruit people who understand and care about the “why” to help you
- Find a champion at each organization who can push things through
- Find ways to leverage resources/normal work duties
- Develop ability to link systems where possible
- Streamline approval processes – involve decision makers from beginning
- Look for additional sources of external funding
- Make sure all details are finalized prior to launch – run a pilot
- Contact poison center
- Recognize work doesn’t occur in a vacuum – prepare for competing priorities
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