Public Health Identification & Interventions for At-Risk Populations from Fish Contamination in NJ and NY

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Genesis of the issue

NYCDOHMH conducted the first local health and nutrition examination survey (NYC HANES)

– Multiple biomarkers including BHg
– New Yorkers have over 3 times the national average of blood mercury concentrations.6
– 25% of the those tested had blood mercury conc. ≥ 5µ/L (the NY State reportable level)6
– Foreign born Chinese had blood mercury concentrations > 8 times general population6

Populations of Interest Profiled in Other Studies

- NE >19% of ♀ Blood Mercury (BHg) over 3.5mg/L
- 16.4% of US females aged 15-45 years eat fish at least once a day
- Higher income, college-educated ♀ living in NE at highest risk
- ♀ in and near coastal areas 3 to 4 times ↑ risk
- Asian diet - eat fish more frequently, in greater variety and quantity than non-Asians
  - NY 10.4% population are Asians
  - NJ 8.4%

Follow Up

1. Fish Market Testing
   - EPA R2 (wholesale market)
   - NYC DoHMH (Asian retail stores)
2. GIS Targeting Tool
3. Health Care Provider Curriculum
Fish Market Testing

EPA Hg Fish Tissue Study (Sampling)

- Fulton Fish Market (NYC)
  - Largest wholesale market in the US
  - 22* most commonly consumed species of fin and shell fish
  - Composite of 3 specimens per sample for most species
  - Target sample size (N = 10 - 15)
  - Super samples for small species (e.g., shrimp, clams, crabs)
  - DNA sequencing

* Additional species collected but constrained by small (<4) sample size
Results

EPA Fish Selection Process

- Regional and national commercial seafood landings (NMFS)
- Net local/national imports/exports (US Census, NMFS)
- Domestic aquaculture production (USDA)
- Surveys of fish species sold in stores (Burger studies)
- Listing of seafood products sold by FFM wholesalers
- List modified by observations and discussions in FFM
NYCDOHMH Study Design & Protocol

- 20 fish species popular among the Chinese
  - Hg
  - PCBs
  - DNA sequencing
- NYC fish markets located in top 10% Chinese populated census tracts
- 15 of each target fish species: 4, 5 and 6 specimens from stores in Manhattan, Brooklyn and Queens, respectively.

Source: NYCDOHMH, Wendy McKelvey

NYC Criteria for Selecting Target Species*

- Availability (based on volume) in stores in the three target neighborhoods.
- Inadequate data on mercury content.
- Fish is on NYC “recommended” list, but with potential for PCB contamination.
- Change in import patterns.

*Source: NYCDOHMH, Wendy McKelvey
NYC Conclusions*

• Higher Hg levels in Chinese New Yorkers probably due to eating more (lower Hg) fish and lower bodyweight.
• No evidence that specimens from Chinese markets are higher in Hg.
• High within-species variability in PCB levels.
• OC pesticide levels were low.
• Hg and PCB levels not strongly correlated, which complicates combining the data in risk messages.
• Communicating meal allowances for combinations of species is a challenge.

*Source: NYCDOHMH, Wendy McKelvey

2. GIS Targeting Tool

• Identify areas where women of child bearing years and young children in NJ and NY are at highest risk for consumption of contaminated fish and seafood.
• Integrate lowest geospatial parameters to examine consumption patterns and contaminant exposure
  – Census tract level
  – Need to model data… thus there are numerous assumptions
• First attempt to develop a tool to pinpoint areas of highest risk
Data Sources Utilized

- Using multiple existing data sources
  - SES
    - Census SF1 & SF4 files for socio-demographic break downs (age, ethnicity, gender, earnings)
    - Rural-Urban Commuting Area Codes (developed by USDA & Rural Health Research Center)
  - Consumption
    - Grocery store fresh fish sales through scanner data
    - NOAA Per Capita Consumption
  - Contamination
    - EPA Fulton Fish Market Analysis, NYC DoHMH, Burger NJ studies, NOAA and FDA

Process of GIS Tool

- Transform and Normalize Datasets
- Develop Targeting Algorithm
- Develop GIS Prototype
- Evaluate Data/Reports
- Analyze/Communicate Results
Data Used to Identify Audiences for Outreach

- Physicians (Ob/Gyns and Pediatricians)
  - Contact information and Language Spoken
    - NYS Physician Profile
    - NJ Division of Consumer Affairs NJ Health Care Profile
- Hospitals
- WIC Clinics
- State and Local Health Departments

Developing Health Care Provider Curriculum - CME’s and CE’s

- Developing educational modules on fish consumption – under development by Wisconsin Department of Health – estimated completion date by end of year
- Video and workbook format covering
  - Toxicology and epidemiology
  - Hazard identification and exposure assessment
  - Clinical perspectives
  - Risk Communication & Fish Advisories
Targeted Outreach

- Physicians and nurses in areas of high consumption of contaminated fish
  - Educational modules
  - Current advisories brochures
  - Increase knowledge of healthy seafood choices
  - Share info on best low-contaminant sources omega-3 fatty acids
  - Ask health care providers to screen and provide education to high risk patients

- Future applications:
  - Hope to provide health care providers, state and local health departments, and policy analysts an effective method for targeting vulnerable populations

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References


• 5 Knoebloch, L. et al (2005) Fish Consumption, advisory awareness & hair mercury levels among women of childbearing age, Env Research, 97, p220.


Questions??