**Introduction**

MENTOR/SHEDS-4M is a probabilistic framework for source-to-dose exposure and risk assessment. It dynamically links biologically-based models with environmental, microenvironmental, and human activity modules. This paper presents a case study of human dietary exposure to Hg and MeHg for the general population in Oswego County, NY. Databases for food consumption patterns, food residue and other auxiliary data were used to model short term and long term exposure and dose distributions. The PBEAT modeling was used to estimate target tissue mercury concentrations and biomarkers. Results are compared with available biomarker measurements from the NHANES and NHEXAS databases.

*Modeling Environment for Toxic Risk Studies incorporating the Stehchkin Human Exposure and Dose Simulation approach for multiple co-occurring contaminants and multimedia. Multipathway, Multieposure RPL.

**Data Sources Used for Modeling Dietary Exposure to Hg and MeHg**

<table>
<thead>
<tr>
<th>Type of Data</th>
<th>Database</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Consumption Patterns</td>
<td>USContinuing Survey of Food Intakes by Individuals (CSFII) 1994-98</td>
<td>USDA</td>
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<tr>
<td>Food Residue</td>
<td>National Marine Fisheries Survey (NMFS) 1978</td>
<td>USEPA, USGS</td>
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<tr>
<td>Food frequency questionnaires</td>
<td>Nutrition and Health Examination Survey (NHANES) Annual Data 1999-2002</td>
<td>NHANES</td>
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<tr>
<td>Fish consumption surveys</td>
<td>National Listing of Fish Advisories Information Network</td>
<td>USEPA-NERL</td>
</tr>
<tr>
<td>National atmospheric deposition patterns</td>
<td>U.S. Environmental Protection Agency (USEPA - Cooperative Agreement CR-83162501)</td>
<td>USEPA-NERL</td>
</tr>
</tbody>
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**Evaluation Case Study**

This case study was conducted to simulate human exposure to Hg and MeHg through the dietary pathway for the general population in Oswego County, NY. 10,000 "virtual individuals" were generated to match the demographic characteristics of Oswego County (Data source: US Census Survey 2000).

**Steps involved in the multivariate application of MENTOR/SHEDS for assessing individual and population exposures and doses to mercury.**

*Dietary pathway components are highlighted in yellow.*

**Mercury Concentrations for Selected Species of Fish Most Commonly Consumed in the U.S. Commercial Seafood Market**

- **SWORDFISH**
- **CANNED TUNA**
- **COD**
- **CATFISH**

**Preliminary Conclusions and Discussion**

The case study of dietary exposure to Hg and MeHg showed that the major contribution of dietary Hg and MeHg exposure is due to consumption of fish. The one-month simulation can characterize dietary intake distributions above the level of 10 µg/kg/day for a larger portion of the study population than the one-day simulation. The predicted distributions of MeHg biomarker (blood and hair) concentrations calculated from MENTOR/SHEDS are comparable to the observed concentrations from NHEXAS-2002 and NHEXAS-V. Future efforts will include assembling/organizing and evaluating available databases in different scales (from national to regional/local) and performing focused case studies to characterize exposures of the general population and selected subpopulations (e.g. sport and subsistence anglers) and biologically relevant doses.

**Acknowledgements**