The Role of MDHHS/VBCDHD

- Provide Public Health information and advice
  - Support VBCDHD and other agencies
  - Respond to Public’s questions and concerns
- Be proactive/respond immediately to protect health of people
- Understand the chemicals
  - How they move, how they could impact health, what can be done to prevent harm
- Evaluate residential well results and provide recommendations/public health response actions
- Maintain scientific knowledge
  - Science is constantly changing
  - Provide Expert
- Outreach to residents, healthcare providers, others
Blood Levels of the Most Common PFAS in People in the United States from 2000-2014

* Average = geometric mean

Exposure to PFAS Chemicals

Health problems are not immediate

If you drink high levels of PFAS chemicals over time you could be more likely than the average person to develop some health problems in the future.
Associated Health Outcomes – PFOA and/or PFOS

**Animals**
- Liver effects
- Immunological effects
- Developmental effects
- Endocrine effects (thyroid)
- Reproductive effects
- Tumors (liver, testicular*, pancreatic)

**Humans**
- Liver effects (serum enzymes/bilirubin, cholesterol)
- Immunological effects (decreased vaccination response, asthma)
- Developmental effects (birth weight)
- Endocrine effects (thyroid disease)
- Reproductive effects (decreased fertility)
- Cardiovascular effects (pregnancy induced hypertension)
- Cancer* (testicular, kidney)

* PFOA ONLY
USEPA’s “Lifetime Health Advisory”

- Based on Reference Dose (RfD) derived from developmental toxicity study in rats
- Lifetime Health Advisory for Drinking Water
  - PFOA + PFOS = 70 ppt
  - Short-term (during pregnancy) and long-term (lifetime) exposure
- Protective of unborn baby against developmental effects
- Protective of all against non-cancer and cancer effects
Illustrating the concept behind a Lifetime Health Advisory: Perfluorooctanoic acid (PFOA)

* Exact numbers have been generalized for illustration
ppt = Parts per trillion

<table>
<thead>
<tr>
<th>Lowest dose that causes an effect in rat pups</th>
<th>Human equivalent dose</th>
<th>Dose that is safe in the most vulnerable people (like developing babies)</th>
<th>Lifetime Health Advisory for PFOA in drinking water</th>
</tr>
</thead>
<tbody>
<tr>
<td>6,000,000 ppt (1,000,000 ng/kg/day)</td>
<td>98,000 ppt (5,300 ng/kg/day)</td>
<td>350 ppt (20 ng/kg/day)</td>
<td>70 ppt (ng/L)</td>
</tr>
</tbody>
</table>
What are PFAS public health drinking water screening levels?

- PFAS public health drinking water screening levels
  - Health-based
    - Protective of fetus and breastfed infant
    - Also protective of formula fed infant and other ages
  - Used to determine if further evaluation of PFAS is needed
  - Used to determine if public health actions are needed
  - Non-regulatory
# MDHHS Public Health Screening Levels

<table>
<thead>
<tr>
<th>PFAS</th>
<th>MDHHS Public Health Drinking Water Screening Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFOA</td>
<td>9 ng/L (parts per trillion [ppt])</td>
</tr>
<tr>
<td>PFOS</td>
<td>8 ng/L (ppt)</td>
</tr>
<tr>
<td>PFNA</td>
<td>9 ng/L (ppt)</td>
</tr>
<tr>
<td>PFHxS</td>
<td>84 ng/L (ppt)</td>
</tr>
<tr>
<td>PFBS</td>
<td>1000 ng/L (ppt)</td>
</tr>
</tbody>
</table>
Multiple Lines of Consideration for Determining Public Health Response Actions

- USEPA Lifetime Health Advisory
- MDHHS Public Health Screening Levels
- Residential Well Results (individually and collectively)
- Site-specific information (e.g., known source, geology, etc.)