



Health-based Guidance for Manganese

Helen Goeden, Ph.D. | Senior Toxicologist/Risk Assessor

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What I want to share

- Manganese (Mn)
 - What is it?
 - Why are we concerned about?
- How does MDH calculate water guidance values?
- Basis of manganese water guidance
 - MDH
 - EPA
- Questions

Manganese (Mn) – What is it?

- Naturally occurring element
- Essential nutrient



Age	Adequate Intake (mg/day)	Upper Limit (mg/day)
0 - 6 mon	0.003	?
7 – 12 mon	0.6	?
1 – 8 year	1 – 1.5	2 - 3
9 year & over	1.6 – 2.3	6 - 11

- We get enough from food & water
- More easily absorbed when in water

BUT



OSHA.gov

At high levels: a neurotoxin

“Manganism”

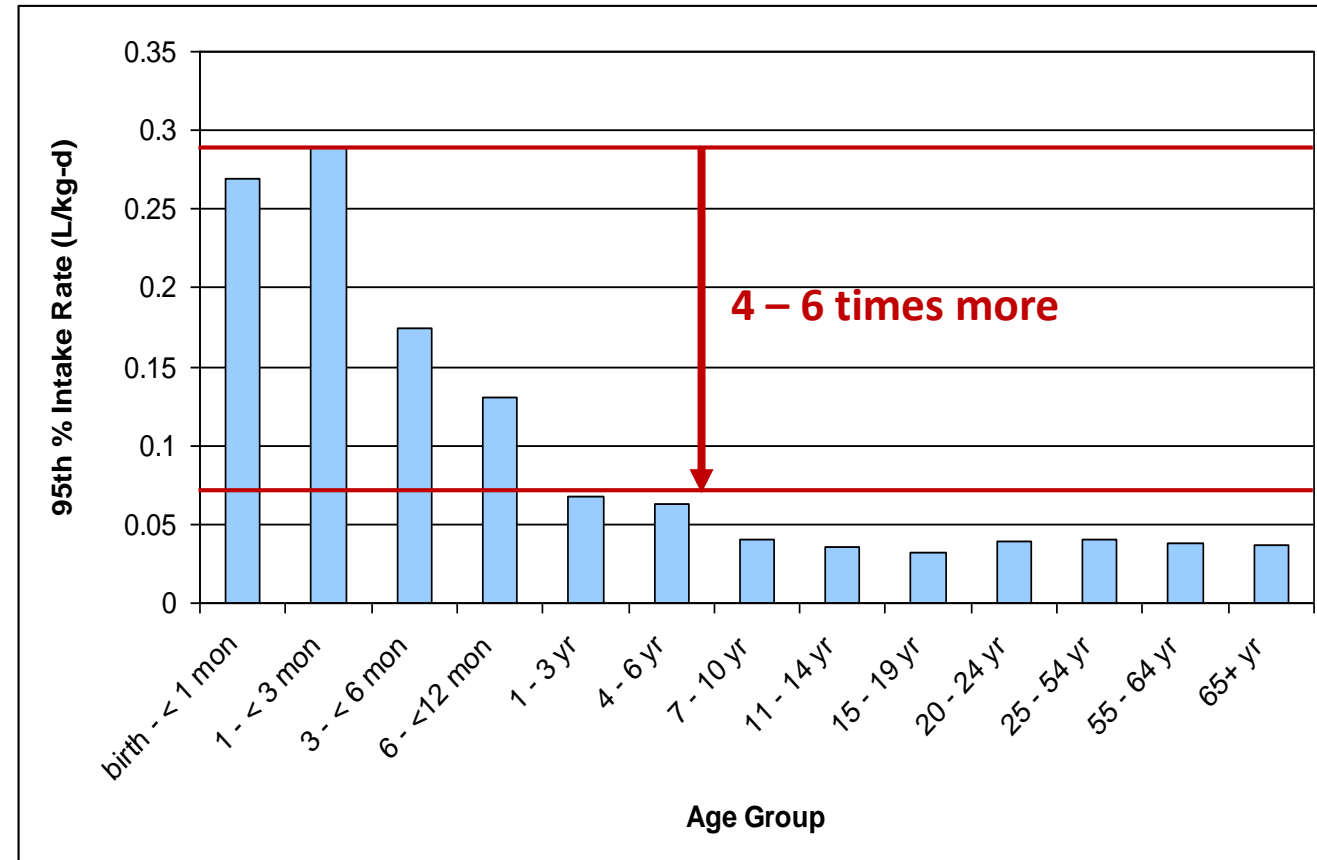
What are we most concerned about?

Babies are at greater risk

- Rapidly growing and developing.
- Higher absorption BUT less able to get rid of Mn from the body.
- Breastmilk levels are below 15 ppb
- Mn is added to formula.

(FDA set a minimum but no maximum level.
Measured ~70 – 700 ppb.)

Drink more for their size

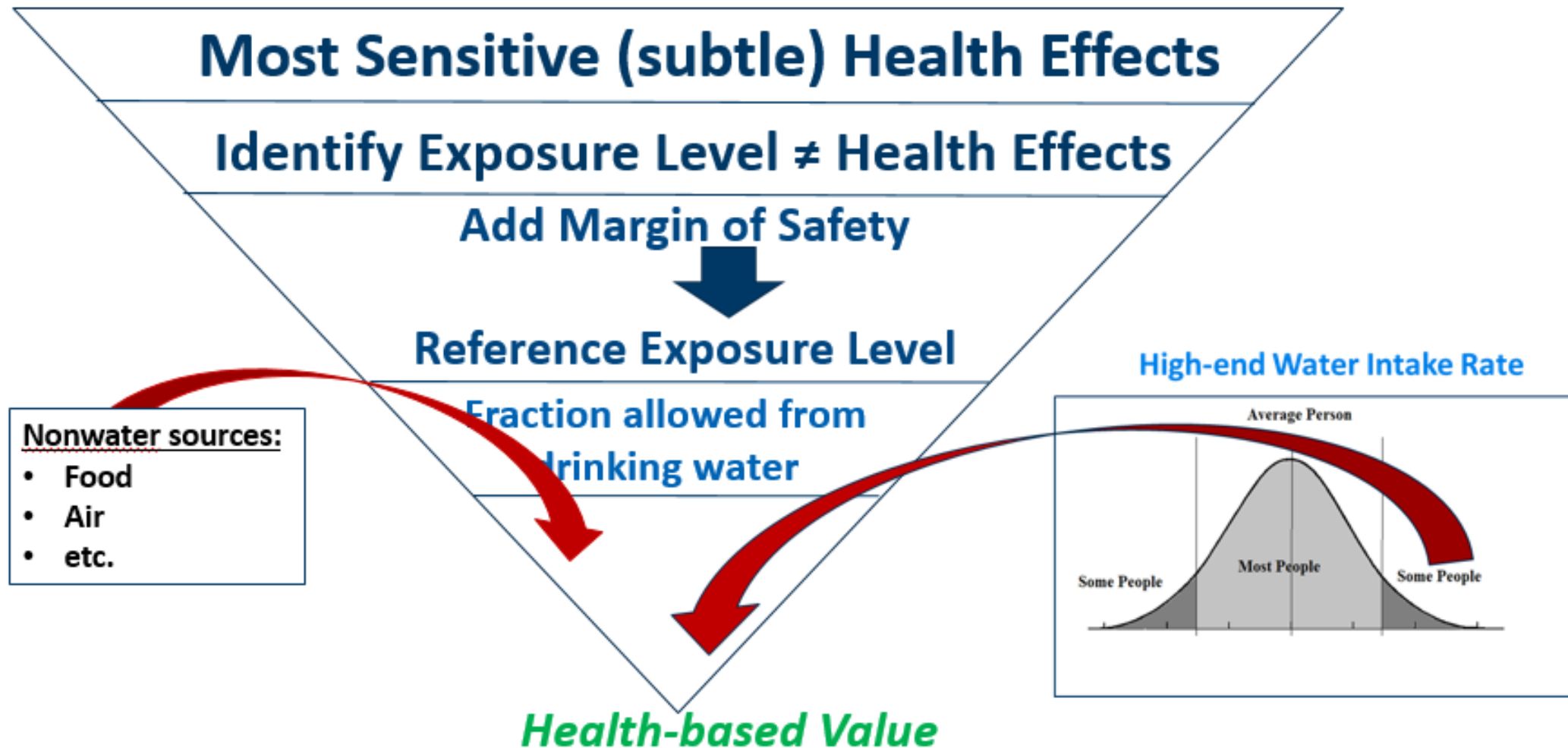


Why are we concerned?

Potential risk

- Studies of children drinking water with elevated Mn report subtle neurobehavioral changes, such as small changes in memory, concentration and motor skills.
- Controlled studies in very young laboratory animals reported neurological effects, such as decreased learning, behavioral changes and motor skills.

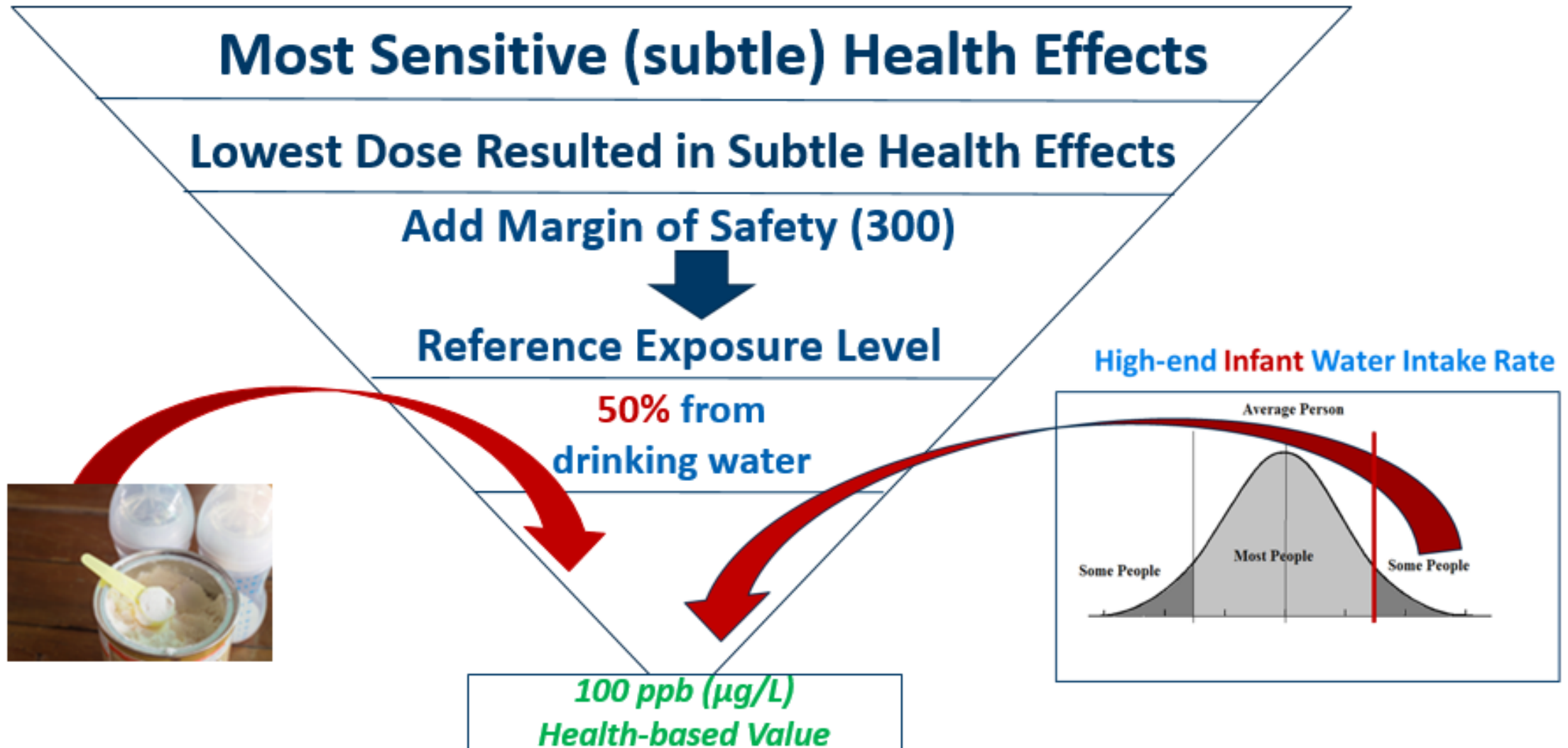
How does MDH calculate guidance values?



MDH Health-based Water Guidance

A concentration of a contaminant in water that can be consumed by the most highly exposure and sensitive individuals in a population with little or no risk to health.

How was MDH manganese guidance calculated?



Manganese water guidance



Infants

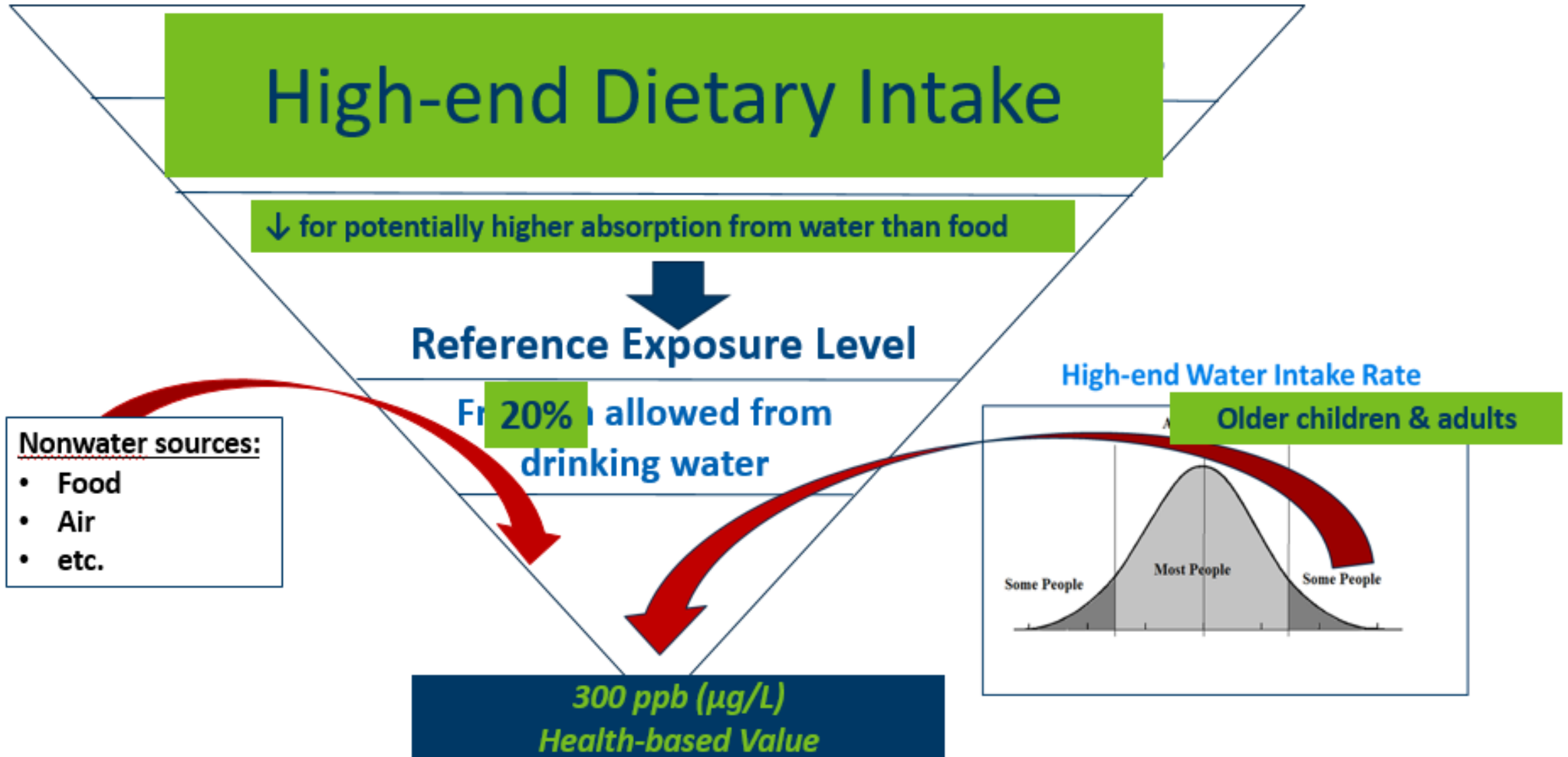
100 ppb



Everyone else

300 ppb

Basis of EPA Health Advisory



Thank you

Contact information:

helen.goeden@state.mn.us

651-201-4904



MDH

Drinking Water Protection

Jon Groethe, P.E.

Community Public Water Supply Unit

Montrose Drinking Water

Sample Location	Mn ($\mu\text{g/L}$) 7/15/20	Mn ($\mu\text{g/L}$) 8/13/20	Average <u>Mn</u> ($\mu\text{g/L}$)
Treatment Plant #2	790	948	869
Well #4	983	990	987
Well #5	798	890	844

- Health Risk Advisory (HRA) for Montrose.
- 100 ppb for infants, 300 ppb for others.

Sampling for Manganese

- The MDH DWP began a sampling program dedicated to Manganese in 2020.
- Montrose was sampled in July and August of 2020.
- Public notification of results is recommended.
- The City provided the information to the public in a letter and provided MDH information via a web link.

What is the city doing now?

- Planning to provide water that is below the 100 ppb HRA level.
- Meeting with MDH staff to learn more.
- Investigation of construction of a filtration treatment plant to reduce Manganese levels.
- The city contract engineering firm will submit a project priority list proposal for a plant. Pursuing funding for the project.
- Design and construction of a treatment plant will take time.

What can consumers do now?

- Water is safe to use for bathing and showering.
- Manganese may stain fixtures or laundry.
- Can have water in your home tested by an accredited laboratory.
- [Search for Accredited Laboratories - Environmental Laboratory Accreditation Program\(https://eldo.web.health.state.mn.us/public/accreditedlabs/labsearch.seam\)](https://eldo.web.health.state.mn.us/public/accreditedlabs/labsearch.seam)

What can consumers do now- Cont?

- Water softeners will remove some amount of manganese.
- Other options for in home water treatment are:
 - Point of use – at the drinking water tap. Reverse Osmosis or carbon filters designed for Manganese removal.
 - Distillation
 - Bottled water
- [Home Water Treatment Fact Sheet- EH: Minnesota Department of Health \(https://www.health.state.mn.us/communities/environment/water/factsheet/hometreatment.html\)](https://www.health.state.mn.us/communities/environment/water/factsheet/hometreatment.html)

Contacts for Drinking Water Protection

For questions related to water testing and treatment:

- Jon Groethe, P.E. - jon.groethe@state.mn.us
- Kim Larsen, P.E. – kim.larsen@state.mn.us

Thank You!