



# Health-based Guidance for Manganese

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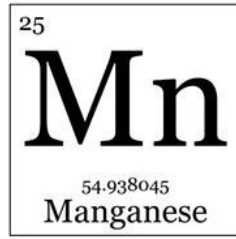
January 22, 2020

# Agenda

- Manganese (Mn)
  - What is it?
  - Why are we concerned?
- How is water guidance calculated?
- Basis of manganese water guidance
- 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 yr	1 – 1.5	2 - 3
9 yr & over	1.6 – 2.3	6 - 11

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

**BUT**



OSHA.gov

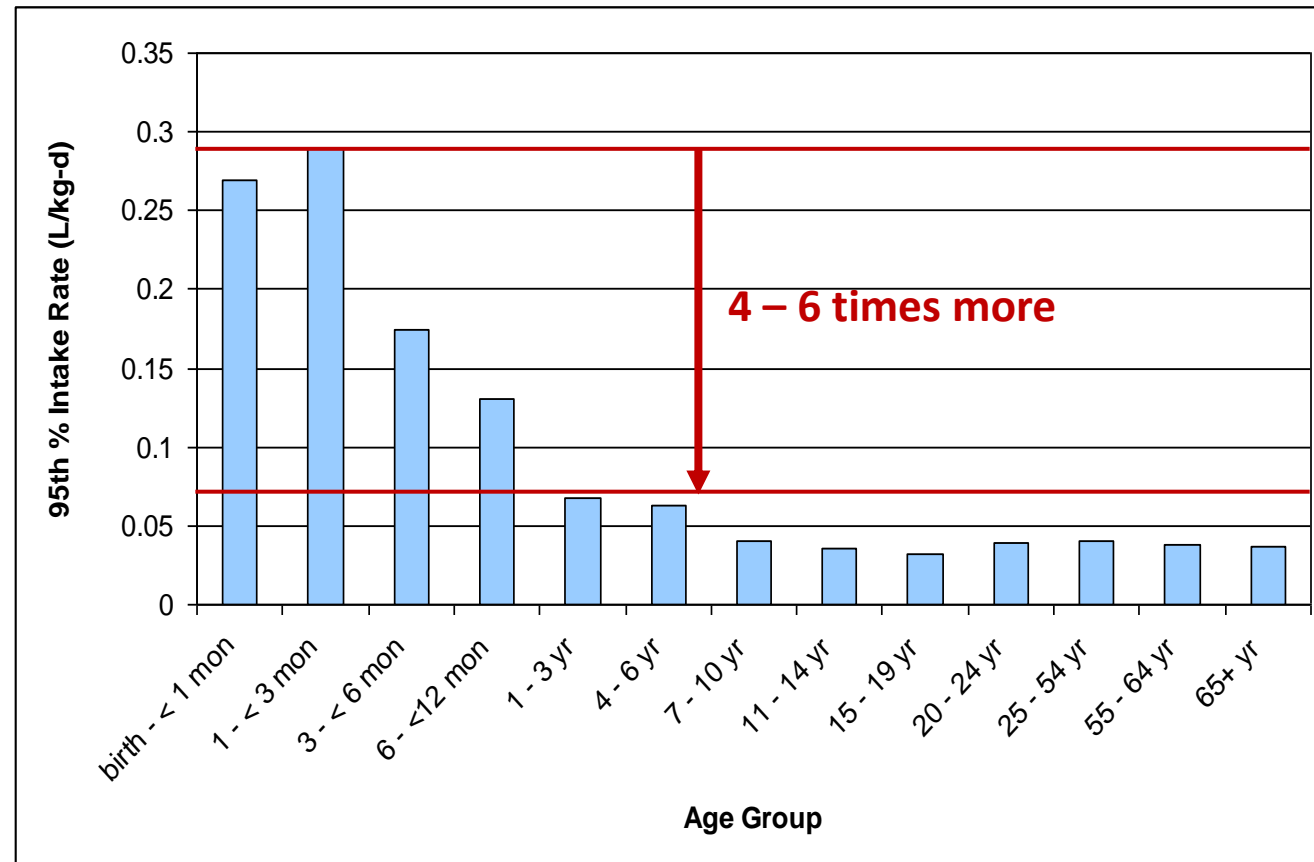
At high levels: a neurotoxin  
“Manganism”

# Manganese – Why are we concerned?

## 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

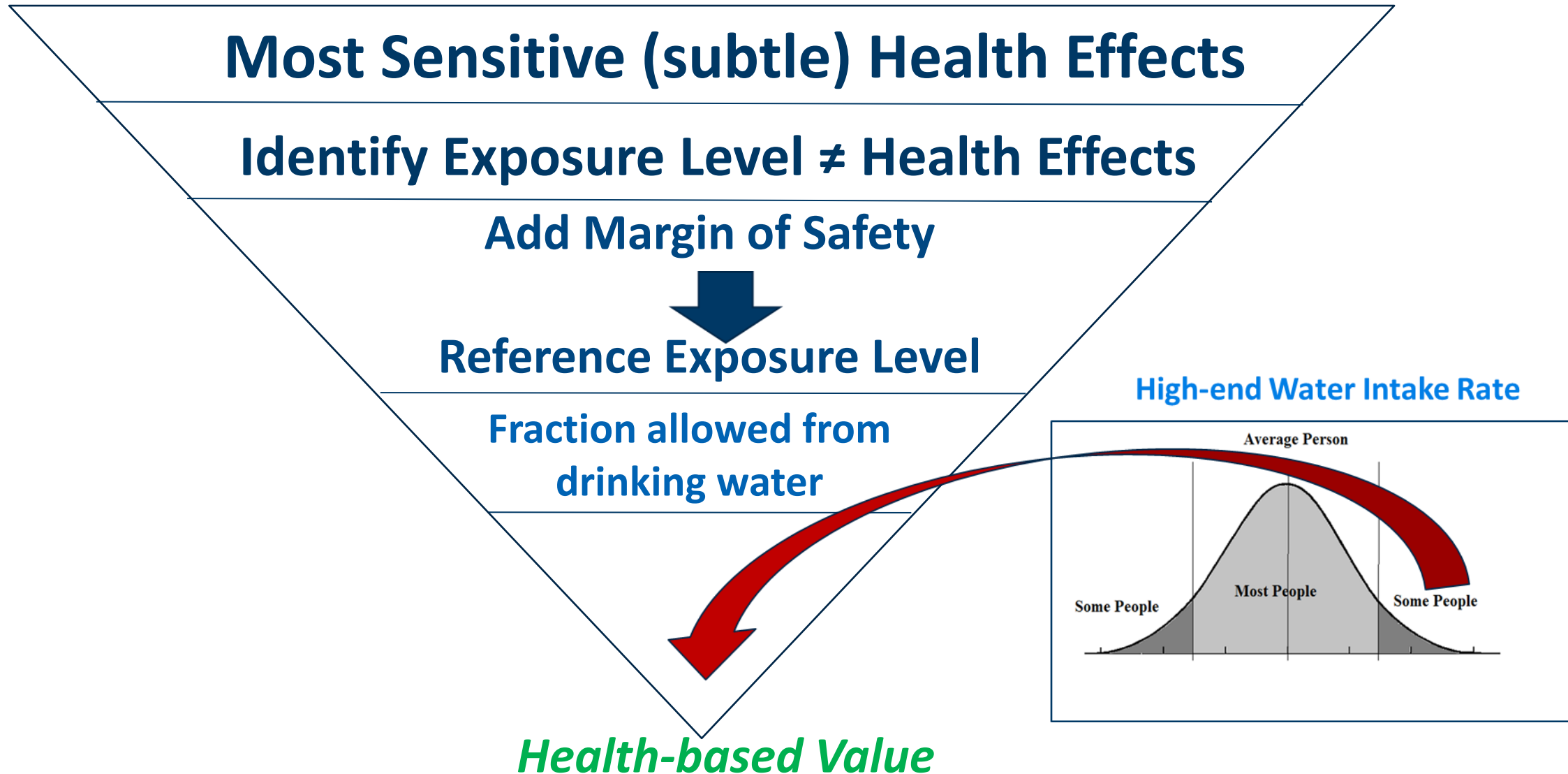


# Manganese – Why are we concerned?

## 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

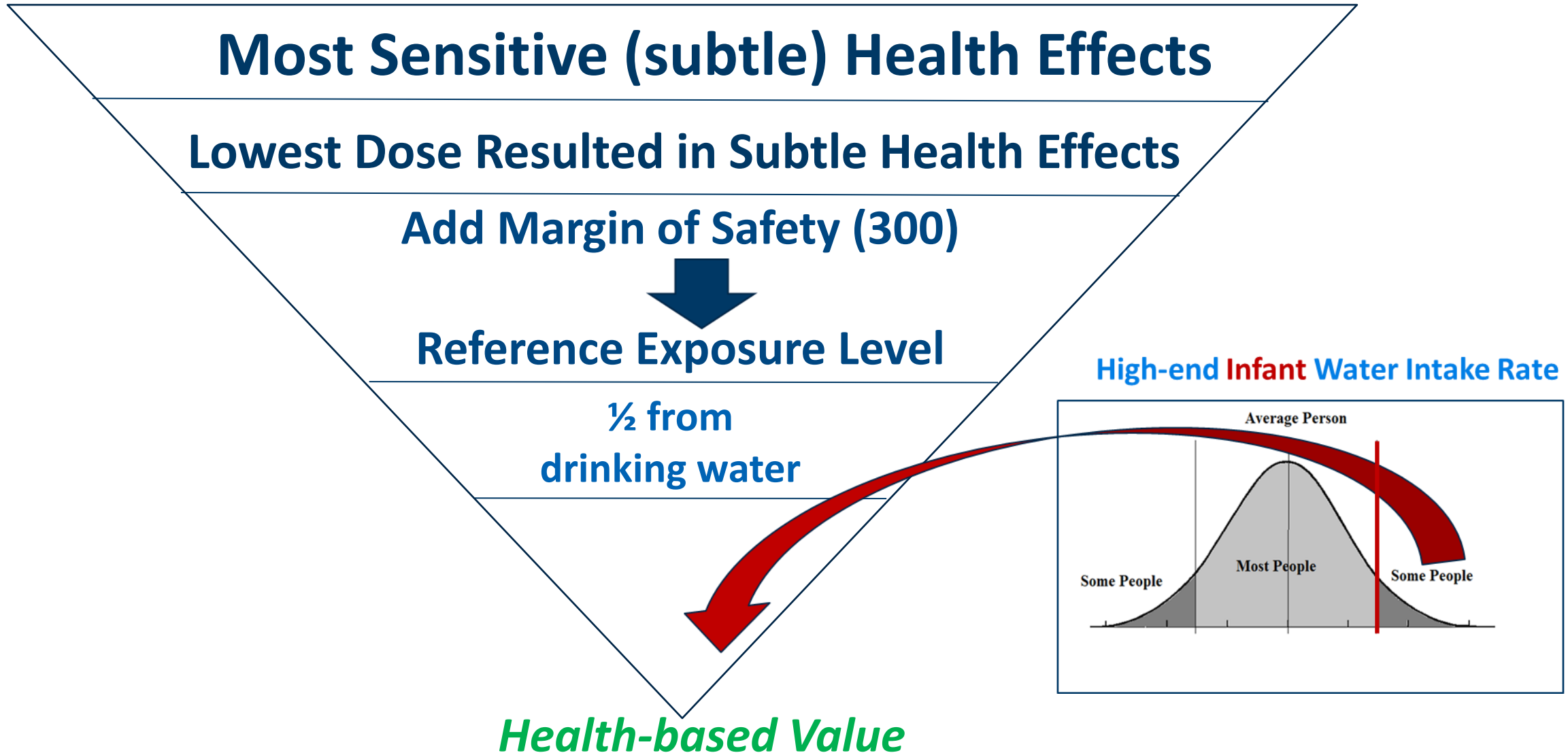
# How is water guidance calculated?



# 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 manganese guidance calculated?





# Manganese water guidance



**Infants**

100 ppb



**Everyone else**

300 ppb

# Thank you

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