



Health-based Guidance for Manganese

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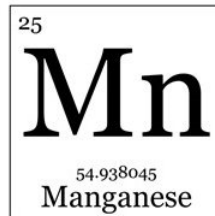
May 30, 2019

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



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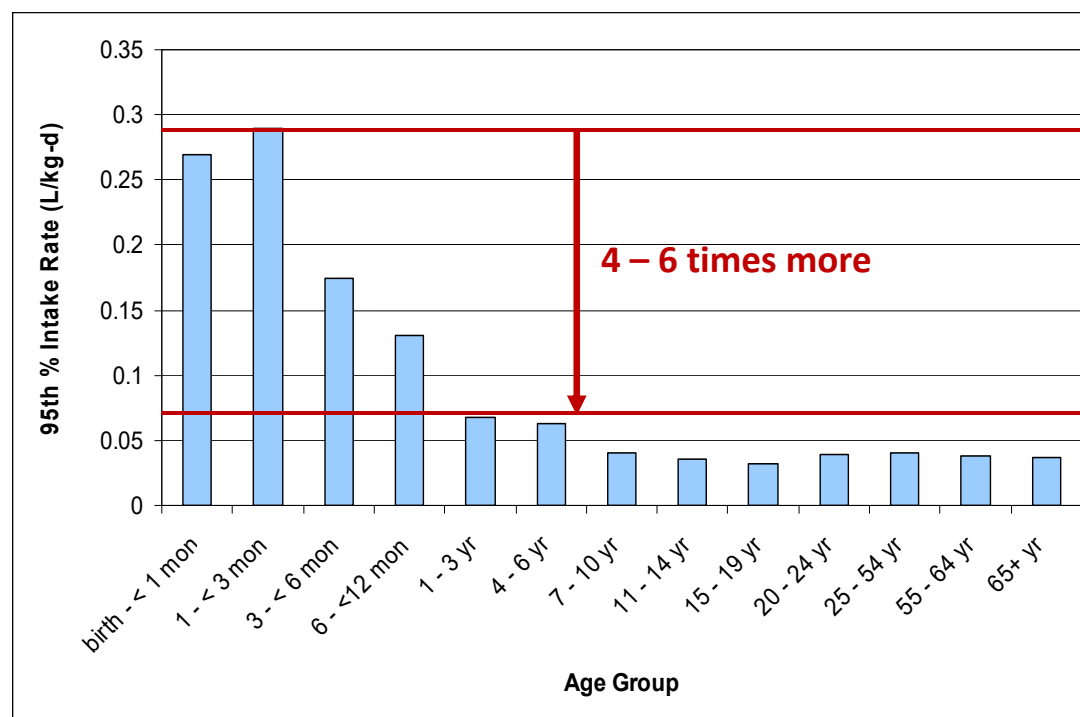
At high levels: a neurotoxin
“Manganism”

Manganese – Why are we concerned?

Babies are at greater risk

- Rapidly growing and developing
- Higher absorption & 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

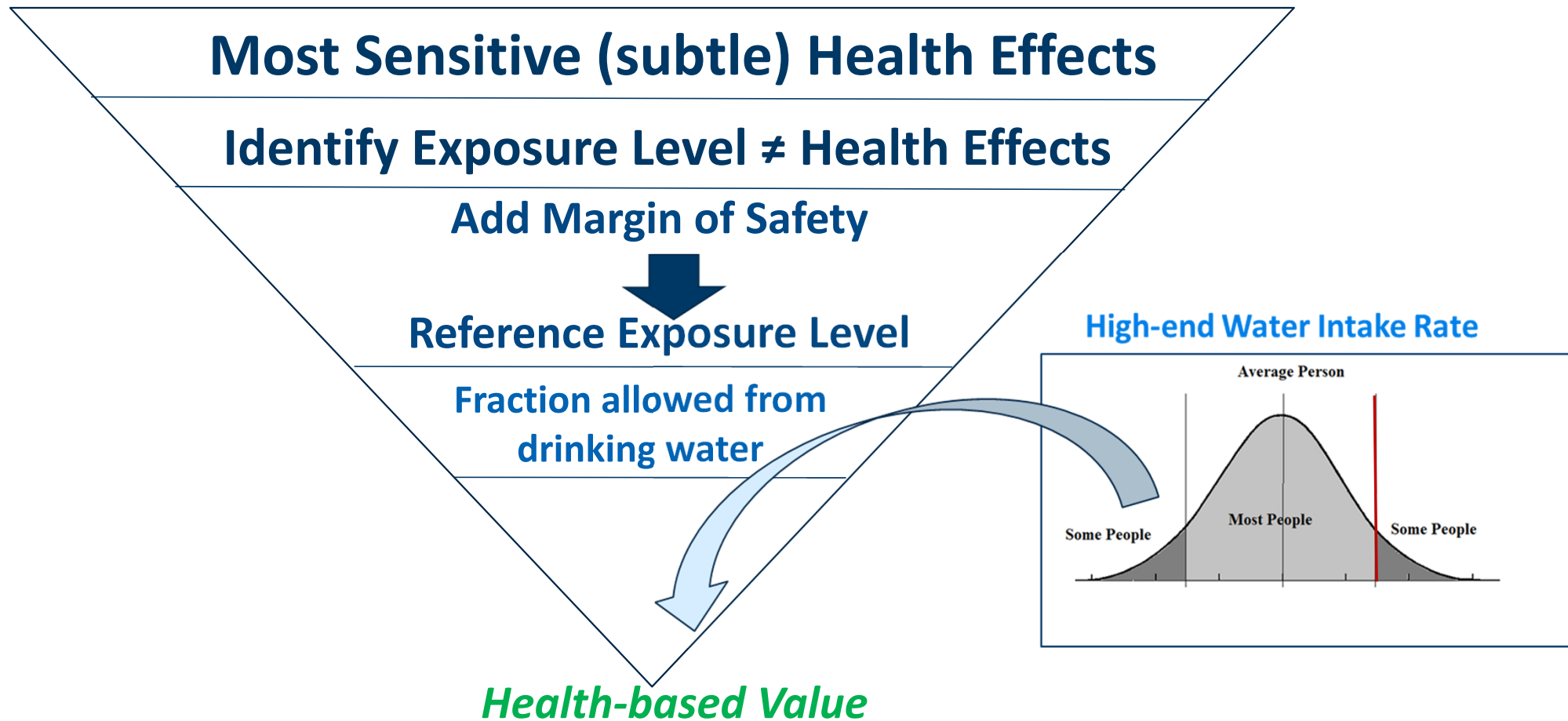


Manganese – Why are we concerned?

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

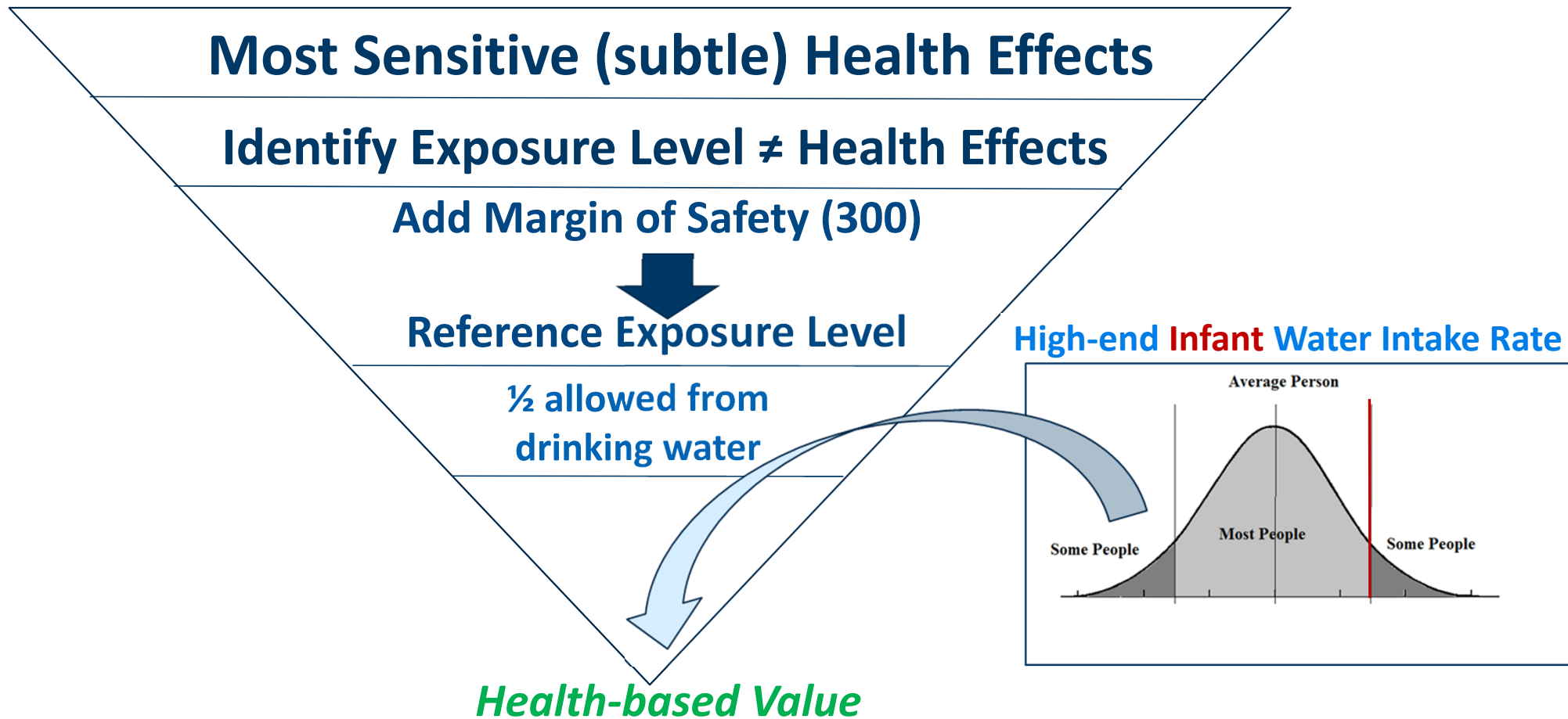
How is water guidance calculated?



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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