



Fluoride

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- * Two aspects for potable water:
 - * Excess amount → Defluorination
 - * Less than optimum → Fluoride addition
 - * Naturally occurring fluoride concentrations in surface waters depend on location but are generally low and usually do not exceed 0.3 ppm.
 - * Groundwater may contain much higher levels, however.

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- * Fluoride works by binding to tooth enamel, which is primarily made up of hydroxylapatite, a crystal composed of calcium, phosphorus, hydrogen and oxygen
 - * Fluoride makes the tooth more resistant to acid attack from bacteria.
 - * Fluoride is added to public water supplies at an average concentration of **about 1 ppm or slightly below.**

Significance of high fluoride conc.

- * Dental fluorosis (mottled enamel), when >2.0 mg/L



Normal



Questionable



Very mild



Mild



Moderate



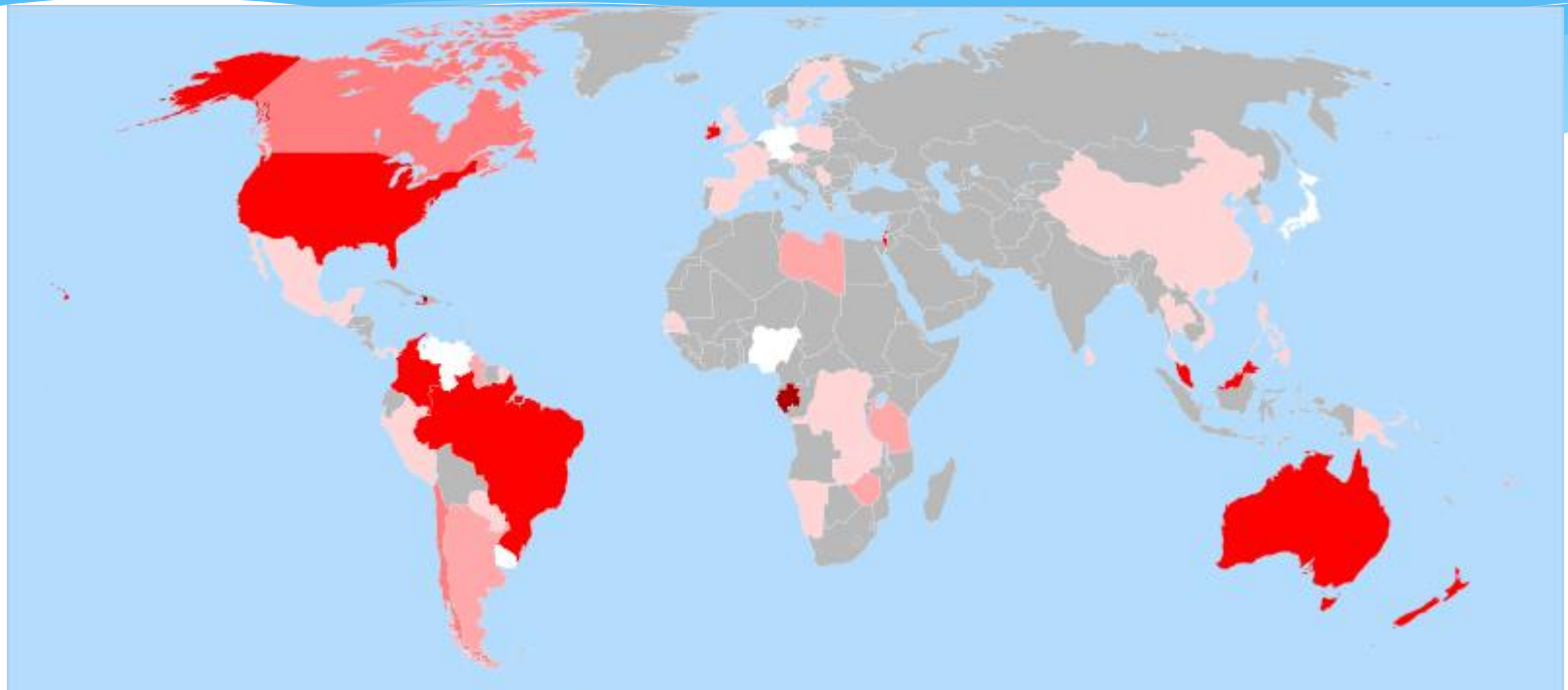
Severe

Significance of high fluoride conc.

- * Excessive dosage of fluoride result in bone fluorosis > 5 mg/L

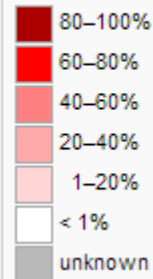


Water fluoridation in the World



* Source: wikipedia

Percentage of population receiving fluoridated water, including both artificial and natural fluoridation.^[18]



Defluoridation

- * Removal of fluoride → passing water through defluoridation media such as tricalcium phosphate, bone char, bone meal, activated alumina

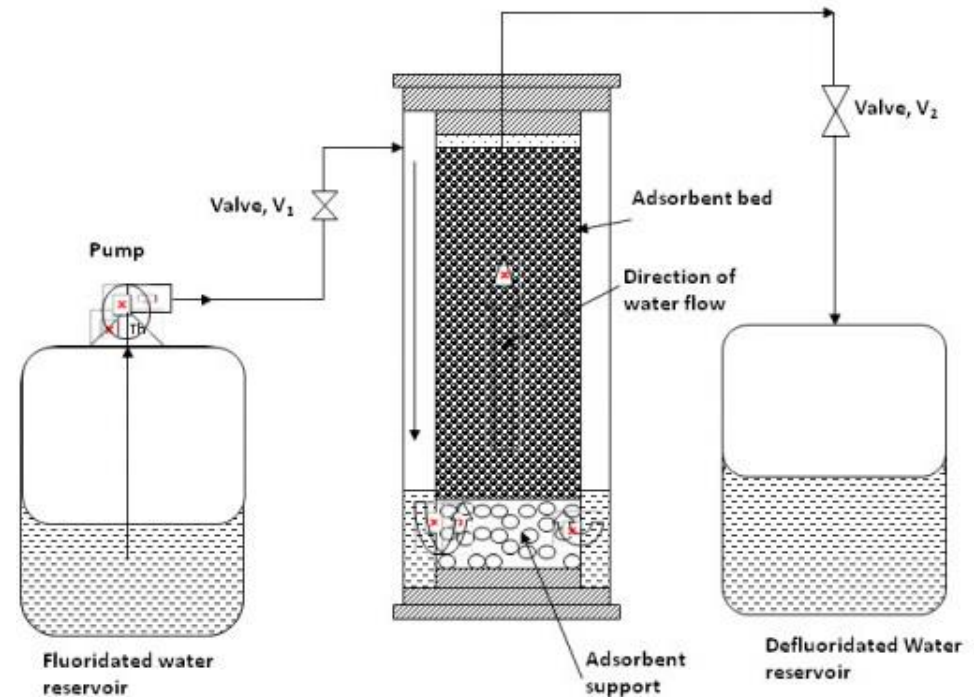


Figure 2
Model I point-of-use system

Low fluoride

- * If F decreases , the dental caries increases.
- ❖ Fluoridation:
 - ❖ Fluoride added to public water supplies in the form of ;
- ✓ NaF
- ✓ CaF₂
- ✓ HF
- ✓ Na₂SiF₆ (sodium silicofluoride)
- ✓ H₂SiF₆ (hydrofluosilicic acid)
- ✓ (NH₄)₂SiF₆ (ammonium silico fluoride)

Methods of Determination

- * Electrode Method
- * Colorimetric Procedures
- * Ion Chromatography
- * ISE (Ion Selective Electrode)

❖ USEPA MCL for Fluoride → 4mg/L

To protect against crippling skeletal fluorosis

❖ Secondary MCL (not enforceable) → 2 mg/L

To protect against dental fluorosis