In February 2000, legislation appeared before the Washington State Senate mandating that fluoride be added to all drinking water in the state.¹ The Washington State Dental Association and the American Dental and Medical Associations were in favor of the bill. Senator Sen. Pat Thibaudeau, D-Seattle argued that adding fluoride to drinking water is the “safest, most cost-effective and most equitable method of reducing tooth decay in communities throughout the state.” Advocates say that fluoride in the water can reduce tooth decay by much as 65 percent in children and 35 percent adults.

Senator Dan Swecker, R-Rochester, Thurston County, sponsored an opposing bill that would have halted all new fluoridation programs in the state pending further study of the compound's effect on the environment, particularly fluoride runoff into salmon streams. Others who oppose fluoridation fear fluoride may actually weaken teeth or present other health risks.

Suppose you are working on a Public Health and Water Supply project for Washington State. The state is working to insure that an appropriate level of fluoride is maintained in public water supplies. Fluoride promotes good dental health when it is present in drinking water at a concentration of at least 1 ppm (part per million). The concentration of fluoride in Washington State water supplies has been found to be normally distributed, with mean 3 ppm and standard deviation 1 ppm.

1. What percentage of Washington water supplies has a fluoride concentration the falls below 1 ppm?

2. The state is preparing the training session regarding fluoridation techniques for communities whose water contains less than 1 ppm fluoride. Training sessions cost $1000 per community. How much is this program expected cost the state? (How would you calculate this?)

3. Scientific research has shown that when the level of fluoride in drinking water is too high, there is a possibility of toxic impacts on humans and the environment. A consultant to the state has said that a 0.13% (yes, a fraction of one percent) of Washington state water supplies have fluoride concentrations which are high enough to present a health risk. What is the cut off for fluoride concentration above which the consultant is concerned?

4. Write a 3 to 4 sentence summary presenting your findings.

¹ Adapted from Gaudette, Karen. “Both sides reject claims as committee considers fluoride bill” Seattle Times, February 1, 2000 and “Association of dentists urges statewide water fluoridation” Seattle Times December 31, 1999