The following article appeared on the USA Today website.

Children exposed to lead are more likely to suffer tooth decay, and vitamin C might help lower blood lead levels, say two studies out Thursday. In the first of the reports in the Journal of the American Medical Association, researchers calculate that lead exposure could account for tooth decay in 2.7 million children. "Other people may debate that but that’s our position." says head researcher Mark Moss of the University of Rochester (N Y.) School of Medicine and Dentistry. Prior studies showed that lead exposure can depress a child’s IQ. "There are a lot worse things that lead can do to you than hurt your teeth." Moss says. He notes, however, that one of the key questions in dentistry is why low-income people experience more tooth decay than higher-income people. "This study suggests lead might be one of the reasons," he says.

The study involved 24,901 children ages 2 and older. It showed that the greater the child’s exposure to lead, the more decayed or missing teeth. "The risk of getting tooth decay increased as the amount of lead went up," Moss says.

Thomas Matte of the Centers for Disease Control and Prevention says that nearly 1 million U.S. children younger than age 6 still have too much lead in their blood, particularly poor children living in older housing. An estimated 57 million residences still have lead paint on the walls, Matte says. He cautions in an editorial, however, that the problems with tooth decay might be associated with something other than lead, perhaps a sugar-rich diet or poor access to fluoridated water. "Those are good points." Moss says. "But I doubt it. We controlled for income level, the proportion of diet due to carbohydrates, calcium in the diet and the number of days since the last dental visit. We still saw this consistent pattern between dental decay and blood lead level—whether they were baby teeth or adult teeth."

In the second study, Joel Simon and his colleagues at the University of California at San Francisco studied 19,578 people who had no history of excess lead exposure. They found that the higher a person’s intake of vitamin C, the lower his blood lead level. (Steve Sternberg, USA Today, June 23, 1999. Internet)

Your task: Write a brief paragraph which identifies the following.

- Is this an observational study or an experiment?
- What is/are the explanatory variable(s)?
- What is/are the response variable(s)?
- Are any confounding variables mentioned?
- Are any lurking variables mentioned?
Potential Solution:

Consider the first study investigating whether a child’s exposure to lead is associated with an increased risk of tooth decay. The response variable is tooth decay. The explanatory variable is lead exposure. Since varying amounts of lead exposure were not randomly assigned to the children, this is an observational study. As mentioned in the article, the study controlled for “income level, the proportion of diet due to carbohydrates, calcium in the diet, and the number of days since the last dental visit.” These are therefore examples of confounding variables. The article also mentions a few other variables that might also explain tooth decay which were not specifically controlled for in the study, such as poor access to fluoridated water. This is an example of a lurking variable.

In the second study mentioned, the response variable is blood lead level. The explanatory variable is vitamin C intake. Assuming varying levels of vitamin C were not assigned to the subjects, this is another example of an observational study. This article does not specifically mention any confounding or lurking variables related to this study.