**NAME \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Activity 1.3 Student Materials**

The purpose of this activity is to understand how lead is absorbed, distributed, and stored in the human body. To accomplish this, you will apply a childhood lead exposure model to evaluate the significance of various factors in predicting health outcomes.

Your professor will be using the model at the front of the class. Answer the following questions and sketch all graphs in preparation for class discussion.

1. The newly established CDC BLL of concern is 5 μg/dL. Using default values in the EPA model, what percentage of children can be expected to have BLLs at or above the newly established BLL of concern?



2. In 1980 before lead was removed from gasoline, average inner-city ambient air concentrations were approximately 0.8 ug/M3. Consider an inner city environment in 1980 that contains soil lead with a concentration of 1400 ppm. Keeping all other inputs into the model at the default values, what are the mean BLLs of children in each age category?



3. Predict the effect on the newborn if a pregnant mother lives in housing where the lead dust exposure is four times as high as that of the default model and spends significant amounts of time in the house.

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*Respond to the following thought-based questions.*

1. If a pregnant woman had lived from childhood in housing where the lead dust exposure is four times as high as the default model, would this increase the probability of the child having a significantly elevated BLL at birth? Explain.

2. Do air rates account for respiration rates?

3. Older children tend to eat different foods than young children. Does the model take these differences into account?

4. Are there other areas or populations that will have potential exposures? Can you predict this graph and compare it to the default model?



*Group Discussion*

This should be a group discussion. Examine the EPA default data for each category of exposure and prepare to discuss the following questions.

1. List some alternative sources of lead that might be considered as well as the four

categories of input.

2. Family composition can play a role in exposure. Would you expect an infant who is first-born to be more or less exposed to lead than an infant who is the third child in a family of athletically active children?

3. What role do you feel parental employment might play in potential variation from default data?

4. If you were assessing these data in your community, give at least two examples of other information you would want to have to validate the EPA model.

*Applications of the EPA model*

1. Two samples of lead were taken from a household: one was a wipe sample that contained high amounts of lead; the other a sample from vacuum dust that contained lower amounts of lead. Without using the model, which do you feel is more predictive of a child’s BLL? Why?

2. You have used the EPA model with inputs from dust vacuum samples, soil samples, water values, and other information (changing according to the value from your community). The model is predictive. How would you validate the model in your community?

3. Identify two or more parameters of lead exposure to children that you would like to investigate in more detail.

4. The EPA model is predictive of the probable range of children’s BLLs, given specific

exposure conditions. Blood lead levels are a marker of exposure but do not provide complete information about lead deposition and distribution in the body. The half-life of blood lead is approximately 40 days. How might this information be used by a public health official conducting housing and environment inspections to encourage removal or remediation of lead?