



# Genetic Studies of Childhood Leukemia in Churchill County, Nevada

## Summary of Findings November 29, 2006

### Background

From 1997 to 2001, doctors in Churchill County found that 15 children had leukemia. This number was higher than usual. Beginning in 2002, the Nevada State Health Division and the Centers for Disease Control and Prevention (CDC) worked together to try to learn why so many children in Churchill County were getting sick. They did many tests. One test found that people who lived in Churchill County had higher amounts of two chemicals in their blood and urine than did people from other areas. The two chemicals were tungsten and arsenic. The higher amounts were found in children with leukemia and in children without leukemia. Because it is not likely that the chemicals alone caused leukemia, CDC did more tests to find out whether genes played a role in causing the disease.

### Genes

Genes contain the instructions for how our bodies work. More than 99.9% of the instructions in our genes are the same as everyone else's; only 0.1% vary from one person to another. These differences are called gene variations. Usually these gene variations cause no harm. For example, genes that produce blue eyes are different from genes that produce brown eyes, but eye color does not affect how well a person sees. Sometimes, gene variations can increase a person's risk of getting a disease. CDC did genetic tests to find out if the children with leukemia in Churchill County had a gene variation that might increase their risk of getting the disease. To do so, scientists compared the genes of families whose children had leukemia with the genes of families whose children did not have leukemia.

### Results

After studying many genes, CDC scientists found a variation in a gene called SUOX. This gene tells the body how to make sulfite oxidase, and the job of sulfite oxidase is to change an unsafe chemical into a safer one. It is not known what effect, if any, the variation has on sulfite oxidase. All of the children with leukemia had this variation in the SUOX gene, and almost half of the children who did not have leukemia had that same variation. This means that even if the variation in the SUOX gene adds to the risk for leukemia, there must also be other factors involved. So far, we do not know what those might be.

### Conclusion

We do not know the cause of most leukemias, and we still are not sure why so many children in Churchill County got leukemia. More research is needed to find out how variations in the SUOX gene affect the people who have them. We also need to learn whether this variation makes it more or less likely that a child will get leukemia. CDC hopes that this study of Churchill County children will help to answer questions about what causes childhood leukemia.