


# Final Report of the Expert Panel on Childhood Leukemia in Churchill County, Nevada



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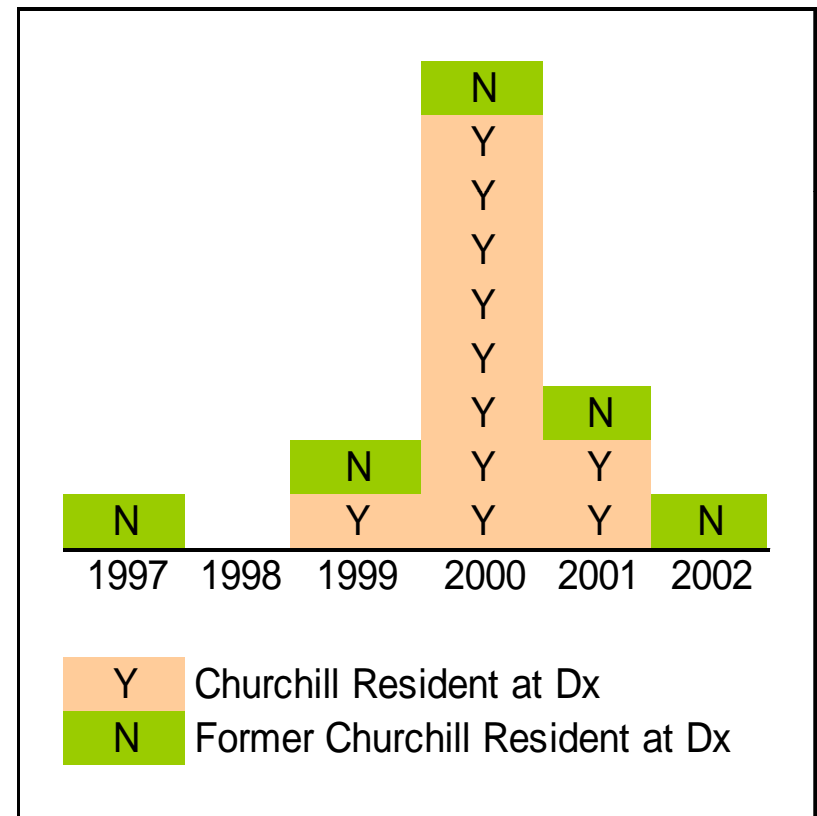


## Purpose and Background

- Review past recommendations and accomplishments and provide updated recommendations
- First report March 2001 (available on the web)
  - Cause of childhood leukemia was unknown
  - 3 broad possibilities (chance, environment, or population mixing)
  - Arsenic identified as an existing human health hazard
  - 6 recommendations made

# 1a. Expand case-finding efforts to identify all cases beginning in 1997

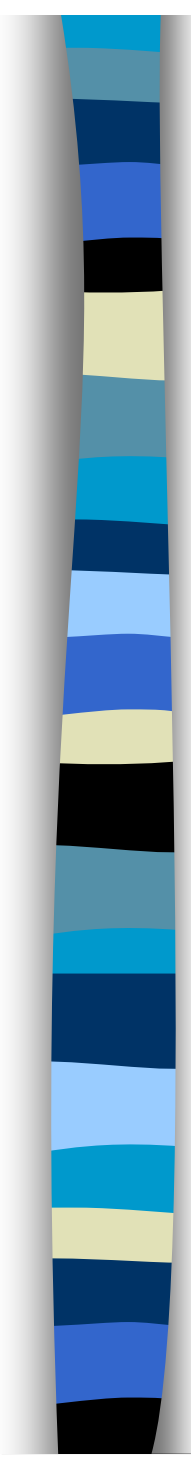
- Surveillance completed for Naval personnel and families
- NCCR certified by NAACCR
- 16 total cases; 5 dx living outside of Churchill County
- O/E = 11
- Last resident case dx 12/2001





1b. Expand case-finding efforts to identify all cases beginning in 1997

- All "resident" cases from 1997 on have likely been identified

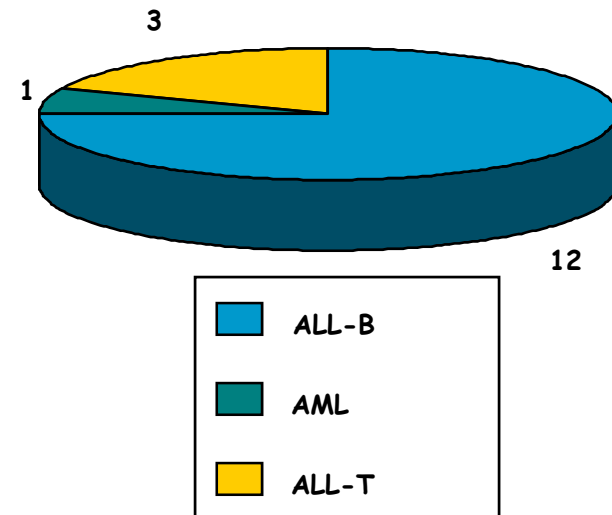


## 2a. Categorize case children by clinical biomarkers and compare distribution with other case-series

- 16 cases
  - 12 B-precursor ALL
  - 3 T-cell ALL
  - 1 AML (NSHD records)
- Medical records available for 14 out of 16 case children
- 4/14 cases had successful conventional chromosomal studies
- 2/14 cases had molecular chromosomal studies
- 3/14 cases had stored specimens

## 2b. Categorize case children by clinical biomarkers and compare distribution with other case-series

- The cell type distribution is typical for ALL
- Chromosomal tests and storage of clinical specimens were infrequent



### 3a. Identify existing environmental health hazards and any associations with leukemia

- Cross-section exposure assessment
  - 14 case families
  - 55 comparison families
- Blood or urine measured for
  - 12 VOCs
  - 18 metals
  - 41 pesticides
  - 36 PCBs
  - Genetics
  - Infections
  - Similar environmental sampling + radon & radioactive elements





## 3b. Cross-sectional study results

- Reassuring that all VOCs, radionuclides, most pesticides, PCBs, and infections were lower or similar in Churchill County as compared to US reference
- 6 metals (antimony, barium, cesium, cobalt, molybdenum, and uranium)
- 7 pesticides were slightly higher
- Arsenic exposures remain a public health concern
- Tungsten findings required follow-up
- No findings were suggestive of an association with childhood leukemia

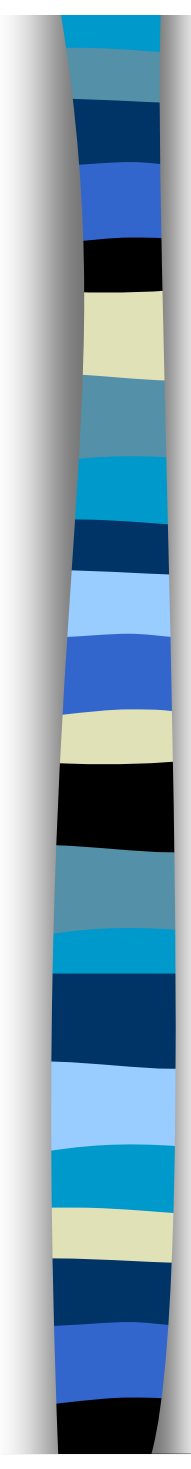
## 4a. Identify past releases of environmental contaminants and potential pathways for human exposure

- ATSDR evaluated information related to surface soils and indoor dust, surface water, sediment, biota, air, and tap water in Churchill County
- ATSDR examined possible exposures from the NASF, including the JP-8 jet fuel pipeline, contaminants in groundwater (on and off base), surface water, soil, air emissions from stationary sources, and emissions of jet fuel from jets flying into and out of the NASF



Testing stations to determine if there is a fuel spill dot the area of the underground fuel storage tanks at the Fallon Naval Air Station.

Photo Marilyn Newton



## 4b. Identify past releases of environmental contaminants and potential pathways for human exposure

- No community exposures of concern related to the leukemia investigation
- No past or present public health hazards to the community from NASF-related contaminants in the environment





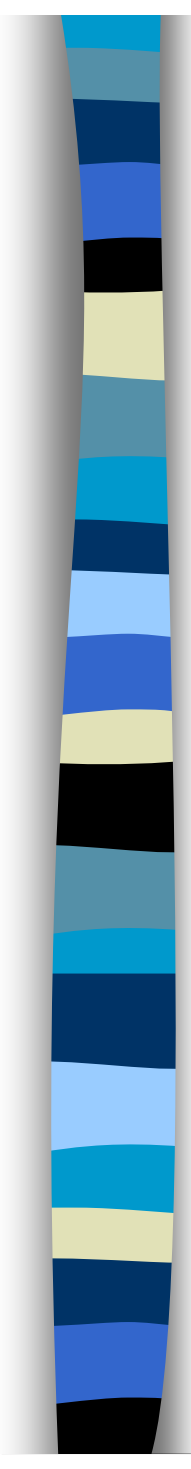
## 5a. Collect and bank specimens for future scientific research

- Only 4 clinical specimens from case-series were stored
- Specimens collected in X-sectional study
  - Blood plasma remains for all but 1 case-sibling
  - Urine remains for all but 2 case-children and 12 comparisons
  - DNA remains for all subjects

## 5b. Collect and bank specimens for future scientific research

- A limited volume of human blood, urine, and DNA collected during the cross-sectional study remain in storage at CDC and may be available for future research studies





## 6a. Determine population movement during 1990s into Churchill County for consistency with population mixing hypothesis

- Data on total population, school enrollment, and Naval personnel were obtained
- No dramatic changes were noted in the overall population or K-12 Naval dependents
- Permanent Navy population remained fairly constant
- NASF reported that 20,000 to 50,000 temporary personnel annually train at the base

## 6b. Determine population movement into Churchill County for consistency with population mixing hypothesis

- Resident population changes do not fit those described by the population mixing hypothesis
- Large population shifts caused by temporary military personnel arriving and departing the base may, or may not, fit the population mixing hypothesis





## 7a. Excessive Arsenic in drinking water.

- 34% of study participants had urinary arsenic levels above the health-based reference level
- City officials report that Fallon will be in compliance and meeting all federal requirements by the end of April 2004
- Guard Our Local Drinking Water (GOLD) Program began educational campaign to private well owners and low cost testing
- Recently, bottled water has been made available to children attending local schools



## 7b. Excessive Arsenic in drinking water

- Several efforts have been made to decrease arsenic exposures to residents of Churchill County
- Private well water will remain a problem after treatment plant goes online, solutions will be incremental over the next several years
- No new information regarding arsenic and leukemia cases



# Conclusions

- Cause of leukemia cluster remains unknown, chance although unlikely cannot be ruled out
- Exhaustive environmental surveys are reassuring and did not identify a potential cause
- Last resident child diagnosed with leukemia was December 2001
- Community, health department, and researchers must prepare for the next case



## Public Health Practice Recommendations

- Continued surveillance
- Collect blood, urine, and data for research
- No additional testing of people or the environment
- Identify people exposed to arsenic-contaminated water supplies and decrease exposures
- Determine availability of existing samples and negotiate location



## Research Recommendations

- Create guidelines and a Research Review Panel to allow access to existing data and samples by qualified researchers
- Encourage further research into the causes of childhood leukemia by Federal agencies and Children's Oncology Group
- Refine and test new theories about why ALL occurs in clusters