

## AUDITORY AND SPEECH COMPLICATIONS IN CHILDHOOD CANCER SURVIVORS: A CHILDHOOD CANCER SURVIVOR STUDY REPORT

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**Background:** The Childhood Cancer Survivor Study is an NIH funded project (U01-CA 55727) designed to study the effects of childhood cancer treatment on long term survivors. Previous studies have found associations between certain cancer therapies and auditory complications.

**Objective:** To describe auditory and speech conditions in survivors, compare the incidence of these deficits with a sibling control group, and evaluate factors associated with the development of these conditions.

**Methods:** Information was obtained from questionnaires completed by 14,362 survivors and 3,901 sibling controls. Analysis determined the first occurrence of 9 auditory and speech conditions in 3 time periods: during therapy, end of therapy to 5 years post diagnosis, and greater than or equal to 5 years post diagnosis. Analysis was performed to determine if speech complications were related to hearing conditions. Multivariate analyses, adjusting for age at diagnosis, and gender, determined the relative risks (RR) and 95% confidence interval (CI) of auditory and speech conditions by treatment exposure.

**Results:** Survivors had statistically significant increases in the RR of hearing loss, deafness not corrected by a hearing aid, complete deafness, tinnitus, dizziness, problems hearing sounds, and stammering or stuttering, across all 3 time periods, when compared to siblings. During the time period of 5 or more years post-diagnosis, statistically significant associations were present for:

Condition	Cisplatin	Cranial Radiation
Hearing loss	2.9 (2.7-3.2)	1.1 (1.1-1.2)
Deafness not corrected	2.9 (2.7-3.1)	1.1 (1.1-1.2)
Complete deafness	2.9 (2.7-3.2)	1.1 (1.1-1.2)
Tinnitus	2.9 (2.7-3.2)	1.1 (1.1-1.2)
Dizziness	2.9 (2.7-3.1)	1.1 (1.1-1.2)
Problems hearing sounds	2.9 (2.6-3.1)	1.1 (1.1-1.2)
Stammering or Stuttering	2.9 (2.6-3.1)	1.1 (1.1-1.2)

No significant positive associations were seen for other head, craniospinal, or neck radiation. The presence of complete deafness (RR=0.8, 95% CI 0.7-1.0) or any hearing condition (RR=0.8, 95% CI 0.8-0.9) did not increase the risk of speech conditions.

**Conclusions:** Childhood cancer survivors are at increased risk of developing auditory and speech complications. This risk continues more than 5 years post diagnosis and treatment related factors are important determinants of this risk. The risk of speech conditions is not increased by the presence of auditory complications. Further follow-up is needed to evaluate the impact of auditory and speech conditions on quality of life.