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I am Dr. James Smith, Chief of the Radiation Studies Branch, National Center for Environmental Health, Centers for Disease Control and Prevention (CDC). Accompanying me is Dr. Dale Sandler from the National Institute for Environmental Health Sciences. CDC is pleased to have this opportunity to discuss the potential health effects of nasopharyngeal radium irradiation treatments and the possibility of undertaking new studies.

CDC has recently compiled current and historical literature relating to nasopharyngeal radium irradiation, which was an accepted medical treatment in the past. Most of the reports in the medical literature are about its use in children and military personnel. Nasopharyngeal radium irradiation was developed in response to observations that enlarged lymphoid tissue was present in a large percentage of children with middle ear hearing loss. The goal of the treatment was to reduce swelling of enlarged lymphoid tissue in the nasopharynx, which was thought to cause various problems including conductive hearing loss and aerotitis media¹. The typical treatment was performed using two radium applicators, each containing 50 mg. of radioactive radium. After a local anesthetic was applied, the applicators were inserted through each nostril, placed near the opening of the eustachian tube, and left in place for approximately 10 minutes. Medical research on the treatment began in the 1920s. Following

¹ Aerotitis media: a group of symptoms produced by the difference between the atmospheric pressure of the environment and the air pressure in the middle ear.

descent, leading to the complications of aerotitis (pain, fluid in the middle ear, bleeding, and rupture of the drum). Because radium treatments shrank the lymphoid tissue, it was thought to be an appropriate treatment for this condition. Flyers with aerotitis missed approximately a third of their combat duty time. Thirty percent of men undergoing submarine training developed objective signs of aerotitis. Reports cited the return of personnel to their missions following treatment with nasopharyngeal radium irradiation. It is not documented in the medical literature when or why the military stopped using nasopharyngeal radium irradiation.

At the time nasopharyngeal radium irradiation treatments began to be used, many physicians believed that conductive hearing loss was due to blockage of the eustachian tube by enlarged lymphoid tissue. It was thought best to treat this form of hearing loss in childhood, before the loss became irreversible.

Nasopharyngeal radium treatments also were advocated to prevent repeated viral and bacterial infections, for asthma which occurred with repeated viral infections, for recurrent middle ear infections, for sinusitis, and for recurrent tonsillitis.

Early proponents of nasopharyngeal radium irradiation therapy cited several reasons for the advantage of nasopharyngeal irradiation over surgery and conventional X-irradiation. Radium treatment could shrink lymphoid tissues in areas that were inaccessible to surgeons. Compared with surgery, the radium

cancer. Reports of thyroid and other carcinomas following treatments with external sources of radiation began appearing from 1950 to 1960, causing concern about the potential for nasopharyngeal radium treatments to cause cancer.

Two studies of children who received nasopharyngeal radium irradiation were published in 1982 and 1989, with conflicting results. The first, by Sandler and colleagues in Maryland, found a statistically significant increase in head and neck tumors including brain tumors (four cases in the exposed group of 904 subjects vs. none in the unexposed comparison group), a statistically non-significant increase in lymphatic-hematopoietic and skin cancers, and a statistically non-significant decrease in breast cancer. The second, by Verduijn and colleagues in the Netherlands, found a statistically non-significant decrease in brain and breast cancers, and a statistically non-significant increase in lymphatic-hematopoietic and other cancers. No head and neck tumors other than brain tumors were found in either the exposed or unexposed groups.

To summarize what is known about possible adverse health effects from nasopharyngeal radium irradiation, the limited studies that have been done are inconclusive with regard to health risk from nasopharyngeal radium irradiation. All of the studies that have been published address only the possible association of various head and neck cancers with nasopharyngeal radium irradiation.

which may also cause specific tumors in the head and neck. However, use of the retrospective cohort method could be difficult and complex, because two very large groups would need to be identified and have their health outcomes tracked over the ensuing years until the present.

Issues that would need to be thoroughly addressed to determine whether a study of this subject is feasible would include 1) the ability to identify and trace a cohort of persons who received the treatment in the 1940s and 1950s, and the ability to identify and trace a cohort of people who are similar in all respects except that they did not receive the radium treatment; and 2) the ability to ascertain the medical history of all study subjects during the ensuing 40 to 50 years. Because the expected occurrence of the various types of cancers is relatively small, missing just one or two cases could have a major impact on the results of the study. Therefore, for this study to be useful, it would be ideal to identify all cases of cancer that have occurred in cohort members since the 1940s. Locating living persons from records of 40-50 years ago would be very time intensive and would require the use of a variety of information sources, such as voter lists, driver's licenses, birth certificates, tax and property records, and military records. Determining the health status and possible occurrence of disease in those who are alive and can be located could be done through interviews, extensive reviews of medical records, and complete medical examinations. Determining the health history of those who are deceased and

I would be happy to answer your questions.