

2.9 THE ATOMIC ENERGY OF CANADA LIMITED (AECL) EMPLOYEE HEALTH STUDY:
FOLLOW-UP OF LONG-TERM CHALK RIVER EMPLOYEES

D.K. Myers and M.M. Werner

In 1979, we embarked on a preliminary examination of computer and paper files relating to past Chalk River employees, as part of our preparation for the AECL Employee Health Study described by Dr. J.L. Weeks. During this phase of the study, it became evident that we did have a record of essentially all deaths among current and retired employees since 1945. These death records are believed to be 100% accurate since 1966 and about 95% accurate for the smaller number of deaths that occurred during the period 1945-1965. Reliable information was not available for deaths of the large numbers of ex-employees who left AECL for other employment; this information will presumably be obtained during the course of the Health Study proper, as described by Dr. Weeks.

The Health Study proper was not expected to yield any definite information for a number of years and it was considered desirable to obtain some concrete data earlier. Moreover, about 77% of the total occupational lifetime exposures of all AECL personnel are attributed to the Chalk River site. For these and other reasons, it was decided to run preliminary analyses on the Chalk River employees who had died during employment, or after retirement. The methods and results have been summarized in reference 1. Copies of 525 death certificates for past employees who died before 1983 have been obtained from provincial registrars. Death rates were compared with those expected for persons in Ontario, Canada. The standard mortality ratio for all 371 male employees who died during 1966-1982 was 0.96 (95% confidence limits 0.78-1.18) for cancer deaths and 0.87 (limits 0.78-0.97) for deaths from all causes. There was no significant excess of deaths from any particular type of cancer. One death from leukemia was observed as compared to 3.5 expected. Similar results were observed for long-term employees who participated in clean-up operations at the NRX and NRU reactors in 1953 and 1958, respectively. All 436 employees (including 23 who had left AECL for other employment) with recorded lifetime occupation exposure of 0.2 Sv (20 rem) or more to the end of 1982 have also been traced, and 66 deaths were recorded. The standard mortality ratio for cancer deaths in this group was 0.66 (limits 0.34-1.15) and for all deaths 0.82 (limits 0.64-1.05).

The cumulative exposure of all Chalk River employees is about 11 Sv per year. Thus, the absence of a significant excess of cancer mortality in these results does not conflict with currently accepted risk estimates or with the concept of awarding workers' compensation in certain individual cases where it is believed that the employee's long-term occupational exposure to radiation or other agents may have caused or contributed to development of cancer. The data do, however, provide some reassurance that large numbers of cancer deaths that might be related to occupational radiation exposure do not exist in the groups of Chalk River employees studied to the end of 1982.

The statistical analyses used depended on the ICD code [2] given on the death certificates; no attempt was made to correct any of the

assigned code numbers. The reliability of this type of information represents a perennial problem [3]. For the 525 death certificates available, ancillary medical information was available in 272 cases [4]; in most cases, this information relates to persons who died during or shortly after employment before reaching age 60-65. There was one clear error in these 272 cases, the omission of a fatal gastro-oesophageal cancer [4]. In the remaining 271 cases, the information in the medical files did not contradict that on the death certificates. Thus, there seems to be a good probability that, for deaths before age 60-65, the data are reasonably reliable. However, it should be noted that only 18% of all death certificates embodied autopsy reports and there is no evidence to indicate that death certificates for older persons are equally reliable. Moreover, there were several instances, all in the group of employees who died after retirement, where it was not obvious to us that the assigned ICD code number corresponds correctly to the underlying cause of death as judged by the written information on the death certificate.

The experience gained in the study has been most valuable in re-checking the results of computer-assisted record linkages at Statistics Canada. A number of these potential linkages, most of which were assigned a fairly low probability of being correct using standard computer programs [5], were rejected after manual examination of the individual records involved. For all past AECL employees, 915 deaths of males and 72 deaths of females prior to 1981 have been identified by this method. About 99% of the known deaths among Chalk River employees were located in the computer search [6].

REFERENCES

1. M.M. Werner, D.K. Myers and D.P. Morrison, "Updated follow-up of long term Chalk River employees," Atomic Energy of Canada Limited Report AECL-8183 (1983).
2. ICDA: Eighth Revision International Classification of Diseases, Adapted for Use in the United States, U.S. Department of Health, Education and Welfare (1967).
3. M.R. Alderson, R.J. Bayliss, C.A. Clarke, and A.G. Whitefield, "Death certification," Brit. Med. J. 287, 444-445 (1983).
4. D.W.S. Evans, personal communication, 1984 July.
5. M.E. Smith, "The present state of automated follow-up in Canada. Part 1. Methodology and files," J. Clin. Computing 9, 1-18 (1980).
6. A. Mullins, personal communication, 1984 August.