

study of radium cases. Table 4 also includes the number of radium-induced malignancies in the measured cases; the number of new malignancies was not large over this time period, but measured cases with malignancies were added as a result of the exhumation program.

In Table 4 the numbers for 1969 reflect cases in the file after the MIT cases were transferred to the CHR. The numbers through 1983 are taken from the published annual reports, the last of which appeared in 1984. The 1990 figures were obtained from a recent update of the files of the CHR. The total of 2,403 measured cases includes 20 offspring of radium-exposed subjects. Without these, a total of 2,383 persons were directly exposed to radium.

Examination of Table 4 shows that, in the ten-year period from 1970 to 1980, the number of newly measured cases increased by about 100 each year; more than 1,200 previously unmeasured cases were added to the files in this period. In addition, previously measured cases were being remeasured each year, on a schedule based on body content. Thus, the productivity of the CHR during this period was amazingly high, as more new radium cases were added to the files than had previously been found and measured by all other studies since the beginning of the radium era.

More than 4,200 additional identified cases are in the files, mostly unlocated and many deceased. These unmeasured cases deserve special mention. The files of the unmeasured cases range from merely the name of an individual or a death certificate to an extensive file. Many of the latter type are patients with whom the CHR has had continuing contact but who have been unwilling or unable to participate in the study, or who died before they could be measured. Extensive files also exist on some individuals who died long before radium study programs were initiated. Among the group of unmeasured cases, documentation exists to show that 21 died with bone sarcomas and 5 with carcinomas of the paranasal sinuses or mastoid air cells.

However, simply increasing the number of measured cases was not enough. Meaningful epidemiologic studies required knowledge of the number of people exposed to radium by each route. For those exposed as a consequence of medical treatment by various physicians, such studies were impossible, because most records of treatment with radium were lost or perhaps destroyed. Likewise, for those who drank radium water, available over the counter, no records at all existed. The names of patients who received radium as a treatment in a hospital, for example at the Elgin State Hospital, were more likely to be available. Another midwestern institution where radium was given to patients also provided a list to the CHR. However,