Ionizing Radiation and the Epidemiology of Cancer in Children and Young Adults: Findings from the UK

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Controversy surrounds the possible adverse health effects of ionizing radiation, and there are few topics which have been addressed more frequently. Ionizing radiation is a potent mutagen, and it has been known for some time that excessive exposure may cause not only radiation sickness and death, but also the subsequent development of leukaemia and other cancers. In recent years public concern and scientific interest has increasingly focused on the possible adverse health effects of exposure of low doses of natural (e.g. radon) and artificial sources of ionizing radiation.

That exposure to ionizing radiation after birth contributes to the production of childhood leukaemia has been established by observations on Japanese bomb survivors and children given radiotherapy. Further, there is evidence that the fetus and young child may be more susceptible to the effects of low doses of ionizing radiation than the adult. Alice Stewart´s and her colleagues suggestion, first made in 1956, that in-utero exposure to diagnostic X-rays might increase the risk of childhood leukaemia has taken several decades to settle. It is, however, now widely accepted that historically between 5%-10% of all childhood leukaemias could have been caused by diagnostic X-ray of the mother´s abdomen while the child was in-utero. Nowadays, modern concern revolves mainly around the importance of the magnitude and timing of the dose. More contentious today than the effect of in-utero exposure, is the suggestion that preconceptual exposure of parents might increase the risk of cancer and other diseases in their children.

This presentation will focus on some of the methodological issues surrounding epidemiological research in the United Kingdom into the possible effects of exposure to low doses of ionizing radiation. As befits the title of the conference, particular attention will be paid to problems surrounding the study of cancer in the vicinity of nuclear establishments. In addition, two large studies in progress in the United Kingdom will be described: one exposure driven - the Nuclear Industry Family Study (NIFS) and the other disease driven - The United Kingdom Childhood Cancer Study (UKCCS).