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## Exposure of people living around nuclear power plants and other nuclear facilities

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The presence of nuclear plants has been often controversial because of possible health effects on the surrounding populations. In Italy, a total of 9 nuclear plants have been operating, including 4 nuclear power plants which are inactive for many years. The Italian Ministry of Health commissioned a study on the health status of inhabitants of all the 9 municipalities hosting a nuclear plant in their territory using the available population and mortality data.

A mortality study was conducted at municipal level. Several causes of death (single or groups) were analyzed, but particular attention was given to the 24 cancer forms associated with ionizing radiation. Due to the small population sizes, analyses were performed on data aggregated for time periods (1980–1989, 1990–1999, 2000–2008), for municipalities, and for specific cancer sites. The standardized mortality ratio was calculated for each municipality with reference to the corresponding regional population. In addition, the expected number of cancer deaths due to radiation was estimated under three different scenarios of exposure to ionizing radiation due to radioactive emissions from the nuclear plants.

No increase of cancer mortality for the whole group of cancers related with ionizing radiation exposure was observed (SMR 92, 95% C.I. 89–95). However, the analyses for specific causes of death revealed an increase of mortality for thyroid cancer (SMR 150, 95% C.I. 105–210), while a reduced mortality was observed for other cancer sites potentially related with exposure to ionizing radiation. The total expected number of deaths in these populations in the observed period is greater than 1 under the assumption of continuous exposure of all individuals at an effective dose rate of 1 mSv/year.

Mortality in the areas where nuclear power plants were located in Italy are generally similar to that of the reference population but an excess of thyroid cancer emerged. These results will be compared with other studies carried out in Italy and other countries.

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