MedicalXpress

Report presents designs for study of cancer risks near US nuclear facilities

March 29 2012

A proposed study could help determine if there is a link between living near nuclear power plants or other nuclear facilities and having a higher risk of cancer, but challenges and limitations exist, says a new report from the National Research Council, the operating arm of the National Academy of Sciences and National Academy of Engineering. The report recommends that a pilot study be completed first to evaluate the feasibility of a full-scale study, although the ultimate decision about whether to perform either would be the responsibility of the U.S. Nuclear Regulatory Commission (USNRC), which sponsored the Research Council report.

The first phase of a two-phase project, the report identifies scientific approaches for carrying out an assessment of cancer risks for populations near the 104 nuclear reactors and 13 fuel cycle facilities that the USNRC licenses across the U.S. as well as for people who have lived close to former sites. The USNRC requested the report because it has been using the results of a 1990 National Cancer Institute survey as its primary public resource about cancer risks near its nuclear facilities, and that study is now outdated and has limitations.

"Finding scientific evidence of whether people who live near nuclear facilities have a greater risk of developing cancer than those who live farther away is a challenge," said John Burris, chair of the committee that wrote the report and president of Burroughs Wellcome Fund in Research Triangle Park, N.C. "There are issues of whether scientists can get the information needed to carry out the study. For example, some

state cancer registries have only recently attained quality data. Also, data may be insufficient to estimate the amount of radioactive material released from nuclear facilities, especially during early years of operations. This makes it much more difficult to determine risks from decades ago when radiation releases from nuclear facilities were larger."

The committee recommended two approaches to the cancer risk study, which could be carried out by the Research Council as the second phase of its project, should the USNRC decide to proceed. One approach would be to investigate rates of cancer occurrence and cancer deaths in small geographic areas within approximately a 30-mile radius of nuclear facilities. The different geographic areas should represent a range of potential exposures from radioactive material releases from the facilities, from the highest to essentially no exposure. Another would be to conduct a record-based, case-control study to assess the association of cancers in children less than 15 years old in relation to their mothers' residential proximity to a nuclear facility during pregnancy. Both approaches would have a sub-analysis focusing on leukemia, the cancer associated with radiation exposure in children.

The committee listed several challenges to carrying out the study, including uneven availability and quality of data on cancer mortality and incidence at geographic levels smaller than the county level and uneven availability of data on the amount of radiation released from nuclear facilities. There also may be limited information on population mobility and potential confounding factors, including exposure to cigarette smoke, access to health care, contact with toxic chemicals, and exposure to other sources of radiation such as from medical procedures like CT scans. The impact of these other possibly immeasurable factors on cancer incidence and mortality could overwhelm the expected effect from the releases of radiation from nuclear facilities. Moreover, the doses resulting from monitored and reported radioactive releases from nuclear facilities are expected to be low. Therefore the cancer risks, if

any, are likely small. It is not certain whether a full-scale study would have sufficient statistical power to detect such small effects, if present.

Given these challenges, if the USNRC decides to move forward with the cancer risk study, the committee proposed a pilot study to verify whether the two recommended approaches could be conducted on a large scale and to help estimate the necessary time, costs, and resources. The committee suggested that the pilot study focus on six nuclear power plants and one fuel cycle facility that provide a broad representation of plant designs and operating histories: Dresden, Ill.; Millstone, Conn.; Oyster Creek, N.J.; Haddam Neck, Conn.; Big Rock Point, Mich.; San Onofre, Calif.; and Nuclear Fuel Services, Tenn.

If such a study goes forward, it is essential that the USNRC communicate with and involve the public and other stakeholders in order to broaden acceptance of the results, the report stresses. A plan for stakeholder engagement should be developed prior to the initiation of data gathering and analysis, and it should include processes to identify key stakeholders, assess their perceptions and concerns, communicate the questions that the study would address and its strengths and limitations, and make the data used in the study publicly accessible to the extent possible.

Provided by National Academy of Sciences