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# Appendix A

## CDC and NCI Responses to Key NAS Recommendations

The National Academy of Sciences Committee to Review the CDC-NCI Feasibility Study of the Health Consequences from Nuclear Weapon Test was asked by CDC to address the following specific questions:

1. Are the methods and sources of information used in the technical report to estimate radiation doses and health effects from fallout appropriate for this study?
2. Are the methods and results clearly presented in the main text of the technical report?
3. Are the findings presented in the report supported by the data and analyses provided?
4. Do the Options for Future Work presented in Chapter 6 represent an appropriate range of options for public health activities that could be pursued as a result of this study?

The Committee made the following comments and recommendations to CDC and NCI. The CDC/NCI responses to these recommendations are also provided.

### **Estimates of dose from Nevada Test Site and global fallout**

***Recommendation:*** The committee recommends that changes be made in the draft report to clarify the assumptions, methods, and uncertainties related to dose estimation. Tables should be used to lay out the sources of uncertainty in the dosimetry and in the estimation of risk. The basis of a “credibility interval” of a factor of 3 for dose estimates should be described in the text in a manner analogous to description of the credibility interval for the risk estimation (given some dose).

***CDC/NCI Response:***

The main assumptions and the methods related to dose estimation have been clarified in the body of the report. In addition, the Appendices D, E, F, and G where the methods are

explained in detail are referred to as many times as judged appropriate. However, it was considered that a systematic assessment of the uncertainties associated with the dose estimates was not within the scope of this feasibility report. It was subjectively estimated that the 90% credibility interval for dose extends from a factor of about 3 below the dose estimate to a factor of about 3 above the estimate. It is emphasized that this quantitative estimate of uncertainty was provided for illustration only. In fact, the uncertainties in the dose estimates vary according to the type of dose that is considered, the conditions of exposure, and the lifestyle and dietary habits of the population groups or individuals that are considered. A much more detailed dose estimation process would be needed in order to derive the uncertainties with a reasonable degree of reliability. It would be carried out if the decision is made to exercise Option 5.

**Recommendation:** CDC and NCI should consider performing a reanalysis of the  $^{131}\text{I}$  exposures to the American public that would incorporate new dosimetry-related information from Chernobyl and elsewhere, the contribution of global fallout, a more comprehensive uncertainty analysis, and correction of acknowledged errors in the previous dosimetry. However, the committee does not recommend an expanded study of exposure to radionuclides other than  $^{131}\text{I}$  inasmuch as the human doses were much lower than those of  $^{131}\text{I}$ , they confer essentially non-detectable increases in individual risk, and the risks are of little public-health significance.

**CDC/NCI Response:** CDC and NCI acknowledge that the feasibility report incorporates data available through Fall 2001, and that should future research efforts be undertaken by either agency these should include the topics addressed in this recommendation. It should be noted that these analyses, particularly the estimation of the contribution of global fallout to the  $^{131}\text{I}$  exposures of the American public and the preparation of a more comprehensive uncertainty analysis, will require a substantial effort and, although these updates might affect the estimated doses, they would not change the report's conclusions regarding the feasibility of a study.

## **Document location and retrieval**

**Recommendation:** The committee recommends an effort to retrieve and archive additional relevant information about the nuclear-weapons testing program. That means collecting data preserved in various repositories that have not been cataloged and may be in danger of imminent destruction. CDC should also:

- Continue its search for documents not held by governmental agencies and take steps necessary to ensure their preservation.
- Enroll other government agencies, especially the Department of Defense, in the effort to identify, preserve, and publish information.
- Make copies of key documents, the data derived from them, and relevant computer codes or other calculation tools and make them all publicly available, including archiving and providing public access to all the databases and spreadsheets generated by the feasibility study and mentioned in it and its appendices, together with inputs and calculation tools used for other studies performed for NCI and CDC.

***CDC/NCI Response:*** CDC has a long history of conducting similar projects, and will undertake this particular effort if resources are identified. NCI will continue to process unique and unpublished fallout data sets obtained by means of direct contact with fallout specialists.

***Recommendation:*** The committee also recommends that CDC urge Congress to declare a government-wide moratorium on the destruction of documents that are potentially pertinent to measuring fallout in the United States and to mandate declassification of historical fallout-related records.

***CDC/NCI Response:*** CDC will explore methods to communicate this information to Congress and other stakeholders.

## **Estimates of cancer and non-cancer risks**

***Recommendation:*** The committee recommends that more emphasis be placed on levels of individual risk and the associated uncertainty and less on population risk from collective dose. Although collective dose and population risk may have some public health utility if the doses are significant in the context of doses and risks from other sources, they fail to show the size of the risk that individuals are likely to experience, which is the key consideration for concerned citizens and for most public-health implications. It is also important that the executive summary and text compare putative lifetime risks posed by fallout with risks posed by natural background irradiation and with natural lifetime risks. Such comparisons will help to provide a perspective for the general public to better understand the risks related to fallout.

***CDC/NCI Response:***

Although qualitative statements are made in the report on the levels of individual risk and of their associated uncertainties, it was considered that quantitative estimates were beyond the scope of this feasibility report.

With regard to the comparison of fallout and natural background radiation, a section was added in Chapter 3 to describe the components of natural background radiation exposure; this section includes a presentation of the geographic variation of natural background exposures in the continental U.S. in the form of maps, which allow a comparison with the doses from fallout to be made. The corresponding risks are considered in section 4.

***Recommendation:*** The potential that the dose-response association might have a substantial upward quadratic component or a threshold should be considered in modeling the risk of leukemia posed by fallout radiation.

***CDC/NCI Response:***

The potential that the dose-response association might have a substantial upward quadratic component or a threshold was mentioned in the discussion of the risk estimates. The implications of dose-response curves other than linear, however, were not assessed quantitatively in the absence of refined dose estimates.

***Recommendation:*** There is no evidence that radiation doses of the magnitude sustained from NTS or global fallout cause any of the major non-cancer diseases (cardiovascular, respiratory, digestive or genitourinary). A conclusion to this effect would therefore be appropriate.

***CDC/NCI Response:***

It was clearly indicated in the report that, other than thyroid cancer and leukemia, there is no epidemiological evidence that fallout caused any other major disease.

## **Communication with the public about exposure and cancer risk**

***Recommendation:*** CDC/NCI should develop a detailed public summary and a communication plan for its distribution. The public summary should provide information that can be readily understood by the lay public, including comparison of background radiation with the radiation doses discussed in the report of the feasibility study and a description of the important uncertainties (related to dose and risk) that apply to the feasibility study.

***CDC/NCI Response:*** CDC has developed a public summary, which will be posted on its website (<http://www.cdc.gov/nceh/radiation/fallout/default.htm>) and linked with NCI's <sup>131</sup>I/Nevada Test Site website materials. The public summary discusses comparison with background radiation as well as the importance of uncertainties in dose and risk estimates that apply to the feasibility study.

***Recommendation:*** The agencies should phase information from the feasibility study into the <sup>131</sup>I/Nevada Test Site Communication Plan in a timely fashion to give interested American citizens a more complete picture of their exposure to NTS and global fallout with appropriate explanations of relative health risks.

***CDC/NCI Response:*** A public summary providing information from the feasibility study will be linked with the <sup>131</sup>I/Nevada Test Site Communication Plan on the NCI website. If additional information becomes available through further research, CDC will ensure that it is also added into these linked websites in a timely fashion.

**Recommendation:** If Option 5 is adopted and important new scientific work develops, CDC/NCI should produce a timely major educational effort that builds on the efforts of the communication plan for the <sup>131</sup>I/Nevada Test Site study.

**CDC/NCI Response:** If additional information were found that would have significant impact on the data and/or conclusions in this feasibility report, CDC and NCI could produce appropriate materials building on the existing communication efforts related to the <sup>131</sup>I/Nevada Test Site.

**Recommendation:** CDC and NCI should make studies on radiation exposure of US citizens transparent and accessible to interested individuals. The committee recommends that interested citizens take part in the study process and, with scientific and social science experts, serve as members of advisory boards for such studies.

**CDC/NCI Response:** Communication of study results to interested individuals and the general public are important aspects of CDC and NCI policy, and will continue to be emphasized in the areas of radiation exposure and associated health effects, as well as others. We will also continue to provide opportunities for interested members of the public to participate in the study process and to serve on study advisory boards.

**Recommendation:** CDC and NCI should hold a follow-up conference, similar to the one sponsored by NCI on risk communication (January 2000), as part of the continuing CDC effort to develop effective guidelines for communicating radiation risk to the American public.

**CDC/NCI Response:** CDC has held several meetings and roundtables in which radiation risk communications has been a key topic. We will continue to seek opportunities to add to the body of knowledge about this important topic.