Thyroid Doses and Risk of Thyroid Cancer From Exposure to I-131 from the Nevada Test Site

Ann G. Moore
A. Iulian Apostoaei, Ph.D.
Brian A. Thomas, M.S.
F. Owen Hoffman, Ph.D.

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SENES Oak Ridge, Inc.
102 Donner Drive
Oak Ridge, TN 37830

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I. Introduction

The Nevada Test Site (NTS) was used by the U.S. government for above-ground testing of nuclear weapons from early 1951 through mid-1962. After the U.S., the Soviet Union and the United Kingdom signed a limited test ban treaty in 1963, the NTS was used for a number of underground tests. All above-ground and some underground nuclear tests released radionuclides into the atmosphere raising concerns about possible adverse health effects due to exposure to radiation (Simon 2006). One of the important radionuclides is Iodine-131 (I-131), which may induce thyroid cancer because it accumulates in the thyroid gland of individuals who consumed contaminated milk and other foods for about one to two months following each nuclear test. Virtually all 160 million Americans who lived in the continental U.S. during the nuclear testing period were exposed to I-131. The radiation doses to the thyroid gland and the risk of developing thyroid cancer for an exposed individual depend largely on age at the time of each nuclear test, geographical location, and the type and amount of milk consumed. The thyroid doses from exposure to I-131 in NTS fallout have been analyzed by the National Cancer Institute (NCI 1997). The NCI maintains a website (http://www.cancer.gov/i131) containing information and resources for Americans exposed to I-131 through fallout from nuclear testing in the 1950s and 1960s, including an online calculator that estimates thyroid doses and risk of thyroid cancer based on information about residence and milk consumption during the time nuclear weapons were being tested at NTS. The methodology for estimating the risk of thyroid cancer used in the NCI's calculator is presented by Apostoaei et al. (2003).

This report provides a set of look-up tables of representative thyroid doses and risks of thyroid cancer for individuals exposed to I-131 in fallout from nuclear weapons testing at the Nevada Test Site. These tables are intended to be used by people who do not have access to a computer. The look-up tables contain estimates of doses and risks for eight representative birth cohorts and sixty-seven locations in eight regions around the

continental United States. They were obtained using a slightly modified version[1] of the NCI's online dose and risk calculator for exposures to I-131 in NTS fallout.

The look-up tables provided here do not cover all possible exposure situations, but they can be used to estimate the general magnitude of a person's thyroid dose and risk of thyroid cancer from NTS fallout according to birth cohort, gender, given residence history, and given amount and type of milk consumed.

Individuals with access to a computer with connection to the Internet can use NCI's online dose and risk calculator, which allows a larger set of options, including personalized residence and milk consumption histories. This report briefly describes the NCI's online dose and risk calculator and provides step by step instructions for using this calculator to obtain a highly personalized assessment of doses and risks from I-131 in NTS fallout.

The doses and risk estimates included in this report account only for I-131 released into the atmosphere from nuclear weapons tests at the Nevada Test Site. In certain regions of the country, people lived in the vicinity of nuclear facilities (e.g., Hanford, Washington; Oak Ridge, Tennessee) where they were exposed to additional amounts of I-131 released into the atmosphere by operations that overlapped in time with the nuclear weapons tests at NTS. The effect of combining these two sources of I-131 (i.e., NTS fallout and releases from local facilities) was investigated in an earlier report (SENES 2005), which gives combined doses and risks for real individuals who lived near Oak Ridge, TN, and Hanford, WA, facilities during the years of I-131 releases.

Iodine-131 and other radionuclides produced by nuclear tests performed outside the boundaries of the U.S. could also have traveled over the U.S. territory and affected

[1] The modified version allows the user to report mean instead of median doses, and 95% instead of 90% confidence intervals. The modified dose and risk calculator estimates risk using the thyroid cancer risk model recently published by the BEIR VII (NRC/NAS 2006).

American people. To date, a methodology for addressing the effects of the global fallout has not been completely established, even though CDC/NCI (2005) believe that development of such a methodology is feasible and recommended Congress to consider conducting a more detail dose reconstruction of radioactive fallout from global nuclear weapons testing for I-131. Approximate estimates of the doses and risks from exposure to global fallout has been addressed in CDC/NCI (2005) and reported in *American Scientist* by Simon et al (2006).

II. Methods

As a means of creating a general purpose set of tables for use in obtaining a thyroid dose and the associated risk of thyroid cancer, several birth years were chosen during the relevant time period, spaced roughly every five years, starting with 1935. Also included were 1952 and 1957, known to be years with substantial I-131 deposition from the weapons testing program at the Nevada Test Site. Several counties in almost every state throughout the continental United States were selected as sites of residence (Figure 1).

For purposes of this study, the following assumptions were made:

1. All thyroid doses were run for females, since their dose results in a risk of developing cancer as much as three times higher than for males.
2. Milk consumption was assumed to be an average amount of retail commercial cow's milk (i.e., 1-3 eight-ounce glasses per day).
3. The birth date of the individual was assumed to be January 1 of the birth year.
4. Residence was assumed to be in the same location for the entire period of exposure.

III. How to Use these Tables

Follow these steps to determine an estimate of your dose and risk from NTS weapons testing fallout:

Step 1.

Select the table that contains the birth year that is closest to your birth year.

Table Number	Birth Year	Page
1	1935	10
2	1940	12
3	1945	14
4	1950	16
5	1952	18
6	1955	20
7	1957	22
8	1960	24

Note: To apply the results found in these tables to males, see the "Gender Differences" section below.

Step 2.

Locate the region of the country, state, and county in which you resided during the time period from 1951-1971.

Step 3.

Read horizontally across the page to determine an estimate of your results.

a. The first three columns report the approximate thyroid dose that you received (the lower and upper values represent a 95% uncertainty range). The doses are reported in rad. The "rad" is a unit used to express radiation dose. It is a measure of the energy absorbed in the organ or tissue exposed to radiation. Everyone is exposed to radiation in the course of everyday life. There is a natural "background" radiation (from, for example, cosmic rays) and on average this background radiation exposes a person's thyroid to about 0.1 rad per year. A single chest x-ray gives a thyroid dose to a person of about 0.007

rad. One transcontinental round-trip flight gives a thyroid dose of about 0.005 rad.

b. If you are currently free of thyroid disease, the values reported in the second set of three columns represent the chances out of 1000 that you will develop thyroid cancer in the future. Note: This estimate includes both the risk from exposure to NTS fallout and the baseline risk for an unexposed population.

c. If you have already been diagnosed with thyroid cancer, the values reported in the last three columns represent the probability that the dose you received contributed to the development of the thyroid cancer. Note: The probability of causation is not a true probability but a statistical term obtained from differences in disease rates anticipated in large population groups composed of exposed and unexposed individuals. For this reason, the term "probability of causation" is more correctly referred to as an "assigned share" (Land 2003).

Step 4.

Adjust doses and risks extracted from the tables according to gender, milk consumption and milk type as discussed below.

IV. Gender Differences

Although doses to males and females are similar for the same location and diet, the risk is lower for males than for females due to a lower baseline risk and a lower sensitivity to radiation exposure. That is, for a similar radiation dose, the risk for males would be approximately a factor of 3 to 4 times lower than that for females (Table 10). This means that the female risk number should be divided by a factor of three to four to give an approximation of the risk for a male living in the same region.

V. Variations in Milk Consumption

This report contains tables of dose and risk obtained using an average milk consumption rate of 2 glasses per day (a range of 1-3 glasses per day). If the user drank more or less than 2 glasses a day of retail commercial cow's milk, the doses and risks

should be adjusted accordingly. Table 11 illustrates the variation in doses and risk due to rate of milk consumption. For instance, if you drank 4 glasses a day, multiply the number in the table by 2. If you drank 1 glass per day, divide by 2.

VI. Different Milk Source

The source of milk has a profound effect on the amount of exposure a consumer had to I-131 and the subsequent dose to the thyroid. For the tables, retail commercial milk was used as the milk source. If someone drank goat's milk or milk from a backyard cow, their dose would be higher, with the largest difference in dose occurring for someone on a diet of goat's milk. Table 11 illustrates these differences due to milk source. For example, if a person drank an average amount of goat's milk, their thyroid dose would be 6 to16 times higher than if they drank an average amount of commercial retail cow's milk depending on their location of residence. If a person drank milk from a backyard cow (assumed to be a fairly large quantity because of the availability of milk), their dose would be about 2 times higher. Another variation is a child that was breast-fed during the first year, for whom the dose to the thyroid would be lower by about 30% than a diet of retail commercial cow's milk.

VII. Risk of Developing Thyroid Cancer if Not Exposed to NTS Fallout

It is worth noting that there exists a baseline risk of developing thyroid cancer, without taking into consideration any exposure to radiation, as illustrated in Table 9. Females are almost two times as likely as males to develop thyroid cancer without considering any radiation dose or milk consumption rates. When these factors are added to the baseline risk, the rate of thyroid cancer occurrence increases to 3 to 4 times greater for females than for males. With regard to future risk, the reference to "chances per 1000" means that there are a certain number of chances per 1000 people of getting cancer. This is the baseline risk plus the excess risk due to exposure. When thyroid doses are low, the total future risk is virtually the same as the baseline risk.

VIII. How to Perform a Custom Calculation

If the user has access to a computer with an internet connection, an online dose and risk calculator can be used to determine one's own unique thyroid dose and risk of thyroid cancer based on one's birth year, place (or places) of residence, and type and amount of milk consumed. The web address to access the on-line dose calculator is: http://ntsi131.nci.nih.gov. The on-line calculator presents the dose and risk estimates in an easy-to-read manner, and provides information to help users put their future risk from exposure to NTS fallout into perspective using comparisons with the risk of thyroid cancer from natural causes.

Directions for using the NCI on-line dose and risk calculator are as follows:

From the introductory page, select "Start Calculator" from the bottom of the page.

The next page requires input of birthday, gender, and year of diagnosis of thyroid cancer if a cancer has been diagnosed.

Clicking "next" brings the user to the page where residential history and milk consumption are entered.

There are directions on the page that instruct the user how to enter their residential locations and milk consumption during this time period. After all information has been entered, pressing the "calculate dose" button will yield after a short period of time, an estimated thyroid dose from exposure to I-131 in NTS fallout.

Doses can be viewed by shot and by year, in addition to total dose. Press "calculate risk" to obtain estimates of risk. The risk estimate includes the total future risk and the risk for an unexposed group of the same age and gender.

IX. Additional Considerations

There are some notable differences of information in what is presented in this report and the NCI on-line dose calculator that are worthy of mention. The NCI calculator reports a 90% range of uncertainty and a median value, while the calculations presented in this document give a 95% range of uncertainty and an arithmetic mean

value. The central value from the NCI calculator will be lower than the mean value presented here. Also, the NCI calculator does not at present provide values for the Probability of Causation or Assigned Share, and has not yet implemented the latest risk algorithms from the BEIR VII report of the National Academies of Science, which gives an increased risk for females and a somewhat decreased risk for males. The addition of this information to the NCI calculator is currently under development.

X. References

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Table 1 Dose and risk estimates for a **female born in 1935** on a diet of retail commercial milk

U.S. Region	Thyroid Dose (rad)			Future Risk (chances/1,000)[a]			PC/AS (%)[b]		
County, State	Lower[c]	Mean	Upper[c]	Lower	Mean	Upper	Lower	Mean	Upper
Pacific Coast									
King, WA	0.27	1.4	5.8	1.1	1.4	1.7	0.17	3.4	18
Multnomah, OR	0.2	0.7	2.3	1.1	1.3	1.5	0.11	1.8	8.3
Jackson, OR	0.19	1.2	5.5	1.1	1.4	1.6	0.13	2.9	15
Butte, CA	0.23	1.3	5.4	1.1	1.4	1.6	0.17	3.3	17
Los Angeles, CA	0.019	0.2	0.96	1.1	1.3	1.5	0.017	0.6	3.5
San Francisco, CA	0.18	1.2	5.2	1.1	1.4	1.6	0.14	3	16
Western States									
Benton, Wa[d]	0.22	0.99	3.7	1.1	1.4	1.6	0.14	2.5	13
Humboldt, NV	0.24	1.7	8	1.1	1.4	1.7	0.16	3.8	22
Elko, NV	0.45	2.2	8.6	1.1	1.4	1.8	0.33	5.5	27
Storey, NV	0.22	0.99	3.7	1.1	1.4	1.6	0.12	2.2	11
Clark, NV	0.21	1.1	4.4	1.1	1.4	1.6	0.13	2.8	15
Salt Lake, UT	1.3	5	18	1.2	1.5	2.3	0.78	10	42
Iron, UT	0.4	2.1	9.1	1.1	1.4	1.8	0.24	4.6	23
Washington, UT	1.5	19	100	1.2	2.1	6.1	1.2	22	77
Maricopa, AZ	0.052	0.25	0.92	1.1	1.3	1.5	0.03	0.66	3.5
Bernlillo, NM	0.69	3.1	12	1.2	1.4	2	0.49	7	32
Mountain States									
Kootenai, ID	0.63	3.9	16	1.2	1.5	2.2	0.51	7.7	38
Boise, ID	1.2	13	74	1.2	1.8	4.4	0.85	17	70
Bonneville, ID[d]	0.77	3.6	13	1.2	1.5	2.1	0.46	8	36
Lewis & Clark, MT	1.7	17	89	1.2	1.9	5.1	1.3	20	74
Daniels, MT	1.7	6.5	23	1.2	1.6	2.5	0.98	12	47
Sheridan, WY	1.3	4.4	14	1.2	1.5	2.1	0.71	8.9	36
Gunnison, CO	1.8	29	170	1.2	2.5	8.7	1.3	23	84
Denver, CO	1.4	3.4	8.7	1.2	1.4	1.9	0.67	7.7	29
Central States									
Burleigh, ND	1.5	5.7	19	1.2	1.5	2.4	0.87	10	44
Pennington, SD	1.9	8.4	31	1.2	1.6	3	1.2	15	55
Hall, NE	1.8	6.9	24	1.2	1.6	2.6	0.99	13	48
Wyandotte, KS	1.7	5.5	17	1.2	1.5	2.2	0.99	11	40
Ness, KS	2	7.1	22	1.2	1.6	2.4	1	13	49
Lake of the Woods, MN	0.79	3.4	13	1.1	1.4	2	0.45	7	33
Scott, MN	1.6	7.5	28	1.2	1.6	2.8	1.1	14	52
Story, IA	1.9	10	43	1.2	1.7	3.2	1.2	15	60
Calloway, MO	1.7	5.5	17	1.2	1.5	2.3	0.92	11	41
Vilas, WI	1	4.7	18	1.2	1.5	2.2	0.72	9.4	39
Cook, IL	1	3.6	12	1.2	1.5	2	0.61	7.9	34
Macon, IL	1.6	9.8	43	1.2	1.7	3.2	0.91	15	57
Alcona, MI	0.81	4.2	18	1.2	1.5	2.2	0.49	8.6	42
Hamilton, IN	1.1	5.8	24	1.2	1.5	2.4	0.69	10	46

Table 1 (cont) Dose and risk estimates for a **female born in 1935** on a diet of retail commercial milk

U.S. Region	Thyroid Dose (rad)			Future Risk (chances/1,000)[a]			PC/AS (%)[b]		
County, State	Lower[c]	Mean	Upper[c]	Lower	Mean	Upper	Lower	Mean	Upper
Southeast States									
Anderson, TN[d]	0.75	2.1	6	1.1	1.4	1.7	0.4	5.1	22
Forsyth, NC	0.51	1.4	4.1	1.1	1.4	1.6	0.3	3.6	17
Montgomery, AL	0.56	1.4	3.4	1.1	1.4	1.6	0.3	3.4	14
Fulton, GA	0.47	1.2	2.8	1.1	1.4	1.6	0.23	2.8	12
Aiken, SC[d]	0.52	1.5	4.3	1.1	1.4	1.6	0.29	3.6	16
Orange, FL	0.26	0.7	2	1.1	1.3	1.5	0.13	1.7	7.6
Southern States									
Ellis, OK	1.6	5.7	18	1.2	1.5	2.3	1	11	42
Pulaski, AR	1.3	5.3	20	1.2	1.5	2.4	0.77	10	43
Dallas, TX	1.3	4.9	17	1.2	1.5	2.2	0.74	9.8	39
El Paso, TX	0.43	2	8	1.1	1.4	1.8	0.26	4.6	25
Bexar, TX	0.43	1.5	4.8	1.1	1.4	1.6	0.27	3.7	17
Jackson, TX	0.37	1.2	3.9	1.1	1.4	1.6	0.2	3.1	14
Rapides, LA	0.68	4	18	1.2	1.5	2.1	0.45	7.6	37
Madison, MS	0.45	1.6	6.2	1.1	1.4	1.7	0.25	3.9	21
Eastern States									
Washington, DC	0.72	2	5.3	1.2	1.4	1.7	0.42	4.9	20
Richmond, VA	0.77	2.3	6.7	1.2	1.4	1.8	0.47	5.6	23
Hudson, NJ	0.75	2.7	8.7	1.2	1.4	1.8	0.44	6.3	26
Baltimore, MD	0.91	2.9	8.6	1.2	1.4	1.9	0.46	6.6	28
Kanawha, WV	0.78	2.7	8.5	1.2	1.4	1.8	0.45	5.5	23
Allegheny, PA	0.67	2.4	7.8	1.2	1.4	1.7	0.39	5.2	23
Cuyahoga, OH	1.2	4.8	17	1.2	1.5	2.3	0.7	9.5	42
Hopkins, KY	0.77	2.2	6.1	1.2	1.4	1.7	0.41	5.2	23
Northeast States									
Erie, NY	0.95	3.7	13	1.2	1.5	2.1	0.59	8.2	35
Albany, NY	1	5.9	25	1.2	1.5	2.4	0.68	11	44
Suffolk, MA	0.88	3.4	11	1.2	1.5	2.1	0.52	7.8	35
Chittenden, VT	1.2	7.8	35	1.2	1.6	3.1	0.9	13	58
Grafton, NH	1	4.5	17	1.2	1.5	2.2	0.63	9	39
Cumberland, ME	0.74	4.1	17	1.2	1.5	2.2	0.44	8.1	38
Aroostook, ME	0.98	4.5	17	1.2	1.5	2.3	0.64	9.2	41

[a] Future risk of developing thyroid cancer for those who have not been diagnosed with thyroid cancer.

[b] Probability of Causation/Assigned Share (PC/AS) for those who have been diagnosed with thyroid cancer.

[c] Lower and upper bound values represent a 95% uncertainty range.

[d] Additional exposure occurred for individuals residing near federal facilities that released I-131 during times similar to the era of nuclear weapons testing at the Nevada Test Site (Hanford WA, Idaho Falls ID, Oak Ridge TN, and Savanah River SC).

Table 2 Dose and risk estimates for a **female born in 1940** on a diet of retail commercial milk

U.S. Region	Thyroid Dose (rad)			Future Risk (chances/1,000)[a]			PC/AS (%)[b]		
County, State	Lower[c]	Mean	Upper[c]	Lower	Mean	Upper	Lower	Mean	Upper
Pacific Coast									
King, WA	0.48	2.1	7.8	1.2	1.7	2.3	0.47	6.5	29
Multnomah, OR	0.36	1.1	3.3	1.2	1.7	2	0.32	3.9	16
Jackson, OR	0.32	1.7	7.5	1.2	1.7	2.2	0.36	5.6	26
Butte, CA	0.37	1.9	7.7	1.3	1.7	2.3	0.42	6.2	28
Los Angeles, CA	0.029	0.27	1.3	1.2	1.6	1.8	<0.1	1.1	6.3
San Francisco, CA	0.29	1.7	7.2	1.2	1.7	2.2	0.36	5.6	27
Western States									
Benton, Wa[d]	0.41	1.6	5.8	1.2	1.7	2.2	0.4	5.3	24
Humboldt, NV	0.41	2.7	12	1.2	1.7	2.6	0.43	7.7	37
Elko, NV	0.7	3.3	12	1.3	1.8	2.7	0.81	10	41
Storey, NV	0.36	1.9	7.7	1.2	1.7	2.2	0.34	5.3	25
Clark, NV	0.37	1.8	6.8	1.3	1.7	2.3	0.38	5.7	27
Salt Lake, UT	2.1	7.8	27	1.4	2.1	4	2.1	18	60
Iron, UT	0.63	3.4	14	1.3	1.8	2.7	0.66	9.2	41
Washington, UT	2.4	26	130	1.5	3.3	12	3	33	86
Maricopa, AZ	0.078	0.39	1.6	1.2	1.6	1.8	<0.1	1.4	6.9
Bernlillo, NM	1	4.4	16	1.3	1.9	3.1	1.2	12	48
Mountain States									
Kootenai, ID	1.2	7	29	1.4	2	4	1.5	16	58
Boise, ID	2	19	99	1.4	2.8	9	2.2	28	82
Bonneville, ID[d]	1.5	5.8	19	1.3	2	3.5	1.4	15	53
Lewis & Clark, MT	3.4	26	140	1.4	3.2	11	3.7	32	85
Daniels, MT	3.4	13	41	1.4	2.3	4.9	3	24	67
Sheridan, WY	2.3	8	25	1.3	2	3.8	2	18	59
Gunnison, CO	3	39	230	1.4	4.3	18	3.3	34	91
Denver, CO	2.3	5.7	14	1.3	1.9	3.2	1.8	15	48
Central States									
Burleigh, ND	3	12	46	1.4	2.3	5.3	2.7	22	70
Pennington, SD	3.6	15	53	1.4	2.5	6.2	3.4	27	74
Hall, NE	3.3	12	41	1.4	2.3	4.9	2.8	24	67
Wyandotte, KS	3	9.7	30	1.4	2.2	4	2.7	21	62
Ness, KS	3.8	13	40	1.4	2.3	5	3.2	25	68
Lake of the Woods, MN	1.5	5.8	20	1.3	1.9	3.4	1.4	14	53
Scott, MN	3	12	43	1.4	2.3	5.2	2.9	24	70
Story, IA	3.2	16	66	1.4	2.5	6.4	3.1	26	76
Calloway, MO	3.1	11	35	1.4	2.2	4.5	2.9	22	64
Vilas, WI	1.8	7.7	27	1.4	2.1	3.9	1.9	18	59
Cook, IL	1.8	5.7	17	1.3	1.9	3.3	1.7	15	51
Macon, IL	2.8	15	66	1.4	2.5	6.5	2.5	26	75
Alcona, MI	1.4	6.2	25	1.3	2	3.7	1.4	15	58
Hamilton, IN	1.8	8	31	1.4	2.1	4.1	1.8	18	61

Table 2 (cont) Dose and risk estimates for a **female born in 1940** on a diet of retail commercial milk

U.S. Region	Thyroid Dose (rad)			Future Risk (chances/1,000)[a]			PC/AS (%)[b]		
County, State	Lower[c]	Mean	Upper[c]	Lower	Mean	Upper	Lower	Mean	Upper
Southeast States									
Anderson, TN[d]	1.3	3.7	10	1.3	1.8	2.6	1.1	11	39
Forsyth, NC	0.87	2.5	7.1	1.3	1.7	2.3	0.83	7.7	31
Montgomery, AL	0.99	2.6	6.8	1.3	1.7	2.3	0.84	7.9	29
Fulton, GA	0.84	2.2	6.1	1.3	1.7	2.2	0.66	6.6	25
Aiken, SC[d]	0.92	2.6	7.1	1.3	1.7	2.3	0.79	7.9	30
Orange, FL	0.42	1.2	3.2	1.2	1.6	2	0.33	3.7	15
Southern States									
Ellis, OK	2.9	10	32	1.4	2.2	4.2	2.8	22	63
Pulaski, AR	2.5	9.3	33	1.4	2.2	4.5	2.3	20	64
Dallas, TX	2.3	8.2	27	1.4	2.1	4	2	19	58
El Paso, TX	0.7	3	11	1.3	1.8	2.6	0.67	8.7	39
Bexar, TX	0.76	2.5	8.2	1.3	1.7	2.3	0.74	7.7	31
Jackson, TX	0.66	2.1	6.7	1.3	1.7	2.2	0.57	6.7	28
Rapides, LA	1.2	6.6	29	1.3	2	3.7	1.3	15	55
Madison, MS	0.79	2.7	9.1	1.3	1.7	2.5	0.73	8	35
Eastern States									
Washington, DC	1.2	3.3	9.4	1.3	1.8	2.5	1.1	9.9	36
Richmond, VA	1.3	3.8	11	1.3	1.8	2.7	1.3	11	38
Hudson, NJ	1.2	4.2	13	1.3	1.8	2.8	1.2	12	43
Baltimore, MD	1.5	4.7	14	1.3	1.9	3	1.2	13	45
Kanawha, WV	1.3	4.1	13	1.3	1.8	2.6	1.2	11	41
Allegheny, PA	1.1	3.5	11	1.3	1.8	2.5	1	10	37
Cuyahoga, OH	2.1	7.9	28	1.3	2.1	4.1	1.9	18	61
Hopkins, KY	1.4	4.1	12	1.3	1.8	2.7	1.2	11	41
Northeast States									
Erie, NY	1.7	6.3	22	1.3	2	3.7	1.7	16	57
Albany, NY	1.7	8.9	36	1.4	2.1	4.2	1.7	19	61
Suffolk, MA	1.6	5.6	19	1.3	1.9	3.5	1.4	15	53
Chittenden, VT	2.2	13	54	1.4	2.4	6	2.4	23	74
Grafton, NH	1.8	7.5	27	1.3	2	3.8	1.7	17	57
Cumberland, ME	1.3	6.4	26	1.3	2	3.7	1.3	15	56
Aroostook, ME	1.8	7.7	26	1.3	2.1	4.2	1.8	18	60

[a] Future risk of developing thyroid cancer for those who have not been diagnosed with thyroid cancer.

[b] Probability of Causation/Assigned Share (PC/AS) for those who have been diagnosed with thyroid cancer.

[c] Lower and upper bound values represent a 95% uncertainty range.

[d] Additional exposure occurred for individuals residing near federal facilities that released I-131 during times similar to the era of nuclear weapons testing at the Nevada Test Site (Hanford WA, Idaho Falls ID, Oak Ridge TN, and Savanah River SC).

Table 3 Dose and risk estimates for a **female born in 1945** on a diet of retail commercial milk

U.S. Region	Thyroid Dose (rad)			Future Risk (chances/1,000)[a]			PC/AS (%)[b]		
County, State	Lower[c]	Mean	Upper[c]	Lower	Mean	Upper	Lower	Mean	Upper
Pacific Coast									
King, WA	0.68	2.9	11	1.2	2.1	3.4	1.1	12	45
Multnomah, OR	0.51	1.6	4.6	1.2	1.9	2.6	0.77	7.3	27
Jackson, OR	0.46	2.4	10	1.1	2	3.1	0.85	10	41
Butte, CA	0.53	2.7	11	1.2	2.1	3.3	0.96	11	44
Los Angeles, CA	0.04	0.37	1.8	1.1	1.8	2.3	<0.1	2.1	12
San Francisco, CA	0.42	2.3	9.9	1.2	2	3.1	0.83	10	42
Western States									
Benton, Wa[d]	0.58	2.2	8.1	1.2	2	3	0.91	9.5	38
Humboldt, NV	0.57	3.7	17	1.2	2.1	3.9	1	13	54
Elko, NV	0.97	4.6	17	1.3	2.3	4.3	1.9	17	58
Storey, NV	0.49	2.6	10	1.2	2	3.1	0.77	9.3	39
Clark, NV	0.53	2.4	9.3	1.2	2	3.2	0.89	10	42
Salt Lake, UT	2.9	10	36	1.4	2.8	7	4.6	29	73
Iron, UT	0.84	4.5	18	1.2	2.2	4.2	1.5	15	56
Washington, UT	3.4	37	180	1.6	5.7	25	6.5	46	93
Maricopa, AZ	0.11	0.52	2.1	1.1	1.8	2.2	0.17	2.6	12
Bernlillo, NM	1.4	6.3	24	1.3	2.5	5	2.6	21	64
Mountain States									
Kootenai, ID	1.7	9.7	40	1.4	2.7	7	3.3	25	73
Boise, ID	2.9	27	140	1.5	4.7	19	5	40	90
Bonneville, ID[d]	2	8.1	26	1.3	2.6	6.2	3.2	25	68
Lewis & Clark, MT	4.8	36	180	1.5	5.4	21	8.1	46	92
Daniels, MT	4.7	17	56	1.6	3.4	9	6.8	37	80
Sheridan, WY	3.3	11	35	1.4	2.8	6.7	4.6	29	73
Gunnison, CO	4.2	56	330	1.5	7.6	39	7.3	48	96
Denver, CO	3.3	7.8	20	1.4	2.6	5.2	4.1	25	65
Central States									
Burleigh, ND	4.3	17	62	1.5	3.3	9.9	6	34	81
Pennington, SD	5.2	20	73	1.5	3.8	12	7.6	40	85
Hall, NE	4.7	17	56	1.5	3.4	9.2	6.4	37	79
Wyandotte, KS	4.2	13	41	1.5	3.1	7.2	6.1	33	75
Ness, KS	5.4	18	54	1.5	3.5	9.3	7.3	38	80
Lake of the Woods, MN	2.1	8.1	27	1.4	2.6	5.8	3.3	24	69
Scott, MN	4.2	17	59	1.5	3.5	10	6.6	37	83
Story, IA	4.8	24	100	1.5	4.1	13	7	40	87
Calloway, MO	4.3	15	47	1.5	3.2	8.3	6.4	34	77
Vilas, WI	2.6	11	38	1.4	2.9	6.9	4.3	29	74
Cook, IL	2.6	8	24	1.3	2.6	5.4	3.7	25	68
Macon, IL	4.1	23	98	1.5	4.1	13	5.8	39	86
Alcona, MI	2	8.7	34	1.3	2.7	6.5	3.1	25	73
Hamilton, IN	2.7	13	55	1.4	3.1	8.2	4.3	29	77

Table 3 (cont) Dose and risk estimates for a **female born in 1945** on a diet of retail commercial milk

U.S. Region	Thyroid Dose (rad)			Future Risk (chances/1,000)[a]			PC/AS (%)[b]		
County, State	Lower[c]	Mean	Upper[c]	Lower	Mean	Upper	Lower	Mean	Upper
Southeast States									
Anderson, TN[d]	1.8	5.1	14	1.3	2.3	4	2.6	18	54
Forsyth, NC	1.2	3.4	9.6	1.2	2.1	3.3	1.9	14	46
Montgomery, AL	1.4	3.5	9	1.2	2.1	3.2	1.9	14	43
Fulton, GA	1.2	3	8.1	1.2	2.1	3	1.5	12	39
Aiken, SC[d]	1.3	3.6	10	1.2	2.1	3.3	1.9	14	45
Orange, FL	0.51	1.6	4.6	1.2	1.9	2.5	0.71	7	26
Southern States									
Ellis, OK	4	14	44	1.5	3.2	7.5	6.4	34	76
Pulaski, AR	3.4	13	46	1.4	3.1	8.3	5.2	31	77
Dallas, TX	3.3	12	38	1.4	2.9	6.9	4.7	31	73
El Paso, TX	0.96	4.2	16	1.2	2.2	4.2	1.5	15	57
Bexar, TX	1.1	3.5	11	1.2	2.1	3.4	1.7	14	46
Jackson, TX	0.92	2.9	9.2	1.2	2.1	3.1	1.3	12	43
Rapides, LA	1.7	9	39	1.3	2.7	6	2.8	23	71
Madison, MS	1.1	3.6	13	1.2	2.1	3.7	1.7	14	51
Eastern States									
Washington, DC	1.8	4.7	13	1.3	2.3	3.8	2.6	18	52
Richmond, VA	1.9	5.3	15	1.3	2.3	4.1	2.9	19	56
Hudson, NJ	1.8	5.9	19	1.3	2.4	4.6	2.6	21	59
Baltimore, MD	2.2	6.8	20	1.3	2.4	4.7	3.5	22	62
Kanawha, WV	1.9	6.4	20	1.3	2.3	4.3	2.8	19	58
Allegheny, PA	1.6	5.3	17	1.3	2.3	3.9	2.3	18	54
Cuyahoga, OH	2.9	11	39	1.4	2.9	7	4.3	29	75
Hopkins, KY	1.9	5.6	16	1.3	2.3	4.2	2.7	19	57
Northeast States									
Erie, NY	2.4	8.7	30	1.3	2.7	6.2	3.8	26	70
Albany, NY	2.4	12	50	1.4	3	7.7	3.9	30	76
Suffolk, MA	2.2	7.9	26	1.4	2.6	5.7	3.3	25	68
Chittenden, VT	3.1	18	77	1.5	3.7	12	5.3	36	85
Grafton, NH	2.5	11	38	1.3	2.8	7	3.9	28	73
Cumberland, ME	1.9	9.1	37	1.3	2.7	6.5	3.1	25	72
Aroostook, ME	2.6	11	36	1.4	2.8	7.2	4	28	75

[a] Future risk of developing thyroid cancer for those who have not been diagnosed with thyroid cancer.

[b] Probability of Causation/Assigned Share (PC/AS) for those who have been diagnosed with thyroid cancer.

[c] Lower and upper bound values represent a 95% uncertainty range.

[d] Additional exposure occurred for individuals residing near federal facilities that released I-131 during times similar to the era of nuclear weapons testing at the Nevada Test Site (Hanford WA, Idaho Falls ID, Oak Ridge TN, and Savanah River SC).

Table 4 Dose and risk estimates for a **female born in 1950** on a diet of retail commercial milk

U.S. Region	Thyroid Dose (rad)			Future Risk (chances/1,000)[a]			PC/AS (%)[b]		
County, State	Lower[c]	Mean	Upper[c]	Lower	Mean	Upper	Lower	Mean	Upper
Pacific Coast									
King, WA	0.97	4.1	15	1	2.5	5.4	2.2	20	64
Multnomah, OR	0.73	2.2	6.5	1	2.2	3.6	1.6	14	45
Jackson, OR	0.66	3.4	15	0.98	2.5	5	1.7	18	61
Butte, CA	0.76	3.8	15	1.1	2.5	5.3	1.9	19	64
Los Angeles, CA	0.055	0.52	2.4	0.9	1.9	2.8	0.18	4.2	24
San Francisco, CA	0.6	3.3	14	1	2.4	5	1.7	18	63
Western States									
Benton, Wa[d]	0.82	3.2	11	1	2.4	4.8	2	17	58
Humboldt, NV	0.8	5.1	23	1	2.7	6.5	2	22	72
Elko, NV	1.4	6.3	23	1.1	3	7.7	3.6	28	75
Storey, NV	0.69	3.5	14	1	2.3	4.5	1.6	16	56
Clark, NV	0.74	3.3	13	1	2.4	5.1	1.8	18	60
Salt Lake, UT	4.1	14	48	1.3	4.2	14	9	43	86
Iron, UT	1.2	6.2	25	1.1	2.8	7.1	3.1	25	73
Washington, UT	4.7	51	260	1.6	11	54	13	60	96
Maricopa, AZ	0.15	0.71	2.9	0.94	2	2.7	0.35	5.1	23
Bernlillo, NM	2	8.6	32	1.2	3.3	9.1	5.3	33	79
Mountain States									
Kootenai, ID	2.4	14	57	1.3	4	14	6.8	38	86
Boise, ID	4.1	38	200	1.5	8.5	44	9.5	54	95
Bonneville, ID[d]	2.9	12	37	1.2	3.8	12	6.4	39	83
Lewis & Clark, MT	7	52	260	1.6	10	47	16	60	96
Daniels, MT	6.7	24	80	1.6	5.5	18	14	52	90
Sheridan, WY	4.7	16	48	1.3	4.2	13	9.6	43	85
Gunnison, CO	6	79	460	1.6	14	84	14	62	98
Denver, CO	4.6	11	28	1.3	3.6	9.6	8.1	39	80
Central States									
Burleigh, ND	6.1	24	88	1.5	5.2	19	12	49	90
Pennington, SD	7.4	29	100	1.5	6.4	26	15	55	93
Hall, NE	6.7	24	80	1.5	5.4	18	13	52	89
Wyandotte, KS	5.9	19	57	1.4	4.7	14	12	49	87
Ness, KS	7.7	25	76	1.5	5.6	19	14	53	90
Lake of the Woods, MN	3.1	11	38	1.3	3.6	11	6.8	37	83
Scott, MN	6	23	82	1.5	5.6	20	12	52	91
Story, IA	6.7	33	140	1.6	7	28	14	55	94
Calloway, MO	6.2	21	66	1.4	5	16	13	49	88
Vilas, WI	3.8	15	52	1.3	4.4	14	8.9	43	86
Cook, IL	3.7	11	34	1.2	3.7	10	7.5	39	82
Macon, IL	5.8	32	140	1.5	7	29	12	54	93
Alcona, MI	2.9	12	48	1.2	3.9	12	6.3	39	86
Hamilton, IN	3.9	19	75	1.3	4.7	16	8.6	43	88

Table 4 (cont) Dose and risk estimates for a **female born in 1950** on a diet of retail commercial milk

U.S. Region	Thyroid Dose (rad)			Future Risk (chances/1,000)[a]			PC/AS (%)[b]		
County, State	Lower[c]	Mean	Upper[c]	Lower	Mean	Upper	Lower	Mean	Upper
Southeast States									
Anderson, TN[d]	2.6	7.1	19	1.1	3	6.8	5.2	30	72
Forsyth, NC	1.7	4.9	14	1.1	2.6	5.4	4	24	65
Montgomery, AL	2	5	13	1.1	2.6	5	4	24	63
Fulton, GA	1.7	4.2	11	1.1	2.4	4.5	3.2	21	58
Aiken, SC[d]	1.8	5	14	1.1	2.6	5.3	3.8	24	64
Orange, FL	0.72	2.2	6.5	0.97	2.2	3.4	1.5	13	43
Southern States									
Ellis, OK	5.8	20	62	1.5	4.9	16	13	49	87
Pulaski, AR	4.9	18	64	1.4	4.7	17	11	46	88
Dallas, TX	4.7	16	53	1.4	4.3	14	9.7	45	86
El Paso, TX	1.4	5.8	22	1.1	2.8	7.1	3.2	25	74
Bexar, TX	1.5	4.9	16	1.1	2.6	5.4	3.6	23	65
Jackson, TX	1.3	4.2	13	1.1	2.5	5	2.7	21	63
Rapides, LA	2.4	13	57	1.3	3.9	12	5.9	36	84
Madison, MS	1.6	5.2	18	1.1	2.6	6.2	3.5	24	70
Eastern States									
Washington, DC	2.5	6.6	18	1.2	2.9	6.5	5.2	29	70
Richmond, VA	2.7	7.6	21	1.2	3	7.2	5.9	32	74
Hudson, NJ	2.5	8.3	26	1.2	3.2	8.2	5.3	33	76
Baltimore, MD	3.1	9.5	27	1.2	3.3	8.3	7.1	35	78
Kanawha, WV	2.7	9	28	1.2	3.1	7.5	5.8	32	75
Allegheny, PA	2.3	7.5	24	1.2	2.9	6.8	4.7	29	72
Cuyahoga, OH	4.2	16	56	1.3	4.3	14	8.7	43	87
Hopkins, KY	2.8	7.9	22	1.2	3	7.3	5.5	32	74
Northeast States									
Erie, NY	3.4	12	42	1.2	3.8	12	7.7	39	84
Albany, NY	3.4	17	70	1.3	4.6	16	7.7	44	88
Suffolk, MA	3.1	11	36	1.3	3.7	11	6.4	38	83
Chittenden, VT	4.4	25	110	1.5	6.1	24	11	50	93
Grafton, NH	3.6	15	52	1.2	4.1	13	7.8	41	85
Cumberland, ME	2.7	13	51	1.2	3.9	13	6.3	38	85
Aroostook, ME	3.7	15	53	1.4	4.3	15	8.1	43	87

[a] Future risk of developing thyroid cancer for those who have not been diagnosed with thyroid cancer.

[b] Probability of Causation/Assigned Share (PC/AS) for those who have been diagnosed with thyroid cancer.

[c] Lower and upper bound values represent a 95% uncertainty range.

[d] Additional exposure occurred for individuals residing near federal facilities that released I-131 during times similar to the era of nuclear weapons testing at the Nevada Test Site (Hanford WA, Idaho Falls ID, Oak Ridge TN, and Savanah River SC).

Table 5 Dose and risk estimates for a **female born in 1952** on a diet of retail commercial milk

U.S. Region	Thyroid Dose (rad)			Future Risk (chances/1,000)[a]			PC/AS (%)[b]		
County, State	Lower[c]	Mean	Upper[c]	Lower	Mean	Upper	Lower	Mean	Upper
Pacific Coast									
King, WA	1.2	4.7	17	0.82	2.7	7.1	3	26	74
Multnomah, OR	0.89	2.7	7.5	0.77	2.3	4.5	2.4	19	55
Jackson, OR	0.94	5.4	25	0.83	3	9.4	2.9	27	80
Butte, CA	1.1	6.1	26	0.84	3.1	8.8	3.1	29	78
Los Angeles, CA	0.064	0.41	1.7	0.68	1.8	2.8	0.2	4.1	21
San Francisco, CA	0.89	5.7	25	0.85	3	8	2.8	28	78
Western States									
Benton, Wa[d]	1	3.9	14	0.84	2.5	5.8	2.7	23	66
Humboldt, NV	1.1	8.5	40	0.86	3.5	12	3.2	32	86
Elko, NV	2	11	45	0.99	4.1	14	6.7	41	87
Storey, NV	0.97	4.4	16	0.78	2.5	5.5	2.7	22	67
Clark, NV	0.95	3.9	14	0.81	2.5	6.1	2.7	22	70
Salt Lake, UT	5.7	23	88	1.2	6.6	28	14	55	94
Iron, UT	1.4	7.3	29	0.92	3.1	8.7	4.1	31	80
Washington, UT	5.5	52	250	1.4	12	67	15	64	97
Maricopa, AZ	0.21	1.1	4.2	0.73	2	3.3	0.61	8.6	37
Bernlillo, NM	2.4	9.7	31	0.98	3.6	11	6.5	39	84
Mountain States									
Kootenai, ID	2.9	17	69	1.1	4.9	19	8.2	46	90
Boise, ID	5.1	56	300	1.3	13	79	15	63	98
Bonneville, ID[d]	3.9	16	56	1	5	18	9.6	49	90
Lewis & Clark, MT	8.3	66	340	1.5	15	83	19	67	98
Daniels, MT	7.5	27	86	1.2	6.1	24	17	58	92
Sheridan, WY	5.5	18	55	1.1	4.9	16	12	50	88
Gunnison, CO	7.7	89	490	1.6	18	110	21	69	98
Denver, CO	6.5	16	42	1.1	4.8	15	13	51	87
Central States									
Burleigh, ND	6.5	25	86	1.3	5.7	21	15	54	91
Pennington, SD	8.2	34	120	1.3	7.9	32	18	62	95
Hall, NE	8.3	29	95	1.3	6.9	25	17	60	93
Wyandotte, KS	7.5	24	77	1.3	6.2	23	16	58	92
Ness, KS	9.6	31	96	1.4	7.1	27	21	61	94
Lake of the Woods, MN	3.6	14	52	1.1	4.5	15	9.2	45	89
Scott, MN	7	27	98	1.3	7	28	17	58	94
Story, IA	7.6	42	180	1.3	9.1	43	18	62	96
Calloway, MO	8	27	86	1.3	6.4	24	16	58	92
Vilas, WI	4.6	19	65	1.1	5.3	21	11	51	91
Cook, IL	4.5	14	40	1.1	4.4	14	10	47	87
Macon, IL	7.2	40	180	1.4	9.4	42	17	62	96
Alcona, MI	3.5	15	60	1	4.7	19	8.9	46	90
Hamilton, IN	4.5	21	81	1.1	5.2	19	11	50	90

Table 5 (cont) Dose and risk estimates for a **female born in 1952** on a diet of retail commercial milk

U.S. Region	Thyroid Dose (rad)			Future Risk (chances/1,000)[a]			PC/AS (%)[b]		
County, State	Lower[c]	Mean	Upper[c]	Lower	Mean	Upper	Lower	Mean	Upper
Southeast States									
Anderson, TN[d]	3.2	9.4	25	0.97	3.5	10	7.3	39	81
Forsyth, NC	2.1	6.3	18	0.89	2.9	7.4	5	31	75
Montgomery, AL	2.5	6.5	16	0.92	2.9	6.8	5.6	32	73
Fulton, GA	2.1	5.1	13	0.85	2.6	6	5	27	68
Aiken, SC[d]	2.1	5.8	15	0.89	2.8	7	5.1	30	73
Orange, FL	0.98	3.1	9.8	0.77	2.3	4.8	2.4	19	60
Southern States									
Ellis, OK	6.9	24	80	1.3	6.1	23	16	56	92
Pulaski, AR	5.8	23	90	1.2	6.2	22	15	55	92
Dallas, TX	5.9	19	62	1.2	5.4	20	12	52	91
El Paso, TX	1.8	9	37	0.93	3.6	13	4.5	34	85
Bexar, TX	1.9	6.1	19	0.89	2.9	7.4	4.8	30	76
Jackson, TX	1.6	5.1	16	0.87	2.7	6.1	4.1	27	71
Rapides, LA	3.1	14	56	0.96	4.2	16	7.7	42	88
Madison, MS	1.8	5.7	19	0.86	2.7	6.8	4.3	28	73
Eastern States									
Washington, DC	3	7.8	21	0.96	3.2	8.8	6.7	36	79
Richmond, VA	3.4	10	30	0.99	3.8	11	9	41	83
Hudson, NJ	3.3	11	38	0.99	4.1	13	7.5	43	85
Baltimore, MD	3.8	11	28	1	3.6	11	8.4	41	82
Kanawha, WV	3.6	11	33	0.95	3.6	10	7.8	40	83
Allegheny, PA	2.7	8.3	24	0.94	3.2	8.3	6.2	35	78
Cuyahoga, OH	5.2	20	70	1.2	5.4	21	12	51	91
Hopkins, KY	3.4	9.7	27	0.96	3.5	11	8.2	39	82
Northeast States									
Erie, NY	3.8	14	46	1.1	4.3	15	8.2	45	87
Albany, NY	4	21	85	1.1	5.9	26	10	51	93
Suffolk, MA	3.7	13	44	1	4.4	15	8.7	45	88
Chittenden, VT	4.9	32	130	1.2	7.8	41	13	58	95
Grafton, NH	4	18	70	1.1	5.4	23	10	49	91
Cumberland, ME	3.2	17	69	1	5.4	20	8.3	45	92
Aroostook, ME	4.3	18	69	1.1	5.2	20	11	49	91

[a] Future risk of developing thyroid cancer for those who have not been diagnosed with thyroid cancer.

[b] Probability of Causation/Assigned Share (PC/AS) for those who have been diagnosed with thyroid cancer.

[c] Lower and upper bound values represent a 95% uncertainty range.

[d] Additional exposure occurred for individuals residing near federal facilities that released I-131 during times similar to the era of nuclear weapons testing at the Nevada Test Site (Hanford WA, Idaho Falls ID, Oak Ridge TN, and Savanah River SC).

Table 6 Dose and risk estimates for a **female born in 1955** on a diet of retail commercial milk

U.S. Region	Thyroid Dose (rad)			Future Risk (chances/1,000)[a]			PC/AS (%)[b]		
County, State	Lower[c]	Mean	Upper[c]	Lower	Mean	Upper	Lower	Mean	Upper
Pacific Coast									
King, WA	0.35	1.1	3.3	1.4	2.8	4.2	0.96	9.9	37
Multnomah, OR	0.38	1.4	4.2	1.4	2.8	4.6	1	11	42
Jackson, OR	0.24	0.87	2.7	1.4	2.7	3.9	0.66	7.9	31
Butte, CA	0.23	1.1	4.4	1.4	2.8	4.4	0.75	9.7	41
Los Angeles, CA	<0.01	0.095	0.47	1.3	2.5	3.1	<0.1	0.98	5.6
San Francisco, CA	0.15	0.5	1.5	1.4	2.6	3.5	0.45	5.2	23
Western States									
Benton, Wa[d]	0.37	1.8	6.8	1.5	3	5.2	1.3	13	51
Humboldt, NV	0.38	2.7	12	1.5	3.2	6.6	1	16	63
Elko, NV	0.49	2	6.4	1.5	3	5.5	1.5	14	51
Storey, NV	0.43	3.8	18	1.6	3.4	7.6	1.5	20	68
Clark, NV	0.42	2.8	13	1.5	3.3	7.6	1.3	17	68
Salt Lake, UT	2.3	7.7	23	1.8	4.7	14	5.9	36	81
Iron, UT	0.81	5.9	25	1.6	4.2	12	3	28	78
Washington, UT	1.2	12	58	1.8	5.8	22	4.2	38	88
Maricopa, AZ	0.069	0.52	2.4	1.4	2.6	3.5	0.26	4.6	25
Bernlillo, NM	0.5	2	6.7	1.5	3	5.2	1.5	15	49
Mountain States									
Kootenai, ID	1.2	9	43	1.7	4.8	14	3.5	32	81
Boise, ID	1.2	8.8	38	1.7	4.8	16	3.8	34	84
Bonneville, ID[d]	1.2	4.6	16	1.6	3.7	7.9	3.1	25	68
Lewis & Clark, MT	3.8	20	88	2	7.7	27	11	49	91
Daniels, MT	4.4	20	73	2.2	7.3	27	11	51	90
Sheridan, WY	2.9	13	47	1.9	5.8	19	7.5	43	87
Gunnison, CO	2.2	14	58	1.9	6.3	22	6.9	44	90
Denver, CO	3	9.1	26	1.8	5	15	7.5	39	83
Central States									
Burleigh, ND	4.1	24	110	2.2	8.6	37	10	52	94
Pennington, SD	3.2	16	65	2	6.6	24	8.4	45	89
Hall, NE	3.9	17	66	2	7	26	9.2	47	90
Wyandotte, KS	3.2	14	52	1.9	6.1	20	8.4	45	88
Ness, KS	5.7	25	90	2.3	9.6	36	14	57	93
Lake of the Woods, MN	1.8	7.3	25	1.7	4.4	11	4.8	33	79
Scott, MN	1.8	8.3	30	1.8	4.6	13	4.8	34	81
Story, IA	3.4	22	110	2	7.6	28	8.3	46	91
Calloway, MO	5.1	27	110	2.3	9.9	43	13	56	95
Vilas, WI	1.6	6.9	24	1.7	4.3	11	4.8	32	78
Cook, IL	1.6	5.9	21	1.7	4	10	3.9	28	75
Macon, IL	2.7	18	85	2	7.2	29	8	45	92
Alcona, MI	0.99	4.4	15	1.6	3.6	8.3	2.6	24	71
Hamilton, IN	1.5	13	61	1.7	5.1	15	4.3	32	83

Table 6 (cont) Dose and risk estimates for a **female born in 1955** on a diet of retail commercial milk

U.S. Region	Thyroid Dose (rad)			Future Risk (chances/1,000)[a]			PC/AS (%)[b]		
County, State	Lower[c]	Mean	Upper[c]	Lower	Mean	Upper	Lower	Mean	Upper
Southeast States									
Anderson, TN[d]	1.7	6.5	23	1.7	4.2	11	4.9	32	77
Forsyth, NC	1.2	4.5	14	1.6	3.7	7.9	3.5	26	67
Montgomery, AL	1.7	6.1	19	1.7	4.1	9.9	5.1	32	75
Fulton, GA	1.6	5.4	17	1.7	4	9.9	4.3	29	75
Aiken, SC[d]	1.5	5.1	15	1.7	3.9	9.2	4.2	29	72
Orange, FL	0.62	2.2	6.9	1.5	3	5.1	1.7	16	51
Southern States									
Ellis, OK	4.4	26	110	2.2	10	47	11	55	95
Pulaski, AR	3.4	19	81	2.1	8.3	33	10	49	92
Dallas, TX	3.5	16	58	2.1	7.4	26	10	49	90
El Paso, TX	0.68	2.6	9.5	1.5	3.2	6.3	2	18	61
Bexar, TX	1.1	4	14	1.6	3.6	7.9	3	24	69
Jackson, TX	0.85	3.7	13	1.6	3.5	7.5	2.7	22	67
Rapides, LA	2.1	11	45	1.8	5.5	18	6.3	39	86
Madison, MS	1.2	4.2	12	1.6	3.7	8.1	3.5	26	69
Eastern States									
Washington, DC	1.4	4.8	15	1.6	3.7	8.2	3.6	26	70
Richmond, VA	1.4	5.2	17	1.7	3.8	8.7	4.2	28	72
Hudson, NJ	0.86	4	16	1.6	3.5	7.3	2.5	22	65
Baltimore, MD	1.5	6.7	25	1.7	4.1	11	4.2	30	76
Kanawha, WV	1.8	8.9	34	1.8	4.8	15	5.1	33	83
Allegheny, PA	1.2	5.5	23	1.6	3.9	9.6	3	25	74
Cuyahoga, OH	2.3	11	45	1.9	5.6	19	6	40	87
Hopkins, KY	1.8	8.1	30	1.7	4.8	14	5.6	35	82
Northeast States									
Erie, NY	1.4	7.6	32	1.7	4.5	14	4.6	32	82
Albany, NY	0.78	5	21	1.6	3.7	9.2	2.3	24	73
Suffolk, MA	0.87	5.2	22	1.6	3.8	9.4	2.7	24	74
Chittenden, VT	1.4	11	52	1.7	5.2	18	4.5	36	86
Grafton, NH	1.5	7.6	29	1.7	4.4	12	4.2	31	80
Cumberland, ME	1.1	5	18	1.6	3.7	9.3	3.1	25	72
Aroostook, ME	1.6	8.6	35	1.7	4.7	14	4.6	33	82

[a] Future risk of developing thyroid cancer for those who have not been diagnosed with thyroid cancer.

[b] Probability of Causation/Assigned Share (PC/AS) for those who have been diagnosed with thyroid cancer.

[c] Lower and upper bound values represent a 95% uncertainty range.

[d] Additional exposure occurred for individuals residing near federal facilities that released I-131 during times similar to the era of nuclear weapons testing at the Nevada Test Site (Hanford WA, Idaho Falls ID, Oak Ridge TN, and Savanah River SC).

Table 7 Dose and risk estimates for a **female born in 1957** on a diet of retail commercial milk

U.S. Region	Thyroid Dose (rad)			Future Risk (chances/1,000)[a]			PC/AS (%)[b]		
County, State	Lower[c]	Mean	Upper[c]	Lower	Mean	Upper	Lower	Mean	Upper
Pacific Coast									
King, WA	0.26	1	3.1	1.6	3	4.6	0.83	9.6	35
Multnomah, OR	0.24	1.3	5	1.6	3.1	5.2	0.89	11	44
Jackson, OR	0.18	0.79	2.6	1.6	2.9	4.3	0.54	7.9	34
Butte, CA	0.065	0.44	1.9	1.5	2.8	3.7	0.23	4.4	22
Los Angeles, CA	<0.01	0.055	0.31	1.5	2.7	3.3	<0.1	0.64	4.3
San Francisco, CA	0.062	0.25	0.82	1.5	2.8	3.5	0.22	2.9	14
Western States									
Benton, Wa[d]	0.26	1.9	8.4	1.7	3.3	6.3	0.96	14	56
Humboldt, NV	0.61	5.7	26	1.8	4.5	14	2.4	27	80
Elko, NV	0.62	3.2	11	1.8	3.7	8.1	2	22	65
Storey, NV	0.71	7.8	36	1.9	5.1	16	2.7	32	84
Clark, NV	0.14	0.7	3.1	1.5	2.9	4.1	0.42	6.5	33
Salt Lake, UT	2.3	8.4	26	2.1	5.5	16	6.4	39	83
Iron, UT	0.2	2.7	14	1.6	3.7	8.8	0.74	16	68
Washington, UT	0.64	14	80	1.9	7.2	31	3	38	91
Maricopa, AZ	0.055	0.7	3.5	1.6	2.9	4.3	0.23	6.2	33
Bernlillo, NM	0.51	2.8	11	1.8	3.6	7.8	1.7	20	65
Mountain States									
Kootenai, ID	1.5	13	62	2	7	27	5.3	41	90
Boise, ID	1	9.6	45	2	5.9	21	4	36	88
Bonneville, ID[d]	1.6	6.6	23	2	4.9	14	4.7	34	80
Lewis & Clark, MT	4.7	26	100	2.5	11	46	13	56	94
Daniels, MT	5.2	24	88	2.7	11	44	14	58	94
Sheridan, WY	3.5	16	56	2.3	7.9	31	10	50	91
Gunnison, CO	1.4	8.7	37	2	5.6	19	4.9	36	85
Denver, CO	3.2	10	31	2.2	6	18	9.2	43	85
Central States									
Burleigh, ND	5	31	140	2.7	13	60	14	60	96
Pennington, SD	3.9	20	84	2.4	9.3	37	11	53	92
Hall, NE	4.5	23	94	2.6	10	39	13	55	94
Wyandotte, KS	3.7	20	82	2.5	9.4	41	11	53	93
Ness, KS	4.7	24	93	2.4	11	41	14	57	93
Lake of the Woods, MN	1.8	8.4	30	2	5.4	17	5.5	38	85
Scott, MN	2.1	11	41	2.2	6.6	23	6.4	42	88
Story, IA	3.4	26	140	2.3	10	53	10	51	95
Calloway, MO	5.1	26	96	2.6	11	47	17	59	94
Vilas, WI	1.7	8.4	30	2.1	5.5	18	6	37	85
Cook, IL	1.6	7.3	29	1.9	5	15	5	33	81
Macon, IL	2.3	22	110	2.3	9.5	45	8.3	48	94
Alcona, MI	1	5.3	21	1.8	4.5	13	3.2	28	80
Hamilton, IN	1.4	13	64	2	6.3	22	4.5	36	88

Table 7 (cont) Dose and risk estimates for a **female born in 1957** on a diet of retail commercial milk

U.S. Region	Thyroid Dose (rad)			Future Risk (chances/1,000)[a]			PC/AS (%)[b]		
County, State	Lower[c]	Mean	Upper[c]	Lower	Mean	Upper	Lower	Mean	Upper
Southeast States									
Anderson, TN[d]	1	5.6	22	1.8	4.5	14	3.3	29	81
Forsyth, NC	1.2	5.9	22	1.9	4.6	13	4.3	31	78
Montgomery, AL	1.5	6.6	23	1.9	4.9	14	4.6	34	81
Fulton, GA	1.6	7.9	31	2	5.2	16	5.1	35	83
Aiken, SC[d]	1.5	6.2	21	2	4.7	13	4.6	33	80
Orange, FL	0.94	4.5	17	1.9	4.2	11	3.1	27	75
Southern States									
Ellis, OK	1.5	7.1	26	2	5	14	4.6	35	79
Pulaski, AR	2.4	8.4	25	2.1	5.5	16	6.4	39	83
Dallas, TX	1.5	7	26	1.9	5	14	4.7	34	81
El Paso, TX	0.57	2.5	9.3	1.7	3.5	6.9	1.8	18	63
Bexar, TX	0.77	5	22	1.8	4.3	12	2.5	26	77
Jackson, TX	0.61	4.2	19	1.8	4.1	11	2.2	23	76
Rapides, LA	1.3	14	81	1.9	7.6	35	4.7	38	92
Madison, MS	0.54	2.4	8.2	1.7	3.5	6.7	1.5	18	59
Eastern States									
Washington, DC	1	5.4	23	1.9	4.4	11	3.2	27	75
Richmond, VA	0.96	5.5	23	1.8	4.5	13	3.4	29	78
Hudson, NJ	0.86	5	21	1.8	4.4	12	2.8	27	78
Baltimore, MD	1.3	8.1	34	2	5.6	18	4.2	34	85
Kanawha, WV	1.6	9.7	42	2	5.6	19	5	36	85
Allegheny, PA	0.72	5	25	1.7	4	10	2.1	23	74
Cuyahoga, OH	1.7	7.5	30	1.9	5	14	5.1	33	82
Hopkins, KY	1.5	7.1	27	2	5.2	16	4.3	34	83
Northeast States									
Erie, NY	1.2	8.7	40	2	5.5	19	4.8	35	85
Albany, NY	0.96	6.9	30	1.9	4.9	14	3.8	31	81
Suffolk, MA	1.1	7.5	32	1.9	5.6	19	3.7	32	86
Chittenden, VT	1.8	16	75	2.1	8.1	37	6.3	44	93
Grafton, NH	1.9	11	43	2	6.2	23	6.2	40	88
Cumberland, ME	1.5	6.9	25	2	5	14	4.8	33	80
Aroostook, ME	2	12	50	2.2	6.7	24	7.1	42	89

[a] Future risk of developing thyroid cancer for those who have not been diagnosed with thyroid cancer.

[b] Probability of Causation/Assigned Share (PC/AS) for those who have been diagnosed with thyroid cancer.

[c] Lower and upper bound values represent a 95% uncertainty range.

[d] Additional exposure occurred for individuals residing near federal facilities that released I-131 during times similar to the era of nuclear weapons testing at the Nevada Test Site (Hanford WA, Idaho Falls ID, Oak Ridge TN, and Savanah River SC).

Table 8 Dose and risk estimates for a **female born in 1960** on a diet of retail commercial milk

U.S. Region	Thyroid Dose (rad)			Future Risk (chances/1,000)[a]			PC/AS (%)[b]		
County, State	Lower[c]	Mean	Upper[c]	Lower	Mean	Upper	Lower	Mean	Upper
Pacific Coast									
King, WA	0	<0.01	0.018	2.1	3.4	3.8	0	<0.1	<0.1
Multnomah, OR	0	0	0	2.1	3.4	3.8	0	0	0
Jackson, OR	0	0	0	2.1	3.4	3.8	0	0	0
Butte, CA	0	<0.01	0.055	2.1	3.4	3.8	0	<0.1	0.26
Los Angeles, CA	0	0	0	2.1	3.4	3.8	0	0	0
San Francisco, CA	0	0	<0.01	2.1	3.4	3.8	0	<0.1	<0.1
Western States									
Benton, Wa[d]	0	<0.01	<0.01	2.1	3.4	3.8	0	<0.1	0.16
Humboldt, NV	<0.01	0.011	0.07	2.1	3.4	3.8	<0.1	<0.1	0.39
Elko, NV	<0.01	<0.01	0.049	2.1	3.4	3.8	<0.1	<0.1	0.51
Storey, NV	<0.01	<0.01	0.025	2.1	3.4	3.8	<0.1	<0.1	0.13
Clark, NV	<0.01	0.025	0.11	2.1	3.4	3.8	<0.1	0.24	1.4
Salt Lake, UT	0.017	0.22	1	2.2	3.4	4	<0.1	2	11
Iron, UT	<0.01	<0.01	<0.01	2.1	3.4	3.8	<0.1	<0.1	<0.1
Washington, UT	<0.01	<0.01	<0.01	2.1	3.4	3.8	<0.1	<0.1	<0.1
Maricopa, AZ	0	0	0	2.1	3.4	3.8	0	0	0
Bernlillo, NM	<0.01	<0.01	0.041	2.1	3.4	3.8	<0.1	<0.1	0.49
Mountain States									
Kootenai, ID	<0.01	<0.01	0.059	2.1	3.4	3.8	<0.1	<0.1	0.31
Boise, ID	0	0.028	0.17	2.1	3.4	3.8	<0.1	0.13	0.8
Bonneville, ID[d]	<0.01	0.026	0.11	2.1	3.4	3.8	<0.1	0.19	0.96
Lewis & Clark, MT	<0.01	2.5	16	2.3	4.2	7.6	<0.1	7.1	56
Daniels, MT	<0.01	0.29	1.7	2.1	3.4	4.1	<0.1	1.6	14
Sheridan, WY	<0.01	0.82	5.5	2.2	3.6	5.1	<0.1	3.9	33
Gunnison, CO	<0.01	0.014	0.07	2.2	3.4	3.8	<0.1	0.13	0.8
Denver, CO	0.036	0.36	1.6	2.2	3.5	4.2	0.12	3.2	18
Central States									
Burleigh, ND	<0.01	0.19	1.1	2.1	3.4	3.9	<0.1	1.2	9.5
Pennington, SD	0.024	1.1	6.5	2.2	3.7	5.4	<0.1	5.3	36
Hall, NE	0.061	2.5	14	2.3	4.2	8.2	0.26	11	59
Wyandotte, KS	<0.01	0.035	0.23	2.1	3.4	3.8	<0.1	0.27	2.4
Ness, KS	<0.01	1.6	11	2.2	3.9	7.2	<0.1	6.5	52
Lake of the Woods, MN	0	0.029	0.18	2.1	3.4	3.8	<0.1	0.25	1.6
Scott, MN	<0.01	0.37	2.4	2.1	3.5	4.2	<0.1	2.1	18
Story, IA	0.024	11	74	2.4	7.1	25	0.12	18	87
Calloway, MO	<0.01	0.058	0.39	2.1	3.4	3.8	<0.1	0.49	3.7
Vilas, WI	<0.01	0.013	0.057	2.1	3.4	3.8	<0.1	0.12	0.62
Cook, IL	<0.01	0.71	4.2	2.2	3.6	4.7	<0.1	3.2	27
Macon, IL	<0.01	5.3	35	2.3	5.4	14	<0.1	12	75
Alcona, MI	<0.01	0.064	0.4	2.1	3.4	3.8	<0.1	0.35	2.8
Hamilton, IN	0.017	11	74	2.3	6.5	29	<0.1	17	88

Table 8 (cont) Dose and risk estimates for a **female born in 1960** on a diet of retail commercial milk

U.S. Region	Thyroid Dose (rad)			Future Risk (chances/1,000)[a]			PC/AS (%)[b]		
County, State	Lower[c]	Mean	Upper[c]	Lower	Mean	Upper	Lower	Mean	Upper
Southeast States									
Anderson, TN[d]	<0.01	0.012	0.065	2.1	3.4	3.8	<0.1	0.12	0.8
Forsyth, NC	<0.01	0.018	0.1	2.1	3.4	3.8	<0.1	0.19	1.3
Montgomery, AL	0	0	<0.01	2.1	3.4	3.8	0	<0.1	<0.1
Fulton, GA	<0.01	<0.01	<0.01	2.1	3.4	3.8	<0.1	<0.1	<0.1
Aiken, SC[d]	<0.01	0.017	0.098	2.1	3.4	3.8	<0.1	0.18	1.2
Orange, FL	<0.01	0.047	0.32	2.1	3.4	3.8	<0.1	0.4	2.9
Southern States									
Ellis, OK	0	0	0	2.1	3.4	3.8	0	0	0
Pulaski, AR	0	0	<0.01	2.1	3.4	3.8	0	<0.1	<0.1
Dallas, TX	0	0	0	2.1	3.4	3.8	0	0	0
El Paso, TX	0	<0.01	<0.01	2.1	3.4	3.8	0	<0.1	<0.1
Bexar, TX	0	0	0	2.1	3.4	3.8	0	0	0
Jackson, TX	0	0	0	2.1	3.4	3.8	0	0	0
Rapides, LA	0	0	0	2.1	3.4	3.8	0	0	0
Madison, MS	0	0	0	2.1	3.4	3.8	0	0	0
Eastern States									
Washington, DC	0.016	0.24	1.2	2.1	3.4	4	<0.1	2.1	13
Richmond, VA	<0.01	0.37	2.5	2.2	3.5	4.4	<0.1	2.3	20
Hudson, NJ	<0.01	0.018	0.1	2.1	3.4	3.8	<0.1	0.18	0.88
Baltimore, MD	<0.01	2	12	2.2	4	7.6	<0.1	6.4	54
Kanawha, WV	0.012	4.1	27	2.2	4.6	12	<0.1	11	71
Allegheny, PA	<0.01	2.7	17	2.3	4.1	8.8	<0.1	8.1	63
Cuyahoga, OH	0.024	0.69	3.8	2.2	3.6	4.9	0.1	4.2	28
Hopkins, KY	<0.01	0.16	0.99	2.1	3.4	3.9	<0.1	1.2	9.9
Northeast States									
Erie, NY	<0.01	0.12	0.77	2.1	3.4	3.8	<0.1	0.66	4.9
Albany, NY	<0.01	0.06	0.38	2.1	3.4	3.8	<0.1	0.36	2.6
Suffolk, MA	<0.01	<0.01	0.64	2.1	3.4	3.8	<0.1	0.74	5.7
Chittenden, VT	0	<0.01	0.022	2.1	3.4	3.8	0	<0.1	0.11
Grafton, NH	<0.01	0.11	0.75	2.1	3.4	3.9	<0.1	0.86	7
Cumberland, ME	<0.01	0.057	0.38	2.1	3.4	3.8	<0.1	0.43	3.6
Aroostook, ME	<0.01	0.13	0.91	2.1	3.4	3.9	<0.1	0.99	8.9

[a] Future risk of developing thyroid cancer for those who have not been diagnosed with thyroid cancer.

[b] Probability of Causation/Assigned Share (PC/AS) for those who have been diagnosed with thyroid cancer.

[c] Lower and upper bound values represent a 95% uncertainty range.

[d] Additional exposure occurred for individuals residing near federal facilities that released I-131 during times similar to the era of nuclear weapons testing at the Nevada Test Site (Hanford WA, Idaho Falls ID, Oak Ridge TN, and Savanah River SC).

Table 9 Baseline risk (chances/1,000) of being diagnosed with thyroid cancer[a]

	Female			Male		
Birth year	Lower[b]	Mean	Upper[b]	Lower	Mean	Upper
1935	1.1	1.3	1.5	0.62	0.75	0.87
1940	1.2	1.6	1.8	0.67	0.91	1.1
1945	1.1	1.8	2.2	0.61	1	1.2
1950	0.89	1.8	2.5	0.48	0.99	1.4
1952	0.66	1.8	2.6	0.35	0.93	1.4
1955	1.3	2.5	3.1	0.67	1.3	1.6
1957	1.5	2.7	3.3	0.74	1.4	1.7
1960	2.1	3.4	3.8	1	1.7	1.9

[a] The baseline risk is the chance in 1000 individuals of being diagnosed with thyroid cancer from this date forward for those currently without this disease who have not been exposed to fallout I-131.

[b] Lower and upper bound values represent a 95% uncertainty range.

Table 10 Comparison of results for Females and Males born in 1950 on a diet of retail commercial milk

	Thyroid Dose (rad)			Future Risk (chances per 1,000)[a]			PC/AS (%)[b]		
Location	Lower[c]	Mean	Upper[c]	Lower	Mean	Upper	Lower	Mean	Upper
Females									
Gunnison, CO	6	79	460	1.6	14	84	14	62	98
Washington, UT	4.7	51	260	1.6	11	54	13	60	96
Ness. KS	7.7	25	76	1.5	5.6	19	14	53	90
Cuyahoga, OH	4.2	16	56	1.3	4.3	14	8.7	43	87
Chittenden, VT	4.4	25	110	1.5	6.1	24	11	50	93
Males									
Gunnison, CO	6	79	460	0.72	4.7	23	7.7	49	96
Washington, UT	4.7	51	260	0.74	3.4	15	6.7	48	93
Ness, KS	7.7	25	76	0.71	2	5.8	7.7	39	82
Cuyahoga, OH	4.2	16	56	0.6	1.7	4.2	4.6	30	77
Chittenden, VT	4.4	25	110	0.68	2.2	7.2	5.7	37	87

[a] Future risk of developing thyroid cancer for those who have not been diagnosed with thyroid cancer.

[b] Probability of Causation/Assigned Share (PC/AS) for those who have been diagnosed with thyroid cancer.

[c] Lower and upper bound values represent a 95% uncertainty range.

Table 11 Comparison of varied milk sources on thyroid dose for a female born in 1952 living in Los Angeles County, California; Lewis and Clark County, Montana; and Pulaski County, Arkansas.

Los Angeles County, California

		Thyroid Dose (rad)			Future Risk (chances per 1,000)[a]			PC/AS (%)[b]		
Milk Type	**Amount**[c]	Lower[d]	Mean	Upper[d]	Lower	Mean	Upper	Lower	Mean	Upper
Commercial cow	average	0.064	0.41	1.7	0.68	1.8	2.8	0.2	4.1	21
Commercial cow	high	0.83	3.6	13	0.82	2.5	5.5	2.4	22	68
Goat	average	1.5	6.9	24	0.9	3.3	9.8	4.5	33	80
Goat	high	2.5	12	42	0.99	4.3	15	7.5	43	87
Backyard cow	high	0.25	0.96	3	0.71	2	3.1	0.79	8.8	34
Breast milk[e]	---	0.043	0.29	1.2	0.71	1.8	2.7	0.16	2.9	17
No milk	---	<.01	0.13	0.77	0.66	1.8	2.7	<.1	1.3	9

Lewis and Clark County, Montana

		Thyroid Dose (rad)			Future Risk (chances per 1,000)[a]			PC/AS (%)[b]		
Milk Type	**Amount**[c]	Lower[d]	Mean	Upper[d]	Lower	Mean	Upper	Lower	Mean	Upper
Commercial cow	average	8.3	66	340	1.5	15	83	19	67	98
Commercial cow	high	17	120	600	1.9	25	150	33	78	99
Goat	average	62	370	1700	4	66	410	65	91	99.9
Goat	high	80	570	2600	4.9	92	510	72	93	99.9
Backyard cow	high	11	78	380	1.6	17	98	23	71	98
Breast milk[e]	---	6	34	150	1.2	8.4	39	14	57	95
No milk	---	0.3	1.3	4.8	0.71	2	3.2	0.8	8.9	38

Pulaski County, Arkansas

		Thyroid Dose (rad)			Future Risk (chances per 1,000)[a]			PC/AS (%)[b]		
Milk Type	**Amount**[c]	Lower[d]	Mean	Upper[d]	Lower	Mean	Upper	Lower	Mean	Upper
Commercial cow	average	5.8	23	90	1.2	6.2	22	15	55	92
Commercial cow	high	14	57	210	1.7	13	53	29	72	97
Goat	average	60	200	680	3.5	37	160	61	89	99
Goat	high	110	390	1400	5.3	68	330	75	94	99
Backyard cow	high	14	49	180	1.6	11	44	26	69	96
Breast milk[e]	---	5	19	69	1.2	5.3	20	11	50	91
No milk	---	0.46	1.6	5.7	0.72	2	3.5	1	11	43

[a] Future risk of developing thyroid cancer for those who have not been diagnosed with thyroid cancer.

[b] Probability of Causation/Assigned Share (PC/AS) for those who have been diagnosed with thyroid cancer.

[c] Average amount of milk is assumed to be 1-3 8-ounce glasses per day; high amount of milk is assumed to be 4 or more 8-ounce glasses per day.

[d] Lower and upper bound values represent a 95% uncertainty range.

[e] Assumed to be breast milk for 1 year and then a diet of retail commercial cow milk for all future years.

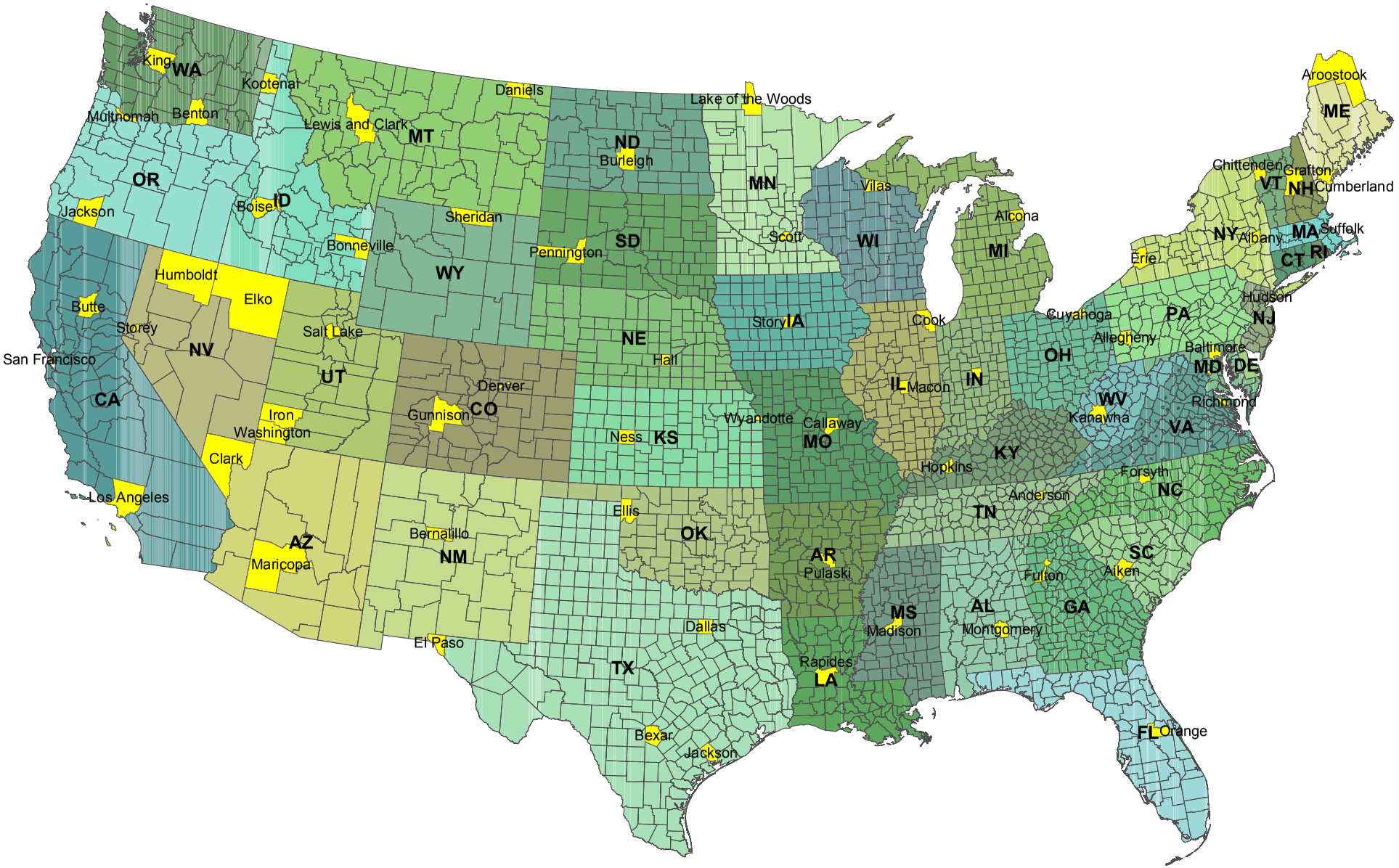

Figure 1. Selected counties of the United States where dose and risk calculations were made.