

## Supplementary Online Content

Kitahara CM, Berrington de Gonzalez A, Bouville A, et al. Association of radioactive iodine treatment with cancer mortality in patients with hyperthyroidism. *JAMA Intern Med*. Published online July 1, 2019.  
doi:10.1001/jamainternmed.2019.0981

**eTable 1.** Relative Risks (RRs) and 95% Confidence Intervals (CIs) for Cancer-Specific Mortality at 100 mGy Organ/Tissue Absorbed Dose Among Hyperthyroid Patients Treated With RAI

**eTable 2.** Estimates of Radiation-Associated Excess Solid Cancer Deaths (95% CIs) per 1,000 Hyperthyroidism Patients (80% Women) treated With Radioactive Iodine, by Age at treatment and Estimated Stomach Dose

This supplementary material has been provided by the authors to give readers additional information about their work.

**eTable 1.** Relative Risks (RRs) and 95% Confidence Intervals (CIs) for Cancer-Specific Mortality at 100 mGy Organ/Tissue Absorbed Dose Among Hyperthyroid Patients Treated With RAI

Patient deaths occurring in the first five years after last RAI were excluded.

|  | <b>Dose-response</b> |        |                                     |         |
|--|----------------------|--------|-------------------------------------|---------|
|  | Patients             | Deaths | RR at 100 mGy (95% CI) <sup>a</sup> | P-value |
| <b>All solid cancers combined</b>  |                      |        |                                     |         |
| Model 1 <sup>a</sup>   | 16,322               | 1,984  | 1.06 (1.02, 1.10)                   | 0.002   |
| Model 2: Model 1, restricted to patients receiving a single RAI treatment                                | 10,835               | 1,284  | 1.11 (1.02, 1.23)                   | 0.008   |
| Model 3: Model 1, restricted to patients receiving only RAI treatment (no surgery or anti-thyroid drugs) | 6,197                | 759    | 1.14 (1.05, 1.27)                   | <0.001  |
| <b>All solid cancers excluding female breast cancer</b>  |                      |        |                                     |         |
| Model 1  | 16,322               | 1,693  | 1.05 (1.01, 1.10)                   | 0.01    |
| Model 2  | 10,835               | 1,103  | 1.13 (1.03, 1.27)                   | 0.005   |
| Model 3  | 6,197                | 655    | 1.11 (1.02, 1.24)                   | 0.01    |
| <b>Female breast cancer</b>  |                      |        |                                     |         |
| Model 1  | 12,835               | 291    | 1.12 (1.003, 1.32)                  | 0.04    |
| Model 2  | 8,576                | 180    | 0.98 (<-0.97, 1.34)                 | >0.5    |
| Model 3  | 4,850                | 104    | 1.05 (1.01, 1.18)                   | 0.01    |

Abbreviations: CI, confidence interval; CLL, chronic lymphocytic leukemia; Gy, Gray; RAI, radioactive iodine

<sup>a</sup> Background rates include terms for sex, sex-specific attained age and birth cohort patterns, Graves' disease diagnosis (yes/no), additional treatment with surgery (yes/no), and additional treatment with anti-thyroid drugs (yes/no).

**eTable 2.** Estimates of Radiation-Associated Excess Solid Cancer Deaths (95% CIs) per 1,000 Hyperthyroidism Patients (80% Women) treated With Radioactive Iodine, by Age at treatment and Estimated Stomach Dose

|   | Mean administered activity (MBq)  | Radiation-associated excess solid cancer deaths (95% CI) |                     |
|---|---|--|---------------------|
|   |   | Treatment at age 40                                      | Treatment at age 50 |
| <b>100 mGy stomach dose</b>                     | 243 ( $\pm$ 35): Graves' disease<br>236 ( $\pm$ 38): Toxic nodular goiter |  |                     |
| Lifetime (all subsequent years after treatment) |   | 13 (2, 27)   | 12 (2, 26)          |
| First 20 years after treatment                  |   | 1 (0.2, 3)   | 3 (0.4, 6)          |
| <b>150 mGy stomach dose</b>                     | 355 ( $\pm$ 46): Graves' disease<br>353 ( $\pm$ 47): Toxic nodular goiter |  |                     |
| Lifetime (all subsequent years after treatment) |   | 19 (3, 40)   | 18 (3, 38)          |
| First 20 years after treatment                  |   | 2 (0.3, 4)   | 4 (0.6, 8)          |
| <b>200 mGy stomach dose</b>                     | 463 ( $\pm$ 62): Graves' disease<br>464 ( $\pm$ 53): Toxic nodular goiter |  |                     |
| Lifetime (all subsequent years after treatment) |   | 25 (4, 53)   | 25 (4, 51)          |
| First 20 years after treatment                  |   | 2 (0.4, 5)   | 5 (1, 11)           |
| <b>250 mGy stomach dose</b>                     | 568 ( $\pm$ 83): Graves' disease<br>568 ( $\pm$ 92): Toxic nodular goiter |  |                     |
| Lifetime (all subsequent years after treatment) |   | 32 (5, 66)   | 31 (5, 64)          |
| First 20 years after treatment                  |   | 3 (0.5, 7)   | 6 (1, 14)           |

