

Summary of NC Thyroid Cancer Panel Report and Recommendations

July 12, 2019

Introduction

The causes of thyroid cancer are poorly understood, and the only known risk factors include childhood exposure to ionizing radiation and obesity [1-2]. A national increase in thyroid cancer in the US and elsewhere has been related to increased screening for thyroid cancer and increased monitoring of people for specific health outcomes [3-5]. It is difficult for researchers to separate out these factors from other risk factors, such as exposures to chemicals in the environment, lifestyle factors, and other health issues.

For these reasons, in spring 2019, the UNC Lineberger Comprehensive Cancer Center (LCCC) brought together a group (a panel) of scientists with expertise in thyroid cancer to identify research needs related to thyroid cancer in North Carolina (NC). The panel reviewed scientific publications [1-6] and considered input from a community meeting held in Iredell County on May 9, 2019 and an online comment portal. A panel meeting at the UNC LCCC in Chapel Hill, NC on May 13, 2019 was jointly sponsored by UNC LCCC, the NC Policy Collaboratory, and the UNC Center for Environmental Health and Susceptibility.

The panel members included: Andrew Olshan, PhD, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, *Panel Chair*; Louise Davies, MD, MS, Dartmouth Geisel School of Medicine; Cari Kitahara, PhD, National Cancer Institute, National Institutes of Health; and Heather M. Stapleton, PhD, Nicholas School of the Environment, Duke University.

Recommendations

Below we present 10 recommendations, organized by activity type. Resources needed to implement these recommendations vary, and they can be implemented through partnerships of organizations, including state health departments, academic institutions, and federal agencies.

I. Develop New Data Resources

- A. **Develop an NC thyroid cancer patient study.** The panel recommends that a population-based study be conducted to gather new information on factors that may influence thyroid cancer in NC. In this kind of study, researchers would compare people from selected areas of NC with elevated rates of papillary thyroid cancer (PTC) to similar people from areas without elevated rates, and possibly to people without thyroid cancer, with a goal of identifying differences between the groups that may relate to development of cancer. This study would help researchers (a) map health care networks and understand medical surveillance (or close observation and monitoring by physicians) and (b) identify patterns of disease, all of which would help to detect thyroid cancer in certain regions.
- B. **Analyze health care claims data to better understand clinical practice and detection patterns.** Areas with strong access to health care and cancer screening sometimes report higher rates of cancer than areas without such services. Identifying areas where there are many medical practices can provide insight into how medical surveillance may contribute to thyroid cancer diagnosis. For this reason, the panel recommends further examination of access to and use of health care services in areas with higher reported rates of PTC.
- C. **Analyze health care claims data to understand other thyroid disease patterns.** Several types of thyroid disease do not cause cancer, such as thyroid nodules, goiter, and hyperthyroidism; but they are strongly associated with PTC. For this reason, the panel recommends analyzing how the rates of diagnosis of these diseases vary over geographic

areas that overlap or are associated with areas of elevated PTC. This analysis may help assess potential shared risk factors, such as environmental or medical detection factors.

- D. Apply existing data from epidemiologic cohort studies to understand the NC situation.** Research on potential risk factors for thyroid cancer is being conducted by experts around the world using cohort studies, which are studies where individual-level exposure data are collected from people without thyroid cancer and they are then followed over time to see whether they develop the disease. Some ongoing cohort studies include cancer-free individuals and thyroid cancer survivors residing in NC. The panel recommends that these cohorts be considered in testing hypotheses generated from investigations in NC. The panel also encourages examination of exposures of interest using data from cohort studies that include NC participants. The panel prioritizes well-designed investigations in NC but believes that available data from other studies can help confirm research findings.

II. Expand Current Projects and Analyses

- A. Investigate potential associations between exposure to coal ash, coal burning emissions, and papillary thyroid cancer.** Given the concerns in NC communities about the potential health effects of exposure to coal ash, the panel recommends investigating associations between exposure to coal ash and PTC. This investigation could be implemented using a case-control study design in which researchers would consider differences in exposure to metals or radionuclides (chemicals that release radiation as they decay) associated with coal ash. Such studies should consider the most likely ways that people are exposed to harmful chemicals associated with coal ash: breathing them in or drinking contaminated water.
- B. Conduct geospatial analysis of thyroid cancer in states neighboring NC.** Analyzing the ways that disease occurs over geographic regions, or geospatial analysis, can be useful in understanding the causes of cancer. However, such analysis can be challenging, because population size can change within a short time period as people move around. Researchers at Duke University used a computer model to predict the likelihood of finding PTC across NC, and they identified areas where people were more likely to have PTC, including Iredell, Rowan, New Hanover, and Brunswick Counties. However, in some cases, the regions of NC with higher likelihood of PTC changed over time, suggesting that some of the risk factors changed over time as well; and some high-risk areas bordered the state line. To better understand what may be occurring along state borders, the panel recommends that a similar geospatial analysis be conducted using state cancer registry data for Virginia, Tennessee, and South Carolina. This analysis would help develop research hypotheses that could be investigated in the future to identify risk factors for PTC.
- C. Conduct comparative analysis of other cancers in Iredell county and other NC counties with elevated rates of thyroid cancer.** To determine whether there are other cancers with elevated rates in the same areas where elevated thyroid cancer rates have been reported, the panel recommends that additional analysis of rates and trends be conducted. Analyzing rates of other cancers that are screening-related, such as prostate and breast cancer, will provide information about whether residents have access to health care and how often they interact with the health care system. The panel also recommends that analyses be conducted to examine major cancer risk factors (such as obesity and smoking) by NC county.

III. Apply New Methods and Enhance Infrastructure and Collaboration

- A. Host a workshop to consult with local and national experts on cancer rates and geospatial analysis methods.** The panel recommends bringing together experts from NC

DHHS, NC universities, other states, and national organizations in a workshop to discuss additional information on study methods, tools, and approaches that could be applied to NC cancer data. Such a workshop would help with current thyroid cancer analyses in Iredell and other NC counties and support future investigation of other cancers in NC.

- B. Enhance NC Central Cancer Registry's identification and classification of thyroid cancer.** The NC Central Cancer Registry (NC CCR) has earned the highest level of recognition from the CDC National Program of Cancer Registries for meeting standards for Data Completeness and Quality. The panel recommends additional funds be provided to continue to ensure the quality and completeness of registry data, including details of tumor size and extent of spread, and enhance timeliness of reporting. Physicians should be encouraged to provide timely, consistent reporting of cancer cases to the cancer registry.
- C. Increase communication with epidemiologists in other states who have investigated elevated cancer rates.** Because elevated rates of cancer have been documented in other states, the panel recommends that epidemiologists and other scientists from NC communicate with scientists in those states regarding cancer rates, challenges, information and methods exchanges, and potential joint investigations.

Literature Cited

1. Kitahara CM, Schneider AB, Brenner AV. Thyroid Cancer. In: Cancer Epidemiology and Prevention. 4th Ed. Thun M, Linet MS, Cerhan JR, Haiman CA, and Schottenfeld D. (Eds.), Oxford University Press, 2018.
2. Lauby-Secretan B, Scoccianti C, Loomis D, Grosse Y, Bianchini F, Straif K; International Agency for Research on Cancer Handbook Working Group. Body Fatness and Cancer--Viewpoint of the IARC Working Group. *N Engl J Med*. 2016 Aug 25;375(8):794-8.
3. Davies L, Welch HG. Current thyroid cancer trends in the United States. *JAMA Otolaryngol Head Neck Surg*. 2014 Apr;140(4):317-22.
4. Kitahara CM, Sosa JA. The changing incidence of thyroid cancer. *Nat Rev Endocrinol*. 2016 Nov;12(11):646-653.
5. Lim H, Devesa SS, Sosa JA, Check D, Kitahara CM. Trends in Thyroid Cancer Incidence and Mortality in the United States, 1974-2013. *JAMA*. 2017 Apr 4;317(13):1338-1348.
6. https://epi.dph.ncdhhs.gov/oe/doc/ThyroidCancerInvestigationSummary_NCDHHS_25Jan2019.pdf