

UND Strategic Plan

Population Health

A stated goal of Discovery for the SMHS is the **discovery of knowledge that benefits the people of this state and enhances the quality of their lives.**

The economic goal attached to this is the generation of \$120 million in internal and external funding.

The Department of Population Health is committed to enhance the lives of North Dakotans through fundamental discovery and the application of discoveries to enhance the lives of our citizens. At present, research in the Department covers multiple areas of large importance to ND health, including addiction to opioids and other drugs, health of American Indians, cancer related research, and others.

In my opinion, two potential research growth areas that heretofore have not been well-addressed, are radon and the research potential of the cancer registry.

Both of these areas represent foci for potential research investment that would likely return that investment with profit.

Radon

Radon is a radiative gas that results from the natural decay of uranium present in rocks and soils. It is invisible, tasteless and odorless. It is the largest cause of lung cancer after smoking, causing 21,000 deaths annually, a sum that far exceeds those of other, more publicized causes of death, e.g., drunk driving (10,497)¹. Indeed, 21,000 underestimates radon's lethality as radon also causes non-malignant lung disease and may cause leukemia². The EPA named radon "*the most serious environmental health hazard threatening Americans*".

Due to the high uranium content of North Dakota's soil and to its cold winters (which result in the trapping of radon gas indoors), radon levels in ND homes are the nation's highest. The highest levels occur in Grand Forks, where the mean value is 12 pCi/L -- 3 times the EPA's action level for remediation [4 pCi/L]. **More**

than 10% of Grand Forks homes exceed 20 pCi/L; this is the carcinogenic equivalent of 1,000 chest X-rays per year.

Deaths due to radon result from the failure to test and remediate homes with high levels. Our recent review of radon knowledge indicates that most Americans do not know that radon causes cancer. Indeed, **most Americans younger than 30 do not even know what radon is!**³ The high radon levels in Grand Forks homes and home-owners poor understanding of this hazard is a critical problem. Radon in homes can be remediated, often at a cost of \$1500 or less. Moreover, low or no cost radon remediation is available for low-income home-owners. *However, radon remediation requires radon testing, and testing requires radon education.*

Thus, there are numerous opportunities for research in radon education. We have made some progress in this area, e.g., Dr. Soojung Kim (faculty member in Communications and student in the MPH program) was recently awarded an Early Career Award to develop a radon “app” to educate individuals about radon using cell phone and social media.

A Phase II grant application to the NIEHS will be submitted April 5. This grant, in collaboration with an interactive media firm in NC, is in excess of 1,000,000. There are many other opportunities that could be developed in this area.

In sum, radon is a proven health hazard, a cause of lung cancer and a possible cause of other cancers (e.g., leukemia and malignant melanoma). North Dakota has the highest radon levels in the nation. This is an opportunity to turn (radioactive) lemons into lemonade.

Cancer Registry

In the area of cancer etiology, North Dakota has several opportunities that have not been appreciated. Many such opportunities lay fallow within the state cancer registry. For example, for unexplained reasons, ND has the highest incidence rates in the nation for chronic lymphocytic leukemia and for colorectal cancer. Our rates for thyroid cancer are also elevated for reasons that are unclear. These are potentially important observations for the following reasons:

- Most CLL is diagnosed “incidentally” among individuals seeking health care for unrelated reasons. Because the availability of health professionals in ND is low, the high rates of CLL in our state are unlikely due to diagnostic

biases. Thus, the actual burden of CLL is likely higher than that recorded. CLL is the commonest leukemia in the Western world, and its cause is unknown. Thus, work to understand the cause of CLL would not only benefit North Dakotans, but would place the SMHS at the forefront of national efforts to understand cancer.

- Colorectal cancer (CRC) is the third most common cancer among Western nations and is an important cause of morbidity and mortality. The high rates of CRC in ND should motivate us to take advantage of this health and research opportunity.
- Thyroid cancer is the 5th most common cancer among women and is the cancer with the fastest growing incidence rates in the U.S. Most of this is likely due to the diagnosis of indolent disease due to the use of imaging techniques. However, this is an unlikely explanation for the high rates in ND. These present another opportunity for discovery.

Project Bibliography:

¹ <https://www.epa.gov/radon/citizens-guide-radon-guide-protecting-yourself-and-your-family-radon>

² Rericha V, et al. Incidence of leukemia, lymphoma, and multiple myeloma in Czech uranium miners: A case-control study. *Env Health Perspect* 2006;114:818-822.

³ Vogeltanz-Holm, Schwartz GG. Radon and lung cancer: What does the public really know? *J Environ Radioact* 2018;192:26-31.