

Cancer Surveillance and Diagnosis in Semipalatinsk

By Bakyt Tumenova, MD, and Armin Weinberg, PhD

Cancer is a special concern in Semipalatinsk Oblast, Kazakhstan, where 40 years of nuclear weapons testing degraded the local environment. Unfortunately, a number of obstacles-socio-economic, structural, and psychological-have impeded efforts to track, prevent, and treat cancer and benign tumors. The institutions participating in the AIHA Semipalatinsk-Houston partnership have launched a number of initiatives to break down these barriers and improve cancer outcomes in Semipalatinsk.

Background

During the years of Soviet nuclear testing at the Semipalatinsk Test Site, local residents were exposed repeatedly to radioactive fallout. Estimates of the radiation released by the testing program vary, but it is reasonable to believe that average effective dose equivalents of 0.1 Sievert (Sv), or 10 rem, were sustained by people in the region, although people close to the site may have received doses as high as 5 Sv (500 rem). At such levels, it is reasonable to expect increases in a number of cancers, especially thyroid cancer, breast cancer, and leukemia, according to Leif Peterson, PhD, an epidemiologist at Baylor College of Medicine's Center for Cancer Control Research. Unfortunately, stated Peterson, "this is the one radiation-exposed population that has managed to elude systematic investigation." Several factors contributed to the deficiency of data on those exposed in Semipalatinsk, but official state secrecy about the nuclear testing program was a major obstacle to researchers.

Exposure to radiation is not the only risk factor for cancer in Semipalatinsk Oblast. Ethnic Kazaks are at increased risk for several types of cancer, especially stomach cancer. In a recent WHO report, Kazak women ranked third out of 48 countries worldwide in relative incidence of stomach cancer; Kazak men ranked fourth. The traditional national diet is deficient in fruits and vegetables, a situation exacerbated by the socio-economic crisis that has engulfed much of the former Soviet Union. Public understanding of cancer is low, and fear is correspondingly high. Consequently, patients routinely delay seeking treatment for suspected cancer, while physicians are reluctant to inform patients of a cancer diagnosis. These factors combine to paint a bleak picture.

"About 50 percent of cancer diagnoses in Semipalatinsk Oblast are late-stage," said Gadulmanap Abeeov, MD, head doctor of the Inter-Oblast Oncology Dispensary. In the United States, approximately 20 percent of cancer patients are diagnosed at a late stage.

Once diagnosed, these patients face numerous obstacles to effective treatment, the most pressing of which are a shortage of chemotherapy drugs and a lack of isotopes for radiotherapy. Despite the current crisis in the health care system, there is active concern about cancer on the part of the local government and the health care community. As part of their involvement in the partnership, these community stake-holders have begun to identify several priorities in Semipalatinsk's "war on cancer."

Defining and Measuring the Problem

A primary objective of the partnership program is tracking the number of people who are ill. Statistical measurement of cancer morbidity and mortality is a complex task, requiring analysis of thousands of patient charts and a system for effective data storage and retrieval. Accurate cancer surveillance takes on special importance in Semipalatinsk, where researchers are trying to establish the effect of the nuclear weapons testing on cancer morbidity. While local authorities have maintained statistics on cancer incidence for years, it has now been decided to adopt a cancer registry model.

A cancer registry program uses standardized abstracting forms and a computerized database to maintain full records of every patient with cancer, complete with information on diagnosis, treatment techniques, and outcome. Cancer registries are typically based in hospitals, and focus on cancer patients who have been diagnosed and/or treated in a particular hospital. In Semipalatinsk, the newly established cancer registry is based in the Inter-Oblast Oncology Dispensary, which is the central treatment point for all adults with solid tumors in Semipalatinsk Oblast.

Five oncologists and two computer programmers were identified to work with the registry late last year and immediately began to meet for regular training and review sessions. Through regular use of the AIHA-funded Internet connection at the Oncology Dispensary, members of the Semipalatinsk registry team have been able to stay in regular touch with their colleagues in Houston. (See box) Patricia Tesch, supervisor of the Cancer Registry at The Methodist Hospital in Houston, participated in the team of Texas Medical Center physicians and scientists that advised the oncologists in Semipalatinsk. In June, Tesch led a two-week training seminar that reviewed the steps that go into a successful cancer registry: collecting demographic and diagnostic information, keeping current with data on treatment, and following the patient after treatment.

"A cancer registry is more than the software used to store the data on cancer morbidity and mortality," Tesch explained. "Ideally, it reflects an entire approach to the management of patients with cancer, tracking patients from diagnosis to death - whether the patient dies six months later of cancer, or 20 years later for an entirely different reason," she noted.

Computer specialists from both Houston and Semipalatinsk are now designing the software that will be used to maintain the registry's database. They are programming a Russian-language package that will resemble American cancer registry software programs, but with adjustments for the Kazak setting (different forms of identification, different address formats) and added fields for information about exposure to the weapons testing program.

Improving Diagnostic Techniques

Partnership efforts to improve cancer surveillance and prevention have gone hand in hand with an effort to improve and standardize diagnostic techniques. Several oncologists from Semipalatinsk have participated in partnership training visits in Houston, including Abeev and Adlet Mukanov, MD, chief of oncology at Emergency First Aid Hospital. These visits have included a strong emphasis on diagnostic techniques, as well as an introduction to current treatment protocols.

Physicians from the Houston team have visited Semipalatinsk to lead continuing medical education (CME) programs for physicians from around the region. Thomas M. Wheeler, MD, deputy chief of pathology at The Methodist Hospital and associate chairman of clinical pathology at Baylor College of Medicine, made his second trip to Semipalatinsk in April. His CME program demonstrated fine-needle biopsy of the thyroid, a technique that allows a quick, non-surgical analysis of the tissue. The program involved a dozen physicians and included bedside teaching and lectures. As the health care system in Kazakhstan moves away from costly inpatient procedures, the promotion of fine-needle biopsy is one step to more cost-efficient delivery of medical services.

"Thyroid nodulation, or tumors, are a serious problem in Semipalatinsk, probably due in part to the radiation," explained Wheeler. "At the same time, it is important to have an accurate diagnosis of cancer before removing the thyroid gland, and not every thyroid nodule is cancerous."

Another important diagnostic tool in oncology is proper staging of the disease process. The standard Tumor-Node-Metastasis (TNM) system has been used in Kazakhstan in clinical practice, but will now be incorporated into the cancer registry effort. Teresa Hayes, MD, PhD,

assistant professor of hematology and oncology at Baylor College of Medicine, noted the value of using TNM-based staging in the registry: "Clinical staging is an important predictor of survival, as well as an indispensable tool for treatment. Treatment choice is frequently determined by the stage of a cancer. By including accurate staging information in the registry, we will be able to compare the data from Semipalatinsk with our own data in Houston."

Toward a Healthier Future

The ultimate goal of partnership cancer surveillance and diagnosis efforts is to create a framework for improved treatment outcomes. Because successful outcomes depend on a diagnosis that is both accurate and timely, a strong initial emphasis has been placed on the cancer registry, early diagnosis and screening efforts, and improved diagnostic technique.

As more scientifically reliable data on cancer morbidity and mortality become available, oncologists in Semipalatinsk will have a new chance to assess treatment outcomes and design new protocols. Working with private donors, the partnership is already beginning to identify critically needed medications and surgical supplies.

Forty years of the Cold War have left an indelible mark on the landscape of Semipalatinsk, and current realities make it difficult to alleviate many of its effects, health-related and otherwise. Through cooperation and mutual assistance, however, the Semipalatinsk-Houston partnership has demonstrated that solutions can be implemented to bring the problem of cancer out into the open, where it can best be combatted.

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