

Wednesday May 7, 2014

Mr. Chairman, Senator Collins, and others:

I am pleased to appear today on behalf of the National Cancer Institute to discuss the relationship of cancer to aging.

It is an opportune moment for this discussion. Thanks in large part to improvements in health care, life expectancy has been extended at unprecedented rates, both in our country and around the world. The number of people over age 65 is growing especially rapidly in countries like the United States that experienced sharp increases in birth rates shortly after World War II, nearly 70 years ago. Furthermore, significant progress is being made in cancer research, with a much deeper understanding of the nature of this complex set of diseases and with improvements in the way we prevent, diagnose, and treat many kinds of cancers. Hence, there is both a need and an opportunity to address more effectively the problems presented by cancers in the elderly.

Because most types of cancer but not all are commonly diagnosed in older age groups, the number of people with cancer is rising, and will continue to rise, here and globally. This chart (the only one I will show) displays both the current and anticipated future distribution of new cases of cancer, grouped by age range, in the United States. As you can see, the absolute number of cases will rise from



Recall that there are many types of cancer, and these types arise in different kinds of cells and in different organs. Moreover, we now know that these different cancers generally carry different constellations of changes in DNA. This means that the incidence of each cancer type is influenced by the numbers of cells at risk of becoming cancerous in each organ at different ages. The risk of developing cancers of different types is also affected by the degree of exposure to environmental agents that cause mutations; by gene variations; by the function of the immune system, which itself appears to weaken as we age; and by the availability of methods that prevent cancers or detect abnormal cells before they become fully malignant.

In view of these varied factors, it is not surprising that types of cancer vary with regard to the time of onset. Most dramatically, some cancers like retinoblastomas, some leukemias and lymphomas, and some brain and bone cancers are largely confined to children, adolescents, and young adults. In contrast, the median age of onset of most of the common cancers is between the ages of 61 and 72, consistent with the more general conclusion (reflected in the chart) that over half of all cancers are diagnosed in older age groups. There is one further complication: while most findings argue for increasing rates of cancer with increasing age, the age-adjusted rate (or incidence) of many cancers appears to fall at highly advanced ages.<sup>1</sup>

I will say more in a few minutes about some of these perplexing and potentially informative

## **Preventing cancer as people age: risk assessment, screening, early diagnosis**

For people of any age, the first line of defense against cancers and their damaging consequences



Moreover, it is anticipated that fewer side-effects of cancer therapy will occur as improved surgical methods are developed, radiotherapy is delivered with greater precision and better division of doses, and drug therapy shifts from traditional chemotherapy to . In addition, the several new immunotherapies from the use of therapeutic antibodies to methods to strengthen the activity of immune cells may be quite well tolerated by patients at advanced ages.

To obtain the evidence that supports the use of these therapies in elderly patients, it will be essential to insure that such patients are included in clinical trials. However, about two-thirds of patients in clinical trials are 65 or younger, even though over half of cancers are diagnosed in patients over 65. Despite some increases in the numbers of patients aged 65 to 75 who now participate in trials, the numbers of patients over age 75 who are enrolled in trials remain low, in the range of 10 percent or less. These numbers reflect the prevalence of co-morbidities that may disqualify such patients from enrollment; the difficulty of travelling to the sites of trials; and a persistent prejudice against inclusion of very old patients in trials. These factors require further examination, and the newly reorganized National Community Oncology Research Program (NCORP) is committed to studying patients at older ages and with the common co-morbidities.

Social and psychological aspects of the care of older patients, including the heavy burden often placed on familial caregivers, also deserve increased attention. It is often no easier to make decisions about when to abandon aggressive, curative measures in favor of symptomatic care and referral to hospice for aged patients than for younger ones. These decisions have important effects on quality of life and on economic costs of care.

## **Learning More About Cancer and Aging**

Because NCI studies cancers of all types and because most cancers occur predominantly in older people, NCI is inherently heavily invested in research on this major cause of morbidity and mortality in aging populations. I have already mentioned a number of ways in which our research specifically addresses the relationship between cancers and aging: through studies of the epidemiology of many kinds of cancer; through efforts to address the utility of preventive measures, like daily aspirin, in older patients; and through attention to the numbers of elderly patients in our clinical trials. Furthermore, we use CISNET Network) to analyze existing data and make predictions about optimal use of screening

tests, such as helical CT scanning for lung cancers. And other commonly used agents, like metformin for diabetes and statins for lowering blood lipids, as well as aspirin, are being studied for their possible chemo-prevention activity.

NCI is also supporting work on more fundamental aspects of aging and its relationship to cancer. For example, NCI's Provocative Questions initiative has called for applications to study how life span relates to cancer incidence in animals, starting from the observation that certain short-lived animals, like mice, have relatively high rates of cancer, whereas some much longer lived animals, like naked mole rats or reptiles, have very low rates. Other Provocative Questions ask how biological mechanisms might influence susceptibility to cancer risk factors at different stages of life or what aspects of aging, other than mutations, might promote or protect against cancers.

Aging and Cancer Interface), the Gerosciences Interest Group, and the Chronic Inflammation and Age-Related Disease group.

I would be pleased to respond to any questions you might have.