Title

* Contribution of Screening and Treatment on Improvements in Cancer Survival
* Contribution of Screening and Treatment on Improvements in US Cancer Survival
* Contribution of Screening and Treatment on Improvements in US Cancer Mortality
* The Contribution of Screening and Treatment on Improvements in US Cancer Mortality
* The Contribution of Stage of Diagnosis & Improvements in Treatment on US Cancer Mortality Rates

Introduction

1. What do we know
   1. Advancements in treatment
   2. Greater use of effective screening
   3. Improvements in the care of other diseases (e.g., CVD)
2. What don’t we know/research gap
   1. How much of the improvement in cancer survival is due to improved screening which shifts the stage of diagnosis to earlier
3. How does our study fill this research gap

Methods

1. Data
2. Methodology

Results

Discussion

**ABSTRACT**

**Importance. More widespread screening and improvements in the detection of cancer shift the stage of diagnosis to earlier and more treatable stages, and thereby lengthen patients’ survival. Similarly, advancements in cancer treatment reduce mortality rates and increase length of life.**  By knowing the relative contribution of screening versus treatment on improvements in cancer mortality, we can more effectively focus cancer care.

**Objective.**  To assess how much of the gain in life expectancy over time among cancer patients resulted from shifts in the stage of diagnosis versus improvements in mortality rates from cancer and competing causes of death.

**Design, Setting, and Participants.** Retrospective cohort evaluation of N patients aged 40-84 years diagnosed with breast, colorectal, lung, prostate, and 8 other leading cancers; 1973-2011; using the US Surveillance, Epidemiology, and End Results registries.

**Main Outcomes and Measures. The gain in life expectancy over time that resulted from shifts in the stage at diagnosis, improvements in mortality rates from cancer, and improvements in mortality rates from other causes of death.**

**Results:**  Life expectancy for breast cancer patients increased by 13.4 years between 1973 and 2001: 30.6% from shifts to earlier stages at diagnosis, 48.5% from improvements in breast cancer mortality rates, and 20.1% from improvements in mortality rates of other diseases. Life expectancy for colorectal cancer patients increased by 7.4 years over this time period: 20.3% from stage shift, 70.3% from improvements in colorectal cancer mortality rates, and 9.5% from improvements in mortality rates of other diseases. We observed a more modest gain of 3.6 years in life expectancy for prostate cancer patients: 19.4% from stage shift, 19.4% from improvements in prostate cancer mortality, and 61.1% from improvements in mortality of other diseases.

**Conclusions and Relevance. Life expectancy for cancer patients primarily increased because of improvements in treatment of cancer itself and competing causes of death, rather than screening.**

**INTRODUCTION**

**2. METHODS**

**2.1 Patient Data**

We obtained incidence and mortality data from the NCI’s Surveillance, Epidemiology, and End Results (SEER) 9 registry database between 1973 and 2011 for the following cancers: bladder, breast, cervical, colorectal, esophageal, head and neck, kidney, lung, lymphoma, melanoma, ovarian, pancreatic, prostate, stomach, and uterine. The SEER 9 registries, which cover ~10% of the US population, form the largest, most representative and longest running national cancer incidence database. SEER captures virtually all of the cancers occurring in the geographic areas covered by the SEER registries; a person’s entry into the registries begins with their diagnosis and ends, if relevant, with their death. We analyzed N cancer cases diagnosed between 1973 and 2011, included only the first matching record for each person, and excluded deaths from cancers identified only by autopsy or death certificate. SEER classifies cancer as the cause of death based on the death certificate, the identity of a primary tumor, and relevant comorbidities. We placed a further requirement: the cancer death must have occurred within 10 years of its diagnosis.19, 20 By allowing this 10-year time window between diagnosis and death, we were able to calculate incidence-based mortality rates between 1973 and 2001 for N incident cancer cases.

An incidence-based mortality rate for a specific cohort of newly diagnosed cancer patients equals the ratio of [1] the number of cancer deaths occurring for this cohort up to 10 years beyond their diagnosis and [2] the total number of person-years lived by this cohort, up to 10 years. For example, X women were diagnosed with localized breast cancer in 2001. Between 2001 and 2011, Y died of breast cancer and this entire cohort lived a total of Z person-years. Thus, the incidence-based mortality rate equaled Y/Z=M. We calculated incidence-based mortality rates by age group at diagnosis (40-44 years to 80-84 years), sex, year of diagnosis (1973-2011), cancer type, and stage (in situ, localized, regional, and distant). Other cause. Proportion.

**RESULTS**

**DISCUSSION**

**REFERENCES**