Projections of the Costs Associated with Cancer Care in the United States

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Robin Yabroff, Ph.D
Health Services and Economics Branch
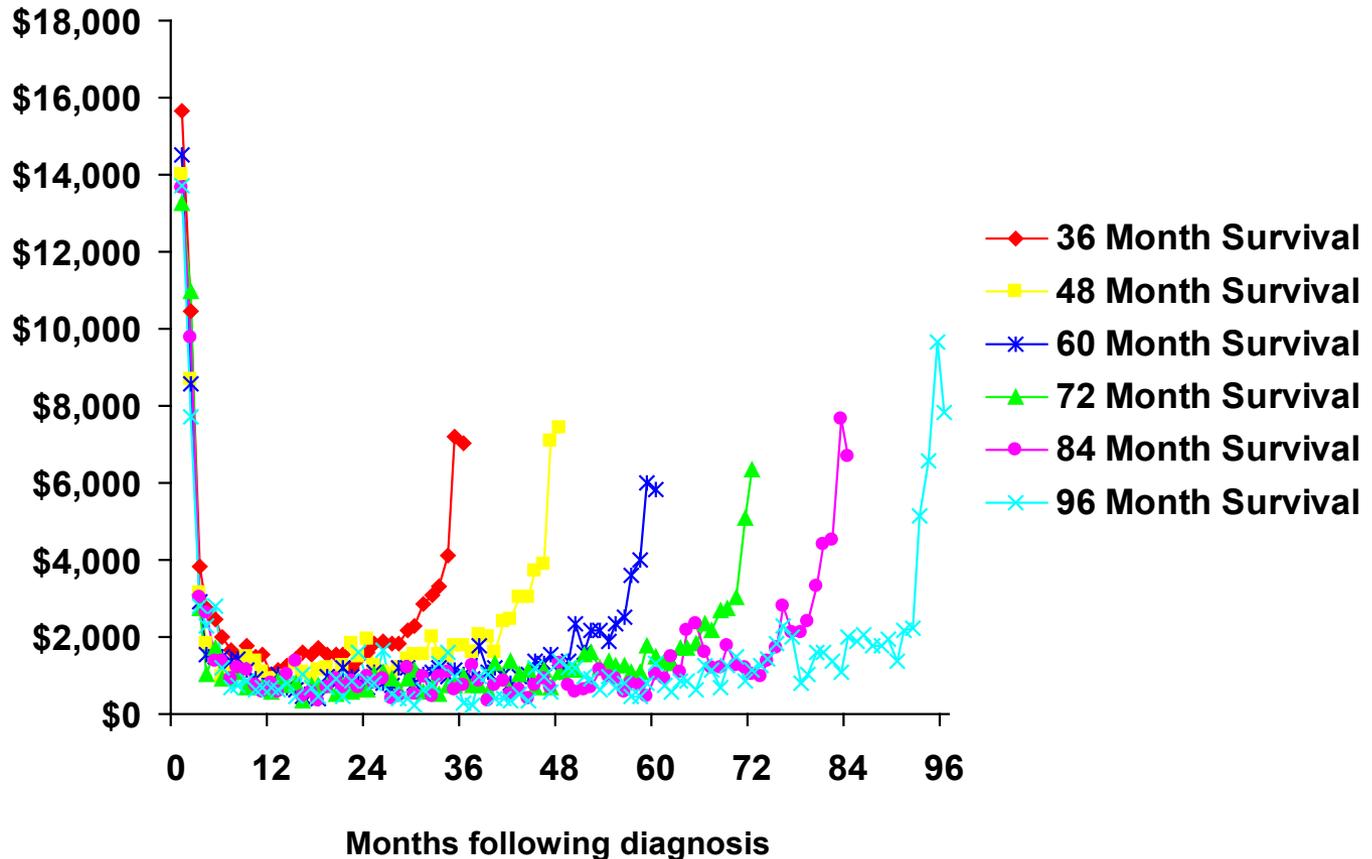Division of Cancer Control and Population Sciences
National Cancer Institute
yabroffr@mail.nih.gov

Overview

- Temporal cost patterns in cancer patients

- National estimates and projections

- Considerations in evaluating cost drivers

- Challenges in projecting cancer care costs

- Opportunities for improving cost estimates and projections

Monthly Medicare Payments for Colorectal Cancer Patients by Length of Survival

Legend:
- 36 Month Survival
- 48 Month Survival
- 60 Month Survival
- 72 Month Survival
- 84 Month Survival
- 96 Month Survival

X-axis: Months following diagnosis (0, 12, 24, 36, 48, 60, 72, 84, 96)

Y-axis: $0, $2,000, $4,000, $6,000, $8,000, $10,000, $12,000, $14,000, $16,000, $18,000

Phase of Care Approach for Estimating Cancer Costs

- Trajectory from diagnosis to death divided into clinically relevant periods or phases of care where flow of costs relatively homogeneous
  - Initial
  - Continuing
  - Last year of life
- Phases can be predefined or determined empirically
- Can be used with longitudinal monthly survival probabilities to model incidence costs for a specific cohort
- **Can be used with modeled prevalence by phase of care to estimate or project prevalence costs in a given year**
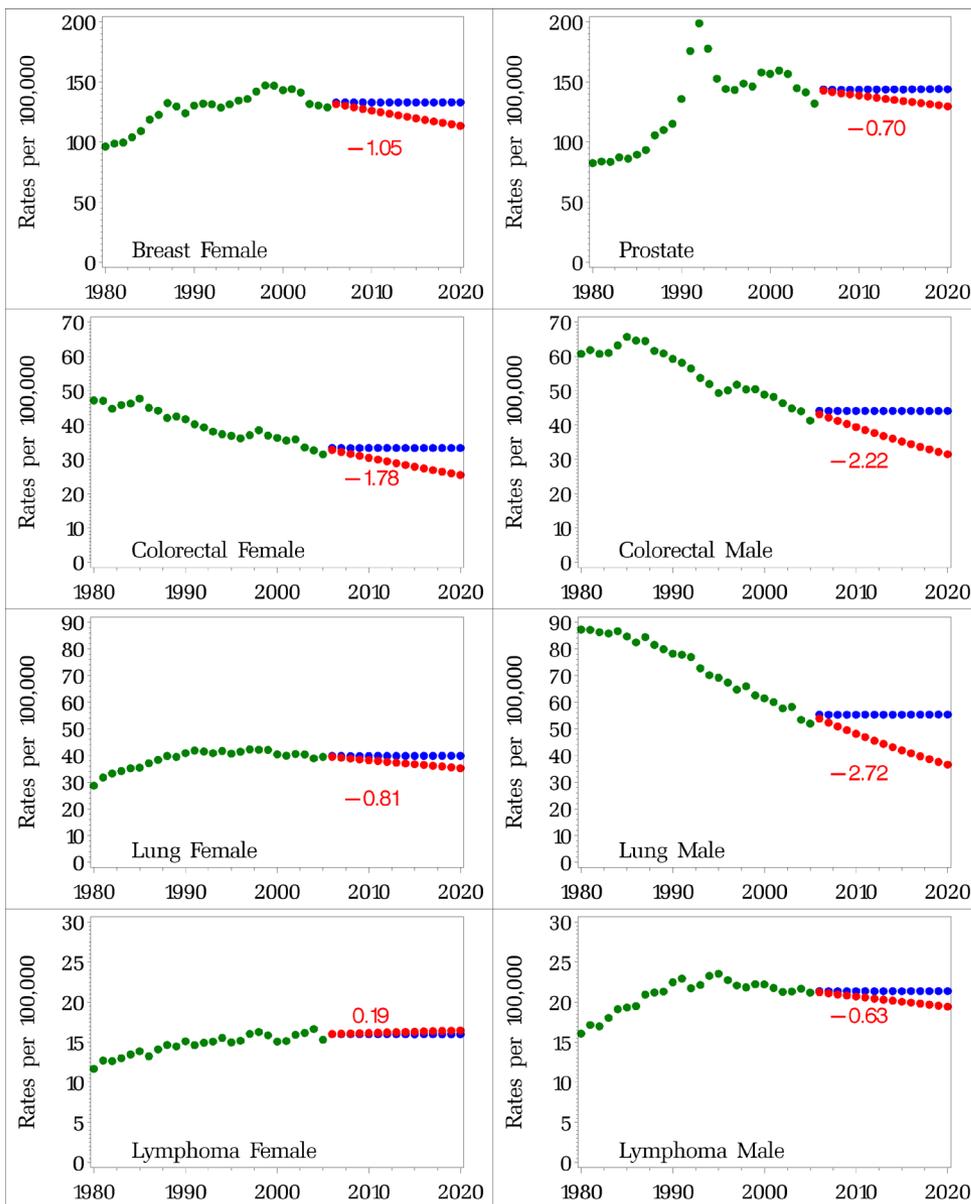
Estimating and Projecting National Cancer Costs

- Dynamic U.S. population projections from Census
  - Population aging and growing

- Incidence and survival rates projected based on most recent years of SEER data by cancer site and gender
  - Incidence mostly declining
  - Survival mostly improving

- Prevalence estimated and projected by phase of care for each cancer site by age and gender

- Linked SEER-Medicare data used to estimate net cost of care by cancer site, gender, and phase of care based on most recent data

Scenarios for Projecting National Cancer Care Costs

– Base case: constant current incidence, survival, cost based on most recent data

– Recent incidence and survival trend and assumptions about cost trends
  - 2% increase annually in costs in initial and last year of life phases
  - 5% increase annually in costs in initial and last year of life phases

Source: Mariotto AB, Yabroff KR, Shao Y, Feuer EJ, Brown ML. Projections of the costs of cancer care in the United States: 2010-2020. J Natl Cancer Inst 2011;103:117-128.

Observed and projected SEER incidence rates

Observed and projected SEER incidence rates

●●● Observed

●●● Projected current

●●● Continuing trend

Source: Mariotto AB, Yabroff KR, Shao Y, Feuer EJ, Brown ML. Projections of the costs of cancer care in the United States: 2010-2020. J Natl Cancer Inst 2011;103:117-128.
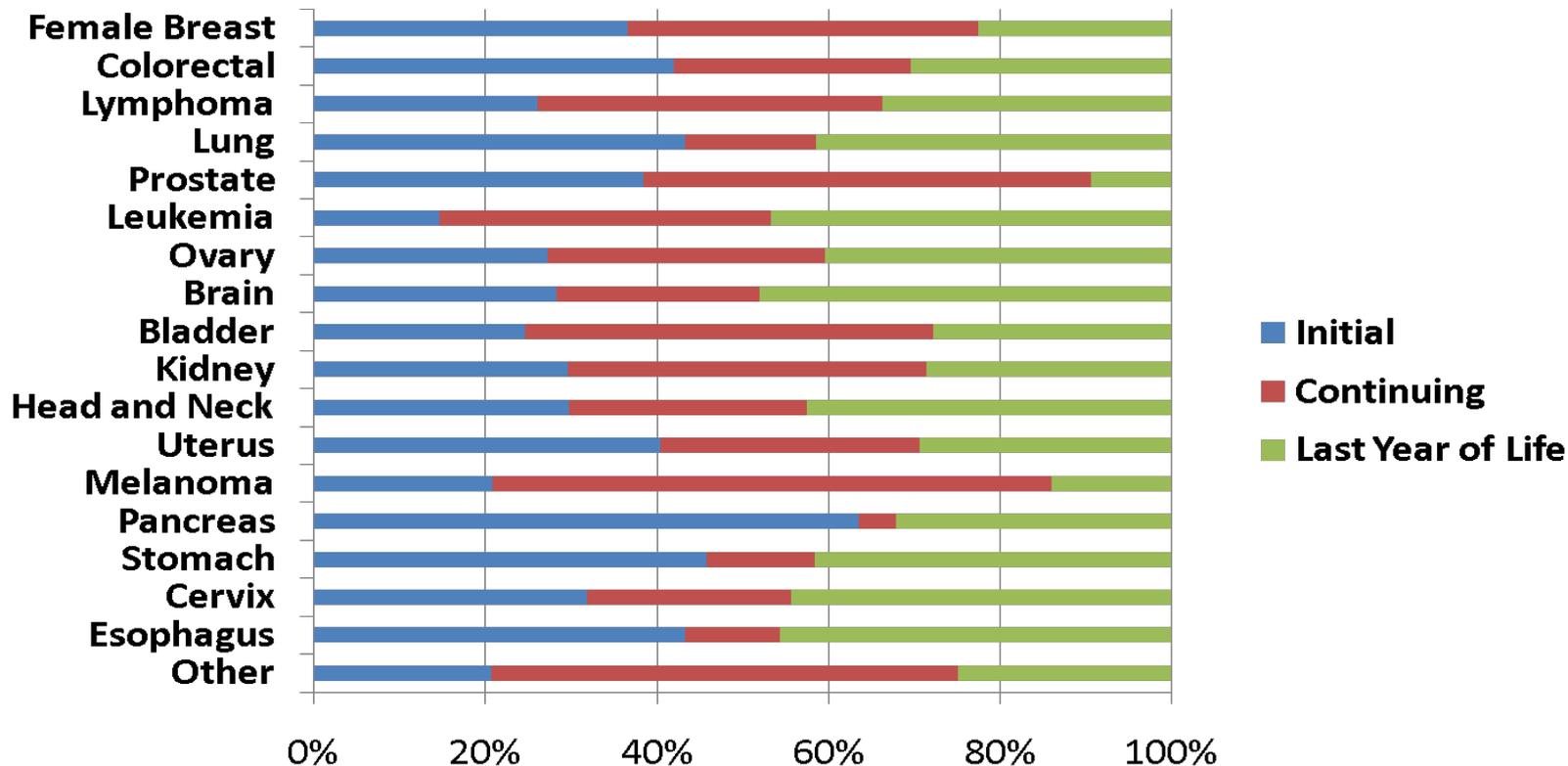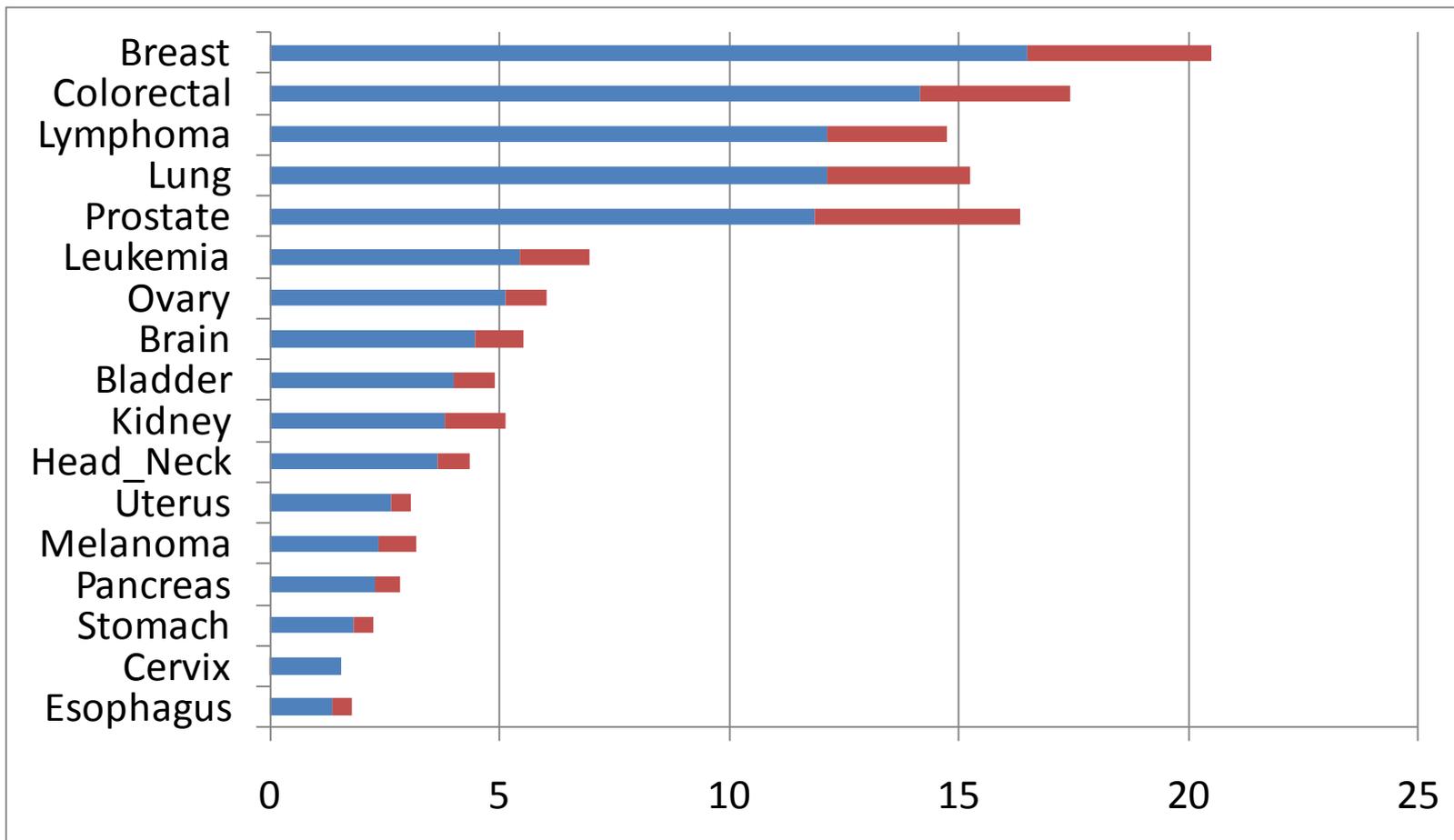
Estimated National Expenditures for Cancer Care in 2010 by Site (in billion $)
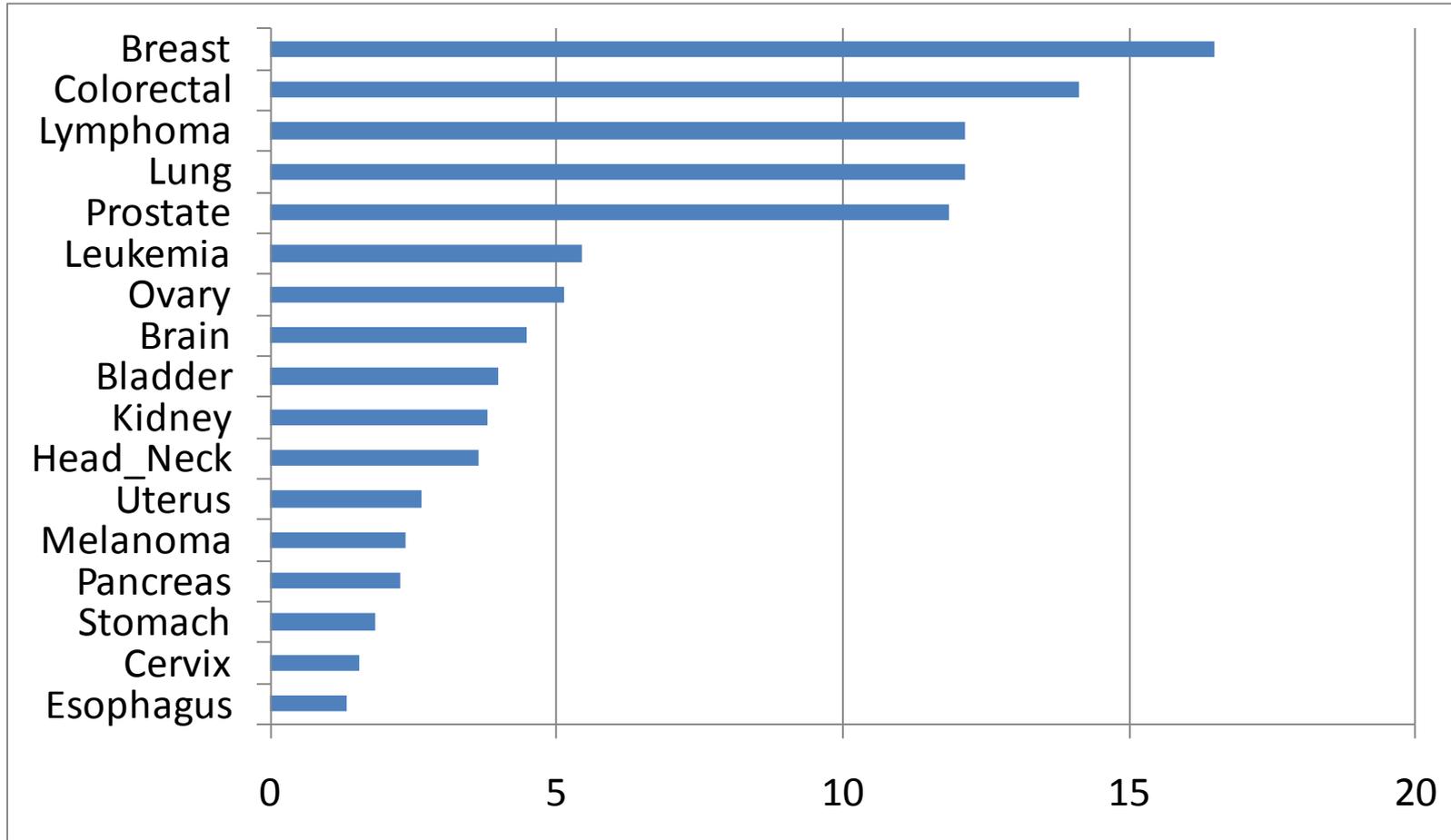
Total Cancer Expenditure in 2010: $124.57 Billion in 2010 dollars

Estimated Proportion of National Expenditures for Cancer Care in 2010, by Site and Phase of Care

Projected Increase in National Expenditures in 2020 by Cancer Site (in billion $): Population Changes Only

Total Cancer Expenditure in 2020, Base Scenario: $157.77 Billion in 2010 dollars

Source: Mariotto AB, Yabroff KR, Shao Y, Feuer EJ, Brown ML. Projections of the costs of cancer care in the United States: 2010-2020. J Natl Cancer Inst 2011;103:117-128.

Projections of National Cancer Care Expenditures in 2020

Recent incidence and survival trends, and
- 2% increase annually in costs in initial and last year of life phases
$172.8 B (39% increase from 2010)

- 5% increase annually in costs in initial and last year of life phases
$206.6 B (66% increase from 2010)

- http://costprojections.cancer.gov/

Source: Mariotto AB, Yabroff KR, Shao Y, Feuer EJ, Brown ML. Projections of the costs of cancer care in the United States: 2010-2020. J Natl Cancer Inst 2011;103:117-128.

Considerations when Evaluating Simultaneous Cost Drivers

- Population changes

- Incidence trends

- Stage Distribution at Diagnosis

- Survival trends

- Changes in use of services
  - Targeted therapy
  - Imaging
  - Hematopoietic growth factors
  - Hospice

- Changes in frequency and/or unit cost per service

- Hospitalizations

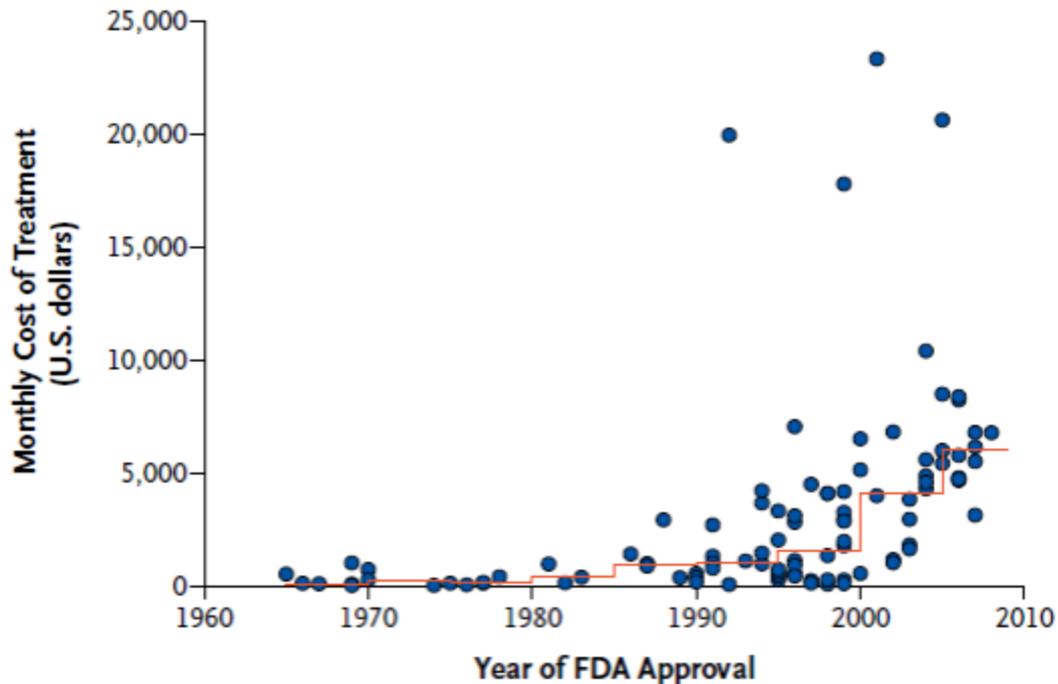# Monthly Costs of Cancer Drugs at FDA Approval

Figure 1. Monthly and Median Costs of Cancer Drugs at the Time of Approval by the Food and Drug Administration (FDA), from 1965 through 2008.

Shown are costs for 1 month of cancer treatment for a person who weighs 70 kg or has a body-surface area of 1.7 m². The red line indicates median prices during a 5-year period. Prices have been adjusted to 2007 dollars and reflect the total price for the drug at the time of approval, including both the amount of Medicare reimbursement and the amount paid by the patient or by a secondary payer. (For details about the costs of individual drugs, see the Supplementary Appendix, available with the full text of this article at NEJM.org.)
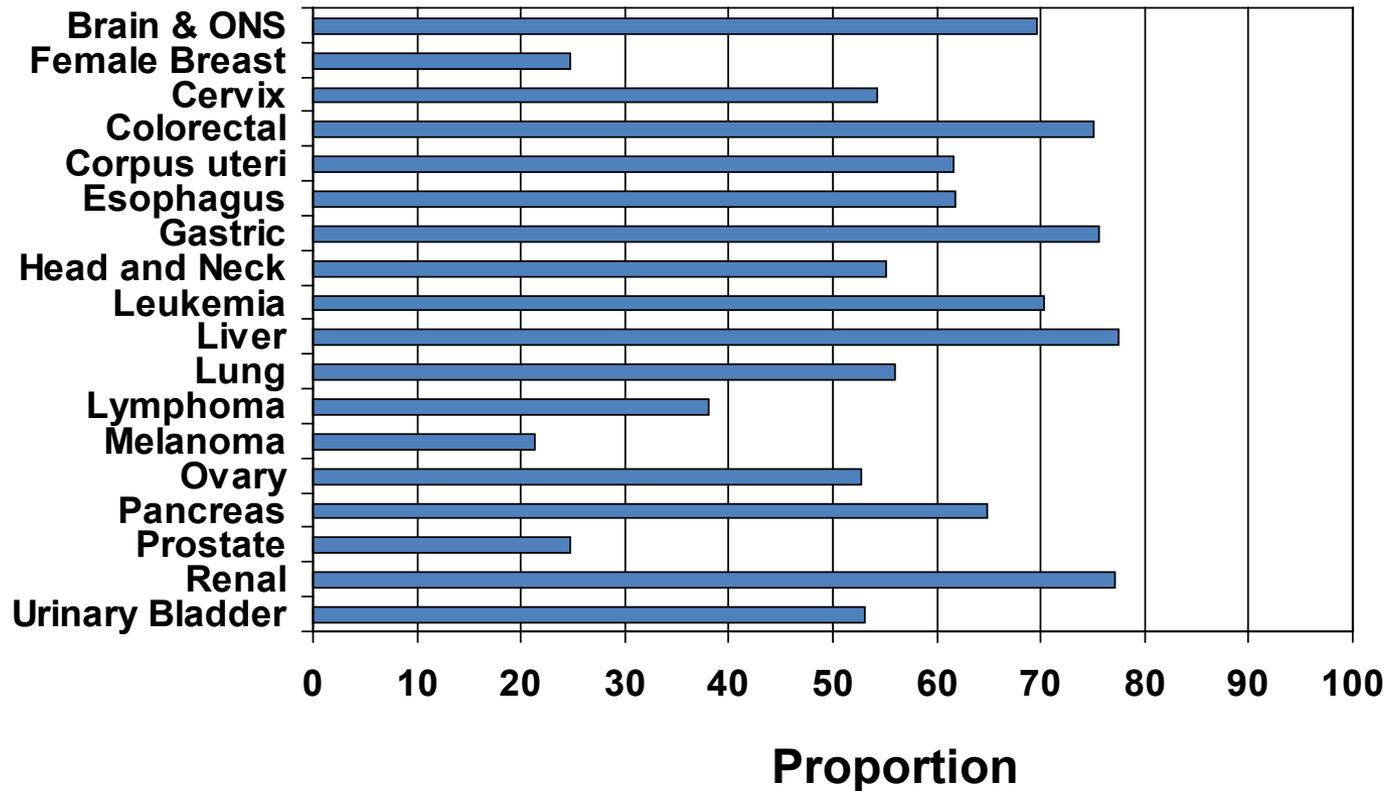
Percentage of Total Medicare Payments in Year Following Diagnosis by Type of Service in 2002
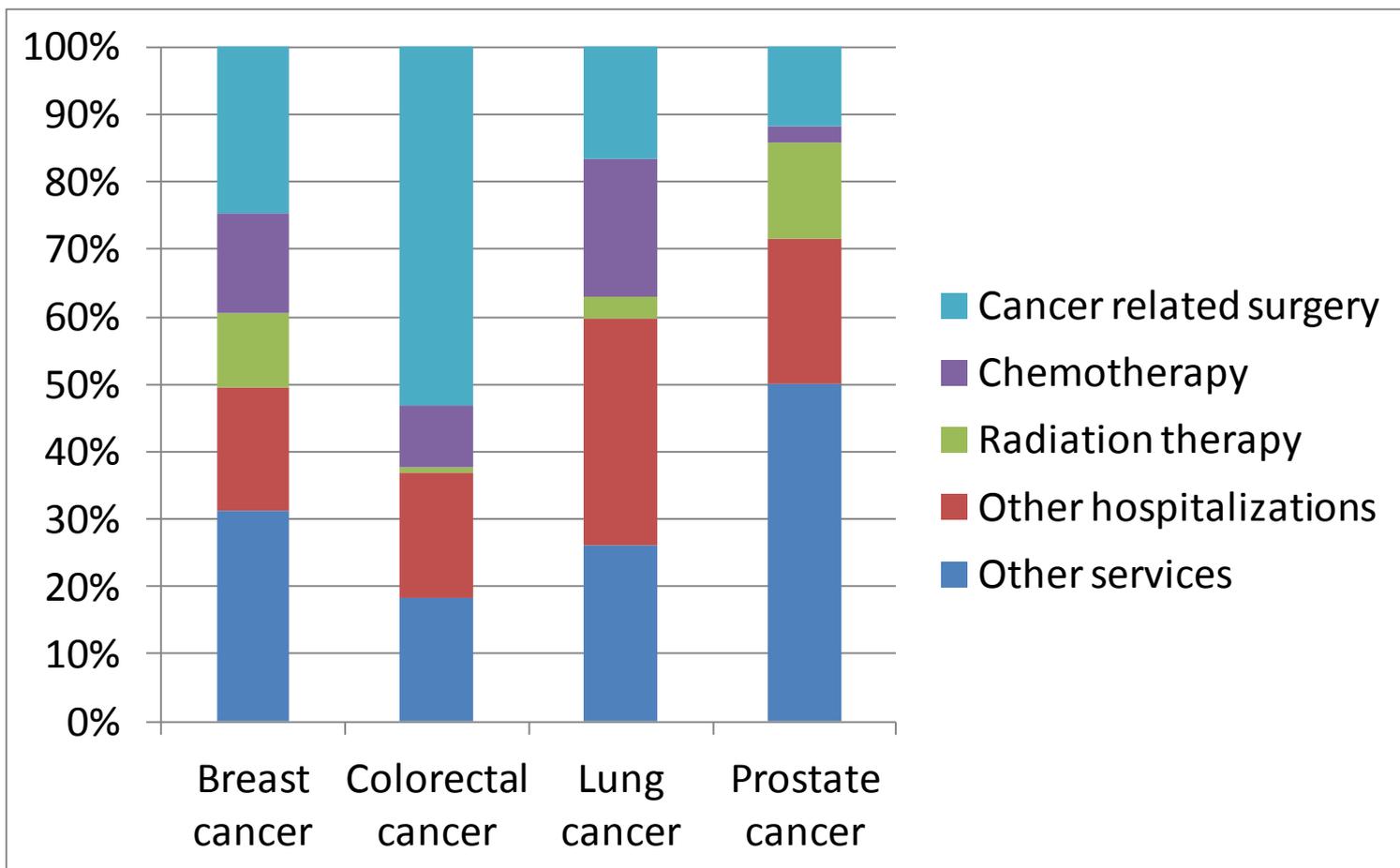
Source: Warren JL, Yabroff KR, Meekins A, Topor M, Lamont EB, Brown ML. Evaluation of trends in the cost of initial cancer treatment. J Natl Cancer Inst 2008;100:888-897.

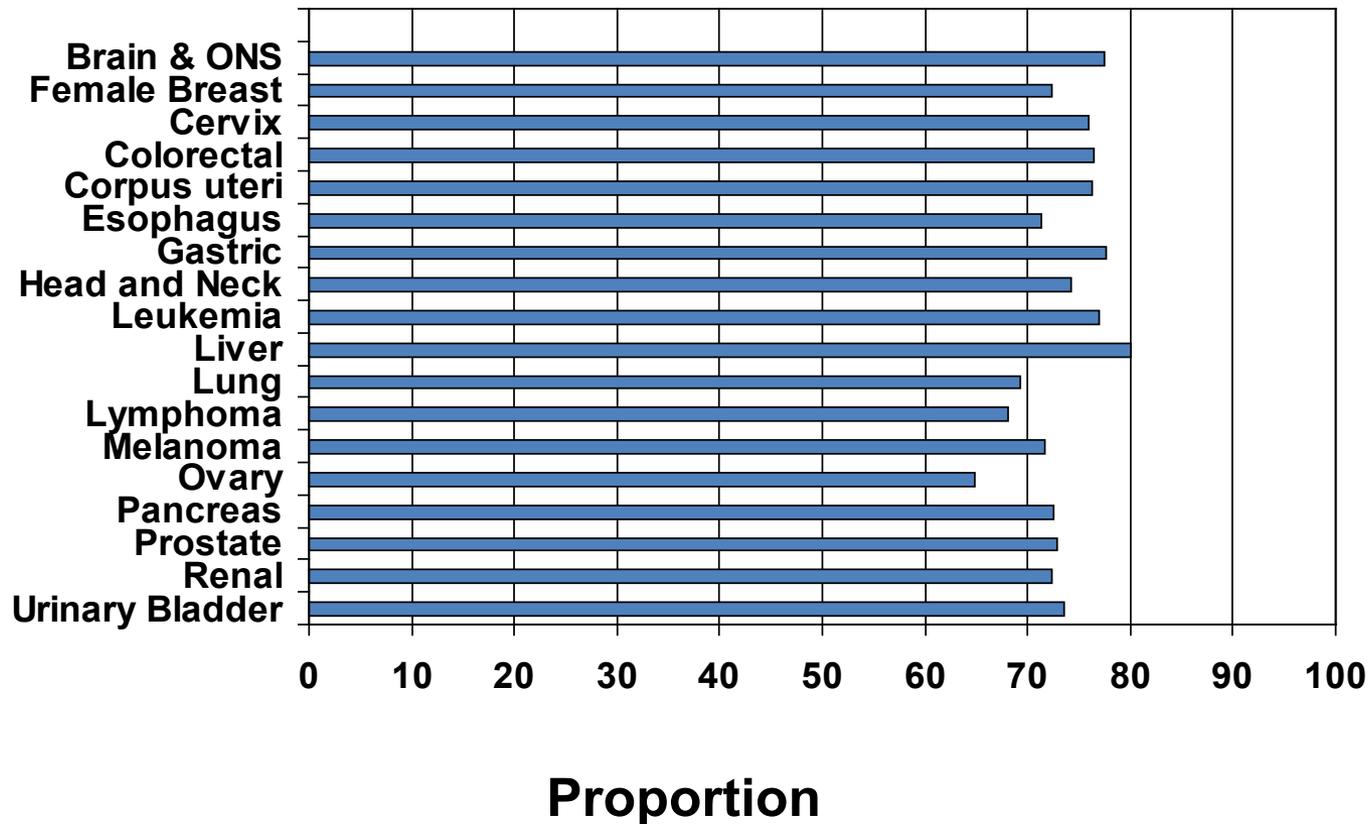# Proportion of Net Medicare Payments due to Hospitalizations in Elderly Cancer Patients, Initial Phase of Care

Tumor Site

Chart showing Proportion (x-axis, 0 to 100) by Tumor Site:
- Brain & ONS: ~70
- Female Breast: ~25
- Cervix: ~54
- Colorectal: ~75
- Corpus uteri: ~61
- Esophagus: ~62
- Gastric: ~76
- Head and Neck: ~55
- Leukemia: ~70
- Liver: ~77
- Lung: ~56
- Lymphoma: ~38
- Melanoma: ~21
- Ovary: ~53
- Pancreas: ~64
- Prostate: ~25
- Renal: ~77
- Urinary Bladder: ~53

Proportion

Source: Yabroff KR, Lamont EB, Mariotto A, Warren JL, Topor M, Meekins A, Brown ML. Cost of care for elderly cancer patients in the United States. J Natl Cancer Inst 2008;100(9):630-641.

Proportion of Net Medicare Payments due to Hospitalizations in Elderly Cancer Patients, Last Year of Life Phase of Care

Tumor Site

Brain & ONS, Female Breast, Cervix, Colorectal, Corpus uteri, Esophagus, Gastric, Head and Neck, Leukemia, Liver, Lung, Lymphoma, Melanoma, Ovary, Pancreas, Prostate, Renal, Urinary Bladder

Proportion

Challenges for Estimating and Projecting Cancer Costs

- Data completeness
  - Care trajectory
  - All payers by type, including out of pocket
  - Under age 65
  - National

- Data comparability
  - Population differences
  - Methods for identifying cancer patients
  - Type of data (Claims, encounter data, discharge, survey-based)

- Estimating and projecting treatment patterns
  - Prevalence changes relatively slowly, but treatment patterns can change rapidly

Opportunities for Improving Cost Estimates and Projections

- Improved Data
  - State-based linkage efforts
  - Medical Expenditure Panel Survey (MEPS) Experiences with Cancer Survivorship Supplement

- Ongoing evaluation of trends
  - Patterns of care
  - Costs

- Comparative studies
  - Cancer Research Network – care and costs in managed care and fee-for-service elderly
  - Patterns of care and costs in other countries

Acknowledgements

- Angela Mariotto

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