Quantifying the Costs and Benefits of Cancer Control Efforts
“Requests will always exceed resources. Doing good is imperative. Doing everything is impossible.”

— J. Grant Howard, Balancing Life's Demands: A New Perspective on Priorities
Overview

• Background
• Considerations in thinking about trade-offs
• Challenges in quantifying costs and benefits
• Opportunities to improve cancer control efforts
Cancer Control Continuum

- Risk Assessment and Prevention
- Screening and Detection
- Diagnosis
- Treatment
- Survivorship
- End-of-Life Care
Cancer Survivorship

• Currently about 16.9 million cancer survivors in the United States
• Recent trends
  – Incidence rates mostly declining
  – Survival following diagnosis mostly improving
• Because of aging and growing population, expect about 26.1 million cancer survivors by 2040
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. 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.


https://www.mskcc.org/research-programs/health-policy-outcomes/cost-drugs
Launch Price of New Cancer Drugs and Household Income, 1975-2014

### Projections of National Medical Care Spending on Cancer 2010 to 2020

<table>
<thead>
<tr>
<th></th>
<th>Spending</th>
<th>Increase</th>
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</thead>
<tbody>
<tr>
<td>National spending in 2010</td>
<td>$124.6 B</td>
<td></td>
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<tr>
<td>National spending in 2020</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population changes only</td>
<td>$157.8 B</td>
<td>27%</td>
</tr>
<tr>
<td>Trends in incidence and survival</td>
<td>$154.7 B</td>
<td>24%</td>
</tr>
<tr>
<td>+ 2% initial and last year</td>
<td>$172.8 B</td>
<td>39%</td>
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<tr>
<td>+ 5% initial and last year</td>
<td>$206.6 B</td>
<td>66%</td>
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Cancer Control Continuum

- Risk Assessment and Prevention
- Screening and Detection
- Diagnosis
- Treatment
- Survivorship
- End-of-Life Care
Cost Domains

• Direct Medical Costs
  o Hospitalizations, Treatment/Medications

• Direct Non-Medical Costs
  o Transportation, caregiver and patient time

• Indirect or Productivity Costs
  o Morbidity and mortality costs

• Intangible Costs
  o Pain and suffering
Cancer Costs in the United States

- Expensive from multiple perspectives
  - State and federal governments
  - Employers
  - Health plans/insurers
  - Providers
  - Patients and families

- Relevance of cost domain varies by perspective
Factors at Multiple Levels Associated with Cancer Outcomes

- National Health Policy Environment
- State Health Policy Environment
- Local Community Environment
- Organization and/or Practice Setting
- Provider/Team
- Patient and Family

Employer

Cancer Outcomes
Illustrative Example: Interventions to Increase Colorectal Cancer Screening

- **Patient**: Telephone reminders
- **Provider and practice**: Reminders in electronic medical record
- **Insurer**: Quality measurement, value-based payment
- **Employer**: Offer of comprehensive insurance coverage, paid sick leave, promotion
- **Policy**: Elimination of cost-sharing, expansion of insurance coverage options
**Table: Interventions to Increase Colorectal Cancer Screening**

<table>
<thead>
<tr>
<th></th>
<th>Reach</th>
<th>Duration of Impact</th>
<th>Across Cancers and Continuum</th>
<th>Effect on disparities</th>
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<tbody>
<tr>
<td>Patient</td>
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<tr>
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<tr>
<td>Multi-level</td>
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Relevant cost domains differ by perspective
Data Challenges in Measuring Costs Across the Cancer Control Continuum

Risk Assessment and Prevention → Screening and Detection → Diagnosis → Treatment → Survivorship → End-of-Life-Care

Healthcare Cost and Utilization Project (HCUP)
Medical Expenditure Panel Survey (MEPS)
Additional Data Challenges

• Information about medical care costs generally from health insurance claims
  • Direct medical cost covered by insurer
  • Limited data for direct non-medical and morbidity costs
• Generalizability, especially when considering coverage churn and disparities
  • Limited clinical data, even with registry linkages
• Timeliness
MISCAN-Colon (CISNET) microsimulation model
Evaluated multiple screening strategies
Specifically evaluated treatment for stage III/IV disease
- Higher treatment cost
- Improvements in survival

When treatment is more costly, most colorectal cancer screening becomes cost-saving
- Screening can reduce incidence and increase early detection
- Screening can help control treatment costs

MISCAN-Colon (CISNET) microsimulation model

Evaluate effects of improvements in prevention, screening, and treatment compared with usual care, 2005 to 2020
  - Colorectal cancer mortality
  - Morbidity
  - Productivity savings

Simultaneous improvements: >101K deaths avoided, $34B in productivity savings

Improved screening > prevention > treatment in productivity savings

Challenges

• Current spending growth is unsustainable
• Cost estimates are incomplete
• Longitudinal, comprehensive data not available
• Multiple and competing perspectives
• Simulation models time-consuming and expensive
• Data cannot be easily used to evaluate widening disparities in cancer outcomes  
  o insured/uninsured and type of coverage 
  o geography, especially state-level
Opportunities

• Greater availability of data and linkages
• Rapidly evolving methods and computing
• Cost and variants of cost-effectiveness analyses can help prioritize investments
• Simulation modelling
  o Assess trends on multiple components of continuum
  o Compare investments across continuum
• Natural experiments