Quantifying the Costs and Benefits of Cancer Control Efforts

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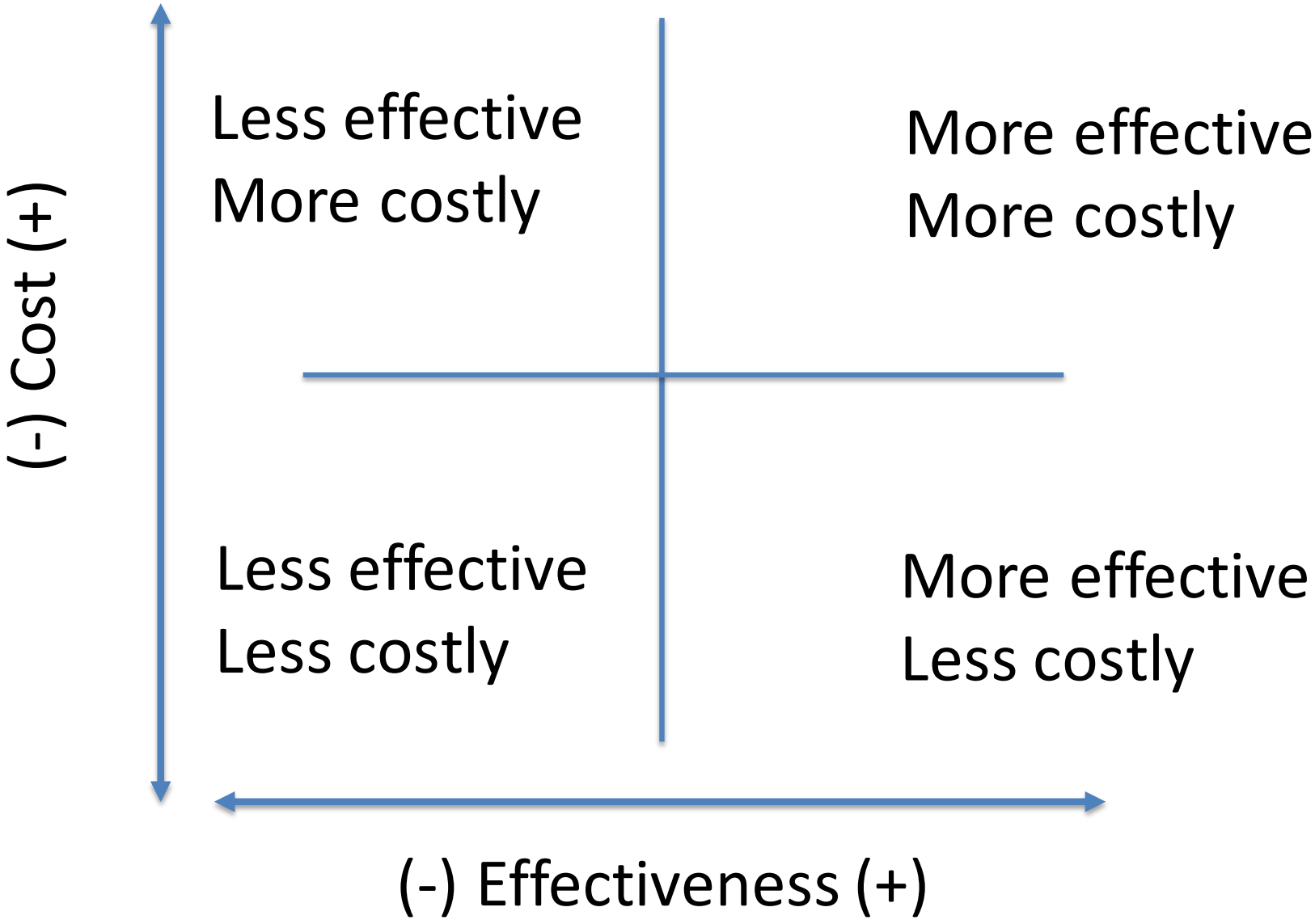
“Requests will always exceed resources. Doing good is imperative. Doing everything is impossible.”

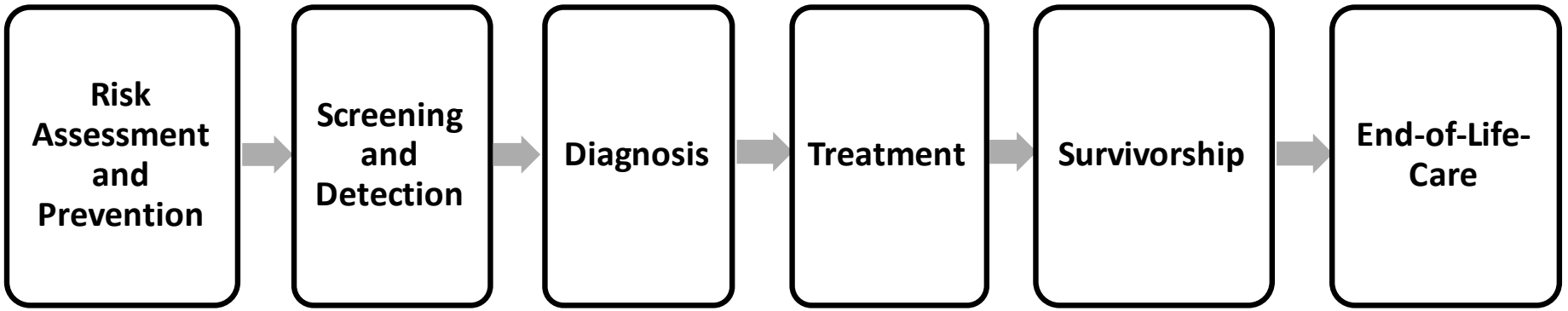
— J. Grant Howard, Balancing Life's Demands: A New Perspective on Priorities

Overview

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


Less effective
More costly
More effective
More costly
Less effective
Less costly
More effective
Less costly
(-) Cost (+)
(-) Effectiveness (+)

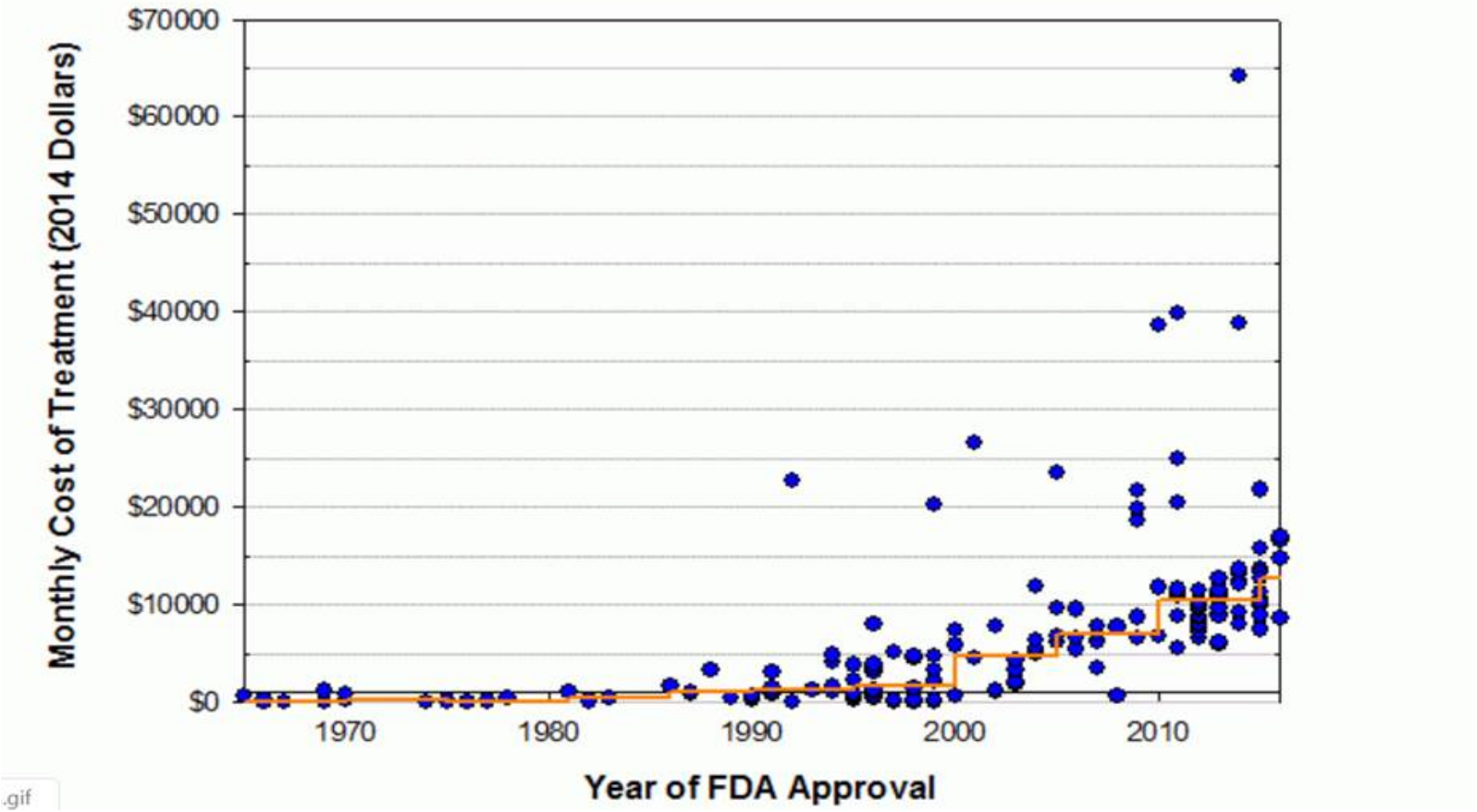
Cancer Control Continuum



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

Monthly and Median Costs of Cancer Drugs at the Time of FDA Approval 1965-2016

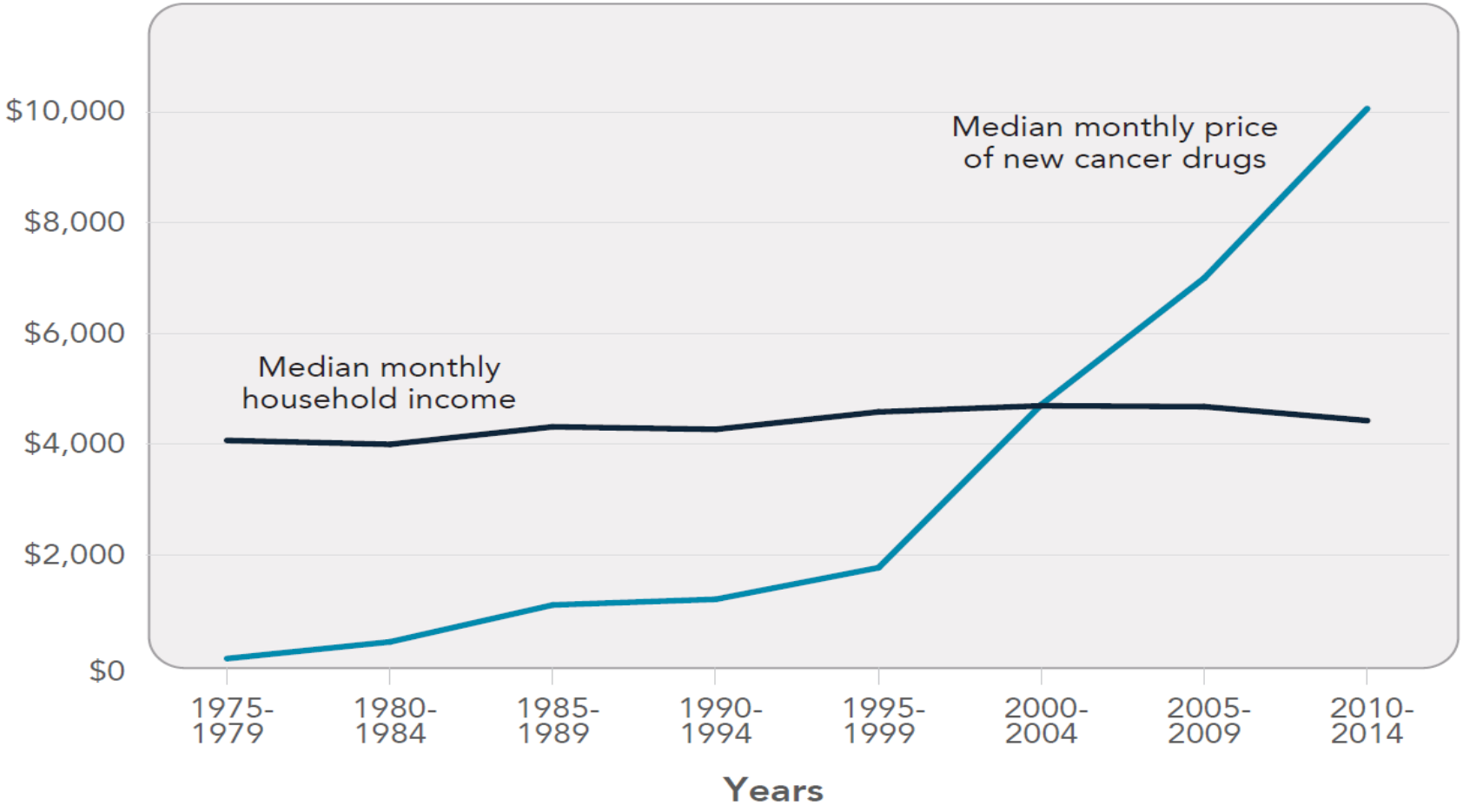


Shown are costs for 1 month of cancer treatment for a person who weighs 70 kg or has a body-surface area of 1.7 m^2. Prices have been adjusted to 2007 dollars and reflect the total price for the drug at the time of approval, including both the amount of Medicare reimbursement and the amount paid by the patient or by a secondary payer.

Source: Bach PB. Limits on Medicare's ability to control rising spending on cancer drugs. N Engl J Med 2009; 360:626-633.

https://www.mskcc.org/research-programs/health-policy-outcomes/cost-drugs

Launch Price of New Cancer Drugs and Household Income, 1975-2014



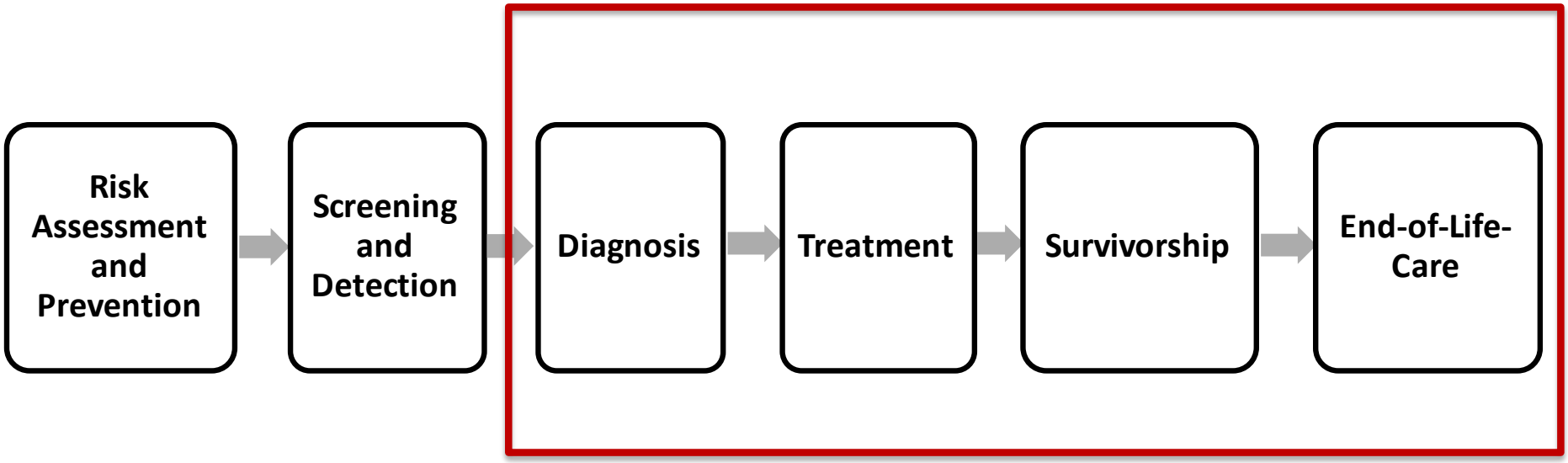
Source: Prasad V, Jesus K, Mailankody S. The high price of anticancer drugs: origins, implications, barriers, solutions. Nat Rev Clin Oncol. 2017.

Projections of National Medical Care Spending on Cancer 2010 to 2020

	Spending	Increase
National spending in 2010	$124.6 B	
National spending in 2020		
Population changes only	$157.8 B	27%
Trends in incidence and survival	$154.7 B	24%
+ 2% initial and last year	$172.8 B	39%
+ 5% initial and last year	$206.6 B	66%

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.

Cancer Control Continuum



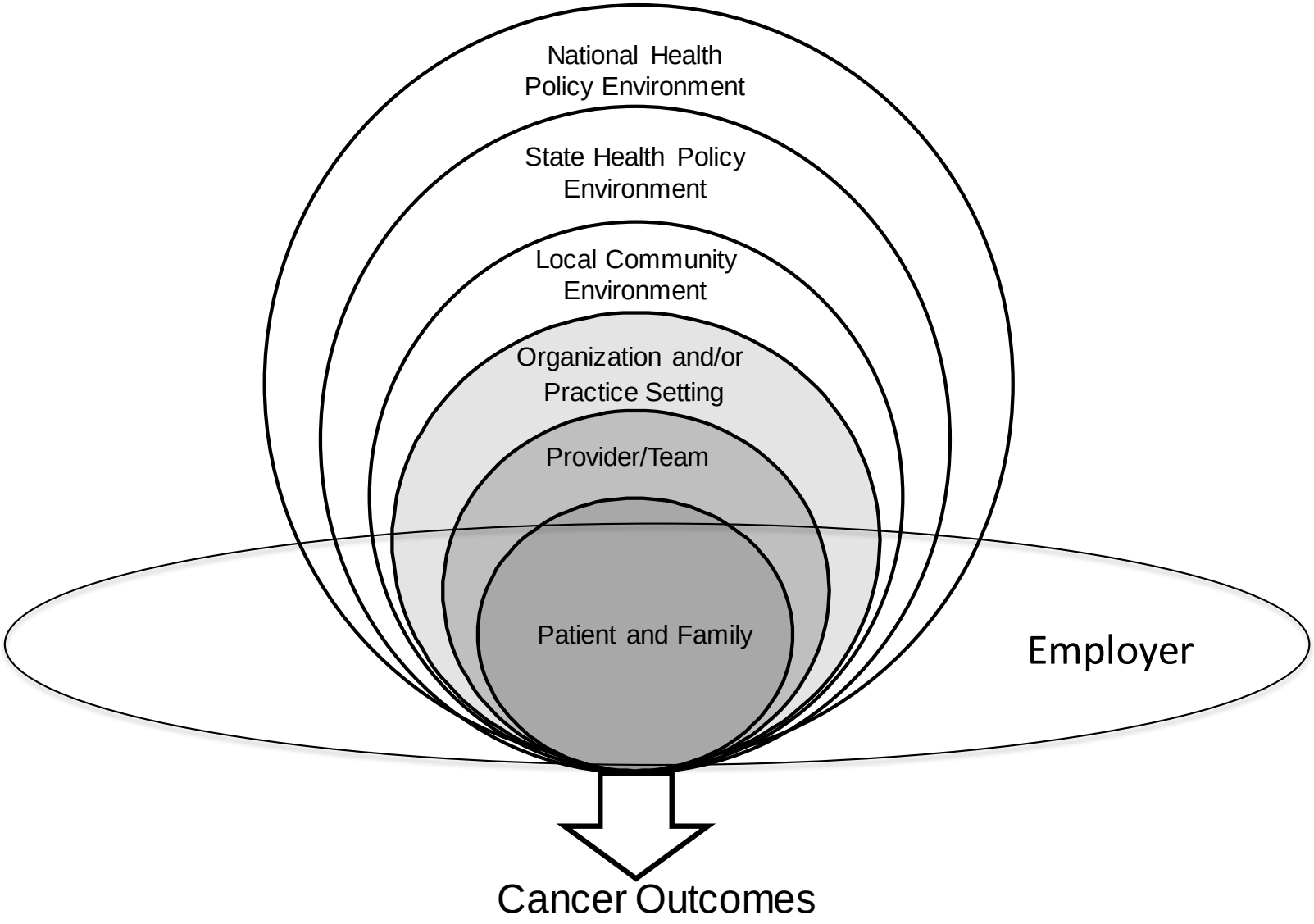
Cost Domains

- Direct Medical Costs
  - Hospitalizations, Treatment/Medications
- Direct Non-Medical Costs
  - Transportation, caregiver and patient time
- Indirect or Productivity Costs
  - Morbidity and mortality costs
- Intangible Costs
  - 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



Illustrative Example: Interventions to Increase Colorectal Cancer Screening

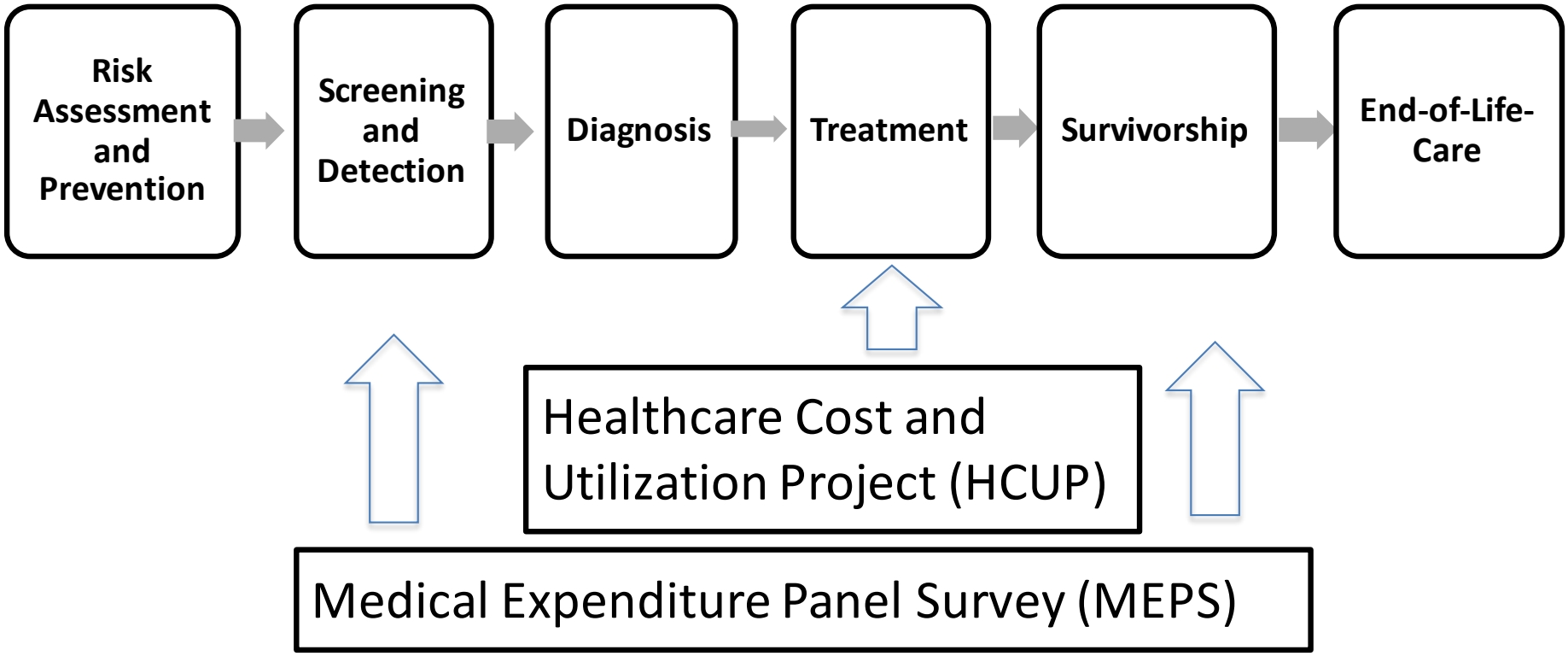
- **Patient**: Telephone reminders
- **Provider and practice**: Reminders in electronic medical record
- **Insurer**: Quality measurement, value-based payment
- **Employer**: Offer of comprehensive insurance coverage, paid sick leave, promotion
- **Policy**: Elimination of cost-sharing, expansion of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

Interventions to Increase Colorectal Cancer Screening

	Reach	Duration of Impact	Across Cancers and Continuum	Effect on disparities
Patient				
Provider	+	+	++	+
Insurer	++	++	++	+
Employer	++	++	++	+
Policy	+++	+++	+++	+++
Multi-level	++++	++++	++++	++++

Relevant cost domains differ by perspective

Data Challenges in Measuring Costs Across the Cancer Control Continuum



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

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Effect of Rising Chemotherapy Costs on the Cost Savings of Colorectal Cancer Screening

Iris Lansdorp-Vogelaar, Marjolein van Ballegooijen, Ann G. Zauber, J. Dik F. Habbema, Ernst J. Kuipers

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**

Source: Lansdorp-Vogelaar I, van Ballegooijen M, Zauber A, Habbema DF, Kuipers EJ. Effect of rising chemotherapy costs on the cost savings of colorectal cancer screening. J Natl Cancer Inst 2009;101:1412-1422.

AJPM American Journal of Preventive Medicine
A Journal of the American College of Preventive Medicine and Association for Prevention Teaching and Research

Productivity Savings from Colorectal Cancer Prevention and Control Strategies

Cathy J. Bradley, PhD, Iris Lansdorp-Vogelaar, PhD, K. Robin Yabroff, PhD, Bassam Dahman, PhD, Angela Mariotto, PhD, Eric J. Feuer, PhD, Martin L. Brown, PhD

- 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, $34 B in productivity savings**
- **Improved screening > prevention > treatment in productivity savings**

Bradley CJ, Lansdorp-Vog Bradley CJ, Lansdorp-Vogelaar I, Yabroff KR, Dahman B, Mariotto A, Feuer EJ,Brown ML. Productivity savings from colorectal cancer prevention and controlstrategies. Am J Prev Med. 2011 Aug;41(2):e5-e14.

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
  - insured/uninsured and type of coverage
  - 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
  - Asses trends on multiple components of continuum
  - Compare investments across continuum
- Natural experiments

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