Health Economics Research in Cancer Screening: Current Challenges and Future Directions

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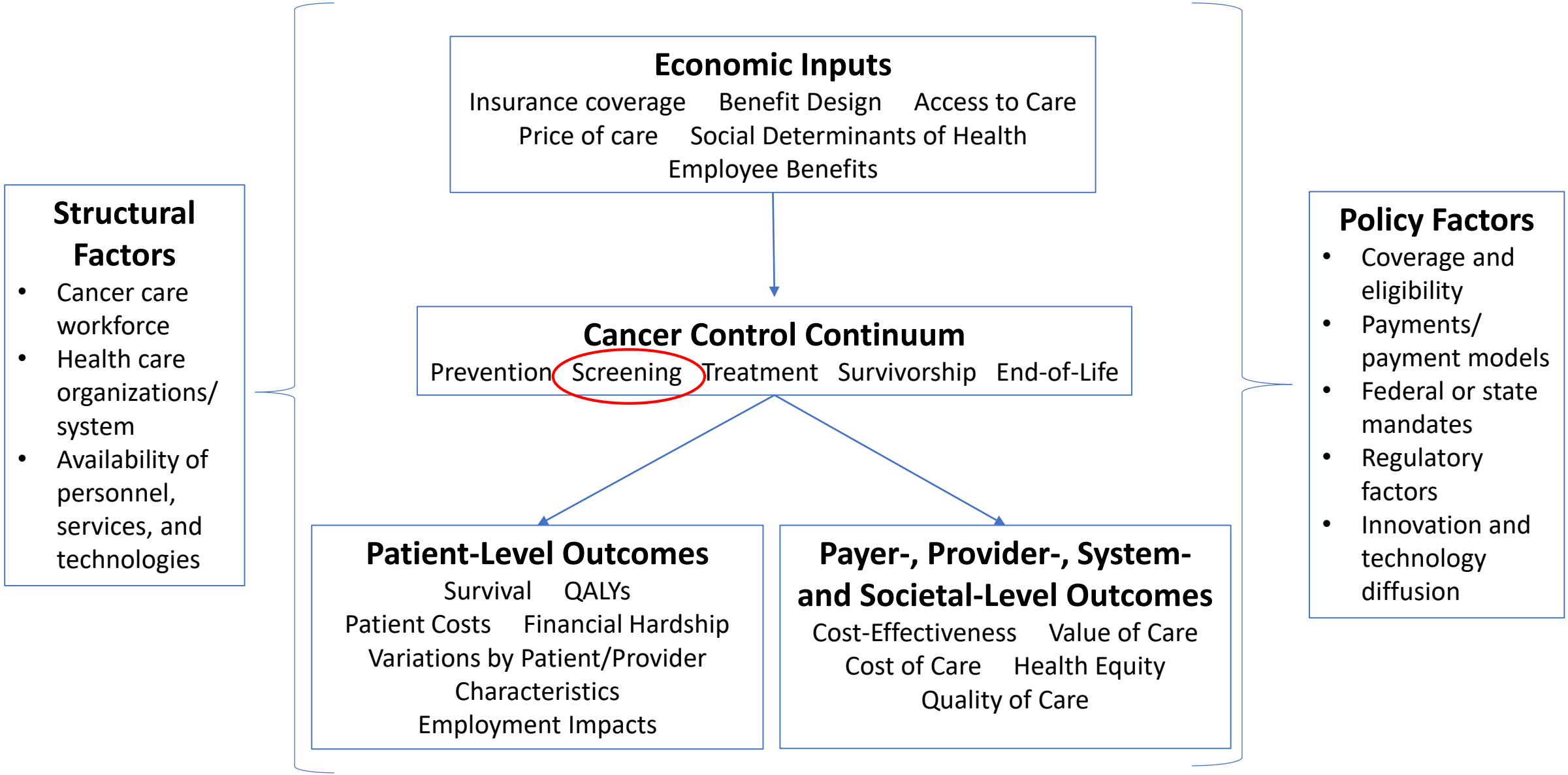
Framework of Cancer Health Economics Research



Halpern et al. Cancer 2020

Role of Screening in Cancer Care Continuum

- Screening for prevention, early detection of cancers, their precursors can reduce treatment burden, mortality & morbidity
- Economic costs, with burden of screening upfront while benefits may not be not realized for years
- Economic impact includes utilization of screening tests themselves but also diagnostic workup and follow-up that may result
  - Patient factors
  - Provider and system level factors including workforce and capital equipment
- Understanding economics key to ensuring value, equitable distribution of resources, and design of interventions to promote better outcomes

Kenkel: Prevention, Chapter 31 in *Handbook of Health Economics, 2000*
Shih: Economics of Cancer Prevention and Control in *the Oxford Encyclopedia of Health Economics, 2020*

Decision Science

Developing and evaluating screening guidelines/ programs

- Modeling studies to assess costs and benefits of screening based on:

- Age range
- Risk profile
- Modality of screening
- Frequency of screening
- Participation

Understanding factors influencing screening uptake

- Observational and quasi-experimental studies to assess the impact of factors on screening use:

- Supply and demand side factors
  - Provider supply and incentives
  - Insurance
  - Access, barriers
- Policy environment (state, federal)

Microeconomics

Current State of Science

- NCI review identified 27 *health economic systematic reviews* of screening programs or interventions
  - 19: cost-effectiveness of screening strategies (top three cancers: cervical, colorectal, breast)
  - 3: research methodology (simulation models)
  - 5: costs of care
- What's unique about cancer health economics research in screening?
  - Policy environment and guidelines create rich opportunities for study designs based on natural experiments
  - Frequent use of microsimulation models to design and evaluate screening policies

Current State of Funding

- Screening-focused economics research accounted for ~1/3 of NCI-funded economics analyses/outcomes grants
  - Large % included use of simulation models
  - Relatively few grants focused primarily on policy evaluation using observational data for causal inference
- Main economic outcomes examined were cost and/or cost-effectiveness, but usually not primary focus of project
- Emerging topics that are less prominent in funded grants:
  - Financial hardship (toxicity) and out-of-pocket payment
  - Minority populations
  - Screening for cancer survivors

Opportunities: Study Topic/Type

- Studies on policy and market factors affecting screening
  - Demand and supply side issues
  - Need to drill down from US policy to local context
  - Variation in market factors across US impacts screening use
- Connect findings from simulation models to policies
  - Increased integration of modeling, observational quasi-experimental studies, and implementation science
- Better understand economic factors affecting over- and under-use of screening
- Focus on important subpopulations for targeted screening
  - Disparities in access to/use of screening, social/economic factors associated with screening
  - Rural populations
  - Precision medicine for risk-stratified screening

Opportunities: Data Resources

- Key data sources include national and focused surveys, administrative databases, registry data
- Fragmentation of data systems
  - Need longitudinal data to study patterns of screening use and understand downstream outcomes
  - Challenges of linking different data sources
  - Geographic identifiers for linkage and understanding local area factors
- Under-collected/reported information
  - Limited information on patient factors including cancer risk factors, quality of life, barriers/facilitators to screening
  - Quality of care measures
  - Patient/provider communication
  - Database of federal, state, local legislation on cancer screening policies

Opportunities: Methods Development, Training

- Observational studies
  - Ensure training in and application of state-of-the art applied econometric methods for observational & quasi-experimental designs to address sources of potential endogeneity and allow for causal inference
  - Explore opportunities to conduct randomized policy studies to allow for robust evaluation
- Modeling studies
  - Translate cost-effectiveness results from simulation models to policy recommendations, including in local market contexts
  - Understand how to most accurately reflect costs in modeling studies
  - Incorporate modeling methods in conventional health economics curricula
- Under-explored areas
  - Partnerships with implementation science researchers
  - Application of evolving data science methodologies (e.g. machine learning, Bayesian models)
  - Determine research priorities using value of information analysis

Screening-focused Recommendations

- Develop policies and platforms for increased linkage and access while maintaining patient privacy/confidentiality
  - Novel data linkages to enrich clinical details, PRO data (e.g., NCI CanCORS), patient factors, biomarkers (BRCA)
- Ensure continued funding and access to large-scale registries and cohorts like Population-based Research to Optimize the Screening Process (PROSPR) & Breast Cancer Surveillance Consortium (BCSC) which are designed for screening research and offer research, collaboration opportunities
- Continued cross-disciplinary training in health econometric methods, economic theoretical foundation of screening and demand for health care, development/use of microsimulation models
- Promote collaborations between health economists, modelers, data partners, implementation scientists, policy makers, and patient stakeholders