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Promising Approaches From Behavioral Economics to Improve Patient Lung Cancer Screening Decisions

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Abstract

Lung cancer is a devastating disease, the deadliest form of cancer in the world and in the United States. As a consequence of CMS's determination to provide low-dose CT (LDCT) as a covered service for at-risk smokers, LDCT lung cancer screening is now a covered service for many at-risk patients that first requires counseling and shared clinical decision making, including discussions of the risks and benefits of LDCT screening. However, shared decision making fundamentally relies on the premise that with better information, patients will arrive at rational decisions that align with their preferences and values. Evidence from the field of behavioral economics offers many contrary viewpoints that take into account patient decision making biases and the role of the shared decision environment that can lead to flawed choices and that are particularly relevant to lung cancer screening and treatment. This article discusses some of the most relevant biases, and suggests incorporating such knowledge into screening and treatment guidelines and shared decision making best practices to increase the likelihood that such efforts will produce their desired objectives to improve survival and quality of life.

Key Words: Behavioral economics, lung cancer, cancer screening, smoking

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INTRODUCTION

Lung cancer is a devastating disease, the deadliest form of cancer in the world and in the United States (US), expected to account for 158,080 deaths (26.5% of all cancer deaths) in the US in 2016, with 224,390 newly diagnosed cases this year [1]. The 5-year survival rate remains a dismal 17.7%, with only slight improvement over the past four decades, despite advances in diagnosis and treatment [1]. The annual direct costs (ie, use of resources for cancer care) of lung cancer in 2020 are projected to be in the range of $14.7 billion to $18.8 billion [2]. Costs due to lost time and productivity are more difficult to model but are likely larger than direct costs [3].

A sea change in lung cancer care occurred with the release of the National Lung Screening Trial finding of a 20% reduction in lung cancer mortality among smokers with annual low-dose CT (LDCT) screening [4]. As a result of the United States Preventive Services Task Force's recommendation in favor of LDCT lung cancer screening for smokers and the CMS's determination to provide LDCT as a covered service for at-risk smokers, LDCT lung cancer screening is now a covered service for many at-risk patients. The CMS coverage determination requires a prescreening visit with a qualified medical provider to confirm eligibility and to engage in counseling and shared clinical decision making to include a discussion of the risks and benefits of LDCT screening [5]. The CMS requirement states: "As part of the counseling and shared decision making visit, we are requiring that, among other things, shared decision making (including the use of one or more decision aids) includes information on benefits, harms, follow-up diagnostic testing, over-diagnosis, false positive rate and total radiation exposure" [5]. This requirement for shared decision making as a prerequisite to a screening examination represents a new step for CMS that reflects rising consumerism in US health care.

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The decisions confronting smokers and patients with positive LDCT screening tests are complex. The balance of harms and benefits as patients navigate the complexities of short-term follow-up versus biopsy, risks and benefits of various biopsy and staging procedures, and benefits and harms of various surgical, chemotherapeutic, and radiation treatment options is extremely complex and difficult to model. Patient and caregiver preferences and concerns must be included in the decision to screen, diagnose, and treat lung cancer. Provider, patient, and caregiver biases can distort optimum outcomes.

Patients considering LDCT lung cancer screening must learn the intricacies of prevalence, incidence, true- and false-positive findings, and true- and false-negative findings, and appreciate that for 1,000 LDCT-screened patients, 100 to 200 will have positive scans but only 10 to 20 will have lung cancer. Only a third of newly diagnosed lung cancers are expected to be curable. The question of over-diagnosis and unexpected and potentially clinically significant findings adds to the complexity and the challenge of fully informing patients and caregivers of the pros and cons of screening and follow-up testing. Decision support tools have been developed by the National Comprehensive Cancer Network [6] and the University of Michigan [7] to assist in shared clinical decision making. These tools assist in framing the basic concepts and manage the complex decisions implicit in choosing to screen and in choosing alternatives when navigating a positive screen finding. However, such decision aids are fundamentally reliant on the premise that with better information, patients will arrive at rational decisions that align with their preferences and values. Evidence from the field of behavioral economics offers many contrary viewpoints that take into account decision making biases on the part of both patients and providers and the role of the shared decision environment that can lead to flawed choices. For guidance in better understanding the role of biases and decision environments in shared decision making, and opportunities to intervene and improve lung cancer screening and treatment decisions, we turn to behavioral economics.

fundamentals of economic theory with insights from psychology about the common biases that influence decision making. Behavioral economics understands decision making as a process with predictable biases [8]. Given the predictable nature of decision making biases, health policy can be crafted to anticipate and counteract biases to produce socially desirable outcomes.

Health care has long been identified as a sector where the actors—patients, providers, and payers—fail to behave in a rational manner. As described in *Irrationality in Health Care: What Behavioral Economics Reveals about What We Do and Why*, many features of this market make it uniquely resistant to description via traditional economic models [9]. For example, owing to insurance, patients, the consumers of health care goods and services, pay for only a fraction of the services they consume with little salience to the cost of consumption [9]. Additionally, the price of services is unclear, and both patients and payers generally lack the ability to compare goods and services on the basis of value and price [9]. There is an inherent information bias in the consumption and selection of health services; patients must rely on providers to select the procedures and medications that are necessary [10]. Theories based on a rational decision maker fail to explain why people eat poorly when they do not want to be obese, or fail to take prescribed medication that they have gone to a physician to obtain [10]. Given the unique aspects of this market, individuals are particularly prone to irrationality and bias in decision making.

Using behavioral economics to anticipate these "irrational" choices allows for the formulation of more realistic and effective policy [11]. Once policy is no longer predicated on a rational actor, possibilities emerge for novel approaches to delivering care, incentivizing health behavior, promoting evidence-based medicine, and communicating crucial health information [11,12]. Behavioral economics holds promise as a tool for designing the framework for health care choices—called "choice architecture." By taking advantage of expected decision biases, individuals can be guided or "nudged" toward wiser choices without restricting choice freedom [8].

BRIEF OVERVIEW OF BEHAVIORAL ECONOMICS

Behavioral economics is a branch of economics that challenges the fundamental assumption that humans behave as fully informed and rational actors. Rather, behavioral economics, as a discipline, combines the

PATIENT BIASES AFFECTING MEDICAL DECISIONS

Patients often make shared health decisions in collaboration with a health care provider. Frequently, multiple treatment options exist for a given condition and the

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