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A national survey of primary care physicians: Perceptions and practices of low-dose CT lung cancer screening

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ABSTRACT

Soon after the National Lung Screening Trial, organizations began to endorse low-dose computed tomography (LCDT) screening for lung cancer in high-risk patients. Concerns about the risks versus benefits of screening, as well as the logistics of identifying and referring eligible patients, remained among physicians. This study aimed to examine primary care physicians' knowledge, attitudes, referral practices, and associated barriers regarding LDCT screening. We administered a national survey of primary care physicians in the United States between September 2016 and April 2017. Physicians received up to 3 mailings, 1 follow-up email, and received varying incentives to complete the survey. Overall, 293 physicians participated, for a response rate of 13%. We used weighted descriptive statistics to characterize participants and their responses. Over half of the respondents correctly reported that the US Preventive Services Task Force recommends LDCT screening for high-risk patients. Screening recommendations for patients not meeting high-risk criteria varied. Although 75% agreed that the benefits of LDCT screening outweigh the risks, fewer agreed that there is substantial evidence that screening reduces mortality (50%). The most commonly reported barriers to ordering screening included prior authorization requirements (57%), lack of insurance coverage (53%), and coverage denials (31%). The most frequently cited barrier to conducting LDCT screening shared decision making was patients' competing health priorities (42%). Given the impact of physician recommendations on cancer screening utilization, further understanding of physicians' LDCT screening attitudes and shared decision-making practices is needed. Clinical practice and policy changes are also needed to engage more patients in screening discussions.

1. Introduction

In 2017, an estimated 220,000 people will be diagnosed with lung cancer in the United States (U.S.) (Siegel et al., 2017). Most cases are caused by smoking and are diagnosed at late stages, resulting in a mere 28% five-year survival rate for regional stages and a 4% survival rate for distant stages. The five-year survival rate (55%) is substantially better for those diagnosed at a local stage (Siegel et al., 2017). Evidence from the National Lung Screening Trial (NLST) (Aberle et al., 2011) showed that low-dose chest CT (LDCT) performed annually among high-risk patients (i.e., 55–74 years old, current or former smoker who quit < 15 years ago, and 30+ pack-year smoking history) for lung cancer screening could not only find cancers earlier but resulted in a 20% relative reduction in mortality from lung cancer and 7% relative reduction in all-cause mortality. If mortality reductions shown in the NLST could be replicated, estimates suggest that low-dose CT (LDCT) screening could avert about 12,000 deaths from lung cancer per year (Ma et al., 2013).

Although nearly all professional societies and cancer-related organizations including the US Preventive Services Task Force endorse LDCT screening for lung cancer in high-risk patients (Moyer, 2014; Smith et al., 2015; Wood et al., 2015), some physicians and associated

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organizations remain skeptical because of concerns about safety, quality, and generalizability (American Academy of Family Physicians, 2013; Bach, 2013; Centers for Medicare and Medicaid Services, 2014). Specifically, little is known about the quality of LDCT scans and associated image readings performed in community settings, the extent of adherence to follow-up screening or treatment recommendations, and whether patients being referred for LDCT screening meet high-risk criteria. These and other components of lung cancer screening (Mazzone et al., 2015) necessary to ensure high-quality screening remain understudied in the post-NLST era.

As the health care providers for the majority of patients in the U.S., primary care providers play a key role in ensuring the appropriate assessment and referral of patients to radiologic services. In a unique move, the Centers for Medicare and Medicaid Services announced that all Medicare beneficiaries referred for LDCT screening for lung cancer should receive a counseling and shared decision making (SDM) visit with a qualified healthcare provider prior to undergoing screening (Centers for Medicare and Medicaid Services, 2015). This patient-provider discussion is to include: 1) determination of eligibility; 2) counseling on smoking cessation/abstinence; 3) counseling on the importance of adherence to follow-up; and 4) discussion of the benefits and harms of screening. A subsequent Healthcare Common Procedure Coding System (HCPCS) code (G0296) was announced in late 2015 to cover the cost of the SDM visit for primary care providers. The LDCT screening exam is also reimbursed by Medicare and most private insurers (HCPCS code G0297). To counsel patients appropriately, it is vital that providers have a thorough understanding of the eligibility criteria, benefits, and potential harms of LDCT screening, as well as be familiar with SDM principles and associated decision aids.

Since the NLST, a handful of studies have examined the knowledge, attitudes, and early referral practices of healthcare providers for LDCT screening for lung cancer (Ersek et al., 2016; Volk and Foxhall, 2015; Raz et al., 2016; Hoffman et al., 2015; Duong et al., 2017; Henderson et al., 2011; Lewis et al., 2015; Rajupet et al., 2017). In these studies, physicians reported low referral rates (12–52% had referred any patients for screening) (Raz et al., 2016; Lewis et al., 2015), and patients were occasionally incorrectly recommended for screening (Duong et al., 2017). Physicians often expressed that better understanding of private and public insurance coverage, more information about screening centers available in their region, and education were necessary to increase their own personal screening recommendation rates (Volk and Foxhall, 2015; Henderson et al., 2011). Multiple barriers were reported, including uncertainty about the benefits of screening, patient exposure to harmful radiation, lack of institutional infrastructure to support screening, the complexity of discussing screening with patients, and concerns about the generalizability of the NLST findings (Raz et al., 2016; Hoffman et al., 2015; Lewis et al., 2015; Rajupet et al., 2017).

Although these studies have been foundational to our understanding of physicians' knowledge, attitudes, and practices regarding LDCT screening, none conducted since the NLST have included a nationally representative sample of primary care providers. To address this limitation, we conducted a mail and online survey of a national sample of practicing U.S. primary care physicians (i.e., family physicians, internists, and general practitioners) between September 2016 and April 2017 to assess physicians' knowledge of current lung cancer screening guidelines and insurance reimbursement, perceptions of screening effectiveness and cost, screening referral practices, and associated barriers.

2. Methods

2.1. Study participants

We surveyed a nationally representative sample of primary care physicians between September 2016 and April 2017 using a sampling frame of 2500 physicians selected from the American Medical Association (AMA) Master File (American Medical Association, 2017). We oversampled females to ensure an adequate representation of female physicians in the respondent pool. The physicians represented all 50 states, the District of Columbia, and Puerto Rico. Eligible candidates were in direct patient care and self-identified their primary specialty as general medicine, family medicine, or internal medicine. The AMA Master File contained extensive demographic information about each participant (e.g., sex, primary medical specialty, age, location of medical training, degree) and his/her practice (e.g., type of employment, office location). Metropolitan/non-metro designation was determined by geocoding and matching the address of each physician office location to the appropriate county-level 2013 Urban Influence Code U.S. Department of Agriculture, Economic Research Service, 2016.

2.2. Survey procedures

Physicians received up to 3 mailings (i.e., advance cover letter and 2 survey mailings) and 1 additional follow-up email invitation if an email address was available. Participants were randomly assigned to one of five incentive groups: no incentive, unconditional $1 incentive (i.e., participants received $1, and the incentive was not tied to completion of the survey), unconditional $5 incentive, lottery for one of ten $50 Amazon gift cards, and lottery for one of ten $100 Amazon gift cards. This ancillary study on various incentive types was intended to explore whether response rates varied significantly across incentive categories of small denominations.

In early September 2016, all 2500 physicians were mailed an advanced notice letter detailing the survey, alerting participants that they would be receiving a complete survey packet in the mail within the next 1–2 weeks, and requesting that the participants complete the survey as soon as possible once it arrived. The incentives were not mentioned in the advance letter. The initial survey packet was sent to all physicians in September 2016 and contained 1) a cover letter that repeated details of the study and included informed consent information); 2) the survey instrument; and 3) a prepaid addressed envelope in which to return the completed survey. All physicians who had not returned a completed survey within three weeks were mailed a second survey packet. We attempted to find correct or updated addresses via internet searches for all first-round surveys that were returned undeliverable because of an incorrect address or the physician changing office locations. The second survey packet was identical to the first except that the $1 and $5 unconditional incentives were not included, and there was no mention of an incentive in the cover letter accompanying the survey. Participants had the opportunity to complete the survey online with each survey mailing, as the cover letter instructed physicians on how to access the survey online with their unique assigned PIN number. Physicians, survey completion, and updated addresses were tracked using a custom Microsoft Access 2010 database to ensure data integrity. The study protocol was reviewed and approved by the University of South Carolina Institutional Review Board.

Of the 2180 physician that were non-responders to the mailed surveys, 1676 were able to be linked to an email address by the data provider (Medical Marking Services, Inc.), and 1572 were ultimately able to receive the final survey invitation via email (i.e., 104 suppressed/bounced back). Before calculating our response rate, 284 physicians were disqualified and removed based on either 1) secondary specialty other than primary care or self-reported retirement status (n = 272) or 2) failed contact in all survey rounds (i.e., undeliverable mailing address, plus no available email address or bounced/suppressed email, n = 12).

2.3. Survey content

A 19-item survey was designed to determine participants' opinions, knowledge, and recommendation practices regarding LDCT screening for lung cancer (see Supplementary file). Survey items assessing