

## Research Letter

# Lung cancer specialists' opinions on treatment for stage I non-small cell lung cancer: A multidisciplinary survey

Austin Lammers MD <sup>a,b</sup>, Timur Mitin MD, PhD <sup>c</sup>,  
Drew Moghanaki MD <sup>d,e</sup>, Charles R. Thomas Jr MD <sup>c</sup>,  
Robert Timmerman MD <sup>f</sup>, Sara E. Golden MPH <sup>b,\*</sup>, Sujata Thakurta MPA <sup>b</sup>,  
Rafal Dziadziuszko MD, PhD <sup>g</sup>, Christopher G. Slatore MD <sup>b,c,h,i</sup>

<sup>a</sup> Department of Hematology and Medical Oncology, Oregon Health and Science University, Portland, Oregon

<sup>b</sup> VA Portland Health Care System, Health Services Research & Development, Portland Oregon

<sup>c</sup> Department of Radiation Medicine, Oregon Health and Science University—Knight Cancer Institute, Portland, Oregon

<sup>d</sup> Radiation Oncology Service, Hunter Holmes McGuire Veterans Affairs Medical Center, Richmond, Virginia

<sup>e</sup> Department of Radiation Oncology, Virginia Commonwealth University, Richmond, Virginia

<sup>f</sup> Department of Radiation Oncology, University of Texas Southwestern Medical Center, Dallas, Texas

<sup>g</sup> Department of Oncology and Radiotherapy, Medical University of Gdansk, Poland

<sup>h</sup> Pulmonary and Critical Care Medicine, Oregon Health and Science University, Portland, Oregon

<sup>i</sup> Pulmonary and Critical Care Medicine, VA Portland Health Care System, Portland, Oregon

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## Abstract

**Purpose:** The current standard of care for surgically eligible stage I non-small cell lung cancer (NSCLC) is surgical resection, but emerging data suggest that stereotactic body radiation therapy (SBRT) is potentially as effective as surgery. However, specialist views of the current evidence about SBRT and how they would incorporate a randomized controlled trial (RCT) into practice is unclear. We sought to understand specialist opinions about evidence regarding treatment of stage I NSCLC and how this translates into practice and clinical trial implementation.

**Methods and materials:** We used a 28-item, web-based survey that invited all participating providers from the American Society for Radiation Oncology, American Thoracic Society Thoracic Oncology Assembly, and the International Association for the Study of Lung Cancer to share opinions regarding practice beliefs, treatment of stage I NSCLC, and a clinical trial scenario.

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\* Corresponding author. Veterans Administration Health Care System, Health Services Research & Development, 3710 SW US Veterans Hospital Road, R&D 66, Portland, OR 97239.

E-mail address: [sara.golden1@va.gov](mailto:sara.golden1@va.gov) (S.E. Golden)

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**Results:** A total of 959 surveys were completed; 64% were from radiation oncologists (ROs) and 49% were from outside the United States. The majority of ROs (80%) reported that current evidence indicates that SBRT has the same or a better benefit compared with surgery for surgically eligible patients with stage I NSCLC; 28% of non-radiation oncologists (NROs) indicated the same ( $P < .01$ ). Almost all ROs (94%), compared with 62% of NROs, would permit surgically eligible patients to enroll in an RCT of SBRT versus surgery ( $P < .01$ ). Most ROs (82%) and NROs (87%) believed that changing practice in thoracic surgery would be somewhat difficult, very difficult, or impossible ( $P = .066$ ) even if an RCT showed better survival with SBRT.

**Conclusions:** NROs believe that SBRT is much less effective than surgery, contrary to ROs, who believe that they are similar. Most would support an RCT, but NROs would do so less. Changes in surgical practice may be challenging even if an RCT shows better mortality and quality of life with SBRT. These results are helpful in the creation and dissemination of RCTs that are designed to understand this question.

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## Introduction

The current standard of care for surgically eligible patients with stage I non-small cell lung cancer (NSCLC) is surgical resection. However, emerging but limited data suggest that stereotactic body radiation therapy (SBRT) might favorably compare with surgery. A recent study by Chang et al of 2 pooled randomized controlled trials (RCTs) of SBRT versus surgical resection showed that SBRT resulted in a 15% improvement in overall survival at 3 years after treatment.<sup>1</sup> Although these results are provocative, they will likely not change practice given the poor accrual to the trials.<sup>2-4</sup>

These data have created a dilemma for clinicians who care for patients with stage I NSCLC who can tolerate surgery. To move forward, an understanding of how specialists view evidence regarding therapy for stage I NSCLC would be helpful to guide future clinical research. Hence, we conducted a survey to determine how specialists from multiple disciplines interpret evidence regarding treatment of surgically eligible patients with stage I NSCLC, how their understanding translates into practice, and how specialists weigh oncologic outcomes versus quality of life (QoL) to guide future trials and implementation strategies.

## Methods and materials

We conducted this cross-sectional, 28-item, web-based survey that included demographic data, current evidence beliefs and treatments, and described a clinical trial scenario with questions about practice outcomes for surgically eligible patients with stage I NSCLC (Appendix S1; available as supplementary material online only at [www.practical.radonc.org](http://www.practical.radonc.org)). We invited all participating providers listed in the medical society directories of the International Association for the Study of Lung Cancer

(5517 members); American Society for Radiation Oncology (8701 members); and the American Thoracic Society, Thoracic Oncology Assembly (905 members).

Members received an e-mail invitation with a link to the online survey. The survey was sent to each group, with a reminder e-mail approximately 1 month later. A 1-month period was allowed after this reminder before the survey was closed. Demographic data were recorded, and country of origin was combined by region. Most questions used a 5-point Likert scale, and we combined answers as described later. We dichotomized responses on the basis of provider specialty into radiation oncologist (RO) and non-radiation oncologist (NRO; surgery, medical oncology, pulmonology) as well as United States and non-United States.

Response percentages were based on nonmissing answers to each individual question. Descriptive statistics are reported, and differences were assessed with Pearson  $\chi^2$  tests using STATA V.12.0 (StataCorp, Texas). The protocol was approved by the Veterans Administration/Oregon Health and Science University institutional review board (#11149).

## Results

### Respondents

We received responses from 959 clinicians (Table 1) with the following response rates: 6% from the International Association for the Study of Lung Cancer; 6% from the American Society for Radiation Oncology; and 7% from the American Thoracic Society. The majority of respondents were ROs (64%). A plurality (32%) of providers evaluated 11 to 25 patients with stage I NSCLC annually. Nearly half of the respondents (49%) were from outside the United States; among respondents from the United States, geographic response was well distributed.

**Table 1** Characteristics of specialists

Variable	n (%) or median (range)
Age (N = 939)	49 (27-79)
Male sex (N = 939)	735 (78)
Specialty (n = 936)	
Radiation Oncology	598 (64)
Thoracic Surgery	117 (13)
Pulmonology	114 (12)
Medical Oncology	84 (9)
Palliative Care	1 (<1)
Other	22 (2)
Level of training (n = 938)	
Attending	767 (82)
Other	171 (18)
Continent/country of practice (n = 938)	
United States	481 (51)
Europe	171 (18)
Asia	116 (12)
Latin America	53 (6)
Oceania	39 (4)
Canada	34 (4)
Middle East	25 (3)
Africa	4 (<1)
Unknown	14 (<1)
Practice location (United States) (n = 481)	
West	98 (20)
Midwest	129 (27)
South	132 (27)
Northeast	122 (25)
Practice setting (n = 938)	
University	468 (50)
Private, for profit	144 (15)
Non-university	139 (14)
Private, non-profit	129 (14)
Government	38 (4)
Other	15 (2)
Health maintenance organization	5 (<1)
Years in practice (938)	16 (0-46)
Annual number of all patients with stage I non-small cell lung cancer (n = 937)	
1-10	196 (21)
11-25	298 (32)
25-50	221 (24)
>50	222 (24)

## Current state of evidence

The majority of ROs (80%) reported that current evidence indicates that SBRT has the same or a better benefit compared with surgery for surgically eligible patients with stage I NSCLC; 28% of NROs indicated the same ( $P < .01$ ). A plurality of ROs and NROs categorized the evidence as neither strong nor weak (42% vs 39%, respectively;  $P = .346$ ), and 18% of ROs versus 22% of NROs categorized

the evidence as weak or very weak ( $P = .175$ ). When asked about long-term overall mortality rates of SBRT versus surgery, most ROs answered that outcomes were the same (62% vs 34% of NROs;  $P < .01$ ), compared with 16% of ROs and 56% of NROs who believed that the outcomes were worse ( $P < .01$ ). Regarding short-term and long-term QoL, most ROs reported that SBRT was better than surgery (90% vs 64%, respectively), and NROs believed similarly (72% vs 25%, respectively; both  $P < .01$ ).

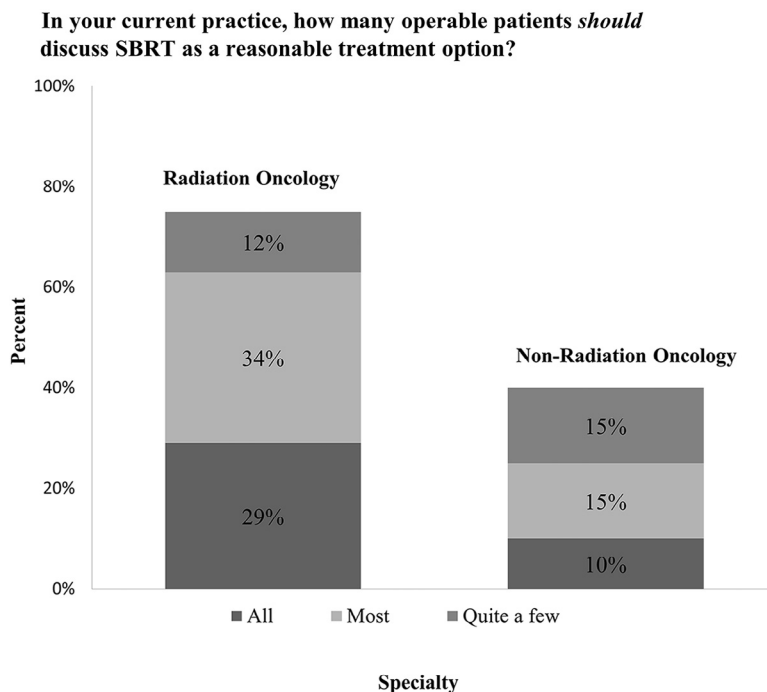
## Practice patterns

To assess practice patterns, we asked how many surgically eligible patients with stage I NSCLC should discuss SBRT as a therapeutic option. Of ROs, 75% answered that quite a few, most, or all patients should discuss SBRT, versus 41% of NROs ( $P < .01$ ), 70% of U.S. respondents, and 56% of non-U.S. respondents ( $P < .01$ ) (Fig 1). We then asked whether it was reasonable for surgically eligible patients to choose SBRT instead of surgery; most ROs agreed or strongly agreed (79%), but only 28% of NROs agreed or strongly agreed ( $P < .01$ ; Fig 2). Of the ROs, 4% responded that they do not offer surgically eligible patients with stage I NSCLC SBRT as a treatment option, compared with 11% of NROs ( $P < .01$ ), 3% of U.S. respondents, and 10% of non-U.S. respondents ( $P < .01$ ; Fig 2).

## Consideration of trial design in surgically eligible patients with stage I NSCLC

In a hypothetical scenario, we described an RCT of SBRT versus surgery among surgically eligible patients with stage I NSCLC, evaluating 5-year survival rates and QoL outcomes with sufficient power to detect >5% difference in 5-year survival. On the basis of this scenario, 94% of ROs agreed or strongly agreed to enroll patients, but only 62% of NROs responded similarly ( $P < .01$ ; Fig 2). Similarly, 94% of U.S. respondents agreed or strongly agreed versus only 71% of non-U.S. respondents ( $P < .01$ ). The majority of respondents recommended SBRT over surgery if the 5-year mortality rates were the same (within 5%): 71% of ROs, 56% of NROs ( $P < .01$ ), 71% of U.S. respondents, and 59% of non-U.S. respondents ( $P < .01$ ). When asked, "If the trial showed that SBRT decreased QoL less than surgery, how would you change your answers?" most respondents did not change their answer (44%-55%) (Fig 1).

We also asked, "What is the lowest level of efficacy that would convince you to talk to your patients about the risks and benefits of both procedures with surgically-eligible patients?" Pluralities of all groups would discuss the risks and benefits if SBRT had equal (within 5%) 5-year mortality rates (RO: 61%; NRO: 47%;  $P < .01$ ; U.S.: 59%; non-U.S.: 52%;  $P = .103$ ). Furthermore, the majority of all groups

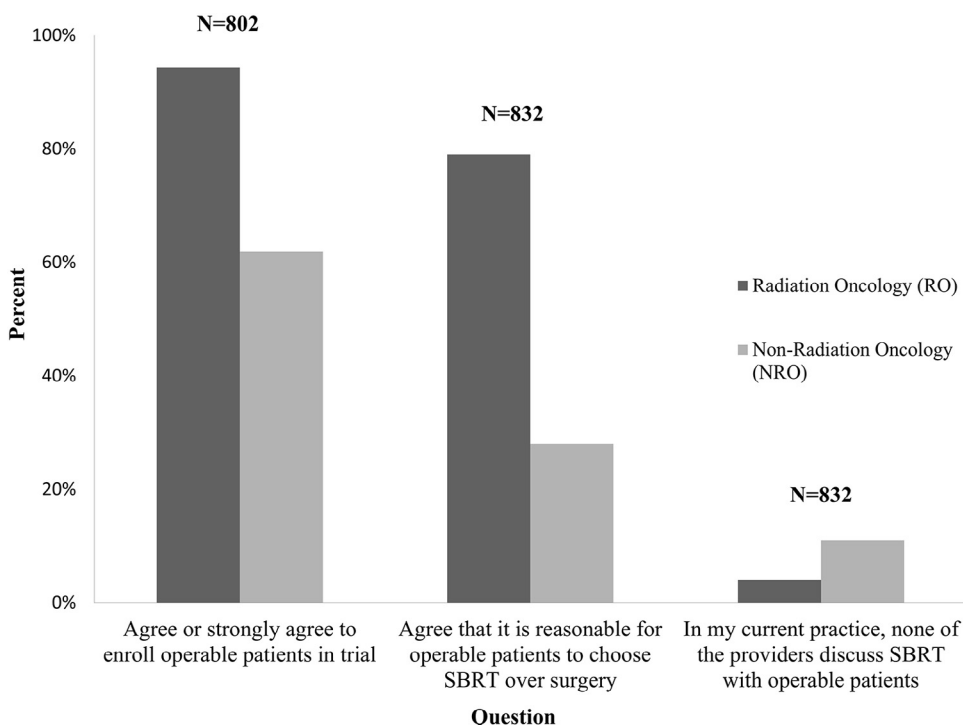


**Figure 1** Current practice opinions regarding stereotactic body radiation therapy by specialty and stratified by level of agreement.

reported that if SBRT led to a higher QoL for patients than surgery, they would not change their response (RO: 51%; NRO: 60%;  $P = .012$ ; U.S.: 53%; non-U.S.: 55%;  $P = .576$ ).

Lastly, we asked about a trial that showed equal 5-year survival rates and QoL in favor of SBRT. Most ROs (82%)

and NROs (87%) believed that changing practice in thoracic surgery would be somewhat difficult, very difficult, or impossible ( $P = .066$ ), but the majority of all providers believed that changing RO practice would be easy, somewhat easy, or very easy (RO: 97%; NRO: 90%;  $P < .01$ ; and U.S.: 98%; non-U.S.: 90%;  $P < .01$ ).



**Figure 2** Selected responses to survey questions by radiation oncology and non-radiation oncology providers.

## Discussion

This study demonstrates starkly differing views of lung cancer specialists' understanding and management in early lung cancer treatment. Notably, despite the lack of adequate RCTs, a majority of ROs (80%) report that evidence already supports SBRT as an alternative to surgery among surgically eligible patients with stage I NSCLC. A similar percentage of NROs (72%) believe the opposite, that the data do not support using SBRT routinely. Despite this, more than half of all respondents reported that it would be reasonable for surgically eligible patients to choose SBRT.

There are 3 ongoing randomized trials comparing surgery versus SBRT among surgically eligible patients: the Joint Lung Cancer Trialist's Coalition (jolt-ca Stablemates), SABRtooth (a United Kingdom study), and the Veterans Affairs Lung Cancer Or Stereotactic Radiotherapy Trial (VALOR).<sup>5-7</sup> A reasonable degree of equipoise regarding formal clinical comparisons is retained as the results of this survey suggest that a majority of both ROs and NROs would consider enrolling their patients in these trials. However, the findings also suggest that interpretations of the study results may be challenging. Clinicians were inconsistent on the degree of survival and QoL differences that would change their practice. They also reported that changing practices of thoracic surgeons might be difficult or impossible if a randomized trial showed equivalent 5-year survival, even if the results showed superior QoL in favor of SBRT.

We also noted consistent differences in the clinical practice and acceptance of randomized clinical trial between U.S. and non-U.S. providers. The differences were most stark in agreement to enroll patients into an RCT of SBRT versus surgery for patients who could tolerate surgical resection for stage I NSCLC. Non-U.S. providers' responses most closely aligned with NRO providers, signaling differences in international practice. This difference has been noted previously in trials of radiation therapy among patients with breast cancer (United States compared with Europe) and could be a result of differing reimbursement models, location of prior studies (United States vs non-United States), and access to radiation therapy.<sup>8</sup>

Our results create concern about the ability to implement trials that will change practice. Designers and funders of RCTs in this field may need to design tailored dissemination and implementation plans given the skepticism that important results can change practice.<sup>9</sup> Although a majority of lung cancer specialists would enroll their patients in an RCT, many NROs might not. Thus, it may be important to design the trials after consideration of our findings to achieve adequate patient accrual.<sup>5,10</sup>

We note several strengths of our paper, including the wide geographic and heterogeneous specialty of respondents. Limitations include a possible selection bias given the survey's voluntary nature. The overall response rate was only

7%, but our response rate was similar to other surveys of professional society members.<sup>11,12</sup>

## Conclusions

NROs think that SBRT is less effective than surgery for patients with stage I NSCLC compared with ROs. Most clinicians will only change their practice if SBRT leads to better oncologic outcomes than surgery, regardless of improvements in QoL, and thoracic surgeons' practice may be particularly difficult to change. These results can be informative when designing, recruiting, reporting, and disseminating the results of RCTs.

## Supplementary data

Supplementary material for this article (<https://doi.org/10.1016/j.adro.2018.01.001>) can be found at [www.practicalradonc.org](http://www.practicalradonc.org).

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