

Lung Cancer Screening  
Survey Results  
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## Introduction/Background

Cancer is the leading cause of death in Vermont. More Vermonters are affected by lung cancer than any other cancer type. The age-adjusted lung cancer incidence rate from 2010 to 2014 was 65.1/100,000 (VCR). This rate is higher than the national rate of 61.2/100,000 (NPCR/SEER). On average, between 2010 and 2014, 379 Vermonters died each year from lung cancer (VT Vital Statistics). The rate of advanced-stage lung cancer incidence for Vermonters aged 55+, 196.7/100,000 (VCR), is higher than the U.S. rate of 182.9/100,000 (NPCR/SEER). Lung cancer is diagnosed at a more distant stage than other cancer types.

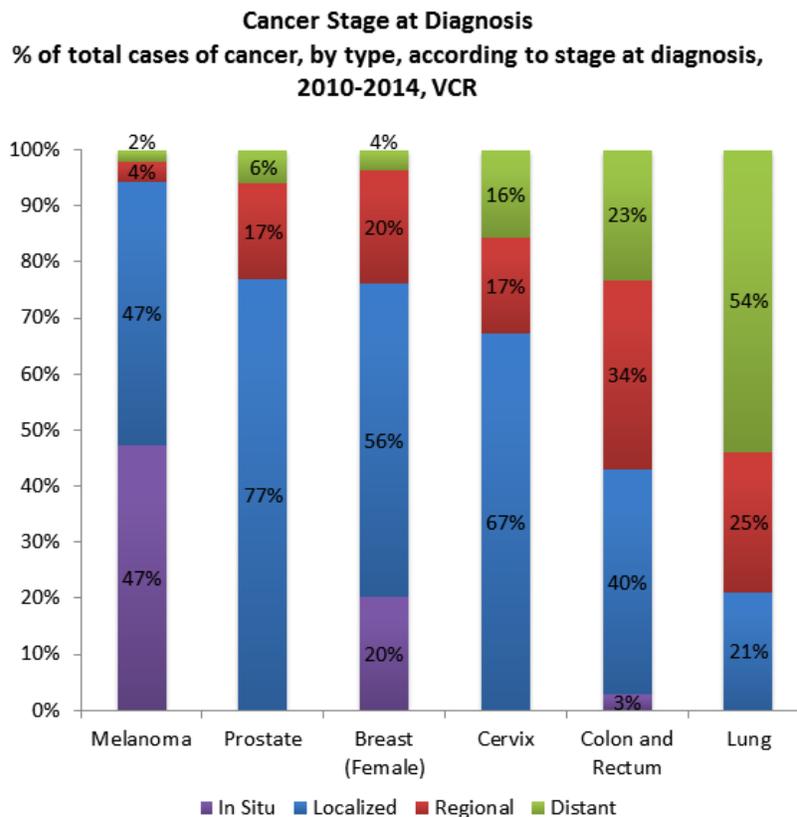
In 2013, the United States Prevention Services Task Force (USPSTF) introduced new guidelines to screen high-risk current and former heavy smokers for lung cancer using annual low-dose computed tomography (LDCT). See Appendix 4. High-risk adults are defined as individuals 55-80 years of age with a 30+ pack year smoking history, and current cigarette use or discontinuation within the last 15 years. The new guidelines offer, for the first time, a proven screening technique to allow for diagnosis of lung cancer at earlier stages when treatment is more effective. Large-scale trials of annual LDCT for patients who are high-risk found a reduction in mortality of 6.7% between patients scanned with LDCT versus those who were scanned with radiography. Increased screening using this method could have a significant impact on the health of Vermonters.

The full USPSTF recommendation also details the effectiveness of screening guidelines and concurrent tobacco cessation efforts. Tobacco cessation is considered by the USPSTF as the primary way to fight lung cancer. Cessation progressively reduces morbidity and mortality related to lung cancer.

Despite the evidence of efficacy, the USPSTF recommendation has nationally had a consistently low adoption rate. In 2015, the American Cancer Society estimated that 3.9% of eligible high-risk patients had received LDCT in the past 12 months. Access to LDCT is limited in the U.S. and common patient concerns are transportation, missed time from work, and cost.

Access to lung cancer screening (LCS) is not well known in Vermont. It is a goal of the Vermont State Cancer Plan to address this by improving lung cancer screening rates. In 2016, the Vermonters Taking Action Against Cancer (VTAAC) Lung Cancer Task Force began an initiative to understand LCS screening capacity, tobacco cessation efforts, and referral patterns.

More information is needed about current LCS practices. In 2017, the Vermont Behavioral Risk Factor Surveillance System (BRFSS) added questions related to LCS patient eligibility and utilization.



**Purpose**

The purpose of this report is to describe the needs of facilities in providing lung cancer screening and to identify the gaps in access and availability of screening across the state. This study also evaluates concurrent tobacco cessation efforts and compares results to other states.

**Methods**

The VTAAC Lung Cancer Task Force fielded a survey in 2017. All fifteen health care facilities in Vermont and one facility in New Hampshire were invited to participate, based on service to Vermont patients.

The survey was emailed to the Director of Radiology/Imaging Services or, in some cases, a different provider (N = 16). The survey contained 27 questions and was used to characterize lung cancer screening practices in each of the facilities. The survey was collected by the analyst at the Vermont Department of Health. If a facility did not respond to the initial survey request, they would receive follow-up emails or phone calls. Data were collected and de-identified before being entered in an Excel spreadsheet. Survey respondent data were imported into SAS 9.3 (SAS Institute Inc., Cary, NC, USA) and analyzed using simple frequencies.

Results

*Response Rate:*

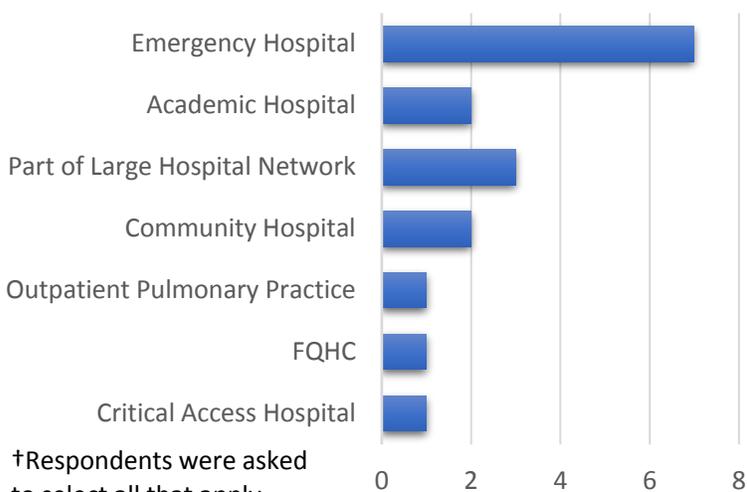
Out of the 16 surveys that were distributed, one facility declined to participate. Twelve facilities (75%) responded, and of those 12 facilities, eight currently offer lung cancer screening (LCS) and could answer survey questions regarding LCS.

*Facility Demographics:*

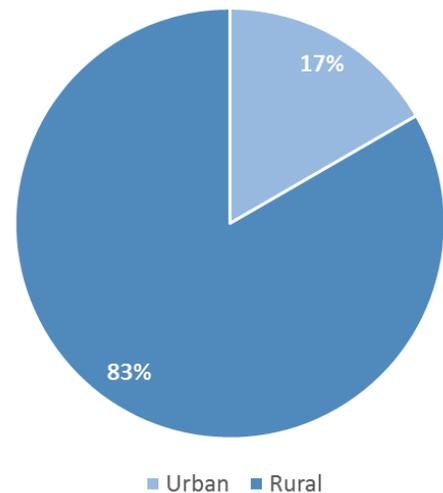
This section includes results from types of facilities surveyed, whether the facility is rural or urban, the number of staff they have, and how their patients are referred. This section also includes types of lung biopsies available to the patient if they are diagnosed with lung cancer.

Half participating hospitals (6/12) were rural emergency hospitals. Patients are referred to the hospitals through physicians that are in-network and out-of-network. Some hospitals have patients who are self-referrals.

**Facility Type (n=12)†**



**Geographic Location of Facility (n=12)**

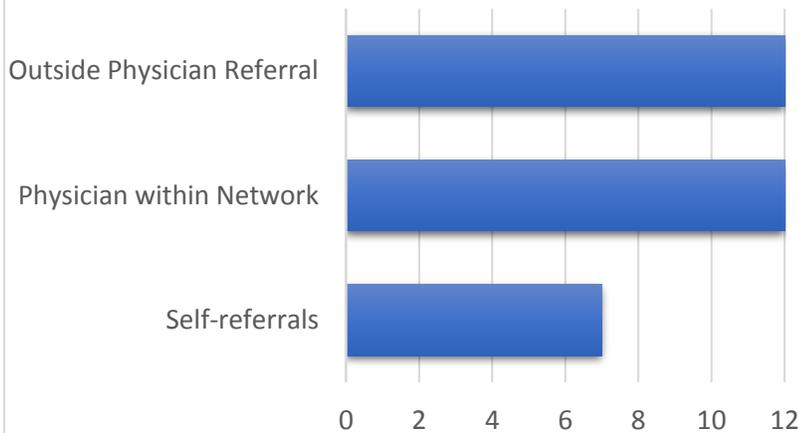


**Number of Specialists Per Hospital \***

	Mean	Median
<b>Thoracic Radiologists (n=9)</b>	1	0
<b>General Radiologists (n=12)</b>	33	4
<b>CT Technologists (n=12)</b>	12	10

\* Numbers reflect both full-time staff and per-diem staff

### How Patients are Referred (n=12)†

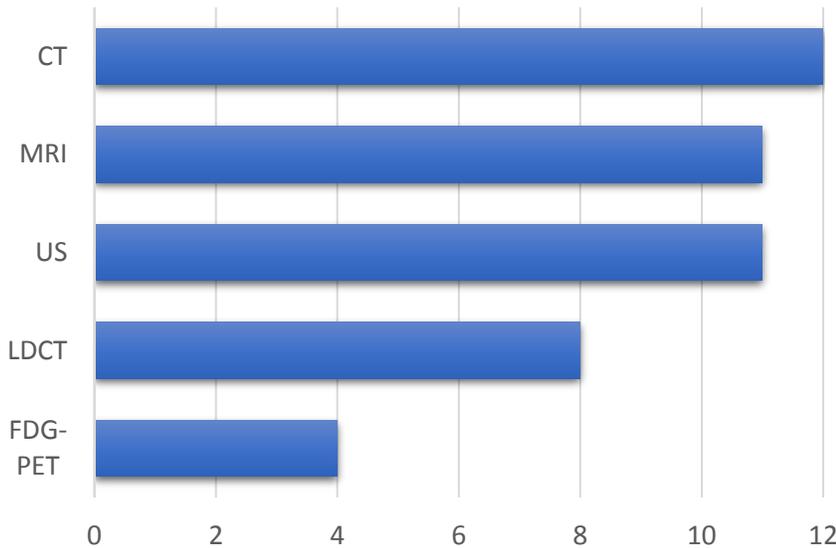


†Respondents were asked to select all that apply

### Facility Services Offered:

Two-thirds of respondents offer LCS. All facilities can perform Computed Tomography (CT) scans. Low-Dose CT (LDCT) is offered at all eight facilities that provide lung cancer screenings. Most of these eight facilities that offer LCS do not use Computer-Aided Detection (CAD).

### Type of Imaging Services Offered at All Hospitals (n=12)†



†Respondents were asked to select all that apply

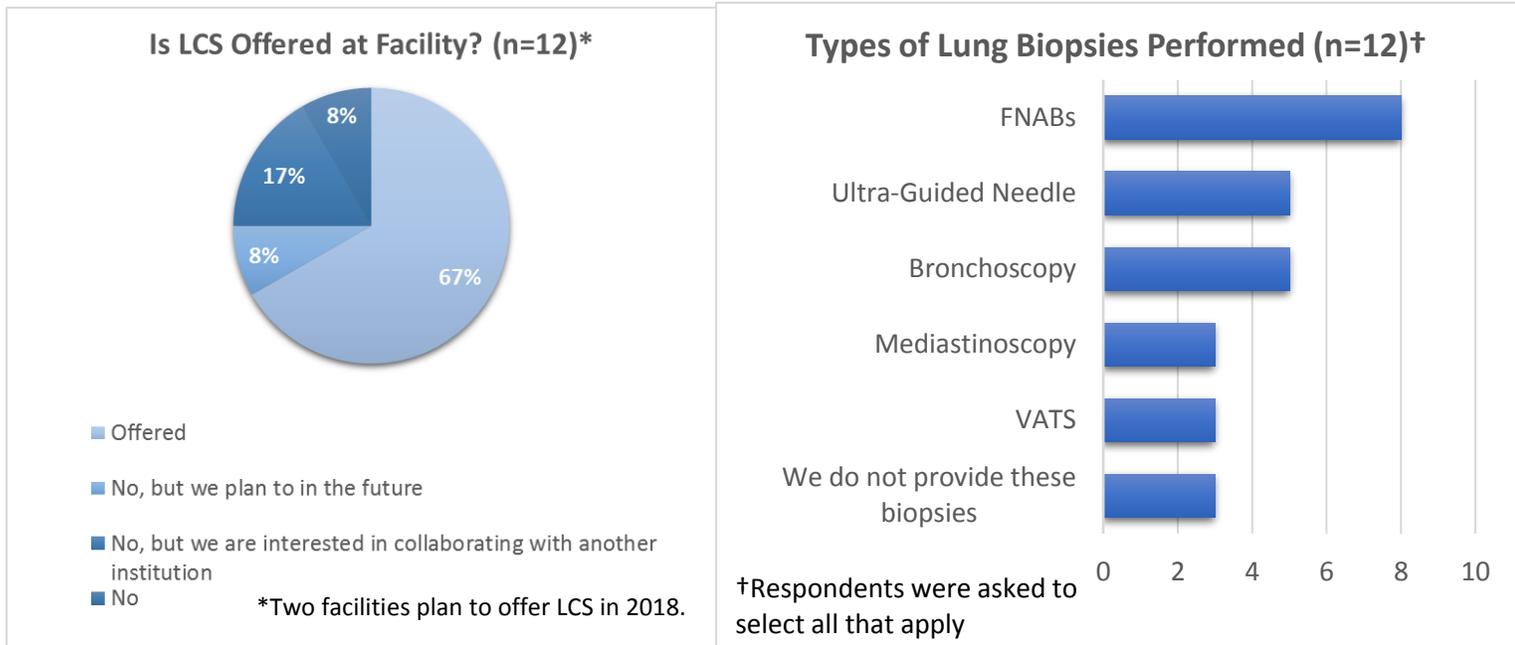
CT = Computer tomography

MRI = Magnetic resonance imaging

US = Ultrasound

LDCT = Low-dose computed tomography

FDG-PET = Fluorodeoxyglucose-positron emission tomography



FNABs = Fine Needle Aspiration Biopsies VATS = Video-Assisted Thoracoscopic Surgery

What is the average number of patients seen at this facility for *lung cancer screening per month* in the last year?

- **30 mean, 17 median (n=8)**

What is the average number of patients seen at this facility *per month* in the last year?

- **15,480 mean, 5,800 median (n=5)**

Is this an American College of Radiology (ACR) designated LCS Center?

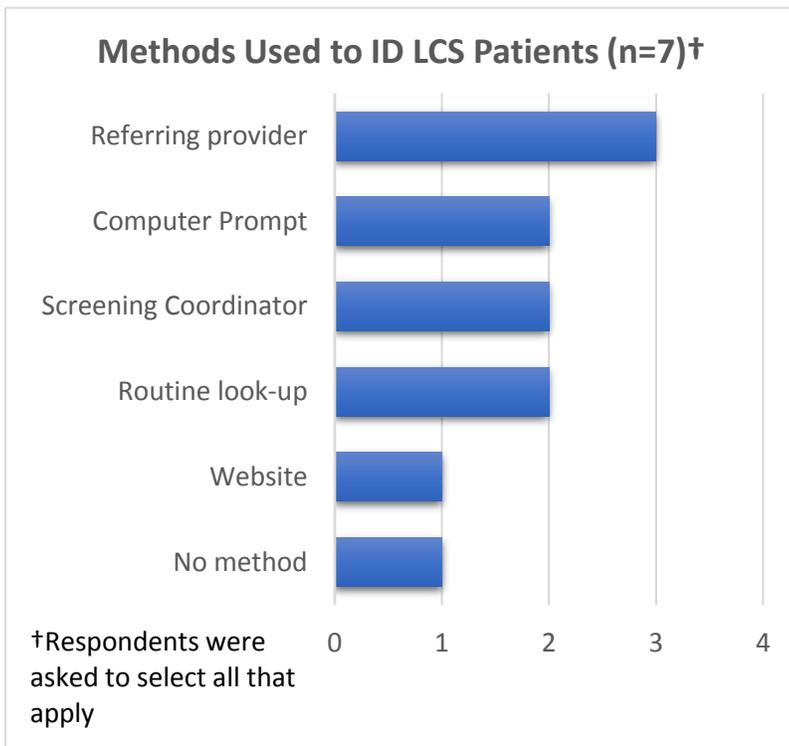
- **Over 75% of those who offer LCS are ACR designated (n=8)**

Does facility use CAD?

- **Over 85% did not use CAD (n=8)**
- **13% said no, but plan to in the future (n=8)**

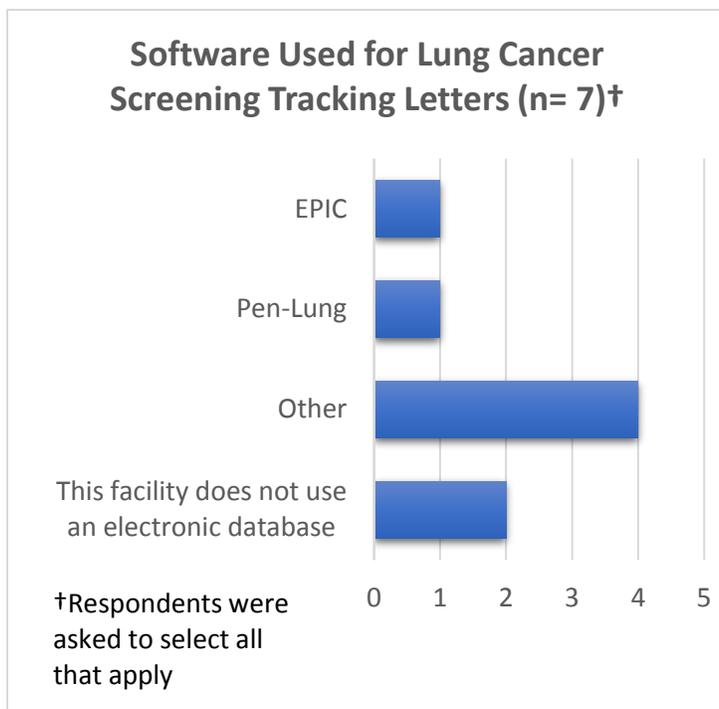
*Identifying Patients:*

LCS Patients are mainly identified through their referring provider.



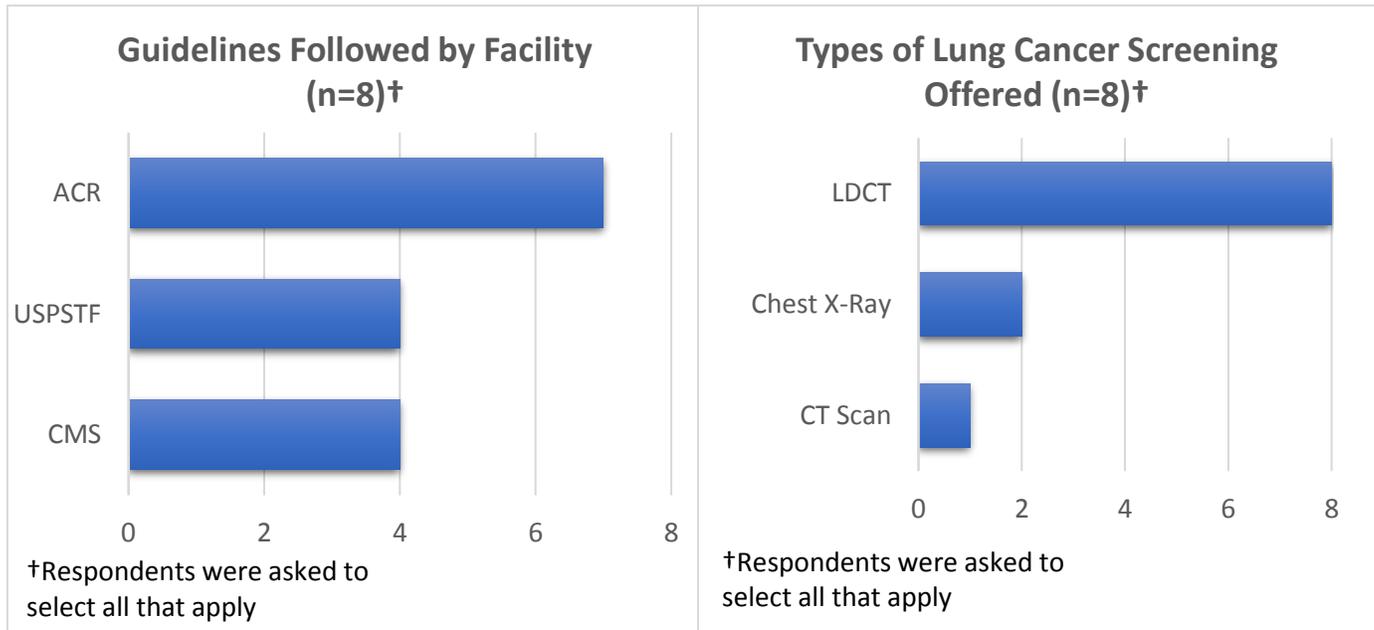
Is facility participating in the American College of Radiology lung cancer screening registry?

- **Over 75% of facilities were participating (n=8)**



*LCS Guideline Usage:*

All the respondents that serve Vermonters and offer LCS follow guidelines. Most follow American College of Radiology (ACR) guidelines. All eight hospital respondents offer LDCT. A few hospitals offer chest x-ray for LCS; this result could not be explained by the position held by each respondent.

*Medical/Technical Information:*

This section explains Computed Tomography Dose Index (CTDI) settings and other dose-saving features used in LDCT. Responses for CTDI settings and other dose-saving features resulted as expected by physician members of VTAAC Lung Cancer Screening Task Force.

CTDI settings for LDCT (n=8):

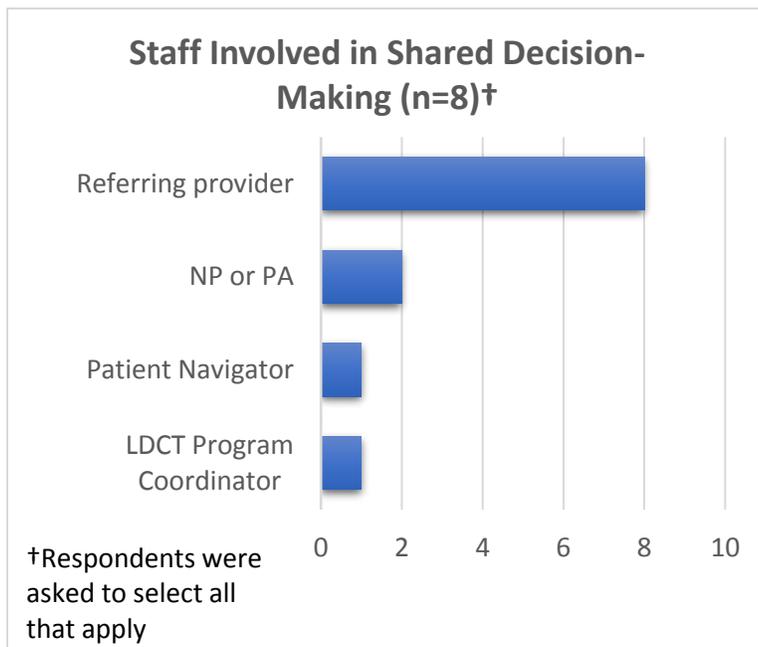
- **2.91 for the large (1 facility)**
- **1.84 (1 facility)**
- **<3.0 milligray (mgy) (2 facilities)**
- **3 (2 facilities)**
- **3.02 (1 facility)**
- **Weight-based according to guidelines (1 facility)**

Other dose-saving features used (n=8):

- **Adaptive Statistical Iterative Reconstruction (ASIR) 50% per slice, ASIR 30%, and ASIR (3 facilities)**
- **Tube modulation, iterative reconstruction (1 facility)**
- **AIDR (2 facilities)**
- **Z DOM, dose modulation with average mAs of 26 (1 facility)**

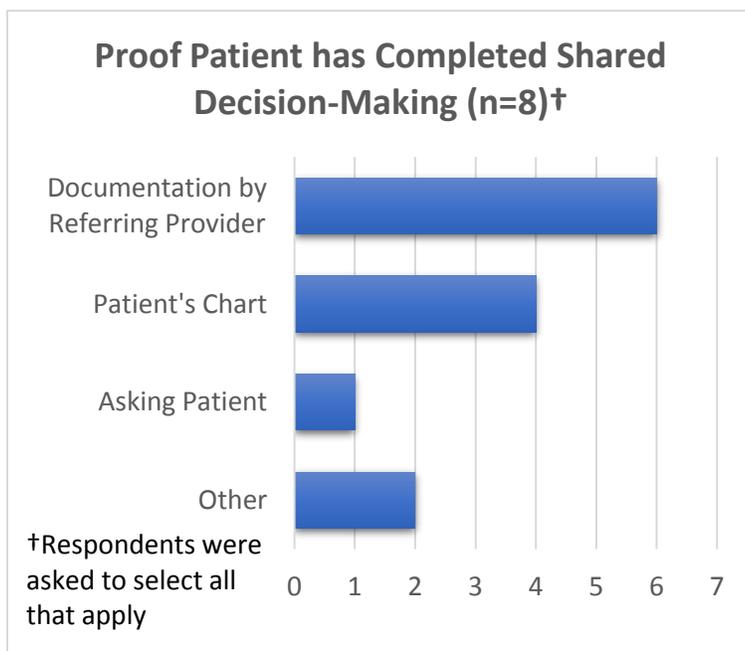
*Shared Decision Making:*

Shared decision making is a process a cancer patient uses to make an informed medical decision with a family member or friend. Many of these eight hospitals refer to the order form from the referring provider to see if the shared decision-making process has been completed.



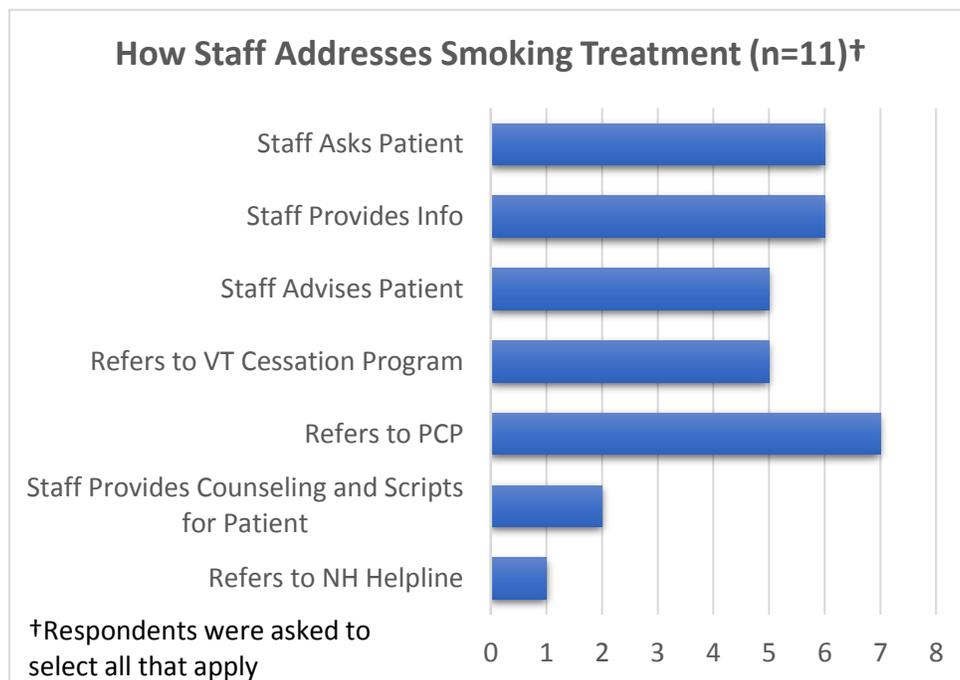
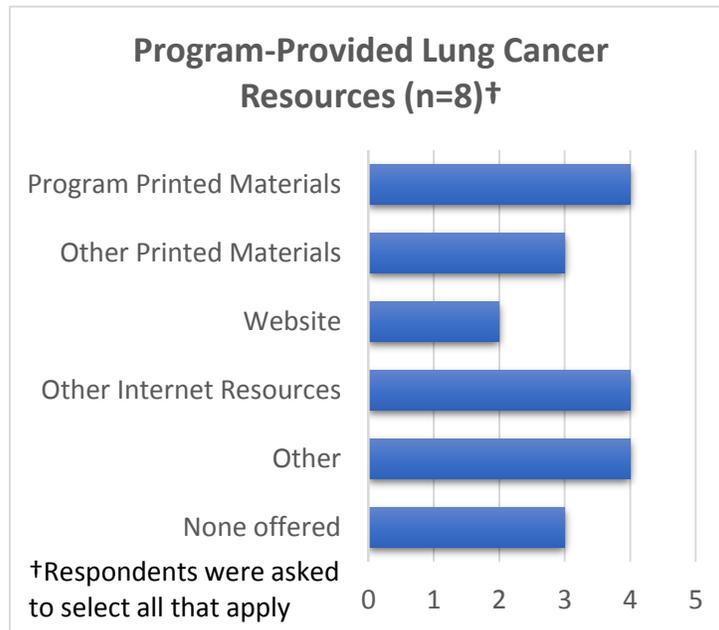
### Shared Decision-Making is Required by Facility's LCS Program? (n=8)

Response	Frequency	Percent
Yes	6	75%



*Lung Cancer Education and Smoking Cessation Efforts:*

Most respondents will refer patients to their primary care provider (PCP) for smoking cessation. Hospitals use a variety of materials for smoking cessation efforts.



## Summary

Lung cancer screening is offered in three-quarters of the hospitals surveyed (8/12). A referring provider is used to identify LCS patients in hospitals (3/7), as well as a computer prompt (2/7), lung screening coordinator (2/7), and a routine check-up (2/7). Referring providers are also responsible for ensuring that their patient has undergone shared decision making (8/8). Patient self-referrals for hospital admissions are common in Vermont (7/12).

All respondents that offer LCS are offering the guideline-recommended screening method LDCT (8/8). A few respondents offer chest x-ray as a screening modality (2/8). This result could not be explained by the position held by each respondent. Most of the respondents follow ACR guidelines (7/8) and half follow USPSTF guidelines (4/8) and CMS guidelines (4/8).

Respondents who offer LCS used a variety of lung cancer screening program resources with their patients. Half of respondents used some program printed materials (4/8) or another internet resource besides a website (4/8). Out of all participating facilities, many refer patients to a primary care doctor (7/11) for smoking cessation help, while fewer refer patients to a Vermont cessation program (5/11), and/or provide direct counseling and scripts (2/11).

## Comparison to Other States (North Carolina and Massachusetts)

- LCS is offered at 75% of the hospital survey respondents that serve Vermonters. This compares to 60% of North Carolina hospital survey respondents.
- Of those facilities that offer LCS, a majority follow ACR guidelines in Vermont and in North Carolina.
- North Carolina facilities predominantly use a screening coordinator to identify LCS patients (50%), and some facilities in Massachusetts also use a coordinator (34%). A few facilities that serve Vermonters use a screening coordinator (29%).

## Recommendations

- Increase use of screening coordinators to help patients navigate a complex healthcare system.
- Educate referring providers and patients on how to advocate for a screening if they are considered high risk. Determine how this education affects the way the LCS patient is identified and what care they receive post-screening.
- Continue monitoring late-stage lung cancer incidence rates to evaluate LCS access and utilization.
- Increase staff-provided smoking cessation counseling and follow-up such as referring to a Vermont cessation program or providing direct counseling and scripts.
- Research factors that contribute to our high late-stage lung cancer diagnosis rate.
- Increase education around appropriate CDTI settings for LCS.

## Limitations

- Not all survey respondents were Directors of Radiology/Imaging.
- The survey results may not be generalizable to all Vermont hospitals or hospital service areas.
- The population sizes of the three states used for comparison vary greatly.
- Healthcare systems of the three states also vary greatly.
- 2016 population demographic estimates were different in Vermont (White alone 94.6%), Massachusetts (White alone 81.8%), and North Carolina (White alone 71.0%).
- 2015 smoking population estimates were different in Vermont (adult cigarette smoking 16%), Massachusetts (14%), and North Carolina (19%).
- CDTI settings for LDCT lung cancer screening are adjusted and improved over time. Estimates from this survey are likely to change.

## Data Sources

CDC State Tobacco Activities Tracking and Evaluation (STATE) System (2015).

National Program of Cancer Registries (NPCR) and Surveillance, Epidemiology, and End Results (SEER) Program - Incidence State Restricted Access Data File (1999-2014).

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Keller, E., Albertson, B., Bennett, E., Chiang, H., Chopan, M., Lantz, K... Carney, J.K. (2015). Vermonters' opinions on Low-dose CT lung cancer screening [Audio Recording mp3]. Retrieved from <https://apha.confex.com/apha/143am/webprogram/Paper321423.html>.

National Lung Screening Trial Research Team. (2011). Reduced lung-cancer mortality with low-dose computed tomographic screening. *N Engl J Med*, 2011(365), 395-409.

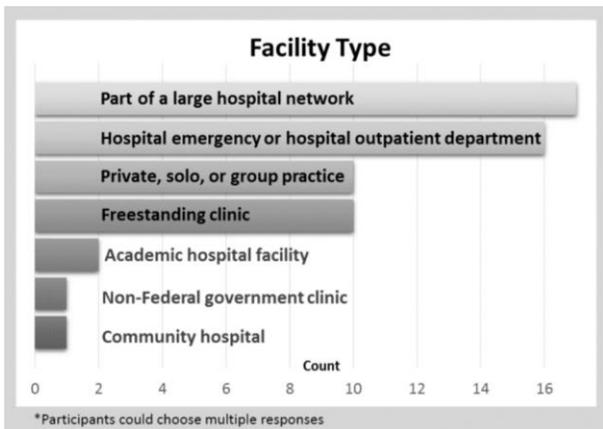
Park, E. R., Gareen, I. F., Japuntich, S., Lennes, I., Hyland, K., DeMello, S., ... & Rigotti, N. A. (2015). Primary care provider-delivered smoking cessation interventions and smoking cessation among participants in the National Lung Screening Trial. *JAMA Internal Medicine*, 175(9), 1509-1516.

U.S. Preventive Services Task Force. (2013). *Final Recommendation Statement: Lung Cancer: Screening*. Retrieved from <https://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/lung-cancer-screening>.

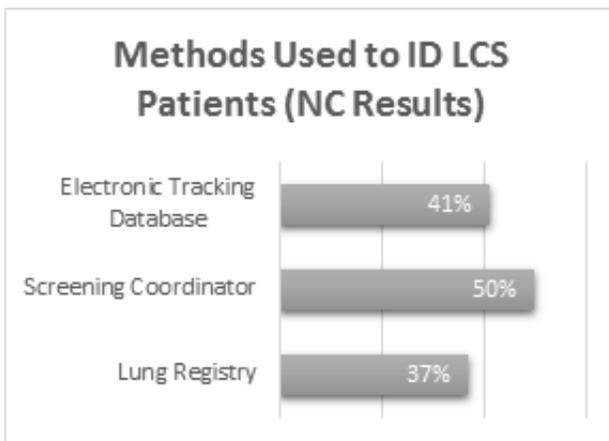
Vermont Department of Health. (2017). *Summary of BRFSS Questions 2000-2017*. Retrieved from <http://www.healthvermont.gov/health-statistics-vital-records/population-health-surveys-data/brfss> on September 14, 2017.

Vermont Department of Health and Vermonters Taking Action Against Cancer. (2016). *2016-2020 Vermont State Cancer Plan: A Framework for Action*. Retrieved from <http://www.healthvermont.gov/wellness/reports/cancer> on September 14, 2017.

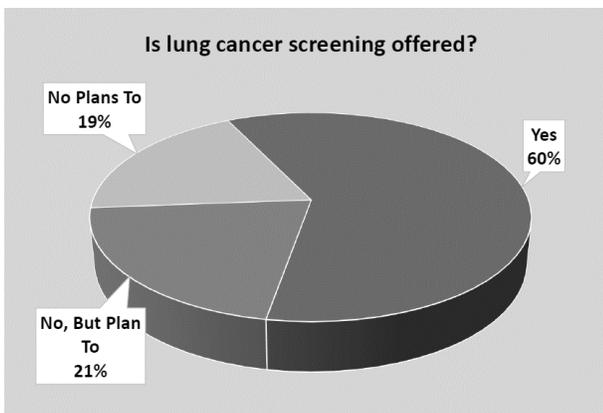
**Appendix 1.** Selected results from Examining Lung Cancer Screening Practices in North Carolina Radiology Facilities



n=48



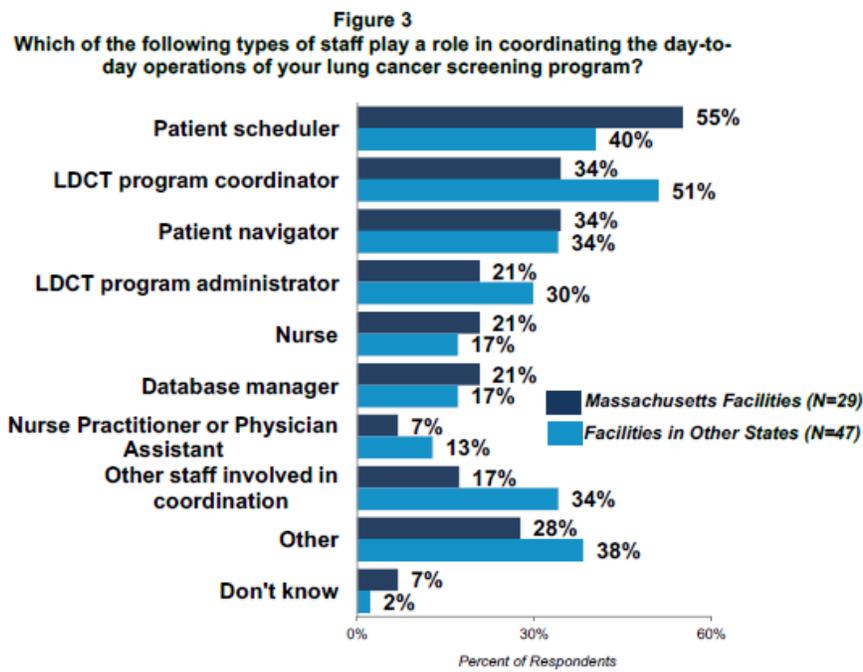
n=48



n=48

**Source:** Henderson, L., Jones, L., Greenwood-Hickman, M.A., Marsh, K., Burroughs, L., Rivera, M.P, ... Molina, P.L. (2015). Examining lung cancer screening practices in North Carolina radiology facilities.

**Appendix 2.** Selected results from and Massachusetts Survey of LDCT Lung Cancer Screening Facilities



Source: Commonwealth of Massachusetts Department of Public Health. (2017). *Survey of LDCT Lung Cancer Screening Facilities*.

### Appendix 3. VTAAC 2017 Lung Cancer Screening Facility Survey

Vermonters Taking Action Against Cancer's Lung Cancer Screening Task Force is conducting a survey of Vermont's lung cancer screening facilities to assess the needs of facilities in providing lung cancer screening and to identify the gaps in access and availability of screening across the state.

Please have this survey completed by the person most knowledgeable about your radiology department; please help get it to the right person if it's not you.

Responses to this survey will be held in confidence; data will be released only in aggregate.

If you currently work at multiple facilities, please fill this out for the facility to which it was addressed.

#### Facility Information

Name (Click or tap here to enter text.)

Location (Click or tap here to enter text.)

#### Information on Person Completing Survey

Name (Click or tap here to enter text.)

Title (Click or tap here to enter text.)

Role in established lung cancer screening or in one under development (if applicable) (Click or tap here to enter text.)

E-mail (Click or tap here to enter text.)

Phone Number (Click or tap here to enter text.)

#### Facility Services Offered

1. What type of imaging series are offered at this facility? (Select all that apply)

Computed Tomography (CT)

Low Dose CT (LDCT)

Fluorodeoxyglucose-PET (FDG-PET)

Magnetic Resonance Imaging (MRI)

Ultrasound (US)

2. What types of lung biopsies are performed at this facility?

CT-Guided Fine-Needle Aspiration Biopsy (FNABs)

Video-Assisted Thoracoscopic Surgery (VATS)

Mediastinoscopy

Bronchoscopy

Ultrasound Guided Needle Biopsy

We do not provide any of these biopsies

3. Is lung cancer screening offered at this facility?

Yes, since Click or tap here to enter text. (Year)  Go to Question 5

Not currently, but it will be offered in the future

No, but we are interested in collaborating with other institutions

No

4. If you answered 'no' or 'not currently' to #3, when does this facility plan to start offering lung cancer screening?

In 2017

In 2018

Other: (Click or tap here to enter text.) ->Go to Question 21.

5. If you answered 'yes' to #3, is this facility an American College of Radiology (ACR) designated Lung Cancer Screening Center?

Yes

No

Not currently, but we would like to be in the future

6. Does your facility use Computer-Aided Detection (CAD) in screening for lung cancer?

Yes

No

Not currently, but we plan to in the future

7. If yes, where do you (or where will you) use CAD? In house or outside this facility? If you refer out, what process do you use a hospital-based or virtual process for outside referral? (Click or tap here to enter text.)

Lung Cancer Screening

8. Has this facility implemented guidelines for lung cancer screening?
- Yes
  - Not currently, but we plan to in the future
  - No -> Go to Question 22.
9. If yes, which recommended guidelines does this facility follow or plan to follow for implementing lung cancer screening? (Select all that apply)
- U.S. Preventive Services Task Force (USPSTF)
  - American College of Radiology (ACR)
  - National Comprehensive Cancer Network (NCCN)
  - Centers for Medicaid and Medicare Services (CMS)
  - Other: (Click or tap here to enter text.)
10. Which screening test(s) does this facility use for lung cancer screening? (Select all that apply)
- Chest X-Ray
  - Sputum Cytology
  - CT
  - LDCT
11. What is the CTDI setting at this facility for a LDCT? (Click or tap here to enter text.)
12. Do you use any other dose-saving features? Please list. (Click or tap here to enter text.)
13. What is the average number of patients seen at this facility for lung cancer screening per month in the last year? (Click or tap here to enter text.)
14. What is the average number of patients seen at this facility per month in the last year? (Click or tap here to enter text.)
15. If a software system is used for lung cancer screening tracking letters, which of the following does this facility use (if handled by another facility please indicate where)?
- EPIC
  - Aspen
  - Pen-Lung
  - Cerner
  - Other: (Click or tap here to enter text.)
  - This facility does not use an electronic database
16. Who or what helps identify lung cancer screening patients and encourages lung cancer screening? (Select all that apply)
- Special notation or flag in the patient header of the patient chart
  - Computer prompt or Best Practices Alert (BPA)
  - Referring provider
  - Routinely looking it up in the medical record at the time of visit
  - Screening Coordinator (nurse, administrator, etc.)
  - Referral to outside facility
  - Centers for Medicare and Medicaid Services (CMS) tracking
  - Other mechanism: Click or tap here to enter text.
  - None
17. Is your facility participating in the American College of Radiology lung cancer screening registry?
- Yes
  - No

Shared Decision Making

18. For patients with insurance (e.g. Medicare) that requires a shared decision making visit, who conducts the shared decision making discussion? (Please check all that apply)

Shared decision making involves a review and discussion of the pros and cons of LDCT lung cancer screening by the patient and a healthcare provider.

- Referring providers (PCPs, NPs, PAs and specialists)
- LDCT-Lung Screening Program Coordinator
- Patient Navigator
- Nurse
- Nurse Practitioner or Physician Assistant Staff
- Radiologist
- None of the Above
- Other (please specify): (Click or tap here to enter text.)

19. For patients with insurance that does not require shared decision making about lung cancer screening does your program still require it?

- Yes
- No
- Don't Know

20. How do you ascertain that a patient has undergone shared decision making before the first screen? (Please check all that apply)

- Documented by referring provider on the order form
- Documentation in the patient's chart
- Asking the patient
- Other (please specify): (Click or tap here to enter text.)

21. What resources on lung cancer screening does your program offer to patients?

- Print materials prepared by your program
- Other print materials
- Information on your program's website
- Direction to other Internet resources (e.g. video, risk calculators, websites)
- Other (please specify): (Click or tap here to enter text.)
- None of the above

22. How does your program staff address smoking treatment for patients (Please check all that apply):

- Staff asks smoking status at most/all patient interactions (at the time of LDCT scan, during follow up calls, etc.)
- Advise all current smokers to seek some support for quitting
- Provide information on smoking treatment resources
- Counseling and prescriptions for nicotine replacement therapy (NRT) are provided by program staff
- Refer patients to 802Quits phone, web, or in-person program (Vermont Quit Partners)
- Refer patients to New Hampshire Tobacco Helpline or Quitworks-NH
- Refer patients to the PCP for smoking treatment advice
- Other (please specify): (Click or tap here to enter text.)

#### Facility Demographics

23. How would you describe this facility? (Select all that apply)

- Private Solo or Group Practice
- Freestanding Clinic (not part of a hospital outpatient department)
- Community Health Center (Federally Qualified Health Center (FQHC), Federally Funded Clinic, or "Look-Alike" Clinic)
- Non-Federal Government Clinic (states, county, city, maternal and child, etc.)
- Health Maintenance Organization or other prepaid practice (ex. Kaiser Permanente)
- Faculty Practice Plan (an organized group of physicians that treat patients referred to an academic medical center)
- Hospital Emergency or Hospital Outpatient Department
- Academic Hospital Facility
- Part of a large hospital network
- Other: (Click or tap here to enter text.)

24. How are patients referred to this facility for general services? (Select all that apply)

- Outside Physician Referral
- Physician Referral within Network/Health System
- Patient Self-Referral
- Other (Click or tap here to enter text.)

25. How would you describe the geographic location of this facility?

- Rural
- Suburban
- Urban

26. How many board certified radiologists are at this facility (please indicate if '0')?

- Number of Thoracic Radiologists: (Click or tap here to enter text.)
- Number of General Radiologists: (Click or tap here to enter text.)

27. How many CT technologists work at this facility (please indicate if '0')? (Click or tap here to enter text.)

Thank you for participating in this study!

If you would like to learn more about Vermonters Taking Action Against Cancer (VTAAC) and the Lung Cancer Screening Task Force, please go to <http://vtaac.org> or contact VTAAC Coordinator, Jessica French, at [Jessica.French@cancer.org](mailto:Jessica.French@cancer.org).

If there is anything else you'd like to tell us about lung cancer screening at this facility or in general, please use the space provided below. (Click or tap here to enter text.)

**Appendix 4. Lung Cancer Screening Guidelines**

## Cancer Screening for Average-Risk Patients

<b>LUNG CANCER</b>	
<b>Organization</b>	<b>Screening Recommendations</b>
<b>USPSTF (2013)</b>	Annual low-dose computed tomography (LDCT) of adults age 55–80 who have a 30 pack-year smoking history and currently smoke or have quit within the past 15 years.
<b>ASCO, ACCP (2012) ALA (2013) ACS (2014)</b>	Similar to USPSTF recommendations, for age range 55-74. ACS and ALA emphasize that doctors should discuss the screening with patients to allow for informed decision-making of the risks and benefits of screening. A focus on the continuing risk of lung cancer and the importance of smoking cessation should be a high priority in screening discussions with current smokers.

*This table is not inclusive of all cancer screening recommendations (by cancer type or organization). Other organizations that promote cancer screening guidelines include (but are not limited to) the National Cancer Institute, the American Academy of Family Physicians, and the American Medical Association.*

\* These guidelines are for individuals at average-risk for select cancers. An individual's risk for cancer is based on two major categories: familial or genetic risk and environmental factors that may be causally related to cancer such as smoking, obesity, diet and physical activity. Two tools for counseling patients on individual risk and helping plan the type and frequency of screening procedures are listed below.

- The National Cancer Institute (NCI) breast cancer, colorectal cancer and melanoma risk assessment tools are designed for use by health providers with their patients. The tools and other information related to overall cancer risk assessment can be found at <http://www.cancer.gov/>.
- The Agency for Healthcare Research and Quality (AHRQ) Electronic Preventive Services Selector (ePSS) is a hands-on downloadable tool based on current USPSTF recommendations that is designed to help providers offer appropriate screening, counseling, and preventive medication services for their patients. The tool can be found at <http://epss.ahrq.gov/>.

**Acronyms:**

<b>ACCP:</b> American College of Chest Physicians	<b>ASCO:</b> American Society of Clinical Oncology
<b>ACG:</b> American College of Gastroenterology	<b>ASCP:</b> American Society for Clinical Pathology
<b>ACOG:</b> American College of Obstetricians & Gynecologists	<b>AUA:</b> American Urological Association
<b>ACS:</b> American Cancer Society	<b>NCCN:</b> National Comprehensive Cancer Network
<b>ALA:</b> American Lung Association	<b>USPSTF:</b> United States Preventive Services Task Force
<b>ASCCP:</b> American Society for Colposcopy & Cervical Pathology	:

Source: Vermont Department of Health. (2016). *Cancer Screening Guide*. Retrieved from <http://www.healthvermont.gov/sites/default/files/documents/2016/12/CancerScreeningGuidelines-Public.pdf>