



Lung Cancer Prevention and Control in Vermont

Outline

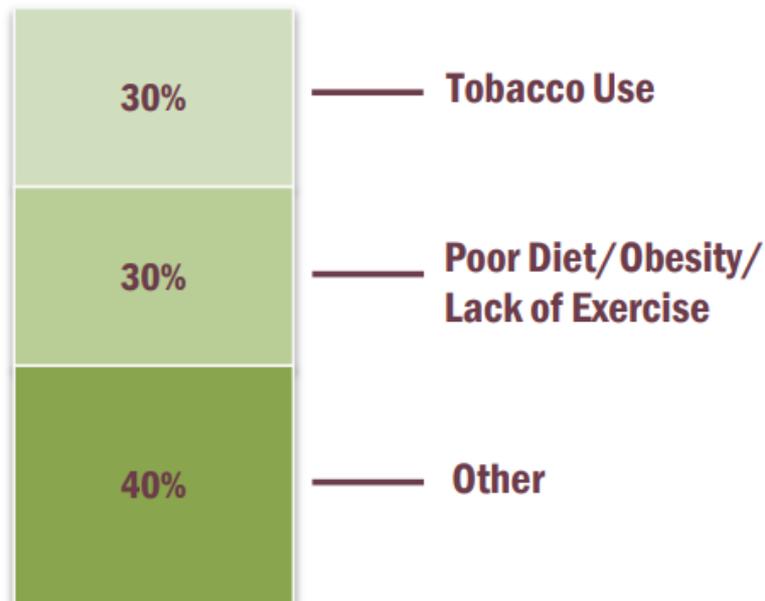
- ❑ Cancer Preventive Behaviors
- ❑ Lung Cancer Incidence and Mortality in Vermont and U.S.
- ❑ Eligible Population for Lung Cancer Screening in Vermont
- ❑ Lung Cancer Screening in Vermont
- ❑ Vermont State Cancer Plan
- ❑ Next Steps



Cancer Preventive Behaviors

What Causes Cancer?

3 Behaviors are Leading Causes of Cancer



- Other causes of cancer include viruses, family history of cancer, reproductive factors, prescription drugs or medical procedures, and environmental pollution.

Source: *Cancer Causes Control*. 2012 April; 23(4): 601–608. doi:10.1007/s10552-012-9924-y.

PACK MENTALITY

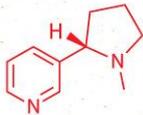
WHY IS IT SO HARD TO QUIT SMOKING?

WITH MORE THAN 5 MILLION PEOPLE DYING EACH YEAR FROM ITS EFFECTS, TOBACCO SMOKING IS ONE OF THE LEADING CAUSES OF DEATH AROUND THE WORLD. EVEN WITH THE SURGEON GENERAL'S WARNINGS, THE NUMBER OF SMOKERS REMAINS HIGH, AND ACCORDING TO THE FDA, 50 PERCENT OF THE PEOPLE WHO RECOVER FROM LUNG CANCER SURGERY START SMOKING AGAIN AFTERWARDS. HERE, WE EXPLORE EXACTLY WHAT CAUSES THE DIFFERENCE BETWEEN ONE PUFF AND A HABITUAL POST-DESSERT DRAG.

The average smoker inhales 1 to 2 milligrams of nicotine per cigarette. Most cigarettes on the U.S. market today have 2 to 10 milligrams or more of nicotine.



Nicotiana Tabacum



Nicotine was first isolated by German chemists Wilhelm Heinrich Posselt and Karl Ludwig Reimann in 1828 as a poisonous ingredient in tobacco.

Once widely used as a pesticide, a 60 milligram dose of the substance can kill a human being.

Nicotine is a naturally occurring alkaloid—or nitrogen-containing chemical—that can be found in large amounts in the leaves of tobacco plants. The bitter-tasting compound is also composed of carbon, hydrogen and sometimes oxygen. Together, all of these chemicals can have powerful pharmacologic and psychological effects on the human body.



"Pharmacologic and behavioral characteristics that determine tobacco addiction are similar to those that determine addiction to drugs such as heroin and cocaine."

American Heart Association

It takes 8 seconds for nicotine to reach the brain after inhaling tobacco smoke.

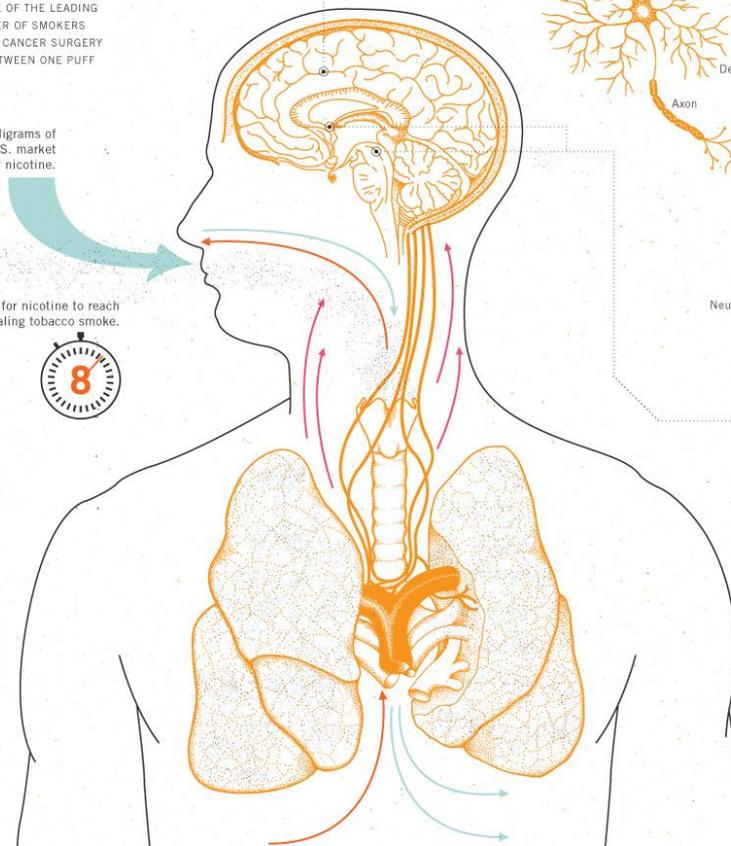


Figure 6.5 Inhalation of tobacco smoke.

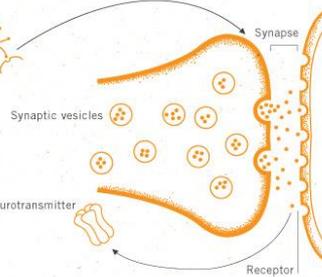
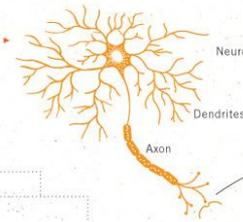


THE PLEASURE PRINCIPLE

Research has shown that nicotine is the main silent agent in cigarettes. More than just a physical craving, it's also a psychological dependency.

1/

Our brain is made up of billions of nerve cells. They release chemical messengers called neurotransmitters that activate the receptor's nerve cell in order to communicate with other cells.

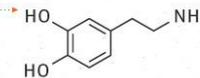


2/

The nicotine molecule is shaped like the neurotransmitter called acetylcholine, which is involved in everything from muscle movement and heart rate to memory.

3/

Once the nicotine reaches the brain, it's able to attach to the acetylcholine receptors and mimic its actions. The body then responds to the nicotine as if they were natural neurotransmitters.

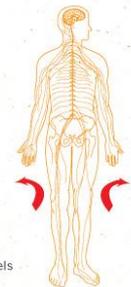
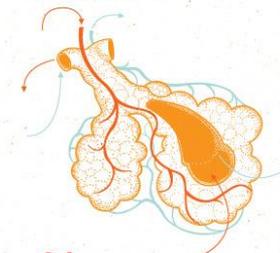


4/

Simultaneously, nicotine also raises dopamine and endorphin levels, which control feelings of pleasure and euphoria. At night, when you're asleep, these pathways shut down and cravings often occur immediately upon waking up.

5/

As smokers increase the amount of cigarettes they smoke, more nicotine is absorbed by their lungs and into their bloodstream. They have to maintain this level of nicotine in order to keep the nervous system stable and prevent withdrawal symptoms.



6/

The nervous system eventually adapts to these levels and the smoker develops a tolerance to the drug.

KEY

- Oxygen
- Carbon Dioxide
- ⊙ Blood

Sources: American Heart Association, National Health Interview Survey, National Center for Health Statistics, World Health Organization, University of Ohio

A COLLABORATION BETWEEN GOOD AND COLUMN FIVE

Image source: <https://www.columnfivemedia.com/work-items/infographic-why-is-it-so-hard-to-quit-smoking>.

What Causes Cancer?

- Tobacco use causes other cancers besides lung cancer.

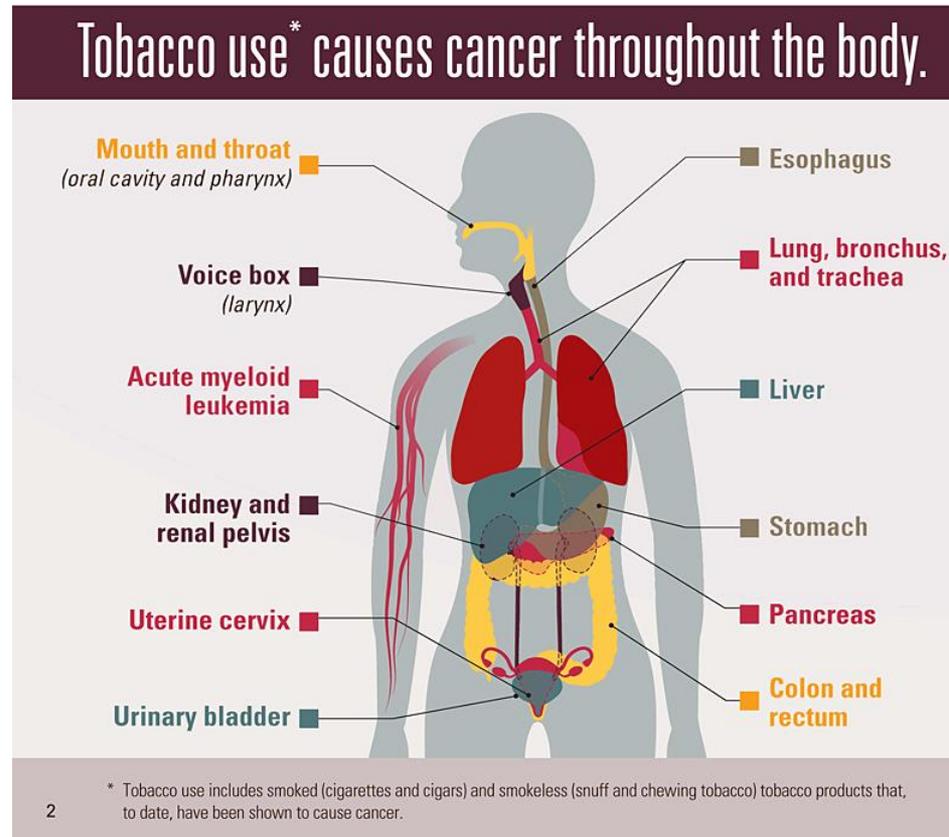


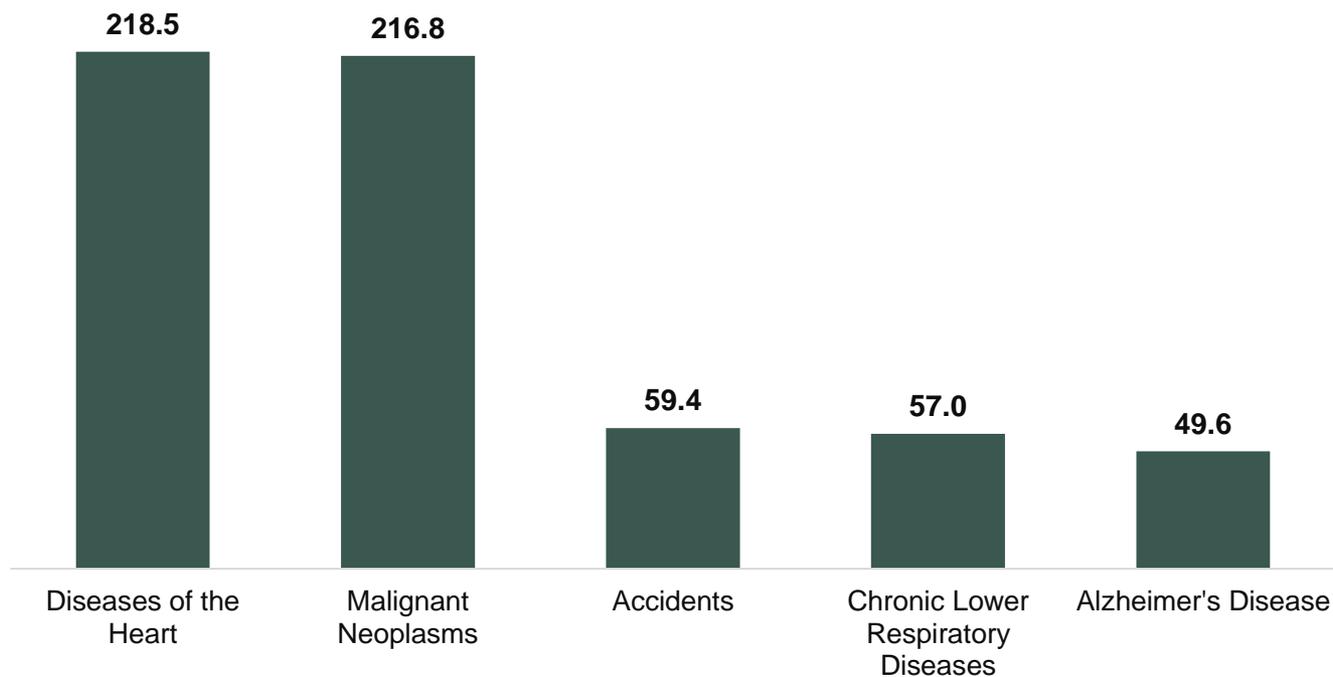
Image Source: <https://www.cdc.gov/vitalsigns/cancerandtobacco/infographic.html#graphic>

Lung Cancer Incidence and Mortality

- ❑ What is the lung cancer incidence rate in Vermont and U.S.?
- ❑ What is the mortality rate for lung cancer in Vermont and U.S.?

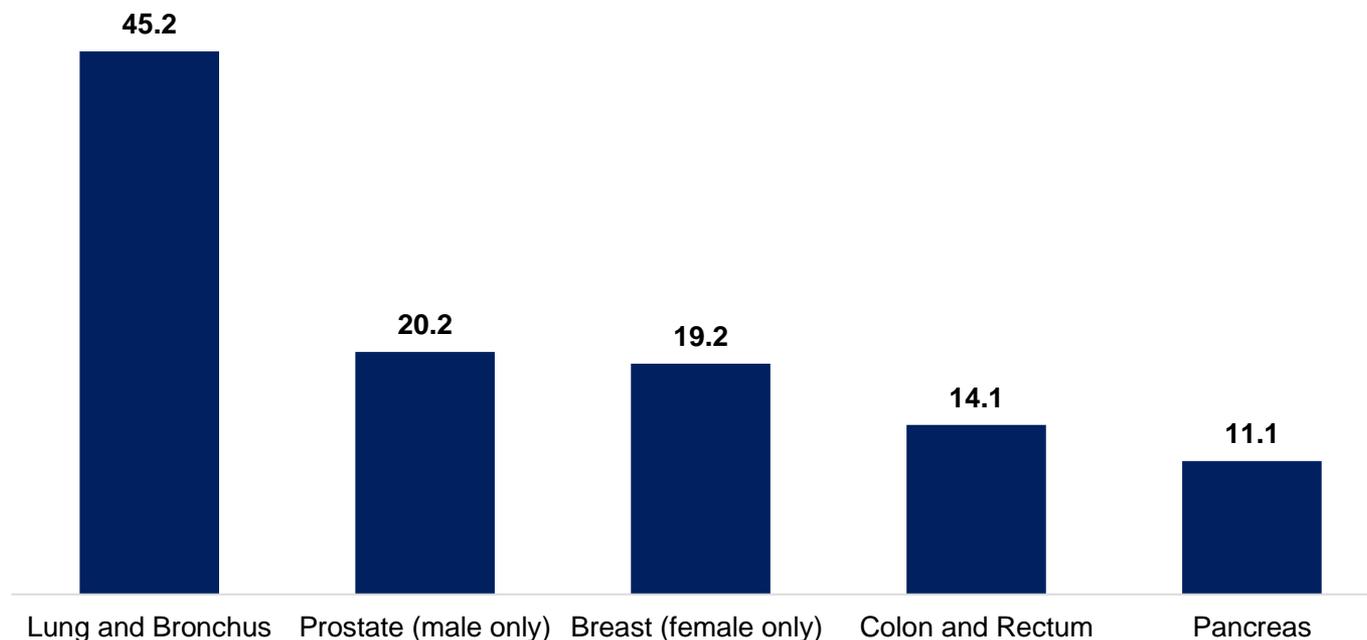
Leading Causes of Death in Vermont

Leading Causes of Death in Vermont per 100,000 Population
(2016)



Lung Cancer Mortality

Top 5 Fatal Cancers in Vermont per 100,000 Population (2011-2015)



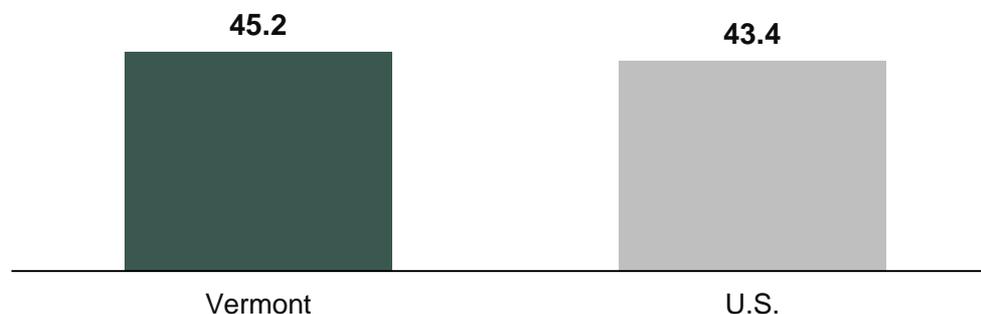
Note: All rates are age-adjusted to the 2000 U.S. standard population.

Vermont is ranked 18th in the U.S. for lung cancer mortality.

Lung Cancer Mortality

There is no statistically significant difference in the lung cancer mortality rate between Vermont and the U.S.

Lung and Bronchus Cancer Mortality Rates in Vermont and U.S., Rates per 100,000 persons, 2011-2015

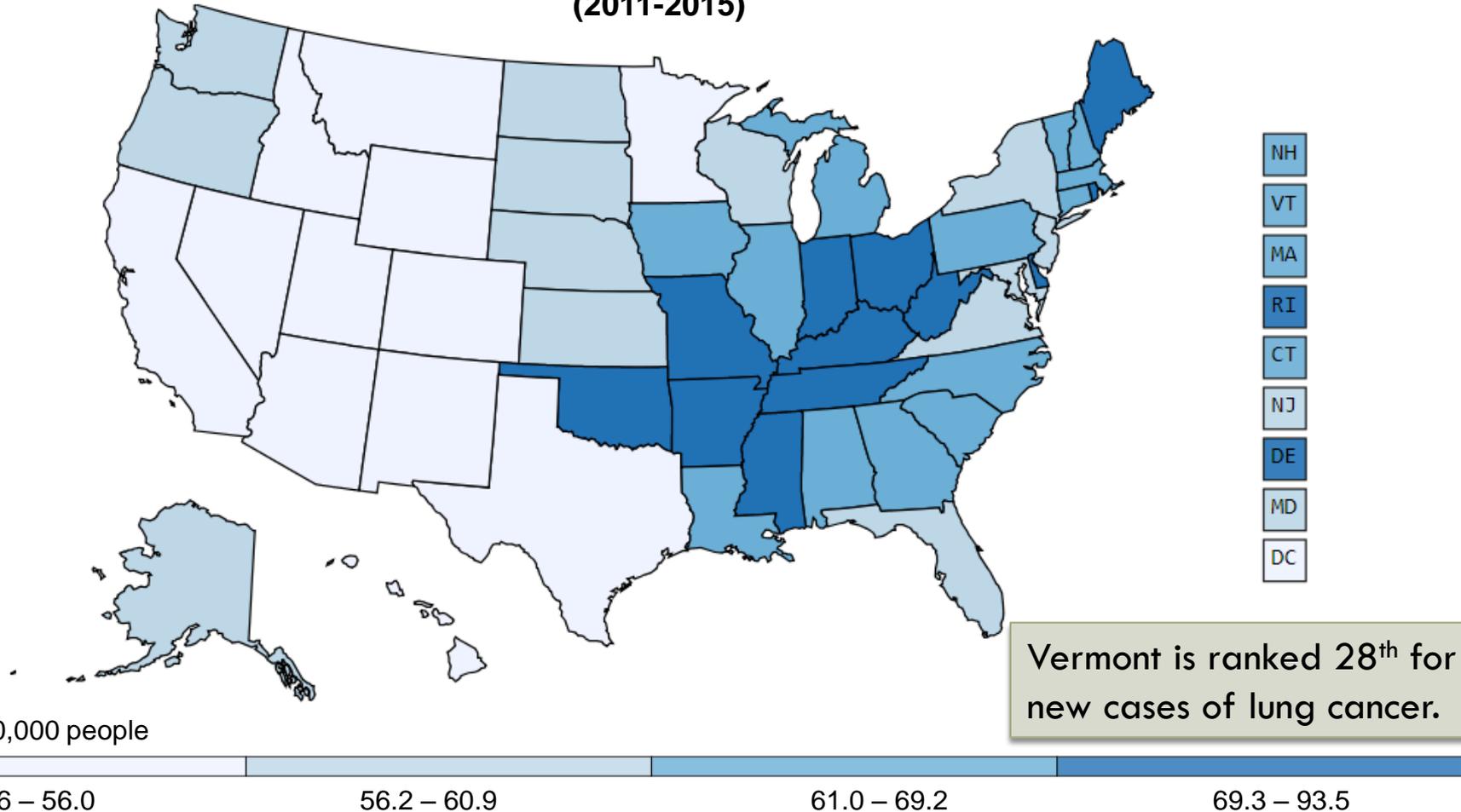


Note: All rates are age-adjusted to the 2000 U.S. standard population.

Data can be accessed at <http://www.healthvermont.gov/health-statistics-vital-records/surveillance-reporting-topic/cancer> Under "Age Adjusted Incidence and Mortality Rates".

How do Vermont Lung Cancer Incidence Rates Compare to Other States?

New Cases of Lung and Bronchus Cancers, Rate per 100,000 persons (2011-2015)

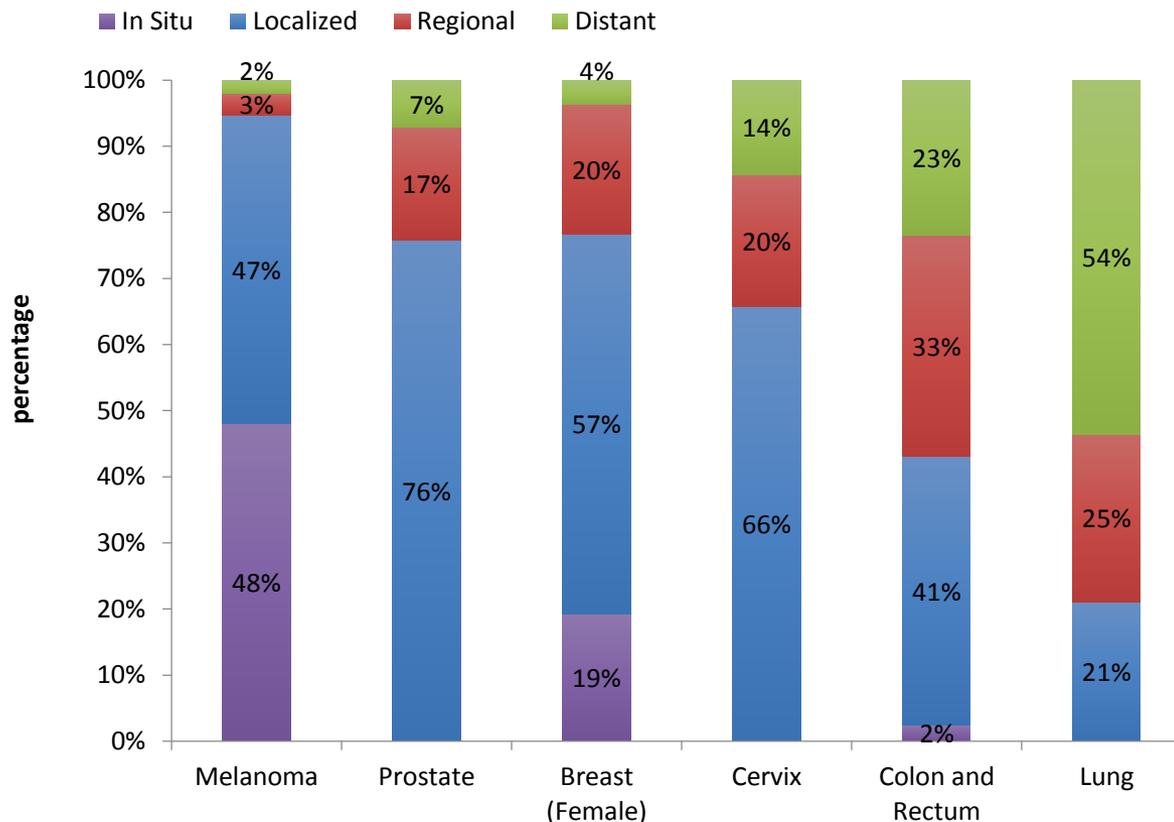


Note: All rates are age-adjusted to the 2000 U.S. standard population.

Cancer Incidence

Cancer Stage at Diagnosis

% of total cases of cancer, by type, according to stage at diagnosis, 2011-2015

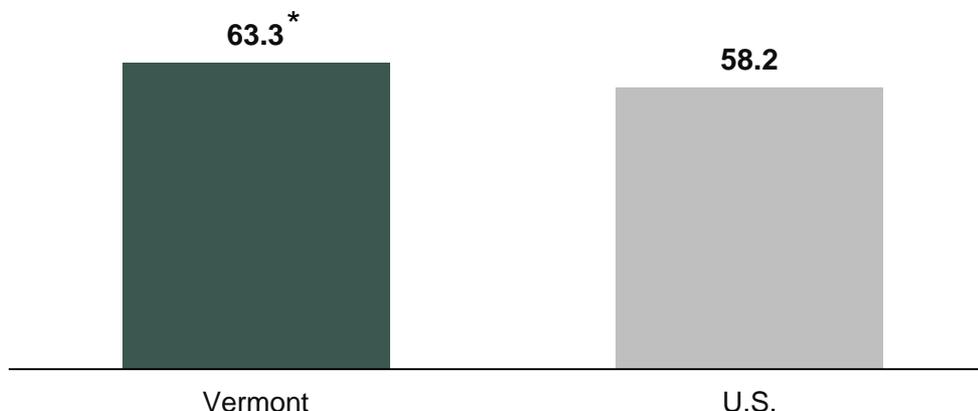


Note: Cervical cancers diagnosed as in situ are not reported to the Cancer Registry and are therefore not included in this chart. Stage of disease at diagnosis is SEER Summary Stage.

Lung Cancer Incidence

From 2011 to 2015, there were about 522 cases of lung cancer per year in Vermont.

Lung and Bronchus Cancer Incidence in Vermont and U.S., Rates per 100,000 persons, 2011-2015

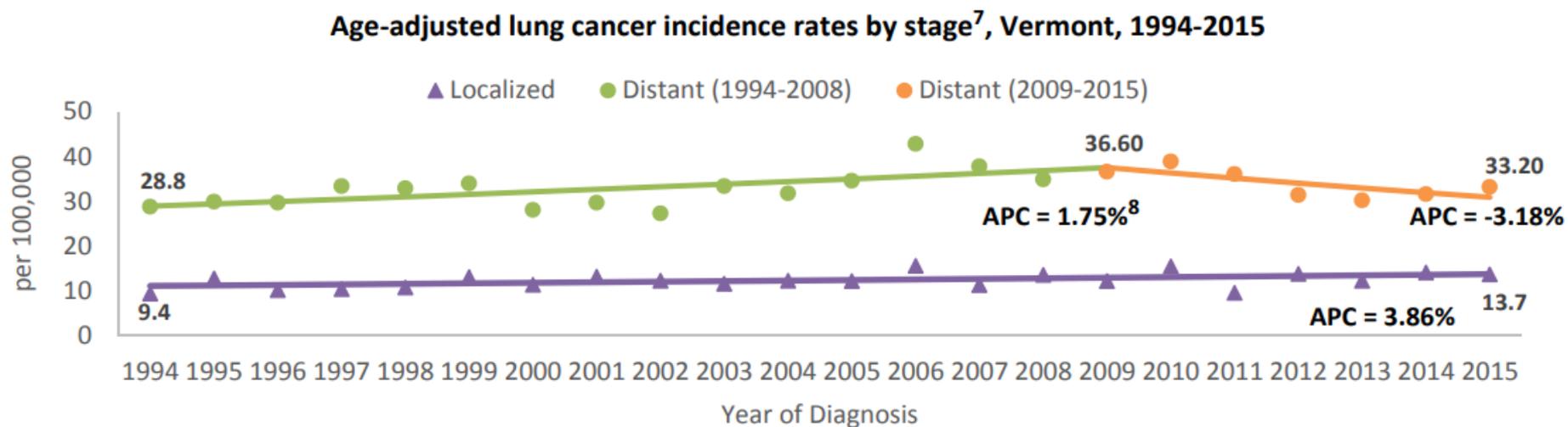


Note: All rates are age-adjusted to the 2000 U.S. standard population.

*Statistically higher than the U.S. rate.

Data can be accessed at <http://www.healthvermont.gov/health-statistics-vital-records/surveillance-reporting-topic/cancer> Under "Age Adjusted Incidence and Mortality Rates".

Lung Cancer Incidence



⁷ Stage of disease at diagnosis is SEER Summary Stage

Data available online in Tobacco Associated Cancers - Data Brief

http://www.healthvermont.gov/sites/default/files/documents/pdf/stat_DataBrief_TobaccoAssociatedCancers.pdf

Eligible Population for Lung Cancer Screening

- ❑ What proportion of Vermonters are a current or former smoker? How do these rates differ across the state?
- ❑ Who is the eligible population for lung cancer screening?
- ❑ Which populations have higher heavy smoking rates?
- ❑ What other comorbidities do the eligible population for lung cancer screening face?

Current or Former Smokers Ages 55-80

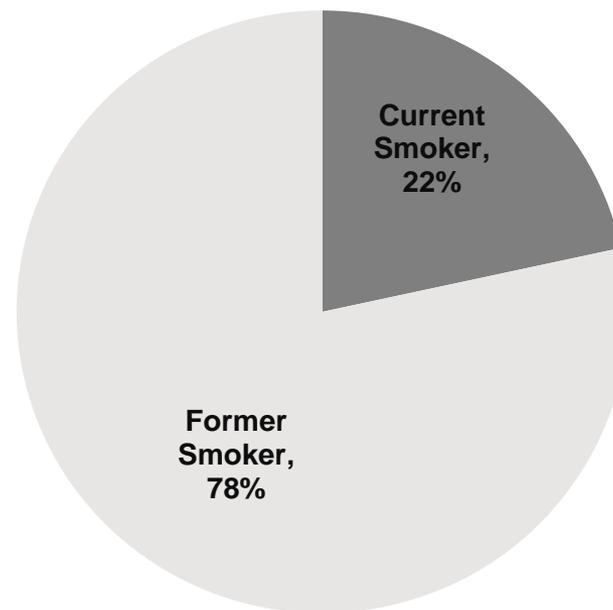
What proportion of Vermont adults (ages 55-80) are a current or former smoker?

53%

Of Vermont adults ages 55-80 are a current or former smoker. A current smoker is defined as a smoker who smokes everyday or sometimes.

In total, about 97,700 Vermont Adults ages 55-80 are a current or former smoker.

Percent of Vermont Adult Smokers by Smoker Type, ages 55-80 (2016-2017)



Current Smokers (any frequency) Ages 55-80

What proportion of Vermont adults (ages 55-80) are a current smoker?¹

12%

Of Vermont adults ages 55-80 are a current smoker. A current smoker is defined as a smoker who smokes everyday or sometimes.

In total, about 21,100 Vermont Adults ages 55-80 smoke currently.



YOU CAN QUIT.
WE CAN HELP.

FOR PROVIDERS

¹A current smoker is defined as someone who has smoked more than 100 cigarettes and who now smokes every or some days. To find out more about Vermont's Quitline, 802Quits, please visit, <http://802quits.org/-providers/>.

Current Smokers Ages 55-80 by County/HSA

What proportion of Vermonters (ages 55-80) are a current smoker?¹

Current Smokers ages 55-80 by County, 2016-2017	
County	Percent (%)
Addison	8
Bennington	14
Caledonia	13
Chittenden	9
Essex	17
Franklin	16
Grand Isle	*suppressed
Lamoille	10
Orange	8
Orleans	15
Rutland	15
Washington	13
Windham	10
Windsor	11

Current Smokers ages 55-80 by Hospital Service Area (HSA), 2016-2017	
Hospital Service Area	Percent (%)
Barre	13
Burlington	9
Morrisville	11
Randolph	*suppressed
Newport	17△
St. Johnsbury	13
St. Albans	17△
Middlebury	9
Rutland	15
Bennington	13
Springfield	15
White River	6▽
Brattleboro	9

△ Statistically higher than the state rate.

▽ Statistically lower than the state rate.

¹A current smoker is defined as a smoker who smokes everyday or sometimes.

*Value suppressed because sample size too small or relative standard error (RSE) is > 30.

Vermonters Eligible for Lung Cancer Screening

What proportion of Vermont adult smokers (ages 55-80) are current or former heavy smokers?

A heavy smoker is defined as,

- a current smoker with a 30 pack-year smoking history or
- a former smoker with a 30 pack-year smoking history who has quit within the last 15 years.

**Lung cancer screening could save
your life.**

Screening is key to early detection – when lung cancer is diagnosed at an early stage it is more likely to be curable.

[Take the Quiz](#)

American Lung Association Lung Cancer Screening Eligibility Quiz available online at,
<https://www.lung.org/our-initiatives/saved-by-the-scan/quiz/>

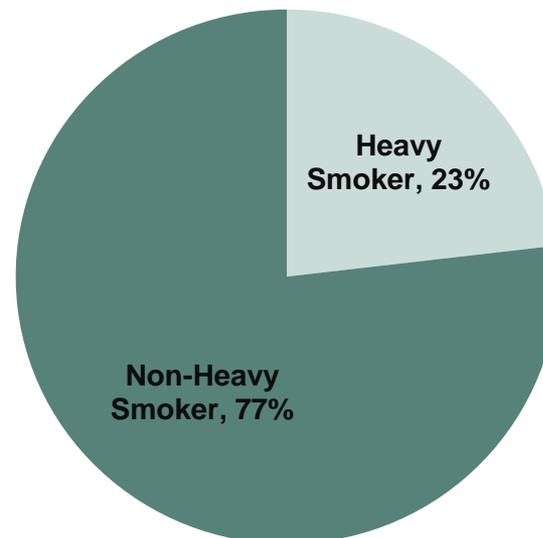
Vermonters Eligible for Lung Cancer Screening

What proportion of Vermont adult smokers (ages 55-80) are current or former heavy smokers?

11%

Of Vermont adults ages 55-80 are current or former heavy smokers and therefore eligible for lung cancer screening.

Percent of Vermont Adult Smokers (ages 55-80) who are a Current or Former Heavy Smoker, 2017



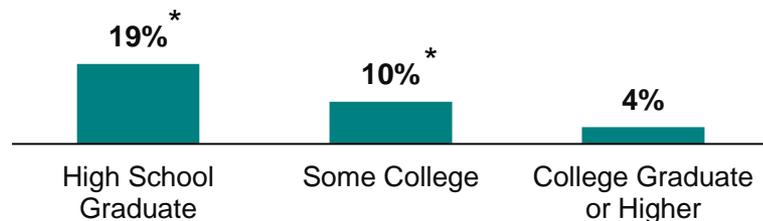
In total, about 19,100 Vermont Adults ages 55-80 are eligible to receive lung cancer screening.

Note: Heavy smoker data is only available for one year, therefore county/HSA rates are not possible.

Heavy Smoking by Education and Income

The more education an adult ages 55-80 has, the less likely they are to be a current or former heavy smoker. Vermont adults ages 55-80 who make less than \$50,000 annually are more likely to be eligible for lung cancer screening in comparison to those who make \$50,000 or more.

Percent of Vermont Adults Ages 55-80 who are a Current or Former Heavy Smoker by Education Level, 2017



Percent of Vermont Adults Ages 55-80 who are a Current or Former Heavy Smoker by Income Level, 2017



*Statistically higher than the rate of heavy smoking for college graduates.

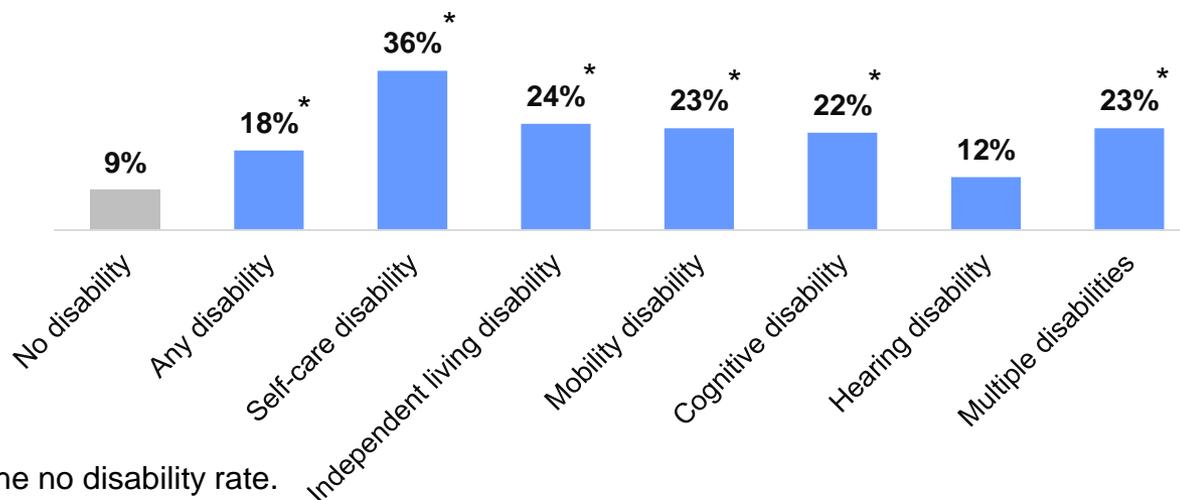
**Statistically higher than the rate of heavy smoking for those who make \$50,000 or more a year.

Disability Status and Heavy Smoking

Which populations have higher heavy smoking rates?

There are about 2,300 Vermont adults ages 55-80 who are a current or former heavy smoker and have a self-care disability and 8,900 Vermont adults ages 55-80 who are a current or former heavy smoker and have any disability. About 1,200 (14%) of Vermont adults ages 55-80 with any disability were screened for lung cancer.

Percent of Vermont Adults who are a Current or Former Heavy Smoker Ages 55-80 by Disability Status, 2017



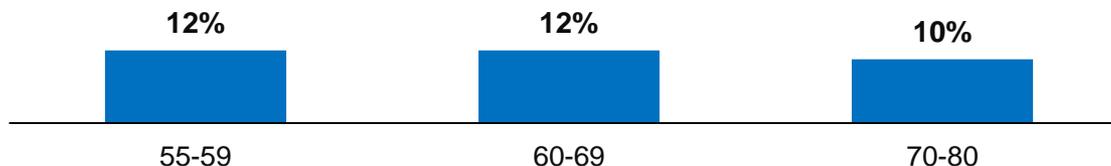
*Statistically higher than the no disability rate.

Heavy Smoking by Age Group

Which populations have higher heavy smoking rates?

There are about 4,600 Vermont adults ages 55-59 who are a current or former heavy smoker. For adults ages 60-69 and 70-80, there are 9,300 and 5,200 current or former heavy smokers, respectively. There are no statistical differences in heavy smoking by age group.

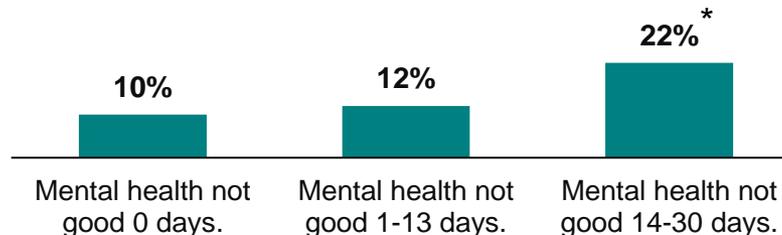
Percent of Vermont Adults who are a Current or Former Heavy Smoker by Age Group, 2017



Mental Health Status and Heavy Smoking

What other comorbidities do the eligible population for lung cancer screening face? Vermont adults ages 55-80 who experience poor mental health most days are more likely to be a current or former heavy smoker in comparison to those who do not experience poor mental health.

Mental Health Status of Vermont Adults who are a Current or Former Heavy Smoker Ages 55-80, 2017



*Statistically higher than heavy smokers responding mental health not good 0 days.

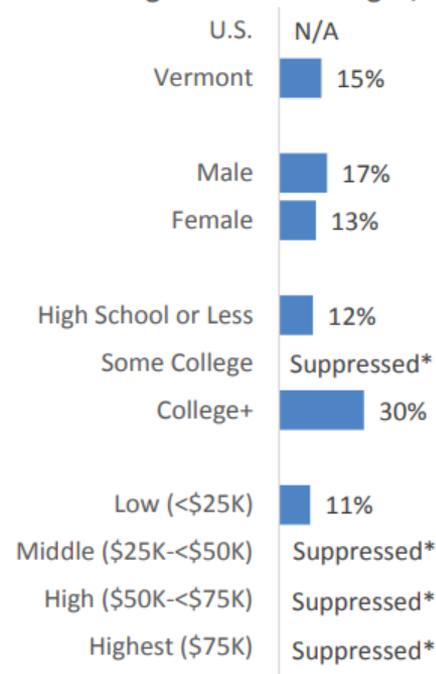
Lung Cancer Screening in Vermont

- ❑ What proportion of eligible Vermonters have been screened for lung cancer?
- ❑ What is the availability of lung cancer screening in Vermont?

Lung Cancer Screening in Vermont

15% Of Vermont adults ages 55-80 who are a current or former heavy smoker are up-to-date on lung cancer screening.

Received Lung Cancer Screening
 Vermont Adults Meeting Criteria for
 Lung Cancer Screening**, 2017



*Value suppressed due to sample size too small or relative standard error (RSE) is > 30.

**Lung cancer screening is recommended for adults who are 55-80, have a 30 pack-year smoking history, and are a current smoker or stopped smoking within the last 15 years. Additional information about lung cancer screening recommendations can be found here: <https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/lung-cancer-screening>
 Data accessible at <http://www.healthvermont.gov/health-statistics-vital-records/population-health-surveys-data/brfss> Under "BRFSS Annual Data Summary"

Note: Heavy smoker data is only available for one year, therefore county/HSA rates are not possible.

2018 Lung Cancer Screening in Vermont Hospitals – Survey Results

- ❑ The Lung Cancer Screening Survey was fielded in 2017.
- ❑ Purpose & Background
 - To describe the needs of facilities in providing lung cancer screening.
 - To identify gaps in access and availability of screening across the state.
 - To evaluate concurrent tobacco cessation efforts.
- ❑ Methods
 - Survey was emailed to Director of Radiology/Imaging Services or, in some cases, a different provider (N=16).
 - Survey contained 27 questions.
 - Data were collected, de-identified and entered into Excel before being analyzed by SAS 9.3.

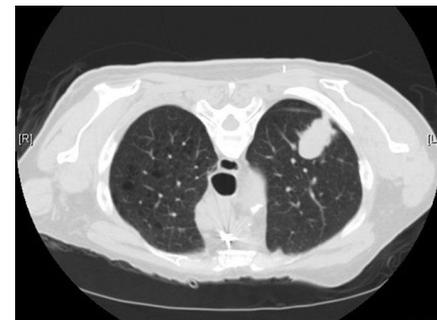


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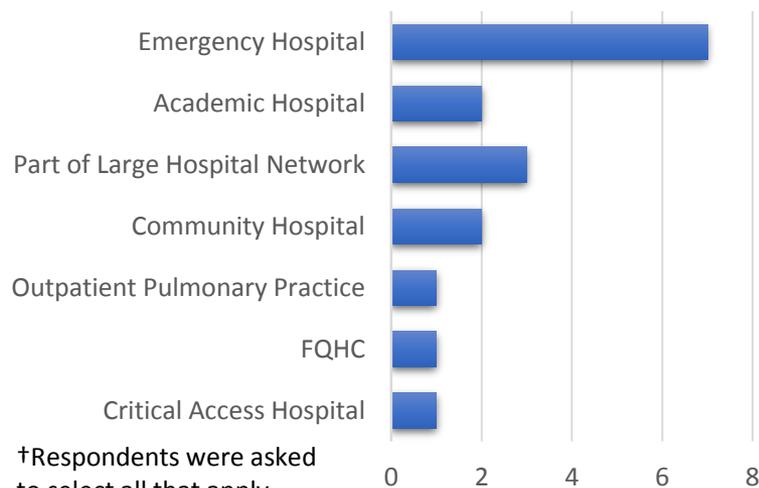
<https://www.cancer.gov/news-events/cancer-currents-blog/2017/lung-cancer-screening-challenges>.

2018 Lung Cancer Screening in Vermont Hospitals – Survey Results

- ❑ Out of the 16 surveys 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.

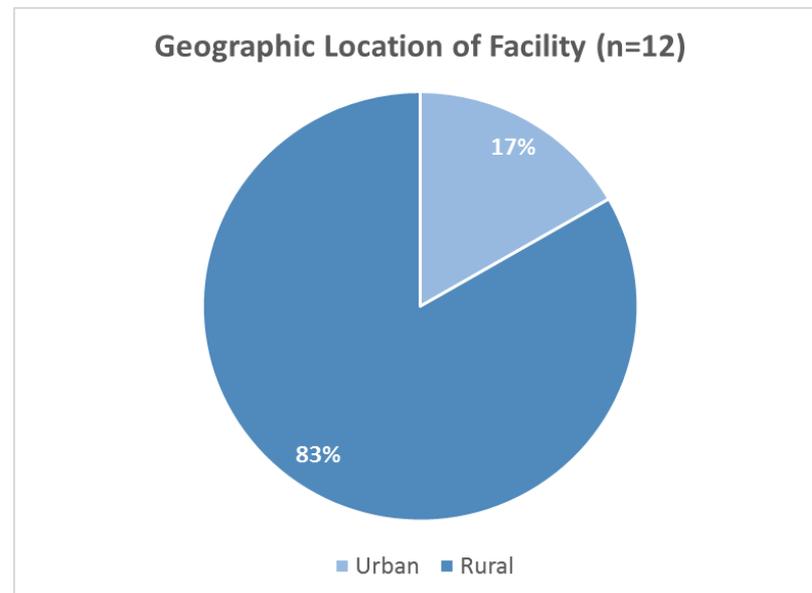
Facility Demographics

Facility Type (n=12)†



† Respondents were asked to select all that apply

Geographic Location of Facility (n=12)

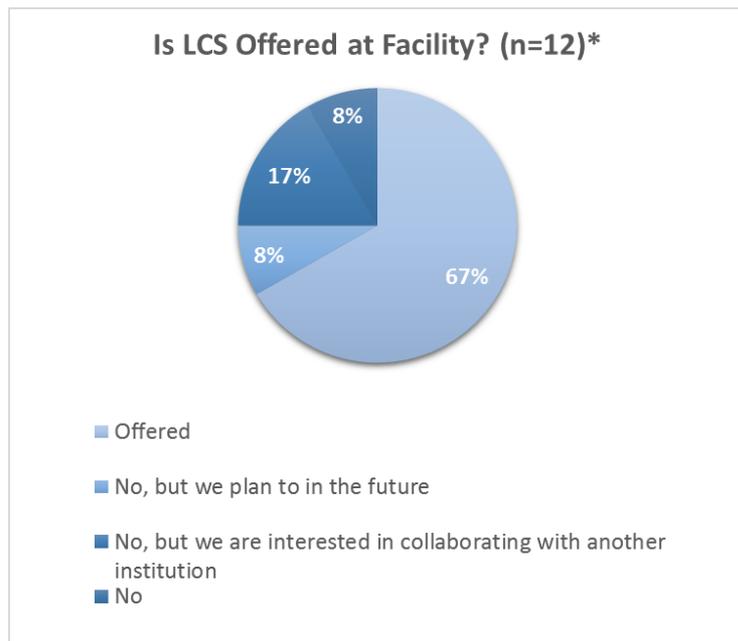


Number of Specialists Per Hospital *

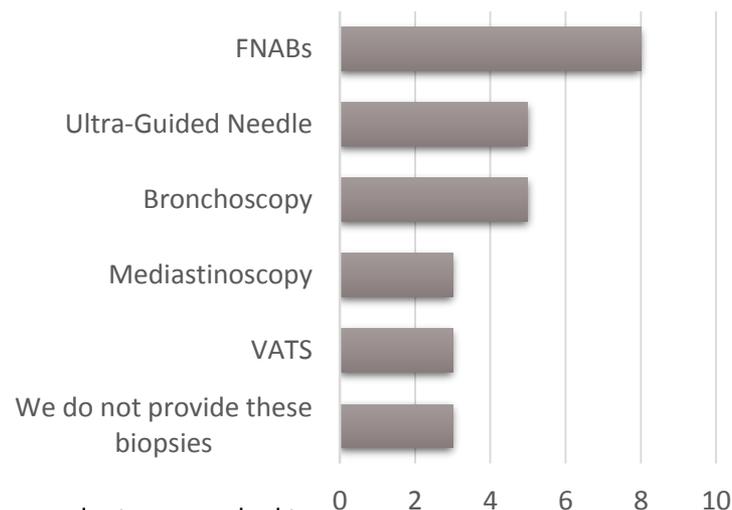
	Mean	Median
Thoracic Radiologists (n=9)	1	0
General Radiologists (n=12)	33	4
CT Technologists (n=12)	12	10

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

Is Lung Cancer Screening offered at the facility?



Types of Lung Biopsies Performed (n=12)†



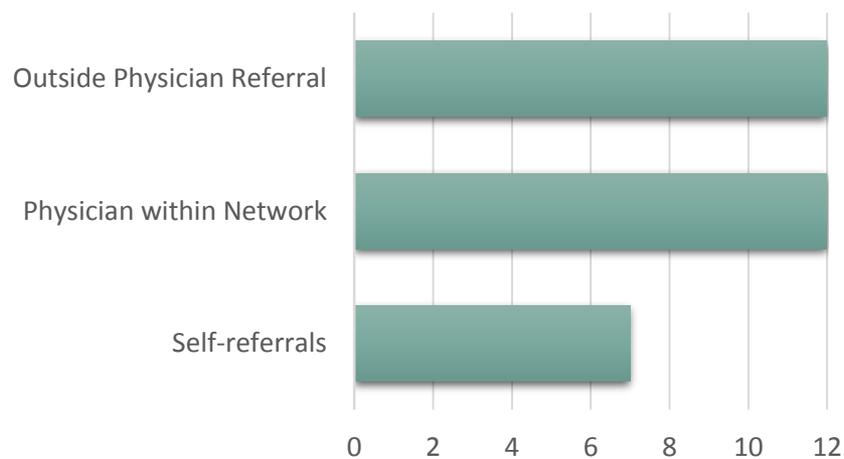
† Respondents were asked to select all that apply

FNABs = Fine Needle Aspiration Biopsies

VATS = Video-Assisted Thoracoscopic Surgery

How are patients referred?

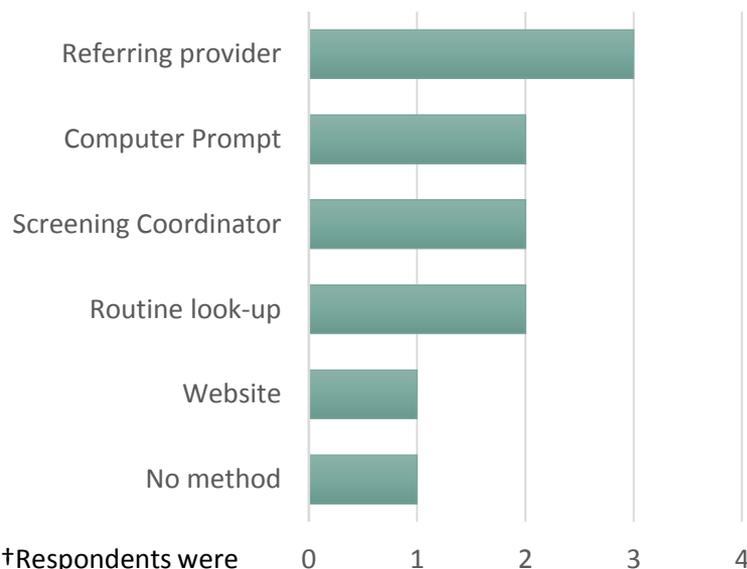
How Patients are Referred (n=12)†



† Respondents were asked to select all that apply

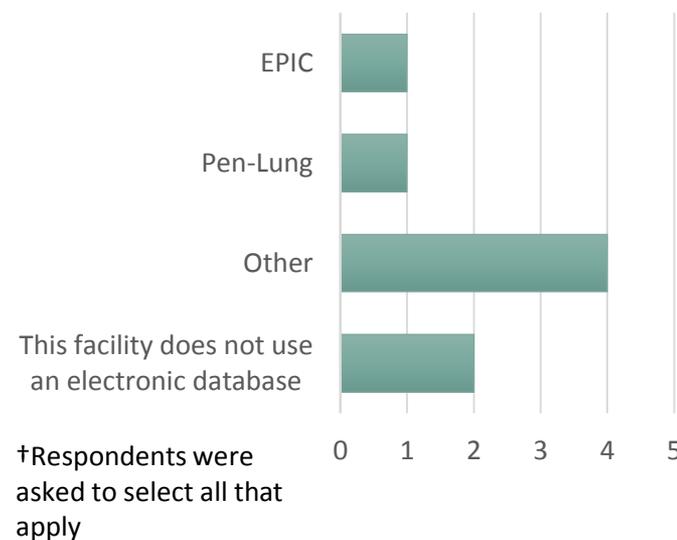
How are patients identified?

Methods Used to ID LCS Patients (n=7)†



†Respondents were asked to select all that apply

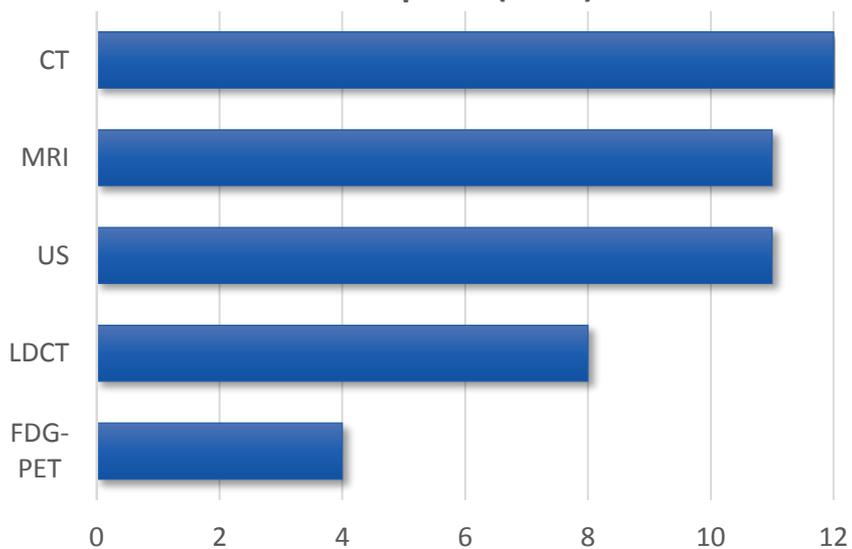
Software Used for Lung Cancer Screening Tracking Letters (n= 7)†



†Respondents were asked to select all that apply

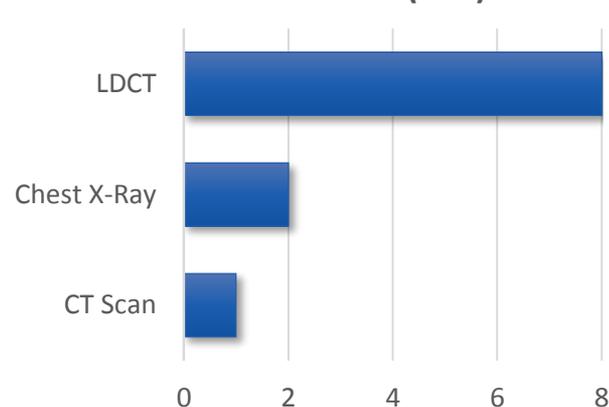
Which services are offered by the facility?

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



†Respondents were asked to select all that apply

Types of Lung Cancer Screening Offered (n=8)†



†Respondents were asked to select all that apply

CT = Computer tomography

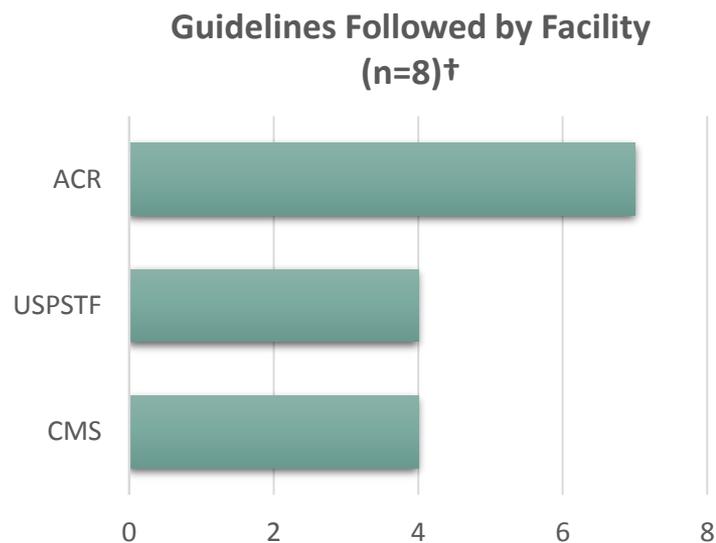
MRI = Magnetic resonance imaging

US = Ultrasound

LDCT = Low-dose computed tomography

FDG-PET = Fluorodeoxyglucose-positron emission tomography

Which guidelines do facilities use?

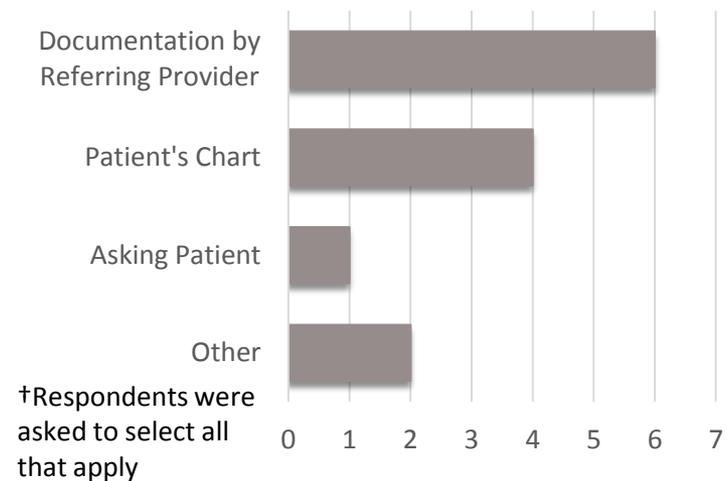


† Respondents were asked to select all that apply

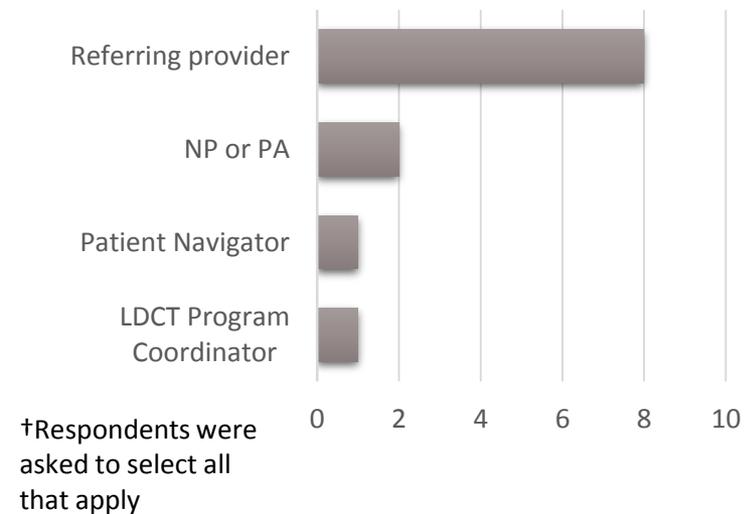
ACR – American College of Radiology
USPSTF – United States Preventive Services Task Force
CMS – Centers for Medicare & Medicaid Services

What is the process for shared decision making?

Proof Patient has Completed Shared Decision-Making (n=8)†

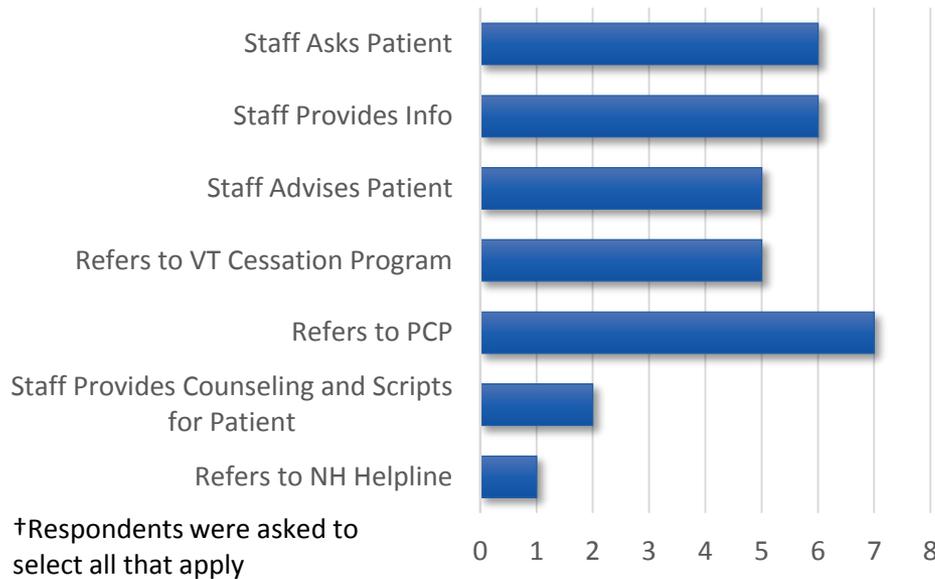


Staff Involved in Shared Decision-Making (n=8)†

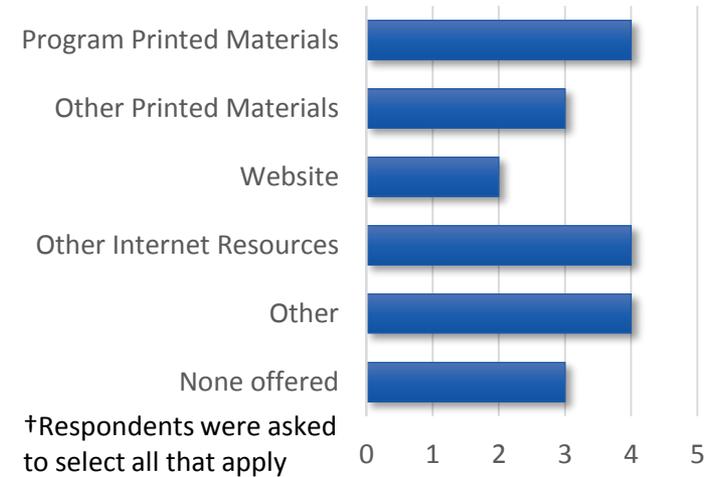


What resources are provided to the patient?

How Staff Addresses Smoking Treatment (n=11)†



Program-Provided Lung Cancer Resources (n=8)†





Lung Cancer Screening Drive-Time Analysis and Focus Groups VT & NH

Drive-Time Analysis for Lung Cancer Screening in Vermont & New Hampshire Hospitals

□ Methods:

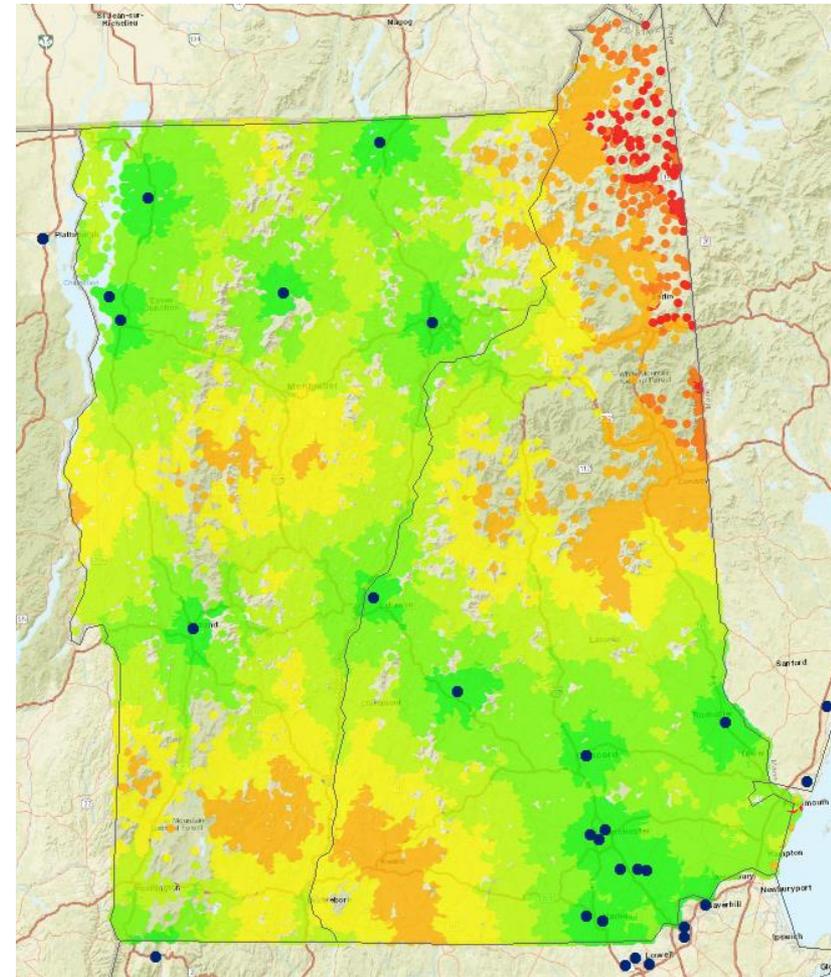
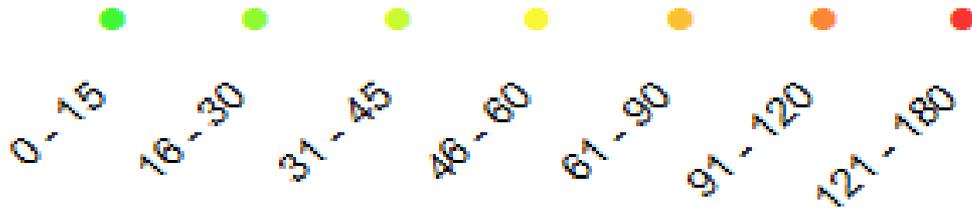
- Map was developed by the Dartmouth Norris Cotton Cancer Center's Geospatial Analyst.
- Lung Cancer Screening Centers (LCSCs) for New Hampshire and Vermont were identified through an accredited facility search on the American College of Radiology's website <https://www.acraccreditation.org/accredited-facility-search?modality=CTAP&designation=LCSC>. In addition, a visual review of their map was done.
- All LCSCs that were identified were then geocoded using ArcGIS. The dark blue dots on the map are all accredited LCSCs as of October 8, 2018.
- The centroid of each census block was used and the travel time to the closest of the identified LCSC facilities was determined using ArcGIS. The centroids are colored based on their travel time and the population of the blocks for ages 55-84.



Drive-Time Analysis for Lung Cancer Screening in Vermont & New Hampshire Hospitals

State	Drive Time to LCSC (Minutes)	Population Aged 55-84
NH	0-15	127,553
NH	16-30	101,493
NH	31-45	44,817
NH	46-60	30,372
NH	61-90	26,076
NH	91-120	1,107
NH	120-180	337
VT	0-15	41,888
VT	16-30	47,483
VT	31-45	40,265
VT	46-60	34,362
VT	61-90	4,256

Drive Time (Minutes) to a Lung Cancer Screening Center:



Lung Cancer Screening Patient Focus Groups

Focus Groups

Led By:

- Tracy Onega, PhD, MA, MS at the Dartmouth Norris Cotton Cancer Center

Goals:

- Describe **knowledge, attitudes, and beliefs** of rural NH & VT residents related to lung cancer screening and quitting smoking
- Identify **barriers and facilitators** in rural communities in NH & VT related to lung cancer screening and quitting smoking
- Assess **acceptability of community-level interventions** to increase access to lung cancer screening and services to quit smoking

Lung Cancer Screening Patient Focus Groups

Focus Groups

Target Audience:

- People eligible for lung cancer screening living in rural counties in NH & VT
- **Focus Groups Held in:**
 - Berlin (NH)
 - Colebrook (NH)
 - Newport (NH)
 - St. Johnsbury (VT)
 - South Royalton (VT)



Lung Cancer Screening Patient Focus Groups

Focus Groups

Preliminary Findings:

Most people:

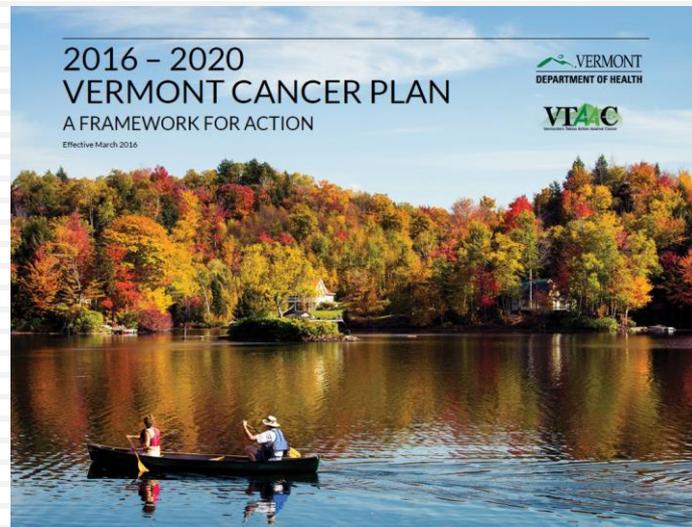
- Have **never heard of** lung cancer screening
- Would be **interested in getting screened**
- Feel their **doctor should have talked with them** about screening
- Think that **education/awareness** is the biggest barrier to getting people screened
 - Brochures in waiting rooms
 - Sending patients reminders like with mammogram
 - Fairs, community events
 - Messaging in convenience stores
 - Facebook, newspaper, TV, radio ads

Next Steps:

- **Interview clinicians** who have and who have not referred
- **Develop intervention** plans for target communities

Vermont State Cancer Plan Objectives

- ❑ Have the 2016-2020 Vermont State Cancer Plan Objectives related to lung cancer improved since 2016?



Vermont State Cancer Plan Objectives

- ❑ Objective 2.1 - Decrease % of adults who smoke cigarettes.
 - From 80% to 74%, no statistical difference.
- ❑ Objective 2.1 a - Decrease % of adults below 250% of FPL who smoke cigarettes.
 - From 29% to 28%, no statistical difference.
- ❑ Objective 2.1 b - Decrease % of adult cancer survivors who smoke cigarettes.
 - From 26% to 25%, no statistical difference.
- ❑ Objective 2.2 - Decrease % of adolescents in grades 9-12 who smoke cigarettes.
 - ↓ From 11% to 9%, statistically better.



Image sources: www.med.uvm.edu, www.seormc.org

Vermont State Cancer Plan Objectives

- ❑ Objective 2.3 - Increase % of adult smokers attempting to quit in the past year.
 - ↓ From 59% to 49%, statistically worse.
- ❑ Objective 2.4 - Decrease % of adult non-smokers exposed to secondhand smoke. §
 - From 48% to 44%, cannot be compared.
- ❑ Objective 2.5 - Decrease incidence rate of tobacco-associated cancers (per 100,000 persons)†.
 - From 197.5 to 167.6, cannot be compared.



§ Baseline and current values are age-adjusted to the 2000 U.S. population to be consistent with other Healthy Vermonters 2020 objectives. They cannot be compared to earlier published values. This baseline value and current value cannot be compared to the target value because the target value is not age-adjusted.

† Baseline values and 2020 targets were recalculated using the CDC methodology released in October 2017 and cannot be compared to earlier published values. For more information on CDC methodology, please visit <https://www.cdc.gov/cancer/npcr/pdf/public-use/predefined-seer-stat-variables.pdf>

Current values were calculated using the CDC methodology released in April 2018 (limited to microscopically confirmed diagnoses only) and cannot be compared to baseline or 2020 target values.

Image source: www.naaccr.org

Vermont State Cancer Plan Objectives

- ❑ Objective 10.1 - Decrease rate of lung cancer diagnosed at an advanced stage among adults 55+ (per 100,000 persons).
 - From 210.0 to 193.6, no statistical difference.
- ❑ Objective 10.2 - Decrease % of lung cancers diagnosed at an advanced stage among adults 55+.
 - From 80% to 74%, no statistical difference.



Image sources: <https://www.cdc.gov/cancer/ncccp/index.htm>, www.VTAAC.org, www.cancer.org, www.lung.org, www.vcsn.net



Next Steps



Next Steps

- ❑ Promote the statewide cancer coalition, Vermonters Taking Action Against Cancer (VTAAC), to gain better representation from lung cancer specialists throughout the state.
- ❑ Continue collaboration among partners through VTAAC Lung Cancer Screening Taskforce. Review new Vermont screening & eligibility data, drive-time analysis, and focus group data to develop an Action Plan to improve LCS in Vermont.
- ❑ Continue collection of LCS data to assess and track trends through 2019 BRFSS Lung Cancer Screening Module and potential UVM research.

Next Steps (cont.)

- ❑ Continue education of primary care providers around importance of LCS, referral processes to screening centers, and ways to improve cancer screening rates.
- ❑ Provide resources for select Vermont clinic staff in the implementation of health systems interventions at the clinic level such as individual provider reports/dashboards.
- ❑ Support hospitals looking to improve their capacity to screen eligible Vermonters and attain accreditation for LCS.

Data Notes

Behavioral Risk Factor Surveillance System (BRFSS): Vermont tracks risk behaviors using this telephone survey of adults. The results are used to plan, support, and evaluate health promotion and disease prevention programs. Since 1990, Vermont, along with the 49 other states and three territories, has participated in the BRFSS with the Centers for Disease Control and Prevention (CDC). Over 7,000 Vermonters are randomly and anonymously selected and called annually. An adult (18 or older) in the household is asked a uniform set of questions. The results are weighted to represent the adult population of the state.

Youth Risk Behavior Survey (YRBS): Every two years since 1993, the Department of Health's Division of Alcohol and Drug Abuse Program, and the Department of Education's Coordinated School Health Programs have sponsored the YRBS. The YRBS measures the prevalence of behaviors that contribute to the leading causes of death, disease, and injury among youth. The YRBS is part of a larger effort to help communities increase the "resiliency" of young people by reducing high risk behaviors and promoting healthy behaviors.

Vermont Cancer Registry (VCR): The Vermont Cancer Registry (VCR) is Vermont's statewide population-based cancer surveillance system. The registry collects information about all cancers (except non-melanoma skin cancers and carcinoma in situ of the cervix) and all benign brain tumors diagnosed in Vermont. All statistics exclude in situ carcinomas except urinary bladder, unless indicated otherwise. Vermont cases include Vermont residents only.

Adult Tobacco Survey (ATS): The Vermont Adult Tobacco Survey is a telephone survey of Vermont adults (18+). The data are used to help evaluate the effectiveness of Vermont Tobacco Control Program efforts to reduce smoking and increase awareness and knowledge on smoking data. Vermont has conducted the Adult Tobacco Survey annually from 2001 to 2008, and every other year thereafter (i.e., 2010, 2012, 2014). The sample includes 2,000 respondents each year, 1,000 each of smokers and non-smokers. Results are weighted by age, gender, county, household composition, telephone type, and smoking status in order to compensate for differences between the sample and the overall Vermont adult population. The weighting procedure ensures that the sample is representative of the Vermont adult population.

NPCR and SEER Incidence 1999-2015 Database (NPCR & SEER): The U.S. incidence rates are based on the National Program of Cancer Registries (NPCR) and the Surveillance, Epidemiology, and End Results (SEER) Program Incidence State Restricted Access Data File (1999-2015). A reporting delay by Department of Veterans Affairs (VA) has resulted in incomplete reporting of VA hospital cases in 2011 through 2015.

Age Adjustment: Measures from BRFSS and YRBS are adjusted for age only if they are Healthy Vermonters 2020 goals. Age adjustment groupings come from those determined by Healthy People 2020.

Data Notes

Confidence Intervals used for statistical comparisons: A confidence interval represents the range in which a parameter estimate could fall which is calculated based on the observed data. For this analysis, we used a 95% confidence interval, meaning that we are 95% confident that the true value of the parameter being examined falls within the specified confidence interval. Statistical significance is assessed by comparing the confidence intervals of different groups. If the confidence intervals from two groups, such as that for the state and a specific county, do not overlap we consider the estimates to be significantly different from one another.

Preventive Behaviors: An activity undertaken by a person in order to prevent disease in an asymptomatic stage. *Health Education Monographs*. 1974 December; 2(4): 354-386. doi: 10.1177/109019817400200405. *Cancer Causes Control*. 2012 April; 23(4): 601–608. doi:10.1007/s10552-012-9924-y.

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To join the statewide cancer coalition, please visit www.VTAAAC.org.