VERMONT
DEPARTMENT OF HEALTH

The Impact of Tobacco Use Among Vermonters with Lung Disease

Introduction

Tobacco smoke is a powerful asthma trigger. When tobacco smoke is inhaled, irritating substances settle in the lining of the airways and can exacerbate asthma. Tobacco smoke also damages tiny hair-like projections in the airways called cilia that normally sweep dust and mucus out of the airways. This causes the lungs to make more mucus than normal and results in a buildup of mucus and other irritating substances in the airways. Long-term exposure to tobacco smoke can lead to irreversible lung damage such as chronic obstructive pulmonary disease (COPD).

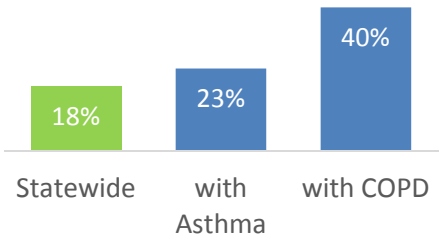
The two most common types of lung disease are asthma and COPD. **Asthma** is characterized by *reversible* airflow limitation and is often associated with specific triggers or allergens. If left untreated or poorly managed, asthma can cause permanent lung damage as well as decreased quality of life, missed days of work or school, and preventable emergency department visits and hospital stays. **COPD** is a *progressive persistent* airway limitation due to the chronic response of the lungs to irritating particles such as tobacco smoke either from a history of smoking or exposure to secondhand smoke. In this brief, data for COPD includes chronic obstructive pulmonary disease, emphysema and chronic bronchitis.

Tobacco Use in Vermont

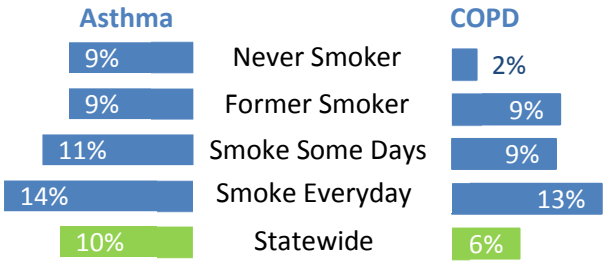
In 2016, 18% of Vermont adults reported smoking cigarettes. However, among those with asthma, the current smoking prevalence was 23%. The rate of smoking was further increased among those with poorly controlled asthma (33%) and those with severe persistent asthma (38%)†. Among those with COPD, the smoking rate was 40%; more than twice the statewide rate.

In Vermont, 10% of adults (approximately 50,000 adults) have current asthma and those who currently smoke were significantly more likely to have asthma compared to those who have never smoked (14% vs. 9%). Asthma prevalence decreased with decreasing frequency of cigarette use and former smokers had a rate of asthma similar to those who had never smoked (9%). Six percent of Vermont adults (approximately 28,000 adults), have COPD, emphysema, or chronic bronchitis. The rate of COPD increased drastically with smoking history. COPD prevalence was 13% among those who smoke every day compared to 2% among those who have never smoked.

Smoking Prevalence among Vermonters ‡ (BRFSS 2016)

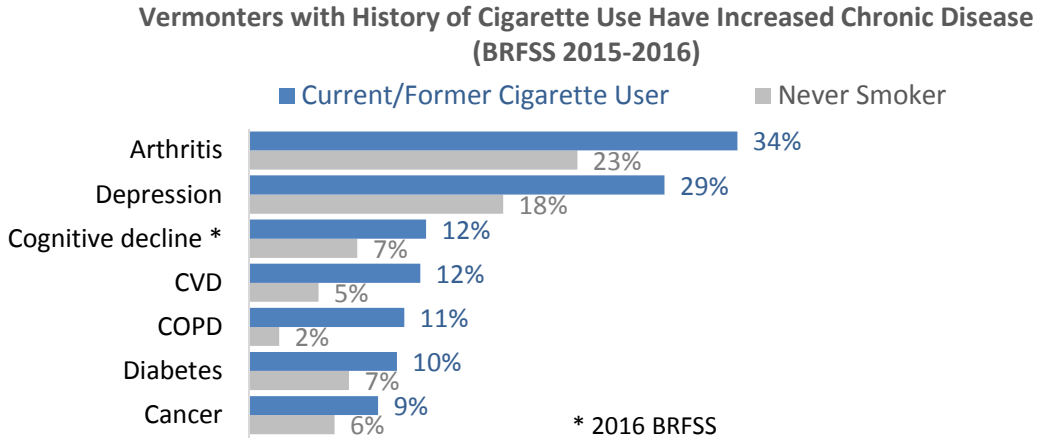


Asthma and COPD Prevalence among Vermonters by Smoking Status (BRFSS 2016)



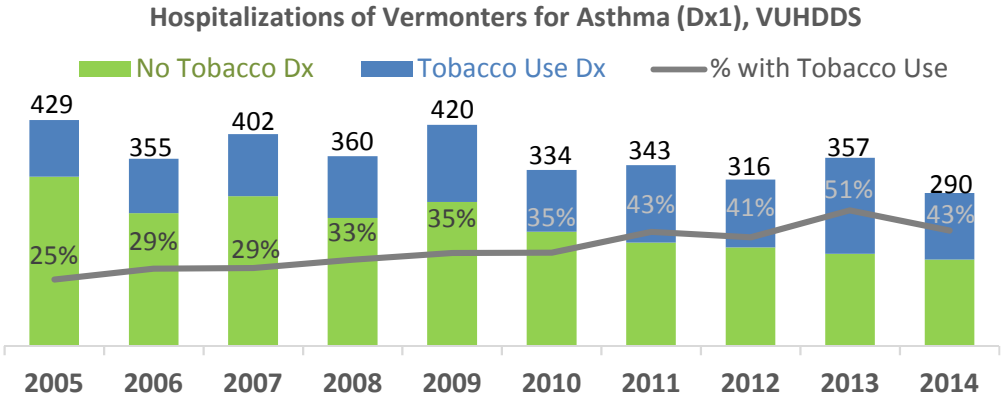
Compared to Vermonters who do not smoke, those who currently smoke are more likely to have not seen a doctor due to cost (17% vs. 6%), not have healthcare coverage (12% vs. 4%), have had their last check-up more than 5 years ago (13% vs. 4%), and have activity limitations due to health problems (31% vs. 19%). In addition, they are less likely to have had a check-up in the past year (57% vs. 72%) or have received an annual flu shot (31% vs. 44%). It is of note that among Vermonters with COPD, 44% also have asthma. Vermonters with COPD are three times more likely to experience activity limitation due to health problems than those without COPD (57% vs. 19%).

People with lung disease often have other chronic health conditions that complicate coordination of care and preventative activities. In addition, Vermonters who smoke cigarettes have significantly higher rates of many chronic diseases including: arthritis, depression, cognitive decline, cardiovascular disease (CVD), COPD, diabetes and cancer.

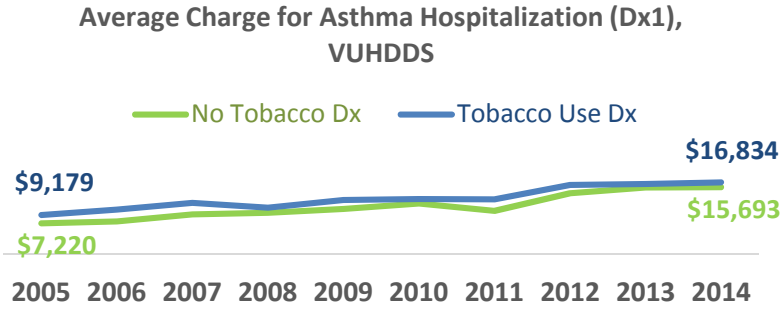


Hospitalizations for Asthma and COPD

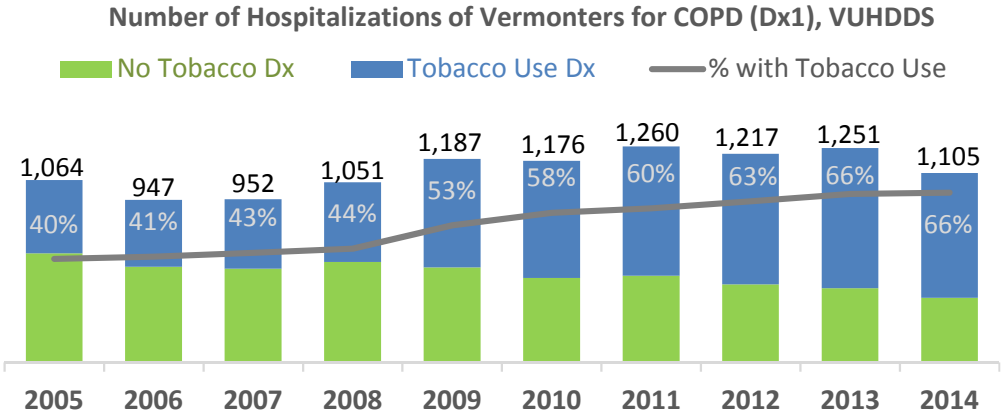
The total number of inpatient hospitalizations with a *primary diagnosis (Dx1)* of **asthma** has decreased from 429 in 2005 to 290 in 2014. However, the percentage of hospitalizations for asthma with a diagnosed history of tobacco use has increased from 25% in 2005 to 51% in 2013 and has recently trended downward. The duration of stay among those with a history of tobacco use was approximately 10% greater than for those without a history of tobacco use (3.7 vs. 3.4 days). Diagnostic codes for a history of tobacco use may currently be underutilized and some individuals who use tobacco may not have received a diagnosis of a history of tobacco use. Therefore, the percentage of cases with a diagnosed history of tobacco use and costs for care among those with a tobacco-use history may be underestimated in this analysis.



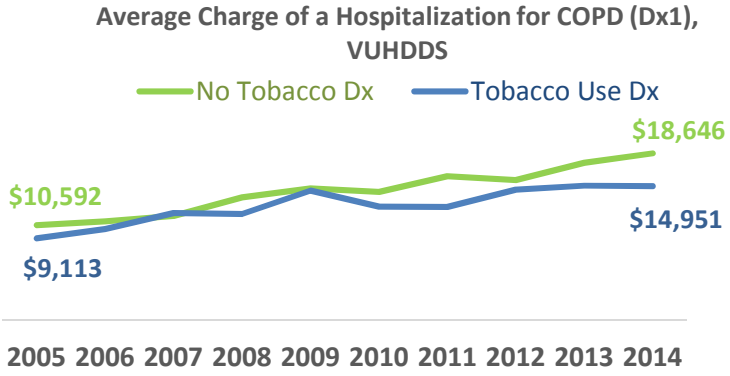
The average charge for a hospitalization for **asthma** has doubled over the last 10 years. In addition, the average charge for a hospitalization of an individual with a diagnosed history of tobacco use was approximately 20% higher than for those without a documented history of tobacco use. In 2014, the average charge was $16,800 among those with documented history of tobacco use and $15,700 for those without a diagnosed history of tobacco use (approximately 8% higher).



The total number of inpatient hospitalizations with a *primary diagnosis* of **COPD** has decreased from a high of 1,260 in 2011 to 1,105 in 2014. However, the percentage of hospitalizations for COPD with a diagnosed history of tobacco use has increased from 40% in 2005 to 66% in 2013 and 2014. On average, those without a tobacco use diagnosis were hospitalized for a slightly longer duration than those who use tobacco (4.9 vs. 3.5 days in 2014). In addition, the number of hospitalizations for COPD was roughly three times the number for asthma.

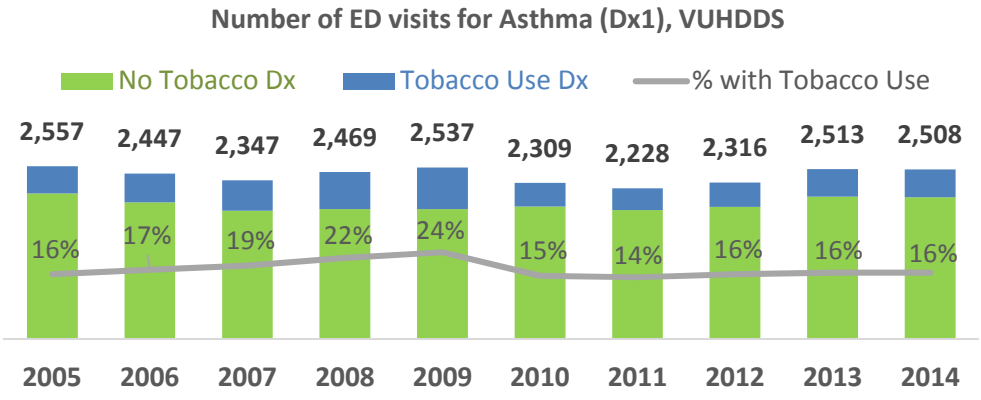


The average charge for a hospitalization for **COPD** has increased approximately 60% over the last 10 years. Interestingly, the average charge for an individual with a diagnosed history of tobacco use was approximately 20% lower than for those without a documented history of tobacco use. In 2014, the average charge was $18,646 for those without a diagnosed history of tobacco use and $14,951 among those with a documented history of tobacco use.

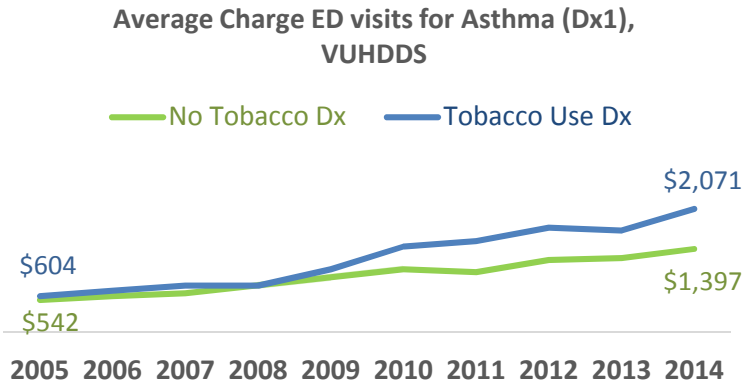


Emergency Department Visits for Asthma and COPD

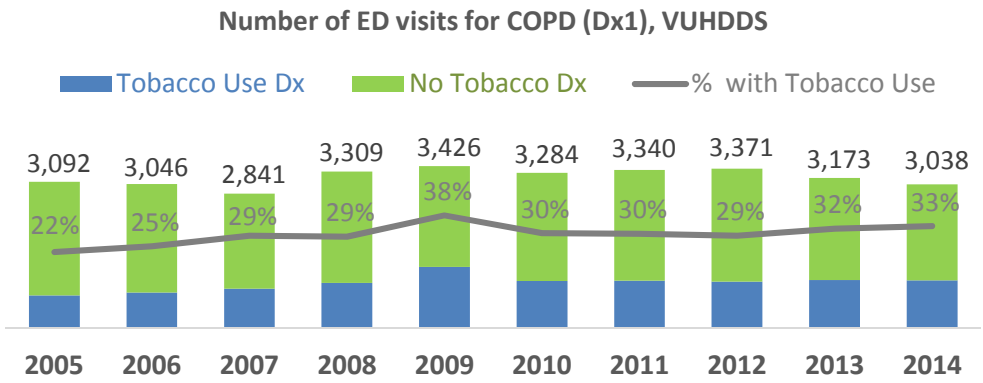
The total number of ED visits for **asthma** has been stable from 2005 to 2014 at approximately 2,500 per year. In recent years, 16% of ED visits with a primary diagnosis of asthma have also had a diagnosed history of tobacco use.



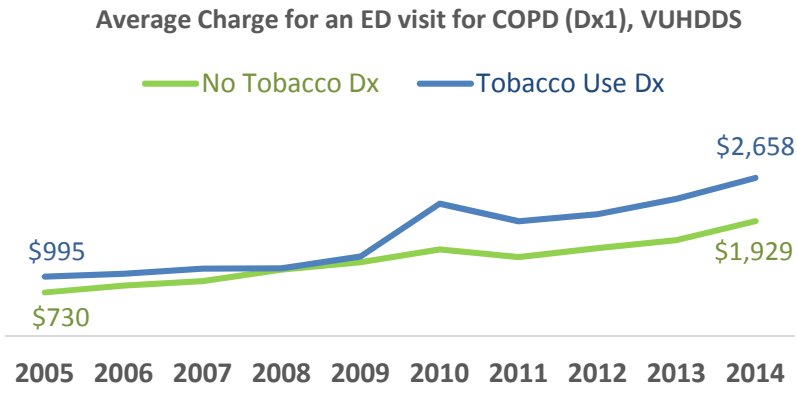
The average charge for an ED visit for **asthma** in 2014 was nearly triple the average charge in 2005. In 2014, the average charge for an asthma ED visit among Vermonters with a diagnosed history of tobacco use was 1.5 times the charge for a visit without a diagnosed history of tobacco use.



The total number of ED visits for **COPD** ranged from 2,841 to 3,426 over the last ten years. In 2014, there were 3,038 ED visits with a primary diagnosis of COPD and one third of these visits included a diagnosed history of tobacco use.

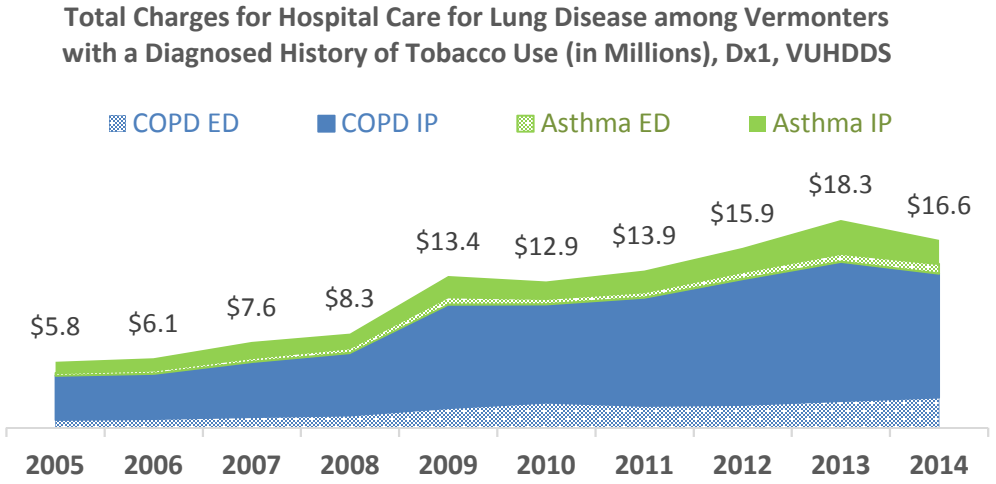


The average charge for an ED visit for COPD has nearly tripled between 2005 and 2014. In 2014, the average charge for an ED visit for **COPD** with a diagnosed history of tobacco use was approximately 40% higher than for those ED visits without a documented history of tobacco use. There were approximately 20% more ED visits for COPD than for asthma and the average cost per visit was roughly 30% greater for COPD.



Total Cost of Tobacco-related Hospital Care for Lung Disease

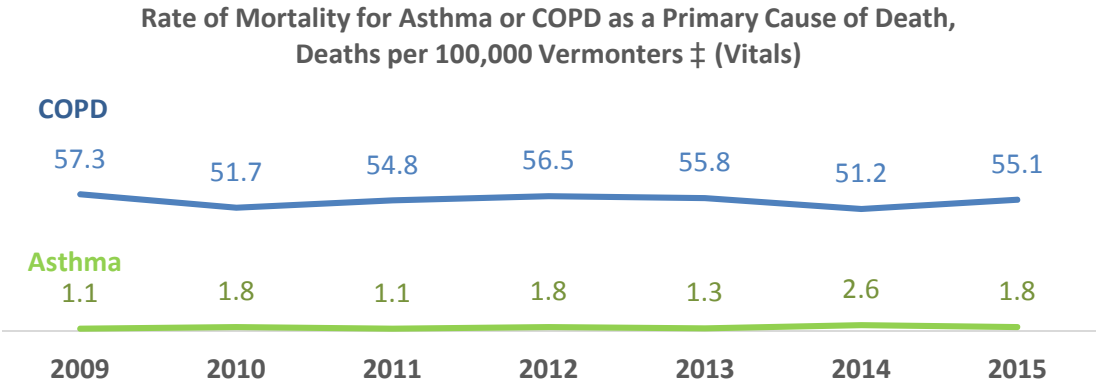
The total estimated cost of hospital care for asthma and COPD among Vermonters with a diagnosed history of tobacco use was $16.6 million in 2014. Hospitalizations for COPD contributed to 66% of total yearly charges. The total charges for treatment of lung disease among tobacco users has almost tripled in the last decade ($5.8 to $16.6 million).



Mortality

COPD and uncontrolled asthma can be life threatening conditions. Chronic lower respiratory diseases (including COPD and asthma) have been the third leading cause of death among Vermont residents since 2005. In 2015, the mortality rate for COPD was 55.1 per 100,000 Vermonters, up from a low of 51.7 in 2010. The mortality rate specifically due to asthma has fluctuated in recent years due to the small number of events. In 2015, the rate was 1.8 per 100,000 Vermonters down from a high of 2.6 in 2014.

Mortality records also contain information on whether tobacco use contributed to the death. Between 2009 and 2015, tobacco was a confirmed or probable contributing cause in approximately 80% of those deaths with a primary cause of death of COPD (1,993 out of 2,394 deaths). Only 6% of deaths due to COPD were confirmed to not be associated with tobacco use. Whereas, when looking at deaths due to asthma and the contribution of tobacco use, the data was more varied across the years. This is likely due to the small number of deaths with a primary cause of asthma each year. Between 2009 and 2015, tobacco use had a confirmed or probable role in 15% of the deaths due to asthma (11 out of 71 deaths). Meanwhile, 61% of deaths due to asthma were not associated with tobacco use.



Discussion

Asthma and COPD are life-threatening chronic lung diseases that result in decreased quality of life for many Vermonters and significantly rising healthcare costs. Smoking tobacco is known to worsen asthma control and increase asthma severity; and long-term tobacco use is a major contributor in the development of irreversible COPD. In addition, exposure to tobacco smoke contributes to many preventable healthcare visits each year and tobacco use is a contributing factor in many deaths due to COPD and asthma each year. Avoiding environments with smoke or quitting smoking can reduce asthma symptoms and lessen the risk of COPD. The Vermont Tobacco Control Program has many resources available through 802quits.org for those who are considering, preparing or ready to stop smoking.

In addition, respiratory infections can have serious complications for those with impaired lung function. Per CDC guidelines, those with COPD or asthma should receive the annual flu shot in addition to the pneumonia vaccine to lessen the risk and impact of respiratory infections.

It is likely that not all individuals who use tobacco received a diagnosed history of tobacco use in the hospital data. Therefore, data presented here likely underestimate the burden of hospital use for COPD and asthma among Vermonters who use tobacco.

The Vermont Asthma Program is working to reduce the burden of asthma among all Vermonters. For more information regarding guideline-based care for asthma, smoking-cessation supports including counseling and free nicotine replacement therapy, use of CPT codes for asthma education provided by a certified asthma educator, or resources for home visiting, please contact the Vermont Asthma Program.

Resources to Reduce the Burden of Asthma among Vermonters

① Find support for you or a loved who is preparing to or ready to quit smoking: http://802quits.org/

② Obtain free resources such as tips for improving self-management and Asthma Action Plans from the Vermont Asthma Program: http://healthvermont.gov/prevent/asthma/index.aspx

③ Gain strategic direction to assist patients in their self-management with the Physician's Guide to Managing and Diagnosing Asthma: http://www.nhlbi.nih.gov/guidelines/asthma/asthma_qrg.pdf

④ Review the CDC vaccination guidelines for those with asthma: https://www.cdc.gov/asthma/flu.html

For More Information

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Data Notes

† Data from the Asthma Callback Survey (*ACBS*), 2012-2013.
‡ Data are age adjusted to the 2000 U.S. Standard population per U.S. Healthy People methodology.
* Cognitive decline data from 2016 BRFSS and asked only of those Vermonters 45 years of age and older.
Vermont Behavioral Risk Factor Surveillance System (*BRFSS*).
Vermont Uniform Hospital Discharge Data Set (*VUHDDS*): Hospital and emergency department discharge data are collected from in-state hospitals and from hospitals in bordering states. The VUHDDS data set was narrowed to only include Vermont residents for this analysis. Patients admitted to the hospital from the emergency department are included in only the hospital discharge data set and are not included in the emergency discharge data. NH changed the way in which they process their data in 2009 which may contribute to any difference observed between 2010 and prior year data. In addition, beginning in 2014 data from MA are no longer included. This change had negligible impact on these statewide analyses.
A primary diagnosis refers to asthma (ICD-9 493) or COPD (ICD-9 490-492, 496) being listed as the first diagnosis code. A diagnosed history of tobacco use was determined from one of three diagnoses codes (ICD-9 305.1 Tobacco use disorder, 649.0 Smoking complicating pregnancy, or V15.82 History of tobacco use) listed in any subsequent diagnosis (dx2-dx20).
Vermont Vital Statistics System (*Vitals*): A primary cause of death from chronic lower respiratory diseases was determined from those due to asthma (ICD-10 J45-J46) or COPD (ICD-10 J40-J44, J47).

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