

# Pulmonary Embolism

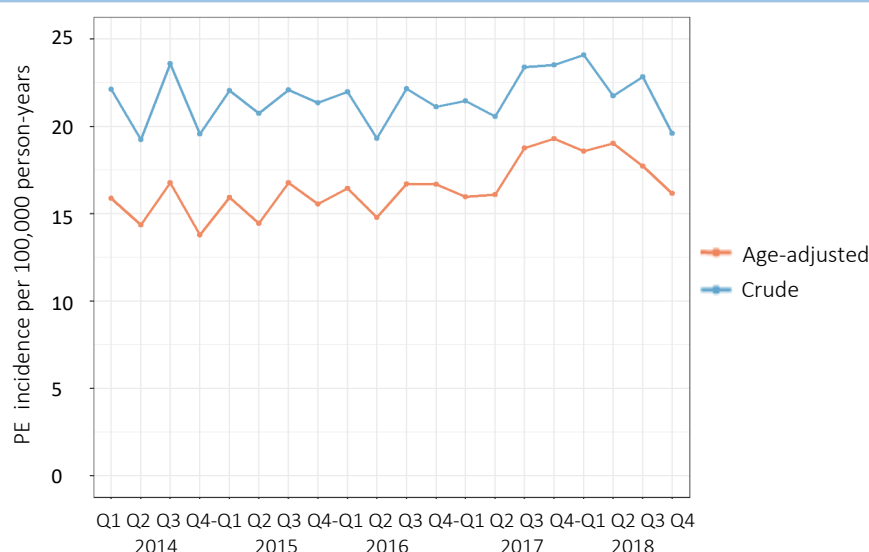
May 2021

## Fact Sheet: Data on Veterans Using VA Health Care

CSPEAR provides timely epidemiologic information on VA health care users. This fact sheet presents summary data to inform a broad community of VA leaders, investigators, and clinicians as they consider how best to address the needs of Veterans.

**Pulmonary embolism (PE)** is caused when a blood clot formed in a deep vein, usually the leg, travels through the blood stream and enters the arteries of the lungs. Obstruction of blood flow through the lungs and the resultant increased pressure account for the signs and symptoms of PE, such as chest pain, shortness of breath, and cough.<sup>1</sup> Sudden death is the first symptom in nearly one quarter of PE cases.<sup>2</sup> PE is a leading cause of in-hospital and pregnancy-related deaths in the US.<sup>3,4</sup> Reported annual incidence ranges from 23 to 115 per 100,000.<sup>5</sup> Approximately half of survivors report reduced quality of life and/or functional impairments.<sup>6,7</sup>

### Trends in Age-Adjusted PE Incidence, 2014-2018



The age-adjusted incidence of PE in VHA primary care users remains between 12 and 20 per 100,000 in the years 2014 through 2018.

Data were extracted from the Corporate Data Warehouse. Incidence rates of PE from 01/01/2014 to 12/31/2018 were estimated among Veterans who used Veterans Health Administration (VHA) primary care (N=7,856,739). The incidence rate was calculated by dividing incident PE cases by the sum of person-years of observation, excluding those with evidence of pre-existing PE at baseline (no PE diagnoses recorded in the prior 5 years). Incidence rates were age-adjusted to the 2016 U.S. standard population using direct standardization.<sup>8</sup> This material is the result of work supported with resources and the use of facilities at the VA Cooperative Studies Program Epidemiology Center in Seattle, WA. The contents do not represent the views of VA or the US Government.

### Fast Facts

Among the 7.9 million Veterans who used VHA primary care services from 2014-2018:

- 108,187 (1.4%) had an inpatient or outpatient PE diagnosis on record
- The overall crude and age-adjusted incidence of PE were 21.6 and 16.7 per 100,000 person-years, respectively.
- Black/African American Veterans had the highest PE incidence rates, while Asian Veterans had the lowest.

Among the 17,788 Veterans diagnosed with incident PE between 2014 and 2018:

- 4% did not survive to hospital discharge.
- 4% died within 30 days of discharge.

### Definitions

**Primary Care User:** Patients who had  $\geq 1$  primary care visit in a VHA facility in the past 2 years, based on the following clinic stop codes in the primary position: 301, 303, 305, 306, 308-310, 312, 317, 318, 322, 323, 339, 348, 350, 533, 565

**Incident PE Case:** Inpatients who had an initial diagnosis of acute or obstetric PE between 1/1/14 and 12/31/18 and  $\geq 1$  of the following:

- A  $\geq 30$ -day supply of anticoagulants in the period -1-30 days post-discharge
- A 1-29-day supply of anticoagulants -1-30 days post-discharge, plus a  $\geq 30$  day supply of anticoagulants 31-60 days post-discharge
- An inferior vena cava filter placed from admission to 30 days post-discharge
- Died prior to hospital discharge
- Died within 30 days of hospital discharge and have any non-missing day supply of anticoagulants from -1-30 days post-discharge

For more information, visit:

[https://phenomics.va.ornl.gov/web/cipher/phenotype-viewer?uqid=e3c2321dc56d46aea26d25a945662a46&name=Incident Pulmonary Embolism CSPEAR](https://phenomics.va.ornl.gov/web/cipher/phenotype-viewer?uqid=e3c2321dc56d46aea26d25a945662a46&name=Incident%20Pulmonary%20Embolism_CSPEAR)

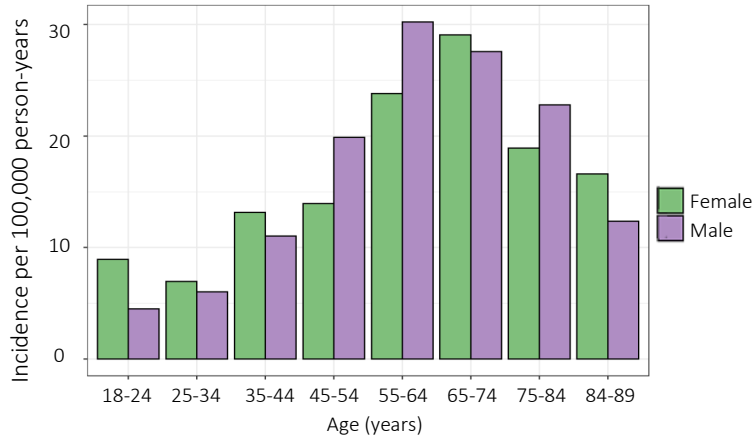
Visit [CSPEAR's website](https://phenomics.va.gov) or contact [CSPEAR@va.gov](mailto:CSPEAR@va.gov) for more information.

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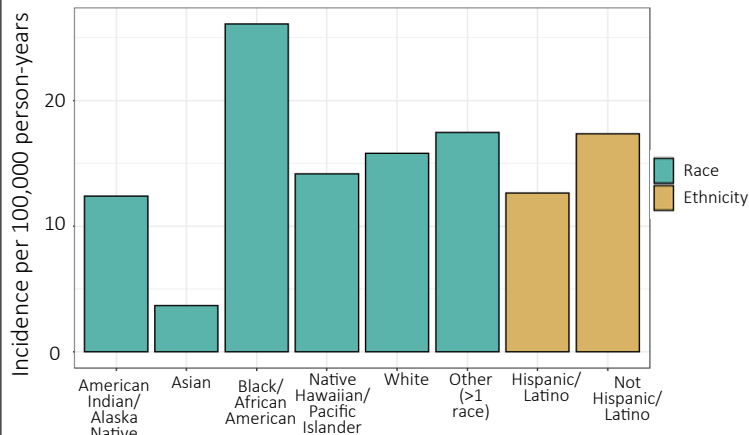


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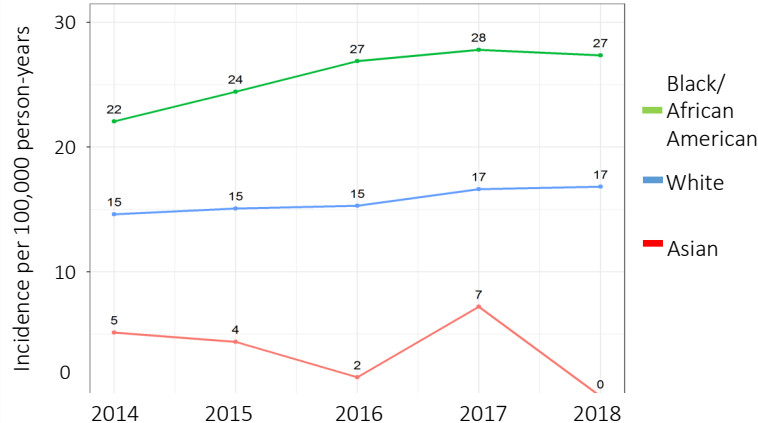
### Incidence of PE: Age and Sex, 2014-2018



### Incidence of PE: Race and Ethnicity, 2014-2018



### Incidence of PE: Race and Year, 2014-2018



Incident PE was most frequently diagnosed in Veterans between ages 55-74 and was more common in male than female Veterans. Black/African American Veterans showed the highest rate of incident PE, with an average of 25 diagnoses per 100,000 person-years from 2014 to 2018. By comparison, the overall average PE incidence (regardless of race) was approximately 14 per 100,000 person-years. Trends in PE incidence among White and Black/African American Veterans held steadily between 2014 and 2018, with just a gradual increase noted over this period. Asian American Veterans, however, experienced a drop in PE incidence between 2014 and 2018.

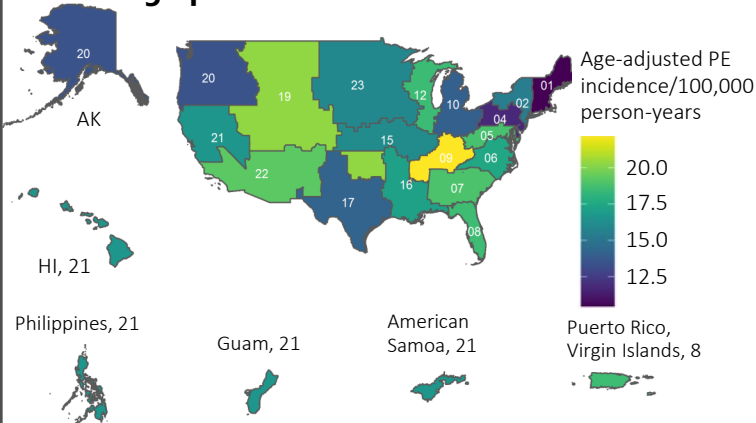
### Chronic Thromboembolic Pulmonary Hypertension

Chronic thromboembolic pulmonary hypertension (CTEPH) is a rare pulmonary vascular complication resulting from an unresolved, undetected, or untreated acute PE. CTEPH is caused by blood clot accumulation, as well as scar tissue formation in the blood vessels of the lungs, leading to severe pulmonary hypertension.<sup>9</sup> Of all the Veterans who utilized VHA primary care services between 2014 and 2018, 4,740 (<0.1%) of Veterans had a CTEPH diagnosis on record. Veterans were not counted as incident PE cases if they had a preexisting diagnosis of CTEPH.

### Limitations and Challenges

- Data do not capture PE diagnoses received outside VA or PE events that result in sudden death.
- To help separate incident from prevalent cases, patients with a PE diagnosis in the 5 years prior to baseline were not counted as incident. However, incidence estimates are only approximations, as EHR data do not indicate whether a diagnosis relates to the onset of disease, continuing care for a pre-existing condition, or disease recurrence.
- PE is the result of dislodged deep vein thrombosis (DVT), and the epidemiology of PE may not reflect that of the underlying epidemiology of DVT.
- Rates of PE are expected to increase in the 7th decade of life and beyond. Observed rates in those ≥65 years may reflect underestimates in the Medicare population or other full-ascertainment issues.

### Geographic Distribution of PE: 2014-2018



### References and Resources

1. Weitz, J.I., 98 - Pulmonary Embolism, in Goldman's Cecil Medicine (24th Edition), L. Goldman and A.I. Schafer, Editors. 2012, W.B. Saunders: Philadelphia. p. 596-603.
2. Heit, J.A., et al., Predictors of survival after deep vein thrombosis and pulmonary embolism: a population-based, cohort study. Arch Intern Med, 1999. 159(5):445-53.
3. Anderson, F.A., Jr., et al., Estimated annual numbers of US acute-care hospital patients at risk for venous thromboembolism. Am J Hematol, 2007. 82(9):777-82.
4. Chang, J., et al., Pregnancy-related mortality surveillance--United States, 1991--1999. MMWR Surveill Summ, 2003. 52(2):1-8.
5. Raskob, G.E., et al., Thrombosis: A major contributor to global disease burden. Thrombosis Research, 2014. 134:931-938.
6. Klok, F.A., et al., Persistent dyspnea complaints at long-term follow-up after an episode of acute PE: Results of a questionnaire. Eur J Intern Med, 2008. 19(8):625-29.
7. Klok, F.A., et al., Quality of Life in Long-term Survivors of Acute Pulmonary Embolism. CHEST, 2010. 138(6):1432-40.
8. U.S. Census Bureau, Population Division. Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2017. Accessed Sep 2018 at <https://factfinder.census.gov>.
9. University of Michigan Medicine. Pulmonary Embolism and CTEPH. Accessed May 2021 at [uofmhealth.org/conditions-treatments/pulmonary-embolism-and-cteph](http://uofmhealth.org/conditions-treatments/pulmonary-embolism-and-cteph).

Visit <https://www.research.va.gov/topics/cardio.cfm> for information about VA research on cardiovascular disease.