

Incidence & Short-Term Outcomes of Pulmonary Embolism in Patients with End-Stage Renal Disease

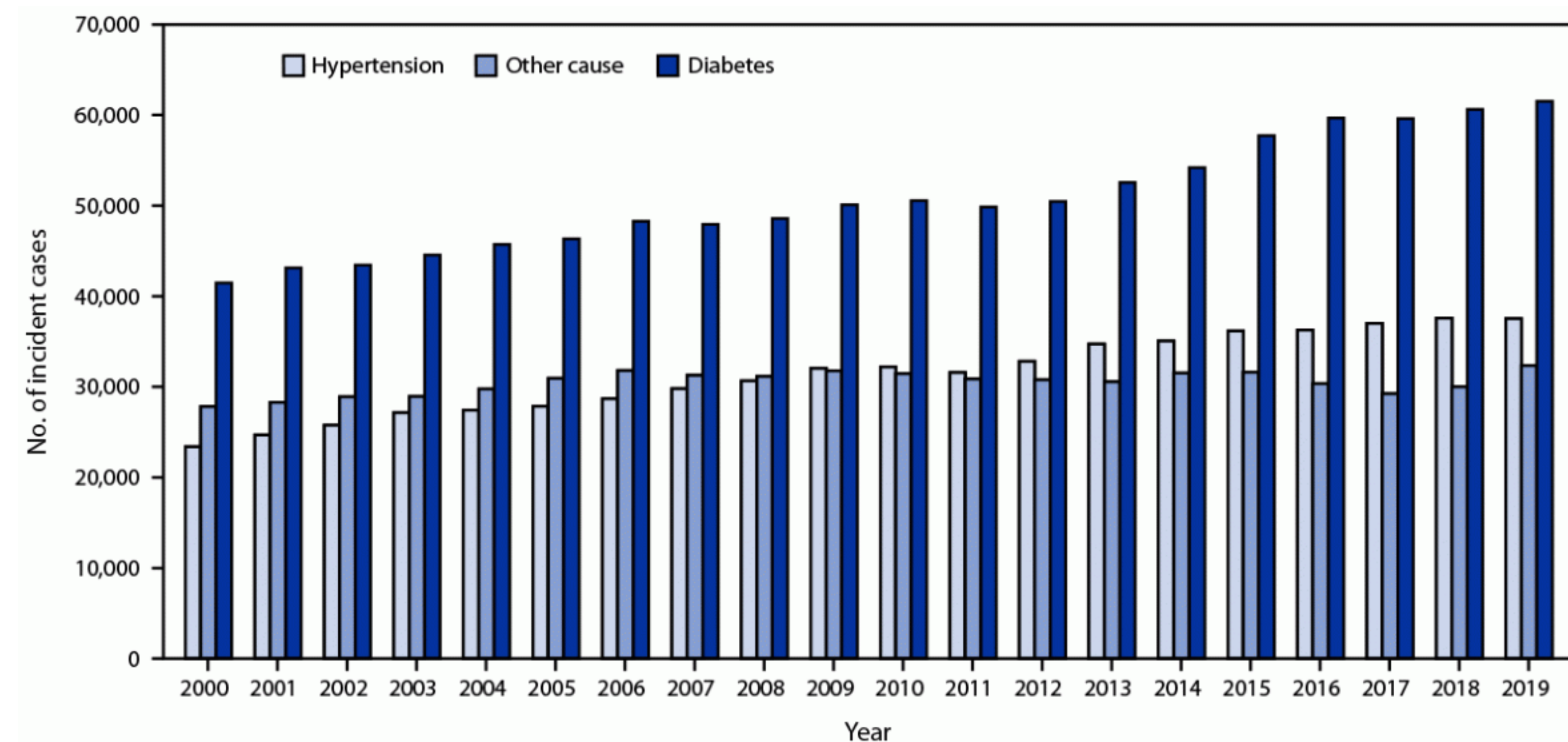
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INTRODUCTION

Pulmonary embolism (PE) is a potentially life-threatening condition requiring immediate diagnosis and management. End-stage renal disease (ESRD) patients have increased risk of thromboembolic events due to factors related to Virchow's triad: hypercoagulability, endothelial dysfunction, and blood stasis. Despite this known risk, the epidemiology and outcomes of PE in ESRD patients remain incompletely characterized. This study aims to clarify the incidence and short-term prognosis of PE in this high-risk population.



OBJECTIVE

This study aimed to clarify the epidemiology and prognosis of PE in ESRD patients. More precisely, we aimed to quantify PE incidence and assess short-term outcomes following diagnosis in ESRD patients.

METHODS

We conducted a retrospective cohort study using the United States Renal Data System (USRDS) from 2005 to 2019. Among 1,398,606 ESRD patients, 176,561 were diagnosed with PE after dialysis initiation. The primary outcomes were 30-day mortality and hospital readmission. Cox proportional hazards models evaluated associations with demographic and clinical factors.

RESULTS

Over the 16-year study period, PE incidence among ESRD patients steadily increased, with sharp rises in 2016 and 2019. Among those who developed PE after dialysis initiation, 30-day mortality was high. Risk was elevated in older adults, males, white patients, and those with cardiovascular or cerebrovascular disease. Hypertension was associated with lower mortality. The 30-day hospital readmission rate was also significant. Risk was higher in females, patients with catheter or graft access, and those with multiple comorbidities. Older age and Black or Hispanic ethnicity were associated with lower readmission risk.

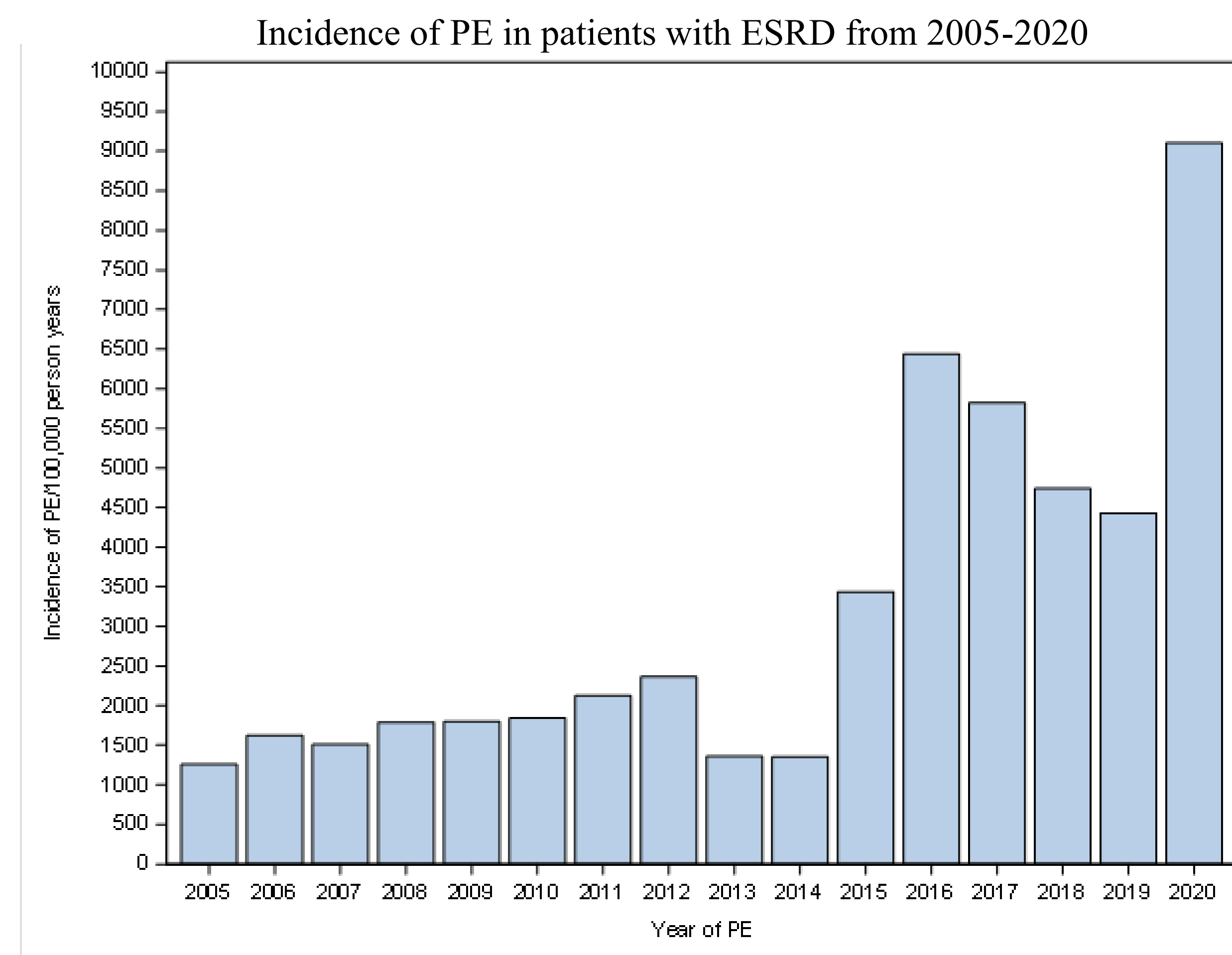


Figure 1: The overall incidence of PE among ESRD patients over the 16-year period was calculated, with an average yearly incidence of 3186.8 per 100,000 patients (95% CI 1958.3–4415.4 per 100,000). Yearly incidence rates showed variation across the study period.

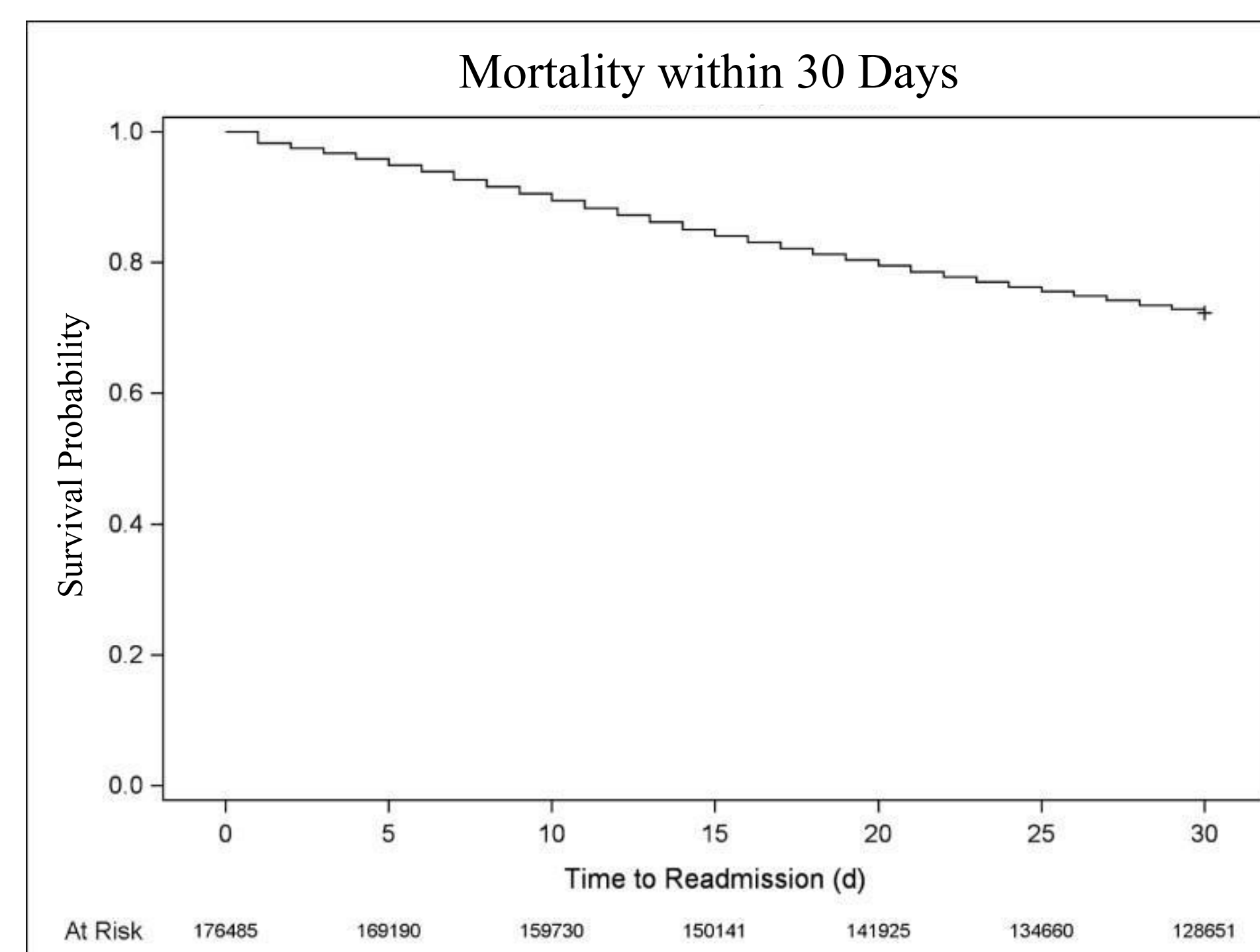


Figure 2: The 30-day mortality rate was 12.1% (HR for age 1.03 per year, 95% CI: 1.02–1.04). Mortality was higher in males (HR 1.23), whites (HR 1.31), and those with cardiovascular disease, diabetes, and tobacco use.

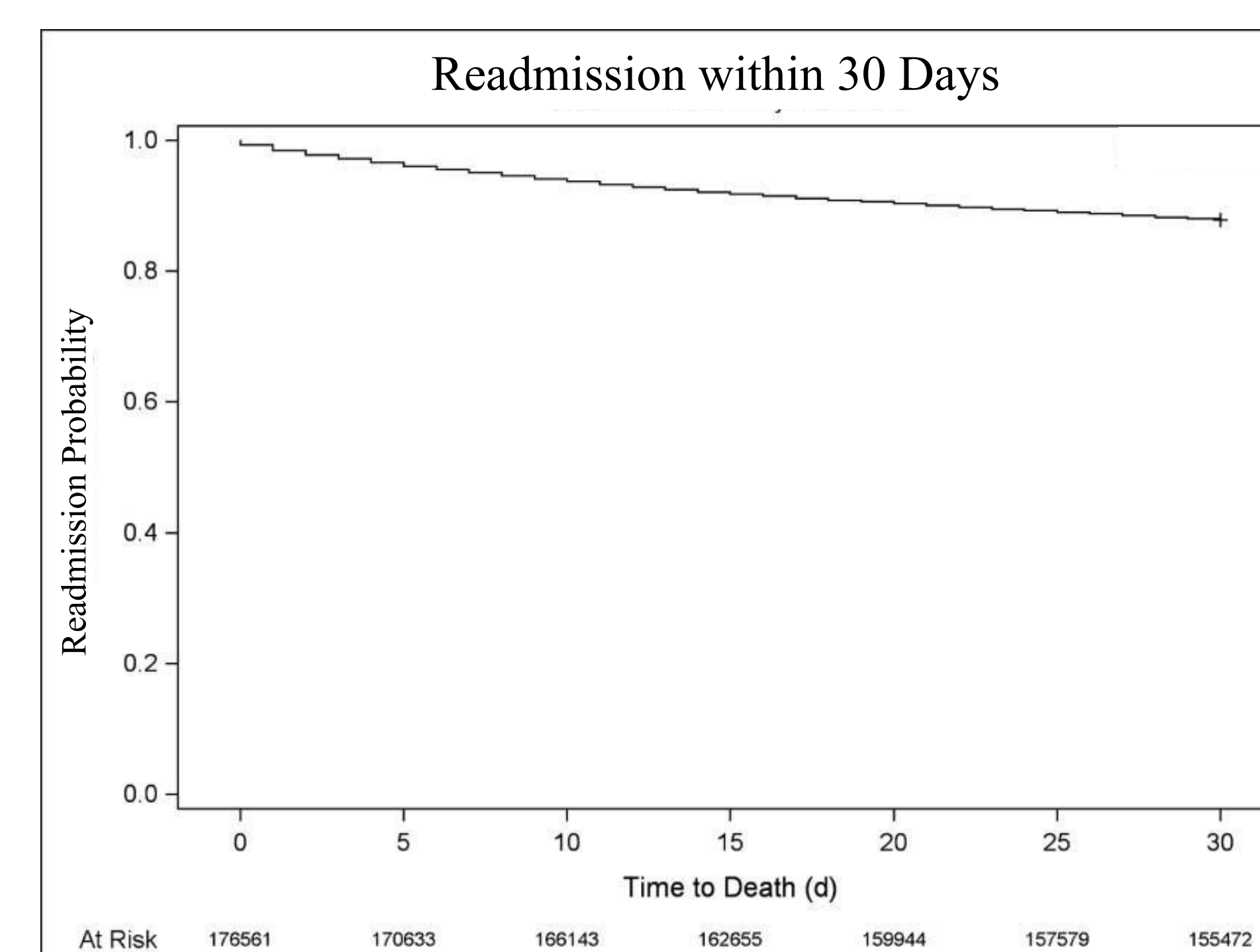


Figure 3: Readmission within 30 days occurred in 27.7% of cases, with elevated risk in women and patients with catheter/graft access, and lower risk in older, Black, and Hispanic patients.

CONCLUSIONS

Pulmonary embolism in ESRD is associated with:

- High incidence (avg. 3,187 per 100,000/year)
- 12.1% 30-day mortality
- 27.7% 30-day readmission

Key risk factors for poor outcomes include:

- Older age, white race, male sex
- Comorbidities: CVD, COPD, CVA, PVD, tobacco use
- Catheter or graft access vs. AVF

Notable findings:

- Hypertension showed a protective association with mortality
- Black and Hispanic patients had lower mortality/readmission. This warrants further study

Clinical implications:

- Reinforce benefits of AVF over catheter/graft access
- Need for improved transitional care and discharge planning for high-risk patients
- Support efforts to ensure equitable access to care

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