
Variability in Statin Use After Hospitalization for Cardiovascular Events or Procedures Among Medicare Beneficiaries Age 65 Years and Older

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Highlights

- For Medicare beneficiaries age 65 years and older, national rates of statin use after hospitalization were:
 - 59.7 percent for ischemic stroke (IS) or transient ischemic attack (TIA),
 - 62.8 percent for acute myocardial infarction (AMI), and
 - 64.1 percent for coronary artery bypass surgery (CABG) or percutaneous coronary intervention (PCI).
- Among beneficiaries hospitalized for IS/TIA and AMI, overall statin use was lower inside the “stroke belt” compared with outside the stroke belt (IS/TIA: 56.8% vs. 60.5%; AMI: 60.7% vs. 63.5%).
- Medicare beneficiaries in New York and Washington generally had the highest and lowest rates of statin use, respectively, across the three cardiovascular groups estimated.

Introduction

Individuals who experienced recent cardiovascular events can benefit from the use of statins. Such events include ischemic stroke (IS), “mini stroke” or transient ischemic attack (TIA), and acute myocardial infarction (AMI). In addition, statins can help people who underwent procedures to revascularize or reopen blockages in blood vessels, such as coronary artery bypass graft surgery (CABG) and percutaneous coronary intervention (PCI).

Statins or 3-hydroxy-3-methylglutaryl coenzyme A (HMG-CoA) reductase inhibitors are lipid-lowering agents that have been recommended in clinical guidelines for use in preventing recurrent ischemic and coronary events.ⁱ Statins are recommended regardless of cholesterol concentration unless statins cannot be tolerated by patients. Previous research indicates that statins are underused.^{ii,iii}

The southeastern region of the United States has been referred to as the “stroke belt” due to the region’s unusually high incidence of stroke and other cardiovascular-related mortality compared with the rest of the country.^{iv,v}

This Data Innovations Statistical Brief presents data from AHRQ’s Synthetic Healthcare Data for Research (SyH-DR) database. The brief focuses on regional and state variability in prescription statin use among Medicare beneficiaries age 65 years and older hospitalized for cardiovascular events or procedures. We examined any outpatient statin prescription use during the first 3 months after the hospitalization for a cardiovascular event or procedure. All differences mentioned in the text are significant at the 0.05 level or better.

ⁱ Grundy SM, Stone NJ, Bailey AL, Beam C, Birtcher KK, Blumenthal RS, Braun LT, de Ferranti S, Faiella-Tommasino J, Forman DE, Goldberg R, Heidenreich PA, Hlatky MA, Jones DW, Lloyd-Jones D, Lopez-Pajares N, Ndumele CE, Orringer CE, Peralta CA, Saseen JJ, Smith SC Jr, Sperling L, Virani SS, Yeboah J. 2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA Guideline on the Management of Blood Cholesterol: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation*. 2019;139(25):e1082-e1143. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7403606/>. Accessed September 26, 2024.

ⁱⁱ Yao X, Shah ND, Gersh BJ, Lopez-Jimenez F, Noseworthy PA. Assessment of trends in statin therapy for secondary prevention of atherosclerotic cardiovascular disease in U.S. adults from 2007 to 2016. *JAMA Netw Open*. 2020;3(11):e2025505. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7679951/>. Accessed September 26, 2024.

ⁱⁱⁱ Ngo-Metzger Q, Zuvekas S, Shafer P, Tracer H, Borsky AE, Bierman AS. Statin use in the U.S. for secondary prevention of cardiovascular disease remains suboptimal. *J Am Board Fam Med*. 2019;32(6):807-817. <https://www.jabfm.org/content/32/6/807.long>. Accessed September 26, 2024.

^{iv} Howard G, Howard VJ. Twenty years of progress toward understanding the stroke belt. *Stroke*. 2020;51(3):742-750. <https://www.ahajournals.org/doi/10.1161/STROKEAHA.119.024155>. Accessed September 26, 2024.

^v Mujib M, Zhang Y, Feller MA, Ahmed A. Evidence of a “heart failure belt” in the southeastern United States. *Am J Cardiol*. 2011;107(6):935-937.

Findings

Overall Statin Use

In 2016, more than half of Medicare beneficiaries age 65 and older who were hospitalized for IS/TIA (59.7%) or AMI (62.8%) or underwent a CABG/PCI procedure (64.1%) used a statin within 3 months of discharge.

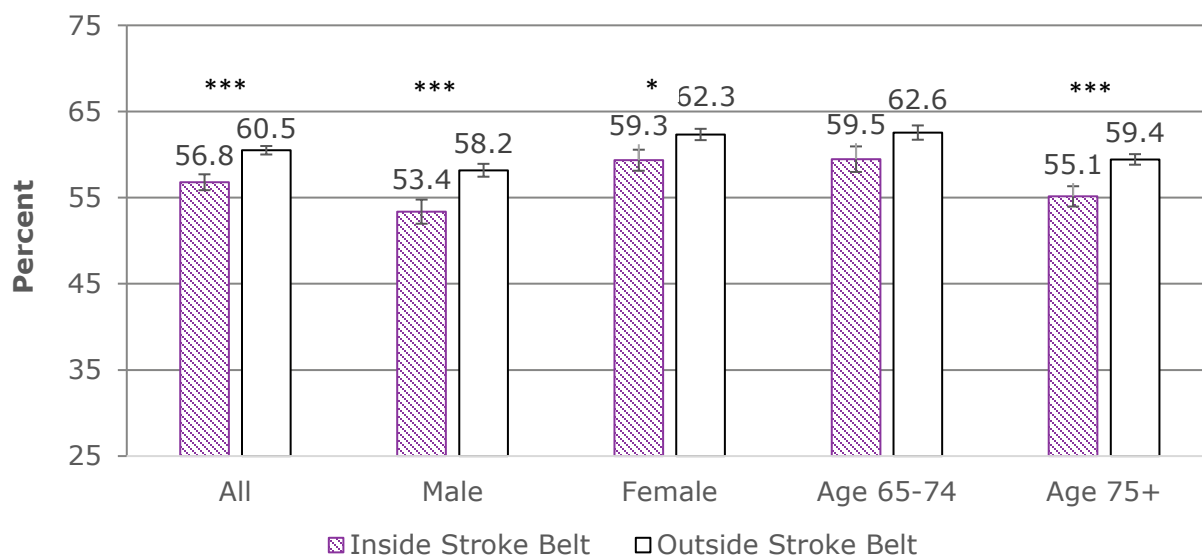
Statin Use by Region

Among those hospitalized for IS/TIA, overall statin use was lower inside the stroke belt (56.8%) compared with outside the stroke belt (60.5%) (Figure 1). Statin use was lower inside the stroke belt for both sexes and adults age 75 and older.

Among beneficiaries hospitalized for AMI, statin use was also lower inside the stroke belt compared with outside the stroke belt (60.7% vs. 63.5%). Statin use was lower inside the stroke belt than outside the stroke belt for males (56.6% vs. 61.7%) and adults age 75 and older (57.8% vs. 61.4%) (Figure 2).

Among hospitalized beneficiaries who underwent a CABG/PCI procedure, there were no statistically significant differences in statin use overall or by sex and age between those inside and outside the stroke belt (Figure 3).

Figure 1. Medicare beneficiaries age 65 years and older who used a statin within 3 months of hospitalization for IS/TIA, by region

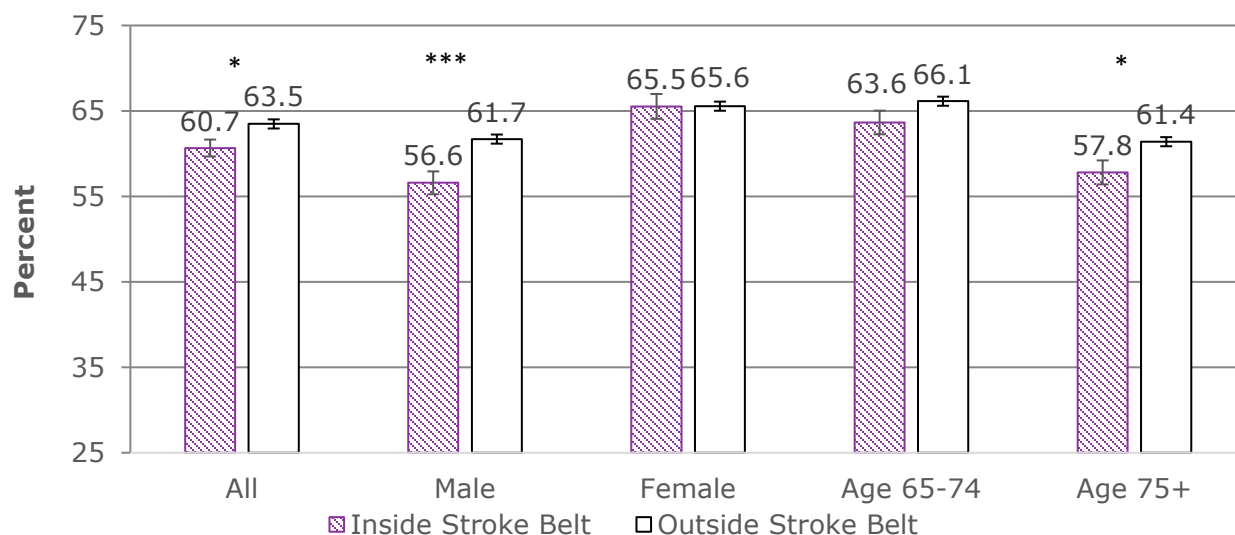


Key: IS-ischemic stroke; TIA-transient ischemic attack; inside stroke belt: Alabama, Arkansas, Georgia, Indiana, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia; outside stroke belt: rest of states, including District of Columbia.

* $p < 0.05$; ** $p < 0.005$; *** $p < 0.005$.

Source: Agency for Healthcare Research and Quality, Synthetic Healthcare Database for Research (SyHDR), 2016.

Figure 2. Medicare beneficiaries age 65 years and older who used a statin within 3 months of hospitalization for AMI, by region

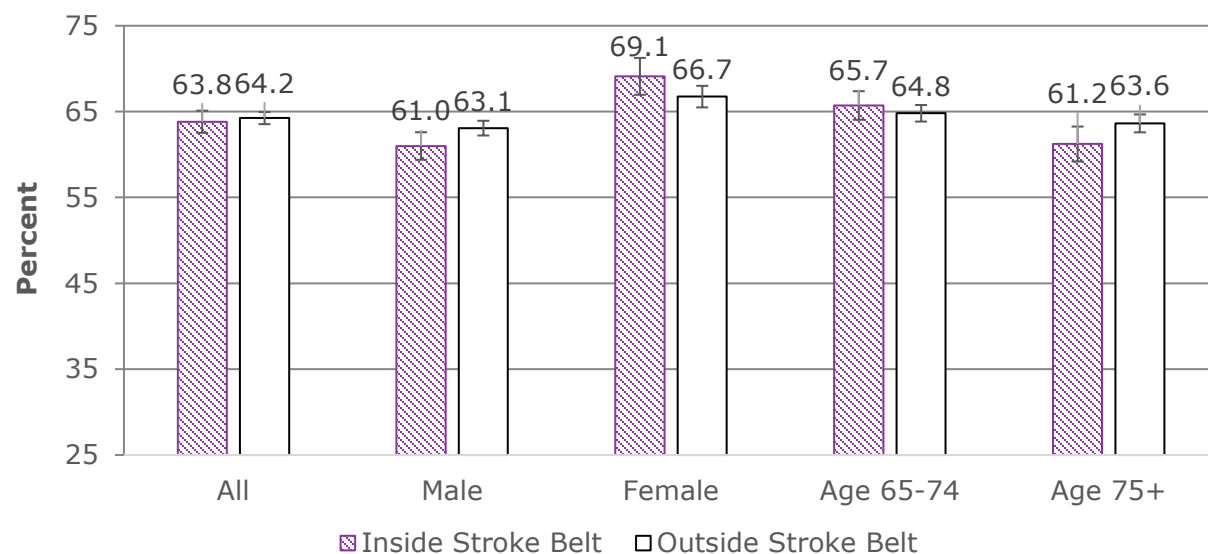


Key: AMI-acute myocardial infarction; inside stroke belt: Alabama, Arkansas, Georgia, Indiana, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia; outside stroke belt: rest of states, including District of Columbia.

*p<0.05; **p<0.005; ***p<0.005.

Source: Agency for Healthcare Research and Quality, Synthetic Healthcare Database for Research (SyHDR), 2016.

Figure 3. Medicare beneficiaries 65 years and older who used a statin within three months of hospitalization for a CABG or PCI procedure, by region



Key: CABG-coronary artery bypass graft; PCI-percutaneous coronary intervention; inside stroke belt: Alabama, Arkansas, Georgia, Indiana, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia; outside stroke belt: rest of states, including District of Columbia.

*p<0.05; **p<0.005; ***p<0.005.

Source: Agency for Healthcare Research and Quality, Synthetic Healthcare Database for Research (SyHDR), 2016.

Statin Use by State

Figures 4-6 display overall and state-level statin use rates within 3 months of hospitalization for IS/TIA, AMI, and CABG/PCI, including the District of Columbia. Estimates for states with fewer than 30 discharges were suppressed. The figures are divided into the following groups:

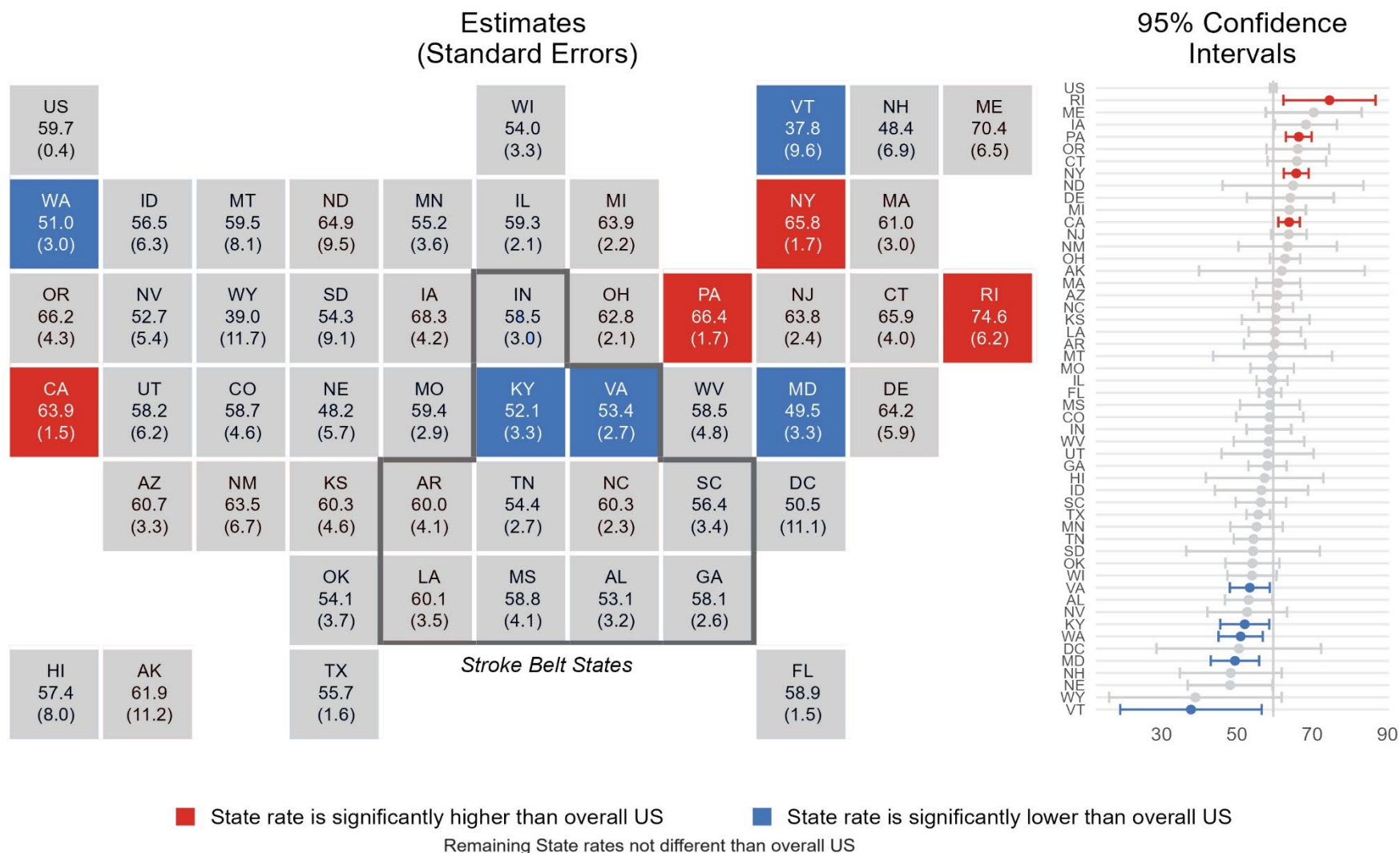
- State rate is significantly higher than overall U.S. rate.
- State rate is not different than overall U.S. rate.
- State rate is significantly lower than overall U.S. rate.

The overall U.S. rate of statin use after hospitalization for IS/TIA was 59.7 percent (Figure 4). The rates in Rhode Island (74.6%), Pennsylvania (66.4%), New York (65.8%), and California (63.9%) were significantly higher than the overall U.S. rate. Rates in Vermont (37.8%), Maryland (49.5%), Washington (51.0%), Kentucky (52.1%), and Virginia (53.4%) were significantly lower.

The overall U.S. rate of statin use after hospitalization for AMI was 62.8 percent (Figure 5). The rates in Hawaii (79.7%), California (68.5%), and New York (68.2%) were significantly higher than the U.S. rate. Rates in South Dakota (42.1%), Montana (44.2%), Arkansas (51.0%), Washington (51.9%), and Maryland (53.3%) were significantly lower.

The overall U.S. rate of statin use after hospitalization for a CABG/PCI procedure was 64.1 percent (Figure 6). The rates in West Virginia (76.8%), New York (72.7%), and Michigan (71.9%) were significantly higher than the U.S. rate. Rates in Maine (43.5%) and Washington (49.1%) were significantly lower.

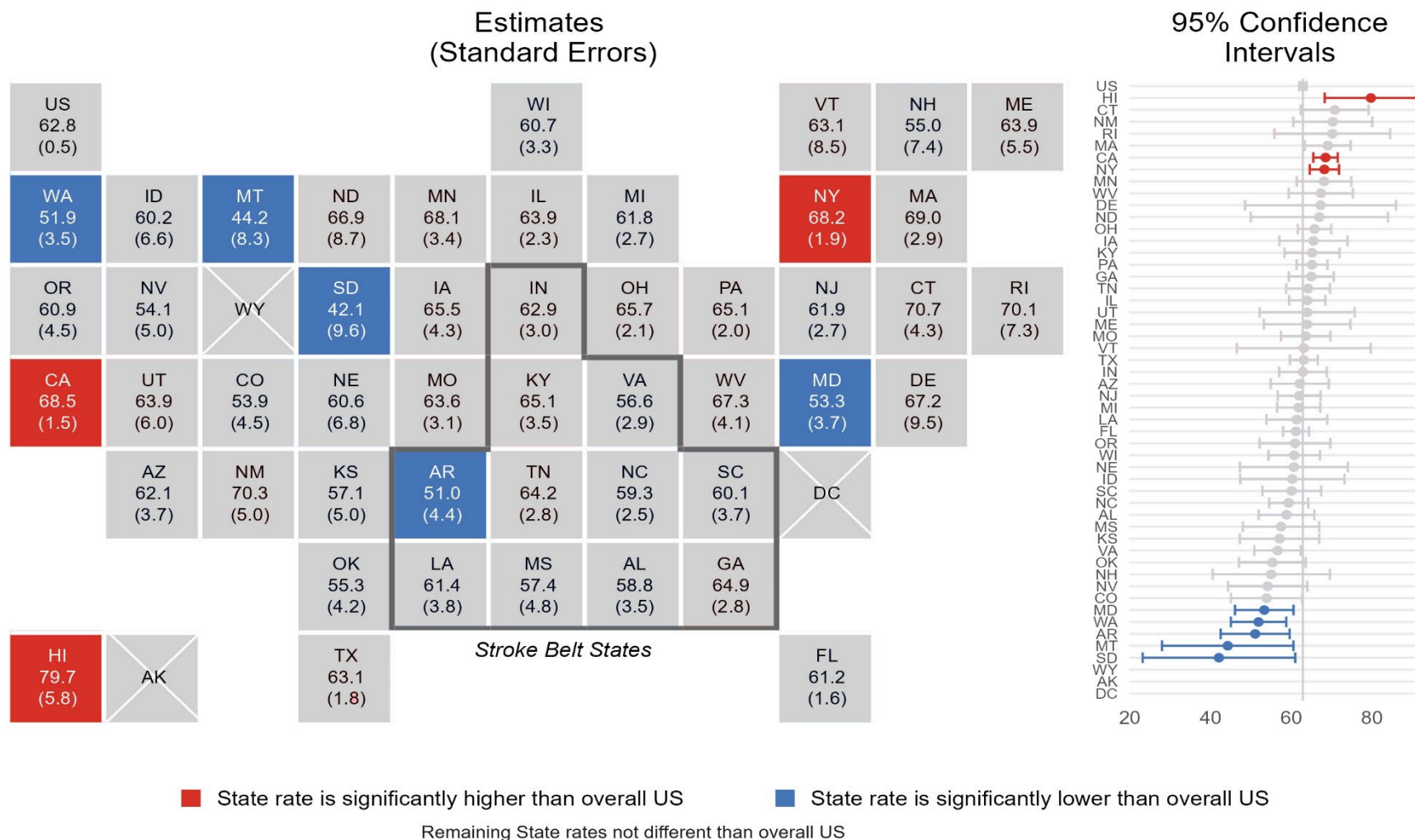
Figure 4. Percentage of Medicare beneficiaries age 65 years and older that used statins within 3-months after a hospital stay for IS/TIA



Key: IS-ischemic stroke; TIA–transient ischemic attack.

Source: Agency for Healthcare Research and Quality, Synthetic Healthcare Database for Research (SyH-DR), 2016.

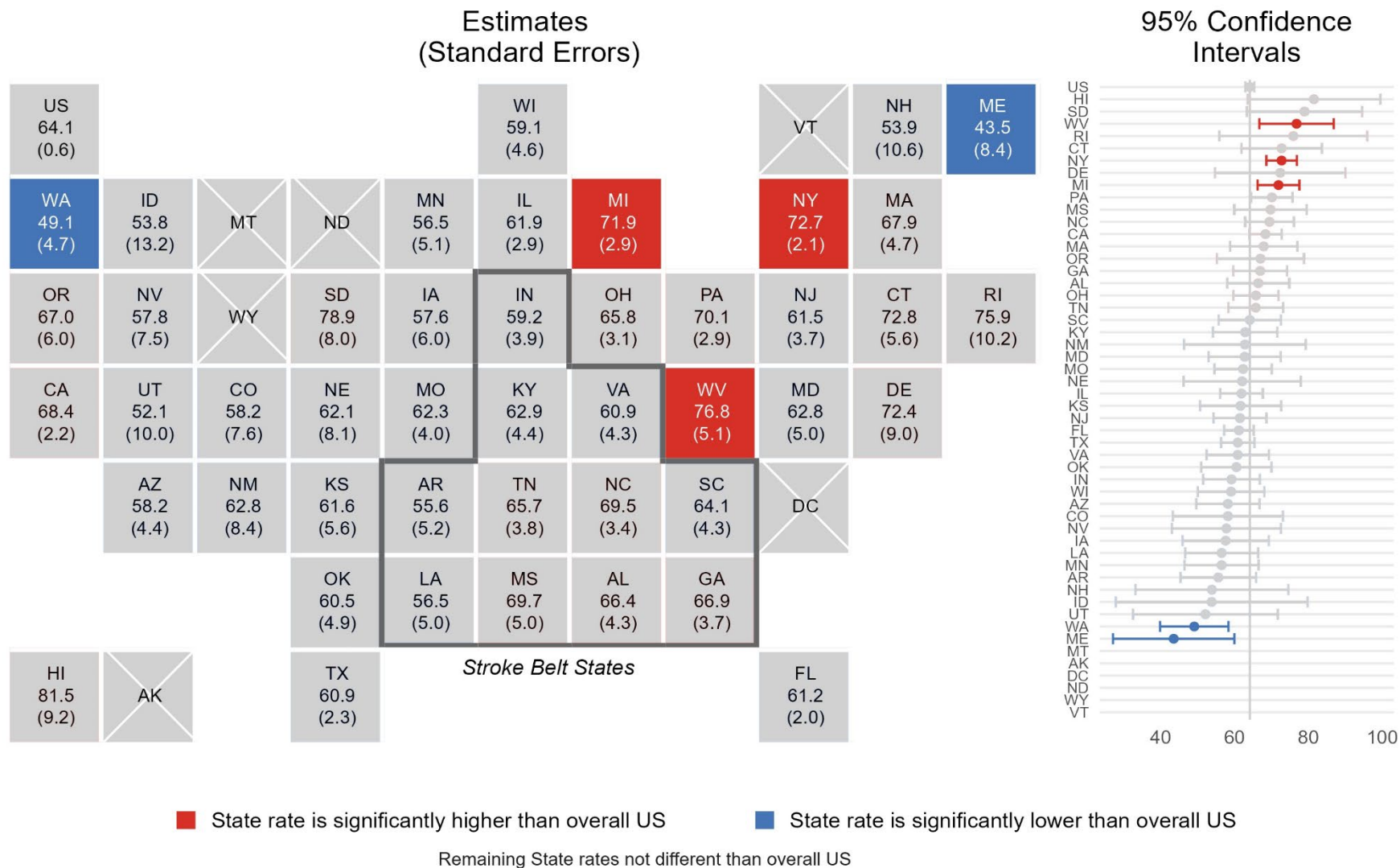
Figure 5. Percentage of Medicare beneficiaries age 65 years and older that used statins within 3-months after a hospital stay for AMI



Key: AMI-acute myocardial infarction.

Source: Agency for Healthcare Research and Quality, Synthetic Healthcare Database for Research (SyH-DR), 2016.

Figure 6. Percentage of Medicare beneficiaries age 65 years and older that used statins within 3-months after a hospital stay for CABG/PCI



Key: CABG-coronary artery bypass graft; PCI-percutaneous coronary intervention.

Source: Agency for Healthcare Research and Quality, Synthetic Healthcare Database for Research (SyH-DR), 2016.

Data Source

The data in this statistical brief are derived from the SyH-DR 2016 public use files. These files include Medicare enrollment and claims data. This analysis was limited to events that occurred in a hospital setting and outpatient prescription medication use.

Definitions

Use of Statins

In this statistical brief, we examined statin outpatient prescription fills. Statins are identified by generic drug names for statins in the Multum Lexicon database from Cerner Multum. Our analysis included the following single-formulation statin drugs: atorvastatin, fluvastatin, lovastatin, pitavastatin, pravastatin, rosuvastatin, and simvastatin. We included any single-dose formulation of statins.

Statin Prescription Fills

We examined the percentage of adults age 65 and older with any outpatient statin prescription fills during the 3 months after hospital discharge (“any statin use”) from a cardiovascular event.

Case Definition

This study used International Classification of Diseases, 10th Revision, Clinical Modification/Procedure Coding System (ICD-10 CM/PCS) codes to identify cardiovascular events. Table 1 lists diagnosis codes used to identify IS/TIA and AMI. The primary listed diagnosis was used to identify cases.

The diagnosis codes in SyH-DR are partially synthesized, where the first three characters were retained from the original values. Similarly, procedure codes were partially synthesized with synthetic codes replacing those in the source files if they belonged to the same procedure category.

We identified coronary revascularization using procedure codes. We categorized procedures using the AHRQ Clinical Classifications Software Refined (CCSR) for ICD-10-CM/PCS. All revascularization procedures used in this study exactly match the codes included in the CABG/PCI CCSR categories: CAR003 – Coronary artery bypass grafts; CAR004 – Percutaneous coronary interventions.

We excluded patients with hospital stays greater than 30 days. We also excluded patients under 65.

Table 1. Codes defining diagnosis

ICD-10-CM/PCS Code	Code Description
Acute Myocardial Infarction	
I21	Acute myocardial infarction
I22	Subsequent ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction
I23	Certain current complications following ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction (within the 28-day period)
Ischemic Stroke	
I63	Cerebral infarction
Transient Ischemic Attack	
G45	Transient cerebral ischemic attacks and related syndromes

Key: CM: Clinical Modification; PCS: Procedure Coding System.

Stroke Belt

- Alabama
- Arkansas
- Georgia
- Indiana
- Kentucky
- Louisiana
- Mississippi
- North Carolina
- South Carolina
- Tennessee
- Virginia

Insurance Coverage

To be included in the analysis, Medicare beneficiaries who met the case definition had to have insurance coverage from the time they were admitted to the hospital to 3 months after their hospital discharge.

About SyH-DR

SyH-DR is an all-payer, nationally representative claims database. The database consists of a sample of inpatient, outpatient, and prescription drug claims, including utilization, payment, and enrollment data, for people insured by Medicare, Medicaid, or commercial health insurance in 2016. AHRQ created SyH-DR, in part, as a resource to facilitate improvements to price and quality transparency in healthcare.

SyH-DR is a synthetic database that preserves the structure and statistical properties of the original claims data while protecting privacy and confidentiality of people and institutions. Synthetic data are created by statistically modeling or changing original data so that new values or data elements are generated while maintaining the original data's statistical properties. Additional steps, such as masking, are taken to reduce the risk of identifying people and institutions so that the data may be made publicly available to a broad community of researchers.

SyH-DR is a robust and nationally representative dataset that can be used to conduct research at various levels of granularity, including sex, age group, and insurance source at the national or state level. For more information about SyH-DR, visit the SyH-DR web page at <https://www.ahrq.gov/data/innovations/syh-dr.html>.

About AHRQ Data Innovations

AHRQ is engaged in several data development activities that have become known as "AHRQ Data Innovations." These activities include identifying data needs and data gaps. In addition, AHRQ is creating new research databases that complement existing databases to address emerging questions in U.S. healthcare delivery. These include the [Physician and Physician Practice Research Database](#) (3P-RD), [Social Determinants of Health](#) (SDOH) database, [Synthetic Healthcare Data for Research](#) (SyH-DR), and [Hospital Financial Measures Database](#) (HFMD).

Suggested Citation

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AHRQ welcomes questions and comments from readers of this publication who are interested in obtaining more information about access, cost, use, financing, and quality of healthcare in the United States. We also invite you to tell us how you are using this statistical brief and other Data Innovations products and to share suggestions on how Data Innovations products might be enhanced to further meet your needs. Please email us at DataInnovations@ahrq.hhs.gov or send a letter to the address below:

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