HHS Public Access

Author manuscript

*Am J Prev Med*. Author manuscript; available in PMC 2024 April 01.

Published in final edited form as:

*Am J Prev Med*. 2023 April ; 64(4): 561–566. doi:10.1016/j.amepre.2022.10.010.

# Trends in Lipid Lowering Prescriptions: Increasing Use of Guideline Concordant Pharmacotherapies — U.S., 2017–2022

**Ahlia Sekkarie, PhD, MPH**[1,2], **Soyoun Park, PhD, MS**[1], **Nicole L. Therrien, PharmD, MPH**[1], **Sandra L. Jackson, PhD, MPH**[1], **Rebecca C. Woodruff, PhD, MPH**[1], **Sharon Attipoe-Dorcoo, PhD, MPH**[3], **Peter K. Yang, MPH**[4], **Laurence Sperling, MD**[1], **Fleetwood Loustalot, PhD**[1,5], **Angela M. Thompson-Paul, PhD, MSPH**[1,5]

[1]Division for Heart Disease and Stroke Prevention, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention (CDC), Atlanta, Georgia;

[2]Epidemic Intelligence Service, CDC, Atlanta, Georgia;

[3]Division for Nutrition Physical Activity and Obesity, National Center for Chronic Disease Prevention and Health Promotion, CDC, Atlanta, Georgia;

[4]Gillings School of Global Public Health, University of North Carolina, Chapel Hill, North Carolina;

[5]United States Public Health Service Commissioned Corps, Rockville, Maryland

## Abstract

**Introduction:** Almost one-third of U.S. adults have elevated low-density lipid cholesterol (LDL-C) increasing their risk of atherosclerotic cardiovascular disease (ASCVD). The 2018 American College of Cardiology/American Heart Association Multisociety Cholesterol Management Guideline recommends maximally tolerated statin for those at increased ASCVD risk and add-on therapies (ezetimibe and PCSK9 inhibitors) in those at very high risk and an LDL-C≥70mg/dl. Prescription fill trends are unknown.

**Methods:** Using national outpatient retail prescription data from Q1 2017–Q1 2022, authors determined counts of patients who filled who filled low-, moderate-, or high-intensity statins alone and with add-on therapies. Overall percent change and joinpoint regression were used to assess trends. Analyses were conducted March−May 2022.

**Results:** During Q1 2017–Q1 2022, patients filling a statin increased 25.0%, with the greatest increase in high-intensity statins (64.1%, 6.6–10.9 million). Low-intensity statins decreased 29.2% (3.3–2.4 million). Concurrent fills of high-intensity statin and ezetimibe rose 210% to 579,012 patients by Q1 2022, with an increase in slope by Q1 2019 for all statin intensities ($p$<0.01). Concurrent fills of a statin and PCSK9 inhibitor increased to 2,629, 16,169, and 28,651 by Q1 2022 for low-, moderate- and high-intensity statins, respectively. For patients on all statin

Address correspondence to: Ahlia Sekkarie, PhD, MPH, Division for Heart Disease and Stroke Prevention, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 4770 Buford Hwy NE, S107-1, Atlanta GA, 30341. xby7@cdc.gov.

The authors report no conflicts of interest or financial disclosures.

intensities and PCSK9 inhibitor there were statistically significant increases in slope in Q2 2019 and decreases in Q1 2020.

**Conclusions:** Patients filling moderate- and high-intensity statins and add-on ezetimibe, and PCSK9 inhibitors have increased, indicating uptake of guideline-concordant lipid-lowering therapies. Improvements in initiation and continuity of these therapies are important for ASCVD prevention.

## INTRODUCTION

Cardiovascular disease is the leading cause of mortality in the U.S.[1] Low-density lipoprotein cholesterol (LDL-C) lowering pharmacotherapies reduce the risk of atherosclerotic cardiovascular disease (ASCVD) events such as myocardial infarction, stroke, and subsequent mortality.[2] Statin use for lowering LDL-C is first-line therapy for primary or secondary ASCVD prevention; however, depending on the dose intensity, it may not be well-tolerated by patients. Approximately 86 million adults (37%), are eligible for statin therapy, but only half take statins.[3,4] When added to statin therapy, ezetimibe can lower LDL-C by an additional 13%−20%, and Proprotein Convertase Subtilisin Kexin Type 9 Monoclonal Antibodies (PCSK9) inhibitors, approved by the Food and Drug Administration (FDA) in 2015,[5] can lower LDL-C levels by 43%−64%.[6]

The 2018 American College of Cardiology/American Heart Association (ACC/AHA) Multisociety Guideline on the Management of Blood Cholesterol (2018 Cholesterol Guideline) emphasizes a heart-healthy lifestyle and shared decision making between patients and clinicians for cholesterol management.[6] In response to evidence from clinical trials,[7–9] the guideline also recommends add-on non-statin ezetimibe for patients with ASCVD already on the maximally-tolerated statin intensity and further adding PCSK9 inhibitors if LDL-C remains ≥70 mg/dL.[6]

This study seeks to understand national trends of patient statin fills with concurrent use of non-statin lipid-lowering prescriptions ezetimibe and/or PCSK9 inhibitors, stratified by statin intensities. Changes in the numbers of patients filling prescriptions from 2017−2022 following the 2018 Cholesterol Guideline are also assessed.

## METHODS

Data on prescription fills, defined as the unique number of patients that picked up a prescription, were obtained from the IQVIA Total Patient Tracker database which covers 93% of all outpatient retail prescription fills in the U.S. Fills prescribed by veterinarians, dentists, and naturopaths were excluded.

Nationally projected number of patients who filled statins (stratified by low-, moderate-, or high-intensity),[6] ezetimibe, and PCSK9 inhibitors, concurrently or alone, were obtained from Q1 2017 to Q1 2022. The percent change of patients filling statins from the beginning to the end of the study period was calculated. Joinpoint regression (JoinPoint 4.9.0.0, National Cancer Institute, Bethesda, MD) was used to determine trend changes for each combination of medications; 21 data points were available for trend analysis, modeling was

limited to a maximum of 3 joinpoints, and the permutation test was used for model selection. This work was exempt from IRB approval.

## RESULTS

The numbers of patients filling a statin, ezetimibe or PCSK9 inhibitor, individually or in any combination, increased 25.0% (from 27−34 million), 117.8% (from 772,533−1.7 million) and 1533.1% (from 16,707−272,838), respectively from Q1 2017 to Q1 2022 (Figure 1). The number of patients filling a statin alone increased 21.8% (from 26−32 million) (Figure 2, Appendix Table 1). Patients filling moderate- or high-intensity statins alone increased by 14.9% (from 16.7−19.2 million) and 64.1% (from 6.6−10.9 million), respectively. The number of patients filling low-intensity statins alone steadily decreased 29.2% (from 3.3−2.4 million). In Q2 2020, there was a decrease in the number of patients filling statins ranging from −0.8% for high-intensity statins to −4.1% for low-intensity statins.

Ezetimibe was most frequently filled with high-intensity statins beginning in Q1 2019, superseding moderate-intensity statins plus ezetimibe (Figure 3, Appendix Table 1). Overall, there was a 210% increase in the number of patients concurrently filling high-intensity statins and an ezetimibe prescription from 187,050 in Q1 2017 to 579,012 patients in Q1 2022. For all 3 statin intensities, there was a statistically significant rate of increase in concurrent ezetimibe prescription fills by the beginning of 2019 ($p<0.01$ for change in slope) and for high-intensity statins there was another increase in Q3 2020 ($p<0.001$ for change in slope) (Figure 3, Appendix Table 2).

The fewest number of patients filled a concurrent statin, ezetimibe, and PCSK9 inhibitor, although the number increased to 613 for low-, 3,339 for moderate-, and 9,836 for high-intensity statins in Q1 2022 (Figure 4, Appendix Table 1). For all statin intensities, there was a significant rate of increase in concurrent ezetimibe and PCSK9 prescription fills by Q2 2019 (change in slope, all $p<0.001$) and for high-intensity statins there was a less rapid increase in Q1 2020 (change in slope, $p=0.02$, Figure 4, Appendix Table 2).

The numbers of patients filling a low-, moderate-, or high-intensity statin and concurrent PCSK9 inhibitor from Q1 2017 to Q1 2022 increased to 2,629 (1,101%), 16,169 (1,576%), and 28,651 (2,124%), respectively (Appendix Figure 1, Appendix Table 1). For all statin intensities, there was a significant rate of increase in concurrent PCSK9 inhibitor prescription fills in Q2 2019 (change in slope, all $p<0.001$) and rate of increase slowed in Q1 2020 (change in slope, all $p<0.01$) (Appendix Figure 1, Appendix Table 2).

## DISCUSSION

From 2017 to 2022, the number of patients filling lipid-lowering prescriptions increased. The largest increase in statin fills was among high-intensity statins. Add-on ezetimibe and PCSK9 inhibitors were most frequently filled with high-intensity statins, suggesting prescribing trends that are guideline-concordant for ASCVD prevention. Similarly other studies have shown add-on therapies are being primarily used to reduce residual ASCVD risk and not due to statin side-effect concerns.[4] Additionally, the number of patients filling PCSK9 inhibitors accelerated after publication of the updated Cholesterol Guideline, price

reductions in 2018 and the FDA broadening the indication for PCSK9 inhibitors in 2019.[5,6] However, all prescription fills were disrupted following the COVID-19 pandemic, and the rate of increase of PCSK9 inhibitor prescription fills has not recovered.

The translation of medical guidelines to clinical practice can often take many years.[10] After the 2013 Cholesterol Guideline, statin use in the U.S. did not increase among patients with ASCVD.[11] The 2018 Cholesterol Guideline included the top 10 take-home messages and a value statement for PCSK9 inhibitors that may have influenced price reductions.[12] In this dataset, the number of patients filling PCSK9 inhibitors increased, particularly with high-intensity statins, consistent with the timing of the guideline. In another national study, PCSK9 inhibitor prescription fills increased from 2015−2019 and the largest year-over-year increase coincided with the release of the 2018 Cholesterol Guideline.[12]

Strengths of this study included the use of a large, national-level, and timely prescription transaction database (covering 93% of retail prescription fills) that includes prescription fills regardless of payer type.[13]

### Limitations

This study was subject to several limitations. First, while results indicated increasing numbers of patients filling guideline-concordant lipid-lowering medications, these changes cannot be linked to specific events and may partially reflect an increase in patients eligible for statins. Second, prescription rates among patients for whom treatment is recommended could not be calculated. However, previous studies have shown these to be low.[3] Third, these data were not linked to demographic information. Previous studies have shown that patients that are younger, female, or with noncoronary ASCVD are less likely to receive guideline-concordant statins[4] and that patients in the Northeast and Southern regions of the U.S. have the highest fill rates of PCSK9 inhibitors.[12] Fourth, only retail pharmacy prescription fills were included (not mail-order or long-term care prescription services); however, retail pharmacies represent the majority of prescription transactions.[12] Fifth, data were not disaggregated by prescriber specialty. This is an area for future research. Finally, these data were not able to address medication adherence.

## CONCLUSIONS

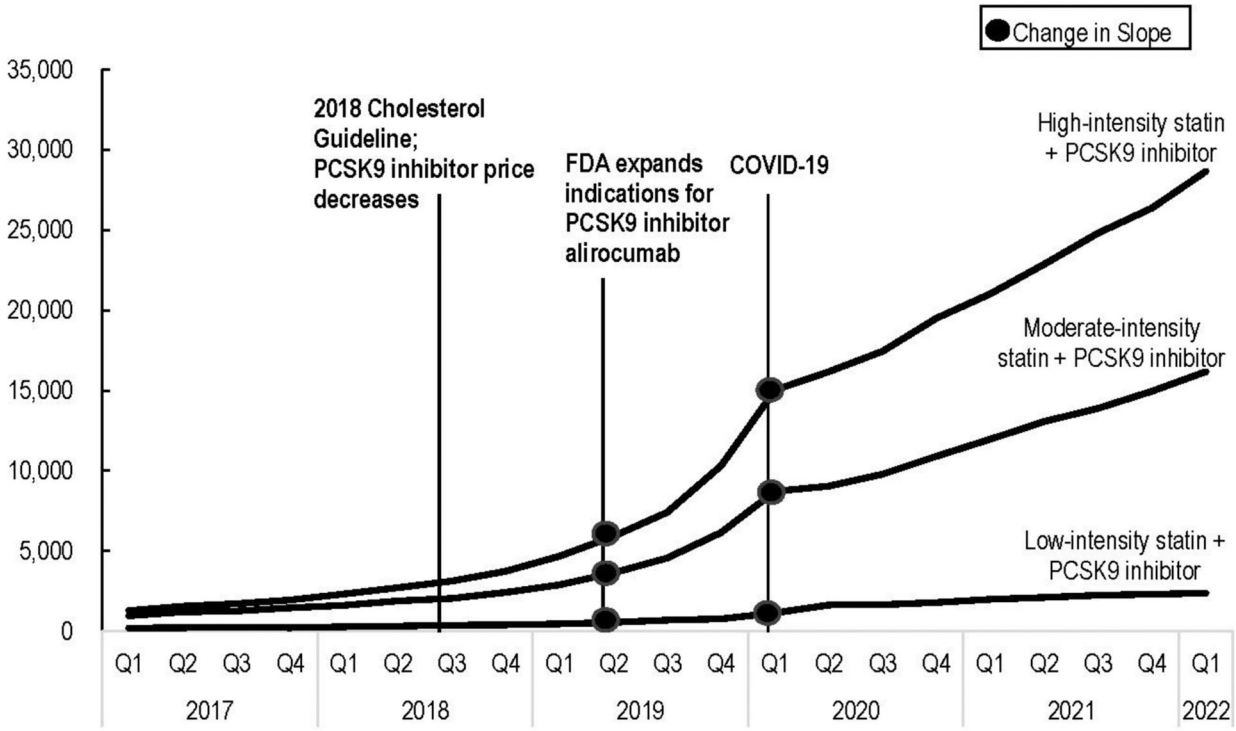
Prescription of more aggressive lipid-lowering therapy is increasing incrementally. Interventions such as improved guidelines and removal of barriers to PCSK9 inhibitor prescriptions are important to improve uptake of lipid-lowering pharmacotherapies and ultimately prevent ASCVD. However, further efforts are required to achieve optimal cholesterol management.[14]

## ACKNOWLEDGMENTS

The findings and conclusions in this report are those of the authors and do not necessarily reflect the official position of the Centers for Disease Control and Prevention.

# Appendix

Appendix




**Appendix Figure 1.**

Projected number of patients filling concurrent statin and PCSK9 inhibitor from outpatient retail pharmacies, stratified by statin intensity, Q1 2017−Q1 2022.

IQVIA Total Patient Tracker, Concurrency Tool, Q1 2017—Q1 2022, United States, data extracted April 2022. The nationally projected number of patients that filled a concurrent statin and proprotein convertase subtilisin kexin 9 (PCSK9) inhibitor from US outpatient retail pharmacies (excluding dental, veterinary, and naturopath specialty prescribers), stratified by statin intensity. Dots represent when there was a statistically significant change in slope from joinpoint regression. In April 2019, the FDA broadened the indications for the PCSK9 inhibitor alirocumab to include secondary event prevention among patients with established cardiovascular disease.[5]

FDA = Food and Drug Administration, PCSK9 inhibitor = proprotein convertase subtilisin kexin 9

## Appendix Table 1.

Projected number of patients who received a statin alone or concurrently with ezetimibe and/or PCSK9 inhibitor from outpatient retail pharmacies, stratified by statin intensity, Q1 2017—Q1 2022[a]

| | Statin alone | | | | Statin and ezetimibe | | | | Statin and PCSK9 inhibit | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Quarter | Low | Moderate | High | Any | Low | Moderate | High | Any | Low | Moderate | High |
| 2017 Q1 | 3,331,521 | 16,708,978 | 6,615,284 | 26,279,363 | 31,854 | 263,651 | 187,050 | 474,339 | 219 | 965 | 1,288 |
| 2017 Q2 | 3,282,514 | 16,769,235 | 6,796,815 | 26,481,817 | 31,438 | 256,375 | 192,823 | 472,949 | 247 | 1,200 | 1,559 |
| 2017 Q3 | 3,219,062 | 16,715,805 | 6,938,806 | 26,521,062 | 31,446 | 253,730 | 197,247 | 475,041 | 221 | 1,257 | 1,711 |
| 2017 Q4 | 3,191,172 | 16,892,652 | 7,173,803 | 26,895,906 | 32,639 | 260,654 | 212,241 | 497,472 | 286 | 1,460 | 1,962 |
| 2018 Q1 | 3,140,042 | 16,927,416 | 7,383,266 | 27,067,483 | 33,215 | 259,824 | 222,760 | 506,921 | 325 | 1,617 | 2,331 |
| 2018 Q2 | 3,122,232 | 17,215,545 | 7,642,696 | 27,598,735 | 34,230 | 266,019 | 239,843 | 531,018 | 391 | 1,892 | 2,720 |
| 2018 Q3 | 3,042,248 | 17,114,237 | 7,757,394 | 27,546,276 | 34,337 | 266,840 | 250,719 | 543,079 | 408 | 2,052 | 3,138 |
| 2018 Q4 | 2,992,944 | 17,272,711 | 8,002,071 | 27,895,301 | 35,114 | 272,889 | 270,226 | 568,579 | 459 | 2,418 | 3,731 |
| 2019 Q1 | 2,939,148 | 17,504,597 | 8,305,390 | 28,390,366 | 35,611 | 273,469 | 287,082 | 586,739 | 553 | 2,895 | 4,687 |
| 2019 Q2 | 2,903,555 | 17,726,313 | 8,580,640 | 28,856,763 | 36,880 | 283,449 | 312,363 | 622,699 | 698 | 3,639 | 5,928 |
| 2019 Q3 | 2,866,800 | 17,955,458 | 8,860,509 | 29,330,260 | 37,808 | 290,401 | 335,020 | 652,787 | 779 | 4,559 | 7,405 |
| 2019 Q4 | 2,800,559 | 18,048,724 | 9,066,116 | 29,556,816 | 38,842 | 297,804 | 357,962 | 683,638 | 1,149 | 6,155 | 10,316 |
| 2020 Q1 | 2,781,817 | 18,402,869 | 9,410,048 | 30,232,398 | 39,853 | 307,074 | 385,691 | 721,255 | 1,631 | 8,736 | 15,022 |
| 2020 Q2 | 2,668,225 | 17,928,822 | 9,335,859 | 29,627,371 | 39,025 | 302,022 | 391,369 | 722,249 | 1,651 | 9,038 | 16,175 |
| 2020 Q3 | 2,667,254 | 18,349,570 | 9,635,095 | 30,302,345 | 41,201 | 313,617 | 419,630 | 762,519 | 1,799 | 9,782 | 17,439 |
| 2020 Q4 | 2,626,563 | 18,607,068 | 9,879,211 | 30,757,003 | 42,955 | 325,236 | 448,550 | 804,129 | 1,992 | 10,916 | 19,506 |
| 2021 Q1 | 2,577,265 | 18,747,051 | 10,091,695 | 31,043,609 | 43,048 | 328,170 | 468,381 | 825,980 | 2,104 | 11,975 | 21,015 |
| 2021 Q2 | 2,535,240 | 18,954,225 | 10,352,529 | 31,466,542 | 44,406 | 338,641 | 499,947 | 868,894 | 2,239 | 13,070 | 22,866 |
| 2021 Q3 | 2,484,372 | 19,109,093 | 10,562,085 | 31,779,925 | 45,337 | 346,453 | 526,941 | 904,092 | 2,308 | 13,885 | 24,805 |
| 2021 Q4 | 2,438,477 | 19,285,887 | 10,766,367 | 32,110,713 | 46,237 | 355,099 | 557,187 | 943,293 | 2,378 | 14,946 | 26,366 |
| 2022 Q1 | 2,358,592 | 19,195,405 | 10,856,408 | 32,017,811 | 46,529 | 358,098 | 579,012 | 967,263 | 2,629 | 16,169 | 28,651 |

[a]IQVIA Total Patient Tracker, Concurrency Tool, Q1 2017—Q1 2022, United States, data extracted April 2022. The nationally projected numbers of patients that received only a statin as a form of lipid-lowering medication (among statins, ezetimibe, and PCSK9 inhibitors) from U.S. outpatient retail pharmacies, stratified by statin intensity (low, moderate, high). Patient counts are estimates for each period and should not be summed, at the risk of double-counting patients who received multiple products or appear in multiple time periods or multiple intensities during the times evaluated.

## Appendix Table 2.

Changes in slope from Joinpoint regression

| | Low-intensity statin | | | | Moderate-intensity statin | | | | High-intensity stat | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Joinpoint | Slope | Difference | P-value | Joinpoint | Slope | Difference | P-value | Joinpoint | Slope | Differe |
| **Ezetimibe + Statin** | | | | | | | | | | | |
| Slope 1 | 2017Q1–2018Q4 | 538.2 | | | 2017Q1–2017Q3 | −4069.2 | | | 2017Q1–2018Q3 | 11123.7 | |

| | Low-intensity statin | | | | Moderate-intensity statin | | | | High-intensity stat | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Joinpoint** | **Slope** | **Difference** | **P-value** | **Joinpoint** | **Slope** | **Difference** | **P-value** | **Joinpoint** | **Slope** | **Differe** |
| Slope 2 | 2018Q4–2022Q1 | 925.2 | 387.0 | 0.00231 | 2017Q3–2019Q1 | 3424.0 | 7493.2 | 0.131547 | 2018Q3–2020Q3 | 21474.7 | 10351.1 |
| Slope 3 | | | | | 2019Q1–2022Q1 | 6994.3 | 3570.3 | 0.004769 | 2020Q3–2022Q1 | 26762.9 | 5288.2 |
| **PCSK9 + Statin** | | | | | | | | | | | |
| Slope 1 | 2017Q1–2019Q2 | 43.39 | | | 2017Q1–2019Q2 | 253.7 | | | 2017Q1–2019Q2 | 437.8 | |
| Slope 2 | 2019Q2–2020Q1 | 328.8 | 285.4 | 0.000293 | 2019Q2–2020Q1 | 1683.8 | 1430.1 | 0.000003 | 2019Q2–2020Q1 | 3122.5 | 2684.6 |
| Slope 3 | 2020Q1–2022Q1 | 129.8 | −198.9 | 0.004695 | 2020Q1–2022Q1 | 979.8 | −704.0 | 0.002321 | 2020Q1–2022Q1 | 1764.6 | −1357.9 |
| **Ezetimibe + PCSK9 + Statin** | | | | | | | | | | | |
| Slope 1 | 2017Q1–2018Q4 | 6.86 | | | 2017Q1–2019Q1 | 52.4 | | | 2017Q1–2019Q2 | 138.0 | |
| Slope 2 | 2018Q4–2022Q1 | 41.9 | 35.0 | 0.000033 | 2019Q1–2022Q1 | 229.7 | 177.3 | 0 | 2019Q2–2020Q1 | 1034.6 | 896.6 |
| Slope 3 | | | | | | | | | 2020Q1–2022Q1 | 618.0 | −417.0 |

Joinpoint regression (JoinPoint 4.9.0.0, National Cancer Institute, Bethesda, MD) was used to determine trend changes for each combination of medications; 21 data points were available for trend analysis so modeling was limited to a maximum of 3 joinpoints, and the permutation test was used for model selection.

## REFERENCES


1. American Heart Association; American Stroke Association. Cardiovascular Disease: A Costly Burden for America - Projections through 2035. Accessed May 13, 2022. https://www.heart.org/-/media/files/get-involved/advocacy/burden-report-consumer-report.pdf?la=en.
2. Alenghat FJ, Davis AM. Management of Blood Cholesterol. JAMA. 2019;321(8):800–801. 10.1001/jama.2019.0015. [PubMed: 30715135]
3. Wall HK, Ritchey MD, Gillespie C, Omura JD, Jamal A, George MG. Vital Signs: Prevalence of Key Cardiovascular Disease Risk Factors for Million Hearts 2022 - United States, 2011–2016. MMWR Morb Mortal Wkly Rep. 2018;67(35):983–991. 10.15585/mmwr.mm6735a4. [PubMed: 30188885]
4. Nelson AJ, Haynes K, Shambhu S, et al. High-Intensity Statin Use Among Patients With Atherosclerosis in the U.S. J Am Coll Cardiol. 2022;79(18):1802–1813. 10.1016/j.jacc.2022.02.048. [PubMed: 35512860]
5. Food and Drug Administration. PRALUENTTM (alirocumab) injection, & REPATHA (evolocumab) injection, for subcutaneous use: initial U.S. Approval. Accessed May 13, 2022. https://www.accessdata.fda.gov/drugsatfda_docs/label/2019/125559s019s020lbl.pdf; https://www.accessdata.fda.gov/drugsatfda_docs/label/2021/125522s29s31lbl.pdf.
6. Grundy SM, Stone NJ, Bailey AL, et al. 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. Circulation. 2019;139(25):e1082–e1143. 10.1161/CIR.0000000000000625. [PubMed: 30586774]
7. Cannon CP, Blazing MA, Giugliano RP, et al. Ezetimibe Added to Statin Therapy after Acute Coronary Syndromes. N Engl J Med. 2015;372(25):2387–2397. 10.1056/NEJMoa1410489. [PubMed: 26039521]

8. Sabatine MS, Giugliano RP, Keech AC, et al. Evolocumab and Clinical Outcomes in Patients with Cardiovascular Disease. N Engl J Med. 2017;376(18):1713–1722. 10.1056/NEJMoa1615664. [PubMed: 28304224]

9. Schwartz GG, Steg PG, Szarek M, et al. Alirocumab and Cardiovascular Outcomes after Acute Coronary Syndrome. N Engl J Med. 2018;379(22):2097–2107. 10.1056/NEJMoa1801174. [PubMed: 30403574]

10. Morris ZS, Wooding S, Grant J. The answer is 17 years, what is the question: understanding time lags in translational research. J R Soc Med. 2011;104(12):510–520. 10.1258/jrsm.2011.110180. [PubMed: 22179294]

11. 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. 10.3122/jabfm.2019.06.180313. [PubMed: 31704749]

12. Attipoe-Dorcoo S, Yang P, Sperling L, et al. Characteristics and trends of PCSK9 inhibitor prescription fills in the United States. J Clin Lipidol. 2021;15(2):332–338. 10.1016/j.jacl.2021.01.010. [PubMed: 33589405]

13. IQVIA. Total Patient Tracker. 2017–2022.

14. Virani SS, Ballantyne CM, Petersen LA. Guideline-Concordant Statin Therapy Use in Secondary Prevention: Should the Medical Community Wait for Divine Intervention? J Am Coll Cardiol. 2022;79(18):1814–1817. 10.1016/j.jacc.2022.02.042. [PubMed: 35512861]

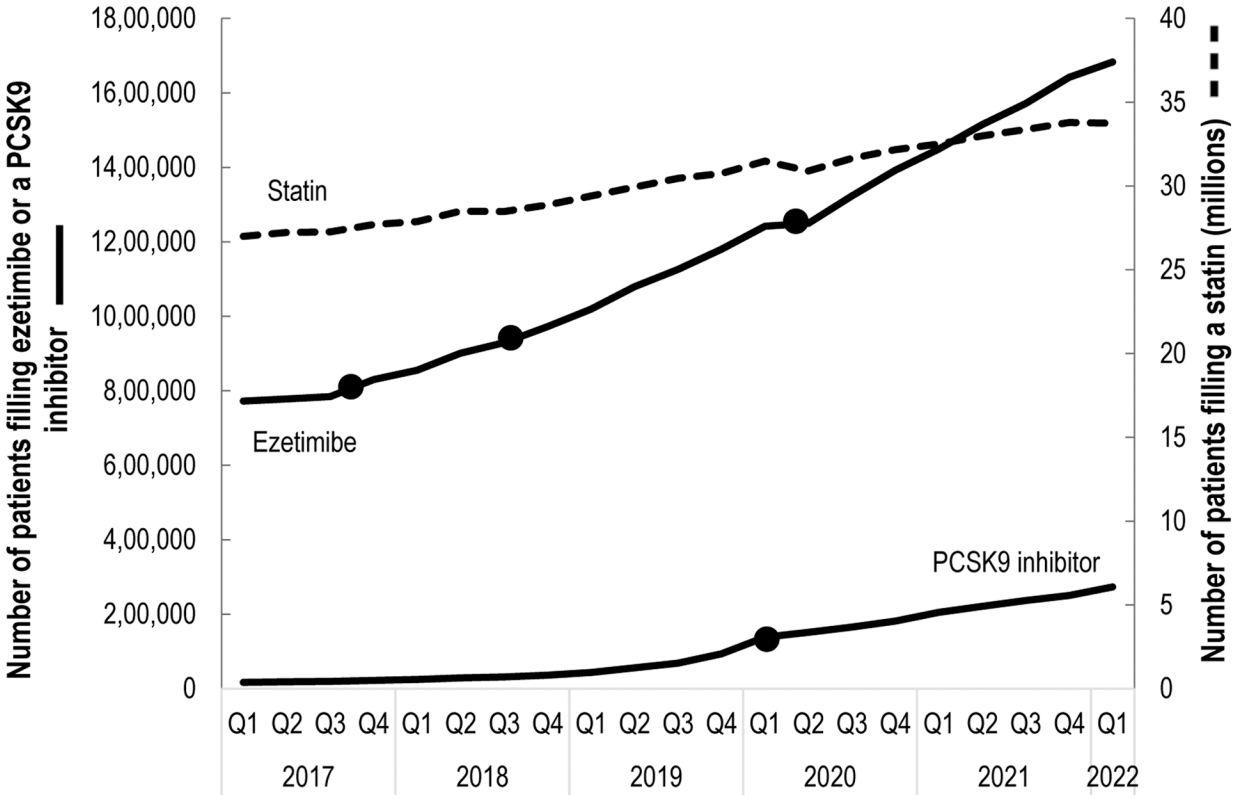



**Figure 1.**

Total projected numbers of patients filling any PCSK9 inhibitor, ezetimibe, or statin, Q1 2017−Q1 2022.

*Notes*: IQVIA Total Patient Tracker, Q1 2017−Q1 2022, U.S., data extracted April 2022. The nationally projected numbers of patients that filled any statin (represented by the dotted line on the secondary axis), ezetimibe, and proprotein convertase subtilisin kexin 9 (PCSK9) inhibitor (represented by the solid lines on the primary axis) from an outpatient retail pharmacy (excluding dental, veterinary, and naturopath specialty prescribers) regardless of concurrency. Dots represent when there was a statistically significant change in slope from joinpoint regression. There were no statistically significant changes in slope for statins.

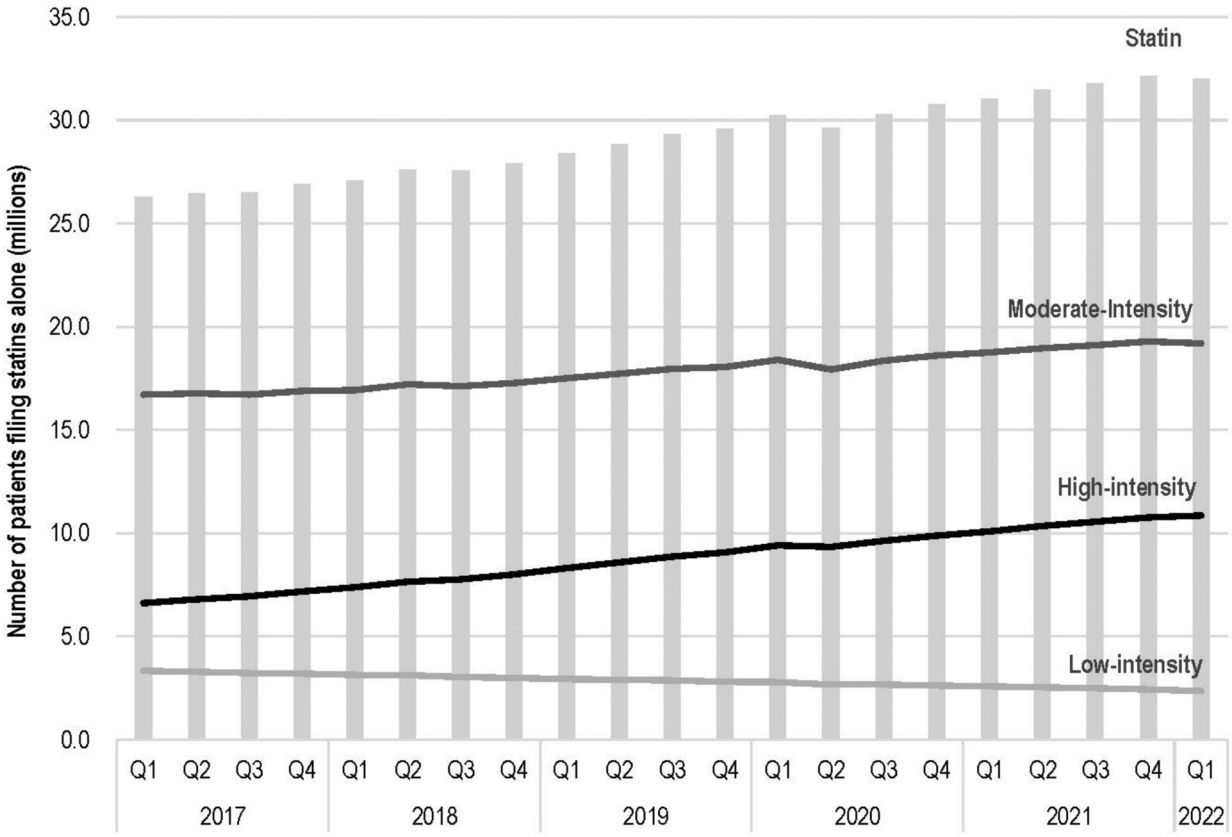



**Figure 2.**

Projected number of patients filling a statin alone from outpatient retail pharmacies, overall and stratified by statin intensity, Q1 2017–Q1 2022.

*Notes*: IQVIA Total Patient Tracker, Concurrency Tool, Q1 2017−Q1 2022, U.S., data extracted April 2022. The nationally projected number of patients that filled only a statin as a form of lipid-lowering medication (among statins, ezetimibe, and PCSK9 inhibitors) from U.S. outpatient retail pharmacies (excluding dental, veterinary, and naturopath specialty prescribers), stratified by statin intensity. Patient counts are estimates for each period and should not be summed, at the risk of double-counting patients who filled multiple products or appear in multiple time periods or multiple intensities during the times evaluated.

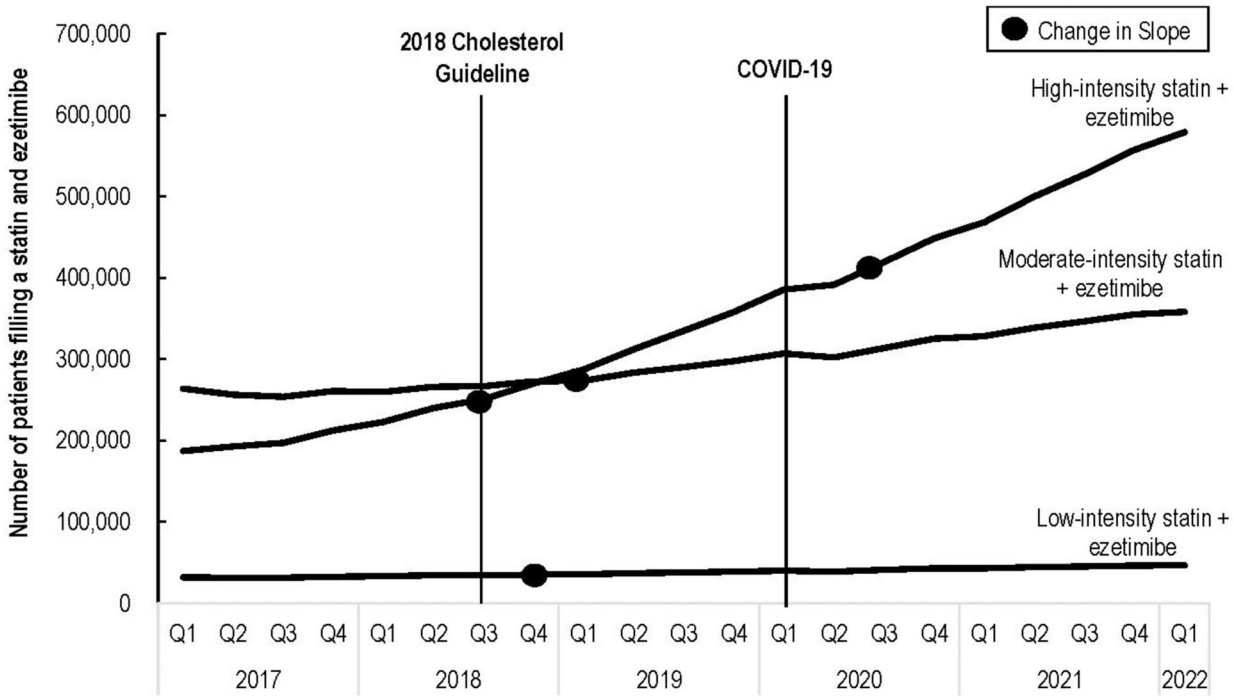



**Figure 3.**

Projected number of patients filling concurrent statin and ezetimibe from outpatient retail pharmacies, stratified by statin intensity, Q1 2017−Q1 2022.

*Notes*: IQVIA Total Patient Tracker, Concurrency Tool, Q1 2017−Q1 2022, U.S., data extracted April 2022. The nationally projected number of patients that filled a concurrent statin and ezetimibe from U.S. outpatient retail pharmacies (excluding dental, veterinary, and naturopath specialty prescribers), stratified by statin intensity. Dots represent when there was a statistically significant change in slope from joinpoint regression.

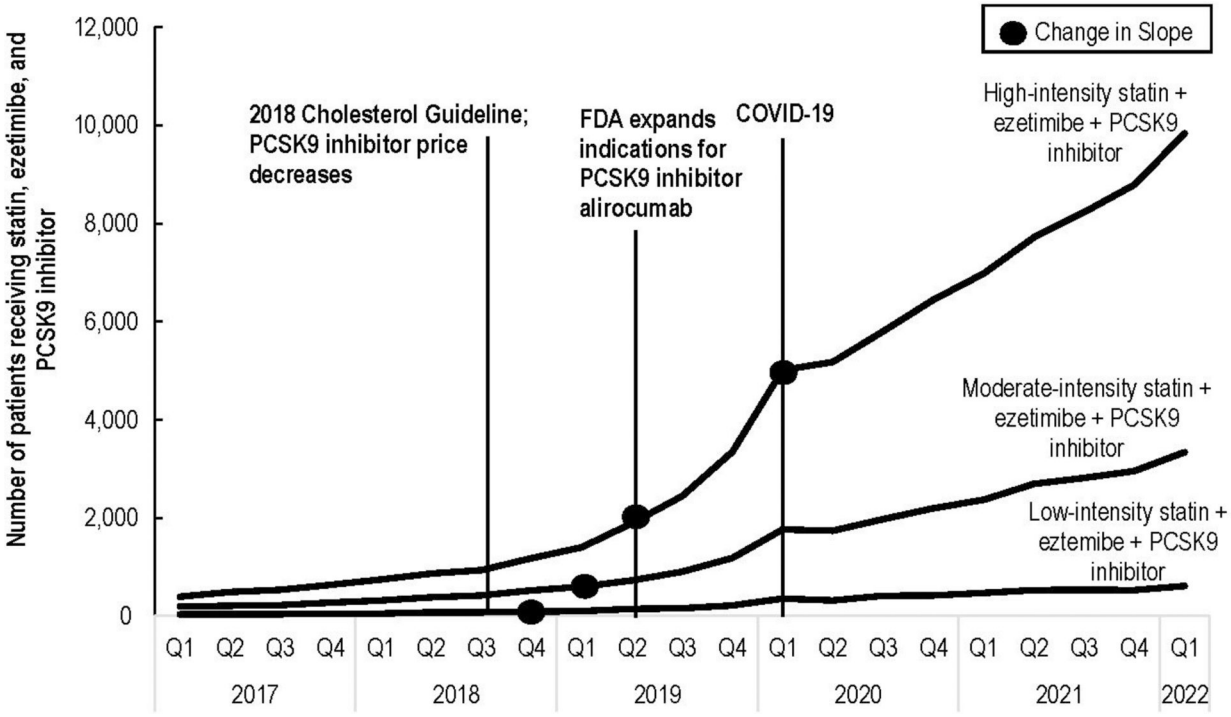



**Figure 4.**

Projected number of patients filling concurrent statin, ezetimibe, and PCSK9 inhibitor from outpatient retail pharmacies, stratified by statin intensity, Q1 2017−Q1 2022.

*Notes*: IQVIA Total Patient Tracker, Concurrency Tool, Q1 2017−Q1 2022, U.S., data extracted April 2022. The nationally projected number of patients that filled a concurrent statin, ezetimibe, and PCSK9 inhibitor from U.S. outpatient retail pharmacies (excluding dental, veterinary, and naturopath specialty prescribers), stratified by statin intensity. Dots represent when there was a statistically significant change in slope from joinpoint regression. In April 2019, the FDA broadened the indications for the PCSK9 inhibitor alirocumab to include secondary event prevention among patients with established cardiovascular disease.[5]