# Association Between Statin Use and New-Onset Diabetes in the US: A Retrospective Analysis Using RWE Data

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## Objective

Our objective is to assess the association between statin use and the incidence of new-onset diabetes (NODM) in the United States through a retrospective analysis.

## Methodology

- A retrospective cohort study utilizing de-identified Optum® Market Clarity data between January 1, 2018, and December 31, 2021.
- Incident hypercholesterolemia (HCL) was identified using ICD-10 codes (E78.0, E78.1, E78.2, E78.4, E78.5, E78.9).
- Inclusion criteria: Patients aged ≥18 years with at least two claims or electronic health records (EHR) for hypercholesterolemia diagnosis at least 30 days apart.
- Exclusion criteria: Patients with pre-existing diabetes, prior use of other lipid-lowering drugs, or pre-existing chronic conditions (CCI > 0) in the baseline period of 12 months from the index date.
- Index date: Second prescription fill date (within 6 months of initial statin prescription).
- Continuous eligibility was observed for 24 months post-index date.
- Patients with the first claim for diabetes in the post-index period were considered new-onset patients.
- Propensity score matching: 1:2 ratio for the cohorts matched on demographics.
    - Cohort 1: Patients who developed diabetes on statins.
    - Cohort 2: Patients who did not develop diabetes on statins.
- Clinical notes were analyzed for pre-existing conditions/symptoms of patients with diabetes on

## Results

- A total of 21,571,189 patients were identified with an incident HCL diagnosis.
- The study included 370,151 patients aged at least 18 years. There was no significant difference (p=0.169) between age groups (≤50 years, >50 years) (**Figure 1**) and gender (**Figure 2**) in the incidence of HCL.
- After applying the exclusion criteria, 149,793 patients were eligible for analysis, and only 50,667 (33.8%) patients had at least two statin prescriptions within 6 months.
- Out of 50,667 patients, 7.4% were diagnosed with diabetes during the post-index period, while 92.6% did not develop diabetes. The difference was not statistically significant (p = 0.06).
- The highest number of patients were prescribed atorvastatin (55%), followed by simvastatin (17.2%), rosuvastatin (16.5%), pravastatin (5%), and other statins (6.3%).
- Among statin users, rosuvastatin was associated with the highest percentage of diabetes cases (8.2%), followed by pravastatin (7.6%) and atorvastatin (7.5%). These differences were statistically significant (p ≤ 0.001) (**Figure 4**).
- The average duration for developing diabetes after initiating statin use was over 300 days, irrespective of the statin type.
- Upon reviewing clinical notes, patients diagnosed with diabetes frequently had multiple mentions of diabetes and its symptoms, followed by weight gain or obesity, sleep deprivation, prediabetes, and hyperglycemia (**Figure 5**).

**Figure 1. Age Distribution Among HCL Patients (in Years)**

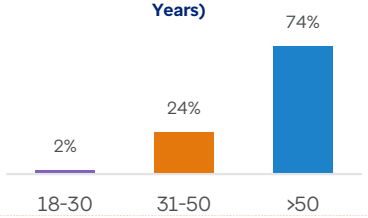


**Figure 2. Gender Distribution Among HCL Patients**

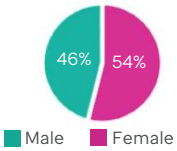


**Figure 3. Patients on Statin Therapy With and Without Diagnosis of Type 2 Diabetes**

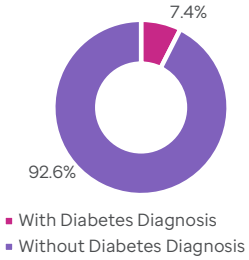


**Figure 4. Association between Statin Type & Type 2 Diabetes Diagnosis**

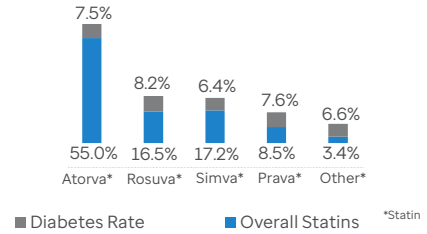


**Figure 5. Terms Identified on Exploring Clinical Notes (n=number of repetitions)**


## Conclusions

- Newer statins have a lower incidence of diabetes compared to older statins (rosuvastatin/atorvastatin).
- Patients on statins require intensive monitoring of blood sugar levels and clinical symptoms for efficient management of diabetes.
- To better predict the development of diabetes in patients on statins, predictive models using NLP techniques should be developed using claims data.
- Limitation: The impact of lifestyle could not be excluded due to limited information in claims data and clinical notes.

References: Ko, Min Jung, et al. "Time-and dose-dependent association of statin use with risk of clinically relevant new-onset diabetes mellitus in primary prevention: a nationwide observational cohort study." *Journal of the American Heart Association* 8.8 (2019): e011320.

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