

Rates of Acute Pancreatitis and Cardiovascular Events among Adults with Severe Hypertriglyceridemia in US Clinical Practice

Seth J. Baum¹, Asia Sikora Kessler², Emily Kutrieb³, Montserrat Vera Llonch², Alex Lonshteyn³, Derek Weycker³, Daniel E. Soffer⁴

¹Flourish Research, Boca Raton, FL, USA; ²Ionis Pharmaceuticals Inc., Boston, MA, USA; ³Avalere Health, Boston, MA, USA; ⁴University of Pennsylvania Health System, Philadelphia, PA, USA

BACKGROUND

- Elevated triglycerides (TGs), defined as TG ≥ 150 mg/dL, affect roughly a quarter of adults in the United States¹:
 - Prevalence is substantially higher among certain subgroups, such as adults with diabetes
- Additionally, ~2% of US adults have severely elevated TGs, or severe hypertriglyceridemia (sHTG), defined as TG ≥ 500 mg/dL¹⁻³
- Elevated TGs—and especially sHTG—remain a key public health concern due to increased risks of acute pancreatitis (AP) and cardiovascular (CV) events⁴⁻⁵
- Recent real-world evidence on rates of AP and CV events among US adults with elevated TGs, overall and within important subgroups, is currently lacking

OBJECTIVE

- To estimate rates of AP and CV events among subgroups of adults defined by TG level in US clinical practice, on an overall basis and for those with additional risk factors

METHODS

Study Design and Data Source

- Retrospective observational cohort design
- Healthcare claims and lab results from the Merative MarketScan Research Databases (01/13-12/19):
 - Commercial Claims and Encounters Database
 - Medicare Supplemental and Coordination of Benefits Database
 - Labs Database

Study Population

- Study population comprised adults with ≥ 1 TG value (01/01/14-12/31/2018) and was stratified based on the first observed TG value:
 - <150 [normal], 150-499, 500-879, ≥ 880 mg/dL
- Adults without continuous healthcare enrollment during the 1-year period prior to the first TG value (“history period”) were excluded

Study Measures

- AP and CV events were identified via hospitalizations with a corresponding principal diagnosis code and were ascertained from the first observed TG value through the end of the study period:
 - CV events included hospitalizations for heart disease (e.g., myocardial infarction, unstable angina), cerebrovascular disease (e.g., stroke, transient ischemic attack [TIA]), and heart failure

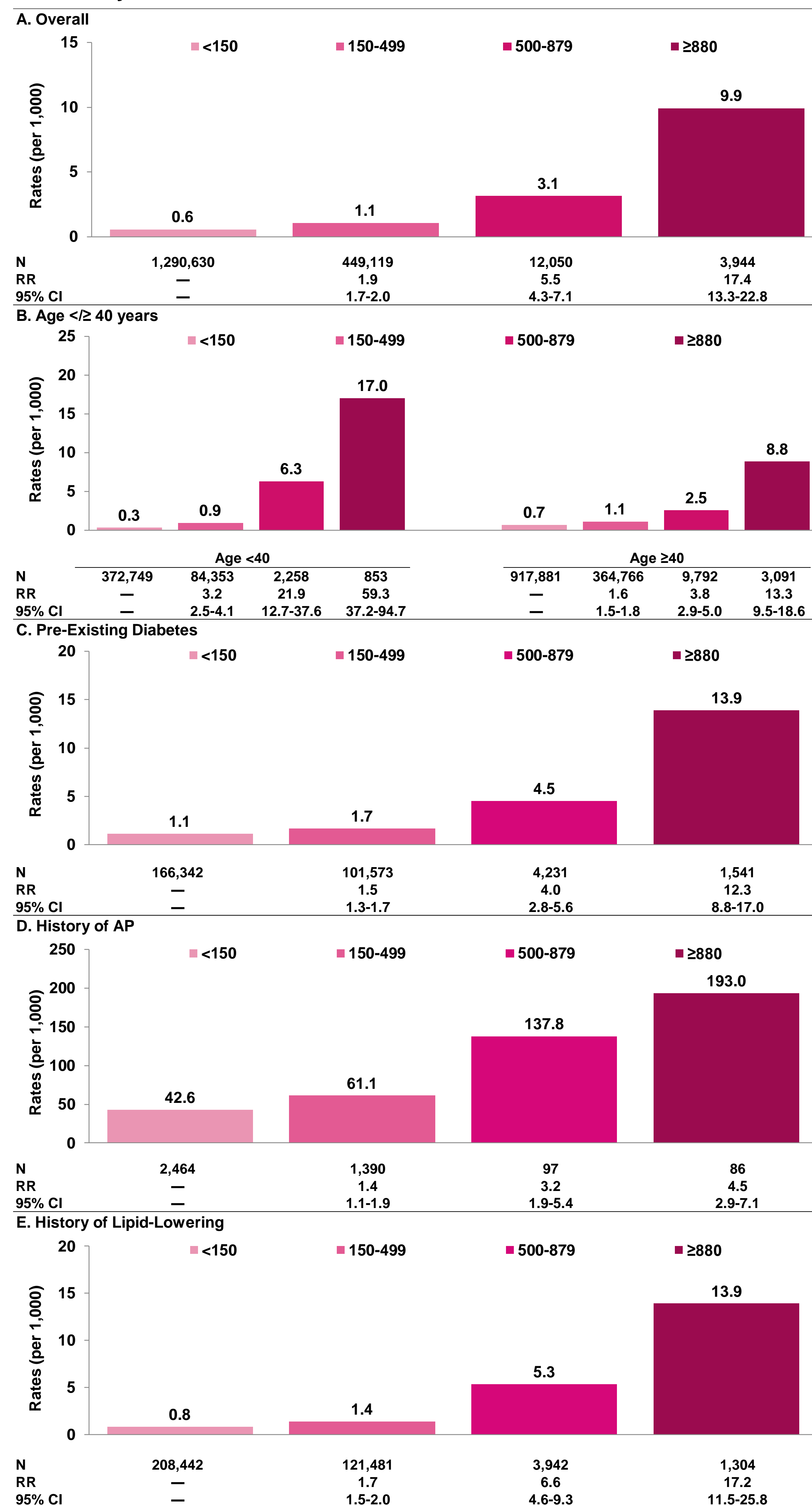
Statistical Analyses

- Rates of AP and CV events were expressed per 1,000 person-years (PY), and were estimated for each TG-specific subgroup, overall and for subsets defined therein based on:
 - Age (<40, ≥ 40 years), pre-existing diabetes, history of AP, history of CV event, and history of lipid-lowering therapy, respectively

RESULTS

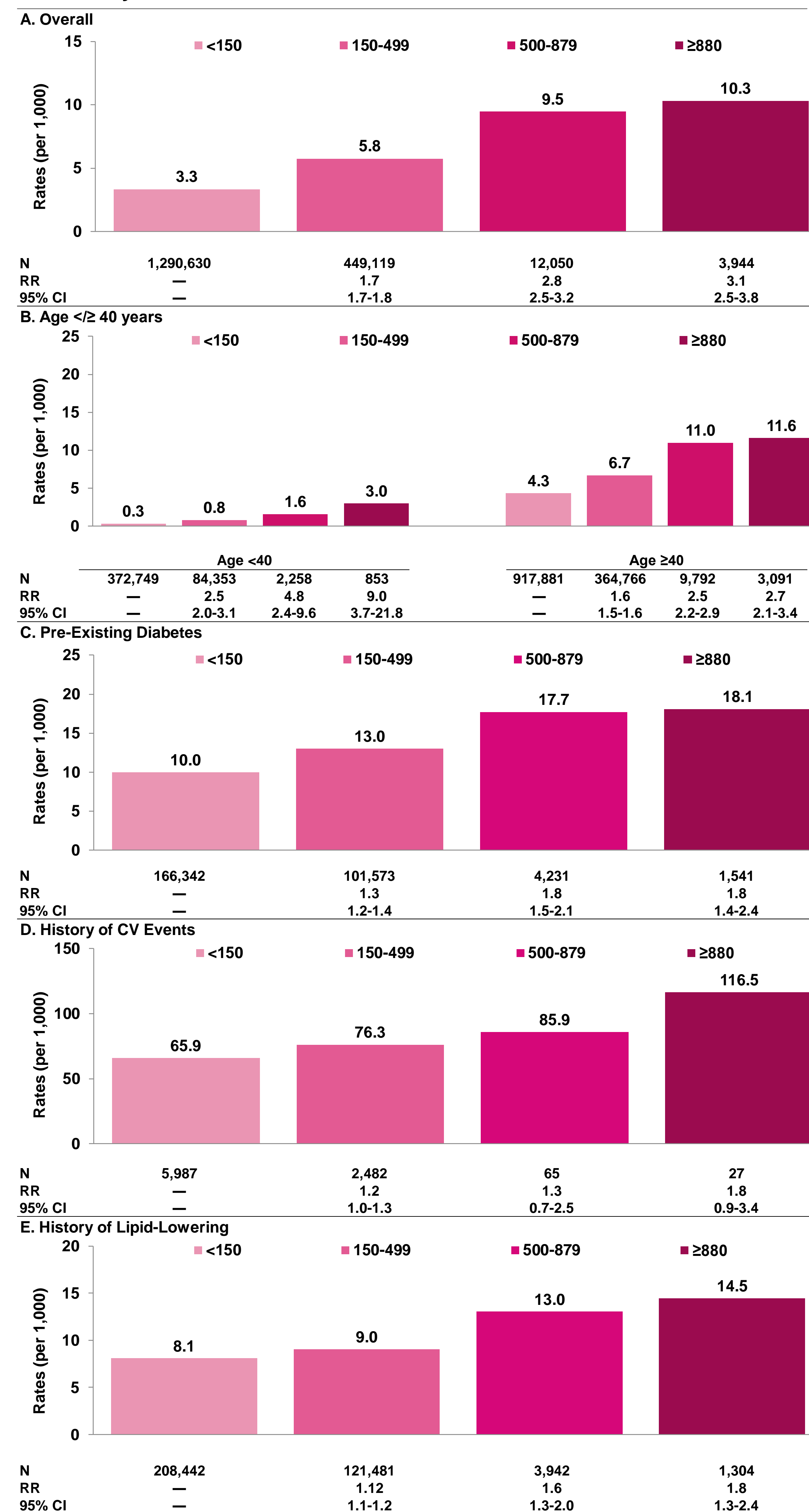
- Rates of AP per 1,000 PY increased monotonically from lowest TG subgroup (<150: 0.6) to highest TG subgroup (≥ 880 : 9.9), corresponding to a relative rate of 17.4 (Figure 1A)
- AP rates were particularly high among adults in the TG ≥ 880 subgroup who also had a history of AP (193.0; Figure 1D), pre-existing diabetes (13.9; Figure 1C), or a history of lipid-lowering therapy (13.9; Figure 1E), or who were aged <40 years (17.0; Figure 1B)

FIGURE 1: Rates and relative rates of AP among subgroups of adults defined by TG level, overall and for those with additional risk factors



- Rates of CV events per 1,000 PY also increased monotonically from lowest TG value (<150: 3.3) to highest TG value (≥ 880 : 10.3), corresponding to a relative rate of 3.1 (Figure 2a)
- CV event rates were highest among adults in the TG ≥ 880 subgroup who also had a history of CV events (116.5; Figure 2D), pre-existing diabetes (18.1; Figure 2C), or a history of lipid-lowering therapy (14.5; Figure 2E)

FIGURE 2: Rates and relative rates of CV events among subgroups of adults defined by TG level, overall and for those with additional risk factors



LIMITATIONS

- Patients' fasting status at the time of TG testing is unknown
- Patients were stratified into TG-specific subgroups based on the first observed value during the case-ascertainment window; however, evidence of a single elevated TG value may not indicate sHTG
- Identification of AP and CV events was based on corresponding diagnosis codes; operational algorithms have not been validated
- Rates of AP and CV events may be downwardly biased as only those requiring hospitalization were considered in analyses

CONCLUSIONS

- Rates of AP and CV events were substantially higher among adults with elevated TG values and increased monotonically from lowest TG value to highest TG value
- Rates of AP and CV events were particularly high among sHTG patients with other risk factors (or proxies for risk factors)
- Understanding the magnitude of disease risk among sHTG patients, with increasing levels of TGs as well as within important subgroups, is critical to improving patient care and outcomes

REFERENCES

- Fan W et al. Prevalence of US adults with triglycerides ≥ 150 mg/dl: NHANES 2007-2014. *Cardiol Ther* 2020;9(1):207-213
- Christian JB et al. Prevalence of severe (500 to 2,000 mg/dl) hypertriglyceridemia in United States adults. *Am J Cardiol* 2011;107(6):891-897
- Pothoulakis I et al. Association of serum triglyceride levels with severity in acute pancreatitis: Results from an international, multicenter cohort study. *Digestion* 2021;102(5):809-813
- Carroll M et al. Trends in elevated triglyceride in adults: United States, 2001-2012. *NCHS Data Brief* 2015 (198):198
- Ginsberg HN et al. Triglyceride-rich lipoproteins and their remnants: metabolic insights, role in atherosclerotic cardiovascular disease, and emerging therapeutic strategies—a consensus statement from the European Atherosclerosis Society. *Eur Heart J* 2021;42(47):4791-4806

DISCLOSURES

Avalere Health, Seth J. Baum, and Daniel E. Soffer received funding for this research from Ionis Pharmaceuticals