OLEZARSEN IN PATIENTS WITH SEVERE HYPERTRIGLYCERIDEMIA

Primary Results of CORE-TIMI 72a & CORE2-TIMI 72b

Nicholas A. Marston, Brian A. Bergmark, Veronica J. Alexander, Thomas A. Prohaska, Yu Mi Kang, Filipe Moura, Andre Zimerman, Elaine Waldman, Julie Weinland, Shuanglu Zhang, Erica L. Goodrich, Sabina A. Murphy, Shuting Xia, Dan Li, Sotirios Tsimikas, Robert P. Giugliano, Marc S. Sabatine on behalf of the CORE and CORE2 Investigators

#AHA25

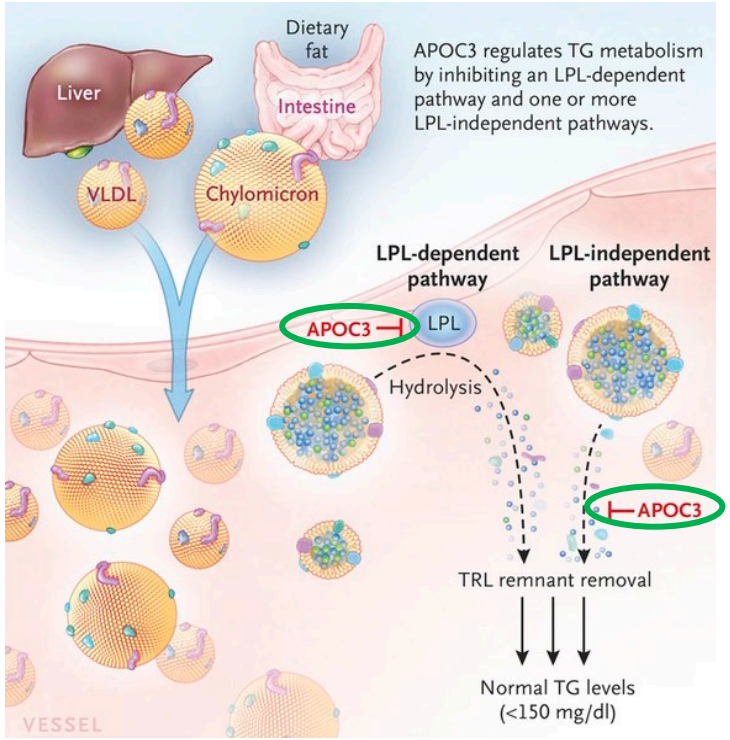
DISCLOSURES

CORE-TIMI 72a and **CORE2-TIMI 72b** were funded by Ionis Pharmaceuticals.

NAM: Clinical trials / Research support: Amgen, Ionis, Marea, Pfizer, Novartis, and AstraZeneca. Consultant: Amgen, New Amsterdam, Ionis, Janssen, Radence, Cleerly, Inc, AMPEL BioSolutions. Honoraria for Lecture / CME Programs: Illumina, Amgen, Medical Education Speakers Network (MESN).

The **TIMI Study Group** has received institutional research grant support through Brigham and Women's Hospital from Abbott, Abiomed, Inc., Amgen, Anthos Therapeutics, ARCA Biopharma, Inc., AstraZeneca, Boehringer Ingelheim, Cleerly, Inc., Daiichi-Sankyo, Ionis Pharmaceuticals, Inc., Janssen Research and Development, LLC, MedImmune, Merck, Novartis, Pfizer, Softcell Medical Limited, The Medicines Company.

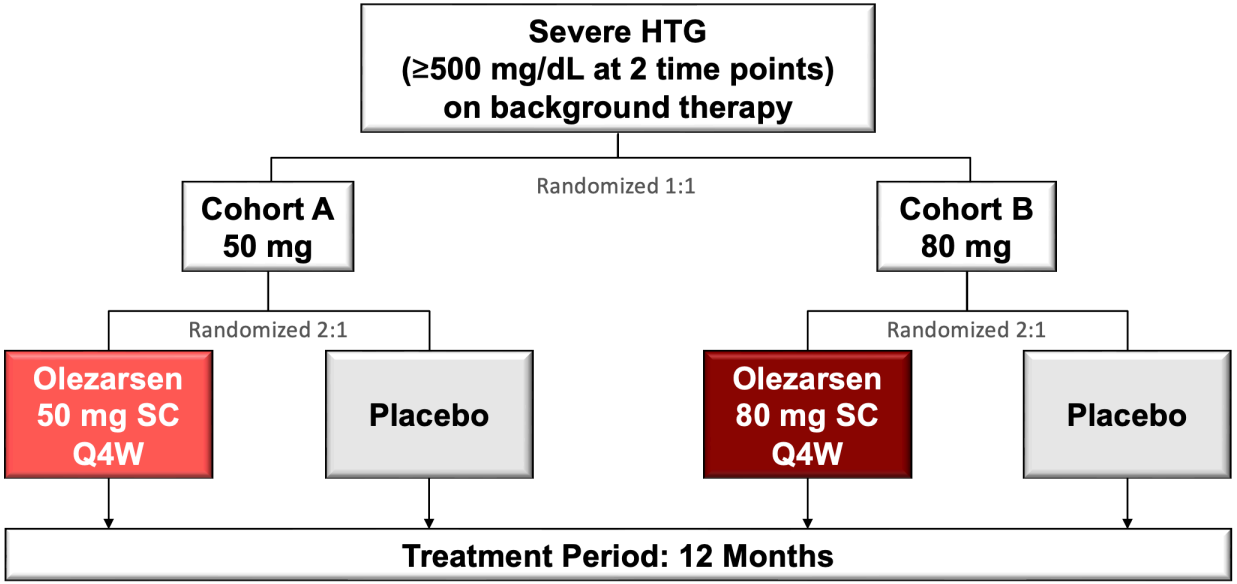
BACKGROUND



- Severe hypertriglyceridemia (sHTG), defined as triglycerides (TGs) of 500 mg/dL (5.65 mmol/L) or greater, carries an increased risk of acute pancreatitis
- Apolipoprotein C-III (APOC3) inhibits:
  - lipoprotein lipase, a key enzyme in TG metabolism
  - hepatic uptake of TG-rich lipoproteins (TRLs)
- Olezarsen is an antisense oligonucleotide targeting APOC3 that promotes the breakdown and clearance of TRLs, yet its effect on severe hypertriglyceridemia and acute pancreatitis risk is unclear

CORE-TIMI 72A & CORE2-TIMI 72B

Identically designed



PEP (each trial): Pbo-adj % Δ in triglycerides at 6 months for each dose
SEP (each trial): % Δ in TGs at 12 mos, % Δ in ApoC-III, Rem-C, non-HDL-C at 6 & 12 mo
SEP (pooled): % achieving <880 & 500 mg/dL, acute pancreatitis, Δ in hepatic fat
Safety (pooled): ALT/AST, renal function, platelets

2 trials performed in accordance with regulatory guidance
PEP, primary endpoint; SEP, secondary endpoint

TRIAL ORGANIZATION

TIMI Study Group

Marc Sabatine (Chair)
Robert Giugliano (Sr Investigator)
P. Fish & A. Jevne (Ops)

Nicholas Marston (PI)
Brian Bergmark (Investigator)
S. Murphy, E. Goodrich, S. Zhang, JF. Kuder (Stats)

Sponsor: Ionis

Sotirios Tsimikas (SVP, Global CV Dev)
Vickie Alexander (Exec Director, Clin Dev)

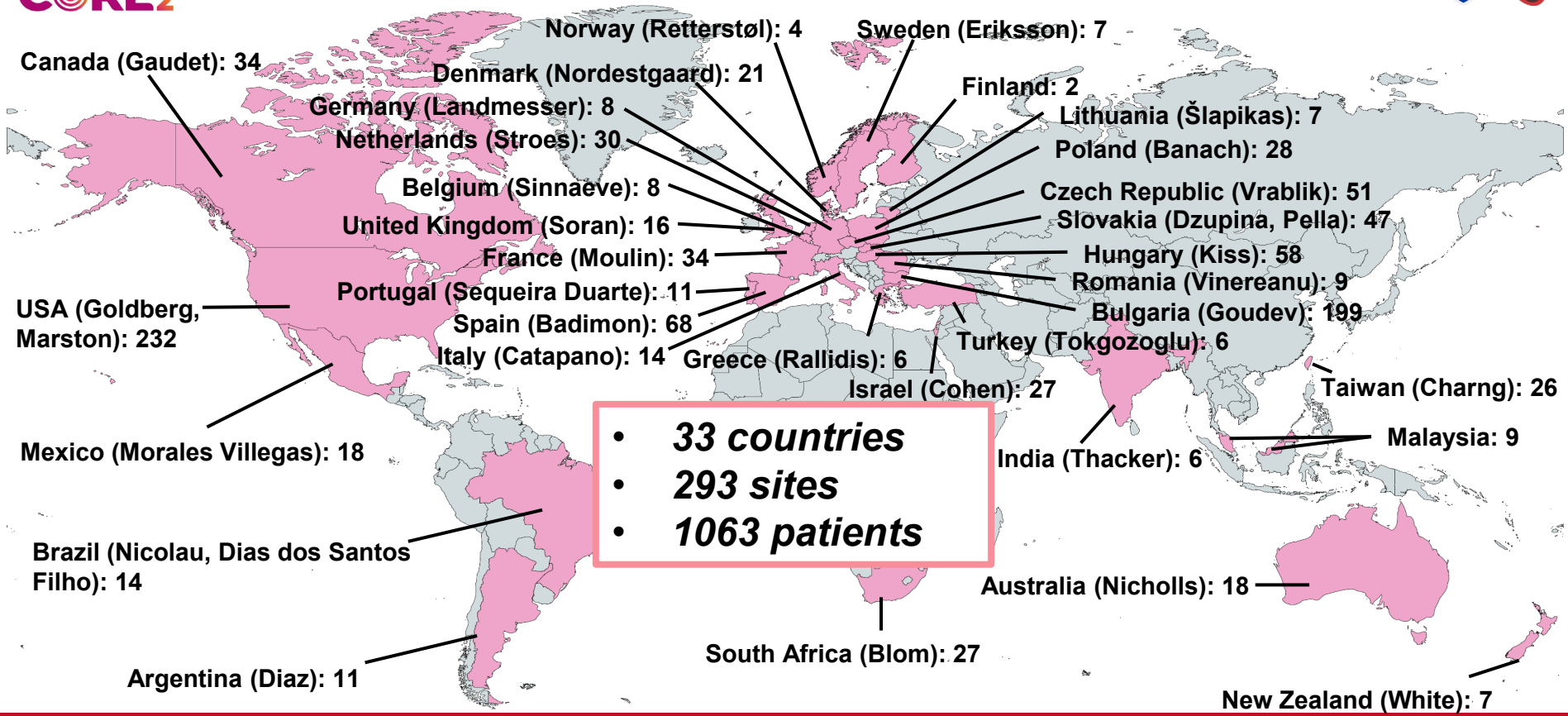
Thomas Prohaska (Medical Director, Clin Dev)
Dan Li, Shuting Xia (Stats)

Independent Data Monitoring Committee

Richard Becker (Chair)
Jamie Dwyer
Willis Maddrey

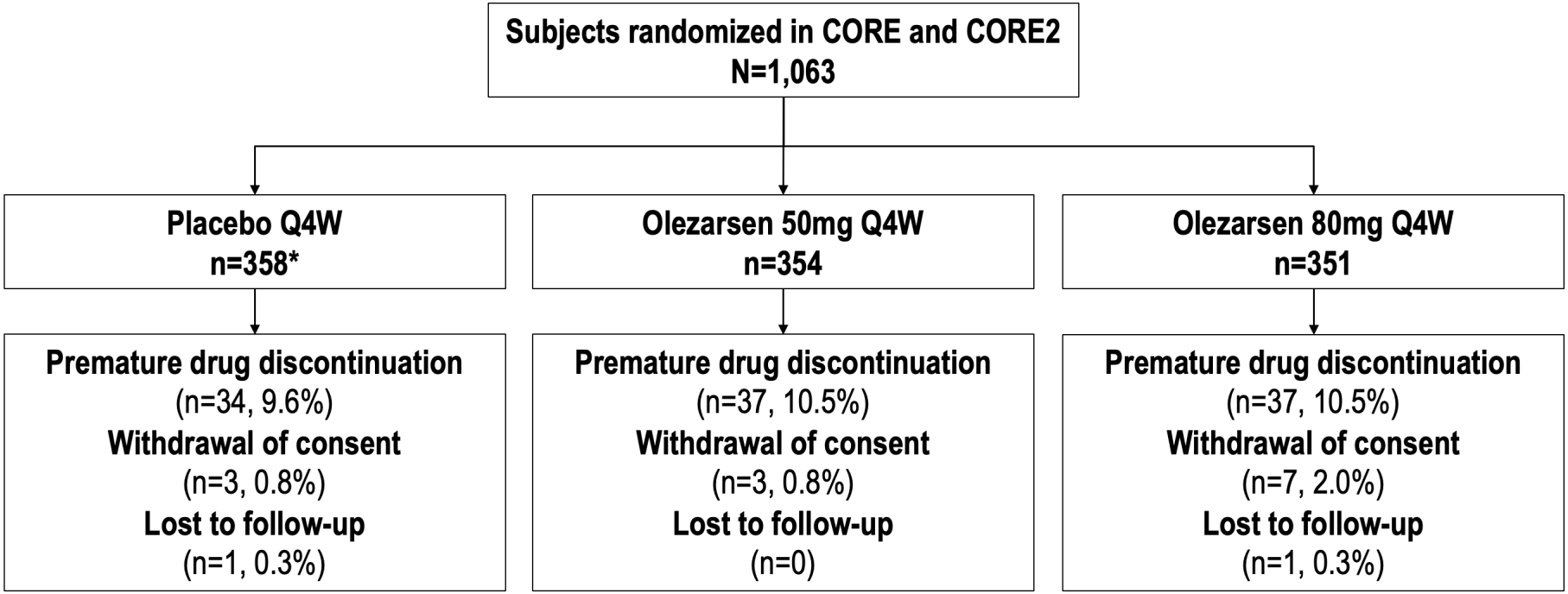
Charles Davis (Statistician)
François Mach
James Freston

GLOBAL ENROLLMENT



- ***33 countries***
- ***293 sites***
- ***1063 patients***

PATIENT DISPOSITION



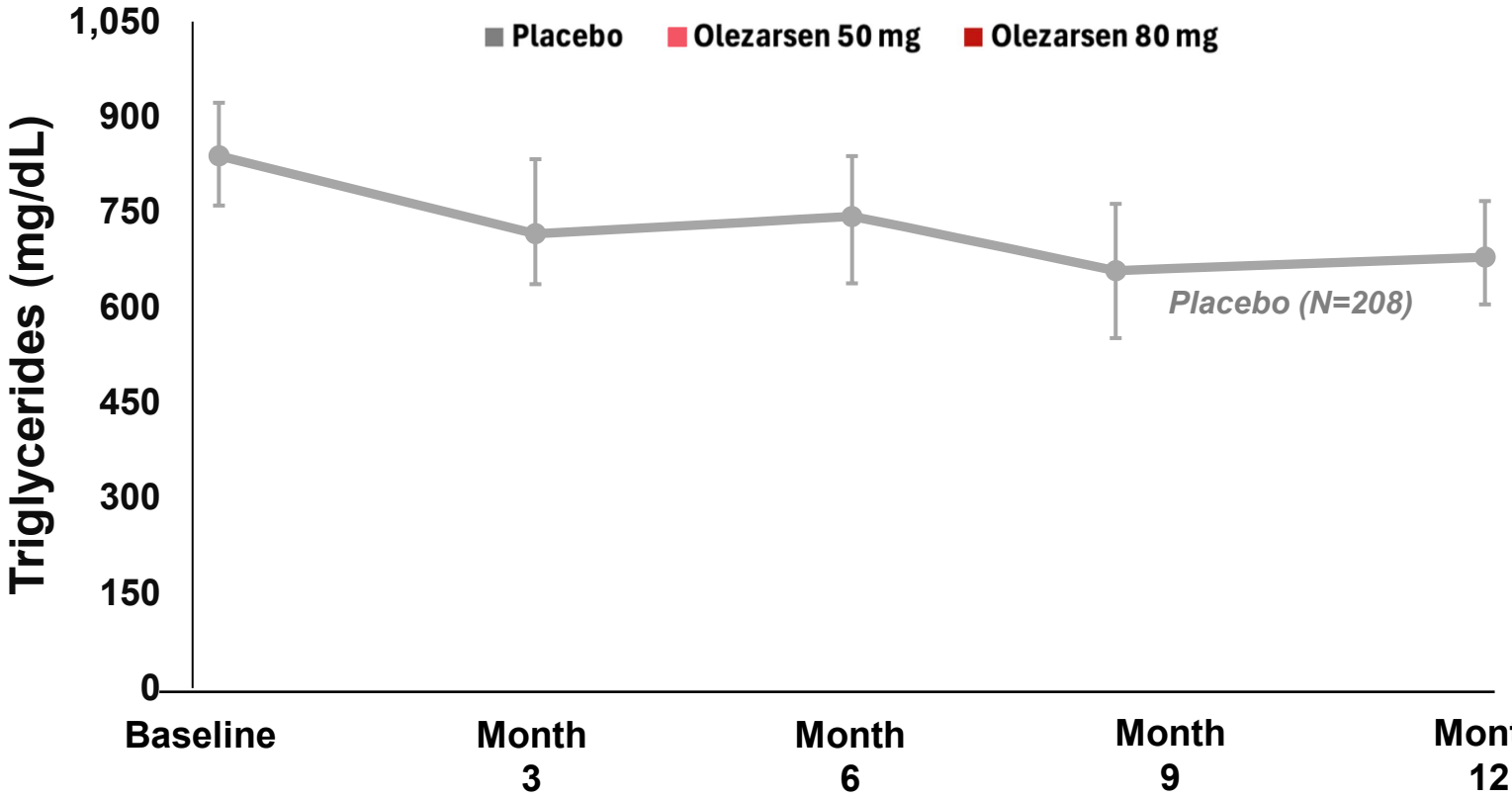
*Two patients in the placebo arm did not receive IP and so were not included in the primary analysis

BASELINE CHARACTERISTICS

	CORE N=617	CORE2 N=444
Age (yrs)	54 (45, 61)	54 (47, 62)
Female sex	24%	23%
Race/Ethnicity		
White	93%	82%
Hispanic/Latino	5%	22%
Body Mass Index (kg/m^2)	31 (28, 35)	31 (28, 35)
Diabetes mellitus	60%	69%
Triglycerides (mg/dL)	832 (602, 1382)	748 (584, 1136)
History of Pancreatitis	23%	13%
Any Lipid Lowering Therapy	99%	99%
Statin	72%	77%
Fibrate	66%	60%
Omega-3 fatty acid	34%	30%
≥2 Lipid-lowering therapies	67%	63%

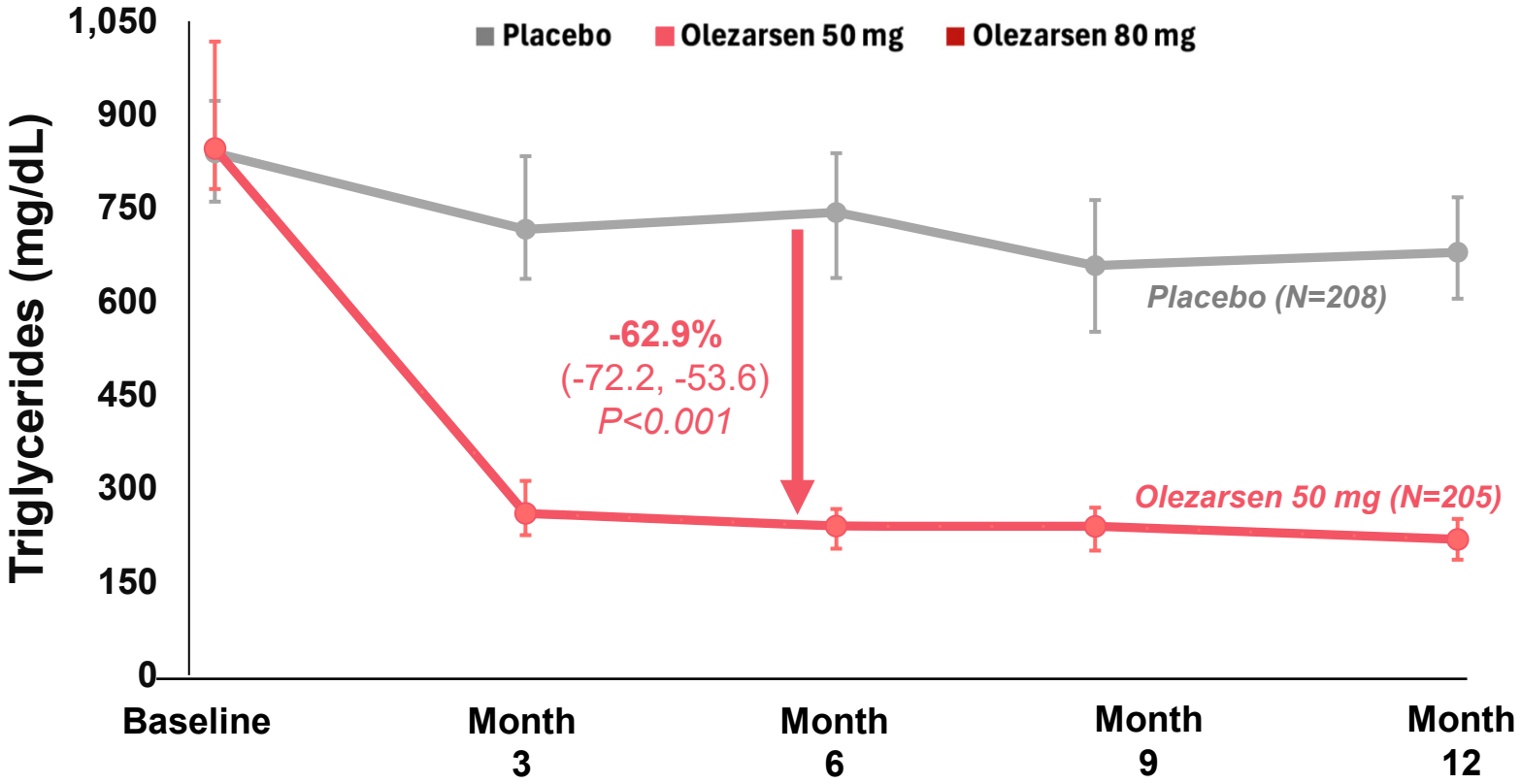
Continuous variables listed as median (IQR)
Baseline variables balanced by treatment arm

PRIMARY ENDPOINT: CORE-TIMI 72A



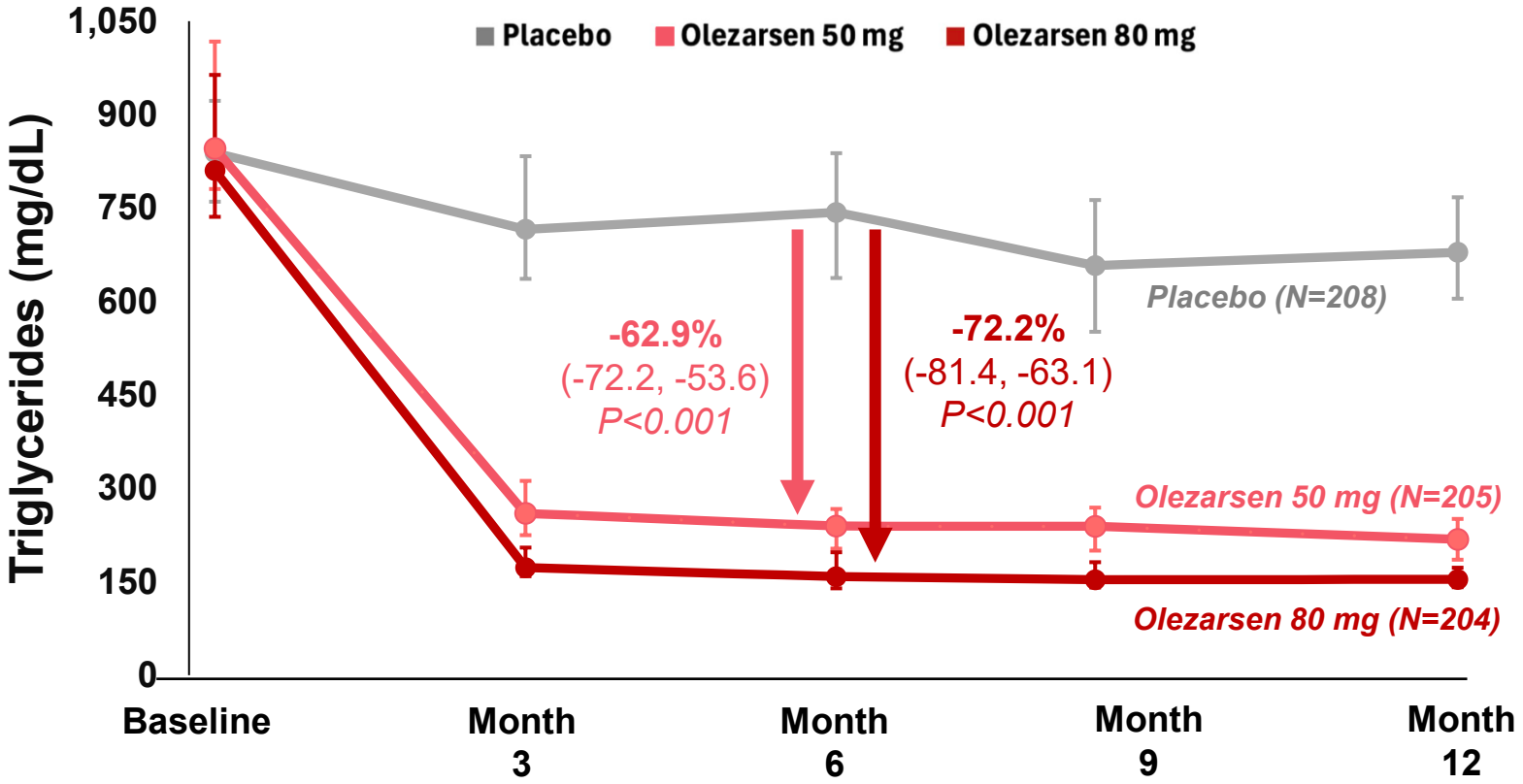
Values plotted are median (95% CI). Differences are placebo-adjusted least squares mean change in TG levels.

PRIMARY ENDPOINT: CORE-TIMI 72A



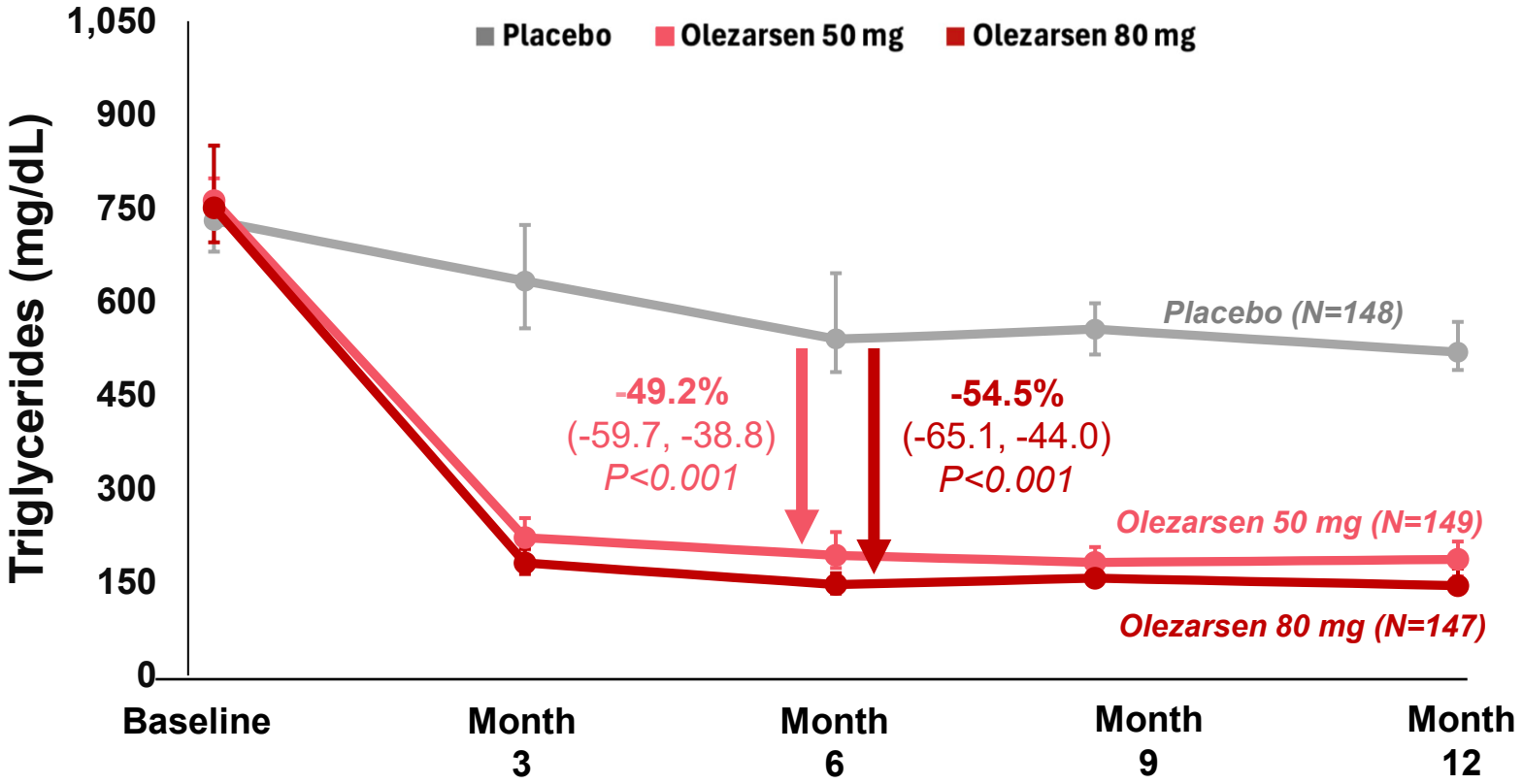
Values plotted are median (95% CI). Differences are placebo-adjusted least squares mean change in TG levels.

PRIMARY ENDPOINT: CORE-TIMI 72A



Values plotted are median (95% CI). Differences are placebo-adjusted least squares mean change in TG levels.

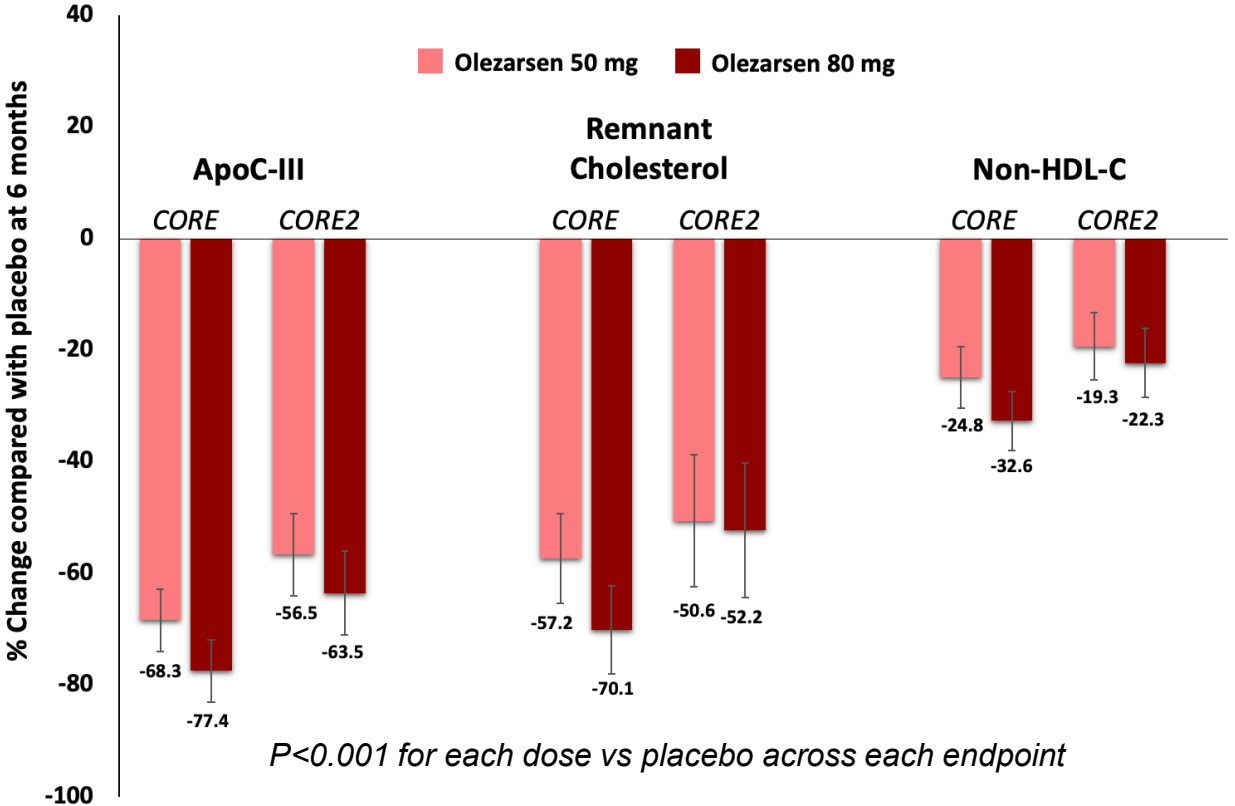
PRIMARY ENDPOINT: CORE2-TIMI 72B



Values plotted are median (95% CI). Differences are placebo-adjusted least squares mean change in TG levels.

SECONDARY LIPID ENDPOINTS

at 6 months

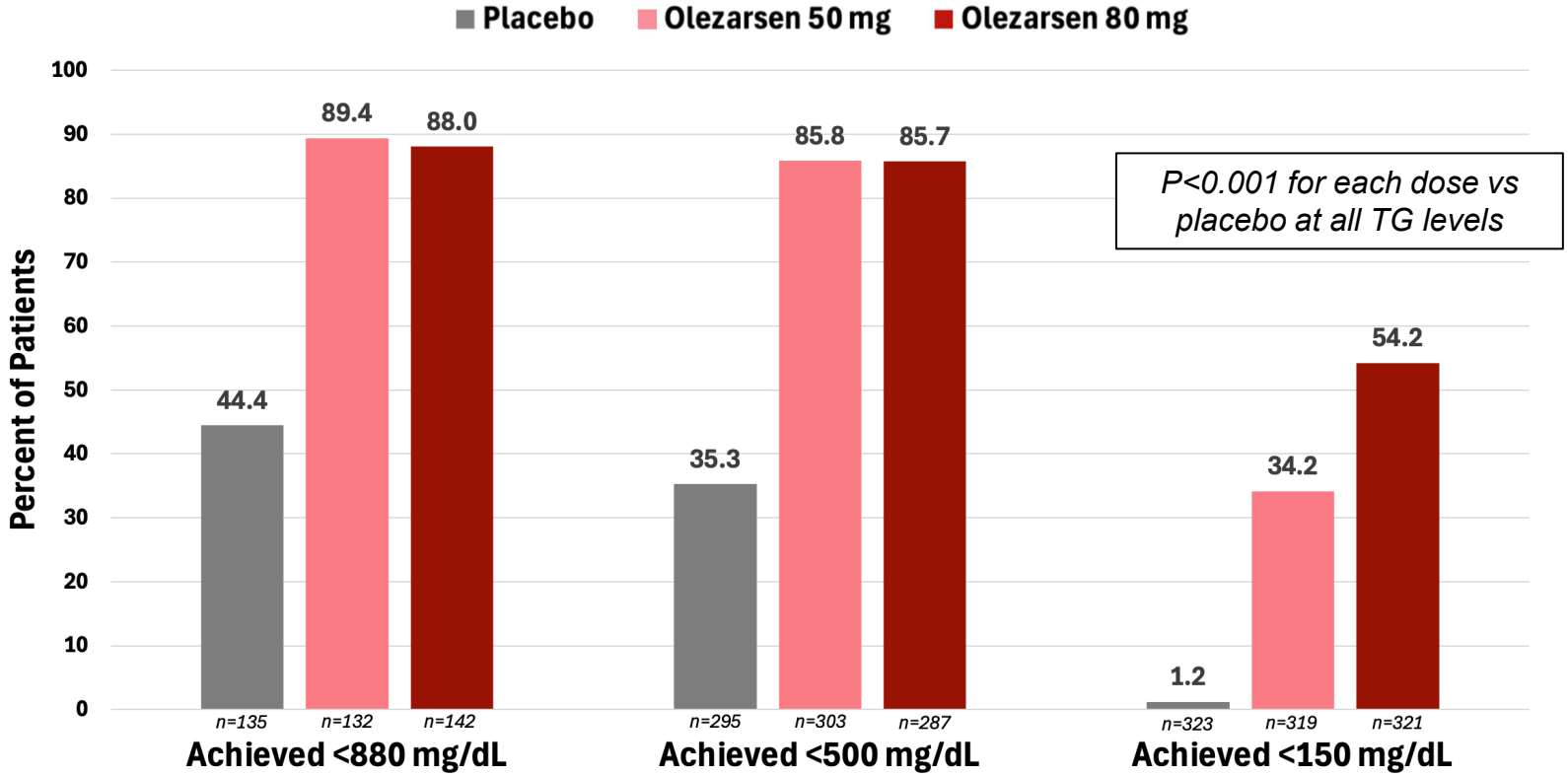


P<0.001 for each dose vs placebo across each endpoint

Error bars represent 95% CIs

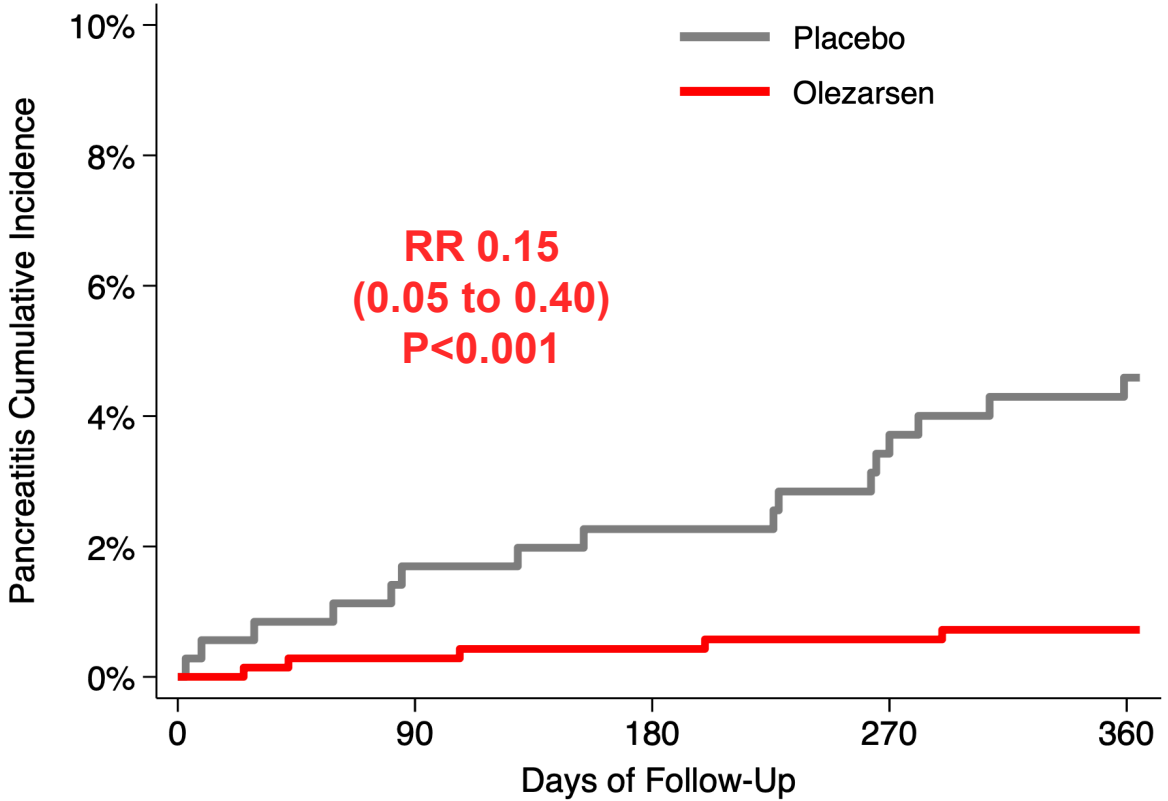
ACHIEVED TG LEVELS AT 12 MONTHS

Pooled analysis across trials



ACUTE PANCREATITIS

Pooled analysis across both doses and trials

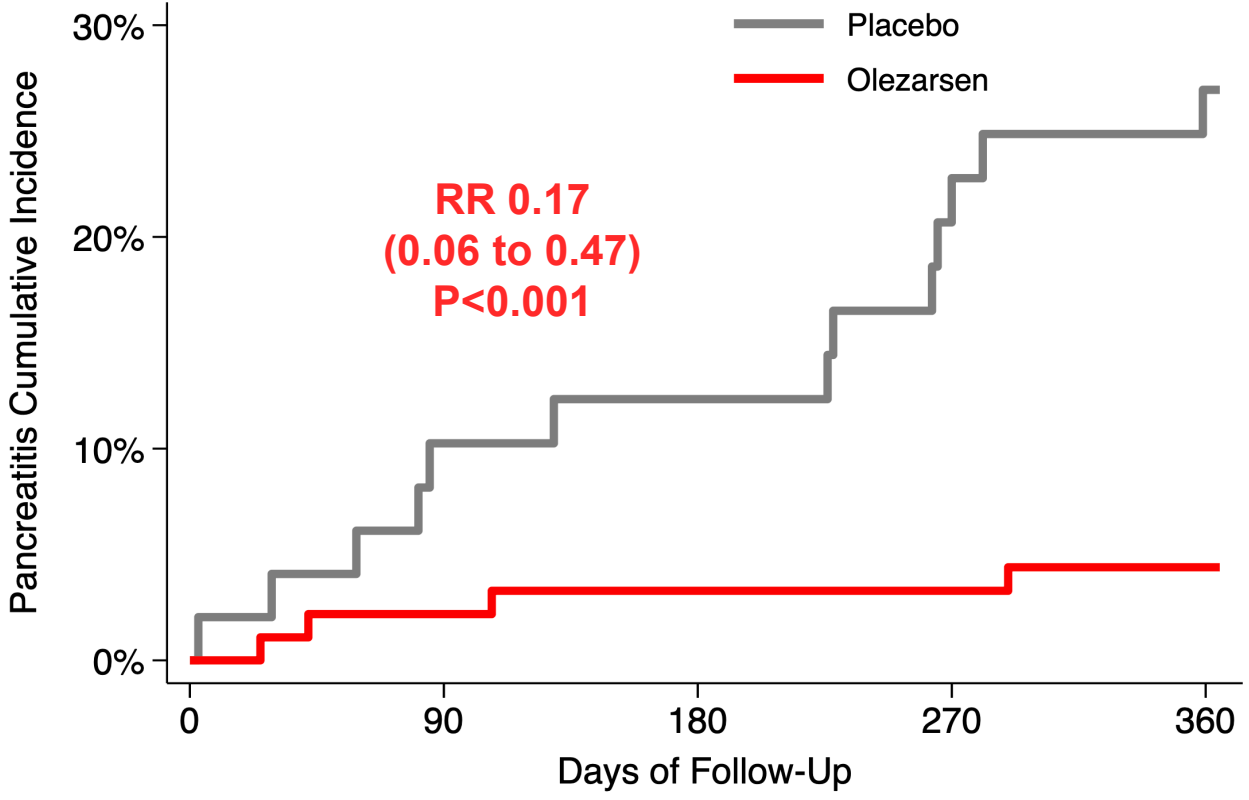


ARR in incidence of total events = 5.2%

NNT over 1 year = 20

ACUTE PANCREATITIS

Prespecified Subgroup with TGs ≥880 mg/dL + Prior AP (N=141)



ARR in incidence of total events = 32.5%

NNT over 1 year = 4

KEY SAFETY PARAMETERS

Pooled analysis across trials

Treatment-emergent adverse events	Placebo N=356	Olezarsen 50 mg N=354	P-value vs Placebo	Olezarsen 80 mg N=351	P-value vs Placebo
Any	75%	75%	0.86	76%	0.64
Leading to drug discontinuation	2%	3%	0.25	4%	0.09
Serious	14%	9%	0.04	11%	0.24
Leading to drug discontinuation	0.3%	1%	0.22	0.6%	0.57
Any Injection Site Reaction	1%	10%	<0.001	17%	<0.001
Mild	1%	10%		15%	
Moderate	0	1%		3%	
Severe	0	0		0	

OTHER PARAMETERS

Pooled analysis across trials

	Placebo	Olezarsen 50 mg	P-value vs Placebo	Olezarsen 80 mg	P-value vs Placebo
Hepatic parameters*					
ALT or AST ≥3x ULN	2%	3%	0.60	7%	0.003
ALT or AST ≥5x ULN	1%	1%	0.99	1%	0.47
Total bilirubin ≥2x ULN	<1%	<1%	0.99	1%	0.56
Absolute change in HFF (%)	0.14	2.28	0.052	4.18	<0.001
Platelet count					
<100K/uL	3%	2%	0.26	7%	0.03
<75K/uL	2%	1%	0.18	2%	0.76
Glycemic measures					
HbA1c (%), pbo-adjusted change		0.25	0.006	0.24	0.009

Patients with ALT/AST <3x ULN at screening/qualification were allowed to be enrolled
*There were no cases meeting Hy's Law criteria

HFF = hepatic fat fraction, measured at baseline & 12 months as part of MRI substudy (n=252). Baseline HFF = 14.3%.

SUMMARY & CONCLUSION

- **Among patients with severe hypertriglyceridemia, olezarsen:**
  - Lowered triglycerides by ~65%, which is more than conventional therapies
  - Resulted in >85% of patients achieving levels below 500 mg/dL
  - Reduced the risk of acute pancreatitis by 85%, a first in sHTG
  - Was generally well-tolerated, with ongoing monitoring in the OLE

- **These findings support the use of olezarsen in patients with severe hypertriglyceridemia to reduce triglyceride levels and risk of acute pancreatitis**

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Olezarsen for Managing Severe Hypertriglyceridemia and Pancreatitis Risk

Nicholas A. Marston, M.D., MPH,[1,2] Brian A. Bergmark, M.D.,[1,2]
Veronica J. Alexander, Ph.D.,[3] Thomas A. Prohaska, M.D., Ph.D.,[3]
Yu Mi Kang, M.D., Ph.D.,[1,4] Filipe A. Moura, M.D., Ph.D.,[1,5,6]
Andre Zimerman, M.D., Ph.D.,[1,7] Elaine Waldman, MBA,[3] Julia Weinland, BSN,[3]
Sabina A. Murphy, MPH,[1,2] Erica L. Goodrich, MS,[1,2] Shuanglu Zhang, MPH,[1,2]
Shuting Xia, MS,[3] Dan Li, Ph.D.,[3] Anne C. Goldberg, M.D.,[8]
Assen Goudev, M.D., Dsc,[9] Lina Badimon, Ph.D.,[10-12]
Robert Gabor Kiss, M.D., Ph.D.,[13,14] Michal Vrablik, M.D., Ph.D.,[15]
Daniel Gaudet, M.D., Ph.D.,[16,17] Philippe Moulin, M.D., Ph.D.,[18]
Erik S.G. Stroes, M.D., Ph.D.,[19] Maciej Banach, M.D., Ph.D.,[20]
Hofit Cohen, M.D.,[21] Dirk Blom, MBChB, Ph.D.,[22] Min-Ji Charng, M.D., Ph.D.,[23]
Børge G. Nordestgaard, M.D., Ph.D.,[24] Stephen J. Nicholls, M.D.,[25]
Sotirios Tsimikas, M.D.,[3,26] Robert P. Giugliano, M.D., SM,[1,2]
and Marc S. Sabatine, M.D., MPH,[1,2]
for the CORE-TIMI 72a and CORE2-TIMI 72b Investigators

www.timi.org

Nicholas Marston, MD, MPH
nmarston@bwh.harvard.edu