

Clinical outcomes among patients with metabolic dysfunction-associated steatohepatitis (MASH) in France: a real-world claims analysis

Boursier, J^{1,2}; Fontvieille, E³; Vimont, A³; Boer, F⁴; Bardot, P⁴; Daumont, M⁴; Kim, Y⁴; Parrinello, CM⁴; Durand-Zaleski, I⁵

¹ Université d'Angers, HIFIH, SFR ICAT, Angers, France; ² Department of Hepato- Gastroenterology and Digestive Oncology, CHU Angers, Angers, France. ³ Cencora, Paris, France; ⁴ Madrigal Pharmaceuticals, Inc, West Conshohocken, PA, USA; ⁵ URCEco, Hôpital Hôtel Dieu, AP-HP, Paris, France

OBJECTIVES

- Metabolic dysfunction-associated steatohepatitis represents a significant health concern that imposes a considerable economic burden on healthcare systems.(1,2)
- Given the rising prevalence of MASH in France (3), it is crucial to estimate the up-to-date clinical burden of the disease.
- The study aimed to describe real-world incidence of liver disease progression, cardiovascular events, and mortality among hospitalized adults diagnosed with MASH in France.

METHODS

Data source

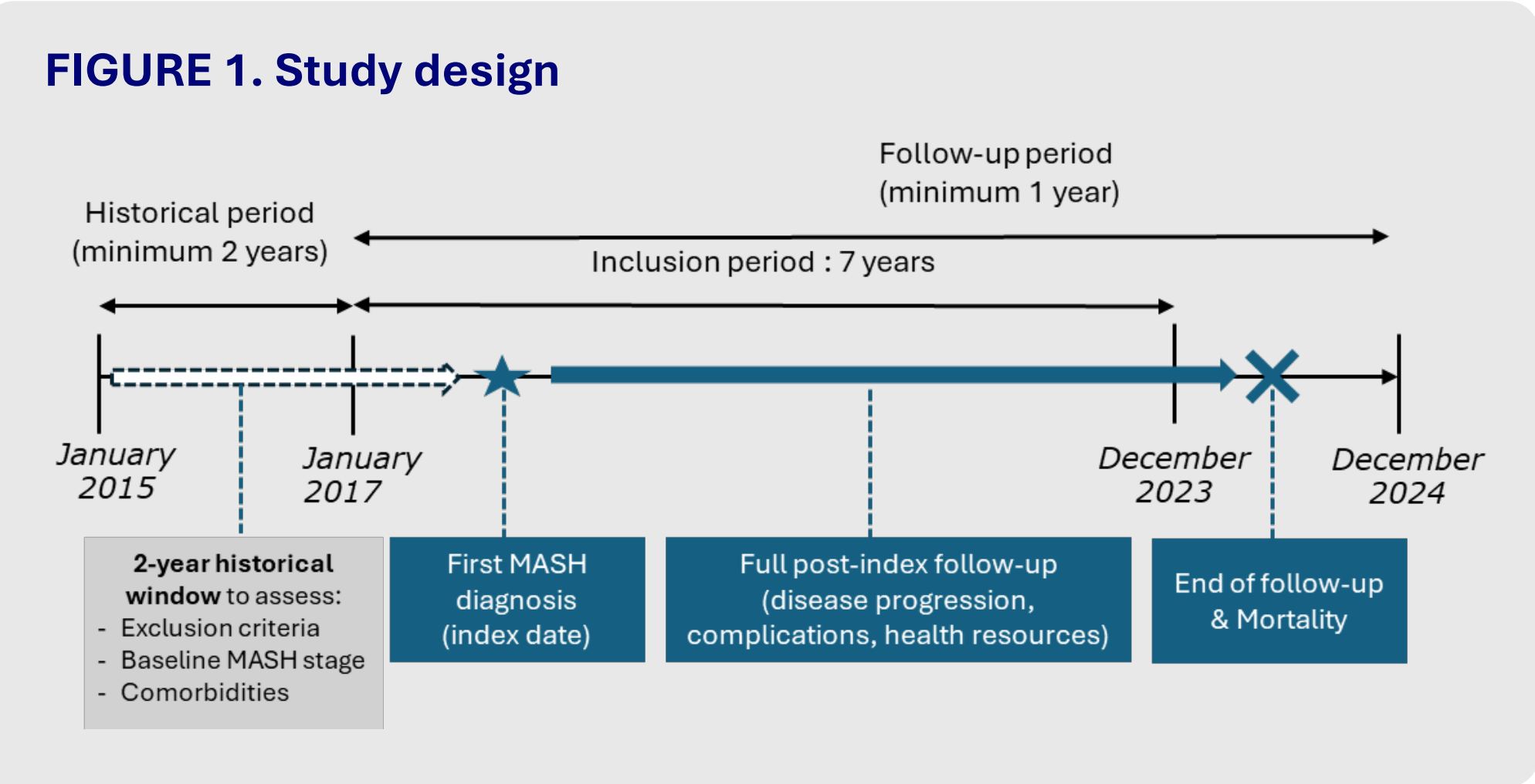
- This retrospective cohort study used data from the 2% representative sample, on sex, age and region of residence, of the French national health claims database (*Echantillon National des Données de Santé*, ESND).

Inclusion criteria

- Adults (≥18 years) identified with an inpatient diagnosis of MASH or metabolic dysfunction-associated steatotic liver disease (MASLD) (index date) via ICD-10 codes K75.8 and/or K76.0, between 2019 and 2024 (period of inclusion), with ≥2 years of historical period and ≥1 year of follow-up required.

Exclusion criteria

- Patients with other chronic liver disease etiologies, such as viral hepatitis, toxic liver disease, Wilson’s disease, Gaucher’s disease, alcohol dependency, alcoholic liver disease, drug use disorders, human immunodeficiency virus) during the 2-year before index date were excluded.



Characteristics at baseline

- Baseline disease severity was classified as non-cirrhotic (F0-F3) or advanced liver disease with the following:
 - Compensated cirrhosis (CC)
 - Decompensated cirrhosis (DCC)
 - Hepatocellular Carcinoma (HCC)
 - Liver transplant (LT)
- Baseline risk factors for cardiometabolic disease were described (type 2 diabetes, obesity, hypercholesterolemia, arterial hypertension) were ascertained during the 2-year before index date.

Endpoint definition

- Patients who were coded to a higher disease severity during follow-up were classified as having disease progression (e.g., *non-cirrhotic* → *CC* or *CC* → *DCC*)
- Major Adverse Cardiovascular Event (MACE-5) included myocardial infarction, stroke, CV death, heart failure and unstable angina.
- Mortality was defined as all-cause death occurring in outpatient or inpatient settings.

Survival analyses

- Non-adjusted survival analysis using the non-parametric Kaplan-Meier survival curve was used to assess time to event (progression, overall survival, and MACE-5)

RESULTS

TABLE 1. Baseline characteristics and cardiometabolic profile

Characteristic		All (N=4,206)	Non-cirrhotic (N= 3,535)	Advanced liver disease (N=671)	CC (N=74)	DCC (N=498)	HCC (N=77)	Liver transplant (N=22)
Sex	Male	2,186 (52%)	1,754 (50%)	432 (64%)	39 (53%)	306 (61%)	71 (92%)	16 (73%)
	Female	2,020 (48%)	1,781 (50%)	239 (36%)	35 (47%)	192 (39%)	6 (7.8%)	6 (27%)
Age, in years	Mean (SD)	56 (16)	55 (16)	64 (15)	64 (12)	63 (16)	70(8)	59 (14)
Follow-up, in years	Median [Q1; Q3]	2.9 [1.3 ; 4.4]	3.0 [1.5 ; 4.5]	2.1 [0.7 ; 3.9]	2.4 [1.1 ; 4.0]	2 [0.6 ; 3.9]	2,2 [0.8 ; 3.6]	3,5 [1.2 ; 5.5]
Cardiometabolic Risk Factors								
Obesity		1,254 (30%)	1,084 (31%)	170 (25%)	28 (38%)	108 (22%)	29 (38%)	5 (23%)
Type 2 diabetes		1,491 (35%)	1,231 (35%)	260 (39%)	43 (58%)	161 (32%)	46 (60%)	10 (46%)
Hypercholesterolemia		1,287 (31%)	1,067 (30%)	220 (33%)	31 (42%)	151 (30%)	33 (43%)	5 (23%)
Arterial hypertension		1,995 (47%)	1,593 (45%)	402 (60%)	56 (76%)	267 (54%)	64 (83%)	15 (68%)
Number of cardiometabolic risk factors	0	1,356 (32%)	1,164 (33%)	192 (29%)	12 (16%)	169 (34%)	8 (10%)	3 (14%)
	1	1,030 (24%)	885 (25%)	145 (22%)	11 (15%)	110 (22%)	15 (20%)	9 (41%)
	2	798 (19%)	644 (18%)	154 (23%)	17 (23%)	111 (22%)	20 (26%)	6 (27%)
	>=3	1,022 (24%)	842 (24%)	180 (27%)	34 (46%)	108 (22%)	34 (44%)	4 (18%)

Disposition of patient

- A total of 4,206 patients met the inclusion/exclusion criteria and were included for analysis, with a median follow-up of 2.9 years [Q1-Q3: 1.3-4.4].

Characteristics of patient

- At baseline, 84.0% were non-cirrhotic and 15.9% had advanced liver disease (1.8% CC, 11.8% DCC, 1.8% HCC, 0.5% LT).
- Patients with advanced liver disease were older (63.6 vs 54.9 years).
- Among all patients, cardiometabolic comorbidities were common (30% obesity, 35% type 2 diabetes, 31% hypercholesterolemia, 47% arterial hypertension).

Overall survival

- Five-year mortality was higher in patients with advanced liver disease compared to non-cirrhotic patients (28.2% vs 7.8%).

Disease progression

- Five-year progression to more severe disease stages or death was estimated to be 33.6% and 12.5% in advanced liver disease and non-cirrhotic, respectively.
- Among non-cirrhotic patients at baseline, 1.1% progressed to CC, 6.0% to DCC, 0.3% to HCC, 0.03% to LT, and 5.12% died, with a median time to progression of 17.3 months

MACE-5

- Five-year cardiovascular event rates were higher in advanced liver disease than in non-cirrhotic patients (MACE-5, 8.8% versus 6.1%, respectively).

Study limitations

- Inpatient-only identification may limit generalizability and likely undercapture earlier, non-cirrhotic disease managed outside hospital settings.
- Reliance on administrative diagnosis codes without supporting clinical, laboratory, or imaging results may introduce misclassification and make the recorded diagnosis date a poor proxy for true disease onset.
- Because the ESND represents only 2% of the national population, some subgroups may be under- or over-represented, particularly rarer advanced-disease groups.

FIGURE 2. All-cause mortality (Kaplan-Meier curves)

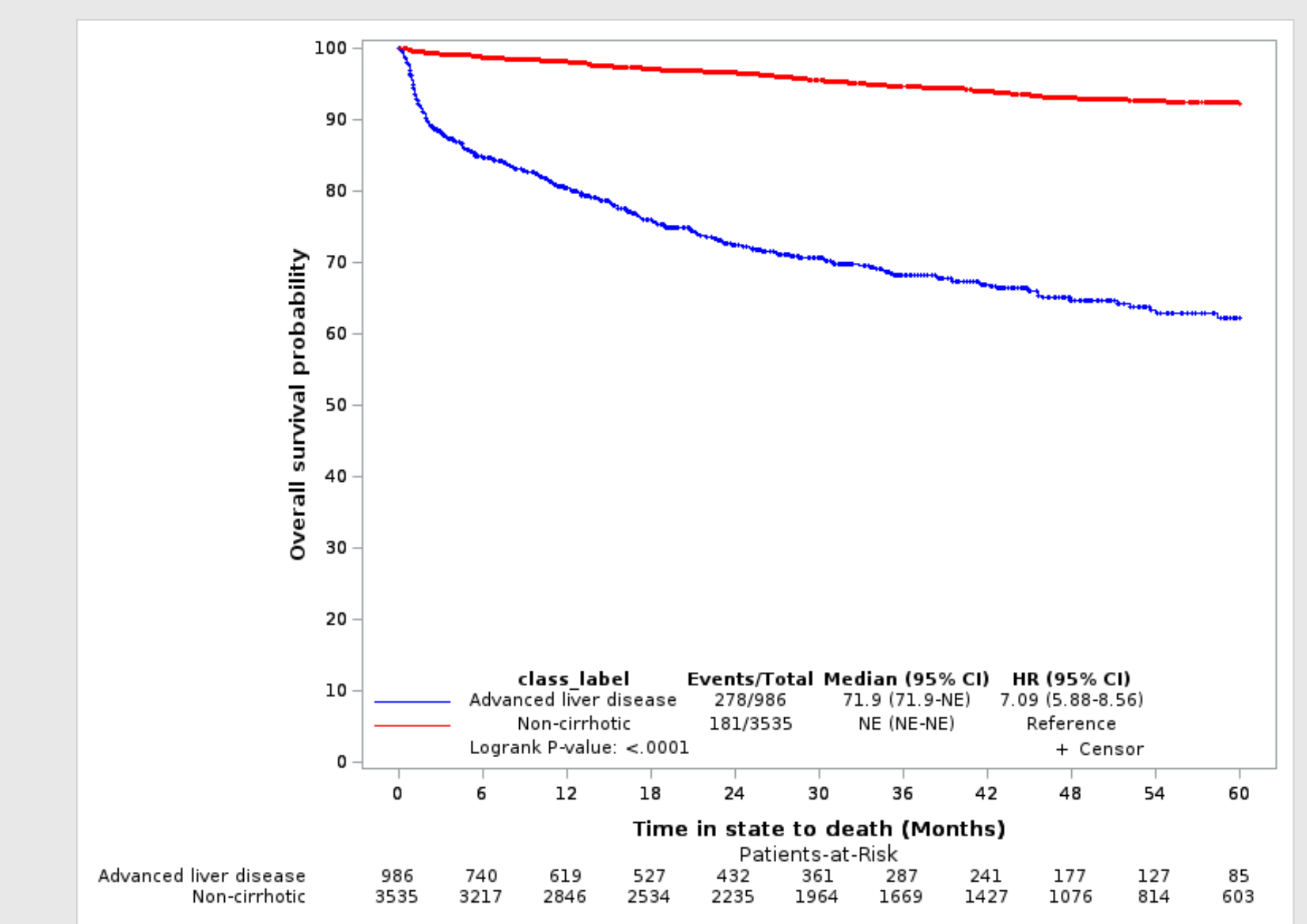


FIGURE 3. Disease progression (Kaplan-Meier curves)

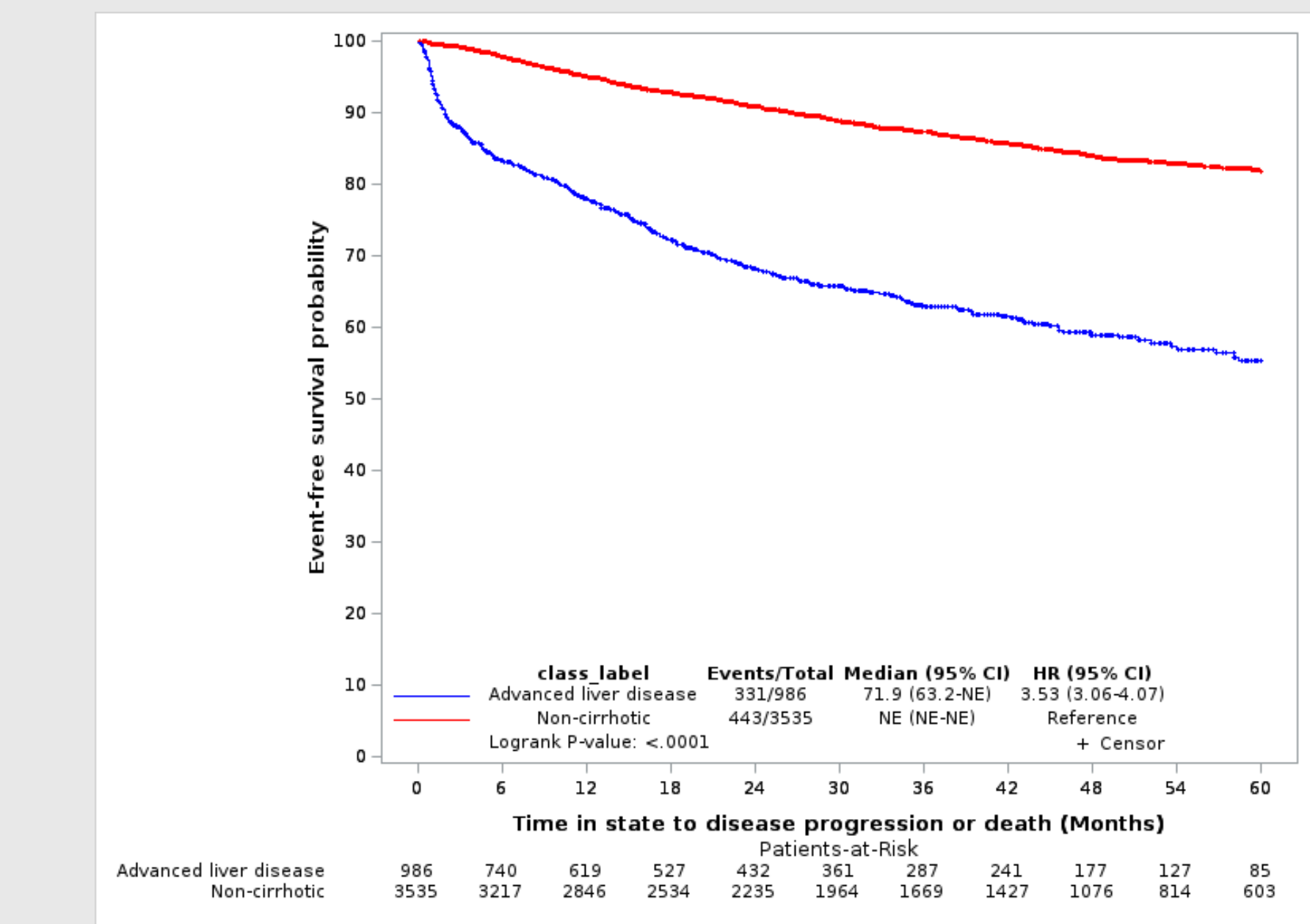
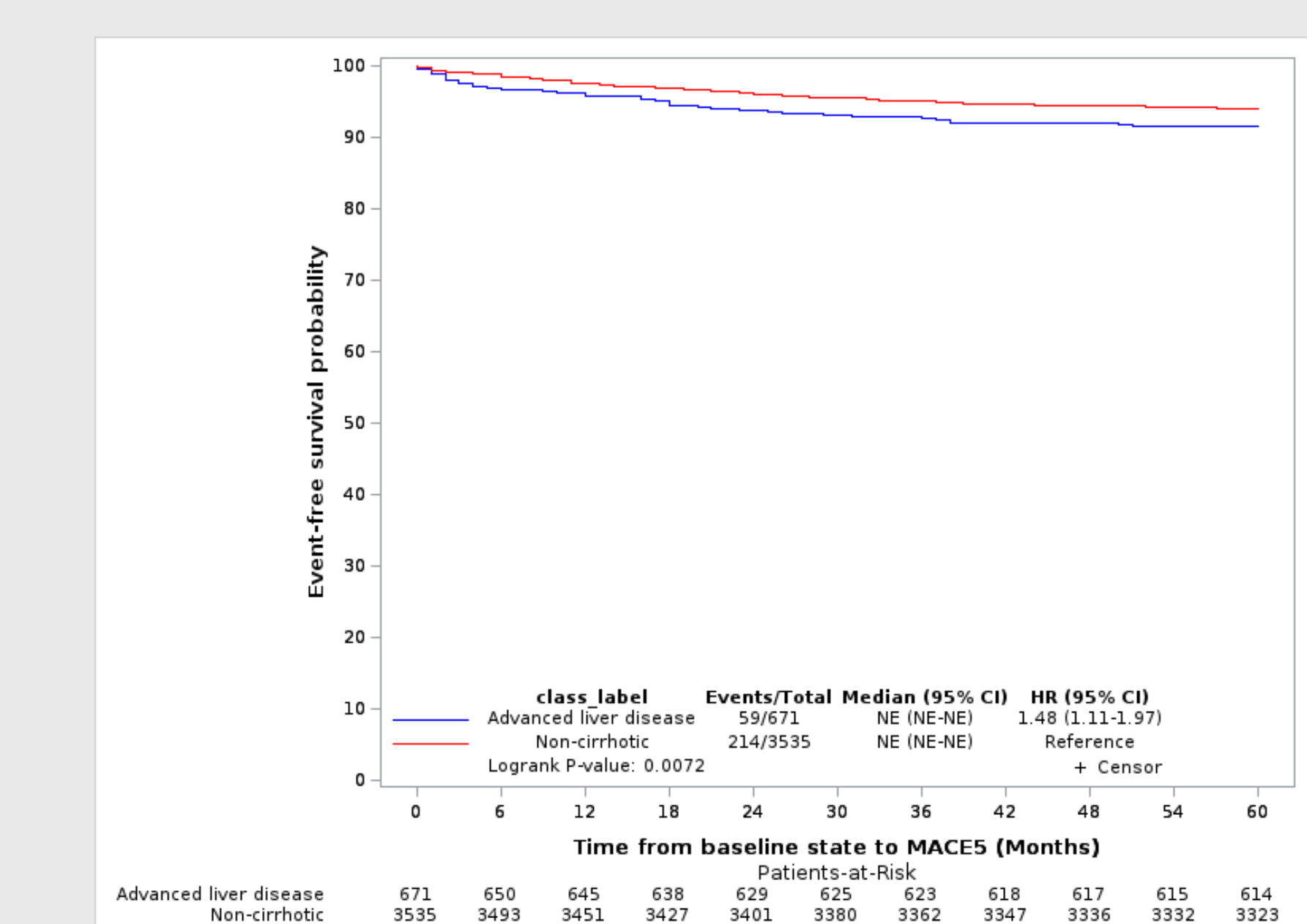


FIGURE 4. MACE-5 incidence (Kaplan-Meier curves)



CONCLUSION

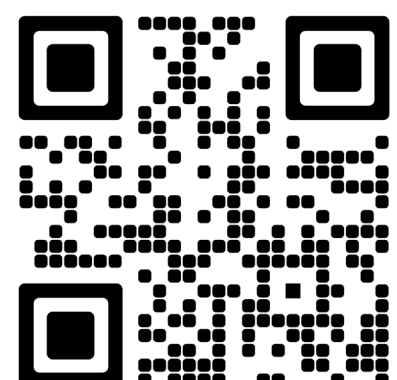
- In this real-world French study, hospitalized adults diagnosed with MASH experienced substantial liver, cardiovascular, and mortality burden, with markedly worse outcomes among those with advanced liver disease.
- Up to one-third of the patients with advanced liver disease progressed during the follow-up, highlighting the severity of the underlying liver disease and therefore the need for treatments that prevent disease progression.
- Earlier identification and more effective disease-modifying management may help reduce both the clinical burden and the healthcare costs associated with progression.

DISCLOSURES AND ACKNOWLEDGEMENTS

Madrigal Pharmaceuticals Inc. provided the funding for this research, which was conducted by Public Health Expertise, part of Cencora Inc.

REFERENCES

- Younossi ZM, Golabi P, Paik JM, et al. The global epidemiology of nonalcoholic fatty liver disease (NAFLD) and nonalcoholic steatohepatitis (NASH): a systematic review. *Hepatology*. 2023;77(4):1335-47. Epub 2023/01/11. doi: <https://doi.org/10.1097/hep.0000000000000004>.
- Estes C, Anstee QM, Arias-Loste MT, et al. Modeling NAFLD disease burden in China, France, Germany, Italy, Japan, Spain, United Kingdom, and United States for the period 2016-2030. *J Hepatol*. 2018;69(4):896-904. Epub 2018/06/11. doi: <https://doi.org/10.1016/j.jhep.2018.05.036>.
- Nabi, O., Boursier, J., Lacombe, K. *et al.* Comorbidities Are Associated with Fibrosis in NAFLD Subjects: A Nationwide Study (NASH-CO Study). *Dig Dis Sci* **67**, 2584–2593 (2022)



SCAN QR CODE
FOR DIGITAL POSTER

