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Impact of Resmetirom on Liver Transplant Demand and Outcomes in MASH Patients in Germany: A Microsimulation Approach

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OBJECTIVES

- Resmetirom received conditional marketing authorization from the European Union (EU) Commission in August 2025 for treating noncirrhotic MASH patients with moderate-to-advanced fibrosis.
- Germany faces a substantial MASH burden and low liver transplantation (LT) rates [1].
  - Around 705 LTs/year for any liver disease indications [2]
  - Estimating 88 LTs/year for MASH patients [3]
- The availability of resmetirom has the potential to decrease demand for LT, thereby improving access to donor livers for patients with any LT indications.

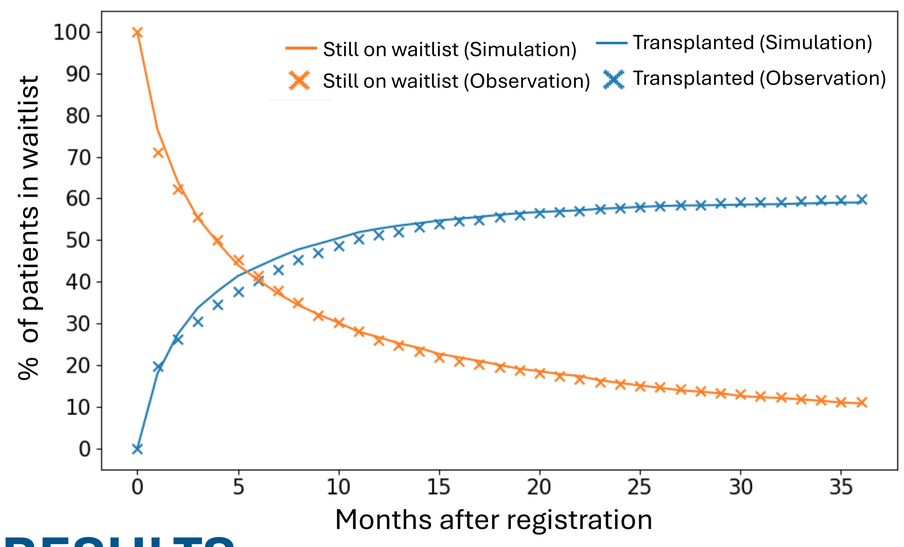
Aim

➢ **To evaluate the potential population-level impact of resmetirom on LT demand and allocation outcomes in Germany**

MODEL VALIDATION

- Our model-estimated waitlist outcomes, during 3 years after registration, closely matched the reported outcomes in the Eurotransplant (ET) 2024 Annual Report [2] (Figure 2).

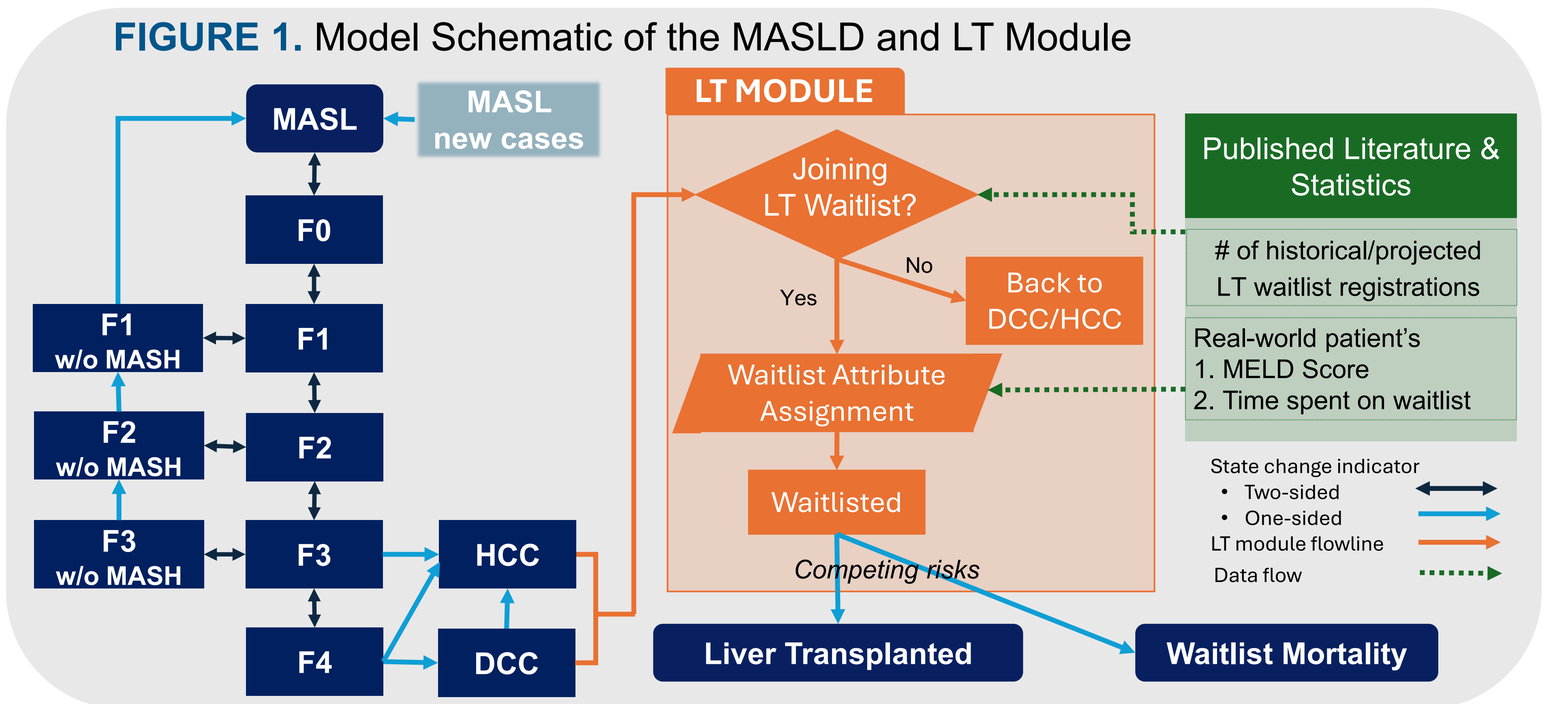
FIGURE 2. Waitlist outcomes: Simulation vs. Observation



METHODS

- **Populations**: Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD) patients with age/sex distribution reflecting the Germany population (mean age 56.5 yrs, 49.1% male)
- **Hybrid Decision Analytic Model:**
  1. **Markov model:** simulating MASLD disease progression (yearly model cycle) [4] (Figure 1)
     - **F2/F3 diagnosis rate**: we assumed that 12.1% of F2/F3 patients were diagnosed in 2025. We increased the diagnosis rate linearly to 33.2% by 2040, after which a fixed rate of 33.2% was applied.
  2. **LT Module:** a synthetic LT waitlist system was developed to mirror the real-world statistics based on the published literature and Eurotransplant statistics library [2, 4]. Two key factors included:
     - Number of annual waitlist registrations by patients with decompensated cirrhosis (DCC) or hepatocellular carcinoma (HCC)
     - Patient-specific attributes, e.g., MELD score and time on the waitlist
- **Simulated Scenarios**
  - **NoRES:** Natural history scenario, where no one received resmetirom
  - **RES:** Resmetirom scenario, where the model assumed 1% of diagnosed F2/F3 patients received resmetirom in 2025 and 5% annually after 2025.
- **Simulation Period:** 2025 – 2065 (after simulating 2015-2024 for validation)
- **Outcomes:** (1) avoided waitlist entries, (2) avoided LTs, (3) reduction in the proportion of MASH patients on LT waitlists, and (4) reduction in time and mortality without LT (across patients with any LT indications)

FIGURE 1. Model Schematic of the MASLD and LT Module



RESULTS

❑ Patients who were eligible and received resmetirom achieved either **slower disease progression** or **resolution of steatohepatitis** (i.e., MASH resolution) compared to themselves in the NoRES scenario → **Fewer** patients developed DCC and HCC that required LTs

➢ **Fewer waitlist entries & LTs**: # of patients who would have been added to the LT waitlist & received LTs without resmetirom (i.e., in their natural history) but did not because they received resmetirom and their disease either improved or stabilized (Table 2)

➢ **Reduction in the MASH patients on LT waitlists**, induced by the avoided waitlist entries (Figure 3)

❑ Due to the avoided LTs, the associated donor livers could be reallocated to other patients (regardless of LT indication or liver disease etiologies)
→ **Reallocated** saved livers to patients with the highest MELD score on the waitlist at the time of availability

➢ Compared to the NoRES scenario, patients were able to receive LTs sooner → **Reduction in time on waitlist and waitlist mortality** (Table 2)

TABLE 2. Impact of resmetirom adoption on LT waitlist

Annual Treatment Rate*	Avoided Waitlist Entries	Avoided LTs	Waitlist Deaths Averted†,‡	Waitlist Time Reduction‡,§
5%	491 (4.57%)¶	333	436	7.91 days
10%	920 (8.56%)	598	798	16.16 days
15%	1,191 (11.08%)	757	1,041	20.96 days

*: Proportion of diagnosed MASH-F2/F3 patients who initiated resmetirom each year from 2026 onwards (1% in 2025 regardless of the annual treatment rate)

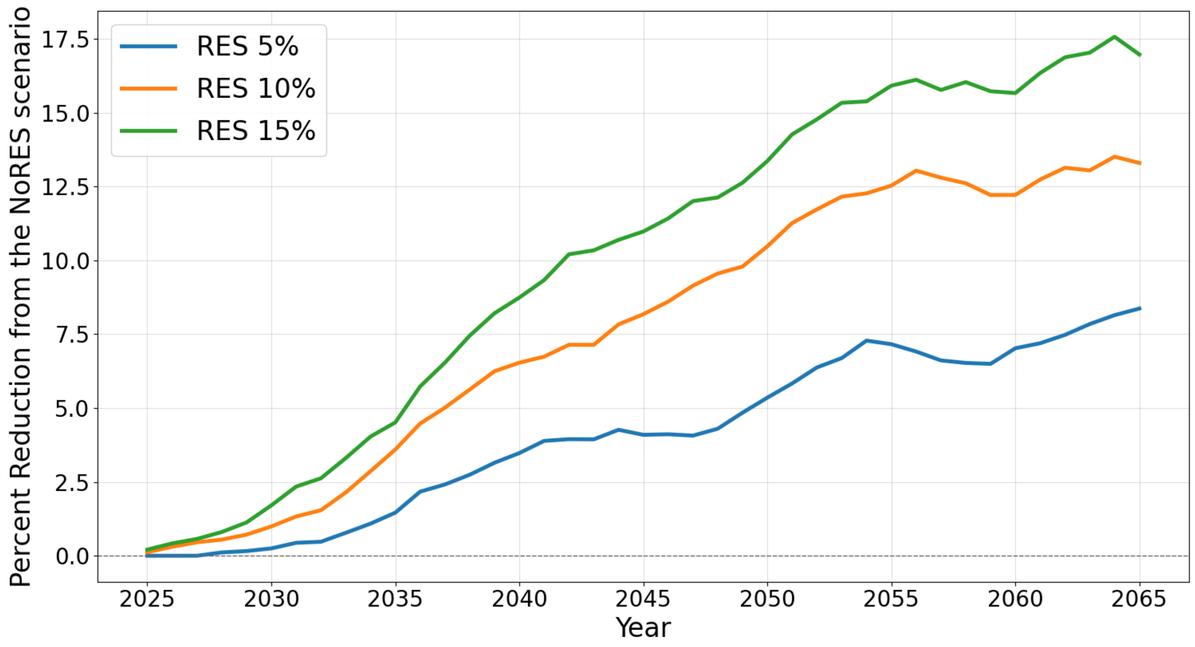
¶: Percentage out of 10,747 MASH patients who were waitlisted in NoRES scenario.

†: Absolute number of deaths in NoRES averted in RES

‡: Waitlist outcomes include patients with *any* LT indications (e.g., MASH, HCV, ALD).

§: Reduction in the average days per waitlisted patient (including patients who did not receive resmetirom)

FIGURE 3. Proportion of MASH Patients in LT Waitlists: Percent Reduction from the NoRES scenario



Note. A 5-year moving average was applied.

CONCLUSION

➢ **Resmetirom has the potential to reduce the burden of MASH and alleviate pressure on the LT system in Germany.**

➢ **By reducing the number of patients requiring LT, resmetirom may improve overall access to donor organs and lower waitlist mortality, thus demonstrating broader population-level benefits of early MASH treatment.**

➢ **Increases in diagnosis rates and market share uptake could yield more substantial effects on LT demand and outcomes**

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REFERENCES

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