# Arcturis

# Identifying and Characterising Pathways to Clinical Diagnosis of Non-Alcoholic Fatty Liver Disease and Non-Alcoholic Steatohepatitis in Hospitals in England

Danielle Robinson[1], Filipa Tunaru[1], Shammi Luhar[1], Grace Hatton[1], Ines de Santiago[2], Lewis Carpenter[1]

[1] Arcturis Data, Building One, Oxford Technology Park, Technology Drive, Kidlington, OX5 1GN UK [2] e-therapeutics plc, 4 Kingdom St, Greater London W2 6BD
danielle.robinson@arcturisdata.co.uk

## Introduction

- Non-alcoholic fatty liver disease (NAFLD) and non-alcoholic steatohepatitis (NASH) have an estimated UK prevalence of 20-30% and 2-12% respectively. [1,2]
- Challenges around diagnosis, such as non-specific symptoms and biopsy diagnosis, mean that NAFLD & NASH are often diagnosed in later stages of the disease.
- Identifying pathways to diagnosis may improve earlier diagnoses and identify cohorts suitable for inclusion in clinical trials.

## Objectives

- To identify the pathways by which patients are diagnosed with NAFLD/NASH.
- To describe the patient characteristic, survival, laboratory testing and diagnostic testing of patients in the identified pathways.
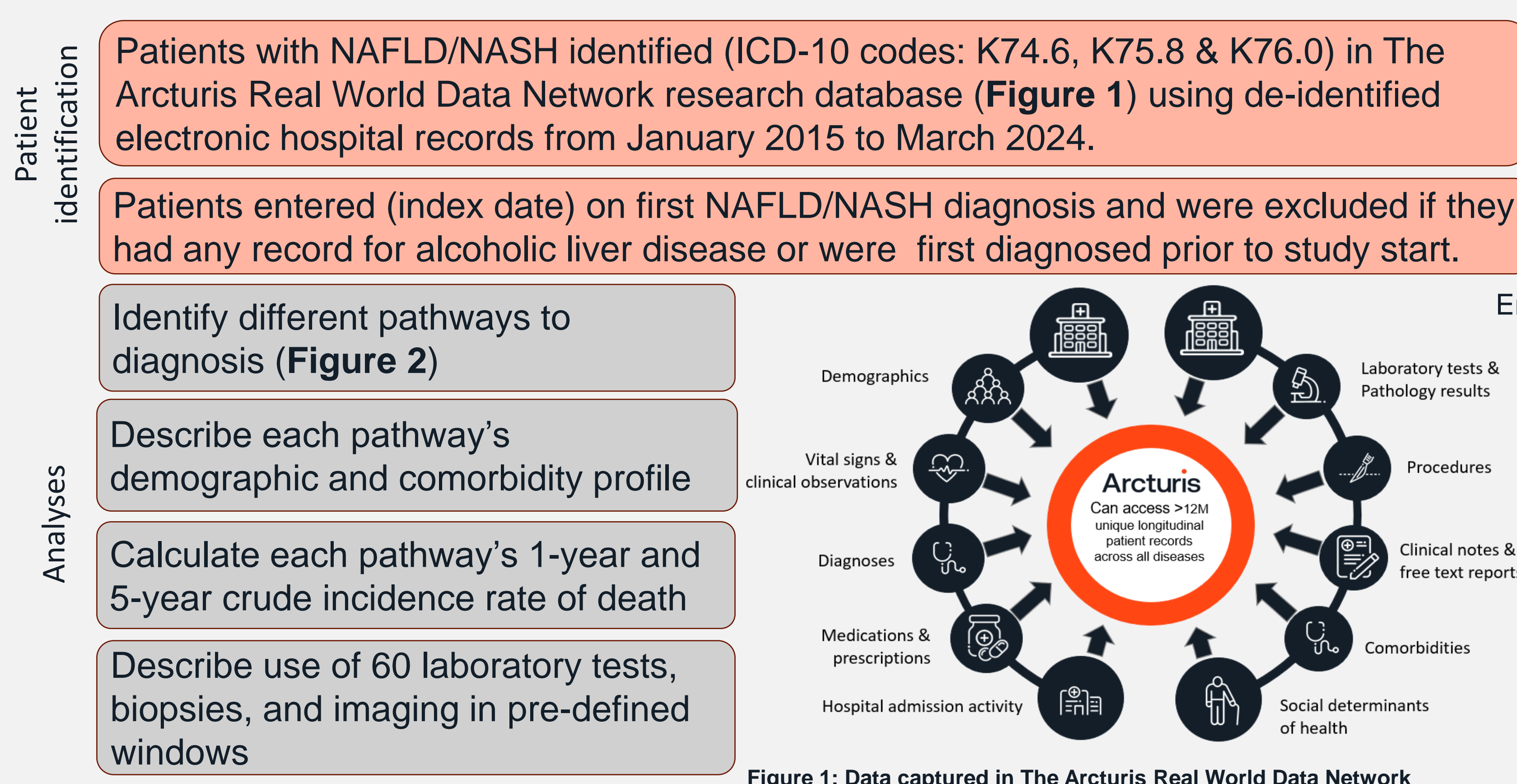
## Methods

**Patient identification**

Patients with NAFLD/NASH identified (ICD-10 codes: K74.6, K75.8 & K76.0) in The Arcturis Real World Data Network research database (**Figure 1**) using de-identified electronic hospital records from January 2015 to March 2024.

Patients entered (index date) on first NAFLD/NASH diagnosis and were excluded if they had any record for alcoholic liver disease or were first diagnosed prior to study start.

**Analyses**

Identify different pathways to diagnosis (**Figure 2**)

Describe each pathway's demographic and comorbidity profile

Calculate each pathway's 1-year and 5-year crude incidence rate of death

Describe use of 60 laboratory tests, biopsies, and imaging in pre-defined windows



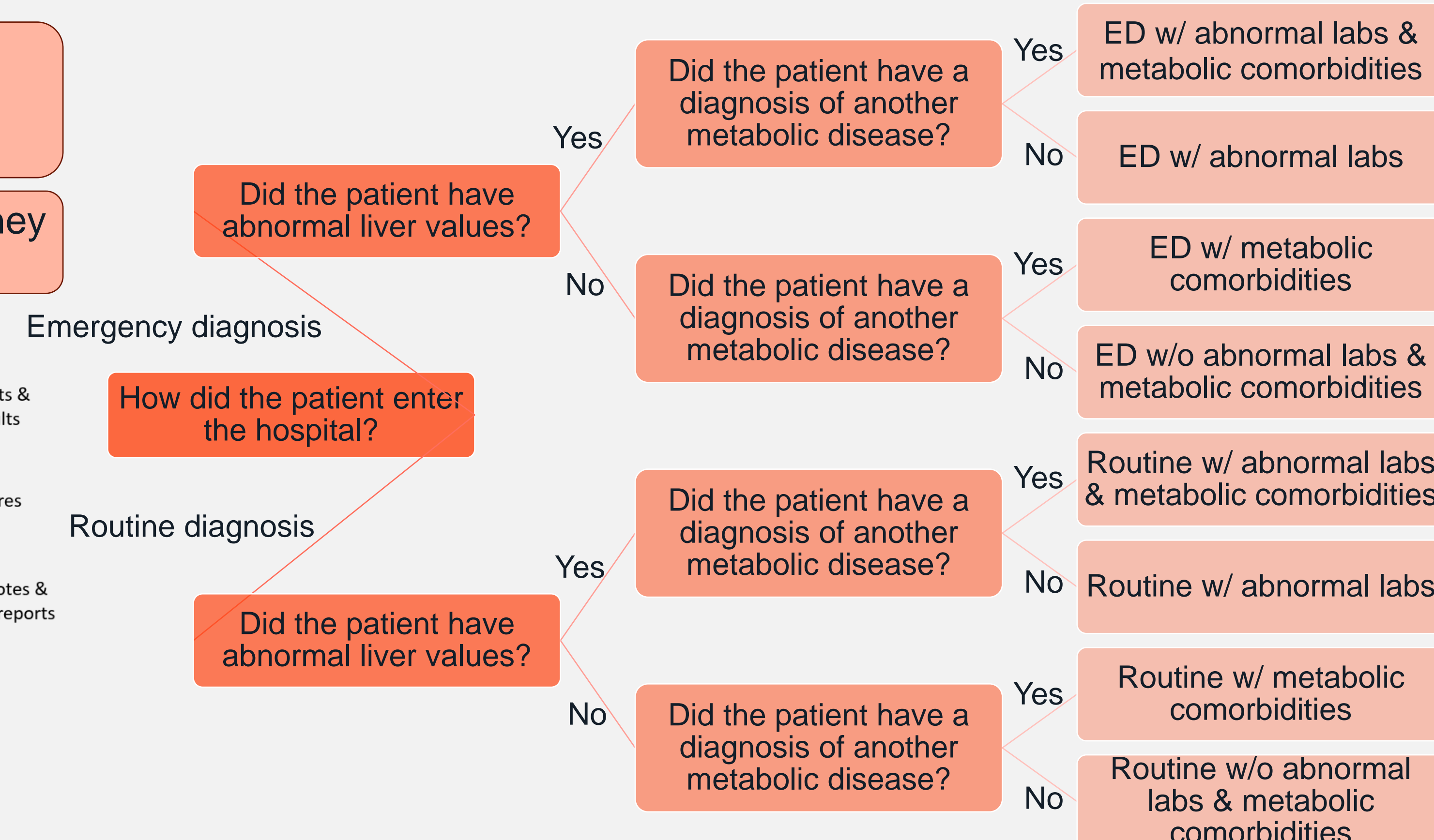Figure 1: Data captured in The Arcturis Real World Data Network



Figure 2: Decision tree depicting the eight pathways to diagnosis

## Results – Characteristics

- Of 22,444 patients diagnosed with NAFLD/NASH, 8,855 had abnormal labs and metabolic comorbidities (59% emergency, 41% routine), 6,151 had just abnormal labs (58% emergency, 42% routine), 4,278 had just metabolic comorbidities (40% emergency, 60% routine), 3,160 had neither abnormal labs nor metabolic comorbidities (41% emergency, 59% routine).
- **Patients without comorbidities were on average ~10 years younger** than those with metabolic comorbidities.
- Other demographic characteristics between the pathways were broadly similar.
- The **1-year incidence rate varied** between 284.78 (95% CI 191.75, 377.81) and 2,839.77 (95% CI 2,662.60, 3,016.94) per 10,000 person years, **Figure 3,** with emergency department admissions and patients with abnormal labs having higher rates.
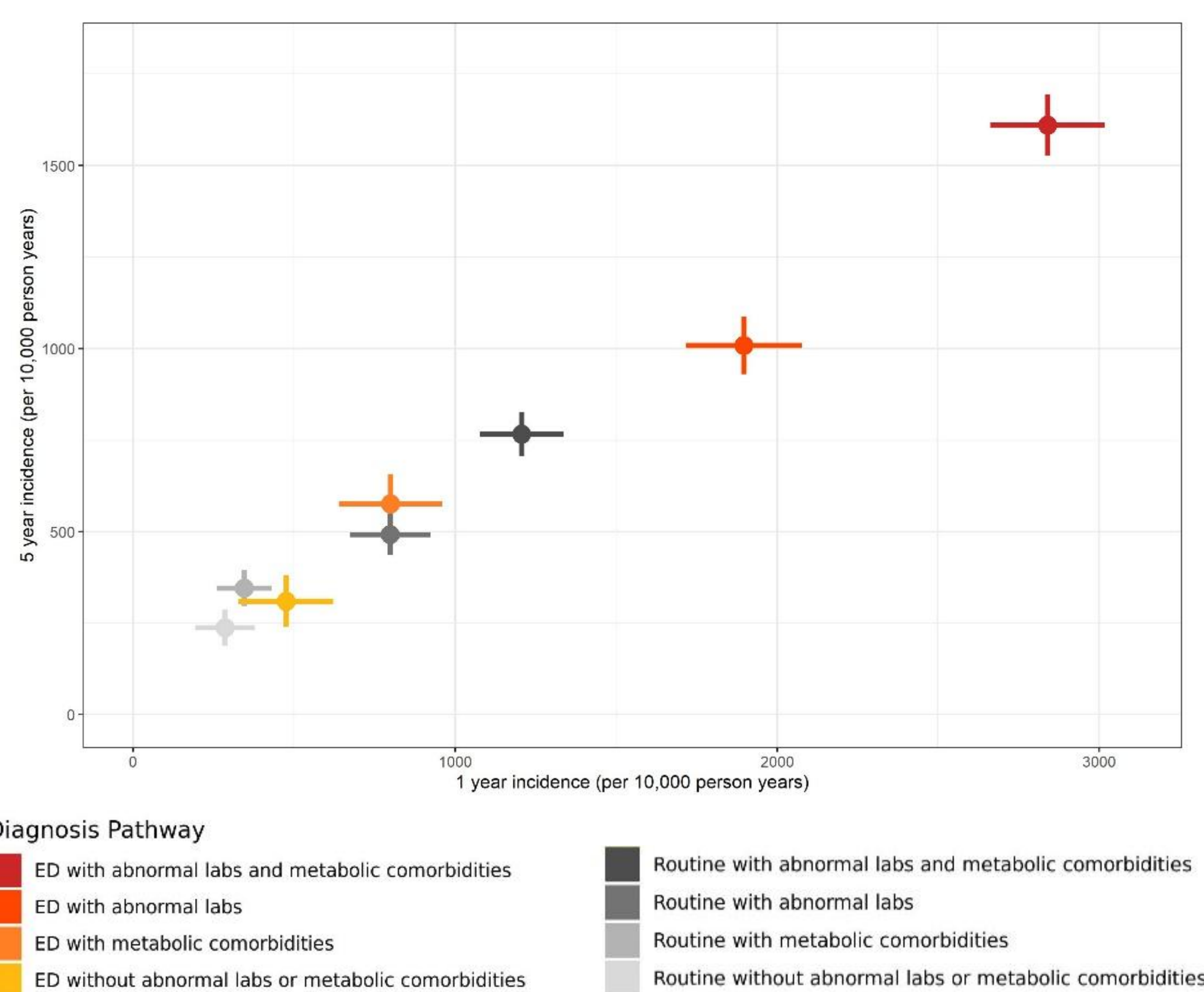


Figure 3: Overall survival incidence rate at 1 (x-axis) and 5 (y-axis) years after index date of all eight diagnosis pathways

## Results – Testing

- **64.9% of liver biopsies were undertaken in the month before index date**, range: 15.4% in the ED with metabolic comorbidities pathway to 81.3% in the routine pathway with no abnormal liver labs or metabolic comorbidities, **Figure 4a.**
- Abdominal ultrasounds occurred frequently prior to diagnosis, **Figure 4b.**
- Around diagnosis abdominal ultrasound were more common in the emergency department.
- **Liver laboratory tests, such as albumin and ALP, were frequently tested** throughout the windows, with peak testing around the index date, **Figure 4c**.
- Testing for GGT, secondary liver test, was higher in routine care diagnosed patients, **Figure 4d**.
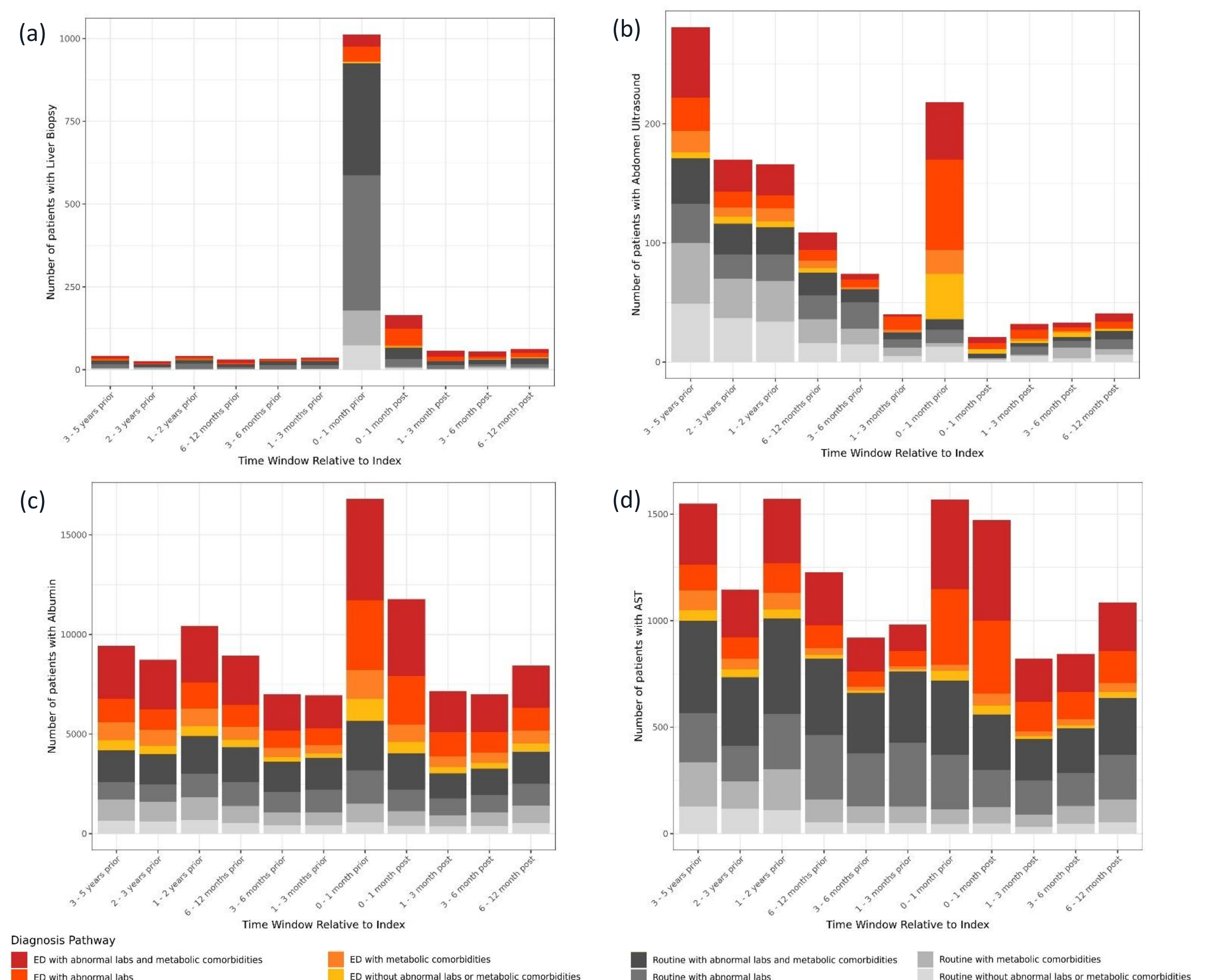


Figure 4: Stacked bar charts depicting number of patients with (a) liver biopsy, (b) abdominal ultrasound, (c) Albumin lab test and (d) GGT lab test

## Conclusions

- We have identified and characterised 8 potential pathways to NAFLD/NASH diagnosis.
- Patient demographics were generally similar between pathways to diagnosis.
- Pathway to diagnosis impacted survival, likelihood of liver biopsy, imaging and liver laboratory tests.
- These pathways can help inform recruitment for clinical trials assessing novel therapies for NAFLD/NASH patients.

## Acknowledgements

## References

[1] Younossi, Z. et al. Global Perspectives on Nonalcoholic Fatty Liver Disease and Nonalcoholic Steatohepatitis, 2019.
[2] Harrison, S. et al. Prevalence and stratification of NAFLD/NASH in a UK and US cohort using non-invasive multiparametric MRI, 2018.