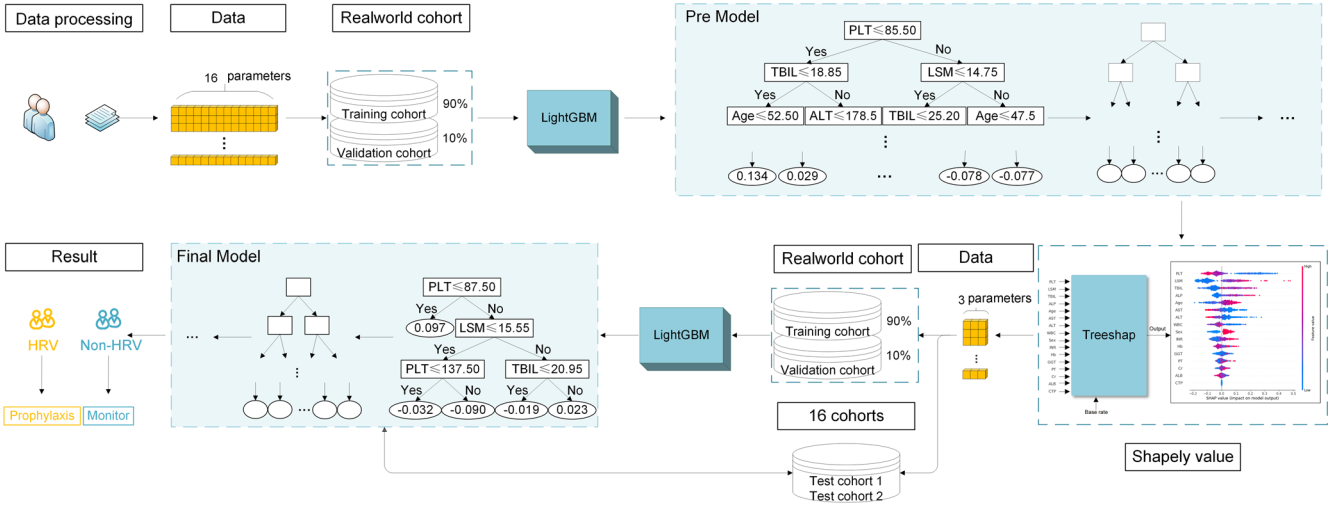


Figure: (abstract: OS014)

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**Background and aims:** Only a few patients with compensated cirrhosis who underwent esophagogastroduodenoscopy (EGD) screening for varices were found to have varices needing treatment (VNT). Our study aimed to identify a novel machine learning-based model (ML EGD) for ruling out VNT and avoiding unnecessary EGD in patients with compensated cirrhosis.
**Method:** A total of 2794 patients from China, Singapore and India were enrolled. Of them, 1283 patients in a real-world cohort from one university hospital, 966 in a multicenter cohort (test cohort 1) from 14 university hospitals, and 545 in an international cohort (test cohort 2) from Singapore and India were included, respectively. For the real-world cohort, patients were shuffled and sampled randomly into training and validation cohort with a ratio of 9:1. In the training cohort, a light gradient boosting machine algorithm was used to develop the pre-model to detect VNT based on clinical data. A shapley value method was used to evaluate the importance of included variables according to pre-model. ML EGD was furthermore developed based on the most related variables to detect VNT using light gradient boosting machine algorithm. Then, we validated it in the validation cohort and tested it in the two external test cohorts.
**Results:** The main etiology of cirrhosis was hepatitis B infection in the training (68.02%), validation cohort (68.99%) and test cohort 1 (79.19%) and the main etiology in test cohort 2 was hepatitis C infection (47.16%). Liver stiffness, platelet count and total bilirubin were evaluated as the most related variables to detect VNT to develop ML EGD. By receiver operator characteristic curve, the most accurate cut-off to rule out patients with VNT was chosen as a ML EGD below 0.50 with a negative predictive value of 96.4%. In the training cohort, a ML EGD below 0.50 could spare 607 (52.6%) unnecessary EGD with a missed VNT rate of 3.6%. In the validation cohort, test cohort 1 and test cohort 2, a ML EGD score below 0.50 could spare 75 (58.1%), 506 (52.4%), 224 (41.1%) EGD with a missed VNT rate of 1.4%, 2.8%, and 3.1%, respectively. Comparing with Baveno VI criteria, ML EGD improved the proportion of avoided EGD (training cohort, 52.6% vs 29.4%; validation cohort, 58.1% vs 44.2%; test cohort 1, 52.4% vs 26.5%; test cohort 2, 41.1% vs 21.1%).
**Conclusion:** We developed a robust machine learning-based model, named ML EGD, with excellent performance to exclude VNT in patients with compensated cirrhosis.

## OS015

### Diagnostic performance of non-invasive liver fibrosis biomarkers: a bayesian individual patient data meta-analysis of hepatitis B cohorts in sub-saharan Africa (HEPSANET)

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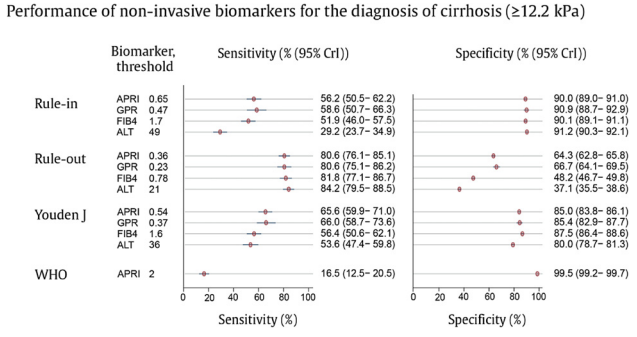
**Background and aims:** In sub-Saharan Africa, hepatitis B is the principal cause of liver disease, and associated mortality is rising.

Low-cost non-invasive biomarkers of liver fibrosis are needed to identify patients at risk of HBV-related mortality who therefore require antiviral treatment. We evaluated the performance of the biomarkers APRI (AST to platelet ratio index), FIB-4 and GPR (GGT to platelet ratio) in an individual patient data (IPD) meta-analysis.

**Method:** We included data from HEPSANET, a network comprised of 12 cohorts of HBsAg-positive individuals in 8 sub-Saharan African countries. We used transient elastography as a reference test for cirrhosis (≥12.2 kPa) and significant fibrosis (≥7.9 kPa). We excluded patients who were pregnant, had hepatitis C, D, or HIV co-infection, were on hepatitis B therapy or had acute hepatitis. Upper limits of normal were 40 U/L for AST/AST and 61 U/L for GGT. We fitted a bivariate Bayesian IPD model with patient-level covariates and study-level random effects.

**Results:** We included 3549 patients. Median age was 33 years (IQR 28–41) and 60% were male. The prevalence of significant fibrosis and cirrhosis among included cohorts was 18% and 7% respectively. APRI and GPR had the best discriminant performance (area under curve 0.81 and 0.82) relative to FIB-4 (0.77) or ALT alone (0.70) for cirrhosis. The World Health Organization (WHO) threshold of APRI>2.0 was associated with sensitivity of 16.5% (95% credible interval 12.5–20.5) and specificity of 99.5% (99.2–99.7) for cirrhosis. At rule-in thresholds for cirrhosis APRI (cut-off 0.65) had sensitivity of 56.2% and specificity of 90.0%; GPR (cut-off 0.47) had sensitivity of 58.6% and specificity 90.9%. At rule out-thresholds for cirrhosis APRI (0.33) had sensitivity and specificity of 80.6% and 64.3%; GPR (0.23) had sensitivity 80.6% and specificity of 66.7% (Figure). The subset of asymptomatic patients who were diagnosed with HBV through routine screening had a mean cirrhosis prevalence of 2.5%, and APRI (cut-off 0.65) had a positive predictive value (PPV) of 13.2% and negative predictive value (NPV) of 98.8%. Among patients diagnosed with HBV due to suspected liver disease, cirrhosis prevalence was 27%; with APRI cut-off 0.65, PPV was 59.6% and NPV 84.5%.

**Conclusion:** APRI at the WHO-recommended threshold of 2.0 has a poor sensitivity for the diagnosis of cirrhosis in sub-Saharan Africa; WHO guidelines should be revised for the WHO African region to reflect these findings. APRI and GPR had equivalent diagnostic performance and performed best at ruling out cirrhosis but were less good at correctly identifying cases. Programs need to be aware of the significant trade-offs between under- and over-diagnosis of liver cirrhosis when implementing low-cost fibrosis markers in hepatitis B programs in sub-Saharan Africa.




## OS016

### Prediction of ten-year risk of severe liver disease in the general population using commonly available biomarkers

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**Background and aims:** Estimating risk for severe liver disease, including cirrhosis, in the general population is complicated in part due to the rarity of this outcome. Existing prediction tools are suboptimal and there is a need for improvement. Here, we aimed to identify subgroups of persons in the general population with high risks for development of severe liver disease using commonly available biomarkers.

**Method:** We used laboratory and clinical data on 126, 925 individuals aged 35–79, in Stockholm, Sweden, with clinical examinations between 1985 and 1996. No individuals had known chronic liver disease, a drug- or alcohol use disorder at baseline. Nationwide registries were used to ascertain ten-year cumulative incidence of severe liver disease, a composite of diagnoses corresponding to cirrhosis or its complications. Candidate biomarkers were selected based on if they meaningfully improved prediction of severe liver disease in addition to the established FIB-4 score. They were then categorized and combined, creating subgroups with different risk profiles.

**Results:** During a follow-up of average 9.3 years, we ascertained 630 incident cases of severe liver disease (0.5%). On top of the FIB-4 score we identified age, impaired glucose, and gamma-glutamyl transferase (gGT) to meaningfully improve a classification of risk. 24 risk groups were created, with a cumulative incidence of severe liver disease at ten years ranging from 0.2% (age 35–65, low FIB-4, no impaired glucose and normal gGT) to 32.1% (age 35–65, high FIB-4, impaired glucose and high gGT). A heatmap of these risk groups was created (Figure 1).

| Cumulative incidence of severe liver disease at ten years | | | FIB-4 Low | FIB-4 Intermediate | FIB-4 High |
|---|---|---|---|---|---|
| gGT high | Impaired glucose | age ≥66 | 13.0 | 13.7 | 29.1 |
| | | age 35-65 | 2.6 | 10.7 | 32.1 |
| | No Impaired glucose | age ≥66 | 3.6 | 0.0 | 22.7 |
| | | age 35-65 | 2.2 | 7.4 | 25.4 |
| gGT normal | Impaired glucose | age ≥66 | 1.3 | 2.8 | 12.5 |
| | | age 35-65 | 0.6 | 1.0 | 6.0 |
| | No Impaired glucose | age ≥66 | 0.6 | 0.7 | 2.5 |
| | | age 35-65 | 0.2 | 0.4 | 5.5 |

Figure 1: Heatmap of subgroups with differing risk for severe liver disease at ten years, in percent.

**Conclusion:** Estimates of risk of severe liver disease in the general population using the FIB-4 score can be substantially improved by adding age and biomarkers commonly available in the primary care setting.

## OS017

### Gadoxetic acid-enhanced MRI-derived Functional Liver Imaging Score (FLIS) and spleen diameter provide complementary information for risk stratification in ACLD

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**Background and aims:** The Functional Liver Imaging Score (FLIS) derived from gadoxetic acid-enhanced MRI (GA-MRI) correlates with hepatic function in chronic liver disease (CLD) patients. Splenic metrics, i.e., volume and craniocaudal diameter (SCCD) are markers of portal hypertension, a key driver of disease progression.