

A COMPARISON OF SURVEILLANCE STRATEGIES FOR THE EARLY DETECTION OF HEPATOCELLULAR CARCINOMA (HCC): A CASE CONTROL STUDY



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Significance:

Due to late detection, HCC is a frequent and major cause of cancer mortality in the Philippines. For better survival, early detection is essential. This study compared the performance of three surveillance strategies in the detection of HCC:

- a **modified GALAD score** (a serum biomarker-based model)
- **ASAPUSTE score** (blood plus ultrasound and transient elastography)
- and the local **standard surveillance strategy** (serum AFP plus ultrasound).

MODIFIED GALAD score for HCC

Variable	Value
Gender	0 if female 1 if male
Age	Age, years
AFP-L3	Alpha-fetoprotein L3, %
AFP	Alpha fetoprotein, IU/mL
DCP	Des-carboxy-prothrombin, ng/mL

ASAP score for HBV related HCC prediction

Age	Age, years
Sex	Male or Female
AFP	Alpha fetoprotein, IU/mL
PIVKA	Protein induced by vitamin K absence II, AU/mL

Methods:

- Single-center case-control study of 26 **HCC cases** and 92 **controls** with **cirrhosis** or **patients at-risk** for HCC
- Measurement of sensitivities, specificities, AUROC, positive and negative likelihood ratios in the three different surveillance strategies.

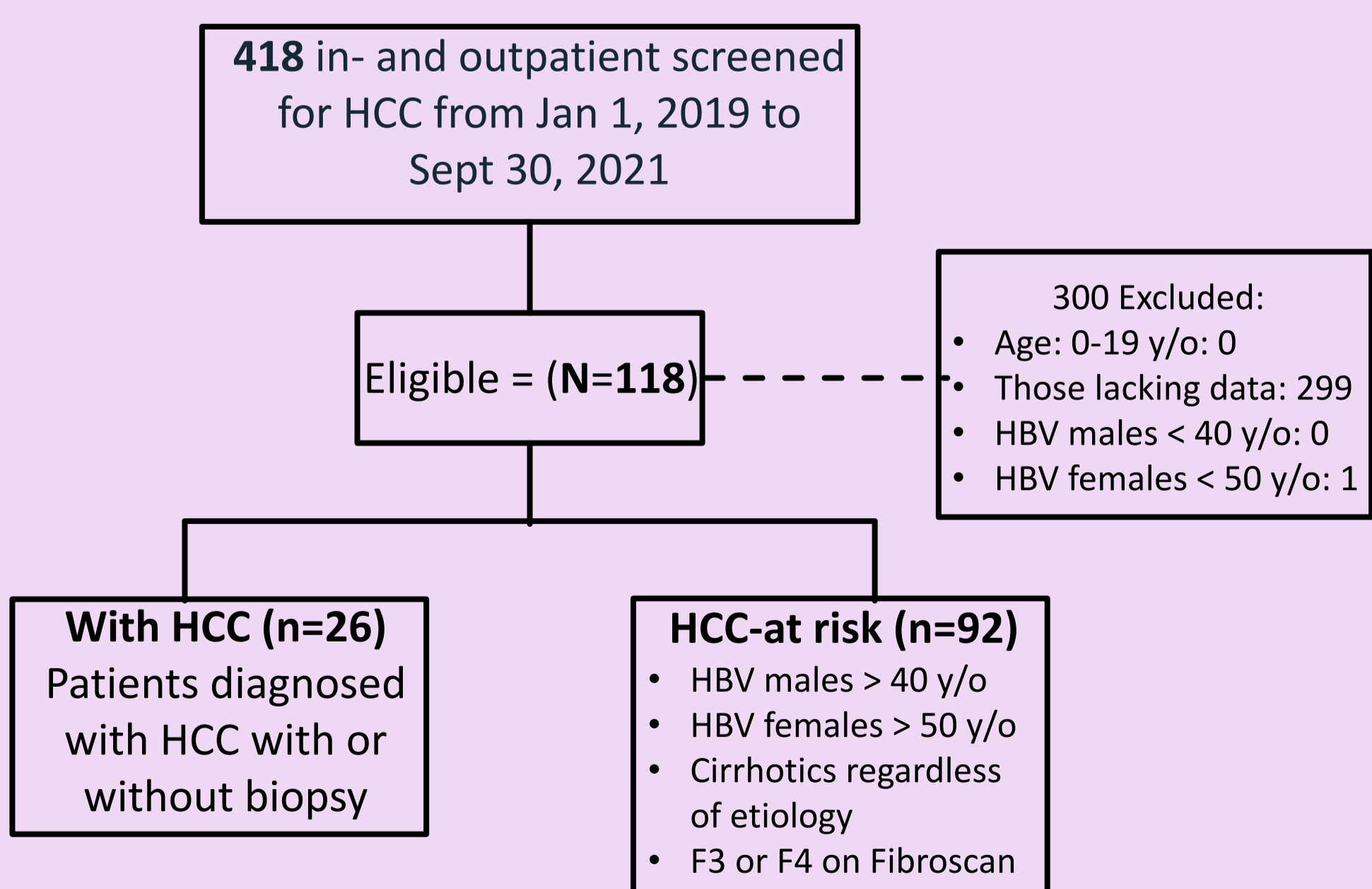
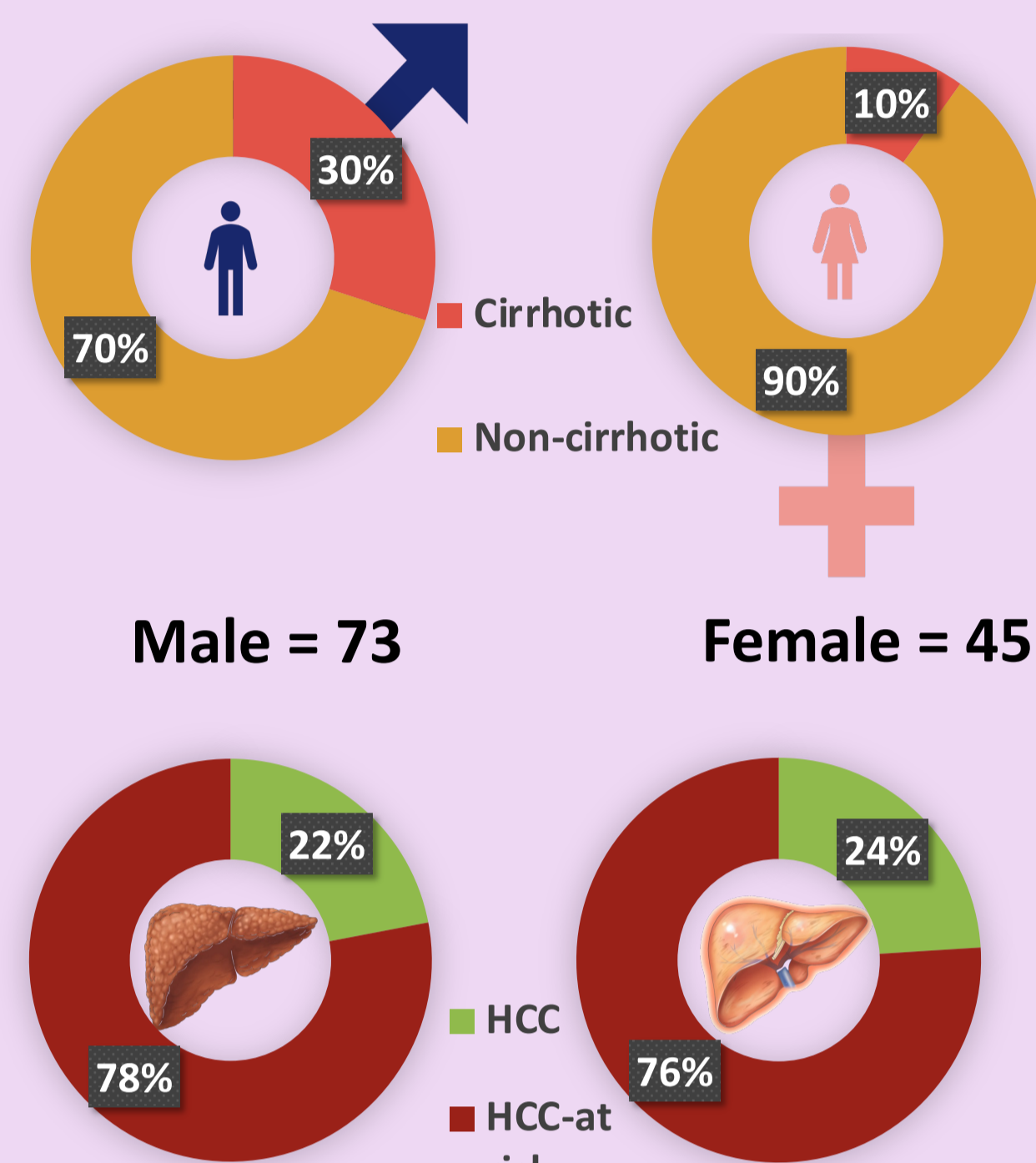


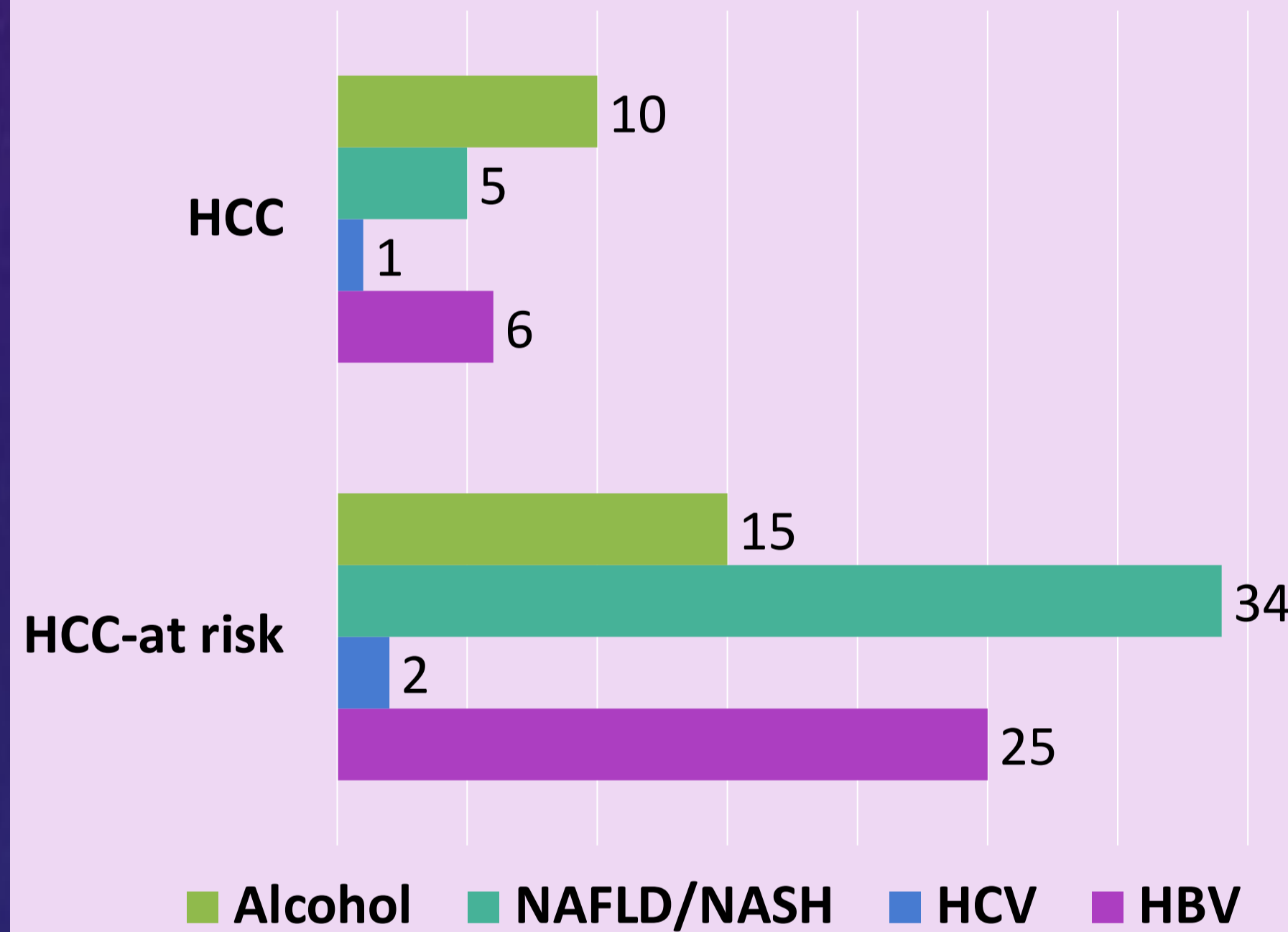
Figure 1: Patient distribution flow diagram

Demographic Profile (Figure 2)

- Mean age: 63 years old, range: 50-76 years



Etiology of Liver Disease



Results:

- The **modified GALAD score** demonstrated the highest sensitivity (96.2%) with an AUROC of 0.775 (95% CI) which is higher than the sensitivity of the standard surveillance (77%).
- The addition of transient elastography (ASAPUSTE score) did not improve sensitivity (65%), but enhanced specificity (37%) in this study cohort.
- The presence of AFP-L3 in the original GALAD score may have contributed to the high sensitivity (> 88%) and specificity (> 88%) of this blood-based surveillance strategy in better predicting early stages of HCC (Johnson P.J. et al. 2014).

Measure (%)	Surveillance Strategies (Table 2)		
	AFP plus Ultrasound (Standard)	Modified GALAD score (Blood-based)	ASAPUSTE Score (Blood plus imaging)
Sensitivity	76.9	96.2% ↑	65.4
Specificity	20.7	27.2% ↓	37.0
Likelihood ratio (+)	0.97	1.32	1.04
Likelihood ratio (-)	1.12	0.14	0.94

Clinical Parameters (Table 1)

	HCC		HCC-at risk		Total		P-value
	Mean	SD	Mean	SD	Mean	SD	
AFP (IU/mL)	1608 ↑	5417	17	47.4	367.65	2591	0.005
PIVKA (AU/mL)	11824 ↑	26341	1610	7033	3860.6	14311	0.001
Fibroscan (kPa)	16 (F4)	12.74	21 (F4)	17.03	20.03	16.25	0.197

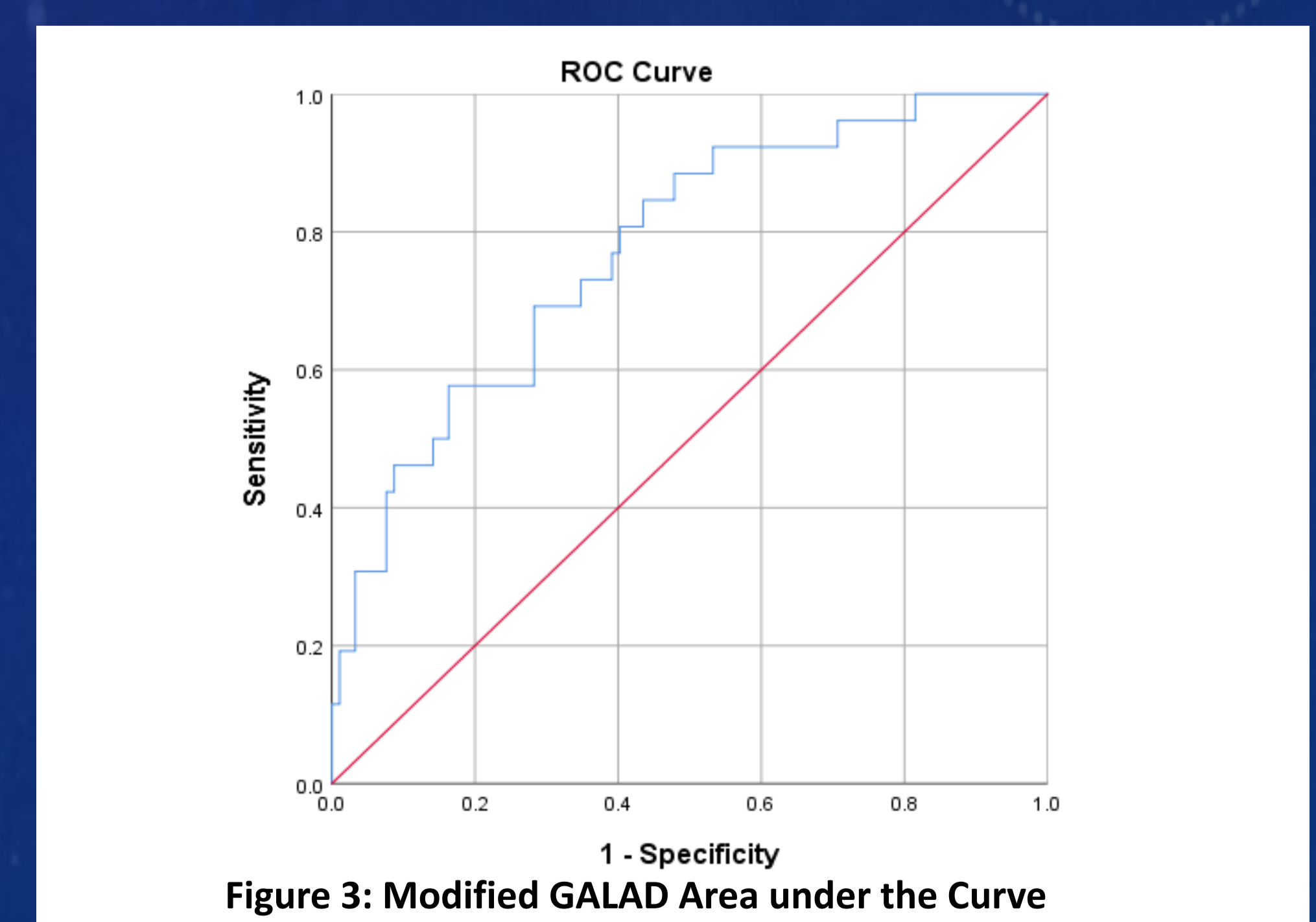
Area under the Curve (AUC) (Table 3)

Modified GALAD	0.775
GALAD	0.95

(Berhane, 2016)

A blood-based surveillance strategy (Modified GALAD)

using serum biomarkers combined with demographic information offers an accurate approach to detect HCC without the use of imaging.



Recommendations:

- This serum-biomarker-based strategy may facilitate HCC surveillance especially in those with limited access to imaging and among those with NAFLD and obesity which limits the diagnostic accuracy of ultrasound.

