

Chronic Liver Disease Comprehensive Management

——The Introduction of Project Pearl

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2024-10-26



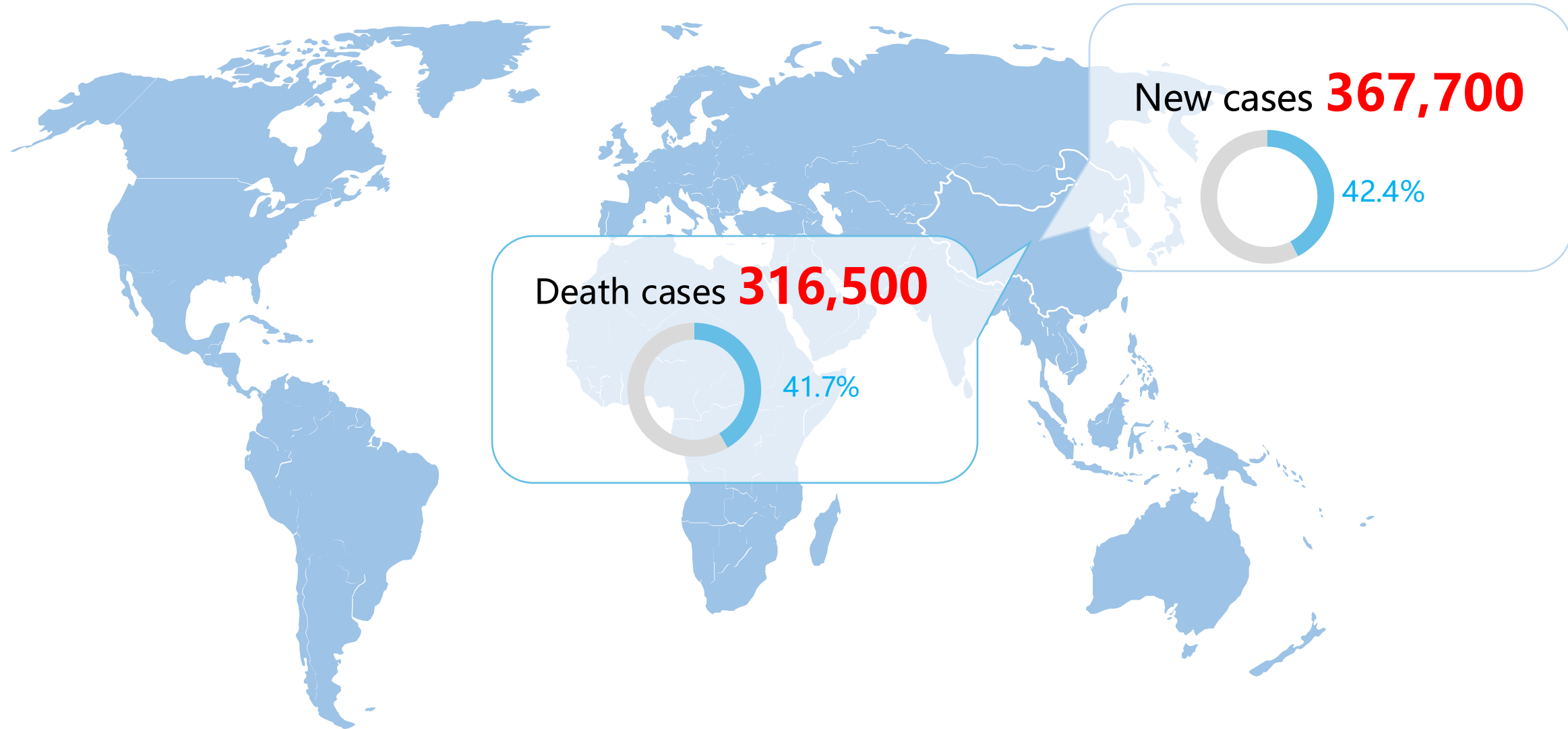
Background

Significance

Project Pearl

Prospects

China has a huge burden of liver cancer



New and death cases of liver cancer in China in 2022

Characteristics of liver cancer in China



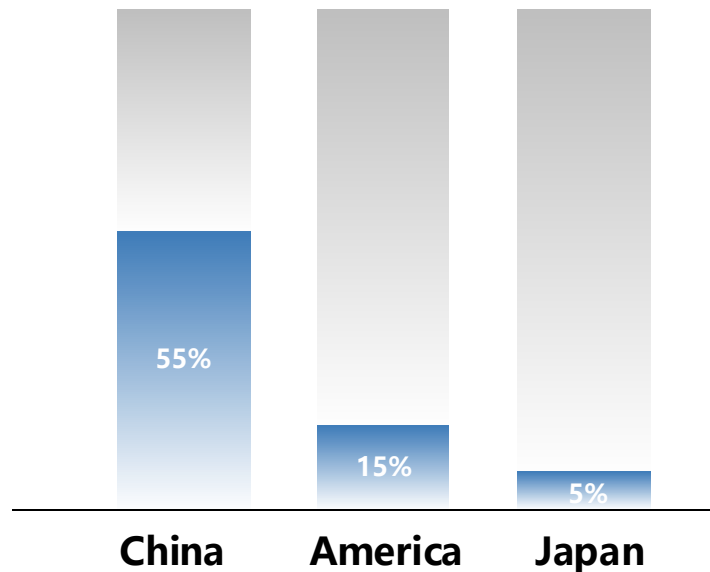
High Incidence Rate

- In China, liver cancer is the 4th most common cancer, ranking 2nd in cancer mortality rates, with HCC accounting for over 85–90%.
- Additional 300,000 to 400,000 liver cancer patients were diagnosed per year in China.



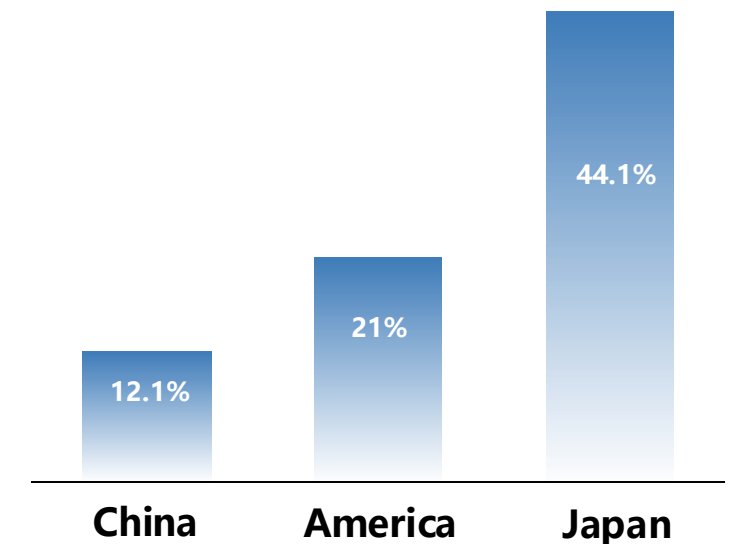
Delayed Diagnosis

Percentage of HCC diagnosed in stage III and IV.

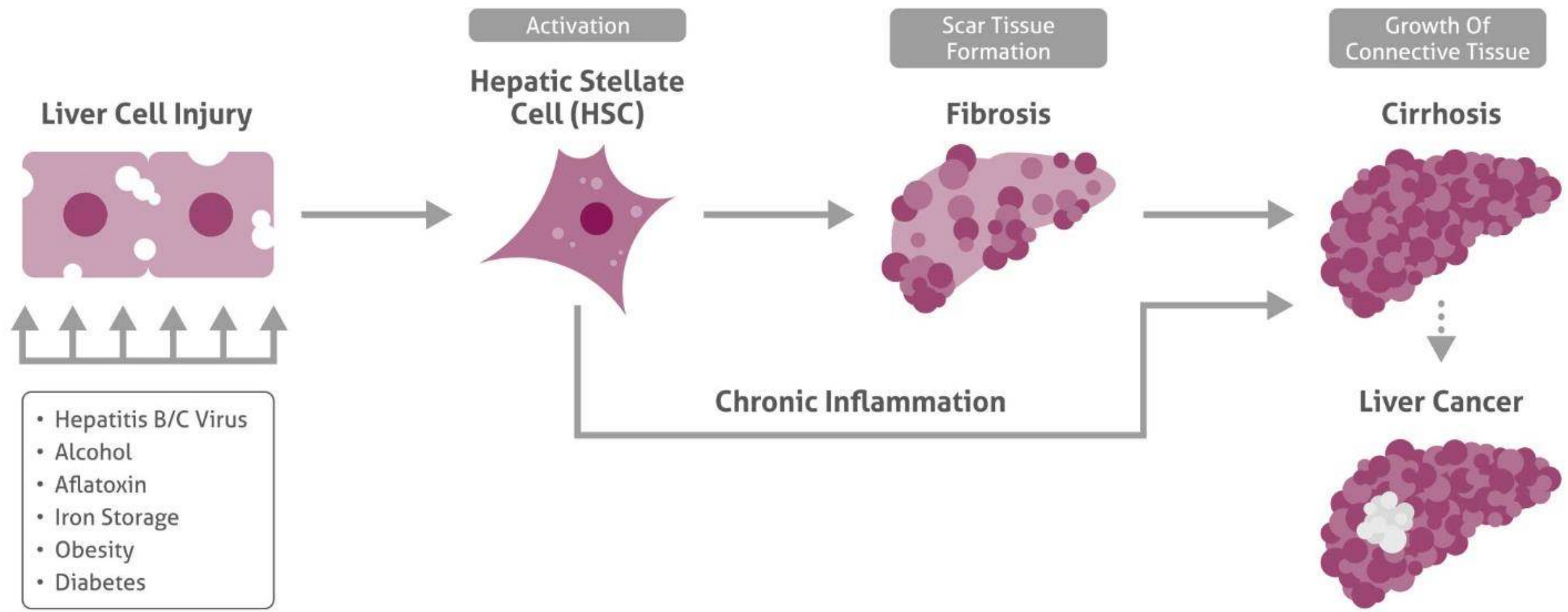


Poor Prognosis

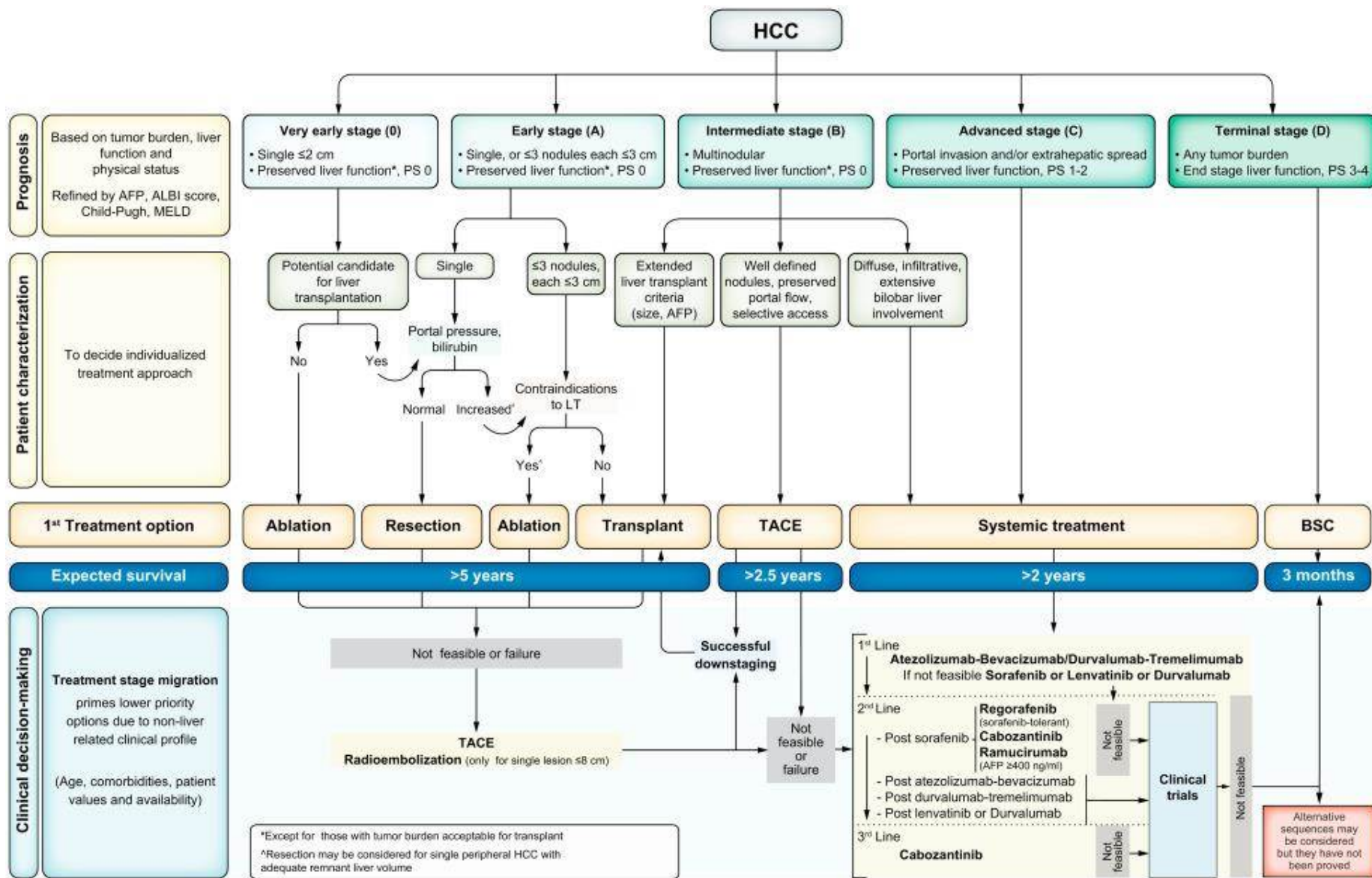
The 5-year survival rate for liver cancer is very low in China, only 12.1%.



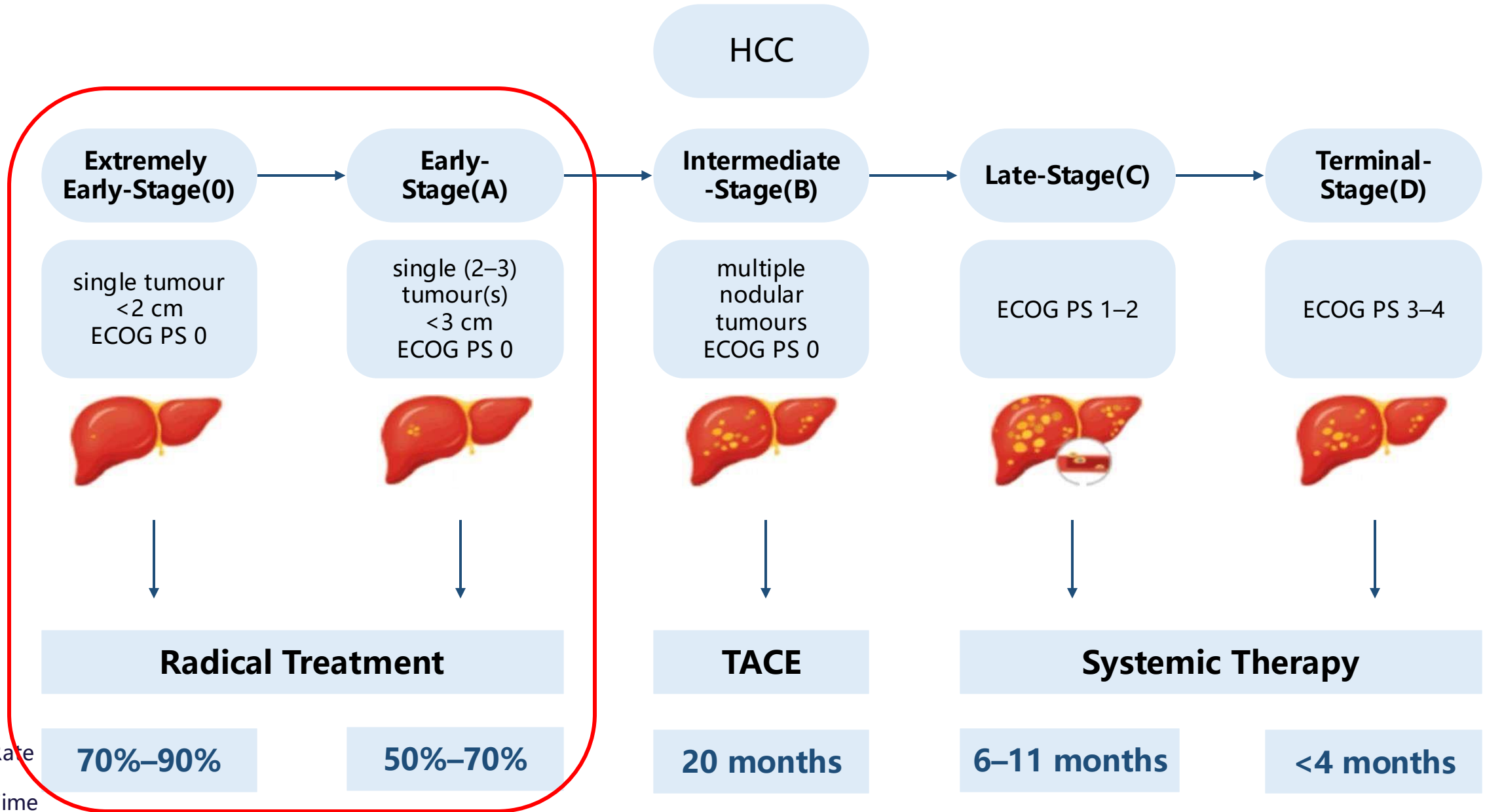
Pathogenesis of Liver Cancer



BCLC staging and treatment strategy in 2022



HCC



TACE, transcatheter arterial chemoembolisation; ECOG PS Eastern Cooperative Oncology Group Performance Status

Five-Year Survival Rate / Median Survival Time

Combining multiple screening methods is recommended to improve the early-stage diagnosis rate

2024 Liver Cancer China Guideline

Alpha fetoprotein (AFP) and protein induced by vitamin K absence-II (PIVKA-II) have been identified as serum biomarkers that may support in HCC diagnosis.

Although the diagnostic value of these biomarkers can be limited when used in isolation, research has shown that sensitivity and specificity for HCC is improved when these assays are combined.

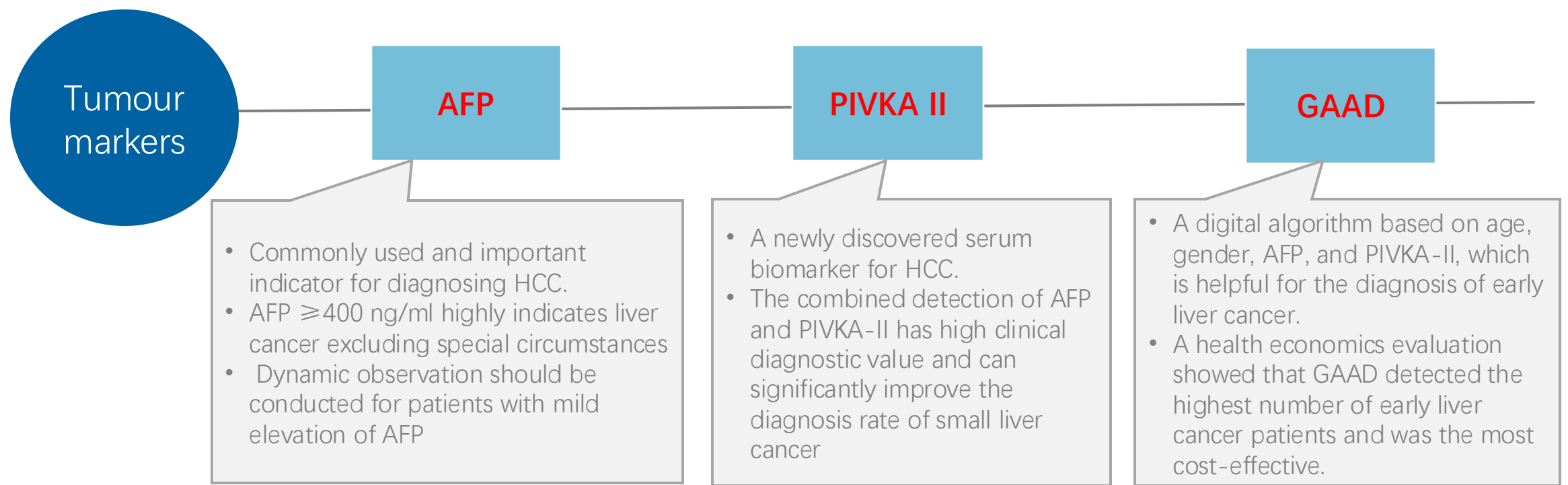
*Multiple screening methods are highly recommended to improve the early stage diagnose rate¹ and thus the survival rate, including AFP, PIVKA II, AFP-L3, GALAD, ASAP, **GAAD**, etc.*



原发性肝癌诊疗指南（2024年版）

血浆游离微小核糖核酸（microRNA）^[77] 和血清甲胎蛋白异质体（lens culinaris agglutinin-reactive fraction of AFP, AFP-L3）也可以作为肝癌早期诊断标志物，特别是对于血清 AFP 阴性人群。基于性别、年龄、AFP、PIVKA II 和 AFP-L3 构建的 GALAD 模型在诊断早期肝癌的灵敏度和特异度分别为 85.6% 和 93.3%，有助于 AFP 阴性肝癌的早期诊断^[78]（证据等级 1，推荐 A）。目前已有基于中国人群大样本数据的优化的类 GALAD 模型（C-GALAD、GALAD-C、C-GALAD II 等）用于肝癌的早期诊断。另外，基于性别、年龄、AFP、PIVKA II 构建的简化的 GAAD 模型^[79] 及 ASAP 模型^[80] 与 GALAD 模型诊断效能类似（证据等级 1，推荐 A）。基于 7 个 microRNA 组合的检测试剂盒诊断肝癌的灵敏度和特异度分别为 86.1% 和 76.8%，对 AFP 阴性肝癌的灵敏度和特异度分别为 77.7% 和 84.5%^[77]（证据等级 1，推荐 A）。

China Anti-Cancer Association (CACA) updated guideline to recommend serum testing and GAAD for aiding high risk patients early diagnosis





Background

Significance

Project Pearl

Prospects

Liver Cancer Screening in China Faces Several Challenges

Challenge 1
Weak
Willingness

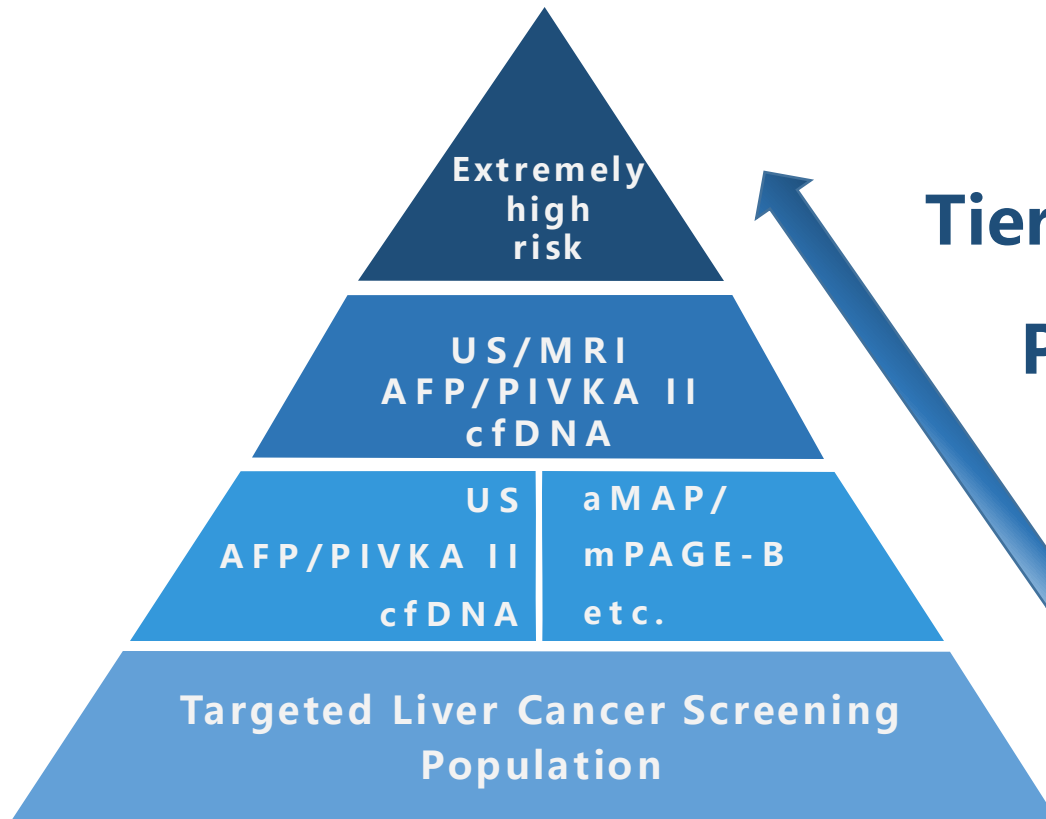
Challenge 2
Poor
Accessibility

Challenge 3
Ineffective
Screening

Challenge 4
Poor
Compliance

Challenge 5
Heavy
Financial Burden

Risk Stratification for Liver Cancer Management



Tiered Enhancement

Precision Screening

Maximising Cost-Benefit Ratio



Disease Background

Significance

Project Pearl

Prospects

Project Pearl

Prospect

Digital platforms help establish a liver cancer early screening and diagnosis system suitable for Chinese people, improving the standardised management process for patients with liver disease within the hospital.

Goal

1. Improving liver cancer staging and disease prognosis through liver cancer risk stratification.
 2. Establish a comprehensive quality control system for liver cancer and hepatitis throughout the entire process.
- Project Population: $\geq 5,000$ liver disease patients complete enrollment, covering $\geq 80\%$ of hepatitis B patients at Zhuhai People's Hospital

Output



Implementation
Details



Patient Management
Data Analysis
Risk Stratification
Model Analysis

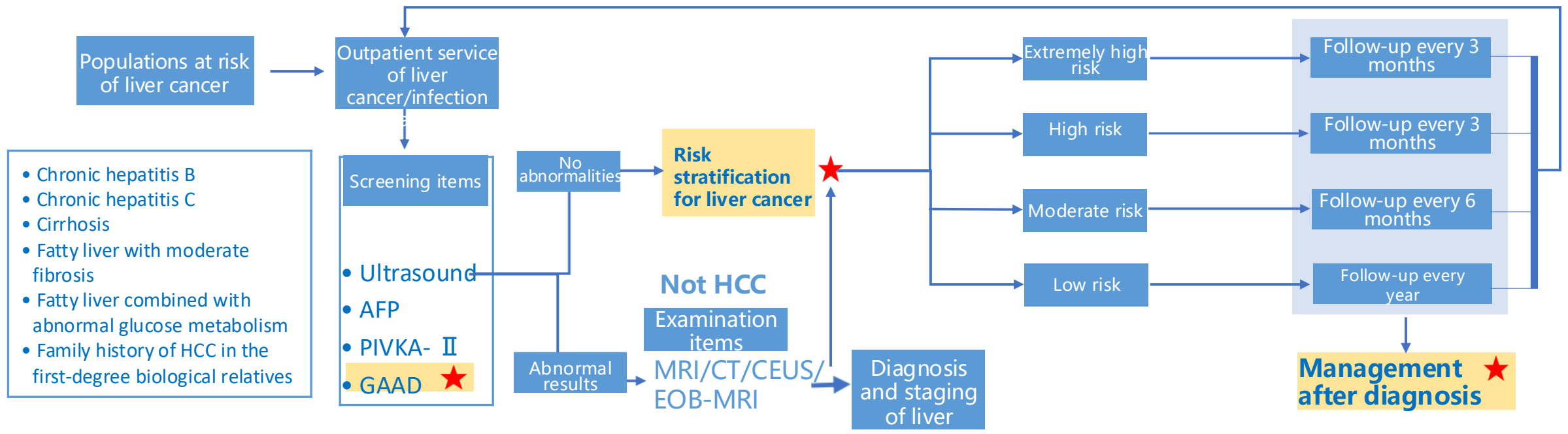


Long-Term
Sustainable
Operations Plan

Standard of clinical path



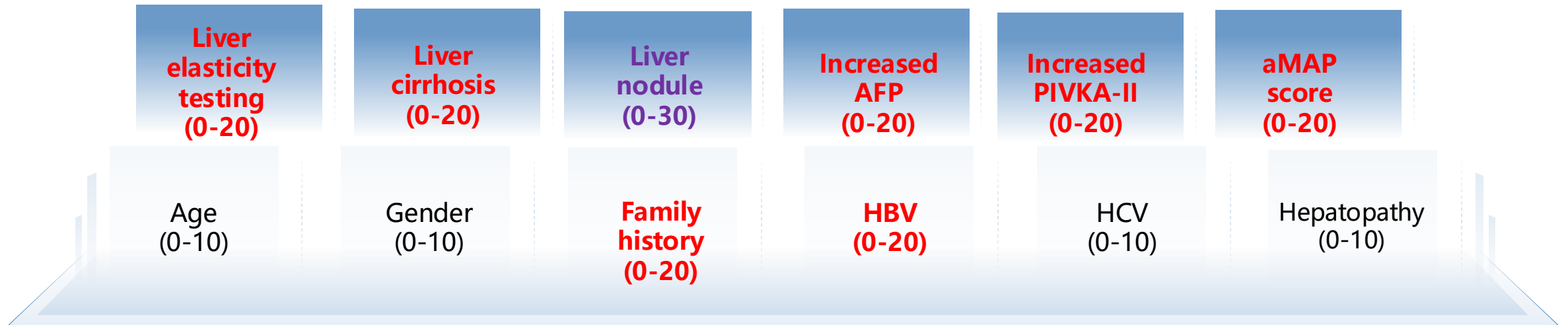
Whole cycle management for populations at risk



Zhuhai risk assessment model



The risk model evaluates these parameters and assigns different scores, with a total score of 210



Optimise Processes, Enhance Efficiency

Disease Awareness



Recruitment



Signing

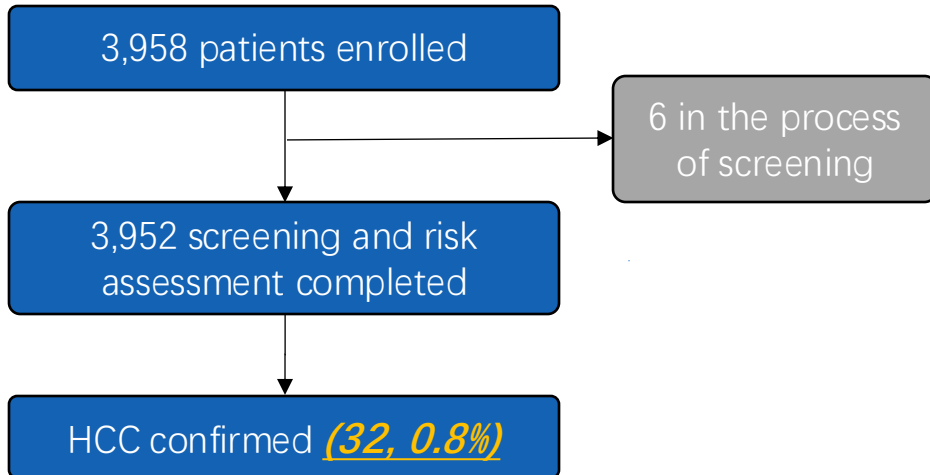


Risk Assessment



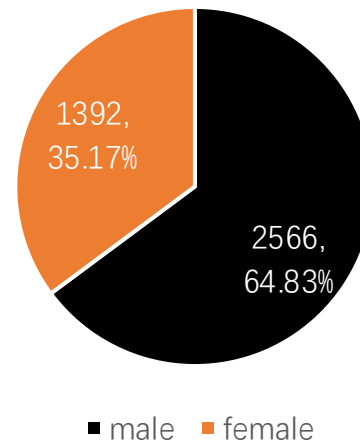
Enrollment status and patient portrait – All patients

Patient enrollment

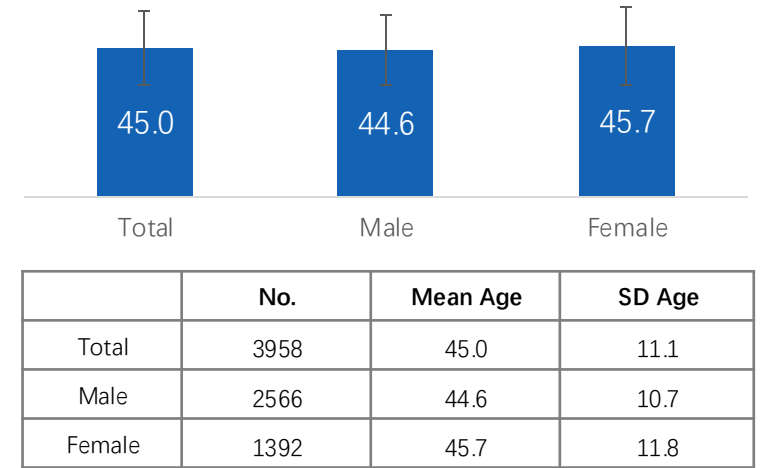


Patient characteristics

Gender



Age

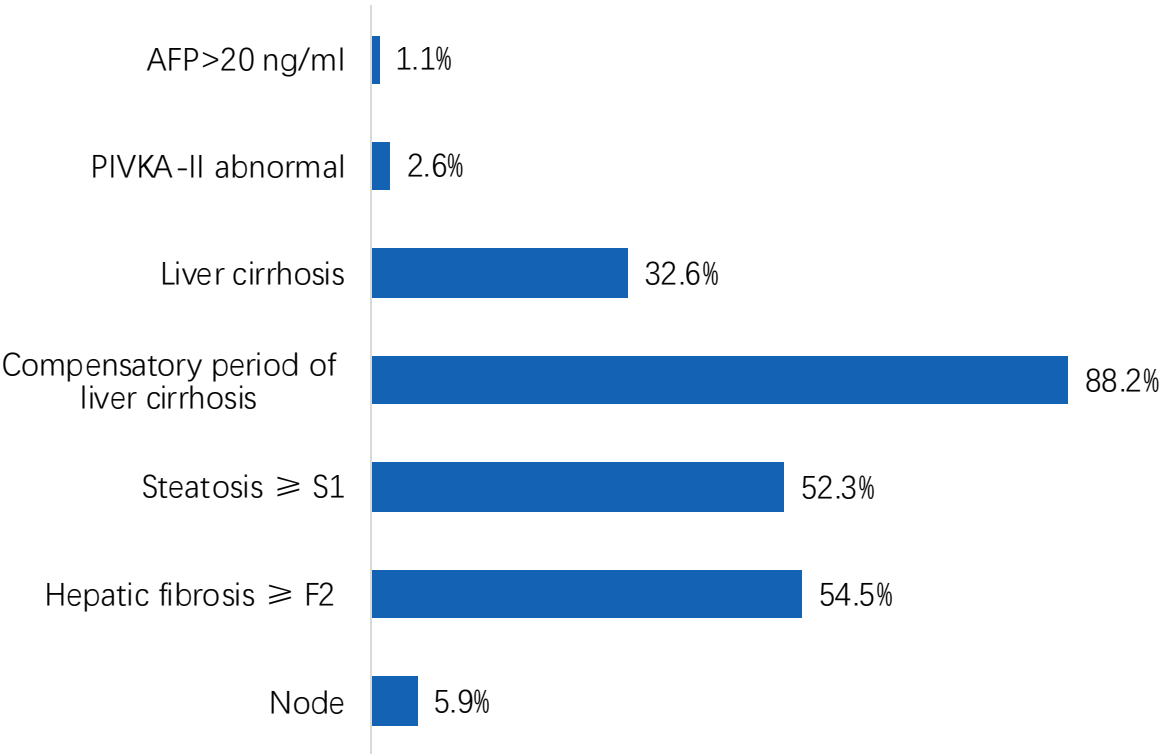


	No.	Mean Age	SD Age
Total	3958	45.0	11.1
Male	2566	44.6	10.7
Female	1392	45.7	11.8

Time period : from March 2023 to Oct 2024, patients visiting the Department of Hepatology and Infectious Disease.

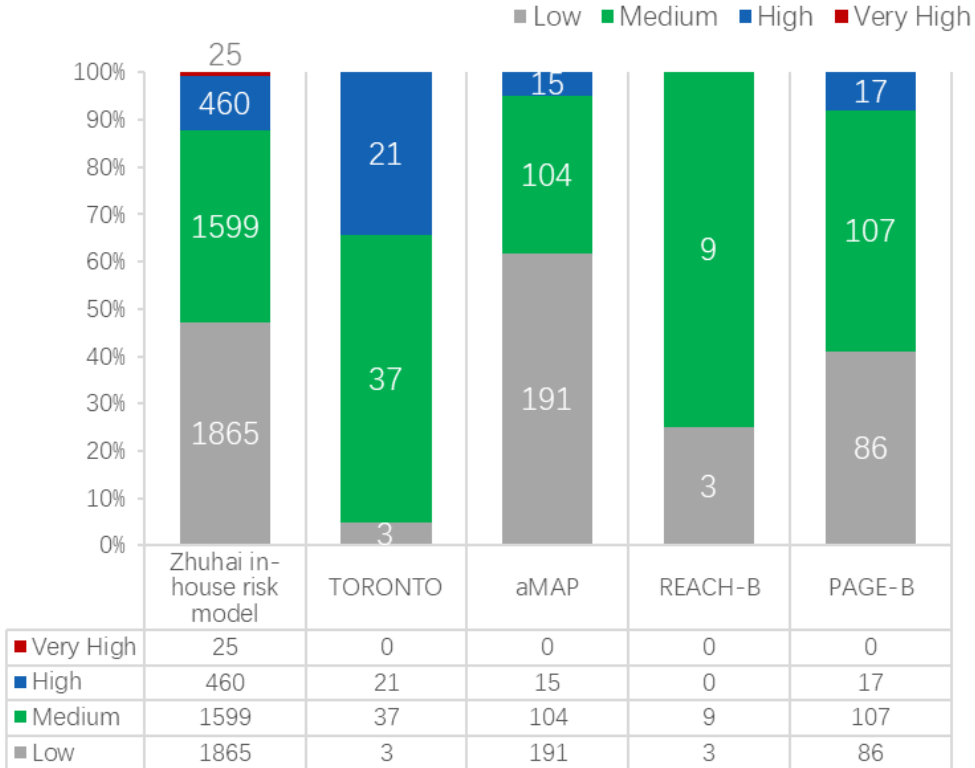
Patient portrait – All patients

Patient characteristics



Note: N for each rate is, AFP = 3246, PIVKA = 3150, live cirrhosis = 2693, compensatory = 651, steatosis = 42, hepatic fibrosis = 42, node=2446; data was evaluated based on the first visit

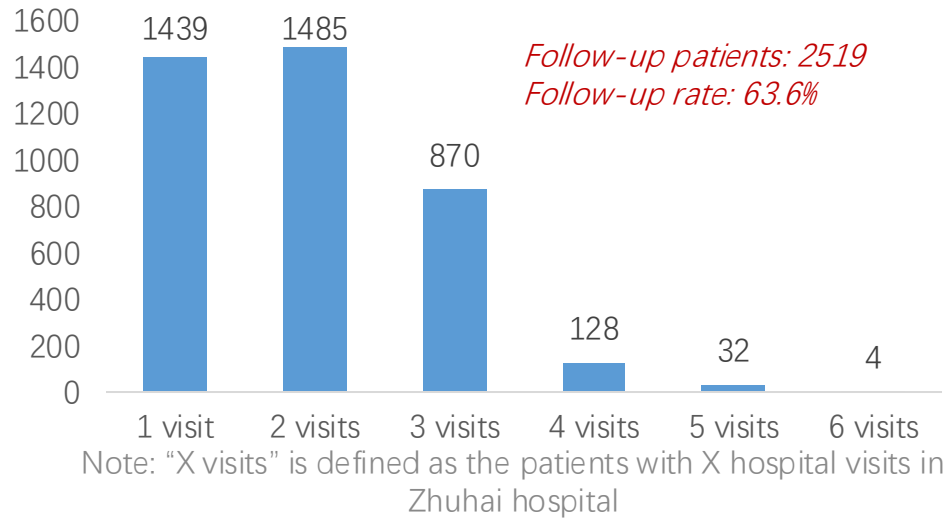
Risk level distribution



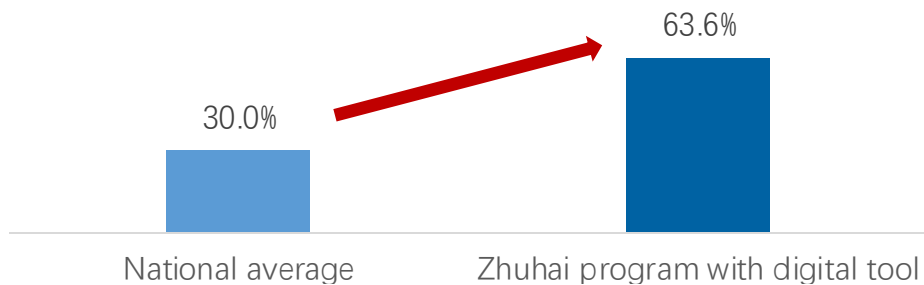
Note: N for each risk model, ZHUHAI in-house risk model = 3949, TORONTO = 61, aMAP = 310, REACH-B = 12, PAGE-B = 210

Patients under digital solution and patients with high risk prefer to have a better compliance rate

Patients with different visits



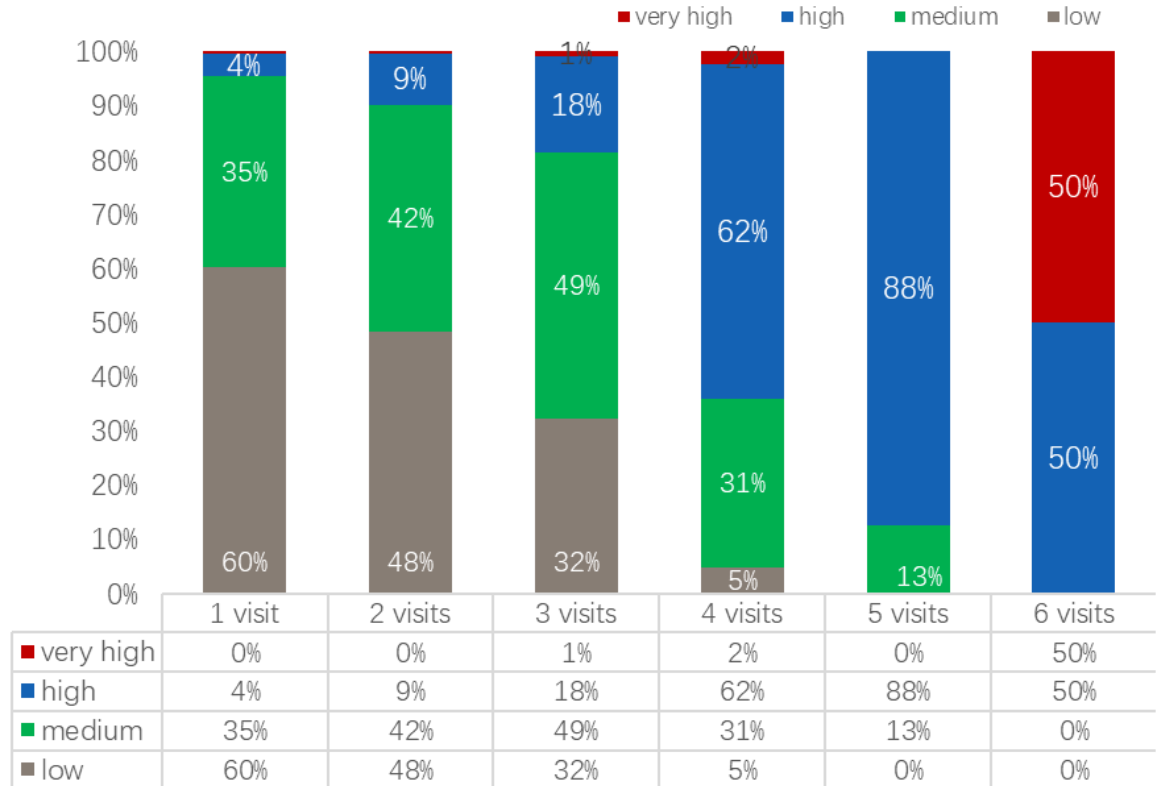
Follow-up rate



Note: 30% average follow-up rate comes from Ruijing Hospital

Risk level for patients with different visits

- Patients with higher risk tend to have better compliance rate, as the proportion of high risk and very-high risk patients increases with the number of visits.
- This may be explained as: 1) enhanced patient's willingness for medical service; 2) Zhuhai digital solution helps to track patients and disease progression.

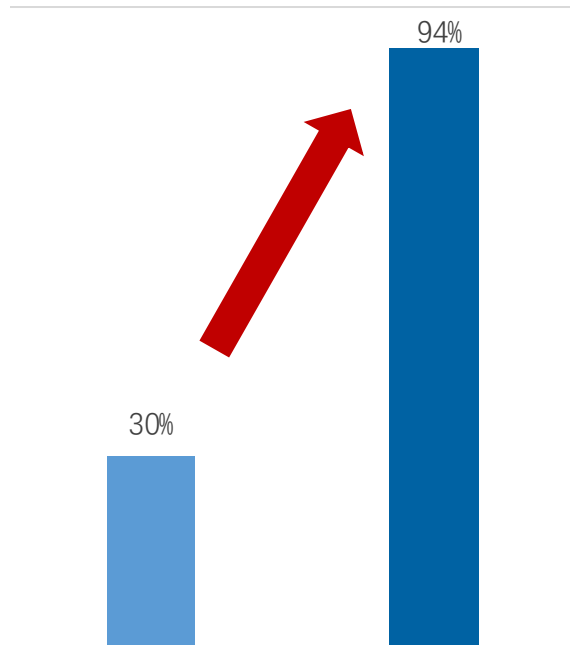


Note: the risk evaluation is based on Zhuhai risk model; reason for the total percent is not 100% is the rounding off the decimal point

The screening program greatly improved the early diagnosis rate of HCC

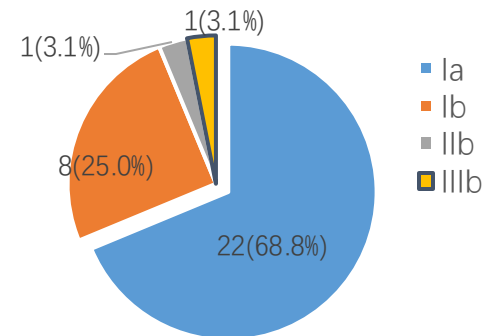
32 patients were diagnosed with HCC (early diagnosis rate: 94%).

HCC Early Diagnosis

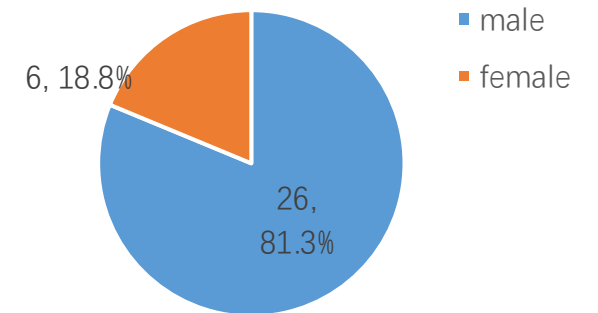


Note: early diagnosis included Ia and Ib (CLNC)

HCC stage

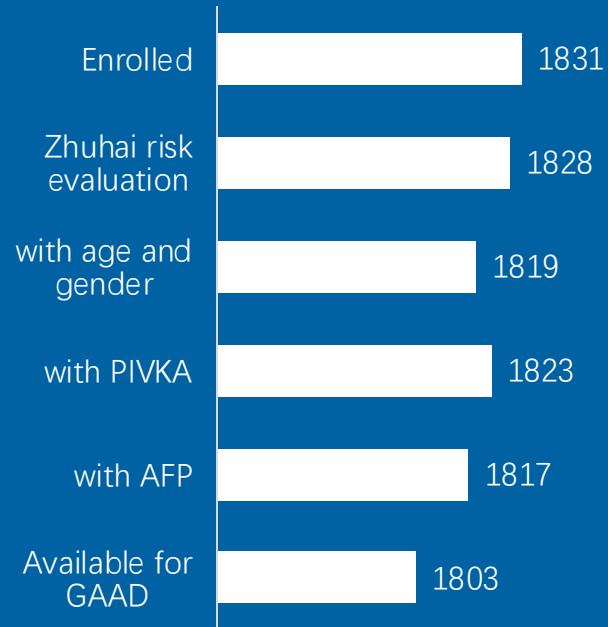


Gender



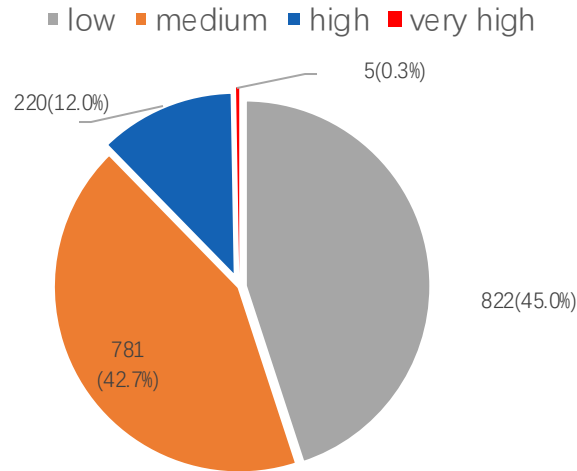
Enrollment status: Sub-group under the GAAD management

1,831 patients were enrolled since March 2023 thru Oct 2024, and 1,803 patients were eligible for GAAD risk evaluation.



Patients enrollment

12.3% patients were classified as high or very high risk by Zhuhai risk model.



Risk level

66.9% patients were male, with the mean age at 44.9 ± 11.0.

All baseline characteristic data is similar with the total population.

Variable	Data
Male rate(n,%)	1217, 66.9%
Age (mean±SD)	44.9 ± 11.0
Male	44.7 ± 10.6
Female	45.3 ± 11.7
AFP > 20 ng/ml (n,%)	24, 1.3%
PIVKA > 21.29 ng/ml (n,%)	41, 2.2%

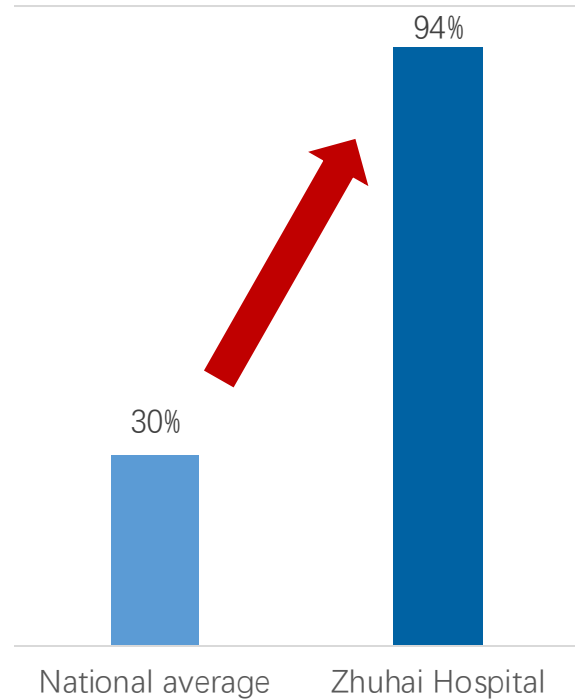
Patient characteristic

HCC diagnosis: Sub-group under the GAAD management

15 out of 16 HCC patients were diagnosed with early-stage HCC (age: 57.94 ± 13.76 ; male rate: 87.5%).

Zhuhai digital solution greatly improved the HCC early diagnosis rate **(94% vs. 30%)**.

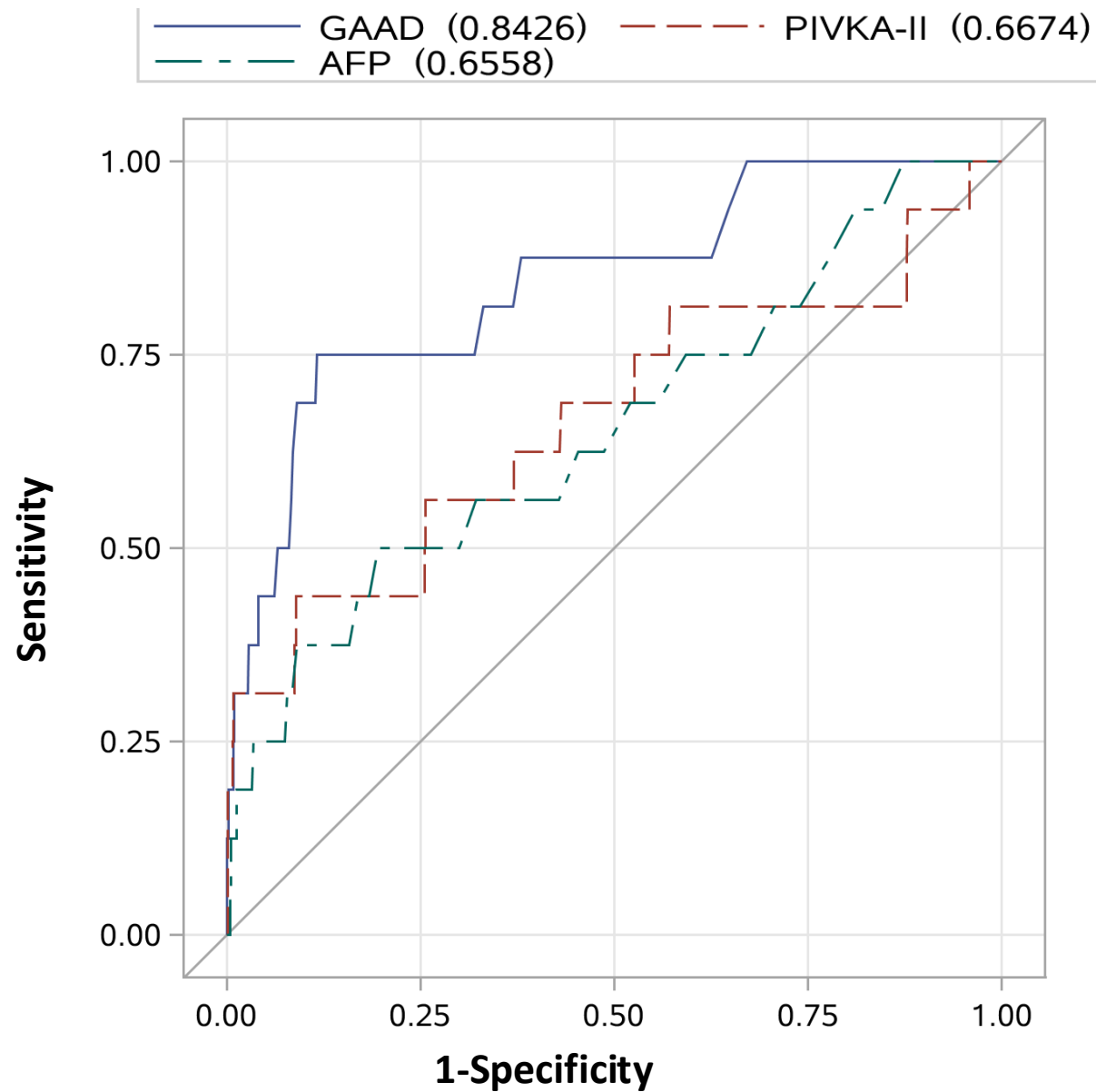
HCC Early Diagnosis

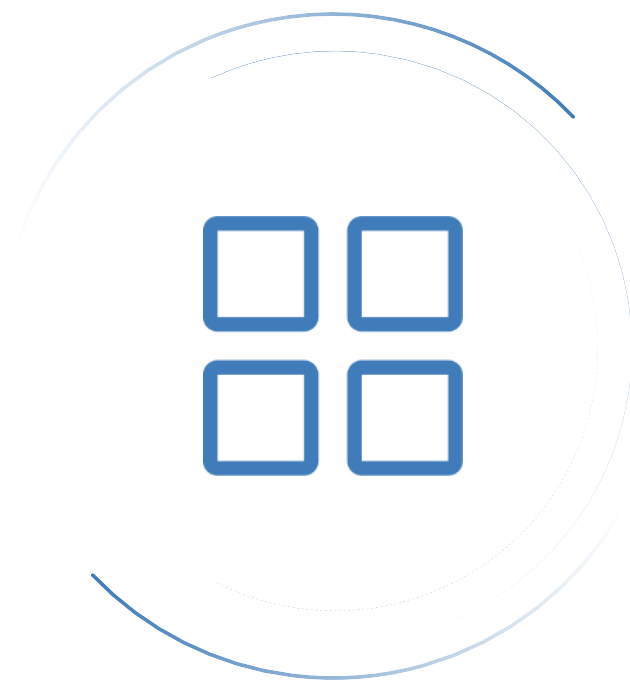


Note: early diagnosis Phrase includes I, Ia and Ib (CLNC); 16 HCC patients were: 13 Ia, 1 I, 1 Ib, and 1 IIIb.

Patients ID	Sex	Age	HCC Staging by CNLC	Patients ID	Sex	Age	HCC Staging by CNLC
Patient 1	female	70	Ia	Patient 9	female	71	Ia
Patient 2	male	33	Ia	Patient 10	male	60	Ia
Patient 3	male	58	Ia	Patient 11	male	33	I
Patient 4	male	62	Ia	Patient 12	male	59	Ia
Patient 5	female	55	Ia	Patient 13	male	41	Ia
Patient 6	male	71	Ia	Patient 14	male	63	IIIb
Patient 7	male	52	Ia	Patient 15	male	36	Ia
Patient 8	male	66	Ia	Patient 16	male	82	Ib

GAAD shows better sensitivity and specificity of HCC diagnosis





Background

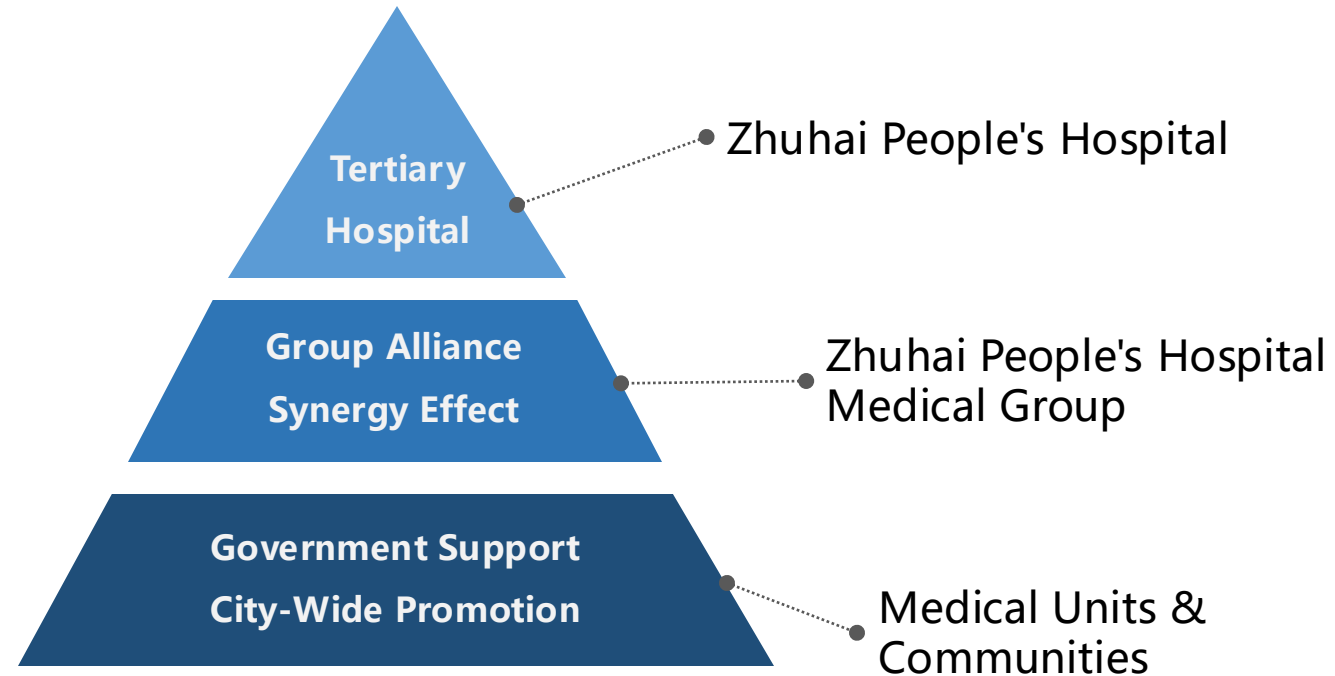
Significance

Project Pearl

Prospects

Project Pearl Ecological Zone Pattern

— from Community to Hospital



Three-Level Medical Treatment

Prospects



**Pattern
Exploration**



**Research
Collaboration**



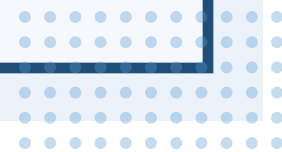
**Application
Extension**



Summary

Project Pearl Ecological Zone Pattern

- **Treat chronic viral hepatitis to reduce liver cancer incidence ;**
- **Discover early liver cancer through regular follow-ups, achieve early diagnosis and treatment, and improve survival rates ;**
- **To implement comprehensive management throughout the disease process, aiding in the execution of the WHO's plan to eliminate viral hepatitis threats by 2030 and supporting the Healthy China 2030 Action Plan.**



Thank You!

