HCV Elimination in Taiwan

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Outline

- WHO global sector strategy on viral hepatitis
- Change of HCV epidemiology in Taiwan
- Policy and strategy of HCV elimination
- Action and key achievements
- Approaching WHO goal on HCV elimination
- Conclusion and perspective

Outline

- WHO global sector strategy on viral hepatitis

WHO目標於2030年消除病毒性肝炎

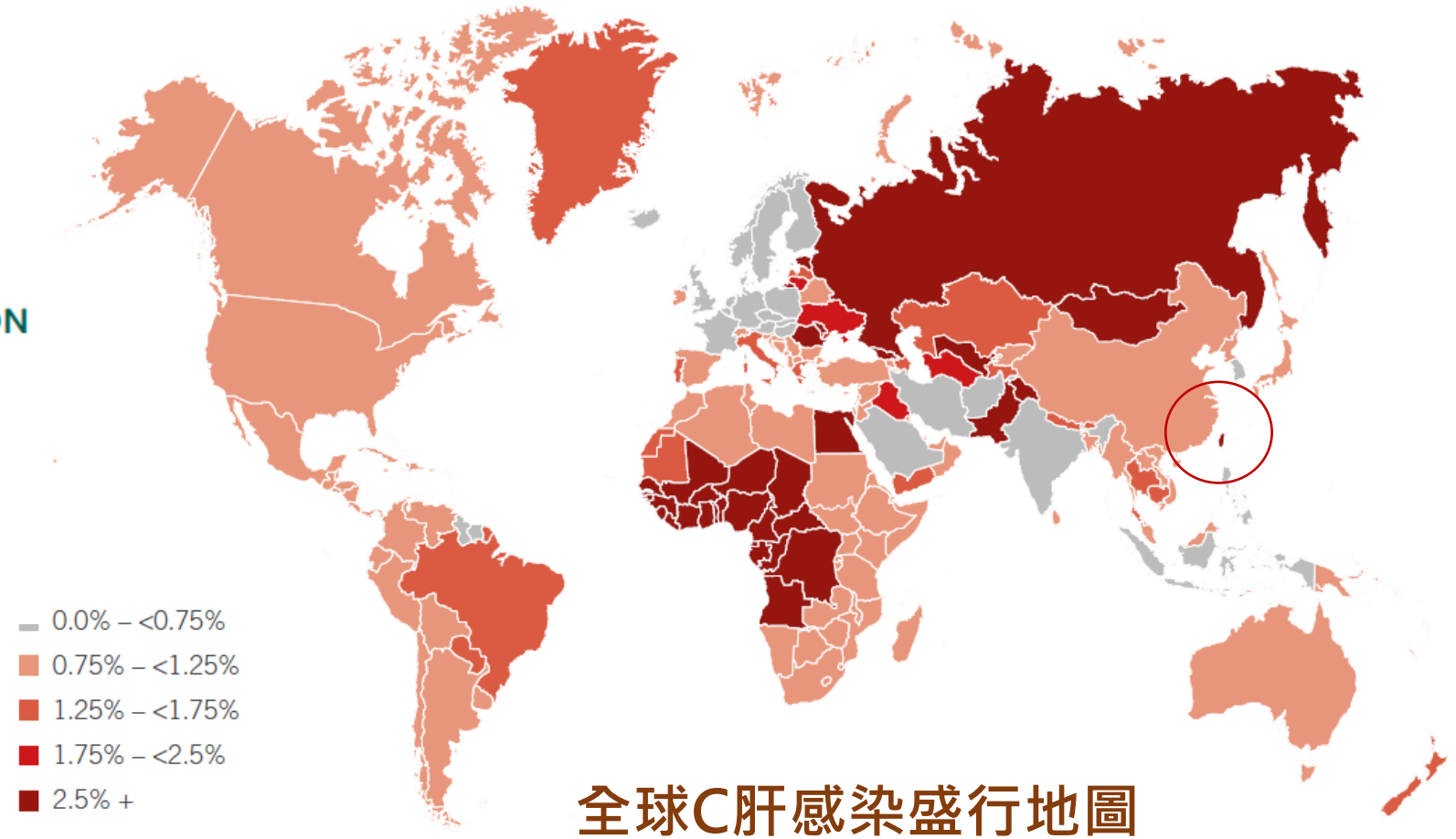
World Health Organization

GLOBAL HEALTH SECTOR STRATEGY ON

VIRAL HEPATITIS 2016–2021

TOWARDS ENDING VIRAL HEPATITIS

WHO Goal: 2030



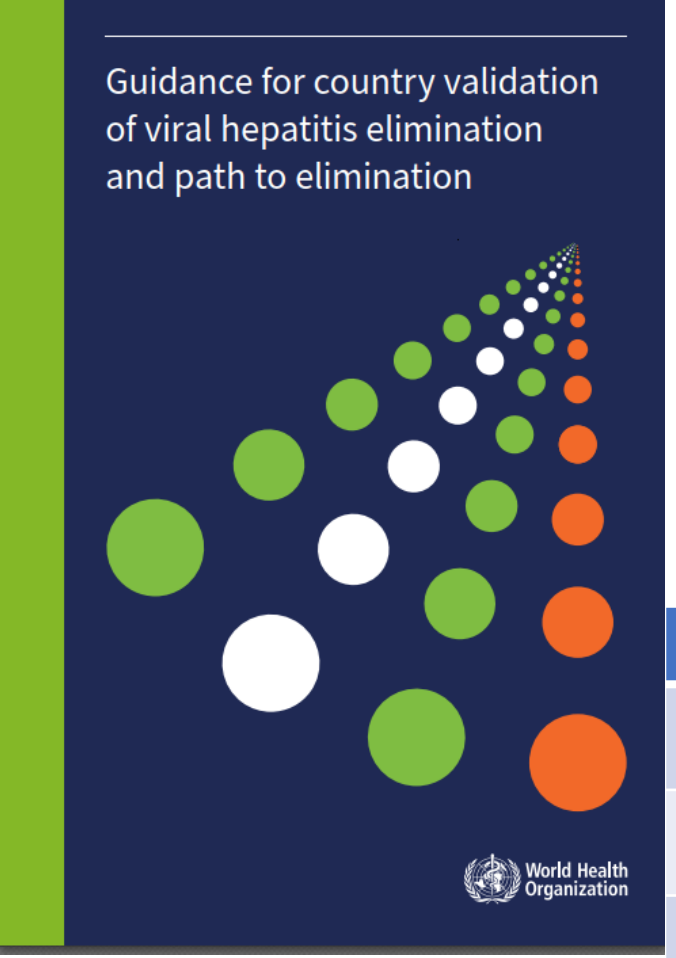
全球C肝感染盛行地圖

Source: Gower E, Estes C, Blach S, Razavi-Shearer K, Razavi H. Global epidemiology of the hepatitis C virus infection. J Hepatol. 2014; 61 (1 Suppl): S45–57 *(2)*.

90% reduction in new cases of chronic hepatitis B and C

65% reduction in hepatitis B and C deaths

80% of treatment eligible persons with chronic hepatitis B and C infections



2022 WHO updated the global strategy to interim (2025) and final (2030) goal

A Path To Elimination (PTE): Programmatic Targets

**establishment a sentinel surveillance for hepatitis sequelae

Elimination Goals	Bronze	Silve	Gold**	Full Elimination
Chronic HCV patients diagnosed	≥60%	≥70%	≥80%	≥90%
Diagnosed chronic HCV patients receiving treatment	≥50%	≥60%	≥70%	≥80%
Injection Safety: Safe injectionsin health-care settings	95%	100%	100%	100%
Blood transfusion safety: Proportion of blood units screened for bloodborne infections	95%	100%	100%	100%
Number of syringes and needles distributed/PWID/year	≥1 syringes	≥1 syringes	≥150 syringes	≥300 syringes

2022 WHO updated the global strategy to interim (2025) and final (2030) goal

Impact Targets

Elimination Goal	2025	2030
Annular Incidence of HCV: General population	≤13/100,000	≤5/100,000
PWID		≤2/100
Annular Mortality: CH/Cirrhosis	≤3/100,000	≤6/100,000 (B+C)
HCC		

Outline

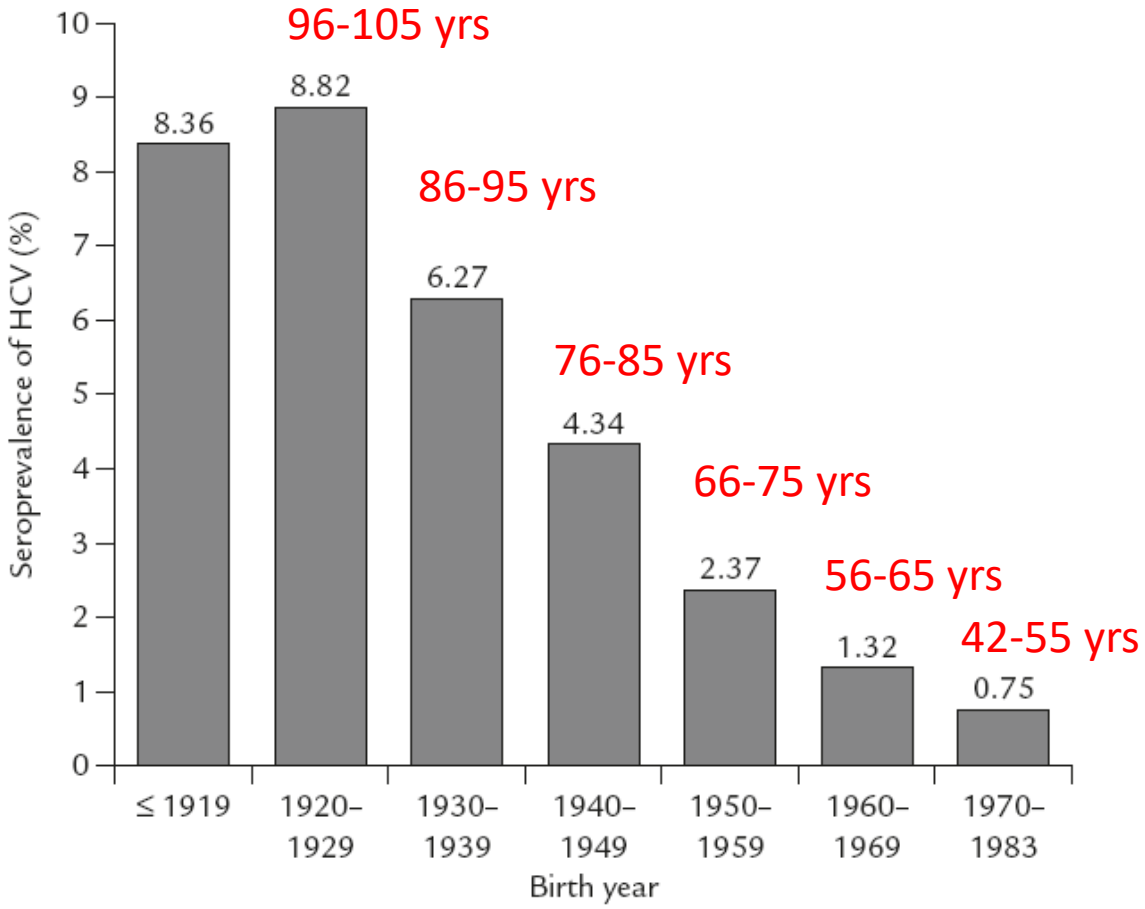
- Change of HCV epidemiology in Taiwan

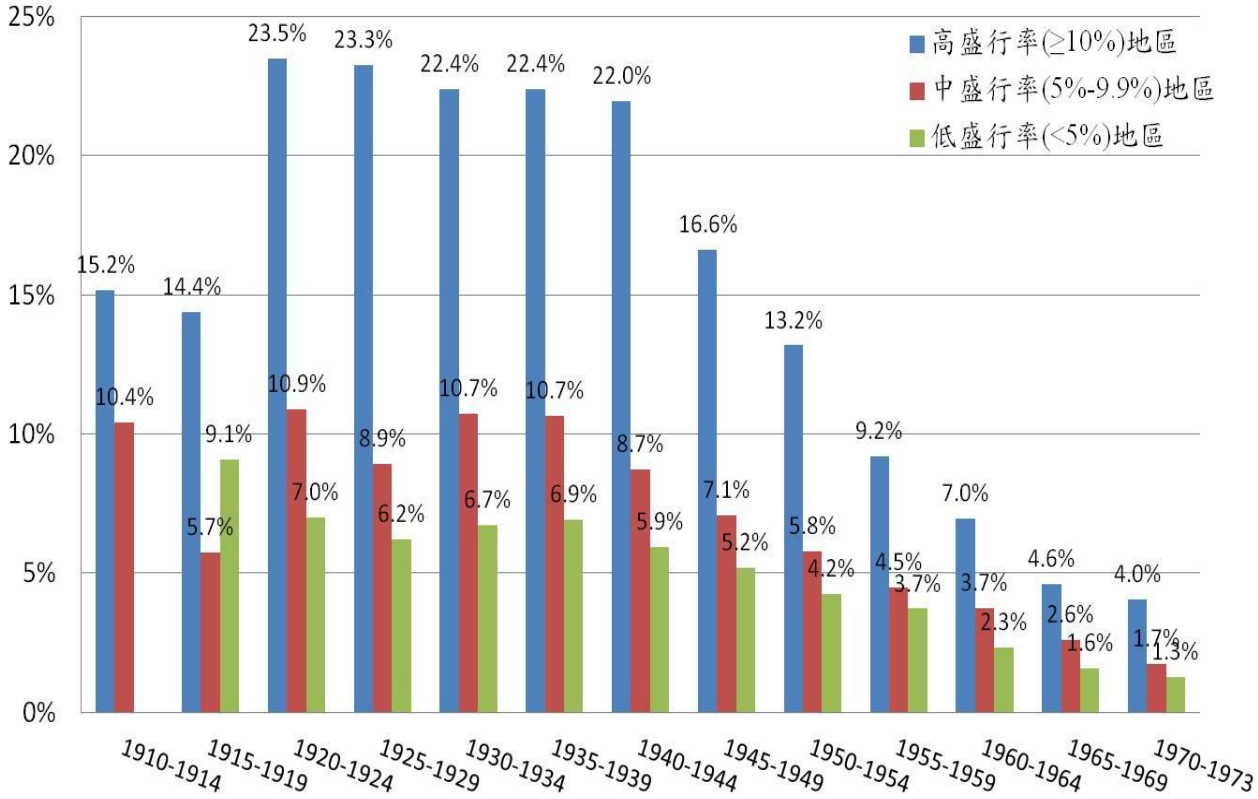
Prevalence of anti-HCV in Taiwan

Populations	Prevalence
General population	2 - 4%
Volunteer blood donors	1 - 2%
With elevated ALT	10%
Chronic liver disease	
HBsAg(+)	10.6%
HBsAg(–)	76 - 88%
Spouse	15 - 20%
Hemodialysis	20 - 40%
Hemophiliacs	90%
IV drug users	67 - 81%
Prostitutes	10 - 18%
Childhood liver disease	9.7%
“Hepatitis C village”	30 - 60%

Updated from Chen DS et al. J Infect Dis 1990;162:817.

Anti-HCV Prevalence by Birth Cohort





Chen CH,et al. J Formos Med Assoc 2007; 106: 148-155

Unpublished data

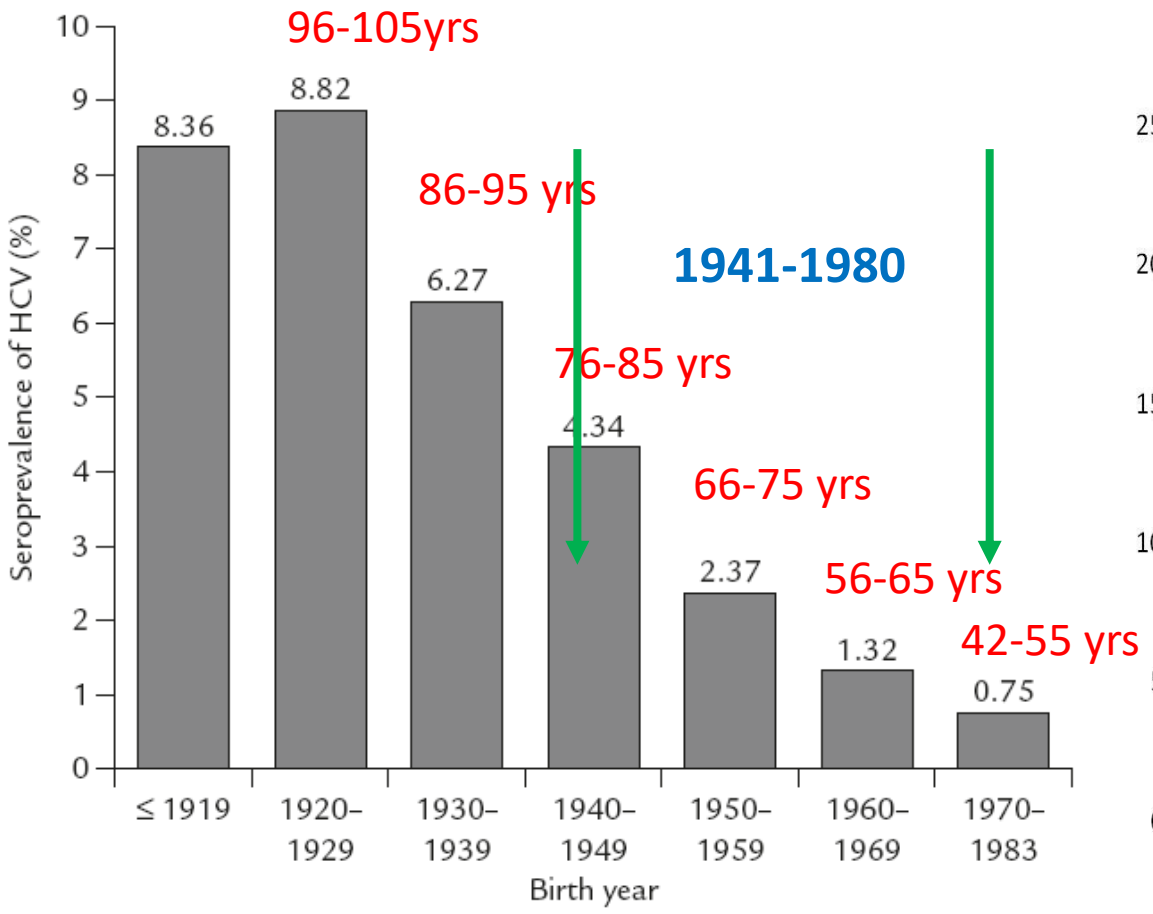
How many CHC patients?

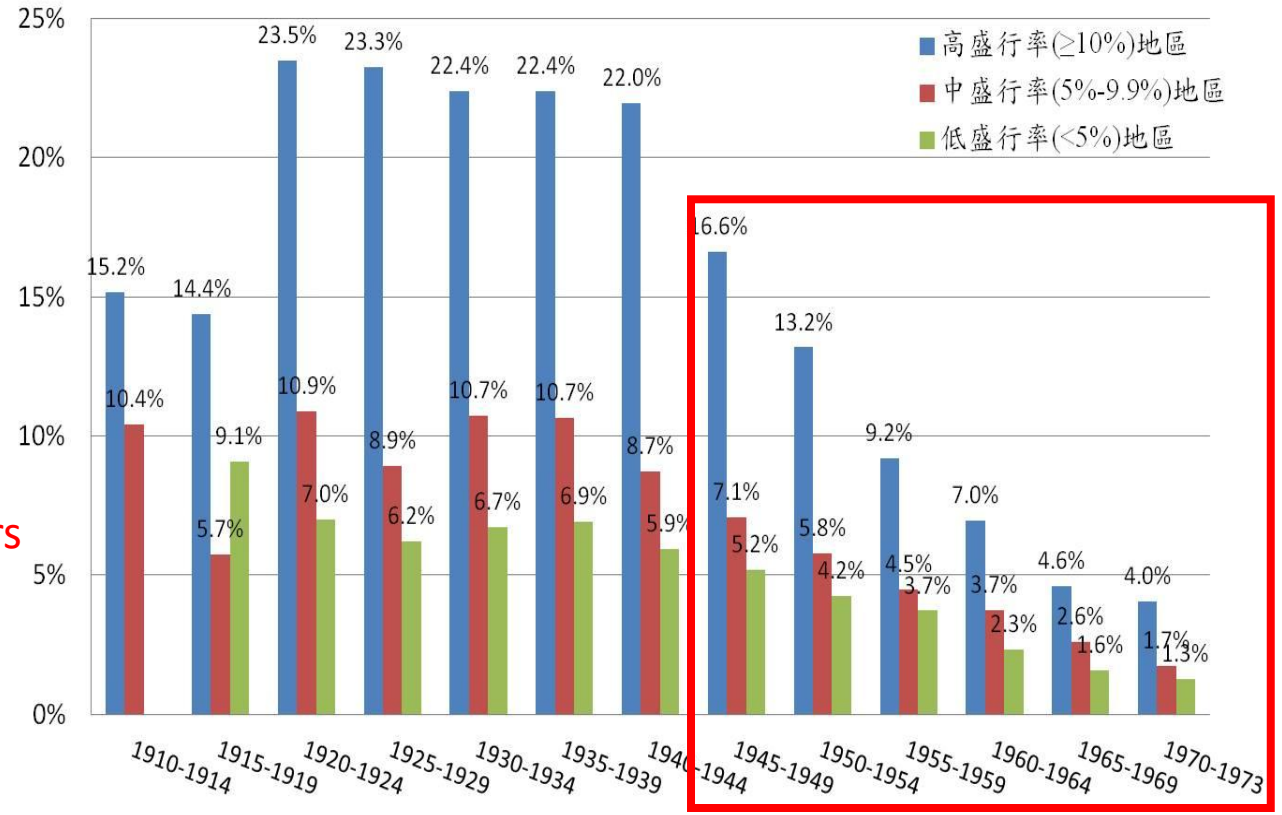
Data source	Year of patient-collection	Estimated numbers of anti-HCV(+) in Taiwan	Estimated numbers of HCV RNA (+) in Taiwan	
Chen, Yang, Huang, 2007	1996-2005	423,283	275,134	(65%)
Yu ML, Yeh ML, Tsai, 2015	1996-2005 (mainly)	745,109	484,321	(65%)
TwHHH[a]	2002	613,189	398,573	(65%)
NHCP[b]	1996-2016	633,456	411,746	(65%)
Median	--	**623,323**	**405,160**	(65%)

[a]TwHHH: Taiwanese Survey on Hypertension, Hyperglycemia, and Hyperlipidemia
[ab]NHCP: National Hepatitis C Program Office, MOHW

Around 6,800 new infections each year
≈ 6,000 expired patients

Anti-HCV Prevalence by Birth Cohort

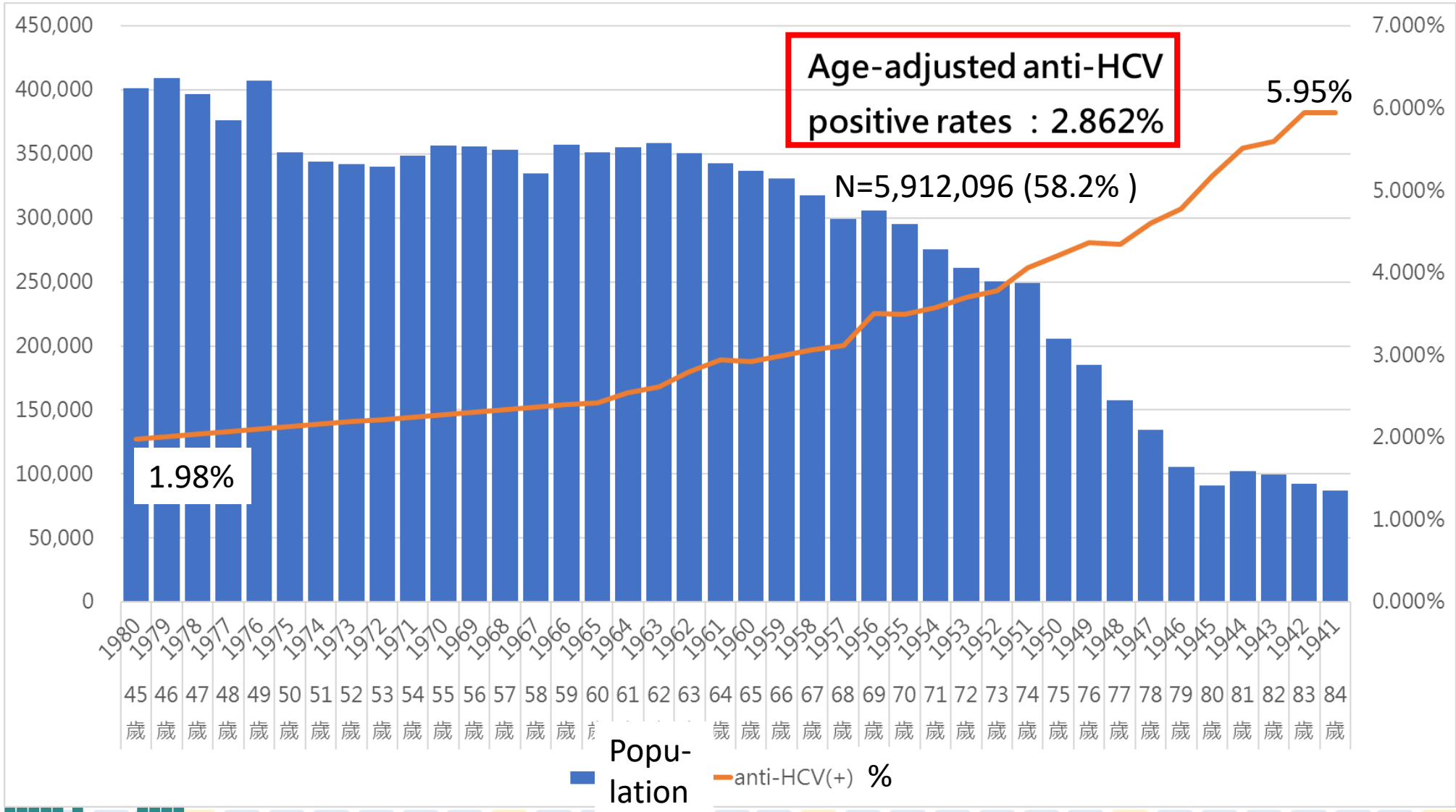




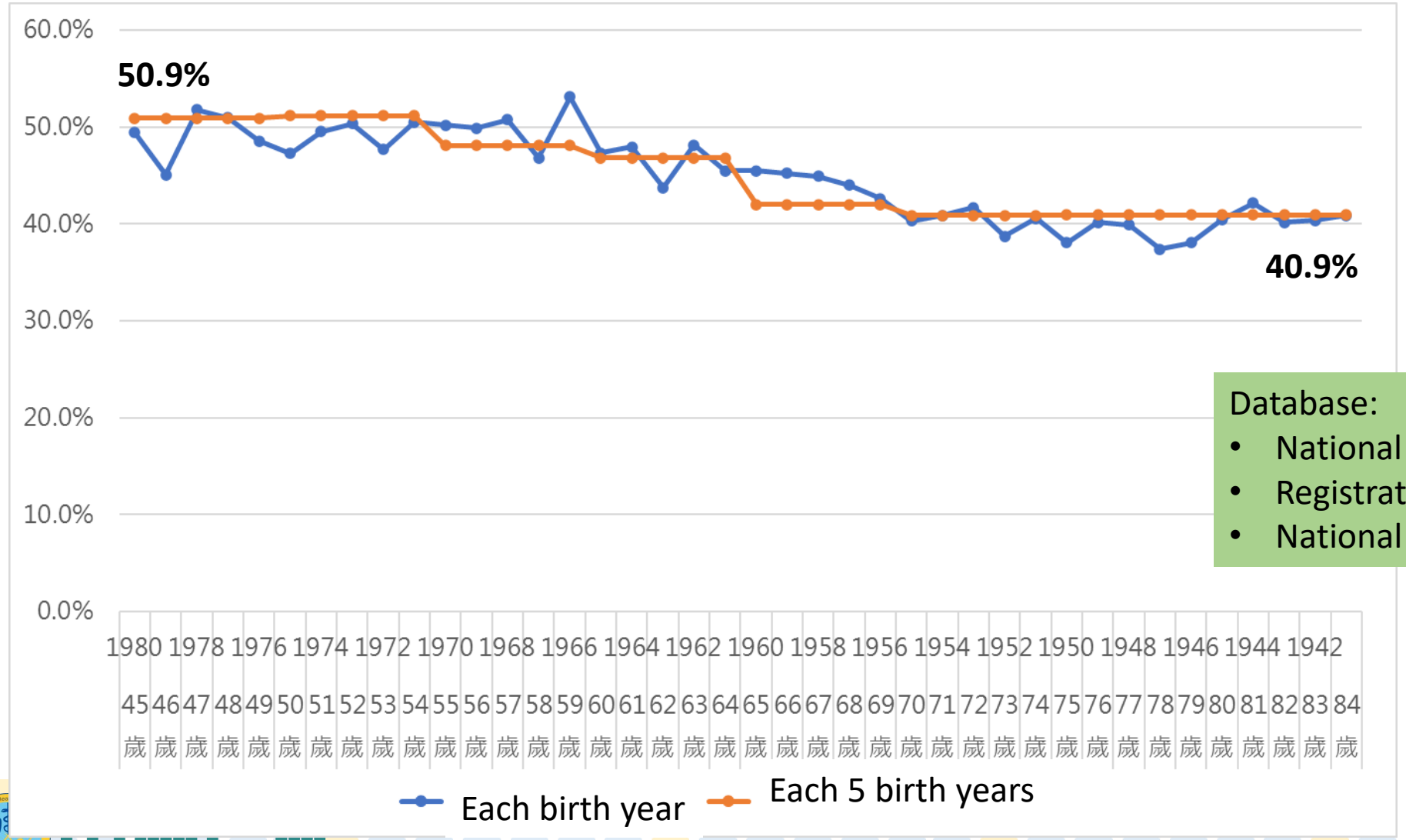
Chen CH,et al. J Formos Med Assoc 2007; 106: 148-155

Unpublished data

National hepatitis B and C screening launched since September 2020; 5,912,096 (58.2%) residents born between 1941~1980 have been screened. Age-weighted prevalence of anti-HCV was 2.862 [ranged from 1.98% (youngest)~5.95% (oldest)].



HCV RNA positive rates in anti-HCV-positive subjects can be estimated. It was estimated to be around 40~50% before DAA era.



Database:

- National hepatitis B and C screening.
- Registration of DAA treatment.
- National Health Insurance.

- 根據國發會2025年45~84歲、各年齡層之目標人口數

慢性C肝病人數(分母)=
目標人口數 * Anti-HCV陽性率 * Anti-HCV陽性之HCV RNA陽性率

45-84歲 (HCV RNA)	情境1 (國家篩檢資料)	情境2 (50%)	情境3 (60%)
推估慢性C肝人數	147,729	163,374	196,048

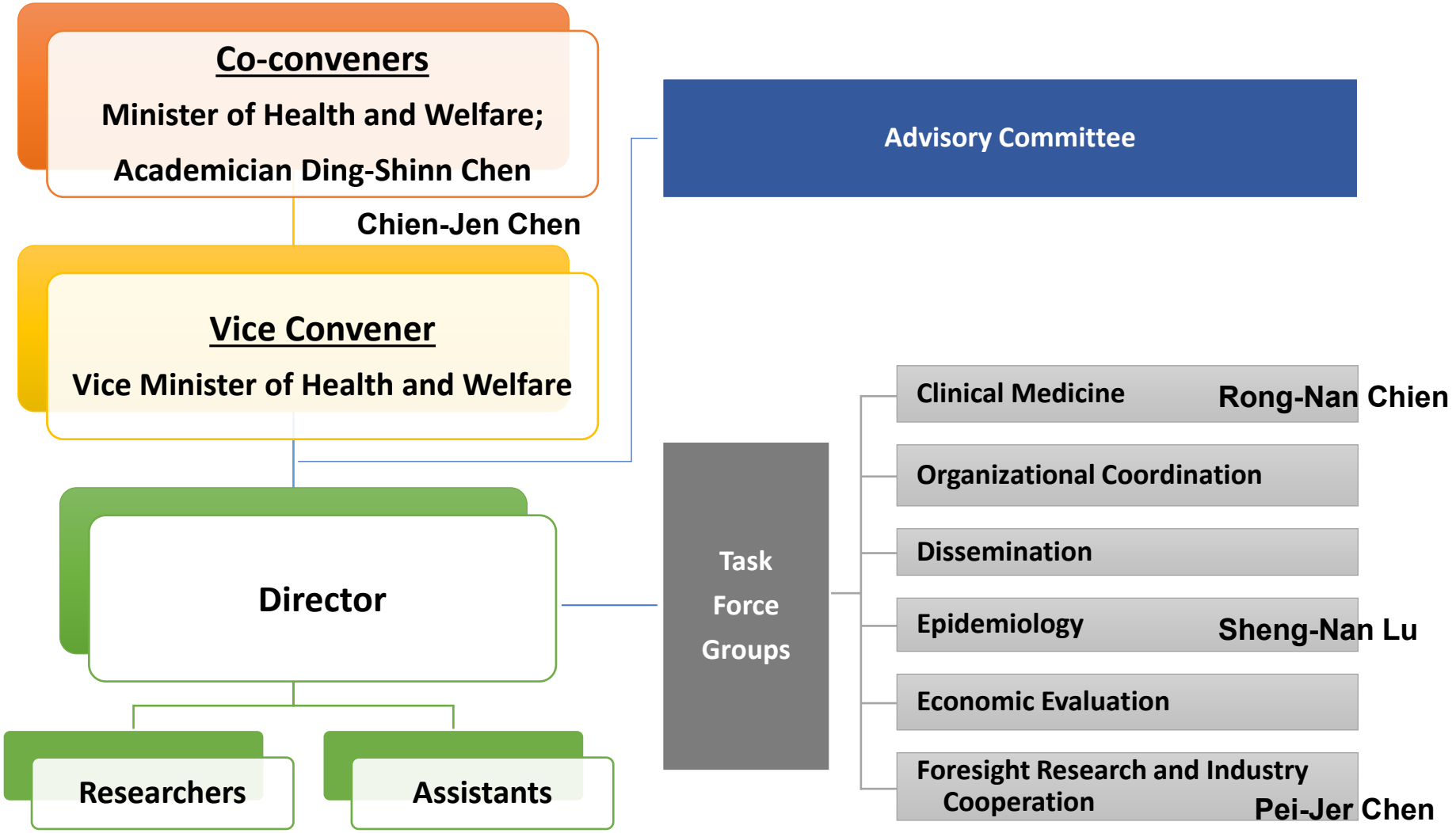
Estimated CHC patients: 179,711

Outline

- Policy and strategy of HCV elimination

National Hepatitis C Program (NHCP) Office, MOHW Since December 2016

Organization Chart



國家C肝防治政策綱領

Taiwan Hepatitis C Policy Guideline

2018-2025

Mission : Hep C elimination

250,000 DAAs-treated CHC patients by 2025

Policy Directions

Therapy
spearheads prevention

Screening
supports therapy

Prevention
secures outcome

Core Strategies

- Precision public health
- Continuum of care
- Localized care delivery

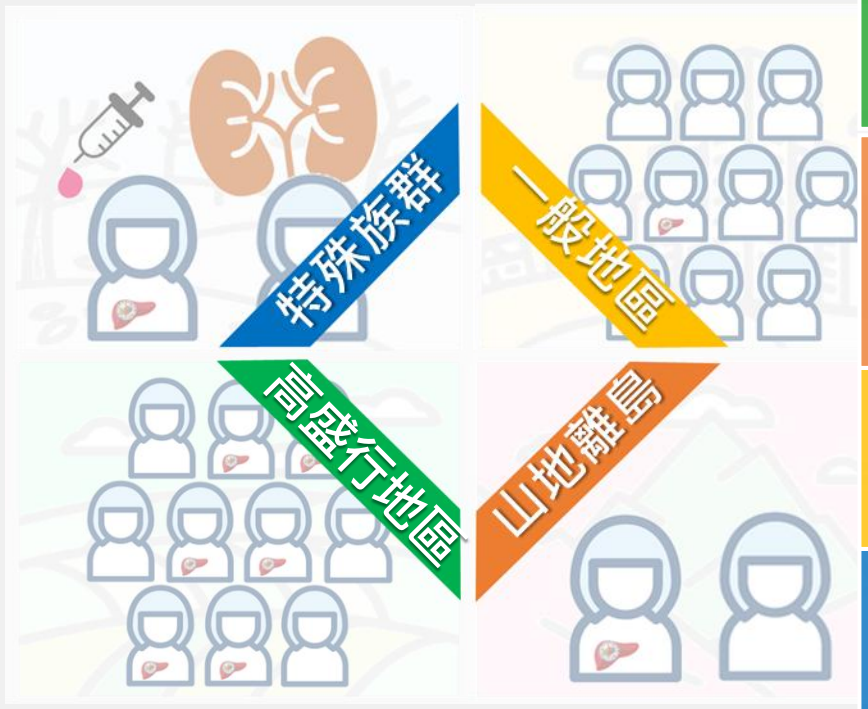
Outline

- Action and key achievements

Core Strategies – Precision Public Health

Smart public health interventions : effectiveness and efficiency

Precision Public health



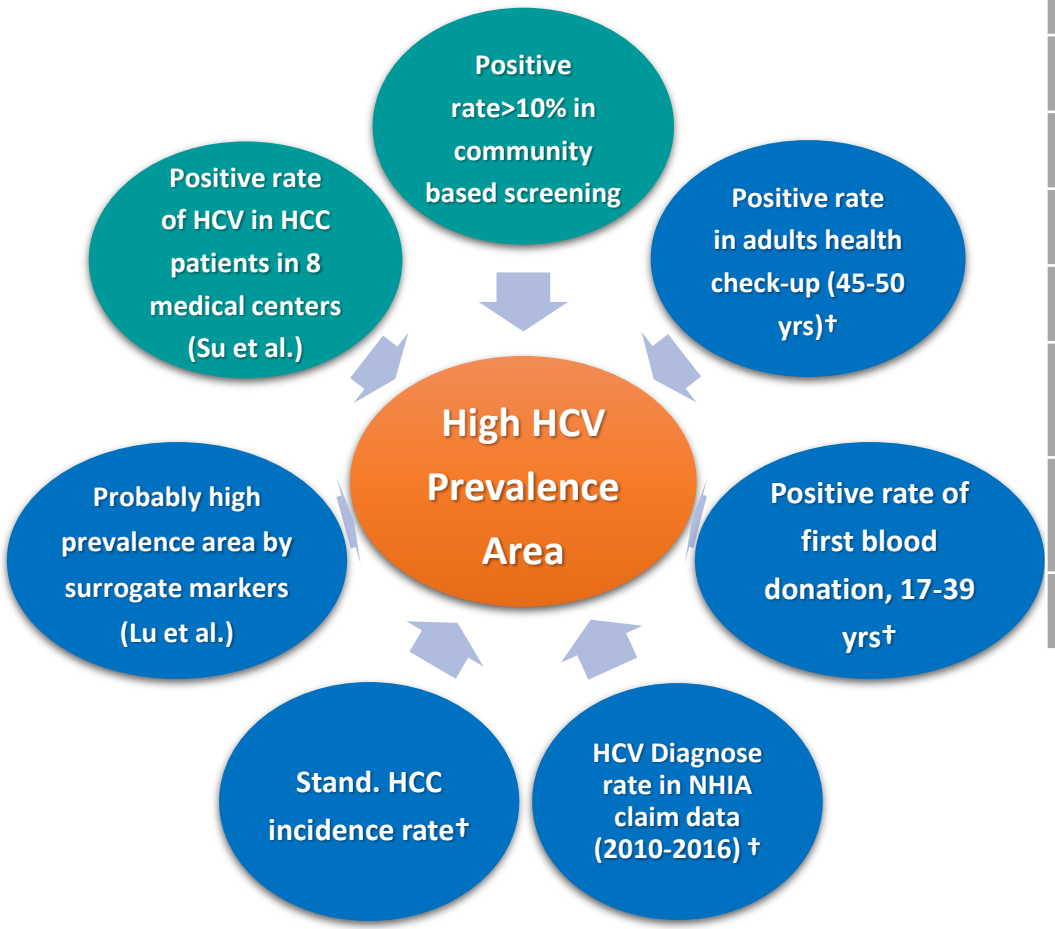
High-prevalent areas: identify the high-prevalent areas, and give them the high priority for coordinated intervention

Mountain and remote areas: develop specific disease control models according to the local social, cultural, disease patterns and medical settings

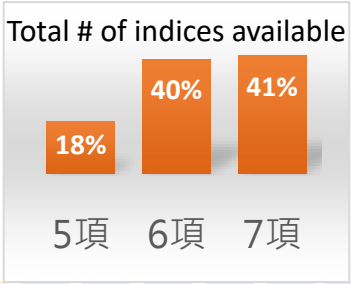
General areas: develop screening strategies specifically fit the low-prevalence areas

Special groups: develop prevention strategies of new- and re-infections according to the different risk behaviors/factors.

Seven Indices of Higher HCV Prevalence

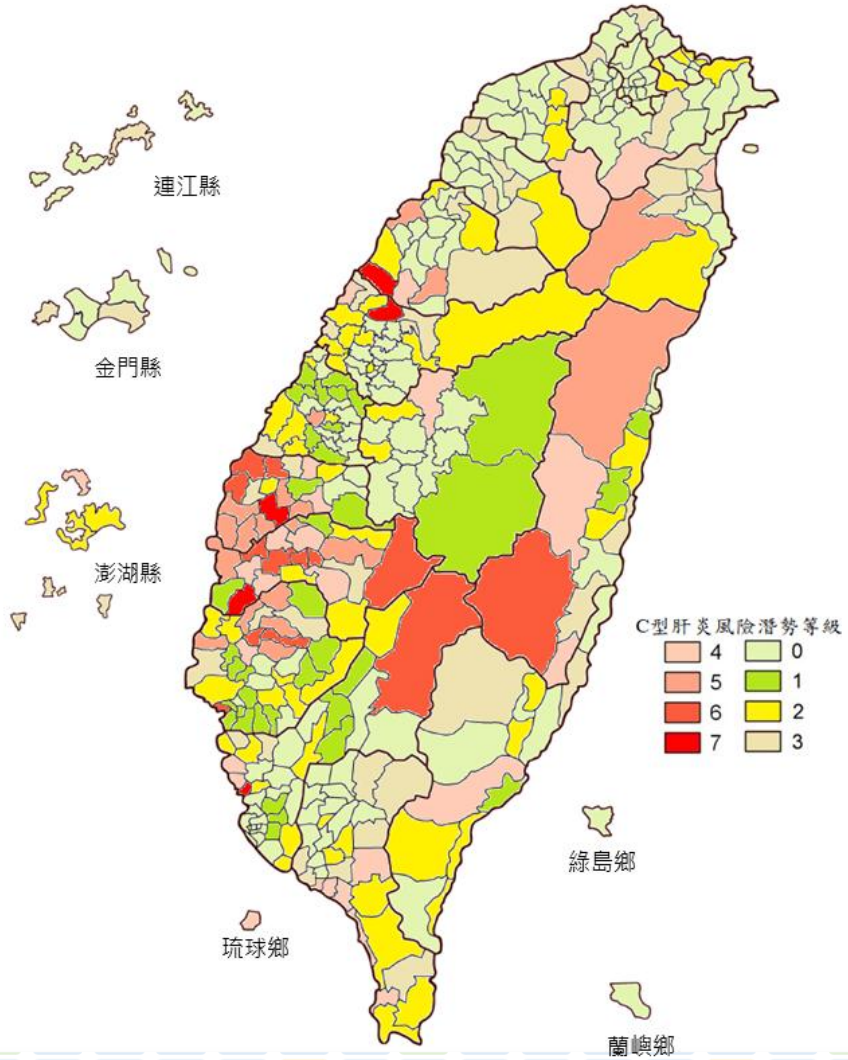


level	Definition
7	All available indices reached high-prevalence definition
6	All available indices but 1 reached high-prevalence definition
5	All available indices but 2 reached high-prevalence definition
4	All available indices but 3 reached high-prevalence definition
3	All available indices but 4 reached high-prevalence definition
2	All available indices but 5 reached high-prevalence definition, and there is at least 1 index reached
1	All available indices but 6 reached high-prevalence definition, and there is at least 1 index reached
0	None of the all available indices reached high-prevalence definition



†The top 20% of rankings are considered as high prevalence area

The risk map of higher hepatitis C prevalence by county

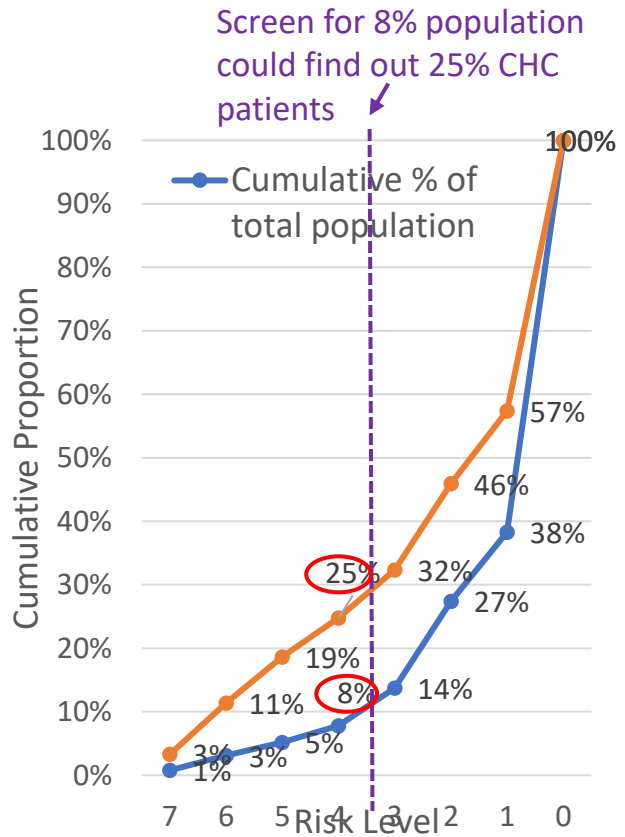


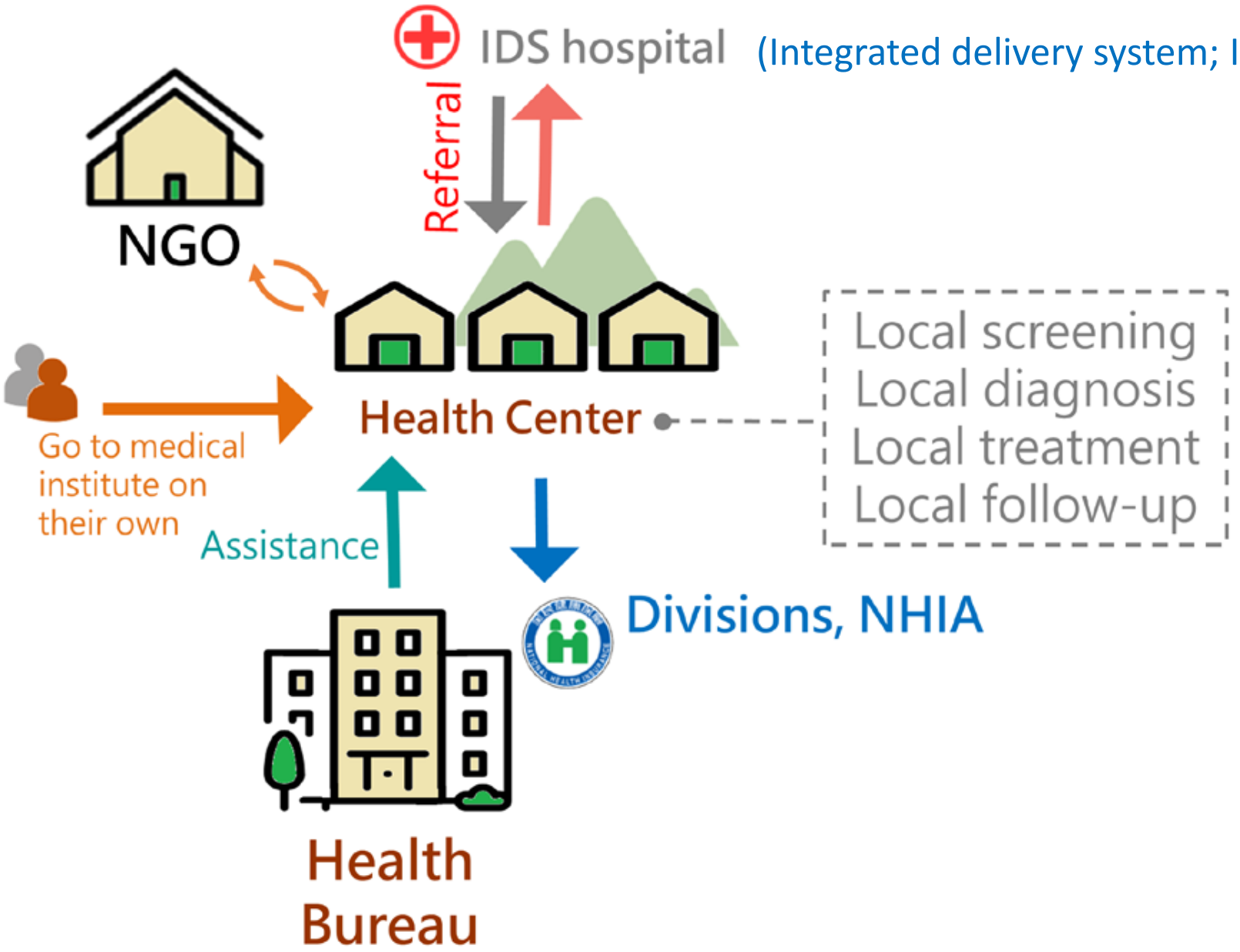
Estimated % of CHC Patients By Risk Levels

Risk Level	# of town-ships	% of total population	% of expected CHC patients	% of CHC patients/ % of total population
7	5	0.78%	3.29%	4.2
6	13	2.35%	8.07%	3.4
5	19	2.07%	7.25%	3.5
4	27	2.62%	6.15%	2.3
3	47	5.93%	7.59%	1.3
2	65	13.64%	13.59%	1.0
1	39	10.88%	11.47%	1.1
0	153	61.73%	42.59%	0.7

64 town-ships

[Last updated: 2018/3/23]





RN Chien, et al. Global Health Med 2021

HCV Prevalence Is Greater in Certain High-Risk Populations

CKD

Prevalence of CKD population[2]

7.6%

Prevalence of dialysis population[3]

17.3%

PWID or HIV infected

Prevalence of PWID population[4]:

90.8%

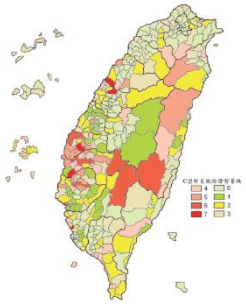
Prevalence of HIV population[5]:

42.1%

Prisoners

Prevalence of HCV in prisoners:

29[6]–91.3[7]%



Micro-elimination:

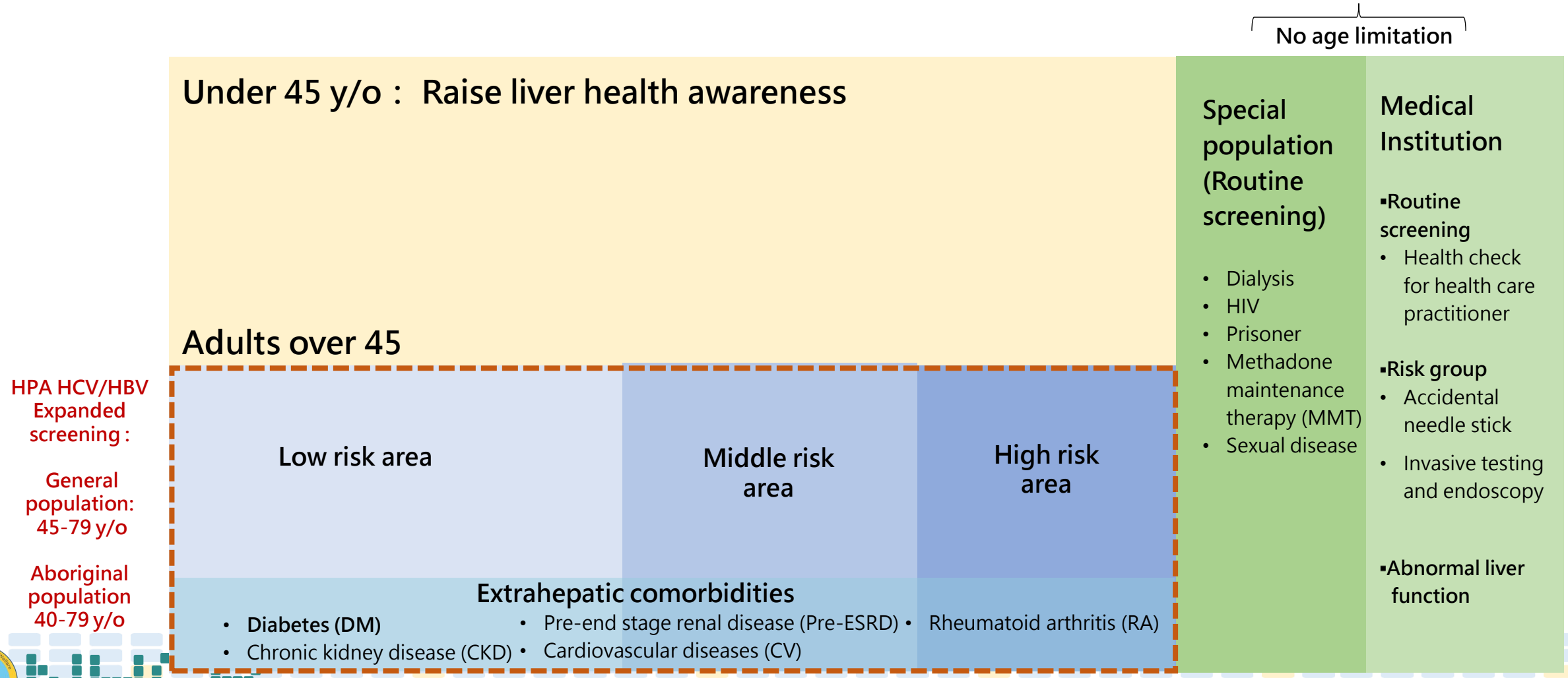
CKD and ESRD: cooperation with nephrologist

PWID or methadone replacement therapy: cooperation with psychiatrist

HIV+HCV: cooperation with infectious doctors

1. Chen CH, et al. Journal of the Formosan Medical Association 2007; 106(2): 148-155. 2. Lee, Jia-Jung, et al. PloS one 9.6 (2014): e100790. 3. Yu ML, Dai CY, Huang CF, et al. Journal of hepatology 2014; 60(2): 253-259.
4. Ng MH, Chou JY, Chang TJ, et al. Addictive behaviors 2013; 38(4): 2089-2093. 5. Sun HY, Ko WC, Tsai JJ, et al. The American journal of gastroenterology 2009; 104(4): 877-884.
6. Chang CJ, et al. European journal of epidemiology 1999; 15(7): 597-601. 7. Hsieh MH et al. PloS one 2014; 9(4): e94791. 8. Taiwan Hepatitis C Policy Guideline 2018–2025.MoHW, Executive Yuan ROC (Taiwan), Taipei City; 2019

Community-based HCV Screening in the Population



Political will:

Government is openly committed to working toward HCV elimination

Finance a national program:

HCV programs are well-funded by payers

Implement harm-reduction programs:

Effective harm-reduction programs are in place that reach most of those at risk of infection

Expand treatment capacity beyond specialists:

Treatment can be prescribed by a range of healthcare professionals, including those interacting with high-risk patients in community settings

Remove treatment restrictions:

Treatment is unrestricted regardless of liver disease stage and other clinical or socio-economic patient characteristics

Implement monitoring & evaluation:

Country is tracking progress toward elimination targets based on effective HCV monitoring program and data infrastructure

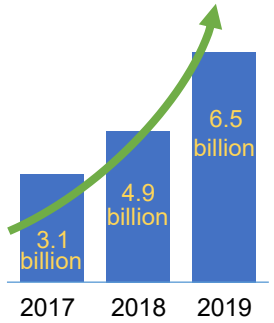
Implement awareness & national screening program:

Awareness and screening programs are well-funded and effectively target the majority of HCV-infected individuals

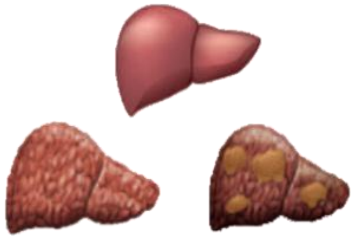
Implement national linkage-to-care program:

Linkage-to care programs are well-funded, covering both general and high-risk or vulnerable populations

Lower the barriers to treatment access



Adequate budget



No limitations on cirrhosis status

Not limited to patients with anti-HCV positive for >6 months

Pan-genotypic regimens available

Reimbursement for DAAs in GT1 patients aged >12 years

Precision screening strategies

Localized care delivery

GP can order HCV RNA and genotype check up

Decline GP income tax
Adjust the cost from 80% to 96%

Others include:

- Continuum of care; leave no one behind
- Preventive measures for specific high-risk populations
- Innovation
- Liver health literacy elevation on prevention of new- and re-infections
- Outcomes evaluation of policy and interventions

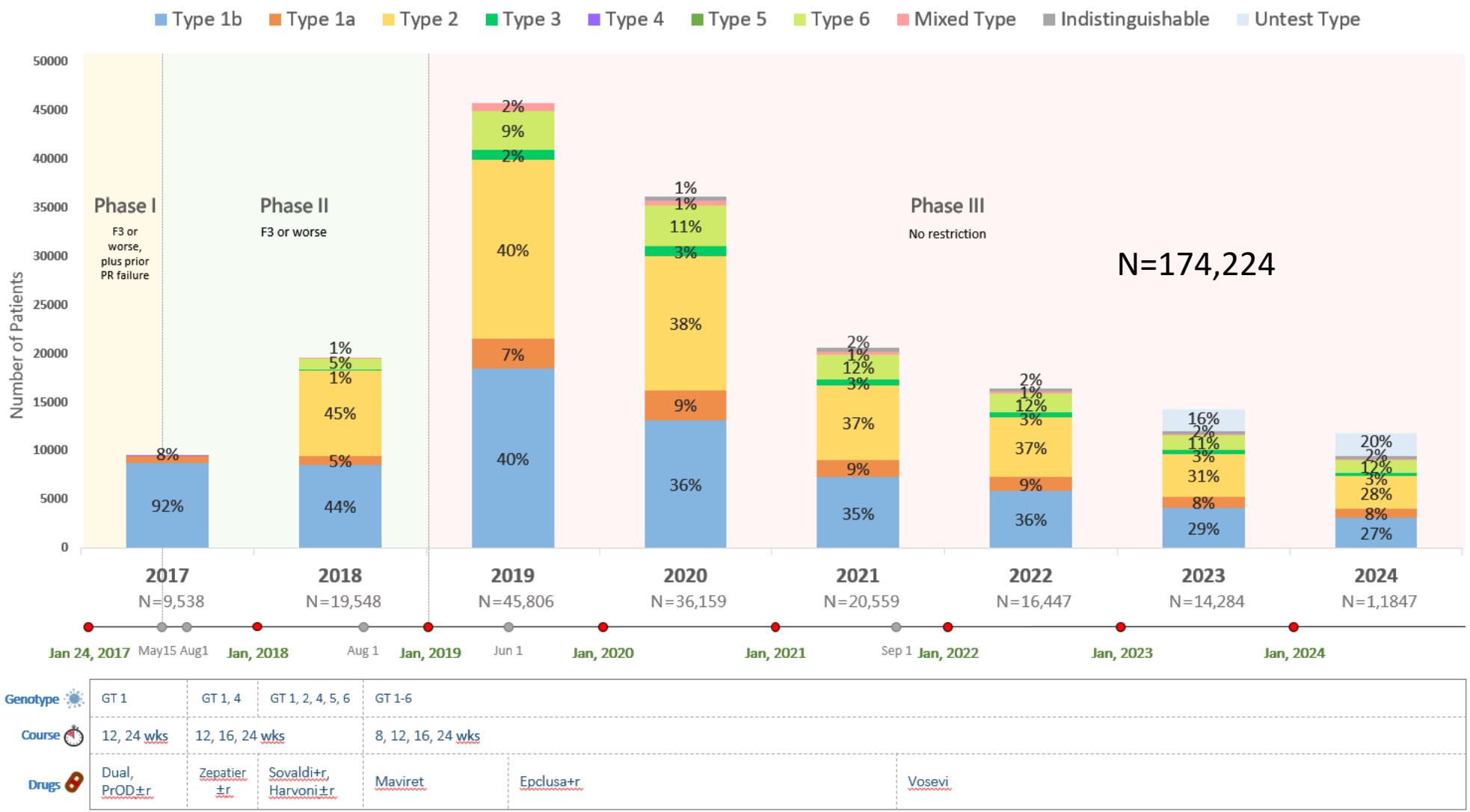


Figure 4

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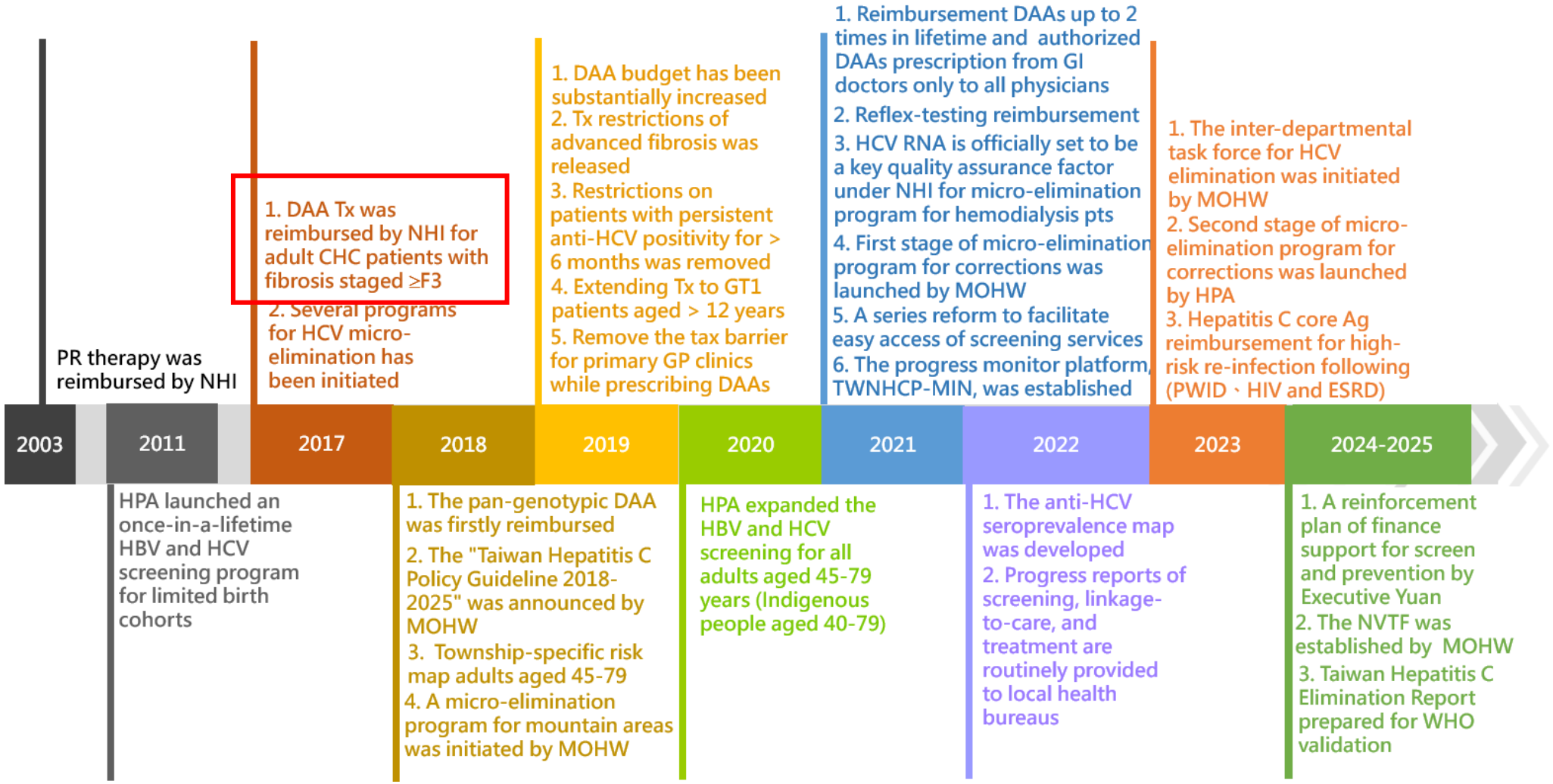

Figure 2

Chien RN, et al. J Formosan Med Assoc 2025 (in press)

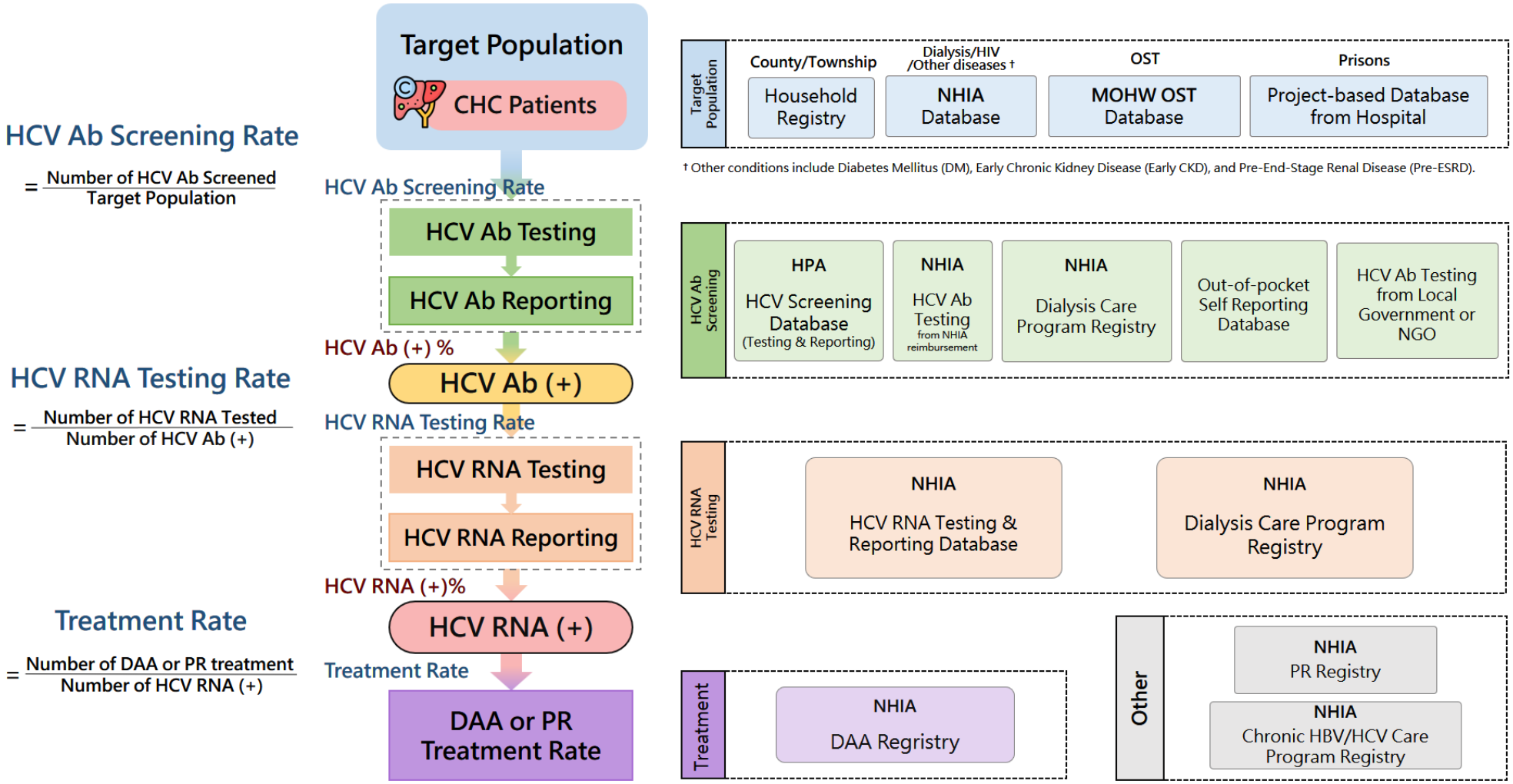

Figure 3

Chien RN, et al. J Formosan Med Assoc 2025 (in press)

Outline

- Approaching WHO goal on HCV elimination

Section1 Summary of Taiwan's HCV Elimination Indicators

Elimination Goals		Taiwan's Current Status	PTE Certification	Full Elimination Certification
Programmatic Targets				
1. Chronic HCV patients diagnosed		General population (45–84 years, DAA): 90.6% (Special populations through Micro-elimination)①	Gold	≥90%
2. Diagnosed chronic HCV patients receiving treatment		General population (45–84 years, DAA): 92.8% (Special populations through Micro-elimination)②	Gold	≥80%
3.Injection safety	(1) Safe injections in health-care settings	100%	Gold	100%
	(2) Blood transfusion safety: Proportion of blood units screened for bloodborne infections	100%	Gold	100%
	(3) Number of syringes syringes and needles distributed/PWID/year	292 syringes in 2023	Gold	≥300 syringes

Table 1
Current HCV care cascade by subpopulations.

Population	Anti-HCV Screened		Anti- HCV Positive		HCV RNA Tested		HCV RNA Positive		DAA or PR Treatment	
Special population										
ESRD under hemodialysis, n = 108,116	108,071	(100 %)	11,466	(10.6 %)	11,166	(97.4 %)	6510	(63.0 %)	6315	(97.0 %)
Persons with HIV, n = 37,137	36,771	(99.0 %)	10,570	(28.8 %)	10,010	(94.7 %)	6566	(77.3 %)	6230	(94.9 %)
Prisoners, n = 29,995[a,b]	20,249	(67.5 %)	3343	(16.5 %)	2761	(82.6 %)	1469	(53.2 %)	1328	(90.4 %)
OST, n = 10,212	9101	(89.1 %)	8410	(93.9 %)	7733	(92.0 %)	6424	(86.6 %)	6126	(95.4 %)
Comorbidity population										
DM care project, n = 1,076,781	885,673	(82.3 %)	52,112	(6.0 %)	43,538	(83.5 %)	26,116	(68.5 %)	25,476	(97.5 %)
Early CKD care project, n = 609,141	511,153	(83.9 %)	34,231	(6.8 %)	28,999	(84.7 %)	17,572	(69.2 %)	17,113	(97.4 %)
Pre-ESRD care project, n = 106,742	93,305	(87.4 %)	7627	(8.3 %)	6629	(86.9 %)	3953	(67.5 %)	3840	(97.1 %)

Data are No. (%).
Abbreviations: CKD, chronic kidney disease; DAA, direct acting antiviral agents; DM, diabetes mellitus; ESRD, end stage renal disease; HCV, hepatitis C virus; HIV, human immunodeficiency virus; OST, opioid substitution treatment; PR, pegylated interferon plus ribavirin.
[a] Hepatitis C Virus Screening and Treatment Program in Correctional Facilities, 2023–2025.
[b] The total number of prisoners was 50,546 and 55,806 by the end of 2023 and 2024 respectively.

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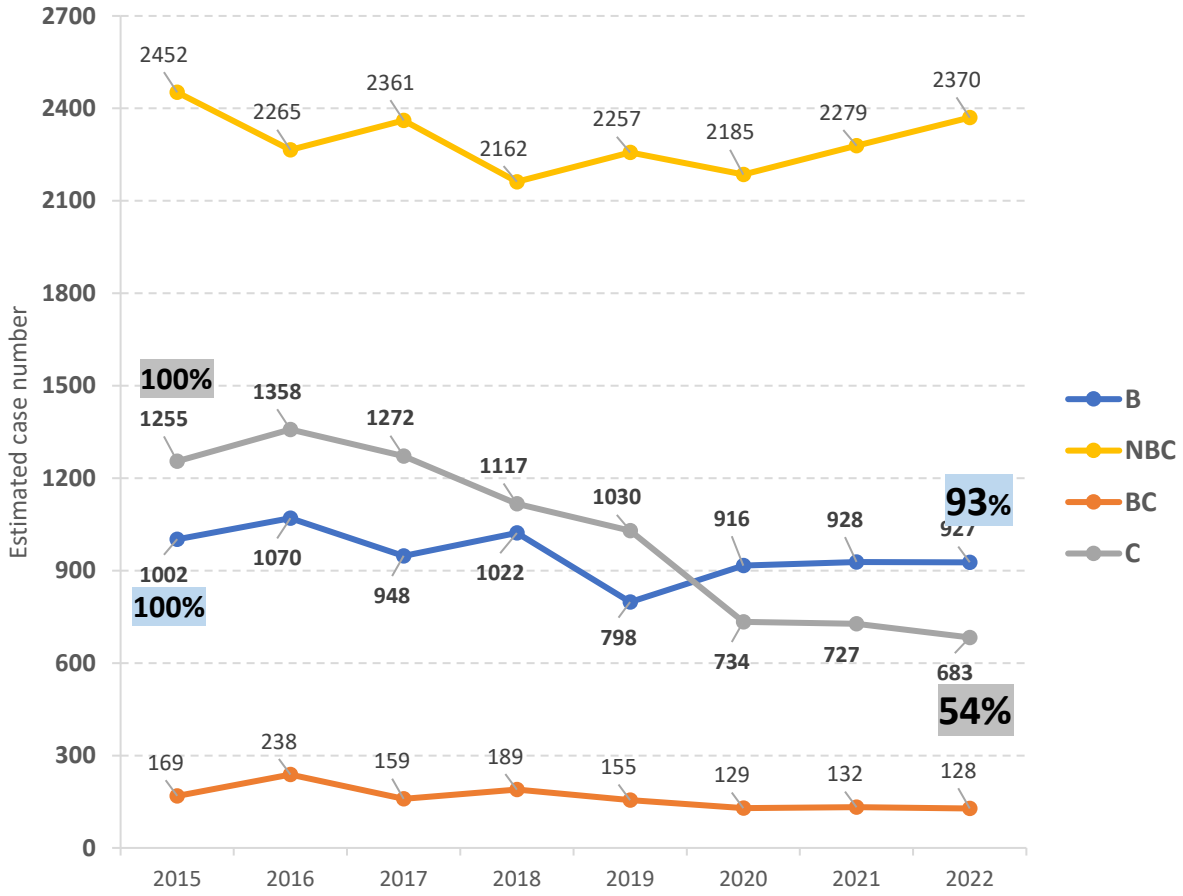
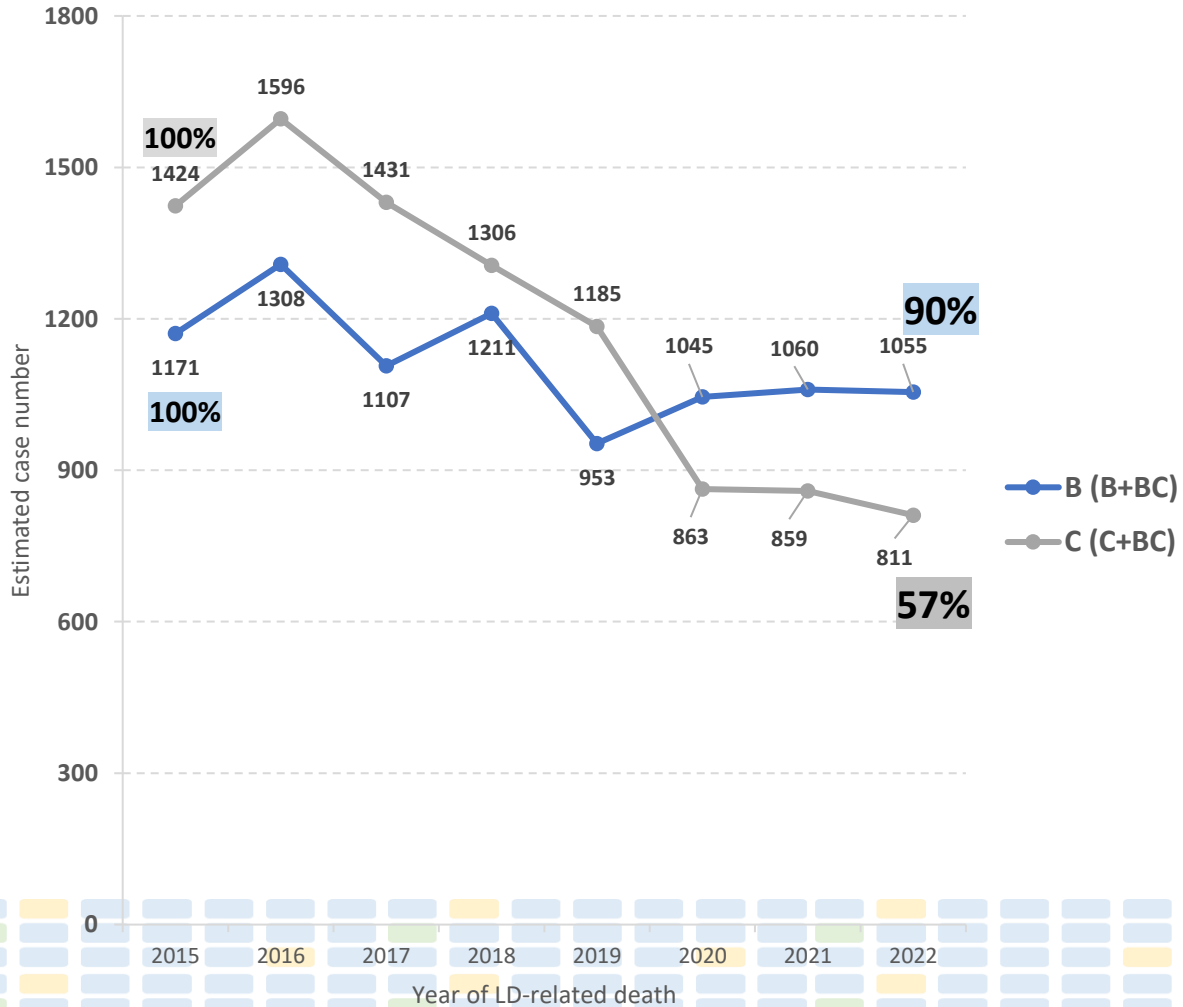
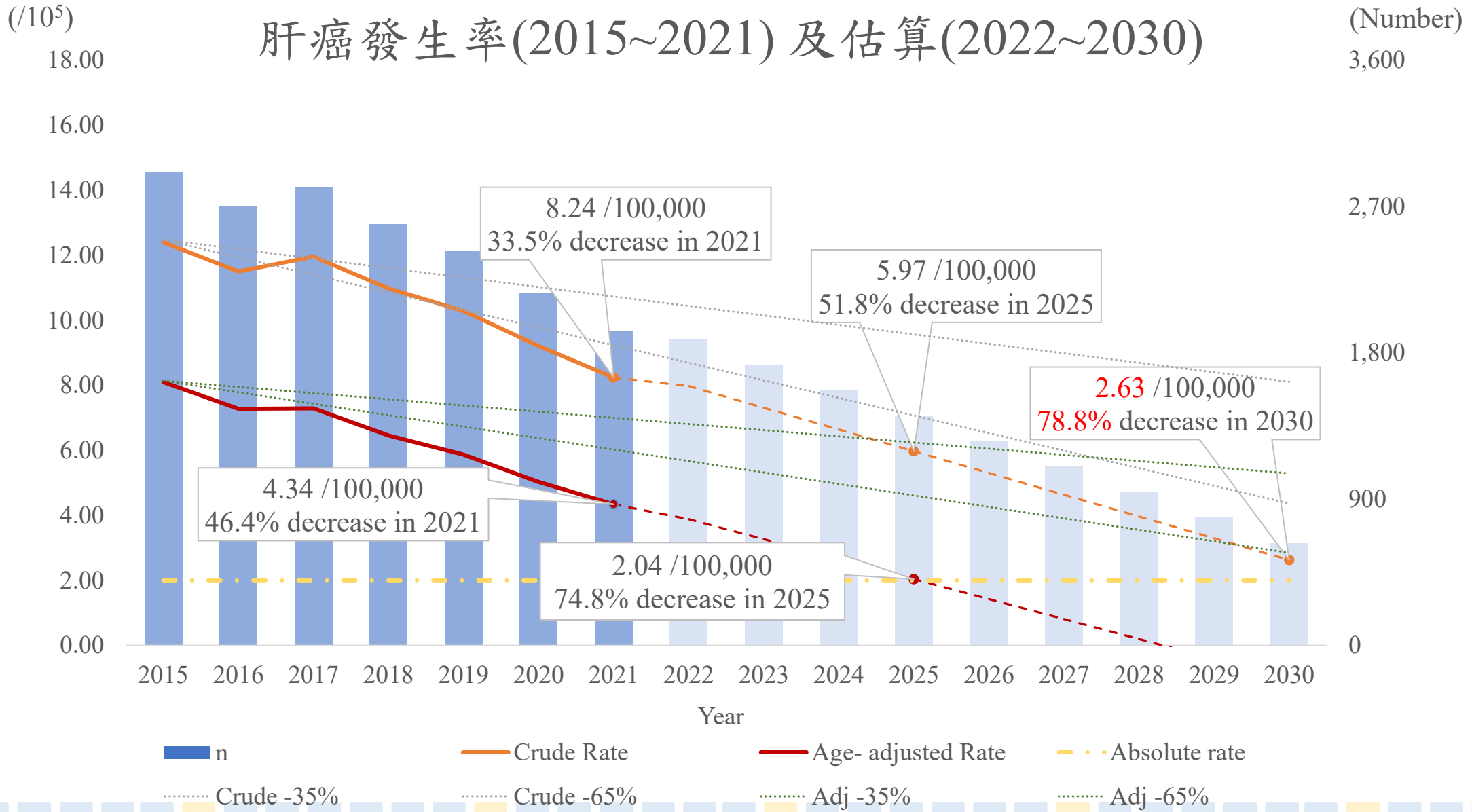
Estimated secular trends of etiology-specific case numbers of national liver disease death according proportions of a sentinel center





肝癌發生率(2015~2021) 及估算(2022~2030)



WHO target: 65% decrease in 2030、HCV-relater mortality 2/10^5

影響性目標				
1. C 型肝炎發生率	A. 一般族群發生率	2024 年 1.9 /10 萬人	--	≤5/10 萬人
	B. PWID 族群發生率	待評估	--	≤2%
2. C 型肝炎死亡率	A. B、C 肝相關肝癌、肝硬化死亡率	・慢性肝病及肝硬化標準化死亡率：2023 年 9.5/10 萬人 ・肝癌標準化死亡率：2023 年 16.4/10 萬人	--	≤6/10 萬人
	B. B、C 肝相關 HCC 發生率(替代指標)	B、C 型肝炎之肝癌粗發生率: 2022 年 23.3/10 萬人	--	

Outline

- Conclusion and perspective

- Achieve WHO full HCV elimination programmatic targets now
- Continue to prevention, screening and treatment CHC patients
- Hopefully, we can achieve impact targets set by WHO by 2030


Taiwan
Formosa, Beautiful Island
Thank You for Your Attention
TAIWAN

Examines the development and implementation of Taiwan's DAA reimbursement policy and evaluates outcomes using a return-on-investment (ROI) framework. Aggregating model-based estimates across 173,747 reimbursed patients and project 614,980 discounted quality-adjusted life years (QALYs). Valuing discounted QALYs at a threshold equal to GDP per capita yields an economic value of about NTD 672 billion. Against NHI DAA spending of NTD 27.74 billion (2017-2024),

the ROI is 22.4.

Pwu RF, et al. J Formasan Med Assoc 2025 (in press)

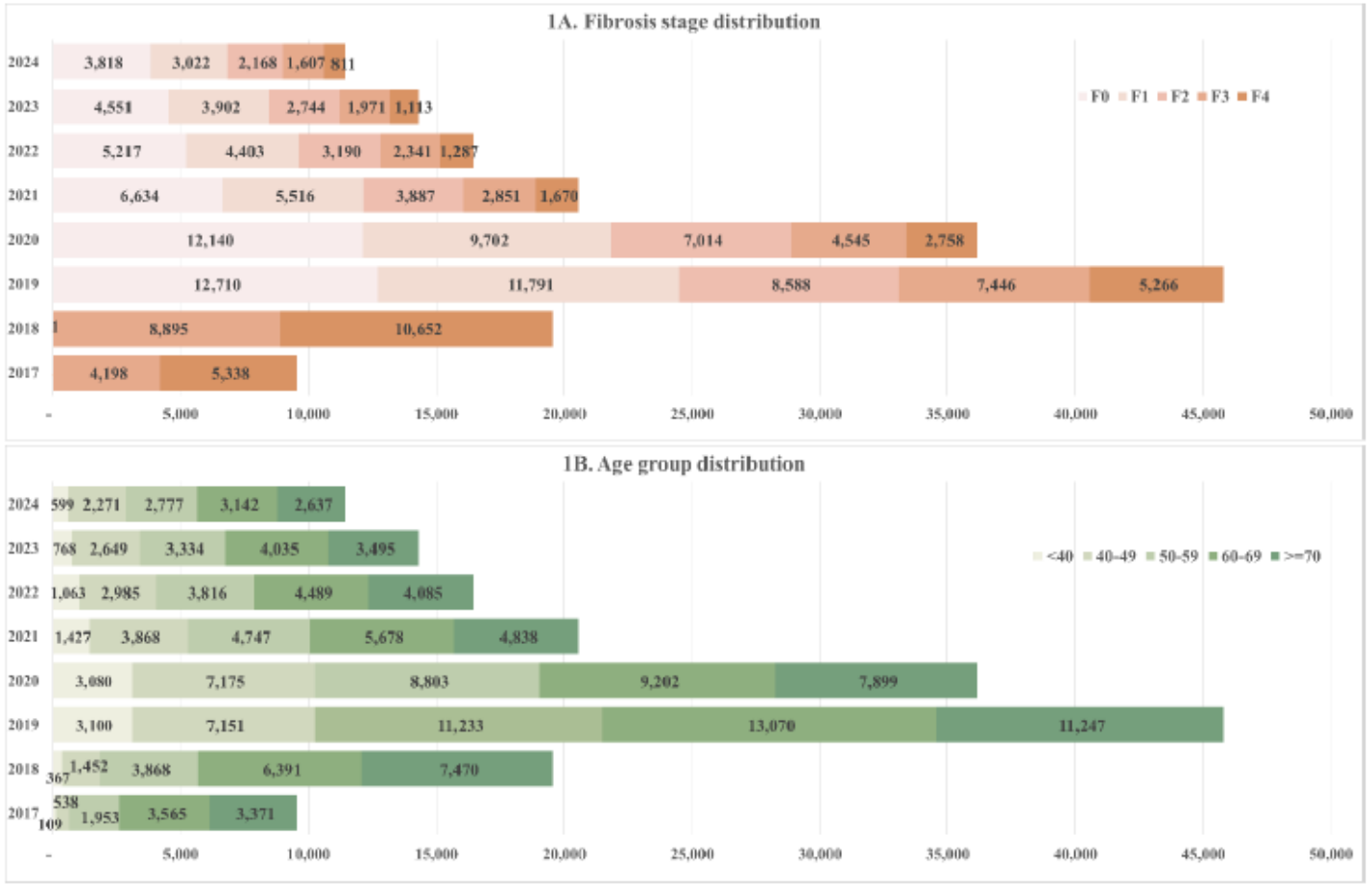


Figure 1. Number of HCV patients receiving DAA treatment under NHI, stratified by year and fibrosis stage (1A, upper panel); stratified by year and age group (1B, lower panel). DAA, direct-acting antiviral; F0-F4, fibrosis stages (METAVIR/FIB-4); HCV, hepatitis C virus.

Pwu RF, et al. J Formasan Med Assoc 2025 (in press)

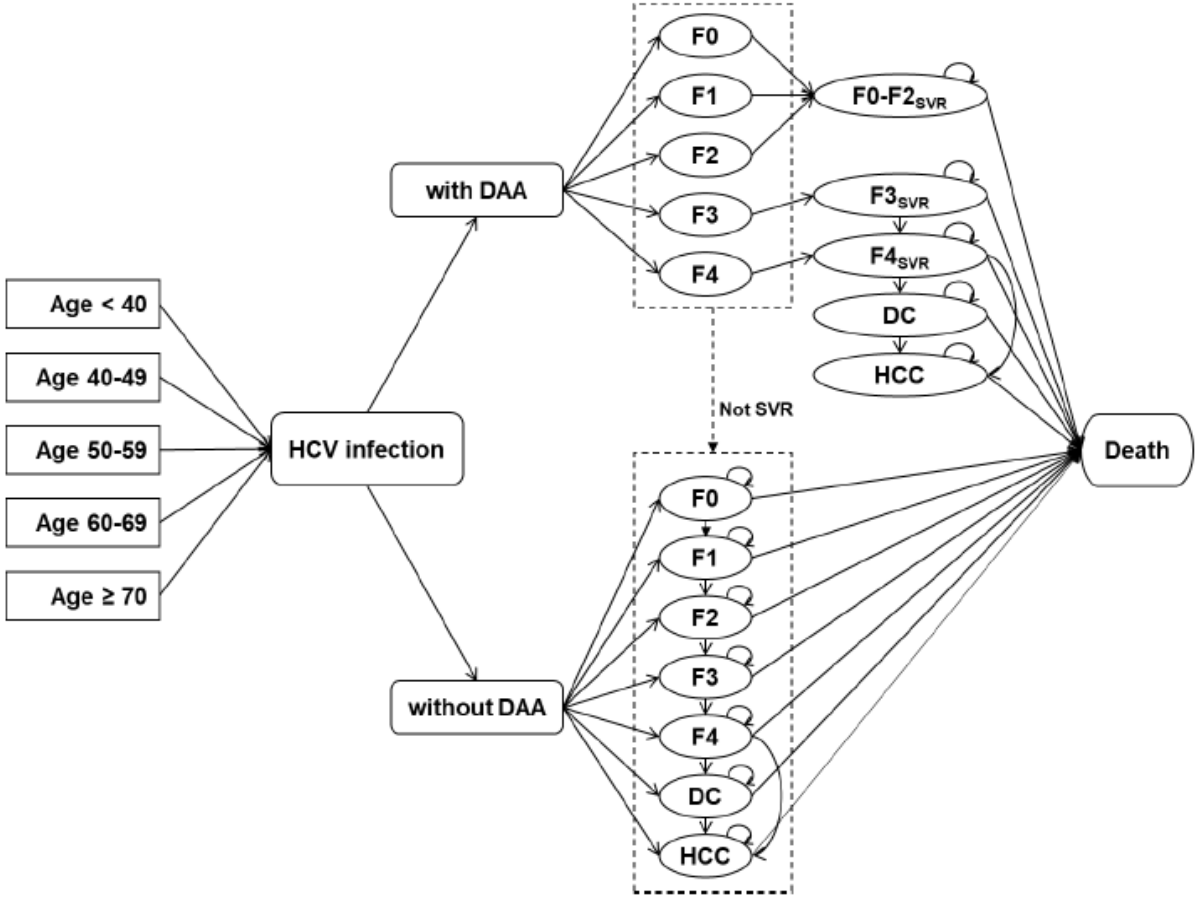


Figure 2. Conceptual schematic of the decision-analytic models used to project health outcomes in patients with HCV infection treated with DAAs. DAA, direct-acting antiviral; DC, decompensated cirrhosis; F0-F4, fibrosis stages (METAVIR/FIB-4); HCC, hepatocellular carcinoma; HCV, hepatitis C virus; SVR, sustained virological response.

Pwu RF, et al. J Formasan Med Assoc 2025 (in press)