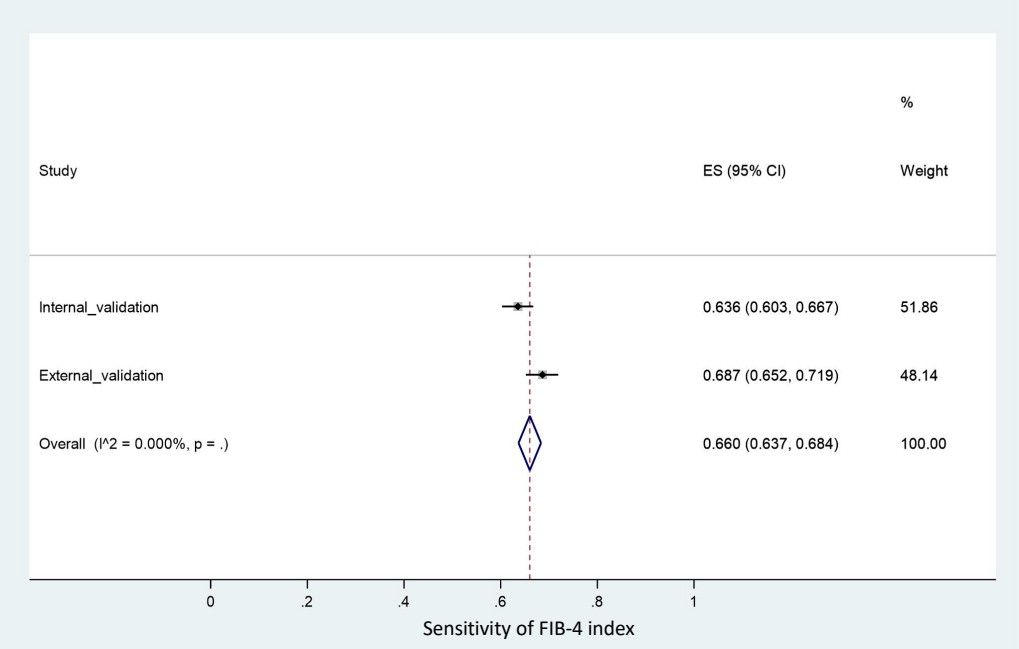
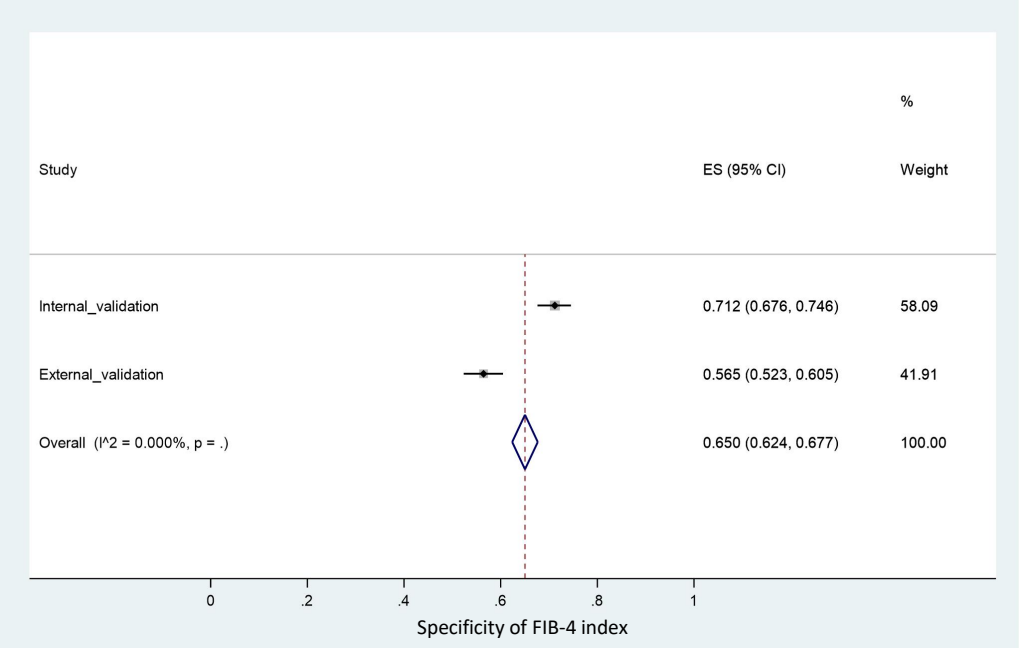
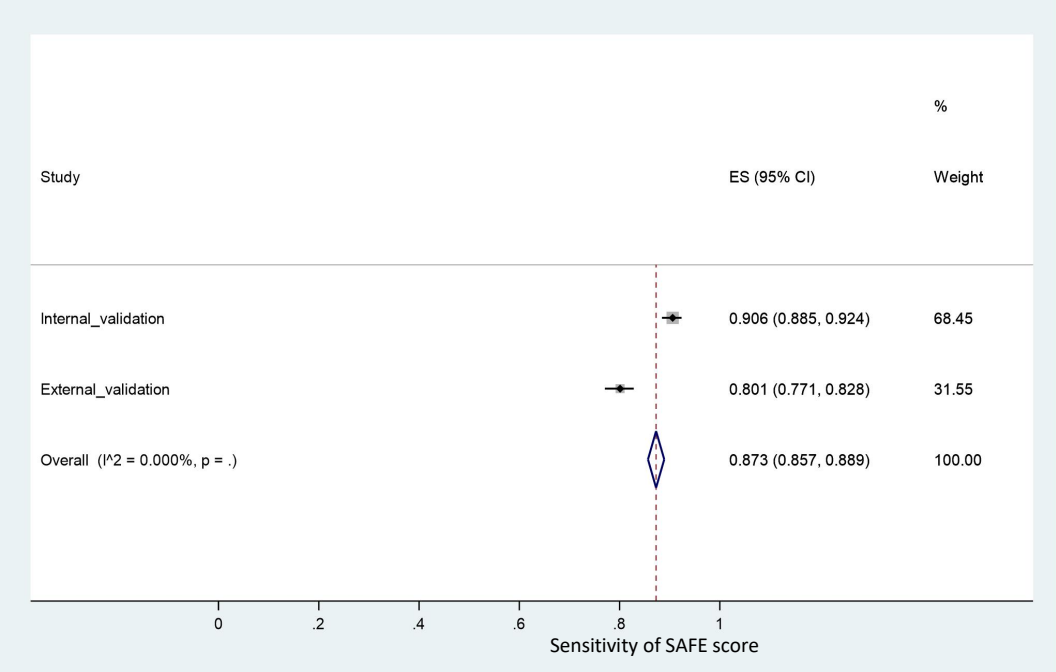


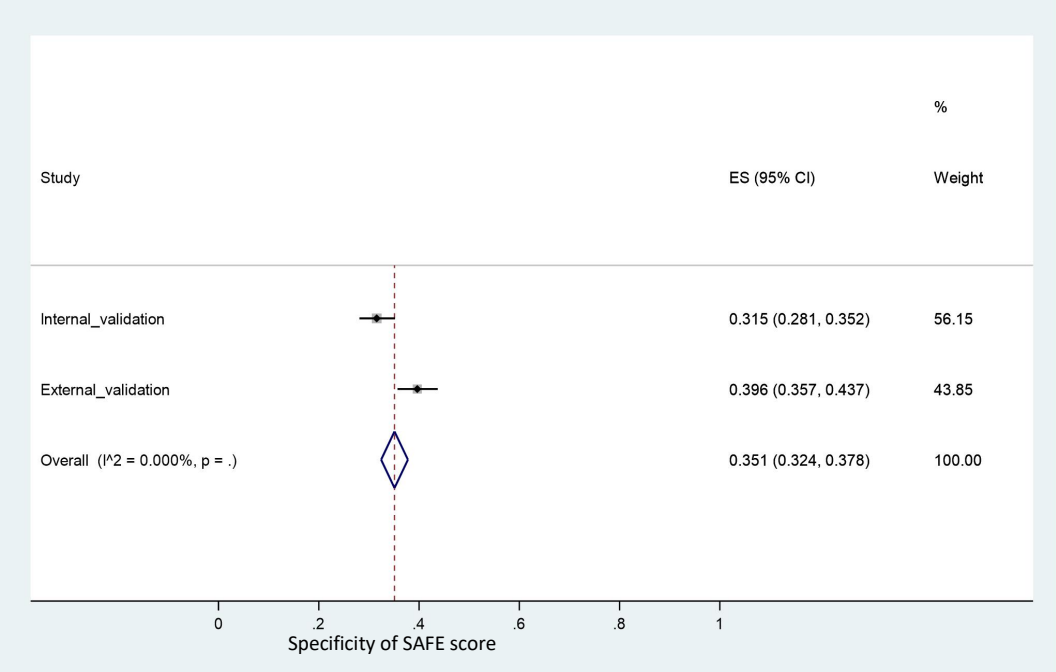
Supplementary Figure 1 Pooled sensitivity of fibrosis-4 index.



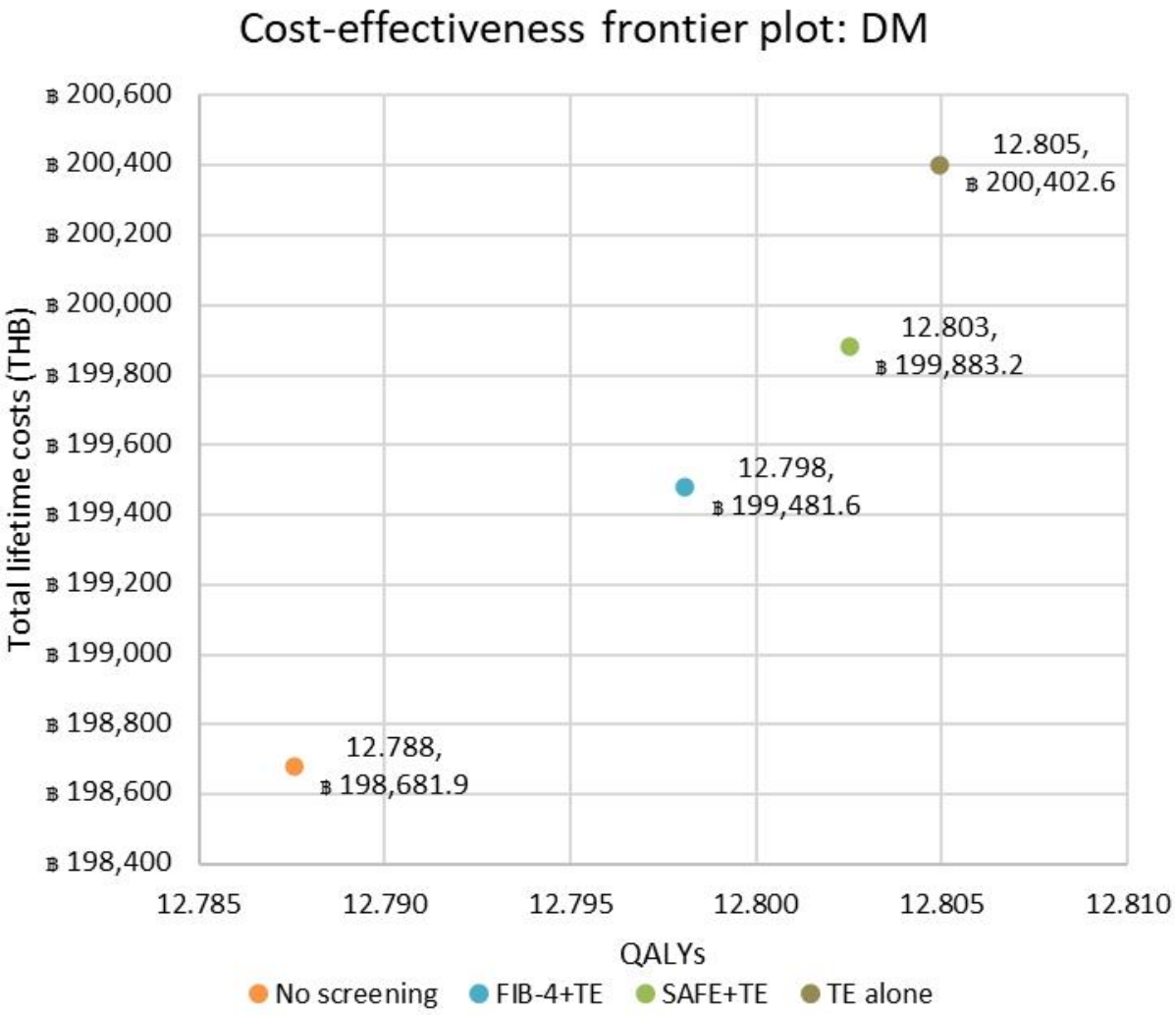
Supplementary Figure 2 Pooled specificity of fibrosis-4 index.



Supplementary Figure 3 Pooled sensitivity of steatosis-associated fibrosis estimator score.



Supplementary Figure 4 Pooled specificity of steatosis-associated fibrosis estimator score.



Supplementary Figure 5 Cost-effectiveness frontier plot. The vertical axis represents total lifetime costs and, the horizontal axis shows QALYs for each screening strategy. DM: Diabetes mellitus; FIB-4: Fibrosis-4 index; QALYs: Quality-adjusted life-years; SAFE: Steatosis-associated fibrosis estimator score; TE: Transient elastography; THB: Thai baht.

Supplementary Table 1 CHEERS 2022 Checklists[1]

Topic	No.	Item	Location where item is reported
Title			
	1	Identify the study as an economic evaluation and specify the interventions being compared.	1
Abstract			
	2	Provide a structured summary that highlights context, key methods, results, and alternative analyses.	4-5
Introduction			
Background and objectives	3	Give the context for the study, the study question, and its practical relevance for decision making in policy or practice.	5-7
Methods			
Health economic analysis plan	4	Indicate whether a health economic analysis plan was developed and where available.	7-8
Study population	5	Describe characteristics of the study population (such as age range, demographics, socioeconomic, or	8

		clinical characteristics).	
Setting and location	6	Provide relevant contextual information that may influence findings.	7-8
Comparators	7	Describe the interventions or strategies being compared and why chosen.	8-9
Perspective	8	State the perspective(s) adopted by the study and why chosen.	8, 13, 14
Time horizon	9	State the time horizon for the study and why appropriate.	10, 14
Discount rate	10	Report the discount rate(s) and reason chosen.	10, 13, 16
Selection of outcomes	11	Describe what outcomes were used as the measure(s) of benefit(s) and harm(s).	7-8
Measurement of outcomes	12	Describe how outcomes used to capture benefit(s) and harm(s) were measured.	7-8
Valuation of outcomes	13	Describe the population and methods used to measure and value outcomes.	7-9, 12-13
Measurement and valuation of resources and costs	14	Describe how costs were valued.	12-13
Currency, price date,	15	Report the dates of the estimated	8, 13

and conversion		resource quantities and unit costs, plus the currency and year of conversion.	
Rationale and description of model	16	If modelling is used, describe in detail and why used. Report if the model is publicly available and where it can be accessed.	7-8, 9-10
Analytics and assumptions	17	Describe any methods for analysing or statistically transforming data, any extrapolation methods, and approaches for validating any model used.	9-14
Characterising heterogeneity	18	Describe any methods used for estimating how the results of the study vary for subgroups.	8, 12-14
Characterising distributional effects	19	Describe how impacts are distributed across different individuals or adjustments made to reflect priority populations.	8, 12
Characterising uncertainty	20	Describe methods to characterise any sources of uncertainty in the analysis.	13-14
Approach to engagement with patients and others affected by the study	21	Describe any approaches to engage patients or service recipients, the general public, communities, or stakeholders (such as clinicians or payers) in the design of the study.	NA

Results			
Study parameters	22	Report all analytic inputs (such as values, ranges, references) including uncertainty or distributional assumptions.	10-13, Table 1
Summary of main results	23	Report the mean values for the main categories of costs and outcomes of interest and summarise them in the most appropriate overall measure.	14-15, Table 2
Effect of uncertainty	24	Describe how uncertainty about analytic judgments, inputs, or projections affect findings. Report the effect of choice of discount rate and time horizon, if applicable.	15-16
Effect of engagement with patients and others affected by the study	25	Report on any difference patient/service recipient, general public, community, or stakeholder involvement made to the approach or findings of the study	NA
Discussion			
Study findings, limitations, generalisability, and current knowledge	26	Report key findings, limitations, ethical or equity considerations not captured, and how these could affect patients, policy, or practice.	17-21
Other relevant			

information			
Source of funding	27	Describe how the study was funded and any role of the funder in the identification, design, conduct, and reporting of the analysis	3
Conflicts of interest	28	Report authors conflicts of interest according to journal or International Committee of Medical Journal Editors requirements.	30

Supplementary Table 2 Age-specific prevalence proportions of metabolic dysfunction-associated steatotic liver disease with significant fibrosis (liver stiffness measurement ≥ 7 kPa)

Age group	Total, *n*	LSM ≥ 7 kPa	Prevalence (95% CI)
18–29.9 years	11	5	0.455 (0.167, 0.766)
30–39.9 years	23	7	0.304 (0.132, 0.529)
40–49.9 years	48	16	0.333 (0.204, 0.484)
50–59.9 years	158	48	0.304 (0.233, 0.382)
60–69.9 years	245	99	0.404 (0.342, 0.468)
70–79.9 years	144	58	0.403

			(0.322, 0.488)
≥ 80 years	41	27	0.659 (0.494, 0.799)

The age-specific prevalence proportions of metabolic dysfunction-associated steatotic liver disease (MASLD) with significant fibrosis were calculated using data of 670 patients with diabetes mellitus (DM) who underwent TE at Siriraj Hospital between 2018 and 2023. The significant fibrosis was defined in those who had liver stiffness measurement (LSM) of ≥ 7.0 kPa. 95% CI: 95% confidence interval; DM: Diabetes mellitus; kPa: Kilopascal; LSM: Liver stiffness measurement; MASLD: Metabolic dysfunction-associated steatotic liver disease.

Supplementary Table 3 Mortality rate calculation

Mortality in patients with DM without MASLD
The mortality rates for patients with DM but without MASLD were derived from age-specific mortality rates of the general Thai population, as reported in the World Health Organization Life Tables[3]. These rates were subsequently adjusted using mortality data specific to patients with DM from Krairittichai et al.[4].
Mortality in patients with DM and MASLD
For patients with both DM and MASLD, mortality rates were estimated by multiplying the age-specific mortality rates of the general Thai population by a hazard ratio (HR) of 1.35 (95% CI: 1.19–1.52) reported by Ng et al.[5]. This HR reflects the increased mortality risk associated with MASLD in patients with DM.
Stage-specific mortality adjustment for liver fibrosis
To account for the impact of liver fibrosis severity on mortality, stage-specific HRs[6] were applied to the baseline mortality of patients with MASLD at fibrosis stage F0. The HRs used were:

- F1: 1.24 (95% CI: 0.85–1.81)
- F2: 1.46 (95% CI: 1.08–1.98)
- F3: 1.96 (95% CI: 1.41–2.72)
- F4: 3.66 (95% CI: 2.65–5.05)

Formula for all-cause mortality rate by fibrosis stage is shown below:

> All-cause mortality rates for each stage of liver fibrosis = age-specific mortality rates of the general Thai population[3] * HR of patients with DM and MASLD relative to non-DM and non-MASLD[5] * HR each specific fibrosis stage relative to stage F0[6].

Liver-related mortality was calculated similarly, using values reported by Taylor et al.[7] and Ng et al.[5,6]. For cardiovascular disease-related deaths, proportions reported by Tampi et al.[8] were applied, reflecting the increased cardiovascular risk observed in patients with liver disease. Mortality rates specific to cirrhosis and hepatocellular carcinoma were sourced from Gruneau et al.[9]. Additionally, mortality rates among patients who underwent liver transplantation were based on data from Thai cohorts[10,11]. This approach integrates liver-specific and cardiovascular mortality risks to provide a comprehensive mortality profile in patients with MASLD and related liver conditions.

DM: Diabetes mellitus; MASLD: Metabolic dysfunction-associated steatotic liver disease.

Supplementary Table 4 Cost analysis results based on primary data from the Siriraj Hospital electronic database

Direct medical cost	Visit per year	Median cost, THB/visit (USD/visit)	SE, THB/visit (USD/visit)	P5, THB/visit (USD/visit)	P95, THB/visit (USD/visit)	Total treatment cost, THB/visit (USD/visit)
Outpatient department visit						
DM without MASLD	2.75	2,945.50 (85.03)	4,368.79 (126.12)	576.50 (16.64)	17,726.80 (511.75)	8,088.14 (233.50)
DM + $MASLD_{F0-F3}$	3.48	3,173.11 (91.60)	101.32 (2.93)	735.75 (21.24)	18,125.00 (523.25)	11,055.04 (319.05)
DM + $MASLD_{F4}$/CC	5.87	3,616.54 (104.41)	466.08 (13.46)	1,142.29 (32.98)	28,053.51 (809.97)	21,226.86 (612.80)
Inpatient department visits						
DM without MASLD	0.02	53,439.50 (1,542.74)	11,005.17 (317.71)	25,552.78 (737.68)	84,944.00 (2,452.24)	812.65 (23.46)
DM + $MASLD_{F0-F3}$	0.03	13,869.88 (400.41)	32,818.51 (947.43)	5,076.75 (146.56)	395,551.75 (11,419.13)	421.84 (12.18)
DM + $MASLD_{F4}$/CC	0.31	51,010.51 (1,472.62)	1,125.35 (32.49)	6,039.55 (174.35)	225,096.95 (6,498.29)	15,999.44 (461.89)

Primary data analysis from the electronic database of Siriraj Hospital of 1,105 patients with DM who underwent TE between January 1, 2018 and December 31, 2023. The data include 14,055 outpatient visits and 415 inpatient visits. CC:

Compensated cirrhosis; DM: Diabetes mellitus; F: Fibrosis stage; MASLD: Metabolic dysfunction-associated steatotic liver disease; P: Percentile; THB: Thai baht; USD: United States dollar.

Supplementary Table 5 Impact of treatment adherence on the incremental cost-effectiveness ratios

Treatment adherence (%)	ICER[1], THB (USD) per QALY gained		
	FIB-4+TE	**SAFE+TE**	**TE alone**
100% (base-case)	75,961.0	80,384.5	98,964.5
	(2,192.9)	(2,320.6)	(2,857.0)
90%	79,957.1	84,470.8	105,092.0
	(2,308.3)	(2,438.6)	(3,033.9)
80%	85,054.0	89,682.7	112,852.8
	(2,455.4)	(2,589.0)	(3,257.9)
70%	91,721.0	96,499.9	122,944.6
	(2,647.9)	(2,785.8)	(3,549.3)
60%	100,740.9	105,722.7	136,530.1
	(2,908.3)	(3,052.1)	(3,941.5)
Minimum adherence rate (%)	31.3%	32.9%	48.2%

[1]Compared to no screening.

FIB-4: Fibrosis-4 index; ICER: Incremental cost-effectiveness ratio; QALY: Quality-adjusted life-year; SAFE: Steatosis-associated fibrosis estimator score; TE: Transient elastography; THB: Thai baht; USD: United States dollar.

References

1 **Husereau D**, Drummond M, Augustovski F, Briggs AH, Carswell C, Caulley L, Chaiyakunapruk N, de Bekker-Grob E, Greenberg D, Loder E, Mauskopf J, Mullins CD, Petrou S, Pwu RF, Staniszewska S; CHEERS 2022 ISPOR Good Research Practices Task Force. Consolidated Health Economic Evaluation Reporting Standards 2022 (CHEERS 2022) statement: updated reporting guidance for health economic evaluations. *BJOG* 2022; **129**: 336-344 [PMID: 35014160 DOI: 10.1111/1471-0528.17012]

2 **Alkhouri N**, Cheuk-Fung Yip T, Castera L, Takawy M, Adams LA, Verma N, Arab JP, Jafri SM, Zhong B, Dubourg J, Chen VL, Singal AK, Díaz LA, Dunn N, Nadeem R, Wai-Sun Wong V, Abdelmalek MF, Wang Z, Duseja A, Almahanna Y, Omeish HA, Ye J, Harrison SA, Cristiu J, Arrese M, Robert S, Lai-Hung Wong G, Bajunayd A, Shao C, Kubina M, Dunn W. ALADDIN: A Machine Learning Approach to Enhance the Prediction of Significant Fibrosis or Higher in Metabolic Dysfunction-Associated Steatotic Liver Disease. *Am J Gastroenterol* 2025 [PMID: 40146016 DOI: 10.14309/ajg.0000000000003432]

3 Life Tables by Country: Thailand [Internet]. 2019 [cited March 20, 2024]. Available from: https://apps.who.int/gho/data/view.searo.61640?lang=en.

4 **Krairittichai U**, Potisat S. Survival Rates and Mortality Risk Factors of Thai Patients with Type 2 Diabetes Mellitus. Journal of the Medical Association of Thailand = Chotmaihet thangphaet. 2017;100 Suppl 1:S8-15. https://www.thaiscience.info/journals/Article/JMAT/10986377.pdf

5 **Ng CH**, Chan KE, Chin YH, Zeng RW, Tsai PC, Lim WH, Tan DJH, Khoo CM, Goh LH, Ling ZJ, Kulkarni A, Mak LL, Huang DQ, Chan M, Chew NW, Siddiqui MS, Sanyal AJ, Muthiah M. The effect of diabetes and prediabetes on the prevalence, complications and mortality in nonalcoholic fatty liver disease. *Clin Mol Hepatol* 2022; **28**: 565-574 [PMID: 35585687 DOI: 10.3350/cmh.2022.0096]

6 **Ng CH**, Lim WH, Hui Lim GE, Hao Tan DJ, Syn N, Muthiah MD, Huang DQ, Loomba R. Mortality Outcomes by Fibrosis Stage in Nonalcoholic Fatty Liver Disease: A Systematic Review and Meta-analysis. *Clin Gastroenterol Hepatol* 2023; **21**: 931-939.e5 [PMID: 35513235 DOI: 10.1016/j.cgh.2022.04.014]

7 **Taylor RS**, Taylor RJ, Bayliss S, Hagström H, Nasr P, Schattenberg JM, Ishigami M, Toyoda H, Wai-Sun Wong V, Peleg N, Shlomai A, Sebastiani G, Seko Y, Bhala N, Younossi ZM, Anstee QM, McPherson S, Newsome PN. Association Between Fibrosis Stage and Outcomes of Patients With Nonalcoholic Fatty Liver Disease: A Systematic Review and Meta-Analysis. *Gastroenterology* 2020; **158**: 1611-1625.e12 [PMID: 32027911 DOI: 10.1053/j.gastro.2020.01.043]

8 **Tampi RP**, Wong VW, Wong GL, Shu SS, Chan HL, Fung J, Stepanova M, Younossi ZM. Modelling the economic and clinical burden of non-alcoholic steatohepatitis in East Asia: Data from Hong Kong. *Hepatol Res* 2020; **50**: 1024-1031 [PMID: 32537840 DOI: 10.1111/hepr.13535]

9 **Gruneau L**, Ekstedt M, Kechagias S, Henriksson M. Disease Progression Modeling for Economic Evaluation in Nonalcoholic Fatty Liver Disease-A Systematic Review. *Clin Gastroenterol Hepatol* 2023; **21**: 283-298 [PMID: 34757199 DOI: 10.1016/j.cgh.2021.10.040]

10 **Prakongsai P**, Pachanee K, Wongphan T. Economic evaluation of liver transplantation for moderate to severe liver cirrhosis patients in universal health coverage. 2016. https://kb.hsri.or.th/dspace/handle/11228/5204

11 **Levy AR**, Kowdley KV, Iloeje U, Tafesse E, Mukherjee J, Gish R, Bzowej N, Briggs AH. The impact of chronic hepatitis B on quality of life: a multinational study of utilities from infected and uninfected persons. *Value Health* 2008; **11**: 527-538 [PMID: 18179664 DOI: 10.1111/j.1524-4733.2007.00297.x]