

**5<sup>th</sup> HEPATITIS C**  
TECHNICAL ADVISORY  
GROUP  
**TAG Meeting**

**IMPACT ON MORTALITY OF HCV  
INFECTION AND TREATMENT,  
GEORGIA, 2015-2018**

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TEPHINET

# Background

- Persons with chronic HCV infection at increased risk for premature death ( cirrhosis, HCC and extrahepatic complications)
- DAAs available free of cost in Georgia since 2015
- Georgia set an overall goal of 90% reduction in HCV prevalence
- Expected to reduce mortality by at least 65%

# Aim

- Evaluate the impact of HCV infection and treatment on all-cause mortality

# Methods

- A retrospective nationwide cohort study
- Study population: All **adults 18 years and older** registered in the national screening registry
- Data sources:
  - Screening registry April 2015 - May 2018
  - Treatment database April 2015 - May 2018
  - National vital statistics 2015-December 2018
- Data linkage by matching national **11-digit Personal IDs**

# Study Cohort Groups

COHORTS	TOTAL
<b>1) Person not infected with HCV infection</b> <i>Screening tests with only negative results</i>	1,002,229
<b>2) Anti-HCV positive persons, but did not receive HCV viremia testing</b>	21,408
<b>3) HCV-infected persons but untreated</b>	14,234
<b>4) HCV-infected persons initiated but did not complete treatment</b>	1,165
<b>5) Patients completed treatment and had missing SVR results</b>	9,943
<b>6) Patients completed treatment and achieved SVR</b>	32,485

# Analysis

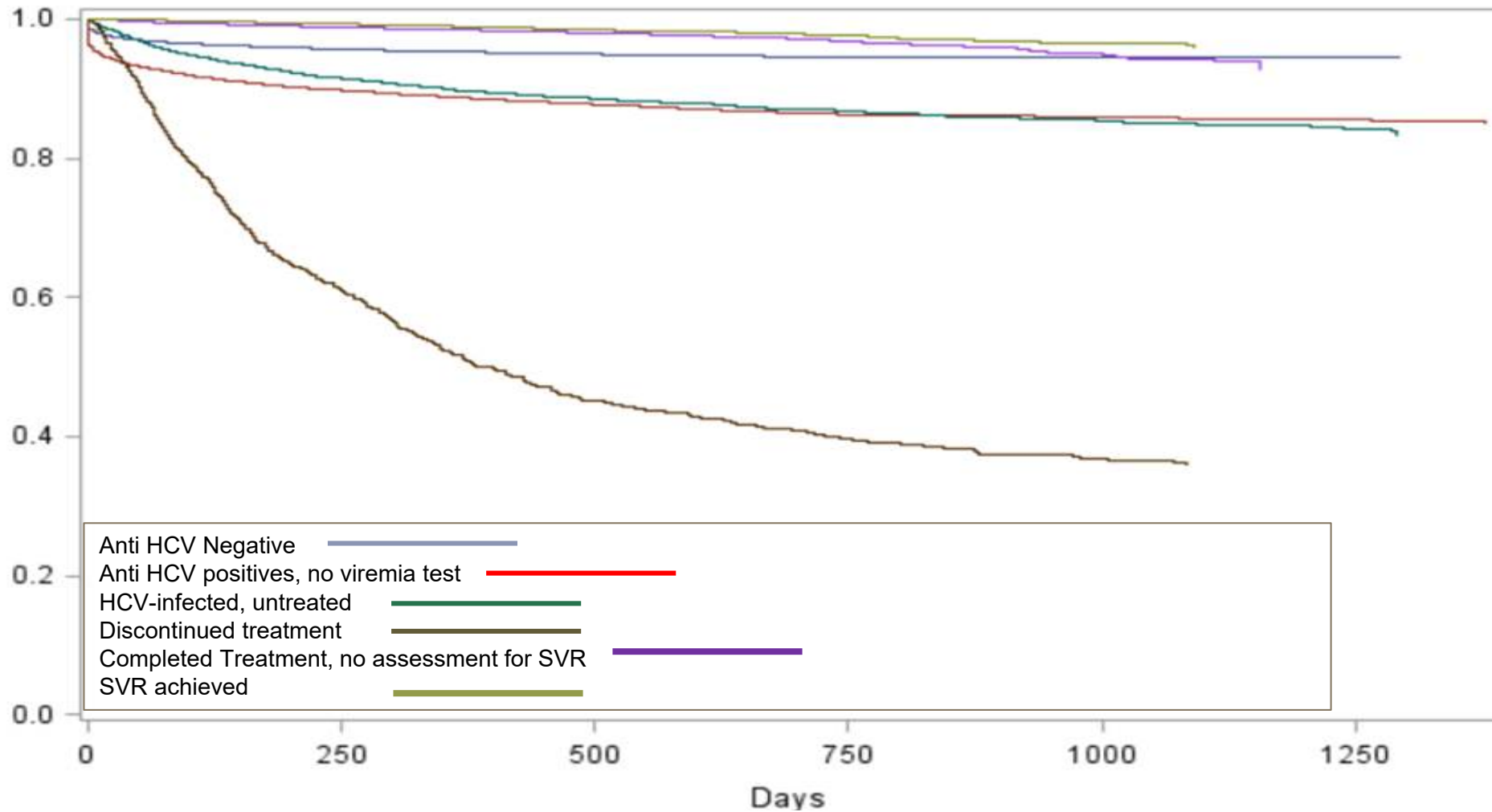
- For patients who received multiple courses of antiviral therapy, only the most recent course of treatment and follow-up thereafter was considered
- Kaplan-Meier survival curves generated ( unadjusted and adjusted)
- Hazard ratio analysis unadjusted as well as adjusted for:
  - age
  - sex
  - hospitalization

# Preliminary Results

## Number of Deaths in Each Cohorts (2015-2018)

COHORTS	N of death (%)	TOTAL
1) HCV not infected	44,047 (4.4)	1,002,229
2) Anti-HCV positives, no viremia testing	2,505 (11.7)	21,408
3) HCV-infected and untreated	1,140 (8.0)	14,234
4) Treated but discontinued treatment	663 (56.9)	1,165
5) Completed Treatment, SVR missing	279 (2.8)	9,943
6) Completed and SVR achieved	575 (1.8)	32,485
<b>TOTAL</b>	<b>49,209 (4.5)</b>	<b>1,081,464</b>

# Crude Kaplan-Meier Survival Curves

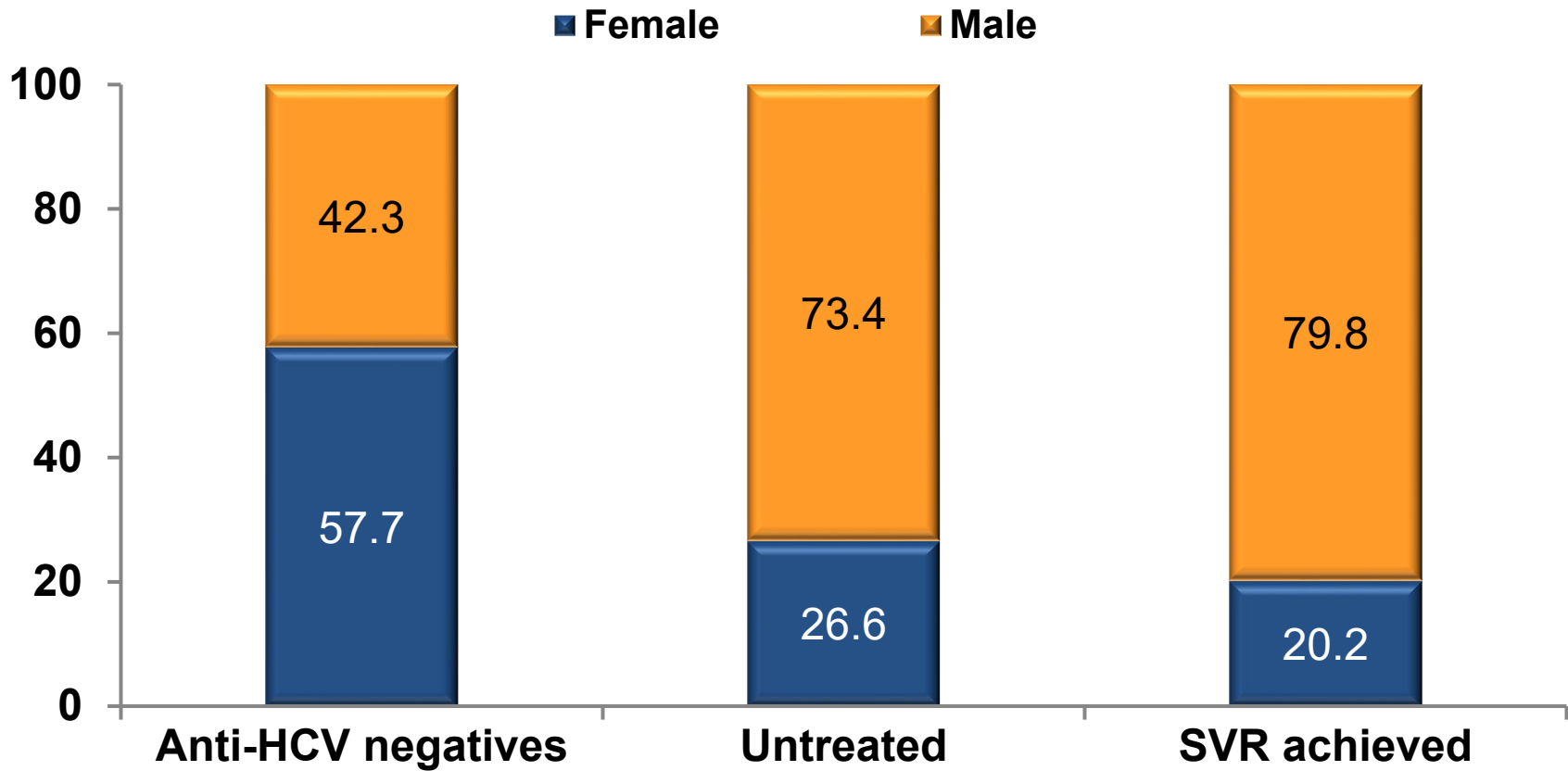




# Preliminary Analysis of Cohort Groups

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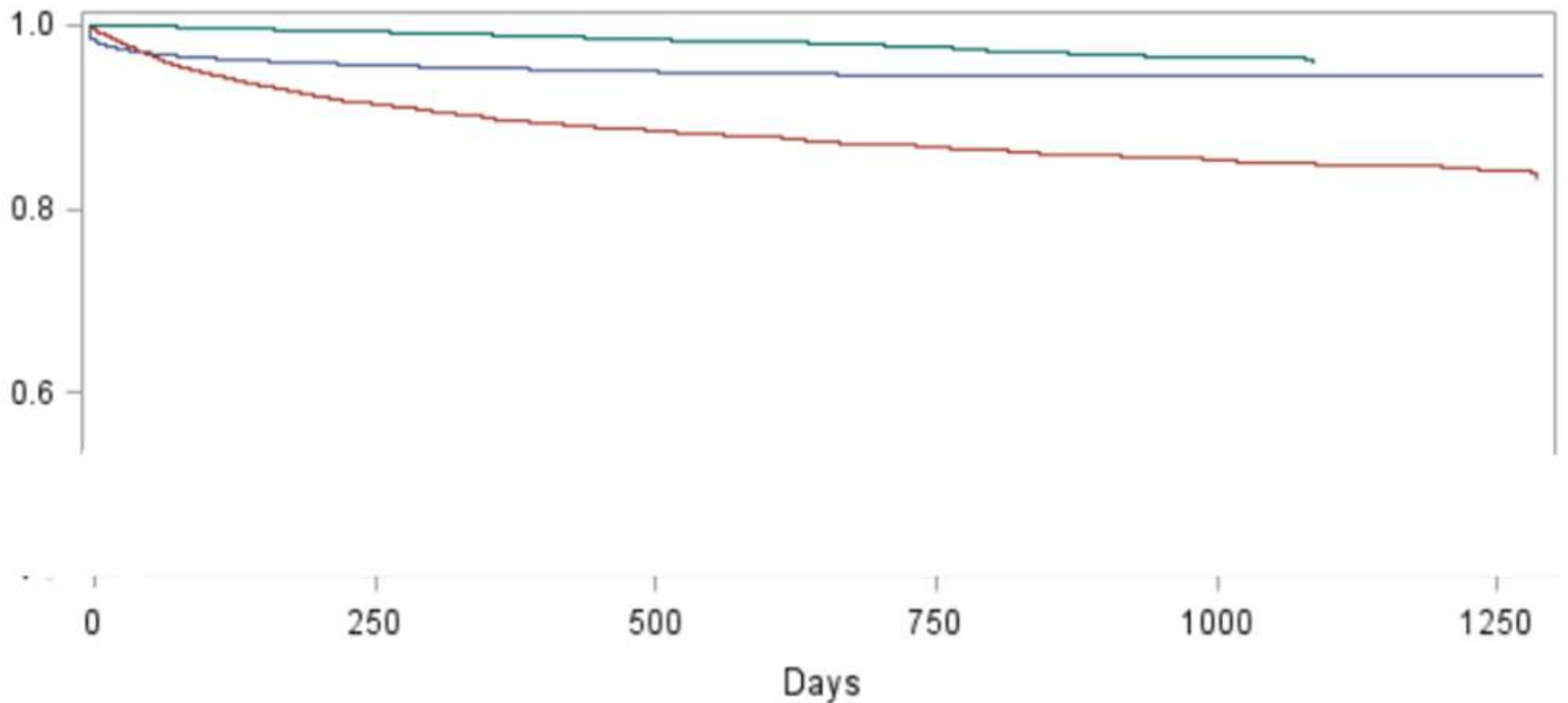
# Baseline Characteristics of Cohort Groups



# Baseline Characteristics of Cohort Groups

n (%)	Person not infected with HCV infection (n=1,002,229)	HCV-infected and untreated (n=14,234)	Achieved SVR (n=32,485)
Age, (years) median (IQR)	43 (29, 61)	49 (39, 60)	45 (39, 53)
<b>FIB-4 Test</b>		n=1,361 (9.6%)	n=30,425 ( 93.7%)
< 1.45	-	776 ( <b>57.0</b> )	17,032 ( <b>56.0</b> )
1.45 – 3.25	-	373 (27.4)	9,444 (31.0)
> 3.25	-	212 (15.6)	3,949 (13.0)
<b>Metavir score</b>		n=233 (1.6%)	n=14,237 (43.8%)
< F4	-	134 ( <b>57.5</b> )	10,267 ( <b>72.1</b> )
F4	-	99 (42.5)	3,970 (27.9)
<b>Follow-up (days)</b> Median (IQR)	302 (131, 542)	195 (80, 452)	608 (433, 686)

# Crude Kaplan-Meier Survival Curves



Anti HCV negative



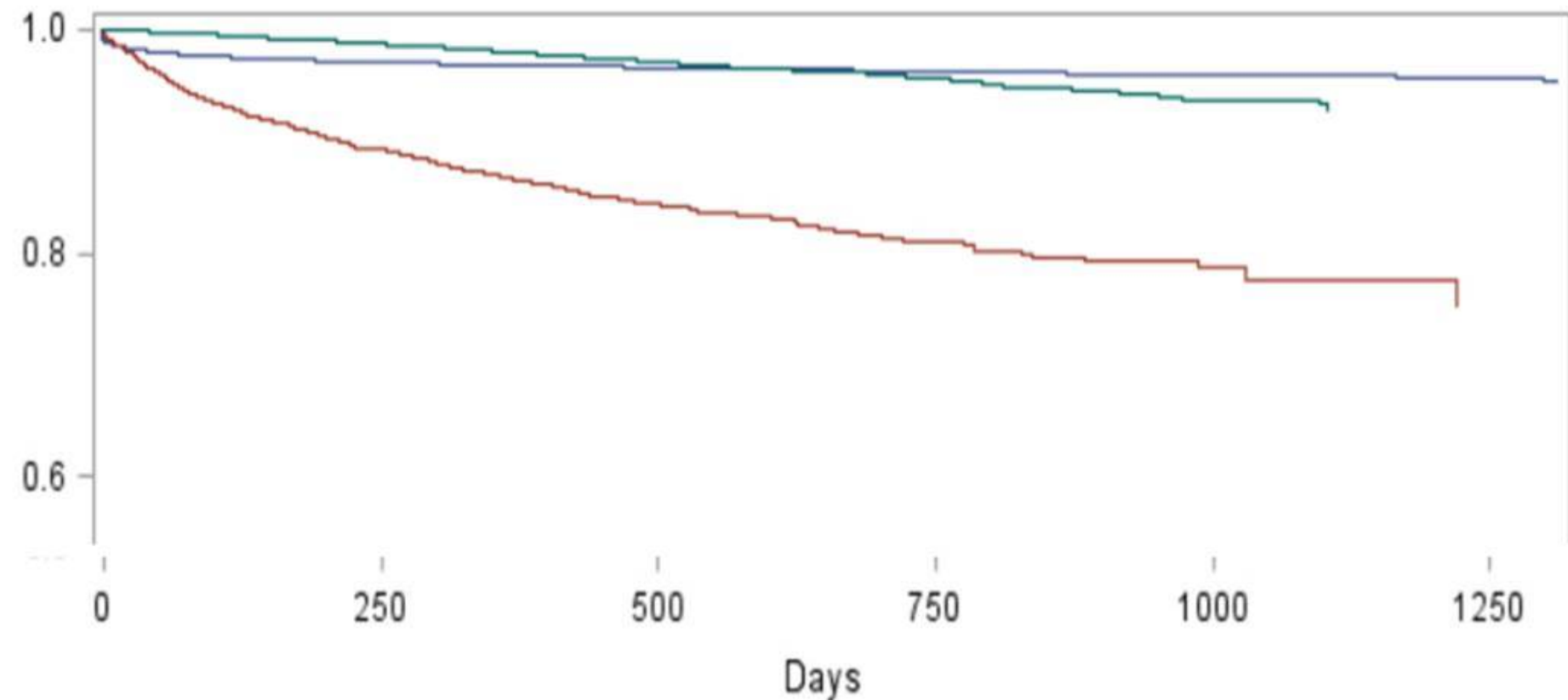
Untreated



SVR achieved



# Adjusted Kaplan-Meier Survival Curves (by age, sex and hospitalization)



Anti HCV negative

Untreated

SVR achieved

# Hazard Ratios for Death

	Hazard Ratio (95% Confidence Interval)		
	Unadjusted	Adjusted for age, sex	Adjusted for age, sex, <b>hospitalization</b>
Untreated vs Uninfected	1.95 (1.84-2.07)	1.50 (1.40-1.61)	1.93 (1.80-2.07)
Untreated vs SVR achieved	5.77 (5.22-6.38)	2.66 (2.39-2.95)	<b>2.54</b> (2.28-2.82)

# Limitations

- Cause-specific mortality was not included in our analysis
- Potential for misclassification
- History of HCC and other comorbidities associated with increased mortality were not assessed
- Some unmeasured factors might account for the observed differences between SVR and untreated patients

# Preliminary Findings

- Treatment of HCV infection favorably affects survival
- Survival of persons treated for HCV infection is comparable to uninfected persons



# Future Analysis Plan

- To study cause-specific mortality in order to determine liver-related mortality
- More analysis for the predictors of mortality
- Stratification analysis by age and sex
- To estimate age standardized mortality rate (aSMR)

# Acknowledgements

- Scientific Committee members
- Department of Medical Statistics, NCDC

**THANK YOU!**