Geographic Density of Gastroenterologists is Associated with Decreased Mortality from Alcohol-Associated Liver Disease

Supplementary Material

Table of contents:

SUPPLEMENTARY METHODS

Center for Disease Control and Prevention's Wide-ranging Online Data for Epidemiologic Research (CDC WONDER)

CDC WONDER is a publicly-available database, which provides mortality and population counts for all US counties. Data are based on US death certificates, which identify a single underlying cause of death and demographic data. WONDER then uses the number of deaths as the numerator and the corresponding county-population size based on US Census Bureau data as the denominator with age-adjusted death rates calculated per 100,000 persons. Each estimate is accompanied by a 95% confidence interval and standard error. We used the Detailed Mortality File, which provides the number and rates of death aggregated by age, race, ethnicity, sex, place of death, date of death, whether an autopsy was performed, and the underlying cause of death, coded by the International Classification of Diseases (ICD)-10 system.

Supplemental Table 1. Co-Variates, Data Sources, and Years of Availability

Co-Variate	Data Source	Year Available
Sex	US Census Bureau	All years
Race/ethnicity	US Census Bureau	All years
Poverty	US Census Bureau	All years
Rural	Health Resources and Services Administration	2010*
Household income	US Census Bureau	All years
Diabetes	Behavioral Risk Factor Surveillance System	All years
Obesity	Behavioral Risk Factor Surveillance System	All years
Smoking	Behavioral Risk Factor Surveillance System	All years
Alcohol consumption	Behavioral Risk Factor Surveillance System	All years
Good health days	Behavioral Risk Factor Surveillance System	All years
Ever Myocardial Infarction or Ischemic Heart Disease	Behavioral Risk Factor Surveillance System	All years
Stroke	Behavioral Risk Factor Surveillance System	All years
Asthma	Behavioral Risk Factor Surveillance System	All years
Primary care physicians	Health Resources and Services Administration	2010, 2015, 2017*
Gastroenterologists	Health Resources and Services Administration	2010, 2015, 2017*
Ophthalmologists	Health Resources and Services Administration	2010, 2015, 2017*
Dermatologists	Health Resources and Services Administration	2010, 2015, 2017*
Transplant surgeons	Health Resources and Services Administration	2010, 2015, 2017*
Substance use, behavioral disorder, mental health counselors	Health Resources and Services Administration	2010, 2015, 2017*
Hospital beds per capita	Health Resources and Services Administration	2010, 2015, 2017*
Substance use treatment center offering treatment for alcohol use disorder		2010-2013, 2015, 2017, 2019**

*For co-variates in which all years were not available, the 2010 value was applied to years 2010-2014, the 2015 value was applied to 2015-2016, and the 2017 value was applied to 2017-2019. For the rural co-variate, 2010 was applied to all years.

*For year 2014, the 2013 value was applied; for 2016, the 2015 value was applied; and for 2018, the 2017 value was applied.

Supplemental Table 2. Exploratory Analysis 1: Multivariable Analysis for Alcohol-Associated Liver Disease Mortality Including State-Level Density of Transplant Surgeons

State-Level Characteristic	Coefficient[a] (95% CI)
Gastroenterologists per 100,000 population	-8.4 (-16.9 to -0.04)
Transplant Surgeons per 100,000 population	-22.2 (-138.1 to +93.6)
Primary Care Physicians per 100,000 population	+1.2 (+0.3 to +2.1)
Substance Use Treatment Centers Treating Alcohol Use Disorder per 100,000 population	
6-10	+14.3 (+4.2 to +24.3)
>10	-2.0 (-18.9 to +14.8)
Binge Drinking in last 30 days[b]	-1.2 (-3.6 to +1.2)
Female[b]	-0.6 (-17.9 to +16.8)
Non-Hispanic Black[b]	-1.0 (-2.1 to +0.05)
Hispanic[b]	+1.3 (+0.4 to +2.2)
Income (per $10,000)	-3.4 (-12.6 to +5.6)
Obesity[b]	-3.6 (-6.1 to -1.1)
Diabetes[b]	+2.8 (-2.3 to +8.0)
Living in Rural Area[b]	-0.2 (-0.6 to +0.2)
Age	
35-44	-10.9 (-19.1 to -2.7)
45-54	-9.7 (-17.9 to -1.6)
55-64	+1.4 (-9.2 to +12.0)
65-74	+7.6 (-6.3 to +21.4)
75-84	-13.4 (-40.3 to +13.5)
≥85	-20.2 (-60.4 to +20.0)
Year	
2011	-5.9 (-16.7 to +4.9)
2012	-16.9 (-33.1 to -0.8)
2013	-23.4 (-45.2 to -1.6)
2014	-27.5 (-54.5 to -0.5)
2015	-26.4 (-57.9 to +5.2)
2016	-27.5 (-65.2 to +10.2)
2017	-29.7 (-71.5 to +12.0)
2018	-28.6 (-73.1 to +16.0)
2019	-23.4 (-72.9 to +26.1)

[a]Coefficients, 95% confidence intervals (CI), and p-values in this table are derived from linear regression. Coefficients reflect the mean difference in age-adjusted mortality rates for alcohol-associated liver disease per 1,000,000 population.
[b]Per % increase in state-level proportion

Supplemental Table 3. Exploratory Analysis 2: Multivariable Analysis for Alcohol-Associated Liver Disease Mortality Including State-Level Density of Substance Use, Behavioral Disorder, and Mental Health Counselors

State-Level Characteristic	Coefficient[a] (95% CI)
Gastroenterologists per 100,000 population	-9.5 (-17.8 to -1.3)
Substance Use, Behavioral Disorder, and Mental Health Counselors per 100,000 population	+0.03 (-0.1 to +0.2)
Primary Care Physicians per 100,000 population	+1.1 (+0.2 to +2.0)
Substance Use Treatment Centers Treating Alcohol Use Disorder per 100,000 population	
6-10	+14.3 (+4.2 to +24.4)
>10	-0.9 (-17.9 to +16.1)
Binge Drinking in last 30 days[b]	-1.2 (-3.6 to +1.0)
Female[b]	-0.2 (-17.5 to +17.0)
Non-Hispanic Black[b]	-1.0 (-2.1 to +1.7)
Hispanic[b]	+1.4 (-2.1 to +0.2)
Income (per $10,000)	-3.6 (-13.0 to +5.8)
Obesity[b]	-3.7 (-6.1 to -1.2)
Diabetes[b]	+2.9 (-2.2 to +8.1)
Living in Rural Area[b]	-0.2 (-0.6 to +0.2)
Age	
35-44	-11.0 (-19.3 to -2.7)
45-54	-9.7 (-17.8 to -1.5)
55-64	+1.0 (-9.4 to +11.4)
65-74	+8.3 (-6.2 to +22.8)
75-84	-14.6 (-42.4 to +13.1)
≥85	-18.4 (-59.9 to +23.0)
Year	
2011	-5.9 (-16.5 to +4.8)
2012	-17.6 (-34.1 to -1.1)
2013	-24.4 (-46.6 to -2.1)
2014	-28.8 (-56.2 to -1.4)
2015	-27.6 (-59.3 to +4.1)
2016	-28.9 (-66.8 to +9.1)
2017	-31.1 (-73.0 to +10.8)
2018	-29.8 (-74.3 to +14.7)
2019	-24.5 (-73.8 to +24.8)

[a]Coefficients, 95% confidence intervals (CI), and p-values in this table are derived from linear regression. Coefficients reflect the mean difference in age-adjusted mortality rates for alcohol-associated liver disease per 1,000,000 population.

[b]Per % increase in state-level proportion

Supplemental Table 4. Exploratory Analysis 3a: Multivariable Analysis for Association of State-Level Density of Ophthalmologists with Alcohol-Associated Liver Disease Mortality

State-Level Characteristic	Coefficient[a] (95% CI)
Ophthalmologists per 100,000 population	-3.2 (-9.3 to +2.9)
Primary Care Physicians per 100,000 population	+1.3 (+0.4 to +2.3)
Substance Use Treatment Centers Treating Alcohol Use Disorder per 100,000 population	
6-10	+14.2 (+3.1 to +25.2)
>10	+1.0 (-16.2 to +18.2)
Binge Drinking in last 30 days[b]	-1.2 (-3.5 to +1.0)
Female[b]	-10.8 (-25.6 to +4.0)
Non-Hispanic Black[b]	-0.6 (-1.7 to +0.4)
Hispanic[b]	+1.4 (+0.4 to +2.3)
Income (per $10,000)	-4.8 (-14.0 to +4.5)
Obesity[b]	-3.5 (-6.3 to -0.7)
Diabetes[b]	+4.4 (-1.3 to +10.2)
Living in Rural Area[b]	-0.2 (-0.6 to +0.2)
Age	
35-44	-7.6 (-16.5 to +1.3)
45-54	-9.2 (-17.6 to -0.7)
55-64	+3.3 (-6.8 to +13.4)
65-74	+8.1 (-6.1 to +22.3)
75-84	-11.4 (-37.5 to +14.8)
≥85	-18.0 (-56.8 to +20.8)
Year	
2011	-6.3 (-16.7 to +4.1)
2012	-17.7 (-33.6 to -1.9)
2013	-24.2 (-45.4 to -2.9)
2014	-28.5 (-54.5 to -2.5)
2015	-29.3 (-60.0 to +1.4)
2016	-30.7 (-67.4 to +6.1)
2017	-33.0 (-74.0 to +8.0)
2018	-33.2 (-77.5 to +11.1)
2019	-29.4 (-79.4 to +20.6)

[a]Coefficients, 95% confidence intervals (CI), and p-values in this table are derived from linear regression. Coefficients reflect the mean difference in age-adjusted mortality rates for alcohol-associated liver disease per 1,000,000 population.

[b]Per % increase in state-level proportion

Supplemental Table 5. Exploratory Analysis 3b: Multivariable Analysis for Association of State-Level Density of Dermatologists with Alcohol-Associated Liver Disease Mortality

State-Level Characteristic	Coefficient[a] (95% CI)
Dermatologists per 100,000 population	-0.2 (-6.3 to +5.9)
Primary Care Physicians per 100,000 population	+1.4 (+0.4 to +2.4)
Substance Use Treatment Centers Treating Alcohol Use Disorder per 100,000 population	
6-10	+13.5 (+2.4 to +24.6)
>10	+0.4 (-16.0 to +16.9)
Binge Drinking in last 30 days[b]	-1.4 (-3.6 to +0.8)
Female[b]	-13.8 (-30.0 to +2.5)
Non-Hispanic Black[b]	-0.7 (-1.8 to +0.3)
Hispanic[b]	+1.4 (+0.4 to +2.3)
Income (per $10,000)	-6.8 (-15.8 to +2.3)
Obesity[b]	-3.3 (-6.2 to -0.4)
Diabetes[b]	+4.3 (-1.7 to +10.2)
Living in Rural Area[b]	-0.2 (-0.6 to +0.2)
Age	
35-44	-5.6 (-13.8 to +2.5)
45-54	-7.1 (-15.4 to +0.1)
55-64	+3.9 (-6.3 to +14.0)
65-74	+9.0 (-4.7 to +22.7)
75-84	-9.2 (-35.4 to +17.0)
≥85	-20.9 (-59.2 to +17.3)
Year	
2011	-4.3 (-14.5 to +5.9)
2012	-14.7 (-30.0 to +0.6)
2013	-20.1 (-40.7 to -0.4)
2014	-23.5 (-48.9 to +1.9)
2015	-23.2 (-53.1 to +6.6)
2016	-23.6 (-59.7 to +12.5)
2017	-25.1 (-65.7 to +15.4)
2018	-25.0 (-69.1 to +19.1)
2019	-20.4 (-70.3 to +29.5)

[a]Coefficients, 95% confidence intervals (CI), and p-values in this table are derived from linear regression. Coefficients reflect the mean difference in age-adjusted mortality rates for alcohol-associated liver disease per 1,000,000 population.

[b]Per % increase in state-level proportion

Supplemental Table 6. Exploratory Analysis 4a: Multivariable Analysis for Cirrhosis and Liver-Cancer Related Mortality

State-Level Characteristic	Coefficient[a] (95% CI)
Gastroenterologists per 100,000 population	-0.2 (-7.4 to +7.0)
Primary Care Physicians per 100,000 population	+0.9 (+0.04 to +1.7)
Substance Use Treatment Centers Treating Alcohol Use Disorder per 100,000 population	
6-10	-7.2 (-15.5 to +1.1)
>10	-3.5 (-17.8 to +10.8)
Binge Drinking in last 30 days[b]	-0.5 (-1.5 to +2.5)
Female[b]	+13.7 (-2.0 to +29.4)
Non-Hispanic Black[b]	-2.1 (-3.2 to -1.1)
Hispanic[b]	+2.2 (+1.4 to +3.0)
Income (per $10,000)	-1.1 (-10.3 to +8.2)
Obesity[b]	+2.9 (+0.8 to +5.0)
Diabetes[b]	+6.3 (+2.6 to +9.9)
Living in Rural Area[b]	-0.09 (-0.4 to +0.3)
Age	
35-44	-3.6 (-11.1 to +3.9)
45-54	-4.2 (-13.1 to +4.7)
55-64	+1.7 (-6.6 to +10.0)
65-74	+9.8 (-0.1 to +19.8)
75-84	-8.6 (-26.0 to +8.7)
≥85	-37.2 (-63.4 to +10.9)
Year	
2011	-2.5 (-12.8 to +7.7)
2012	-7.9 (-20.5 to +4.7)
2013	-12.0 (-28.2 to +4.1)
2014	-15.9 (-36.2 to +4.4)
2015	-14.4 (-38.4 to +9.6)
2016	-22.6 (-51.0 to +5.9)
2017	-24.2 (-56.7 to +8.2)
2018	-29.0 (-65.1 to +7.2)
2019	-26.6 (-67.9 to +14.7)

[a]Coefficients, 95% confidence intervals (CI), and p-values in this table are derived from linear regression. Coefficients reflect the mean difference in age-adjusted mortality rates for alcohol-associated liver disease per 1,000,000 population.
[b]Per % increase in state-level proportion

Supplemental Table 7. Exploratory Analysis 4b: Multivariable Analysis for Cirrhosis and Liver-Cancer Related Mortality – Obesity and Diabetes Removed from Model

State-Level Characteristic	Coefficient[a] (95% CI)
Gastroenterologists per 100,000 population	-4.9 (-14.2 to +4.3)
Primary Care Physicians per 100,000 population	+0.5 (+0.4 to +1.4)
Substance Use Treatment Centers Treating Alcohol Use Disorder per 100,000 population	
6-10	-9.7 (-18.9 to -0.4)
>10	-14.5 (-32.7 to +3.8)
Binge Drinking in last 30 days[b]	+0.03 (-2.1 to +2.2)
Female[b]	+20.6 (+4.7 to +36.6)
Non-Hispanic Black[b]	-1.8 (-3.0 to -0.6)
Hispanic[b]	+2.3 (+1.4 to +3.3)
Income (per $10,000)	-8.6 (-19.2 to +2.1)
Obesity[b]	--
Diabetes[b]	--
Living in Rural Area[b]	-0.1 (-0.3 to +0.5)
Age	
35-44	-3.1 (-12.7 to +6.5)
45-54	-4.9 (-15.5 to +5.6)
55-64	+5.2 (-4.4 to +14.9)
65-74	+5.0 (-7.6 to +17.6)
75-84	-5.1 (-28.6 to +18.4)
≥85	-37.1 (-68.9 to -5.4)
Year	
2011	+1.3 (-8.7 to +11.4)
2012	+2.4 (-11.5 to +16.4)
2013	+2.9 (-15.9 to +21.8)
2014	+4.6 (-19.0 to +28.3)
2015	+9.6 (-19.1 to +38.3)
2016	+8.2 (-25.0 to +41.4)
2017	+11.1 (-26.5 to +48.8)
2018	+13.7 (-26.9 to +54.4)
2019	+19.7 (-26.5 to +65.9)

[a]Coefficients, 95% confidence intervals (CI), and p-values in this table are derived from linear regression. Coefficients reflect the mean difference in age-adjusted mortality rates for alcohol-associated liver disease per 1,000,000 population.
[b]Per % increase in state-level proportion

Supplemental Table 8. Exploratory Analysis 4c: Multivariable Analysis for Cirrhosis and Liver-Cancer Related Mortality – Obesity, Diabetes, and Income Removed from Model

State-Level Characteristic	Coefficient[a] (95% CI)
Gastroenterologists per 100,000 population	-7.3 (-15.3 to +0.7)
Primary Care Physicians per 100,000 population	+0.4 (-0.6 to +1.3)
Substance Use Treatment Centers Treating Alcohol Use Disorder per 100,000 population	
6-10	-9.6 (-19.3 to +0.02)
>10	-16.0 (-35.4 to +3.3)
Binge Drinking in last 30 days[b]	+0.6 (-1.7 to +2.8)
Female[b]	+25.5 (+10.1 to +41.0)
Non-Hispanic Black[b]	-1.9 (-3.1 to -0.7)
Hispanic[b]	+2.4 (+1.4 to +3.4)
Income (per $10,000)	--
Obesity[b]	--
Diabetes[b]	--
Living in Rural Area[b]	+0.3 (-0.2 to +0.7)
Age	
35-44	-3.4 (-11.3 to +7.8)
45-54	-8.5 (-17.1 to +1.0)
55-64	+6.2 (-3.4 to +15.9)
65-74	+3.4 (-9.2 to +15.9)
75-84	+2.1 (-19.5 to +23.7)
≥85	-46.5 (-76.3 to -16.8)
Year	
2011	-1.8 (-11.3 to +7.8)
2012	-0.9 (-14.3 to +12.5)
2013	-2.0 (-19.9 to +16.0)
2014	-2.1 (-24.0 to +19.8)
2015	+0.9 (-24.9 to +26.8)
2016	-3.6 (-33.2 to +25.9)
2017	-4.7 (-36.4 to +26.9)
2018	-6.5 (-37.4 to +24.4)
2019	-5.7 (-38.4 to +27.0)

[a]Coefficients, 95% confidence intervals (CI), and p-values in this table are derived from linear regression. Coefficients reflect the mean difference in age-adjusted mortality rates for alcohol-associated liver disease per 1,000,000 population.
[b]Per % increase in state-level proportion

Supplemental Table 9. Exploratory Analysis 5a: Multivariable Analysis for Alcohol-Associated Liver Disease Mortality in 2010-2013

State-Level Characteristic	Coefficient[a] (95% CI)
Gastroenterologists per 100,000 population	-8.0 (-17.3 to +1.2)
Primary Care Physicians per 100,000 population	+0.7 (-0.1 to +1.6)
Substance Use Treatment Centers Treating Alcohol Use Disorder per 100,000 population	
6-10	+17.0 (+4.3 to +29.6)
>10	+2.4 (-18.6 to +23.4)
Binge Drinking in last 30 days[b]	-1.5 (-4.2 to +1.3)
Female[b]	-7.8 (-2.8 to +12.3)
Non-Hispanic Black[b]	-0.2 (-1.4 to +1.1)
Hispanic[b]	+1.7 (+0.9 to +2.5)
Income (per $10,000)	-7.6 (-17.4 to +2.2)
Obesity[b]	-4.2 (-6.7 to -1.8)
Diabetes[b]	+4.0 (-1.2 to +9.3)
Living in Rural Area[b]	-0.3 (-0.7 to +0.1)
Age	
35-44	-8.2 (-19.5 to +3.1)
45-54	-7.1 (-15.5 to +1.3)
55-64	+8.7 (-3.8 to +21.2)
65-74	+13.8 (-1.9 to +29.5)
75-84	-35.5 (-61.4 to -9.6)
≥85	+18.7 (-23.5 to +60.9)
Year	
2011	-10.7 (-23.4 to +1.2)
2012	-27.1 (-46.6 to -7.6)
2013	-36.2 (-62.6 to -9.8)

[a]Coefficients, 95% confidence intervals (CI), and p-values in this table are derived from linear regression. Coefficients reflect the mean difference in age-adjusted mortality rates for alcohol-associated liver disease per 1,000,000 population.
[b]Per % increase in state-level proportion

Supplemental Table 10. Exploratory Analysis 5b: Multivariable Analysis for Alcohol-Associated Liver Disease Mortality in 2014-2019

State-Level Characteristic	Coefficient[a] (95% CI)
Gastroenterologists per 100,000 population	-9.5 (-17.7 to +1.2)
Primary Care Physicians per 100,000 population	+1.2 (+0.4 to +2.0)
Substance Use Treatment Centers Treating Alcohol Use Disorder per 100,000 population	
6-10	+10.4 (+1.8 to +19.0)
>10	-7.2 (-24.6 to +10.2)
Binge Drinking in last 30 days[b]	-2.7 (-5.0 to -0.4)
Female[b]	-1.5 (-20.3 to +17.3)
Non-Hispanic Black[b]	-1.0 (-2.1 to +0.02)
Hispanic[b]	+1.6 (+0.7 to +2.5)
Income (per $10,000)	-3.5 (-13.3 to +6.3)
Obesity[b]	-2.5 (-4.9 to -0.06)
Diabetes[b]	-0.1 (-0.5 to +0.2)
Living in Rural Area[b]	-0.1 (-0.5 to +0.2)
Age	
35-44	-20.5 (-33.1 to -8.0)
45-54	-14.0 (-22.9 to -5.0)
55-64	-3.9 (-16.0 to +8.2)
65-74	+7.0 (-9.7 to +23.8)
75-84	-21.2 (-50.0 to +7.7)
≥85	-23.8 (-65.3 to +17.7)
Year	
2015	-1.0 (-7.8 to +5.7)
2016	-4.1 (-18.2 to +9.9)
2017	-7.8 (-27.9 to +12.3)
2018	-6.8 (-32.0 to +18.4)
2019	-3.3 (-36.5 to +29.9)

[a]Coefficients, 95% confidence intervals (CI), and p-values in this table are derived from linear regression. Coefficients reflect the mean difference in age-adjusted mortality rates for alcohol-associated liver disease per 1,000,000 population.
[b]Per % increase in state-level proportion

Supplemental Table 11. Exploratory Analysis 6: Multivariable Analysis Adjusting for the 2010 State-Level Alcohol Tax for All Beverages (Among the 32 States and Washington DC who do not have wholesale or retail monopolies on beverage types)

State-Level Characteristic	Coefficient[a] (95% CI)
Gastroenterologists per 100,000 population	-7.6 (-15.6 to +5.7)
Primary Care Physicians per 100,000 population	+0.8 (-0.4 to +2.0)
Substance Use Treatment Centers Treating Alcohol Use Disorder per 100,000 population	
6-10	+2.1 (+1.1 to +3.1)
>10	+0.4 (-1.3 to +2.2)
Binge Drinking in last 30 days[b]	-2.2 (-4.0 to -0.4)
Female[b]	-6.8 (-23.1 to +9.4)
Non-Hispanic Black[b]	-0.6 (-1.8 to +0.6)
Hispanic[b]	+1.6 (+0.5 to +2.7)
Income (per $10,000)	+1.6 (-10.0 to +13.1)
Obesity[b]	-4.2 (-6.8 to -1.6)
Diabetes[b]	+1.3 (-3.9 to +6.6)
Living in Rural Area[b]	+0.3 (-0.5 to +1.0)
Age	
35-44	-12.8 (-21.1 to -4.5)
45-54	-10.8 (-19.3 to -2.4)
55-64	-3.9 (-16.0 to +8.2)
65-74	+6.5 (-10.5 to +23.5)
75-84	-7.3 (-41.6 to +27.0)
≥85	-23.9 (-69.8 to +21.9)
Year	
2011	-0.6 (-11.3 to +10.0)
2012	-13.6 (-32.9 to +5.8)
2013	-20.7 (-47.2 to +5.7)
2014	-25.0 (-58.1 to +8.2)
2015	-24.2 (-62.9 to +14.6)
2016	-22.4 (-67.6 to +22.9)
2017	-27.3 (-77.3 to +22.8)
2018	-27.2 (-80.4 to +26.1)
2019	-26.8 (-86.2 to +32.6)
Weighted State-Level Tax Per Drink (per dollar tax increase)	+2.4 (-11.5 to +16.2)

[a]Coefficients, 95% confidence intervals (CI), and p-values in this table are derived from linear regression. Coefficients reflect the mean difference in age-adjusted mortality rates for alcohol-associated liver disease per 1,000,000 population.

[b]Per % increase in state-level proportion

WHAT YOU NEED TO KNOW

Background
Alcohol-associated liver disease accounts for the majority of liver-related deaths and is rising in incidence. Research to inform interventions to address this public health crisis is critical.

Findings
This national study found that higher geographic density of gastroenterologists was associated with fewer alcohol-associated liver disease deaths. Differences in gastroenterologist density could represent 40% of national alcohol-associated liver disease deaths.

Implications for Patient Care
Increasing the number of gastroenterologists in geographic areas where workforce gaps exist may help to address the growing epidemic of alcohol-associated liver disease.