

Supplementary Table 1: Definitions of all variables accounted for in multivariable analyses

Variable	Definition
Age	Continuous
Sex	M/F
Race	White/Black/Asian/Other/Unknown
Hispanic Ethnicity	Binary
Weight Class	Non-overweight, overweight, obese class I-III
Nicotine Dependence	ICD-10 code (F17.20), ICD-9 code (305.1)
Hepatitis B	ICD-10 code (B18.0, B18.1), ICD-9 code (070.32, 070.32) or a positive HBV antigen test or nonzero DNA test
Hepatitis C	ICD-10 code (B17.1, B18.2, B19.2, 070.70, 070.71), ICD-9 code (070.41, 070.44, 070.51, 070.54) or a positive HCV antibody test, nonzero RNA test, or genotype test with a valid result)
Homelessness	ICD-10 code (Z59.0), ICD-9 code (V60.0)
Psychotherapy	CPT4 code (90804-90815, 90826-90829, 90845, 90847, 90849, 90853, 90857, 90875, 90876, 99408)
Medication-assisted Therapy	3 prescriptions of disulfiram, acamprosate, naltrexone, gabapentin, topiramate or baclofen
Cannabis Use Disorder	ICD-10 code (F12.1, F12.2), ICD-9 code (304.3, 305.2)
Cocaine Use Disorder	ICD-10 code (F14.1, F14.2), ICD-9 code (304.2, 305.6)
Inhalant Use Disorder	ICD-10 code (F18.1, F18.2), ICD-9 code (304.6, 305.9)
Opioid Use Disorder	ICD-10 code (F11.1, F11.2), ICD-9 code (304.0, 305.5)
Other Stimulant Use Disorder	ICD-10 code (F15.1, F15.2), ICD-9 code (304.4, 305.7)
Sedative Use Disorder	ICD-10 code (F13.1, F13.2), ICD-9 code (304.1, 305.4)
Anxiety Disorder	ICD-10 code (F40-F48), ICD-9 code (300, 308, 309)
Specific Personality Disorder	ICD-10 code (F60), ICD-9 code (301)
Mood Disorder	ICD-10 code (F30-F39), ICD-9 code (296, 301.1, 311)
Schizophrenia Disorder	ICD-10 code (F20-F29), ICD-9 code (295, 298.3, 298.3, 298.8)
Chronic Passive Congestion of Liver	ICD-10 code (K76.1), ICD-9 code (573.0)
Hemochromatosis	ICD-10 code (E83.11), ICD-9 code (275.01, 275.02, 275.03)
Autoimmune Hepatitis	ICD-10 code (K75.4), ICD-9 code (571.42)
Primary Biliary Cirrhosis	ICD-10 code (K74.3)
Secondary Biliary Cirrhosis	ICD-10 code (K74.4)
Biliary Cirrhosis	ICD-10 code (K74.5), ICD-9 code (571.6)
Alpha-1 antitrypsin deficiency	ICD-10 code (E88.01), ICD-9 code (273.4)
Nonalcoholic Steatohepatitis	ICD-10 code (K75.81)

Supplementary Table 2: Multivariable Associations with the Receipt of Psychotherapy

Variable	Odds Ratio	95% CI	P value
Age	0.99	0.987 to 0.993	<0.001
Male Sex	0.75	0.68 to 0.84	<0.001
Asian Race	1.21	0.71 to 2.03	0.48
Black Race	0.78	0.64 to 0.95	0.01
Other Race	1.14	0.88 to 1.49	0.32
Unknown Race	1.04	0.79 to 1.36	0.80
Hispanic Ethnicity	1.05	0.75 to 1.47	0.76
Overweight	1.02	0.89 to 1.18	0.75
Obese Class I	1.16	0.99 to 1.36	0.06
Obese Class II	0.95	0.77 to 1.17	0.62
Obese Class III	1.01	0.77 to 1.31	0.95
Missing Weight	1.14	0.98 to 1.34	0.10
Nicotine Dependence	0.90	0.81 to 1.01	0.06
Hep B Positive	1.13	0.76 to 1.68	0.55
Hep C Positive	0.67	0.56 to 0.80	<0.001
Homeless	0.53	0.44 to 0.63	<0.001
Cannabis Use Disorder	1.40	1.21 to 1.61	<0.001
Cocaine Use Disorder	0.96	0.82 to 1.13	0.65
Inhalant Use Disorder	1.45	1.23 to 1.72	<0.001
Opioid Use Disorder	1.21	1.04 to 1.40	0.01
Other Stimulant Use Disorder	1.01	0.80 to 1.27	0.95
Sedative Use Disorder	1.61	1.34 to 1.94	<0.001
Anxiety Disorder	2.56	2.20 to 2.99	<0.001
Specific Personality Disorder	2.95	2.51 to 3.46	<0.001
Mood Disorder	5.34	4.51 to 6.36	<0.001
Schizophrenia	1.74	1.52 to 2.01	<0.001
Chronic Passive Congestion of Liver	0.78	0.62 to 0.97	0.03
Hemochromatosis	0.78	0.51 to 1.18	0.26
Autoimmune Hepatitis	0.61	0.20 to 1.65	0.35
Primary Biliary Cholangitis	1.42	0.20 to 10.75	0.73
Secondary Biliary Cholangitis	0.83	0.11 to 4.61	0.85
Biliary Cirrhosis	0.41	0.08 to 1.58	0.23
Alpha-1-antitrypsin Deficiency	1.36	0.37 to 4.64	0.63
Nonalcoholic Steatohepatitis	0.91	0.60 to 1.36	0.66
Alcohol Dependence	1.61	1.40 to 1.84	<0.001
Both Alcohol Abuse and Dependence	1.74	1.55 to 1.95	<0.001
Medication-assisted Therapy	1.61	1.45 to 1.79	<0.001

Odds ratios for racial categories use white race as reference level, while BMI categories use the reference level of the non-overweight BMI class. AUD class (dependence, abuse or both) use alcohol abuse as a reference level.

Supplementary Table 3: Univariate associations with the development of ALD

Variable	Odds Ratio	95% CI	P value
Age	1.02	1.016 to 1.023	<0.001
Male Sex	1.77	1.55 to 2.03	<0.001
Asian Race	0.87	0.41 to 1.65	0.39
Black Race	0.79	0.61 to 1.02	0.07
Other Race	0.91	0.63 to 1.27	0.60
Unknown Race	0.78	0.56 to 1.06	0.12
Hispanic Ethnicity	1.20	0.86 to 1.64	0.27
Overweight	1.23	1.04 to 1.46	0.02
Obese Class I	1.21	1.00 to 1.46	0.05
Obese Class II	1.08	0.83 to 1.40	0.54
Obese Class III	1.19	0.85 to 1.62	0.29
Missing Weight	0.53	0.42 to 0.66	<0.001
Nicotine Dependence	1.70	1.50 to 1.93	< 0.001
Hep B Positive	3.51	2.54 to 4.83	< 0.001
Hep C Positive	3.40	2.93 to 3.94	<0.001
Homeless	2.22	1.87 to 2.62	<0.001
Cannabis Use Disorder	1.00	0.85 to 1.18	0.98
Cocaine Use Disorder	1.464	1.25 to 1.71	<0.001
Inhalant Use Disorder	2.00	1.71 to 2.34	<0.001
Opioid Use Disorder	1.88	1.63 to 2.16	<0.001
Other Stimulant Use Disorder	1.14	0.86 to 1.47	0.35
Sedative Use Disorder	1.46	1.20 to 1.76	<0.001
Anxiety Disorder	1.22	1.05 to 1.42	0.009
Specific Personality Disorder	0.90	0.74 to 1.10	0.31
Mood Disorder	1.04	0.91 to 1.20	0.57
Schizophrenia	1.45	1.23 to 1.69	<0.001
Chronic Passive Congestion of Liver	5.33	4.43 to 6.40	<0.001
Hemochromatosis	5.37	3.81 to 7.50	<0.001
Autoimmune Hepatitis	7.56	3.47 to 16.5	<0.001
Primary Biliary Cholangitis	53.06	24.26 to 139.50	<0.001
Secondary Biliary Cholangitis	119.60	43.72 to 493.30	<0.001
Biliary Cirrhosis	106.10	43.40 to 350.90	<0.001
Alpha-1-antitrypsin Deficiency	2.25	0.50 to 7.37	0.22
Nonalcoholic Steatohepatitis	13.06	9.31 to 18.49	<0.001
Alcohol Dependence	1.33	1.06 to 1.66	0.01
Both Alcohol Abuse and Dependence	4.64	3.96 to 5.46	<0.001
Medication-assisted Therapy	0.62	0.54 to 0.70	<0.001
Psychotherapy	0.41	0.35 to 0.48	<0.001

Odds ratios for racial categories use white race as reference level, while BMI categories use the reference level of the non-overweight BMI class. AUD class (dependence, abuse or both) use alcohol abuse as a reference level.

Supplementary Table 4: Landmark analysis for the development of ALD among patients with AUD

Landmark (days)	Patients Excluded (event before landmark), N	Patients Included, N	Patients treated, N	Patients Untreated, N	Events
30	484	9151	2278	6873	651
90	506	9129	2418	6711	629
360	573	9062	2612	6450	562

N = number

Events = ALD development

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Supplementary Table 5: Univariate associations with hepatic decompensation

Variable	Odds Ratio	95% CI	P value
Age	0.99	0.98 to 1.00	0.51
Male Sex	1.03	0.72 to 1.48	0.88
Asian Race	0.43	0.02 to 3.35	0.46
Black Race	0.43	0.17 to 0.93	0.04
Other Race	1.14	0.42 to 3.01	0.80
Unknown Race	0.69	0.25 to 1.71	0.43
Hispanic Ethnicity	0.93	0.38 to 2.19	0.87
Overweight	1.14	0.72 to 1.80	0.56
Obese Class I	1.12	0.68 to 1.85	0.66
Obese Class II	1.14	0.59 to 2.20	0.69
Obese Class III	0.70	0.28 to 1.64	0.42
Missing Weight	0.68	0.35 to 1.30	0.25
Nicotine Dependence	0.57	0.41 to 0.79	<0.001
Hep B Positive	1.29	0.70 to 2.37	0.41
Hep C Positive	1.01	0.72 to 1.41	0.96
Homeless	0.60	0.38 to 0.95	0.03
Cannabis Use Disorder	0.73	0.46 to 1.16	0.19
Cocaine Use Disorder	0.61	0.40 to 0.93	0.02
Inhalant Use Disorder	0.67	0.45 to 0.98	0.04
Opioid Use Disorder	0.56	0.39 to 0.80	0.002
Other Stimulant Use Disorder	0.60	0.28 to 1.22	0.17
Sedative Use Disorder	0.70	0.41 to 1.17	0.18
Anxiety Disorder	0.74	0.50 to 1.10	0.14
Specific Personality Disorder	0.68	0.39 to 1.14	0.15
Mood Disorder	0.82	0.57 to 1.18	0.28
Schizophrenia	0.77	0.51 to 1.15	0.21
Chronic Passive Congestion of Liver	3.01	2.02 to 4.56	<0.001
Hemochromatosis	1.23	0.63 to 2.38	0.54
Autoimmune Hepatitis	6.86	1.10 to 131.8	0.08
Primary Biliary Cholangitis	3.44	1.46 to 9.01	0.007
Secondary Biliary Cholangitis	3.44	1.46 to 9.01	0.007
Biliary Cirrhosis	4.7	2.21 to 11.4	<0.001
Alpha-1-antitrypsin Deficiency	0.67	0.03 to 7.06	0.75
Nonalcoholic Steatohepatitis	2.32	1.31 to 4.23	0.005
Alcohol Dependence	1.33	0.77 to 2.31	0.30
Both Alcohol Abuse and Dependence	1.26	0.84 to 1.91	0.27
Medication-assisted Therapy	0.44	0.30 to 0.64	<0.001
Psychotherapy	0.41	0.35 to 0.48	<0.001

Odds ratios for racial categories use white race as reference level, while BMI categories use the reference level of the non-overweight BMI class. AUD class (dependence, abuse or both) use alcohol abuse as a reference level.

Supplementary Table 6: Landmark analysis for the development of hepatic decompensation among patients with cirrhosis

Landmark (days)	Patients Excluded (event before landmark), N	Patients Included, N	Patients treated, N	Patients Untreated, N	Events
30	339	545	78	467	201
90	359	525	90	435	181
360	425	459	96	363	115

N = number

Events = hepatic decompensation

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Supplemental Figure 1: Responses to alcohol consumption questionnaire according to timing of questionnaire. Bar graph displaying mean and 95% CI of responses to Mass General Brigham Biobank alcohol questionnaire. Patients in the “Before Therapy” group answered the questionnaire before they received psychotherapy. Patients in the “After Therapy” group answered the questionnaire after receiving psychotherapy. Patients in the “No Therapy” group did not receive psychotherapy. Each patient answered the questionnaire only once. Statistical analysis is ANOVA with Tukey tests for multiple comparisons. Patients that answered the questionnaire after therapy reported significantly lower drinking than either patients that did not receive therapy, or patients that answered the questionnaire before they initiated therapy. All patients in this analysis were diagnosed with AUD before they completed the questionnaire and had no diagnosis of ALD at the time that they completed the questionnaire. ns: not statistically significant, *****: $p < 0.0001$

