

Cirrhosis and Liver Cancer Mortality in the United States 1999-2016: An Observational Study

Supplementary Material

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Database

CDC WONDER provides mortality data derived from US death certificates, compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative. These include 50 states, 5 territories (Puerto Rico, U.S. Virgin Islands, Guam, American Samoa, and the Northern Mariana Islands), the District of Columbia, and New York City. Each jurisdiction reports data to National Center for Health Statistics through state centralized vital record offices and the over 6,000 local vital registrars nationwide.

The CDC WONDER platform uses the number of cases as the numerator and the corresponding population size based on US Census Bureau data as the denominator with death rates calculated per 100,000 persons. Each estimate is associated with a standard error and 95% confidence interval (CI), both based on the death count and the underlying population and provided by the CDC WONDER platform. Within the platform, we used two specific data sets. First, we used the Detailed Mortality File (DMF), a county-level national mortality and population data collection derived from the U.S. records of deaths (death certificates) since 1968. Counts and rates of death can be obtained by place of residence, age, race, gender, year, and underlying cause-of-death. Second, we used the Multiple Cause of Death (MCD) data set which contains the same mortality and population counts as does DMF. It is only available for 1999-2015. MCD data contains a single underlying cause of death, and up to twenty additional coded causes of death coupled with demographic data. This allowed us to assess trends in specific causes of death linked to cirrhosis. Beginning in 1999 through 2015, all data available was coded according to the International Classification of Diseases (ICD)-10 system. We therefore restricted all analyses to this timeframe.

Supplementary Table 1a: Deaths due to Any Liver Disease Diagnosis (1999-2016)

Liver Disease Deaths							
	Deaths	Crude rate (per 100,000)			Age-adjusted (per 100,000)		
	N	Rate	Lower 95%	Upper 95%	Rate	Lower 95%	Upper 95%
Overall	742,800	17.11	17.07	17.15	16.23	16.19	16.26
Female	278,168	12.48	12.43	12.52	11.38	11.33	11.42
Male	464,632	21.99	21.93	22.06	21.65	21.58	21.71
American Indian	16,257	32.02	31.53	32.51	37.84	37.23	38.45
Asian/PI	11,435	5.03	4.93	5.12	6.23	6.11	6.35
African American	70,542	12.77	12.68	12.87	13.99	13.89	14.1
White	644,562	18.36	18.31	18.4	16.79	16.75	16.84
Hispanic	95,141	15.91	15.81	16.01	23.36	23.2	23.51
Non-Hispanic	645,165	17.23	17.19	17.27	15.56	15.52	15.59
Northeast	119,283	14.85	14.76	14.93	13.57	13.5	13.65
Midwest	149,601	15.71	15.63	15.79	14.69	14.61	14.76
South	292,894	18.4	18.33	18.46	17.42	17.35	17.48
West	181,022	18.22	18.13	18.3	18.03	17.95	18.12

Supplementary Table 1b: Deaths Involving Cirrhosis at Any Position on the Death Certificate (1999-2016)

Liver Disease Deaths							
	Deaths	Crude rate (per 100,000)			Age-adjusted (per 100,000)		
	N	Rate	Lower 95%	Upper 95%	Rate	Lower 95%	Upper 95%
Overall	800,344	18.4	18.4	18.5	17.4	17.3	17.4
Female	276,676	12.4	12.4	12.5	11.2	11.2	11.3
Male	523,668	24.8	24.7	24.9	24.3	24.3	24.4
American Indian	14,383	28.3	27.9	28.8	34.1	33.5	34.6
Asian/PI	15,892	7	6.9	7.1	8.8	8.6	8.9
African American	80,485	14.6	14.5	14.7	15.9	15.8	16
White	689,584	19.6	19.6	19.7	17.8	17.8	17.9
Hispanic	111,480	18.6	18.5	18.8	27.9	27.7	28.1
Non-Hispanic	685,901	18.3	18.3	18.4	16.4	16.4	16.4
Northeast	127,885	15.9	15.8	16	14.5	14.4	14.6
Midwest	153,093	16.1	16	16.2	14.9	14.9	15
South	318,664	20	19.9	20.1	18.9	18.8	18.9
West	200,702	20.2	20.1	20.3	19.9	19.8	20

Supplementary Table 1c: Deaths Involving Both Cirrhosis and HCC (1999-2016)

Cirrhosis and Hepatocellular Carcinoma							
	Deaths	Crude rate (per 100,000)			Age-adjusted (per 100,000)		
	N	Rate	Lower 95%	Upper 95%	Rate	Lower 95%	Upper 95%
Overall	37,737	0.56	0.53	0.59	0.56	0.53	0.59
Female	7,136	0.32	0.31	0.33	0.28	0.28	0.29
Male	30,601	1.45	1.43	1.46	1.37	1.35	1.38
American Indian	511	1.01	0.92	1.09	1.28	1.16	1.4
Asian/PI	2,085	0.92	0.88	0.96	1.12	1.07	1.17
African American	5,169	0.94	0.91	0.96	1.00	0.97	1.03
White	29,972	0.85	0.84	0.86	0.76	0.75	0.77
Hispanic	6,522	1.09	1.06	1.12	1.66	1.61	1.7
Non-Hispanic	31,091	0.83	0.82	0.84	0.71	0.7	0.72
Northeast	6,131	0.76	0.74	0.78	0.68	0.67	0.7
Midwest	6,773	0.71	0.69	0.73	0.63	0.62	0.65
South	13,985	0.88	0.86	0.89	0.79	0.78	0.81
West	10,848	1.09	1.07	1.11	1.04	1.02	1.06

Supplementary Table 2a: The proportion of all deaths for each racial subgroup attributed to cirrhosis Age 25-34

Age 25-34	American Indian		Asian / Pacific Islander		African American		White	
Year	Cirrhosis Deaths	Proportion of all deaths	Cirrhosis Deaths	Proportion of all deaths	Cirrhosis Deaths	Proportion of all deaths	Cirrhosis Deaths	Proportion of all deaths
2009	32	4.26%	8	0.75%	50	0.54%	294	0.93%
2010	33	4.15%	7	0.63%	54	0.61%	305	0.97%
2011	50	5.95%	8	0.71%	51	0.56%	337	1.03%
2012	39	4.18%	8	0.68%	44	0.48%	435	1.30%
2013	44	4.77%	17	1.38%	56	0.59%	426	1.26%
2014	51	5.41%	17	1.33%	48	0.50%	503	1.42%
2015	59	5.57%	18	1.30%	67	0.64%	568	1.47%
2016	76	6.26%	23	1.56%	64	0.54%	602	1.40%

Supplementary Table 2b: The proportion of all deaths for each racial subgroup attributed to cirrhosis Age ≥35

Age ≥35	American Indian		Asian / Pacific Islander		African American		White	
Year	Cirrhosis Deaths	Proportion of all deaths	Cirrhosis Deaths	Proportion of all deaths	Cirrhosis Deaths	Proportion of all deaths	Cirrhosis Deaths	Proportion of all deaths
2009	753	5.81%	883	1.91%	4,278	1.65%	36,763	1.83%
2010	789	5.80%	909	1.89%	4,396	1.68%	38,672	1.90%
2011	860	6.16%	949	1.89%	4,570	1.73%	41,161	1.98%
2012	917	6.36%	1,064	2.00%	4,754	1.76%	43,188	2.06%
2013	989	6.56%	1,097	1.94%	5,235	1.89%	45,665	2.13%
2014	1,052	6.60%	1,164	2.00%	5,503	1.94%	48,305	2.24%
2015	1,194	7.10%	1,181	1.87%	5,695	1.95%	50,948	2.29%
2016	1,215	7.02%	1,266	1.93%	5,532	1.83%	51,426	2.30%

The denominator for 'all deaths' is national all cause mortality for the specified age group

Supplementary Table 3: Age-Adjusted Death Rates per 100,000 Americans

Year	Deaths attributable to cirrhosis																					Deaths due to HCC (overall)					
	Causes listed in addition to cirrhosis																										
	Overall			Upper Gastrointestinal Bleeding			Peritonitis			Sepsis			Hepatorenal syndrome			Cerebro-vascular and ischemic heart disease			Trauma								
Rate	L95	U95	Rate	L95	U95	Rate	L95	U95	Rate	L95	U95	Rate	L95	U95	Rate	L95	U95	Rate	L95	U95	Rate	L95	U95				
1999	9.58	9.45	9.71	1.63	1.58	1.68	0.29	0.26	0.31	0.72	0.68	0.76	0.91	0.87	0.96	0.49	0.46	0.52	0.21	0.19	0.23	2.85	2.77	2.93			
2000	9.62	9.49	9.75	1.61	1.56	1.67	0.31	0.28	0.34	0.72	0.68	0.76	0.83	0.79	0.87	0.52	0.49	0.55	0.23	0.2	0.25	3	2.92	3.08			
2001	9.58	9.45	9.71	1.59	1.53	1.64	0.28	0.26	0.3	0.73	0.7	0.77	0.84	0.8	0.88	0.49	0.47	0.52	0.2	0.18	0.22	2.95	2.87	3.03			
2002	9.61	9.48	9.74	1.46	1.41	1.51	0.31	0.29	0.34	0.7	0.67	0.74	0.82	0.78	0.86	0.54	0.51	0.57	0.2	0.18	0.22	3.06	2.98	3.14			
2003	9.7	9.58	9.83	1.47	1.42	1.52	0.28	0.26	0.31	0.72	0.69	0.76	0.8	0.76	0.84	0.5	0.47	0.53	0.21	0.19	0.23	3.21	3.13	3.29			
2004	9.39	9.26	9.51	1.39	1.34	1.44	0.27	0.25	0.29	0.76	0.72	0.79	0.77	0.73	0.81	0.44	0.41	0.47	0.18	0.16	0.2	3.21	3.13	3.29			
2005	9.42	9.3	9.54	1.25	1.21	1.3	0.27	0.24	0.29	0.79	0.76	0.83	0.71	0.67	0.75	0.47	0.44	0.5	0.21	0.19	0.23	3.27	3.19	3.35			
2006	9.19	9.07	9.31	1.16	1.12	1.21	0.25	0.23	0.28	0.75	0.71	0.78	0.66	0.62	0.69	0.47	0.44	0.5	0.18	0.16	0.2	3.34	3.26	3.42			
2007	9.28	9.16	9.4	1.23	1.19	1.27	0.23	0.21	0.25	0.77	0.73	0.8	0.7	0.66	0.74	0.46	0.43	0.48	0.2	0.18	0.22	3.32	3.24	3.4			
2008	9.36	9.24	9.48	1.25	1.21	1.29	0.25	0.23	0.27	0.79	0.75	0.82	0.68	0.64	0.72	0.47	0.44	0.5	0.19	0.17	0.21	3.54	3.46	3.62			
2009	9.36	9.25	9.48	1.25	1.21	1.3	0.28	0.25	0.3	0.82	0.78	0.85	0.64	0.61	0.68	0.44	0.42	0.47	0.18	0.16	0.2	3.66	3.58	3.75			
2010	9.72	9.6	9.84	1.29	1.25	1.34	0.28	0.26	0.3	0.9	0.87	0.94	0.69	0.65	0.72	0.49	0.47	0.52	0.17	0.15	0.19	3.76	3.68	3.84			
2011	10.1	9.98	10.23	1.31	1.27	1.36	0.27	0.25	0.29	0.91	0.88	0.95	0.71	0.67	0.74	0.48	0.46	0.51	0.21	0.19	0.23	3.87	3.79	3.96			
2012	10.38	10.26	10.5	1.36	1.32	1.41	0.3	0.28	0.32	0.99	0.96	1.03	0.72	0.69	0.76	0.51	0.49	0.54	0.19	0.18	0.21	3.83	3.75	3.91			
2013	10.65	10.53	10.77	1.43	1.39	1.48	0.31	0.28	0.33	1.03	0.99	1.06	0.72	0.68	0.75	0.52	0.49	0.55	0.18	0.17	0.2	3.9	3.82	3.98			
2014	11.09	10.97	11.21	1.38	1.34	1.43	0.36	0.34	0.39	1.13	1.1	1.17	0.76	0.72	0.79	0.5	0.47	0.53	0.19	0.17	0.2	3.84	3.76	3.92			
2015	11.57	11.45	11.7	1.46	1.42	1.51	0.4	0.37	0.43	1.25	1.2	1.29	0.83	0.79	0.86	0.56	0.54	0.59	0.19	0.17	0.21	3.93	3.85	4.01			
2016	11.42	11.29	11.54	1.56	1.51	1.6	0.37	0.35	0.4	1.29	1.24	1.33	0.85	0.81	0.88	0.55	0.52	0.58	0.23	0.21	0.25	4.2	4.12	4.28			
AAPC	1.1 (0.8-1.4)			-0.5 (-1.8- -0.9)			1.5 (0.2-2.8)			3.7 (3.2-4.2)			-0.6 (-1.2 -0.1)			0.6 (-0.3 -1.5)			-0.2 (-1.1-0.6)			2.1 (1.3-3.0)					
AAPC Since 2009	3.0 (2.5-3.4)			2.6 (2.0-3.2)			6.1 (3.9-8.2)			7.1 (6.1-8.4)			3.2 (2.2 -4.2)			2.9 (1.5-4.4)			-0.2 (-1.1-0.6)			2.0 (0.2-3.7)					

AAPC = Average annual percentage change. All percentage changes are presented with 95% Confidence Intervals. AAPC Intervals that do not cross zero have p values < 0.05. Gastrointestinal bleeding is defined by the presence on the death certificate of causes inclusive of peptic ulcers, melena, hematemesis and bleeding varices. Peritonitis and hepatorenal syndrome are both defined by the corresponding ICD-10 codes. Trauma is defined by V01-Y89.

Supplementary Table 4: Average Annual Percentage Change in the rate of Cirrhosis-related death (2009-2016)

State	AAPC	95% CI		Age-Adjusted Death-Rate in 2009		
				Rate	Lower 95%	Upper 95%
Alabama	5	3.2	6.8	11.11	10.06	12.15
Alaska	2.3	0.7	3.9	11.18	8.19	14.91
Arizona	3.6	2.4	4.9	12.7	11.7	13.7
Arkansas	5.7	3.9	7.6	9.6	8.35	10.84
California	2.7	2.1	3.2	11.77	11.36	12.18
Colorado	2.4	2	2.9	10.52	9.48	11.56
Connecticut	3.3	1.5	5.2	8.17	7.15	9.18
Delaware	0	-1.4	1.4	10.47	8.27	13.06
District of Columbia	-1.7	-3.5	0.1	9.07	6.42	12.45
Florida	2.2	1	3.3	12.19	11.65	12.72
Georgia	3.9	1.4	6.5	8.47	7.78	9.16
Hawaii	2.3	1.3	3.4	7.39	5.9	9.16
Idaho	2.4	1.6	3.3	8.6	6.91	10.29
Illinois	2.1	1.1	3.2	9.05	8.46	9.64
Indiana	5	3.8	6.1	9.08	8.26	9.91
Iowa	3.1	2.1	4.2	7.22	6.18	8.27
Kansas	1.7	1	2.3	7.77	6.61	8.93
Kentucky	6.8	5.1	8.5	9.9	8.86	10.94
Louisiana	4.5	2.2	6.9	9.19	8.19	10.2
Maine	1.4	0.5	2.2	9.2	7.51	10.9
Maryland	-1.2	-1.7	-0.7	8.09	7.26	8.92
Massachusetts	-0.3	-0.9	0.2	8.78	7.99	9.56
Michigan	1.6	1	2.1	10.47	9.77	11.17
Minnesota	3.3	2.2	4.4	6.93	6.14	7.73
Mississippi	3.9	2.4	5.5	11.07	9.71	12.43

Missouri	3.6	2.6	4.6	8.3	7.5	9.11
Montana	2.2	1.3	3.1	11.25	9.09	13.77
Nebraska	1.6	0.5	2.7	6.71	5.44	8.19
Nevada	0.7	-0.3	1.7	11.82	10.33	13.32
New Hampshire	1.6	0.3	2.9	9.57	7.78	11.37
New Jersey	1	0.2	1.9	8.3	7.63	8.96
New Mexico	6	4.1	7.9	16.99	14.97	19
New York	1.6	0.9	2.3	6.92	6.51	7.33
North Carolina	2.8	1.9	3.7	10.44	9.7	11.17
North Dakota	5.9	-0.7	12.8	5.7	3.84	8.13
Ohio	3.3	2.8	3.8	10.2	9.57	10.84
Oklahoma	2.6	1.8	3.5	11.4	10.18	12.63
Oregon	2.6	2.1	3	10.68	9.54	11.82
Pennsylvania	2.1	1.5	2.7	8.91	8.35	9.46
Rhode Island	0.5	-0.6	1.7	10.43	8.41	12.8
South Carolina	1.9	1.3	2.6	12.27	11.15	13.4
South Dakota	2.7	1.1	4.3	6.74	4.9	9.04
Tennessee	3.8	3	4.7	11.68	10.74	12.61
Texas	3.2	2.3	4.1	14.09	13.53	14.65
Utah	4	1.9	6.2	6.97	5.66	8.28
Vermont	1.1	-0.4	2.7	8.8	6.53	11.61
Virginia	3.2	2	4.4	9.1	8.35	9.84
Washington	2.2	1.5	3	9.83	8.99	10.68
West Virginia	2.1	1.1	3.1	12.54	10.85	14.24
Wisconsin	1.5	0.9	2.1	8.19	7.37	9.01
Wyoming	3.1	1.2	5	7.55	5.23	10.56

Supplementary Table 5: Average Annual Percentage Change in the rate of HCC-related death (2009-2016)

State	AAPC	95% CI		Age Adjusted Death-Rate in 2009		
				Rate	Lower 95%	Upper 95%
Alabama	-1.1	-4.4	2.3	2.93	2.39	3.47
Arizona	5.3	-4.7	16.3	2.7	2.24	3.16
Arkansas	10.9	3.5	18.9	1.84	1.34	2.47
California	0.8	0.4	1.2	4.28	4.03	4.53
Colorado	3.8	2.5	5	3.32	2.72	3.92
Connecticut	1.7	0.3	3	3.11	2.52	3.8
Delaware	2.3	0.6	4	3.47	2.26	5.08
District of Columbia	2.3	-0.6	5.3	7.0	4.72	9.99
Florida	1.1	-3.1	5.5	3.29	3.02	3.57
Georgia	2.5	1.8	3.2	2.38	2.01	2.75
Hawaii	0	-1.1	1.2	6.27	4.91	7.88
Idaho	5.5	2	9.2	1.81	1.12	2.76
Illinois	1.1	0.4	1.7	2.72	2.4	3.05
Indiana	3.1	-0.4	6.6	2.7	2.25	3.15
Iowa	4.5	3	6	2.48	1.91	3.17
Kansas	5.2	3.8	6.7	2.73	2.09	3.5
Kentucky	4.2	3.2	5.1	3.04	2.46	3.62
Louisiana	2.5	1.4	3.6	3.19	2.6	3.79
Maine	2.4	0.6	4.3	3.12	2.22	4.27
Maryland	2.6	1.9	3.4	3.18	2.66	3.71
Massachusetts	-0.7	-2.8	1.5	3.87	3.34	4.39
Michigan	2.4	1.4	3.4	2.58	2.24	2.93
Minnesota	3.1	2	4.2	2.63	2.14	3.12
Mississippi	2.5	0.6	4.4	1.69	1.2	2.31
Missouri	0.2	-2	2.4	3.32	2.81	3.83

Nebraska	3.9	1.5	6.3	3.07	2.24	4.1
Nevada	3.2	2	4.4	2.77	2.08	3.62
New Hampshire	2.4	0.8	3.9	2.35	1.53	3.44
New Jersey	0.3	-0.5	1	2.83	2.44	3.22
New Mexico	2.5	0.7	4.3	3.44	2.61	4.46
New York	1.3	0.8	1.9	3.01	2.74	3.28
North Carolina	4.2	3.4	5.1	3.7	3.26	4.14
Ohio	1.5	-0.2	3.2	3.2	2.85	3.56
Oklahoma	7.4	-1.1	16.6	2.83	2.25	3.5
Oregon	5.2	3.9	6.5	4.75	4	5.51
Pennsylvania	2.9	2.3	3.6	3.37	3.03	3.71
Rhode Island	1.2	-0.6	3.1	3.84	2.66	5.37
South Carolina	3.4	2.4	4.5	3.78	3.16	4.4
Tennessee	4.1	3.1	5.1	3.98	3.43	4.52
Texas	2.3	1.6	2.9	4.24	3.92	4.55
Utah	2.5	0.8	4.2	2.23	1.55	3.1
Vermont	-5.6	-12.2	1.5	5.19	3.48	7.46
Virginia	0.5	-4.2	5.5	3.77	3.29	4.26
Washington	1.6	-1.1	4.5	4.51	3.93	5.09
West Virginia	3.1	1.1	5.1	2.05	1.44	2.84
Wisconsin	2.8	2.1	3.4	2.4	1.96	2.84

Supplementary Table 6: Average Annual Percentage Change in the rate of Alcohol Use Disorder-related Death (2009-2016)

State	AAPC	95% CI		Age Adjusted Rate in 2006		
				Rate	Lower 95%	Upper 95%
Alabama	-2.3	-3.6	-1.1	1.59	1.23	2.03
Alaska	-0.8	-9.5	8.7	8.89	6.26	12.25
Arizona	0.9	0	1.8	3.71	3.18	4.24
Arkansas	-0.5	-2.4	1.3	1.54	1.09	2.11
California	0.7	-1	2.5	2.25	2.08	2.42
Colorado	0.4	-0.8	1.5	4.85	4.17	5.53
Connecticut	7.8	-0.5	16.9	1.79	1.35	2.33
Delaware	11.1	-7.2	33	2.75	1.7	4.2
District of Columbia	-6.4	-8.5	-4.3	4.17	2.55	6.44
Florida	5.9	3.8	8	2.45	2.21	2.69
Georgia	2.3	0.8	3.9	2.68	2.31	3.04
Idaho	0.9	-1.1	2.9	2.88	2.01	4.01
Illinois	8	4.6	11.6	1.72	1.47	1.98
Indiana	8.3	4.8	11.8	2.04	1.66	2.42
Iowa	13.1	8.9	17.4	1.8	1.31	2.4
Kansas	2.9	-2.8	8.9	2.87	2.23	3.63
Kentucky	7.6	2.4	13	2.83	2.29	3.37
Louisiana	-1.6	-3.5	0.4	1.37	1.01	1.81
Maine	10.8	5.8	16	2.04	1.34	3
Maryland	-2.5	-3.8	-1.2	1.8	1.45	2.22
Massachusetts	7.3	4.5	10.1	2.22	1.83	2.61
Michigan	-0.2	-1.3	0.9	2.6	2.26	2.95
Minnesota	4.8	-1.6	11.6	2.42	1.97	2.87
Mississippi	-2.8	-4.3	-1.3	2.4	1.83	3.09
Missouri	5.7	-1.1	12.9	2.19	1.78	2.59
Montana	3.4	1.8	5.1	5.46	3.97	7.34

Nebraska	15.4	9.2	22	-	0.66	1.82
Nevada	0.5	-0.8	1.8	4.79	3.88	5.71
New Hampshire	2.1	0.6	3.6	3.1	2.19	4.28
New Jersey	-1.8	-3.4	-0.2	1.22	0.99	1.49
New Mexico	7.3	3	11.8	8.25	6.84	9.65
New York	3.3	0.4	6.3	2.06	1.85	2.28
North Carolina	5.1	2.1	8.2	2.29	1.95	2.62
North Dakota	-3.7	-12.3	5.8	-	1.94	5.33
Ohio	10.2	6.1	14.5	1.37	1.14	1.6
Oklahoma	4.3	2.3	6.2	2.4	1.88	3.01
Oregon	6.8	2.2	11.5	4.4	3.68	5.12
Pennsylvania	3.9	2.5	5.2	1.63	1.39	1.88
Rhode Island	7.8	0.7	15.4	1.99	1.2	3.1
South Carolina	4.1	-4.2	13.1	2.39	1.92	2.87
South Dakota	3.2	-9.3	17.4	3.91	2.53	5.77
Tennessee	7.3	3.7	11	2.16	1.77	2.55
Texas	-0.8	-1.8	0.3	1.66	1.47	1.84
Utah	0.8	-0.5	2.2	3.1	2.32	4.05
Vermont	8.5	-1.3	19.3	-	1.45	4.27
Virginia	5.8	2.6	9.1	2.01	1.67	2.35
Washington	0.9	-0.4	2.2	2.12	1.73	2.51
West Virginia	12.3	4.7	20.5	1.85	1.27	2.6
Wisconsin	5.1	0.7	9.7	2.87	2.4	3.34
Wyoming	10.6	-0.8	23.4	-	2.03	5.78

Supplementary Table 7: Overall Age-Adjusted Death Rates in States with High Rates of Liver-Related Mortality

	Alabama	Arizona	California	Kansas	Louisiana	Maryland	New Mexico	Oregon	Texas
1999	1575.13	1284.53	1056.49	1336.62	1337.65	1420.2	1310.48	1322.71	1397.74
2000	1572.77	1268.36	1036.79	1338.39	1320.42	1426.56	1255.16	1311.03	1404.93
2001	1570.87	1243.73	1031.74	1326.52	1326.40	1390.96	1297.52	1314.37	1403.18
2002	1587.94	1269.77	1013.31	1336.7	1317.31	1365.93	1282.98	1325.37	1399.6
2003	1602.18	1248.12	1011.31	1306.71	1328.39	1350.22	1296.66	1289.92	1361.31
2004	1563.01	1205.73	966.22	1252.34	1290.91	1285.56	1223.48	1237.8	1316.14
2005	1570.39	1230.14	961.39	1283.9	1339.91	1282.8	1245.50	1242.79	1309.44
2006	1529.44	1196.42	945.22	1260.32	1251.52	1243.26	1236.37	1218.78	1271.30
2007	1494.87	1140.84	910.00	1235.33	1224.84	1223.52	1211.42	1193.24	1264.45
2008	1505.97	1121.34	893.43	1247.24	1239.18	1203.17	1228.56	1189.28	1267.14
2009	1478.56	1089.00	863.54	1191.93	1187.98	1178.37	1168.50	1155.11	1217.51
2010	1476.99	1092.21	854.09	1201.38	1186.41	1146.33	1170.96	1147.54	1220.59
2011	1469.05	1085.20	846.92	1210.45	1163.76	1125.39	1172.05	1146.91	1189.67
2012	1458.72	1076.35	833.93	1198.99	1179.60	1116.41	1162.72	1120.65	1192.09
2013	1456.80	1064.19	833.05	1195.96	1178.60	1119.41	1150.01	1139.97	1189.38
2014	1430.24	1043.43	801.77	1200.42	1175.71	1101.90	1172.83	1122.19	1179.28
2015	1455.28	1061.53	823.11	1225.52	1148.29	1108.99	1156.97	1148.22	1178.86
2016	1442.28	1067.18	817.04	1195.24	1144.04	1125.17	1177.12	1122.11	1155.76
AAPC 2009-2016	-0.4 (-0.7 - 0.01)	-0.5 (-1.0 - 0.0)	-1.0 (-1.2 - -0.9)	-0.1 (-0.6-0.4)	-1.0 (-1.5 - -0.6)	-0.7 (-1.2 - -0.3)	-0.7 (-0.9 - -0.6)	-0.5 (-1.1 - 0.2)	-0.8 (-1.3 - -0.3)

AAPC = average annual percentage change

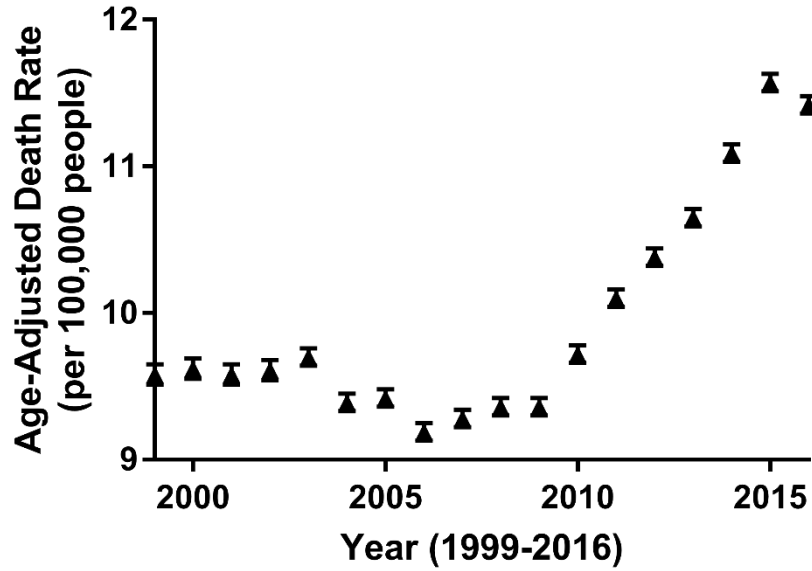
Supplementary Table 8: Death-Rates Due to Other Conditions

	Cirrhosis		Infections		Neoplasia		Cardiovascular Disease		Respiratory Disease	
	Age-adjusted Rate	Total Deaths	Age-adjusted Rate	Total Deaths	Age-adjusted Rate	Total Deaths	Age-adjusted Rate	Total Deaths	Age-adjusted Rate	Total Deaths
1999	9.58	20,661	32.94	58,447	301.72	534,316	540.97	951,686	129.37	227,985
2000	9.62	21,003	32.1	57,611	299.75	537,000	526.41	938,843	128.52	229,285
2001	9.58	21,390	32.22	58,805	294.82	537,278	509.62	924,331	125.9	228,203
2002	9.61	21,835	33.8	62,526	291.3	540,015	500.17	920,716	126.67	232,826
2003	9.7	22,496	33.68	63,291	285.75	539,069	482.85	904,465	125.19	233,938
2004	9.39	22,166	33.18	63,312	279.24	535,440	453.9	863,280	118.89	225,342
2005	9.42	22,808	33.53	65,151	276.45	540,134	441.79	858,251	123.15	237,950
2006	9.19	22,717	33.1	65,664	271.39	540,415	415.53	825,146	114.19	224,931
2007	9.28	23,473	32.42	65,578	267.38	542,761	397.93	807,609	112.23	225,547
2008	9.36	24,140	32.55	67,222	262.61	544,306	388.65	805,912	118.66	243,365
2009	9.36	24,736	32.32	68,090	257.88	545,370	369.49	782,260	113.08	236,444
2010	9.72	26,045	30.87	66,178	256.54	551,580	363.02	782,081	110.96	235,777
2011	10.1	27,614	30.67	67,575	250.33	552,251	352.3	781,117	112.94	246,951
2012	10.38	28,971	29.84	67,193	246.12	556,760	345.67	785,154	109.18	244,817
2013	10.65	30,293	30.16	69,444	240.96	558,122	343.61	798,743	112.75	259,381
2014	11.09	32,142	29.33	69,208	237.85	564,249	338.93	805,554	108.96	256,642
2015	11.57	33,968	29.43	70,856	233.52	567,484	343.32	834,308	111.64	269,543
2016	11.42	34,174	28.07	68,791	229.16	568,787	338.26	838,482	107.23	264,353
Average Annual Percentage Change 1999-2016	1.1 (0.8 – 1.4)		-0.8 (-1.1 - -0.4)		-1.6 (-1.7 - -1.6)		-2.7 (-3.2 - -2.3)		-1.1 (-1.3 – -0.8)	

The absolute number of deaths and age-adjusted death-rate (per 100,000 people) is shown for each year 1999-2016 for cirrhosis, infections (ICD-10 A00-B99), neoplasia (C00-C48, not including HCC, C22), cardiovascular disease (I00-I99), and Respiratory Disease (J00-J98). The average annual percentage change is calculated for the whole study period and shown as percentage (95% confidence interval).

Supplementary Figure 1: Graphical Depiction of Cirrhosis Mortality

Cirrhosis as Primary Cause of Death



Cirrhosis as Any Cause of Death (Primary or comorbid)

