

Chronic Liver Disease Mortality New Mexico, 1981-2004 (Part 1)

Background

Chronic liver disease (CLD) is a chronic condition that has a variety of causes, including alcohol consumption, exposure to various drugs and toxic chemicals, and viral hepatitis. Excessive alcohol consumption has historically been the leading cause of CLD. Among excessive drinkers, the level and duration of alcohol consumption are key determinants in the development and progression of CLD, influencing the rate at which pathology progresses from fatty liver to fibrosis to cirrhosis. In the past 15 years, viral hepatitis, particularly hepatitis C, has emerged as another important cause of CLD. Hepatitis C acts both independently and as a modifier of alcohol's effects on the liver, accelerating the progression of CLD in excessive drinkers with co-occurring hepatitis C. In the final stage of CLD, growth of connective tissue destroys liver cells and liver function, often resulting in death.

The National Center for Health Statistics (NCHS) and the National Institute on Alcohol Abuse and Alcoholism (NIAAA) report United States CLD mortality, using slightly different CLD definitions that exclude viral hepatitis [1,2]. Recent studies have proposed expanding the scope of CLD surveillance to include viral hepatitis [3]. This report will compare New Mexico's CLD death experience to the United States, for the 24-year period 1981-2004, using the broader CLD definition that includes viral hepatitis. Changes during this period in the causes of CLD will be presented. Part 2 of this report will compare New Mexico and United States CLD rates and trends by demographic category.

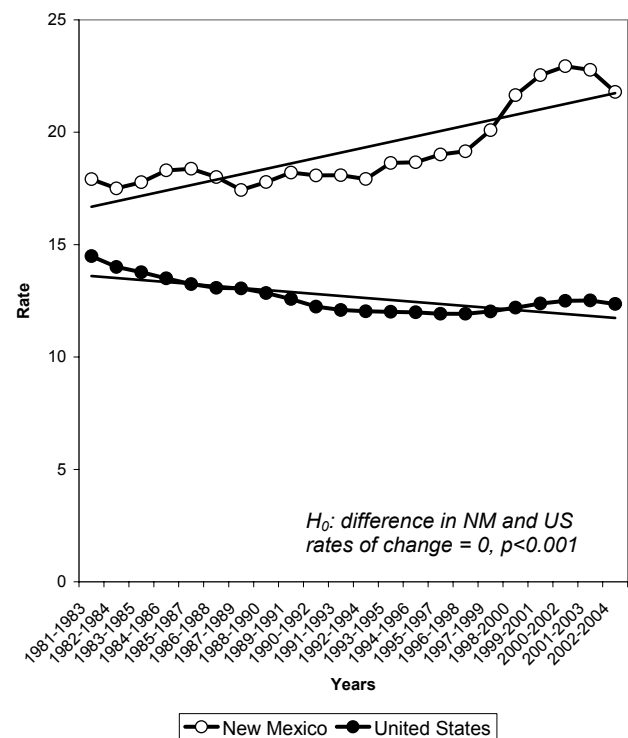
Methods

All chronic liver disease deaths among New Mexico and United States residents were identified from 1981-2004, using NCHS Multiple Cause-of-Death Mortality data available from the National Bureau of Economic Research (NBER). Deaths were classified into eight-

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een CLD categories based on underlying cause of death, as determined using International Classification of Diseases and Related Health Problems (ICD) codes shown in the Addendum. Alcohol-related CLD deaths were identified using Alcohol-Related Disease Impact (ARDI) alcohol-attributable fractions from the Centers for Disease Control and Prevention [4]. Three high-level CLD cause categories (Alcohol-related, Hepatitis C, Other) were reported. Population data from the US Census Bureau (1980-1989) and NCHS (1990-2004)

**Figure 1. Chronic Liver Disease Death Rates
New Mexico and United States, 1981-2004***



* All rates are age-adjusted to the 2000 US standard population; straight lines are based on linear models

were used as the denominators for this analysis.

The number of CLD deaths and 3-year rolling average rates (expressed per 100,000 person years) were calculated for 1981-2004. Death rates were age-adjusted to the 2000 US standard population. Linear models were fit to the 3-year age-adjusted mortality rates to assess the significance of changes in rates over time. The percentage change in rates was estimated using the linear model by dividing the estimated 24-year rate change by the estimated 1981-1983 rate. Because effective testing to diagnose hepatitis C infection only became available in the early 1990s, trends and rate changes for CLD related to hepatitis C were estimated beginning in 1993. The significance of differences in annual rates changes was assessed using two-tailed t-tests.

Results

As shown in Figure 1, New Mexico's CLD death rate increased by 30% between 1981-1983 and 2002-2004, from 17.9 deaths per 100,000 to 21.8 deaths per 100,000. In contrast, the United States CLD death rate decreased by 14% during this period. These rate changes were statistically significant (i.e., different from zero): based on results of linear modeling, New Mexico's rate increased by 0.24 deaths per 100,000 per year during this period ($p < 0.001$) while the United States' rate decreased by 0.09 deaths per 100,000 per year ($p < 0.001$). These opposing trends were significantly different from each other ($p < 0.001$). New Mexico has had the highest CLD death rate in the nation since 1989. In 2004, the most recent year for which leading cause of death information is available, the expanded CLD definition used here constituted the 10th leading cause of death in the United States and the 7th leading cause of death in New Mexico [5].

Figure 2 compares New Mexico and United States CLD death rates by cause of death. These graphs clearly show the emergence of hepatitis C as a cause of CLD death in the early-to-middle 1990s. They also clearly show that alcohol-related CLD remained the predominant cause of CLD death throughout the period 1981-2004.

In 1981-1983, alcohol-related CLD was responsible for 66% of CLD deaths in New Mexico and 59% in the United States (results not shown). By the end of the period, despite the emergence of hepatitis C as an im-

portant cause of CLD, alcohol-related CLD remained responsible for 60% of all CLD deaths in New Mexico and 53% in the United States. By comparison, in New Mexico the proportion of CLD deaths attributable to hepatitis C rose from 6% in 1993-1995 (the first 3-year period for which reliable rates are available) to almost 12% in 1997-1999, and has remained at roughly this level in the years 2000-2004. In the United States, hepatitis C accounted for 5% of all CLD deaths in 1993-1995 and rose to almost 13% of deaths in 2000-2002, but the increase appears to have leveled off. Meanwhile, the proportion of CLD deaths attributable to other non-alcohol-related CLD causes dropped during the period 1981-2004 from 34% to 29% in New Mexico, and 41% to 34% in the United States.

As shown in the Table, New Mexico's alcohol-related CLD rate increased significantly during the period 1981-2004 (from 11.9 deaths per 100,000 to 13.1 deaths per 100,000) whereas the United States alcohol-related CLD rate decreased significantly (from 8.6 to 6.6). This divergence in alcohol-related CLD rates was the principle driver of the divergence in New Mexico and United States total CLD rates during this period. By contrast, hepatitis C rates increased significantly in both New Mexico and the United States during this period. The New Mexico and United States hepatitis C rate trends were not significantly different.

Discussion

Despite the emergence of hepatitis C as an important cause of chronic liver disease death during the period 1981-2004, excessive alcohol consumption remained the leading cause of CLD death in both New Mexico and the United States throughout this period, with the majority of CLD deaths (roughly 60% in New Mexico, more than 50% in the United States) remaining alcohol-related. Moreover, while total and alcohol-related CLD death rates declined significantly in the United States, New Mexico's total and alcohol-related CLD death rates increased significantly during this period.

New Mexico's trend for alcohol-related CLD death is in marked contrast to its trend for alcohol-related motor vehicle crash (AR-MVC) death. At the beginning of the reporting period, AR-MVC death was the leading cause of alcohol-related death in New Mexico (26.9 deaths per 100,000 in 1982). However, AR-MVC death rates dropped by more than 50% from

1981-2004, to 11.1 deaths per 100,000 in 2004 [6]. In 1993, alcohol-related CLD surpassed AR-MVC as the leading cause of alcohol-related death in New Mexico. Since 1998, the death rate from alcohol-related CLD has consistently been 45-50% higher than the death rate from alcohol-related motor vehicle crashes.

Limitations of this study will be discussed in part 2 of this report.

Recommendations

1. Implement annual reporting of CLD death rates in New Mexico to focus awareness and prevention efforts on this serious public health problem.
2. Expand the focus of alcohol-related prevention efforts in New Mexico to include strategies that specifically target excessive alcohol consumption and alcohol-related chronic liver disease.
3. In particular, promote strategies such as alcohol tax increases, that have been found effective in reducing alcohol consumption among chronic/heavy drinkers; and strategies such as screening and brief intervention with at-risk drinkers, that have been found effective in reducing the progression of at-

risk drinkers toward chronic/heavy drinking, alcohol dependence, and alcohol-related chronic diseases.

References

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Table. Trends in CLD Death Rates by Cause of Death, New Mexico and United States, 1981-2004

Cause of Death	Location	Rates ^a			Linear Regression Model		
		1981-1983	1993-1995	2002-2004	Annual Rate Change	Total Rate Change	Percent Change
Alcohol-related	US	8.6	-	6.6	- 0.09	- 2.0	- 24.0 ^b
	NM	11.9	-	13.1	0.08	1.6	13.9 ^{b, c}
Hepatitis C	US	-	0.6	1.6	0.12	1.1	149.3 ^b
	NM	-	1.1	2.3	0.18	1.6	131.8 ^b
Other non-alcohol	US	5.9	-	4.2	- 0.09	- 1.8	- 32.3 ^b
	NM	6.0	-	6.3	0.01	0.2	2.7 ^c
Total	US	14.5	-	12.4	- 0.09	- 1.9	- 13.7 ^b
	NM	17.9	-	21.8	0.24	5.1	30.3 ^{b, c}

^a All rates are age-adjusted to the US 2000 standard population; rates are reported for the beginning and ending 3-year period for which they are available

^b Location's annual rate change is significantly different from 0 (p < 0.05)

^c New Mexico's annual rate change is significantly different from United States' (p < 0.05)

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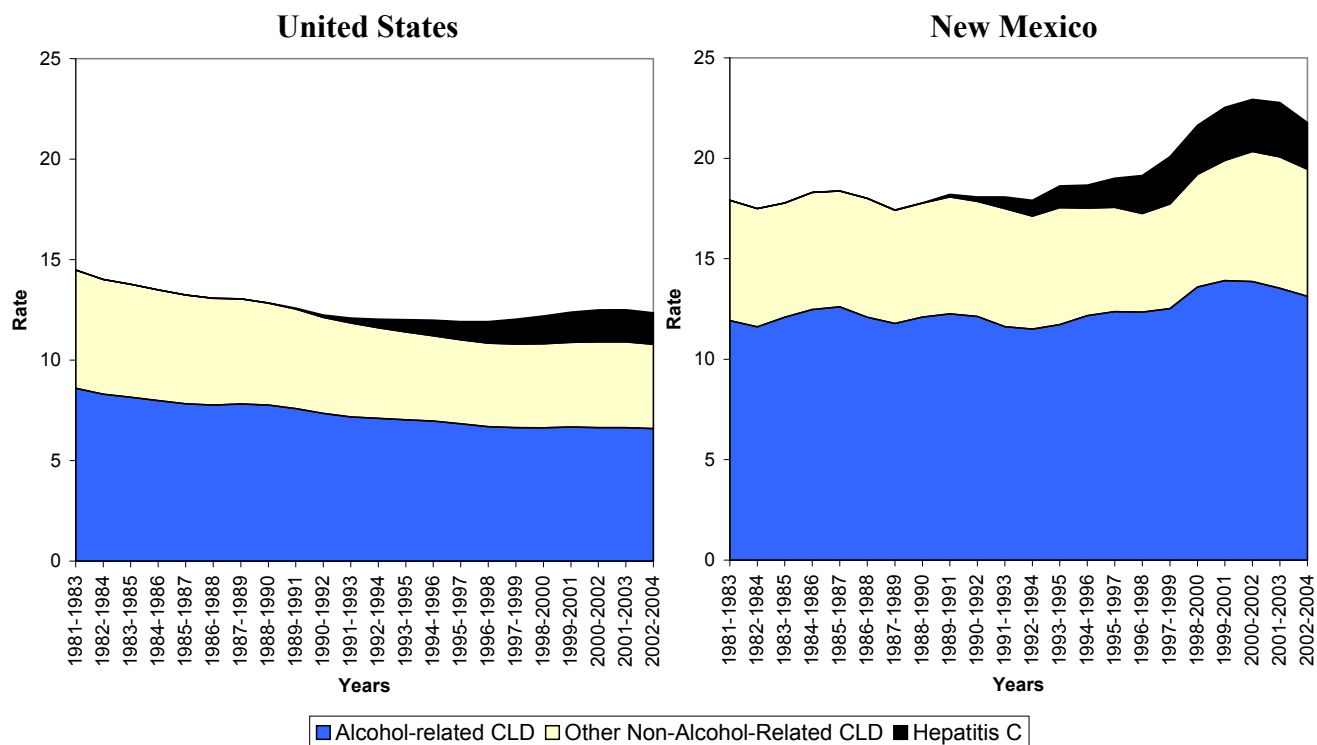
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Figure 2. Chronic Liver Disease Death Rates by Cause, United States and New Mexico, 1981-2004*



* All rates are three-year average rates age-adjusted to the 2000 US standard population

Addendum. Chronic Liver Disease Definitions

3-level category	18-level category	ICD-9 ^a	ICD-10 ^b	% Attributable to Alcohol ^c
Alcohol-related	Alcoholic fatty liver	571.0	K70.0	100%
	Alcoholic hepatitis	571.1	K70.1	100%
	Alcoholic fibrosis/schlerosis	571.2	K70.2	100%
	Alcoholic cirrhosis		K70.3	100%
	Alcoholic hepatic failure	N/A	K70.4	100%
	Alcoholic liver disease, unspecified	571.3	K70.9	100%
	Chronic hepatitis	571.4	K73.0,K73.1, K73.2, K73.8, K73.9	1-2%
	Cirrhosis without mention of alcohol	571.5	K74.6	40%
	Biliary cirrhosis	571.6	K74.3,K74.4, K74.5	40%
	Fatty liver, nec	571.8	K76.0	40%
	Portal hypertension	572.3	K76.6	40%
	Liver disease, unspecified	571.9, 573.9	K76.9	40%
Other non-alcohol-related	Hepatic schlerosis	571.9	K74.1	0%
	Cirrhosis without mention of alcohol	N/A	K74.0,K74.2	0%
	Hepatic coma	572.2	N/A	0%
	Hepatorenal syndrome	572.4	K76.7	0%
	Hepatitis B	70.21, 70.31, 70.20, 70.30, 70.52	B16.0-B17.0	0%
			70.33, 70.32	
	Other Hepatitis (non-A)	70.53, 70.59	B17.2-B17.8	0%
			70.59, 70.6	B18.8-B18.9
70.6, 70.9			B19.0-B19.9	0%
Hepatitis C	Hepatitis C	70.41 70.51	B17.1	0%
		70.44 70.54	B18.2	0%

^a International Classification of Diseases and Related Health Problems, revision 9

^b International Classification of Diseases and Related Health Problems, revision 10

^c Per CDC Alcohol-Related Disease Impact (ARDI) site