Consequences of Excessive Alcohol Use:

- alcohol abuse/binge drinking
  - drinking and driving (accidents, fatalities, property damage)
  - other motor vehicle accidents (boating, snowmobiling)
  - workplace accidents
  - violence
  - risky sexual behaviors
  - alcohol poisoning
  - alcoholism
  - health costs resulting from alcohol-related behaviors
  - other health, economic and social consequences

- Many consequences of excessive alcohol use are imposed on non-drinkers or moderate drinkers

TX594-001

DEFENDANT'S EXHIBIT
CASE NO. C04-0360P
EXHIBIT NO. 594

Patterns of Alcohol Use:

- Over half of 18 and older report drinking in past month
- about 4/9 of drinkers drink 12+ drinks past year
- about 1/3 of drinkers report binge drinking in past month (5+ drinks on single occasion)
- over half of regular drinkers report binge drinking
  - Higher among younger drinkers
  - Estimated 1.5 billion binge episodes in 2001
  - 14 times more likely to report DUI
- almost half of regular drinkers report intoxication
- about 1/8 of regular drinkers binge weekly or more
- about 1/5 of regular drinkers consume 2+ drinks daily
- about 10% of regular drinkers meet criteria for alcohol dependence; 7% for alcohol abuse
- Differences by age and gender

Sources: CDC:
Healthy People 2010: http://www.healthypeople.gov/document/HTML/Volume2/26Substance.htm

TX594-002

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Consequences of Excessive Alcohol Use:

- CDC estimated over 75,000 deaths caused by excessive alcohol consumption in 2001;
  - nearly 2.3 million years of life lost
  - About 30 years of life lost per death
    - 1,634 deaths in Washington
    - 45,563 years of life lost

TX594-005

Source: CDC Alcohol-Related Disease Impact system - http://apps.nccd.cdc.gov/ardi/Homepage.aspx

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Economic Cost of Alcohol Abuse

- Estimated $184.6 billion in 1998
  - Health care costs
  - Criminal justice system costs
  - Treatment costs
  - Costs of accidents
  - Lost productivity costs
- nearly $250 billion currently if rising with inflation

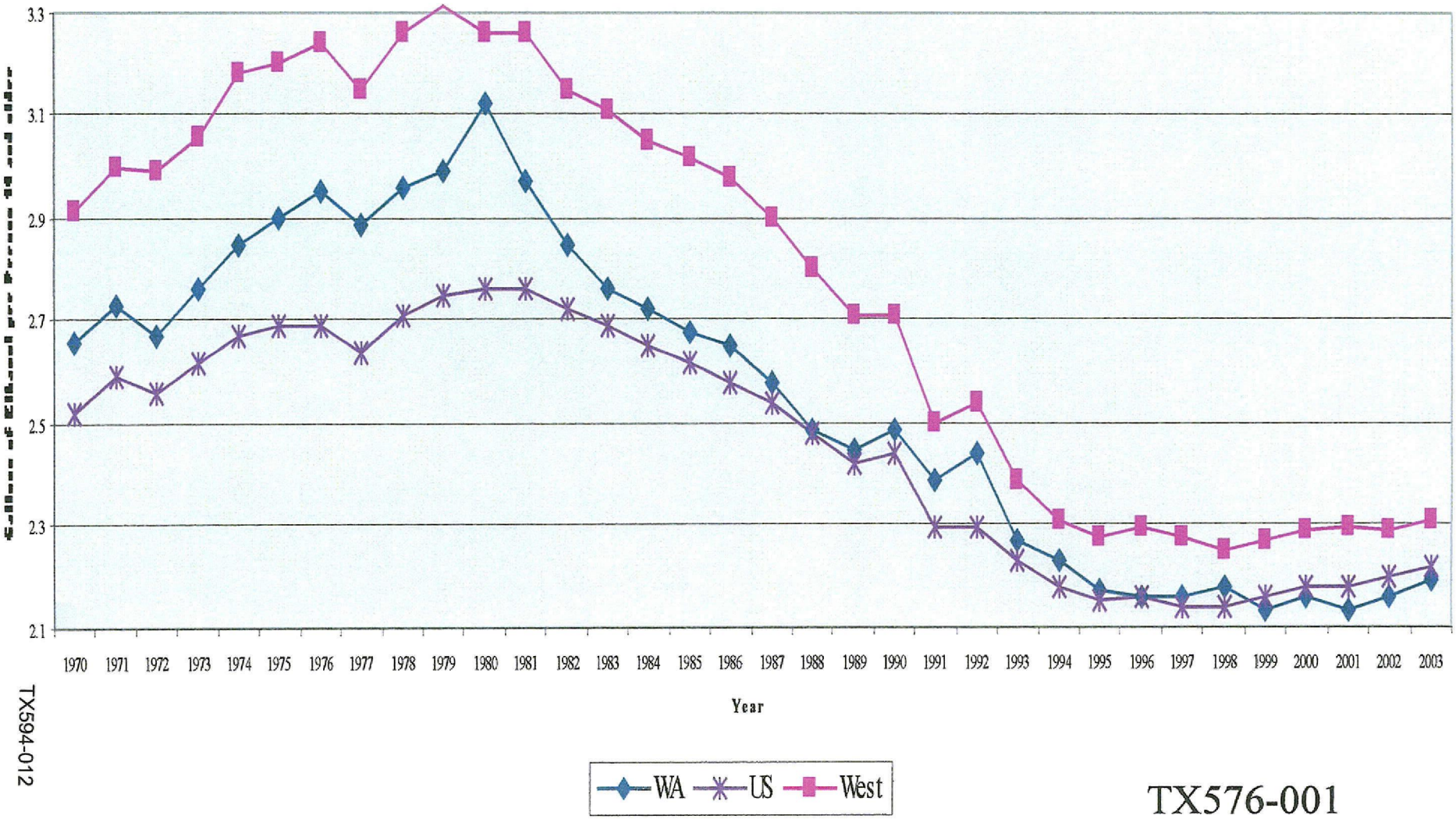
TX594-010

Alcohol Control Efforts in Washington

- Washington has taken a comprehensive approach to addressing the health, economic, and social consequences of excessive drinking
  - **Three tier system**
    - **Quantity discount ban**
    - **Post-and-hold requirement**
    - **Price markup requirements**
    - **Uniform delivered pricing**
    - **Ban on central warehousing**
    - **Ban on "tied house"**
      - **Ban on credit from distributor to retailer**
      - **Ban on retailer to retailer sales**
    - State monopoly
  - Relatively high excise taxes
  - Strong drunk driving policies
  - Comprehensive policies targeting underage drinking
  - Policies/programs targeting high risk populations and/or problem areas (Alcohol Impact Areas)

TX594-011

Per Capita Alcohol Consumption, WA, West and US - 1970-2003

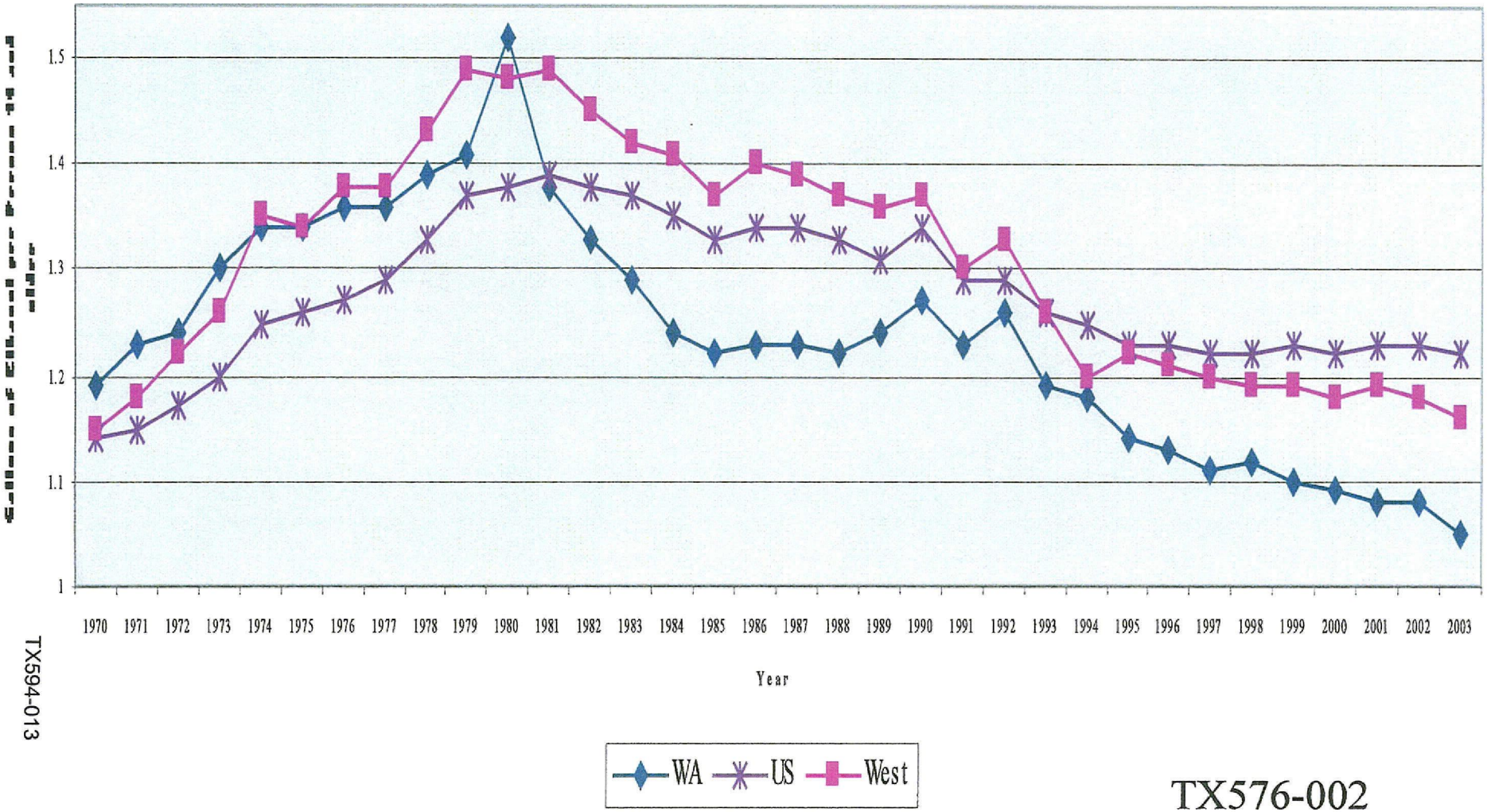


TX594-012

TX576-001

Source: http://www.niaaa.nih.gov/Resources/DatabaseResources/QuickFacts_AlcoholStatistics.htm;
In gallons of ethanol per capita, ages 14 and older

Per Capita Beer Consumption, WA, West and US - 1970-2003

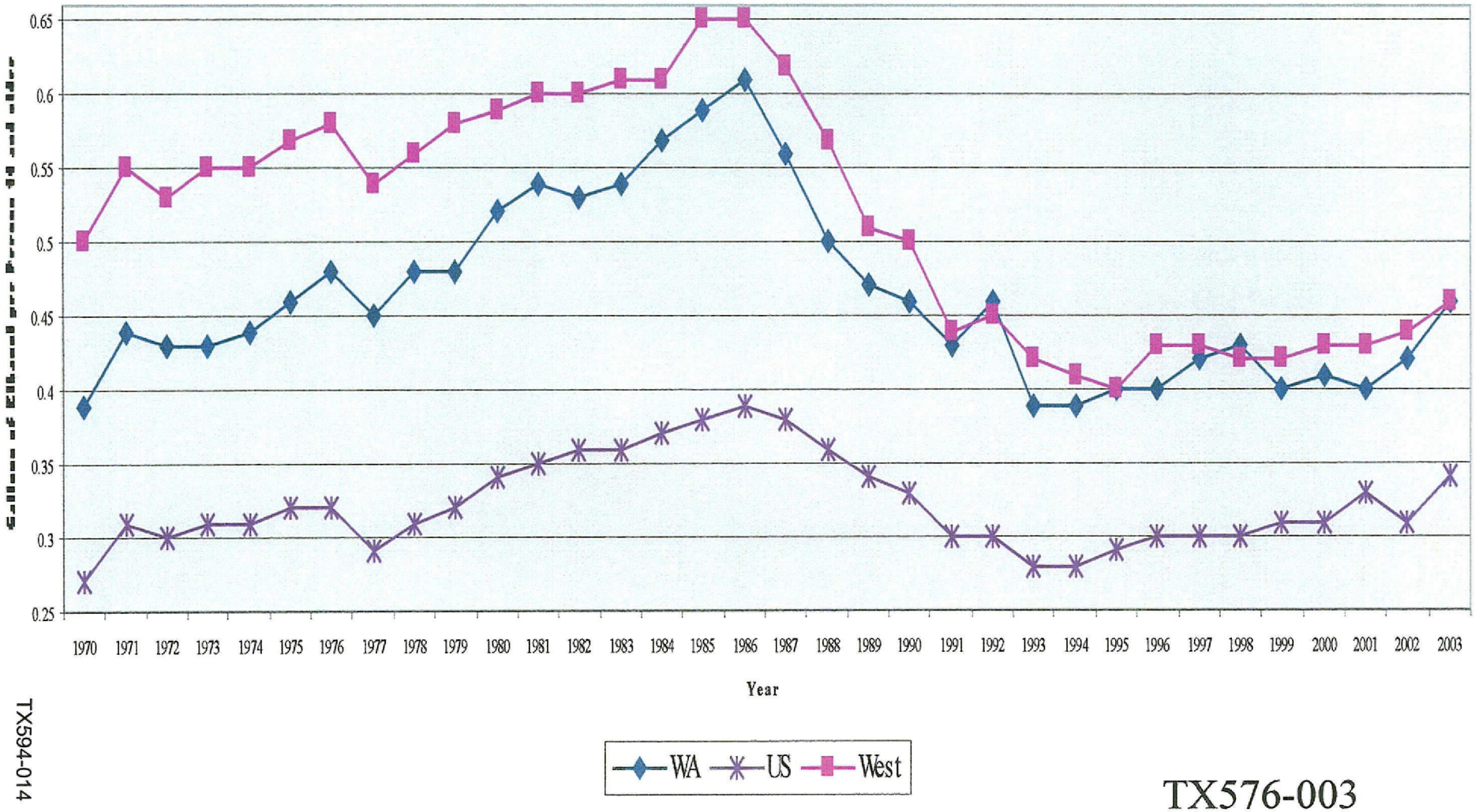


TX594-013

TX576-002

Source: ;
In gallons of ethanol per capita, ages 14 and older

Per Capita Wine Consumption, WA, West and US - 1970-2003

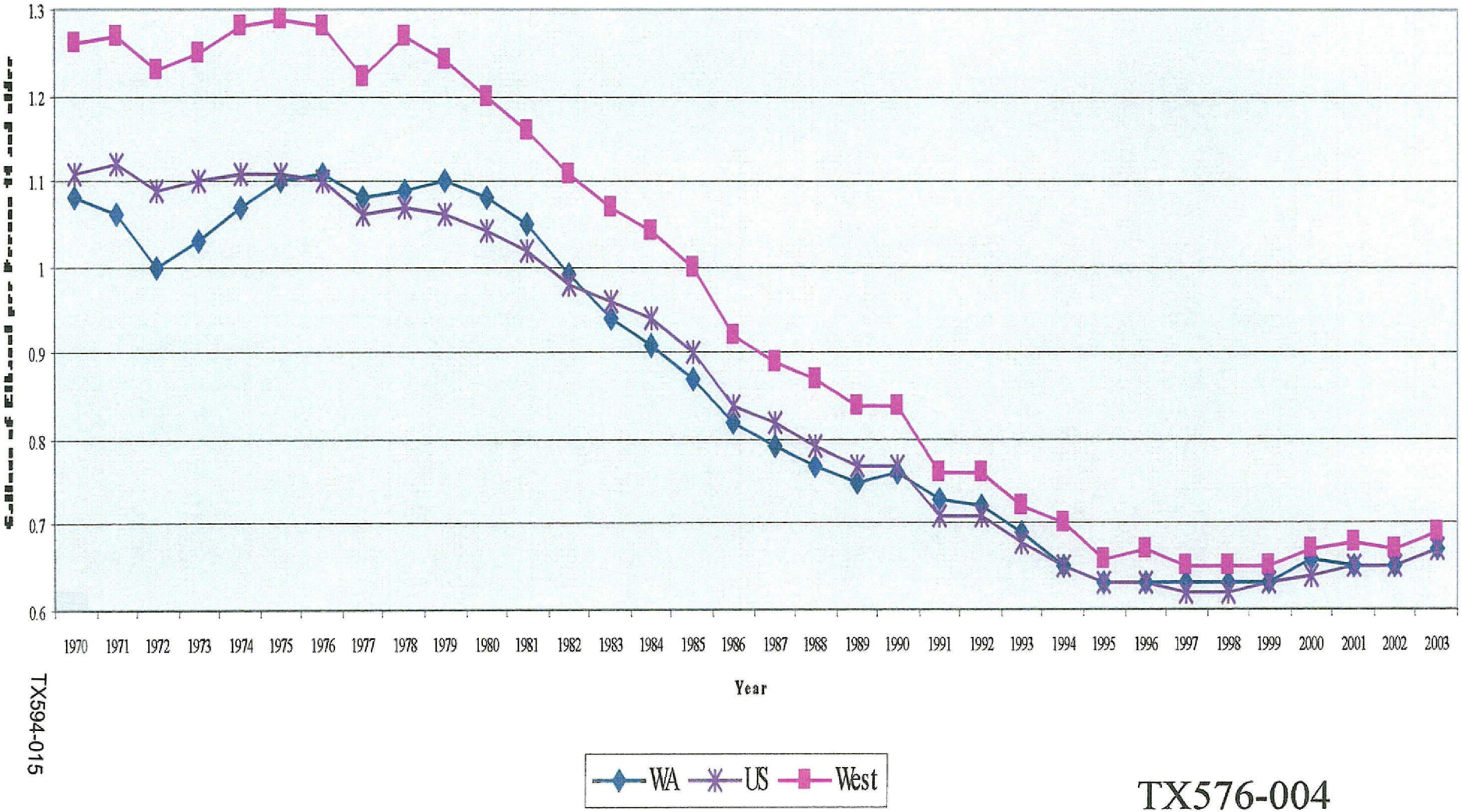


TX594-014

TX576-003

Source: ;
In gallons of ethanol per capita, ages 14 and older

Per Capita Spirits Consumption, WA, West and US - 1970-2003

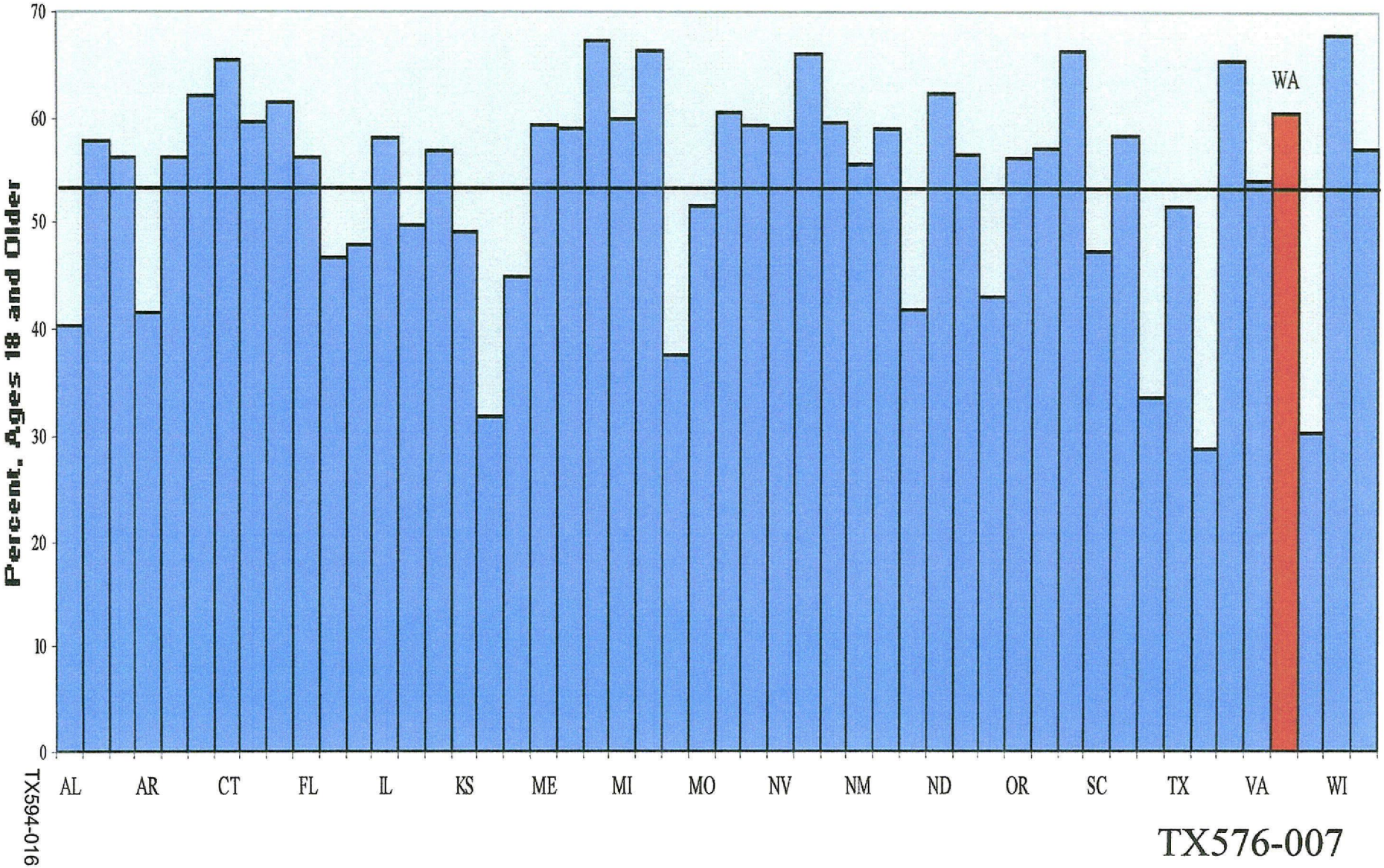


TX594-015

TX576-004

Source: [illegible];
In gallons of ethanol per capita, ages 14 and older

Past Month Drinking Prevalence, by State, 2004

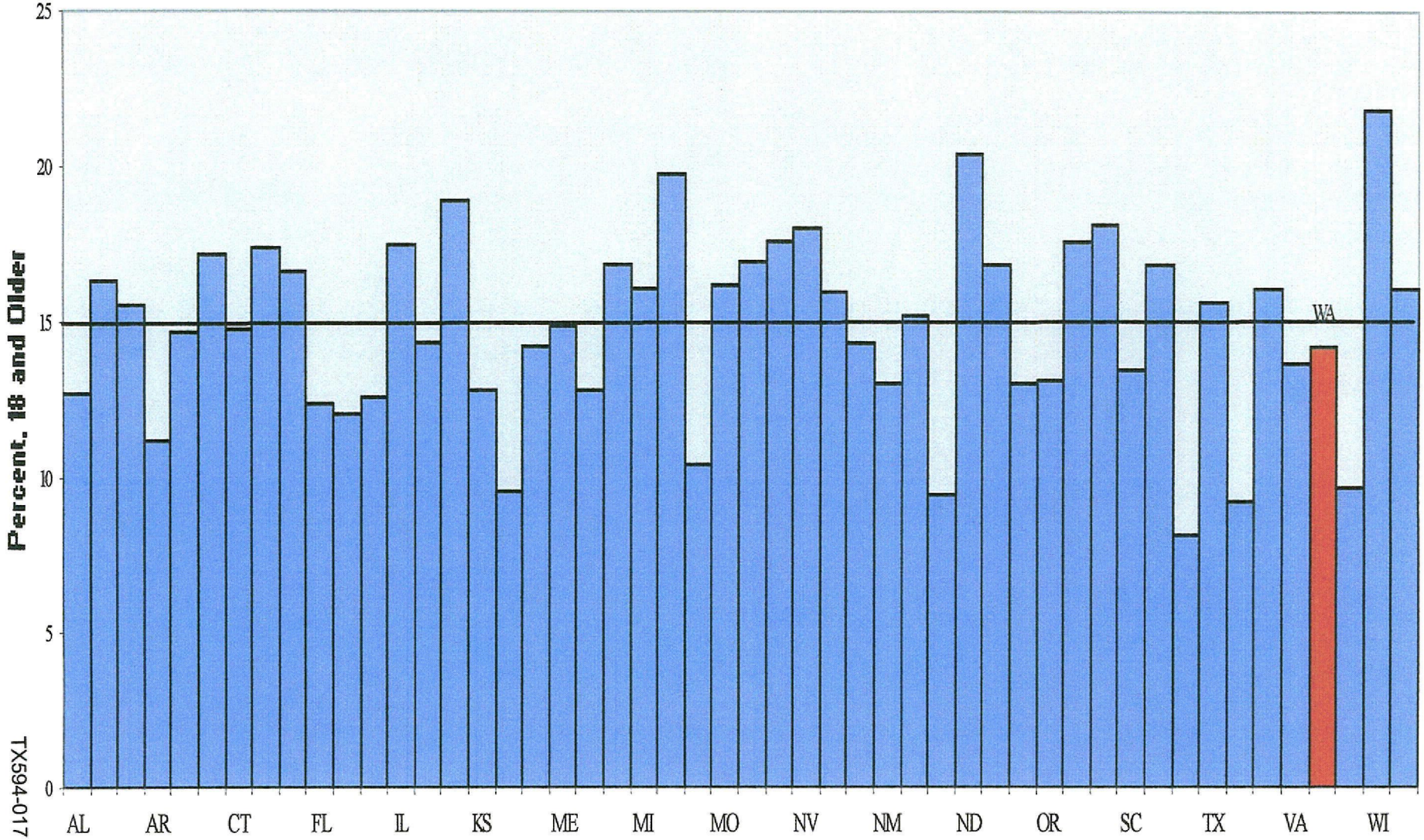


TX576-007

Source:

Note: 2004 drinking prevalence data not available for Hawaii

Binge Drinking Prevalence, by State, 2004



TX594-017

TX576-010

Source:

Note: 2004 binge drinking prevalence data not available for Hawaii

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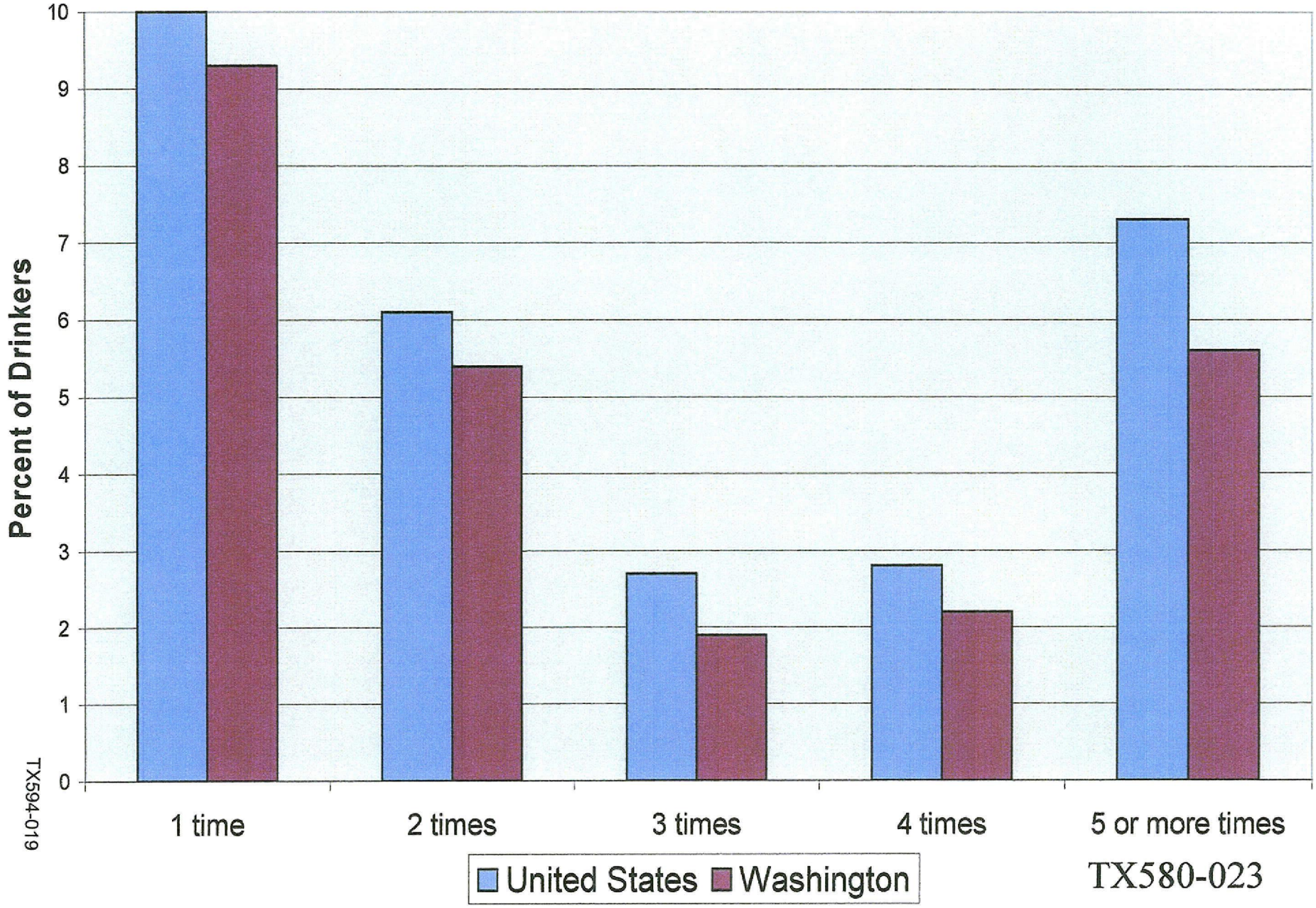
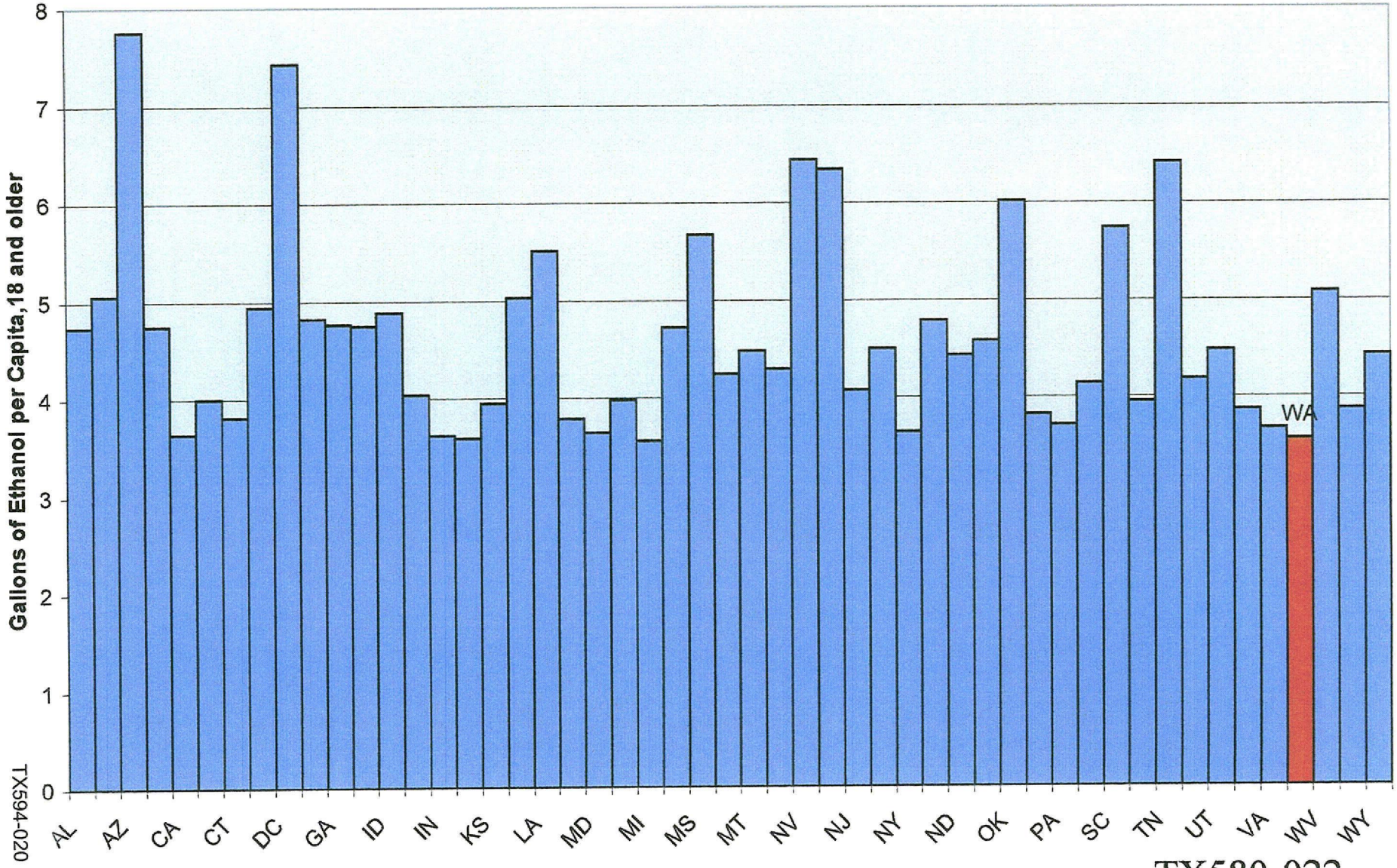
Number of Binge Drinking Occasions per Month, 2002



TX594-019

TX580-023

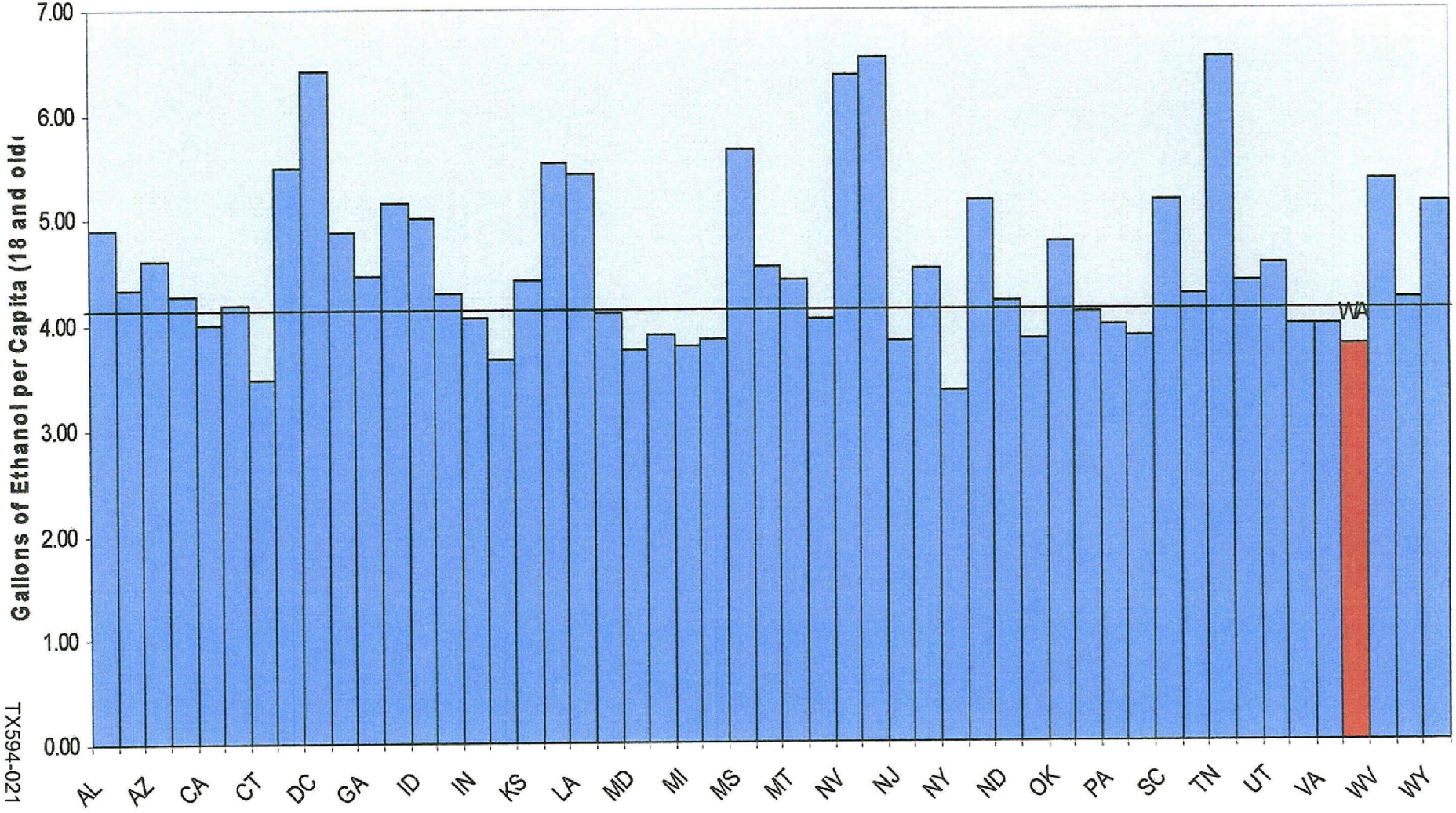
Per Capita Ethanol Consumption per Drinker, by State, 1999



TX594-020

TX580-022

Estimated Per Capita Ethanol Consumption per Past Month Drinker, by State, 2003

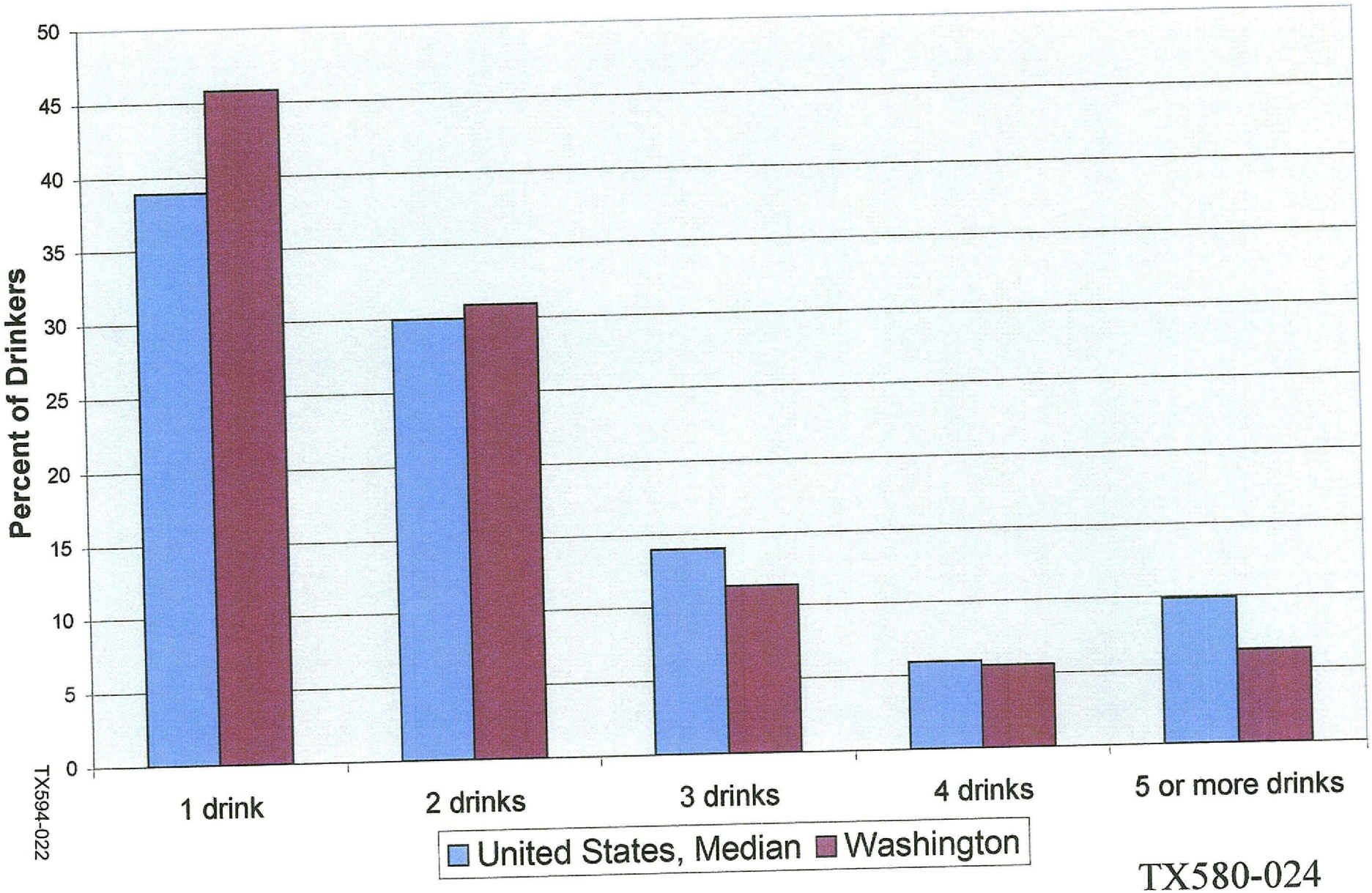


TX594-021

TX576-012

Sources: 2003 past month prevalence:
2003 ethanol consumption:
2003 population 18 and older: http://www.census.gov/popest/states/files/SC-EST2004-AGESEX_RES.csv

Number of Drinks per Drinking Occasion, 2002



TX594-022

TX580-024

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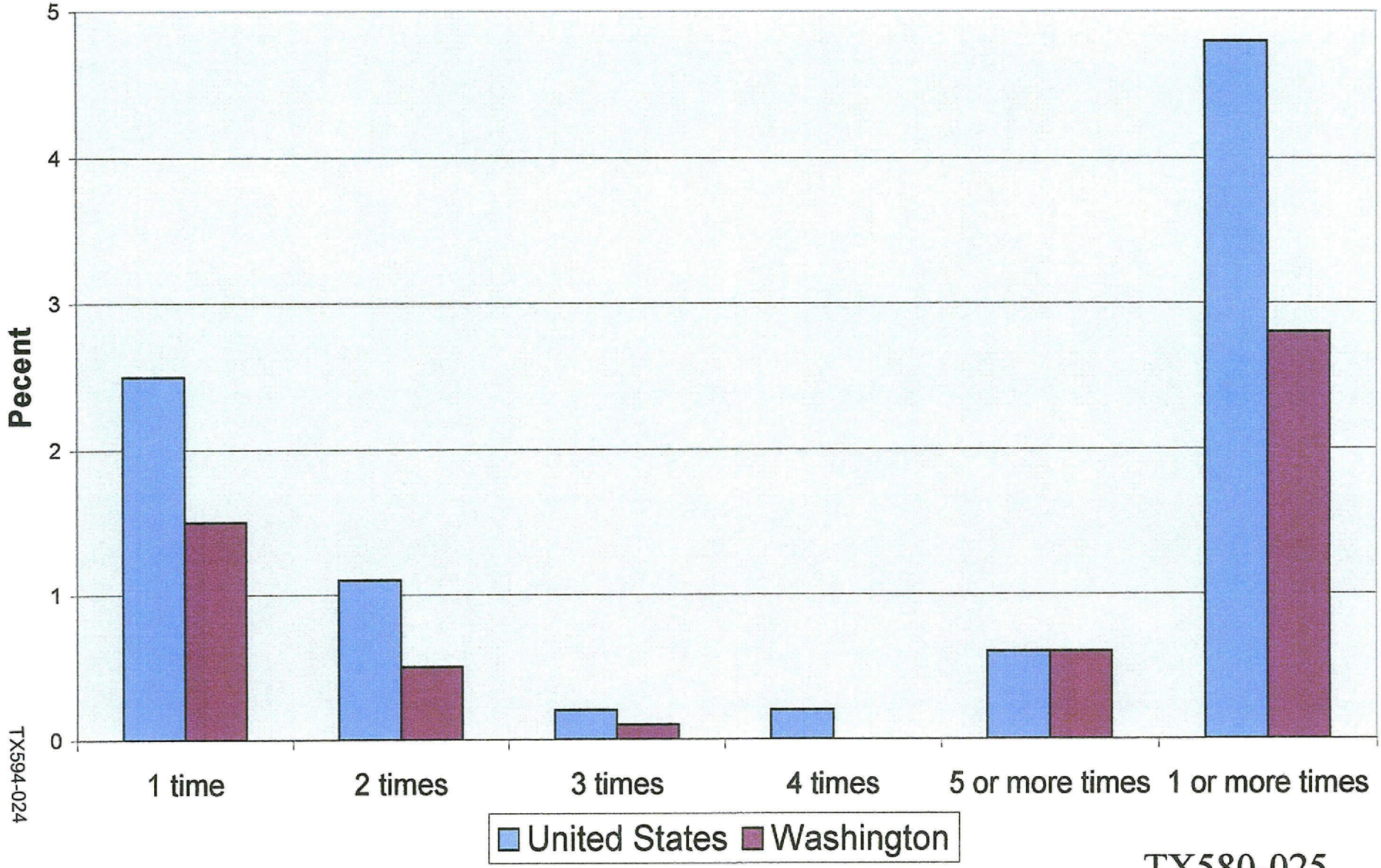
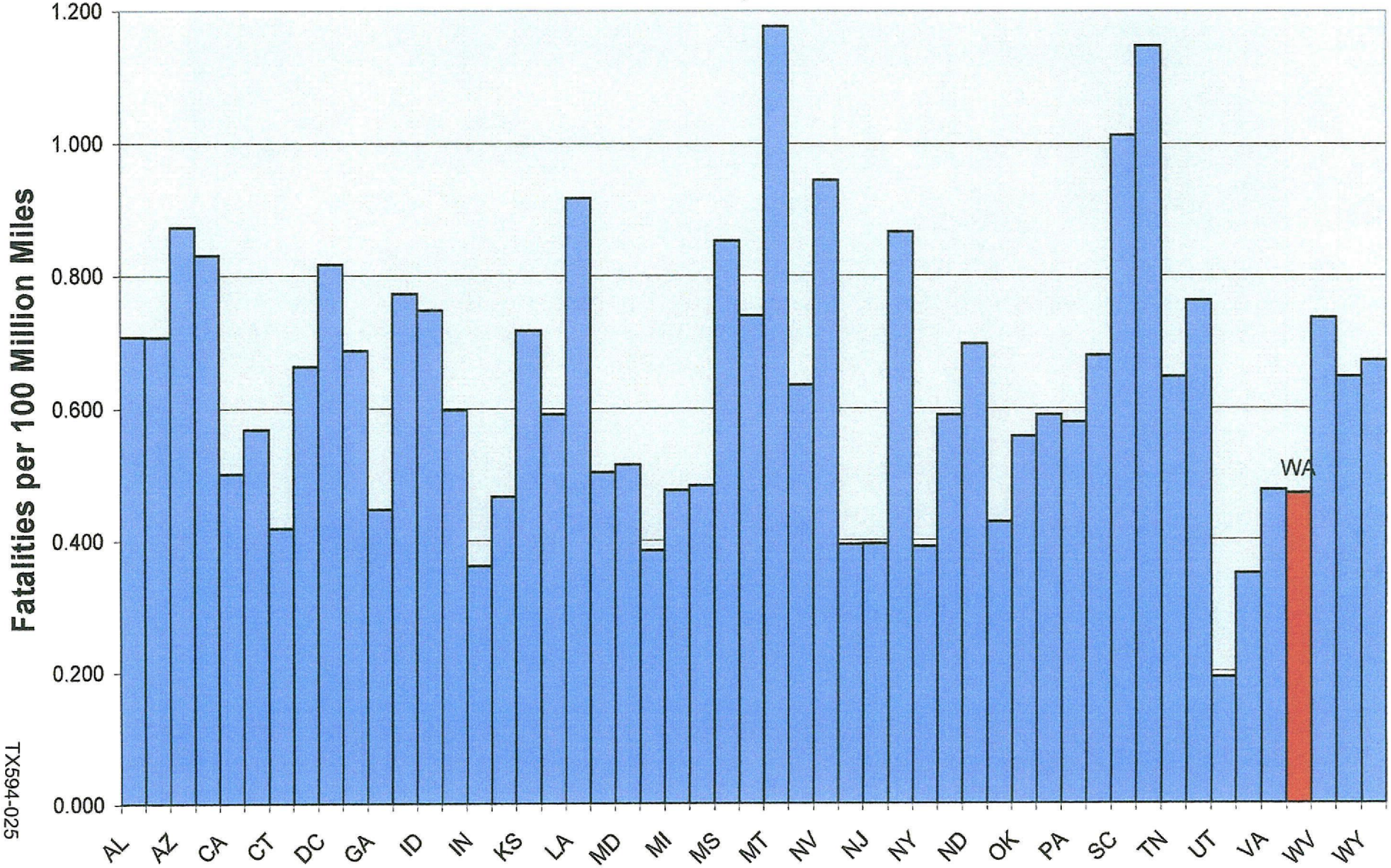
Prevalence and Frequency of Drinking and Driving, 1999



TX594-024

TX580-025

Alcohol-Related Traffic Fatalities per 100 Million Vehicle Miles Traveled, by State, 2003



TX594-025

TX580-026

Alcohol Control Efforts in Washington

- Comprehensive approach has been effective in reducing excessive drinking
  - Overall per capita alcohol consumption generally falling over past 25 years
    - Below national and regional levels
  - Somewhat higher overall drinking prevalence but lower binge drinking prevalence
    - Indicates relatively greater frequency of moderate drinking rather than excessive drinking
  - Less drinking and driving
    - Relatively low alcohol-related traffic fatality rate

TX594-026

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Economics 101: Alcohol Prices and Drinking

- Price elasticity – the percentage reduction in quantity demanded resulting from a one percent increase in price

- Estimates of price elasticity of demand for alcoholic beverages based on aggregate data (Leung and Phelps, 1993):

  - Beer: -0.3
  - Wine: -1.0
  - Distilled Spirits: -1.5

TX594-028

Economics 101: Alcohol Prices and Drinking

- Price increases result in limited substitution within and across alcoholic beverage types, but net impact of price increases is reduction in total ethanol consumption

  - Nelson (1997): overall price elasticity for alcohol: -0.52

- Higher prices reduce drinking prevalence, frequency of consumption, number of drinks per drinking occasion, prevalence of binge drinking, and frequency of binge drinking

- Estimates from models that account for addictive nature of alcohol consumption suggest that long run impact of price even larger

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Alcohol Prices and Youth Drinking

- Grossman and colleagues (1987, 1988) find consistent evidence that higher beer prices lead to significant reductions in frequency and intensity of beer consumption by youth

  Frequent and fairly frequent young drinkers more responsive to price than infrequent drinkers

  Heavy and fairly heavy young drinkers more responsive to price than young light drinkers

- Laixuthai and Chaloupka (1993) find that youth responsiveness to price falls, but remains significant, after increase in minimum legal drinking ages

- Most other studies of prices and youth drinking conducted over the past decade reach a similar conclusions

  Higher prices reduce youth drinking while lower alcoholic beverage prices lead to increases in youth drinking

TX594-031

Alcohol Prices and Drunk Driving

- Many studies using data on motor vehicle accident fatality rates conclude that higher alcohol prices lead to significant reductions in drinking and driving

  - estimates suggest that a ten percent increase in price would:
    - reduce overall fatality rates by 5-10 percent
    - reduce youth fatality rates by 7-17 percent

- Estimates of impact on fatality rates consistent with estimates based on self-reported drinking/driving behavior from survey data:

  - Kenkel (1993) estimated that ten percent price increase would:
    - Reduce drinking and driving by 7.4 percent among males and 8.1 percent among females
    - Lead to larger reductions (12.6 and 21.1 percent) among young males and females

TX594-032

Alcohol Prices and Alcohol-Related Health Consequences

- Studies have examined impact of alcohol prices on:
  - liver cirrhosis death rates
  - other diseases for which alcohol is a primary cause
  - diseases for which alcohol is a contributing factor
  - suicide deaths and suicidal ideation
  - other accidental deaths
  - non-fatal workplace accidents
  - sexually transmitted disease rates

- Generally consistent findings that increases in alcoholic beverage prices lead to significant reductions in the health consequences resulting from alcohol use and abuse

Alcohol Prices and Violence and Other Crime

• Growing literature examining the impact of alcoholic beverage prices on violence and other crime, including:

- homicide, rape, assault, and other violent crime rates
- child abuse
- spouse abuse
- property crimes
- delinquent behavior

• Again, generally consistent findings that increases in prices for alcoholic beverages lead to reductions in violence and other crime resulting from alcohol use and abuse

TX594-034

Alcohol Prices and Educational Outcomes

• Several recent studies examine impact of alcoholic beverage prices on various measures of educational attainment and related outcomes:

- Yamada and colleagues (1996) conclude that higher prices would raise the likelihood of high school graduation

- Cook and Moore (1993) find that higher prices would increase the probability of attending and graduating from a four year college or university

- Analyses of HCAS (Williams, et al. 2002; Powell et al. 2002) find that higher prices improve college student study habits, reduce frequency of missing classes and likelihood of falling behind in school, and lead to higher grade point averages

TX594-035

Summary

- Increases in prices for alcoholic beverages lead to significant reductions in drinking behaviors

- Youth and young adult drinking is more responsive to price than is drinking among adults

- Increases in alcoholic beverage prices significantly reduce the consequences of alcohol use and abuse, including:

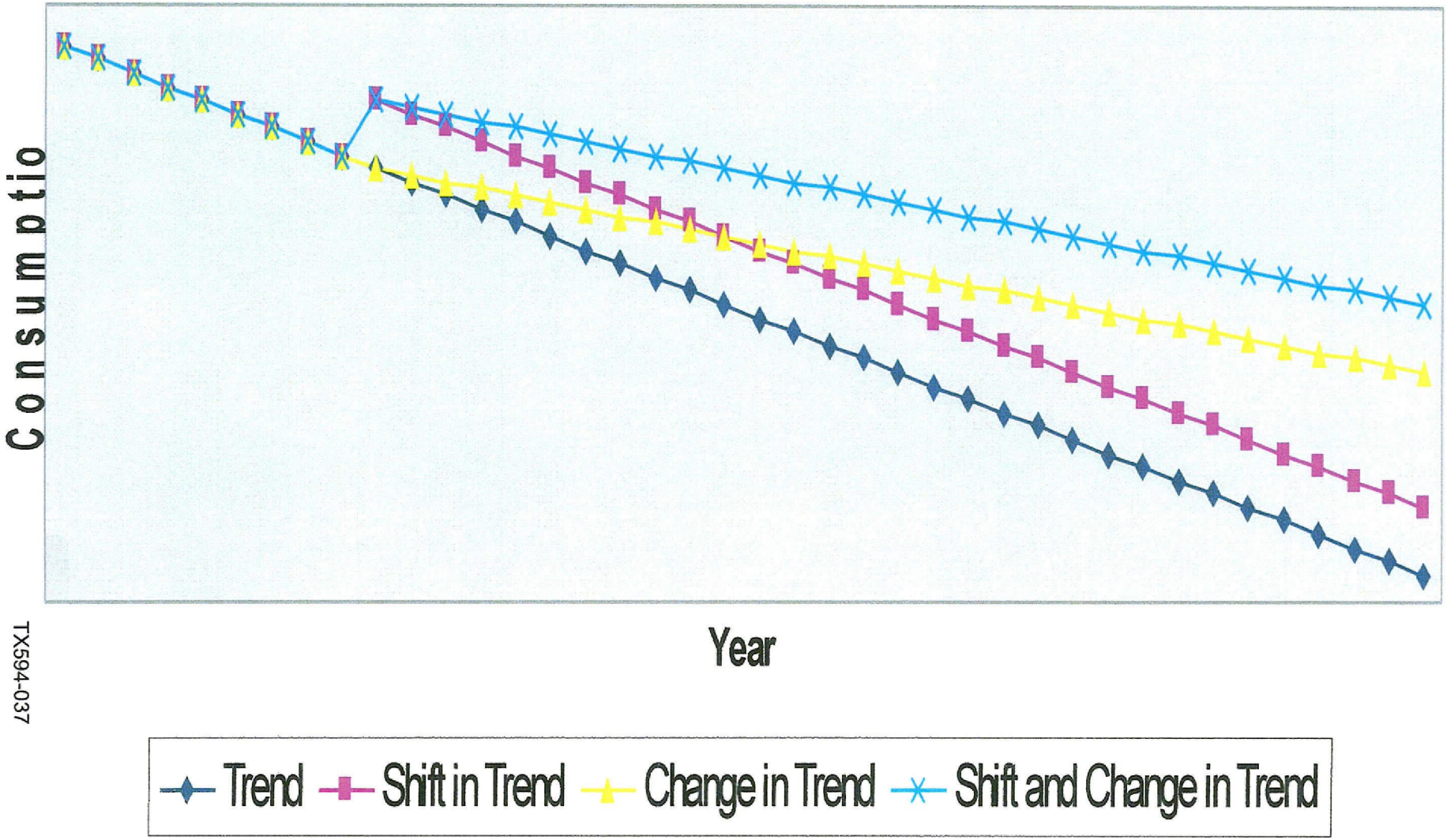
    - Drinking and driving related accidents and fatalities

    - Liver cirrhosis and other Health consequences

    - Violence and other crime

    - Negative educational outcomes

Modelling Impact of Change in Controls



TX594-037

Nebraska

- Price posting and quantity discount prohibition for wine and spirits struck down in a Nebraska Supreme Court decision issued June 1, 1984

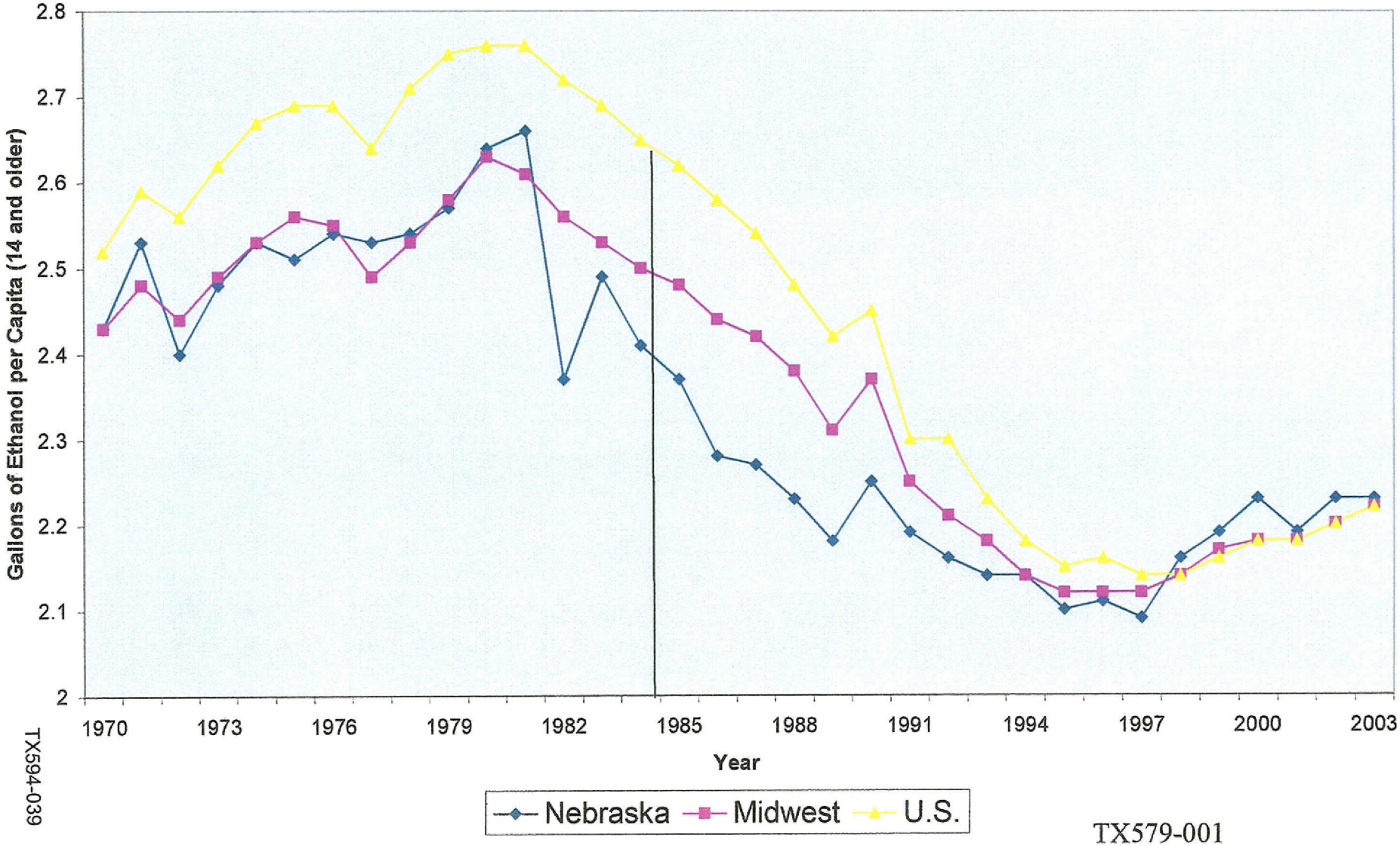
- Relatively frequent alcoholic beverage tax changes in 1970s and 1980s:

Date	Beer	Light Wine	Fortified Wine	Spirits
4/1/65	.08	.20	.55	1.60
7/6/72	.10	.75	.75	2.00
6/1/77	.11	.85	.85	2.25
9/1/79	.12	.55	1.10	2.50
8/30/81	.14	.65	1.25	2.75
10/1/85	.20	.75	1.35	2.90
10/1/87	.23	.75	1.35	3.00
7/1/03	.31	.95	.95	3.75

- Apparent consumption data from National Institute on Alcohol Abuse and Alcoholism; based on sales data

TX594-038

Total Ethanol Consumption, per Capita (14 and older)
Nebraska, Midwest, and United States, 1970-2003



TX594-039

TX579-001

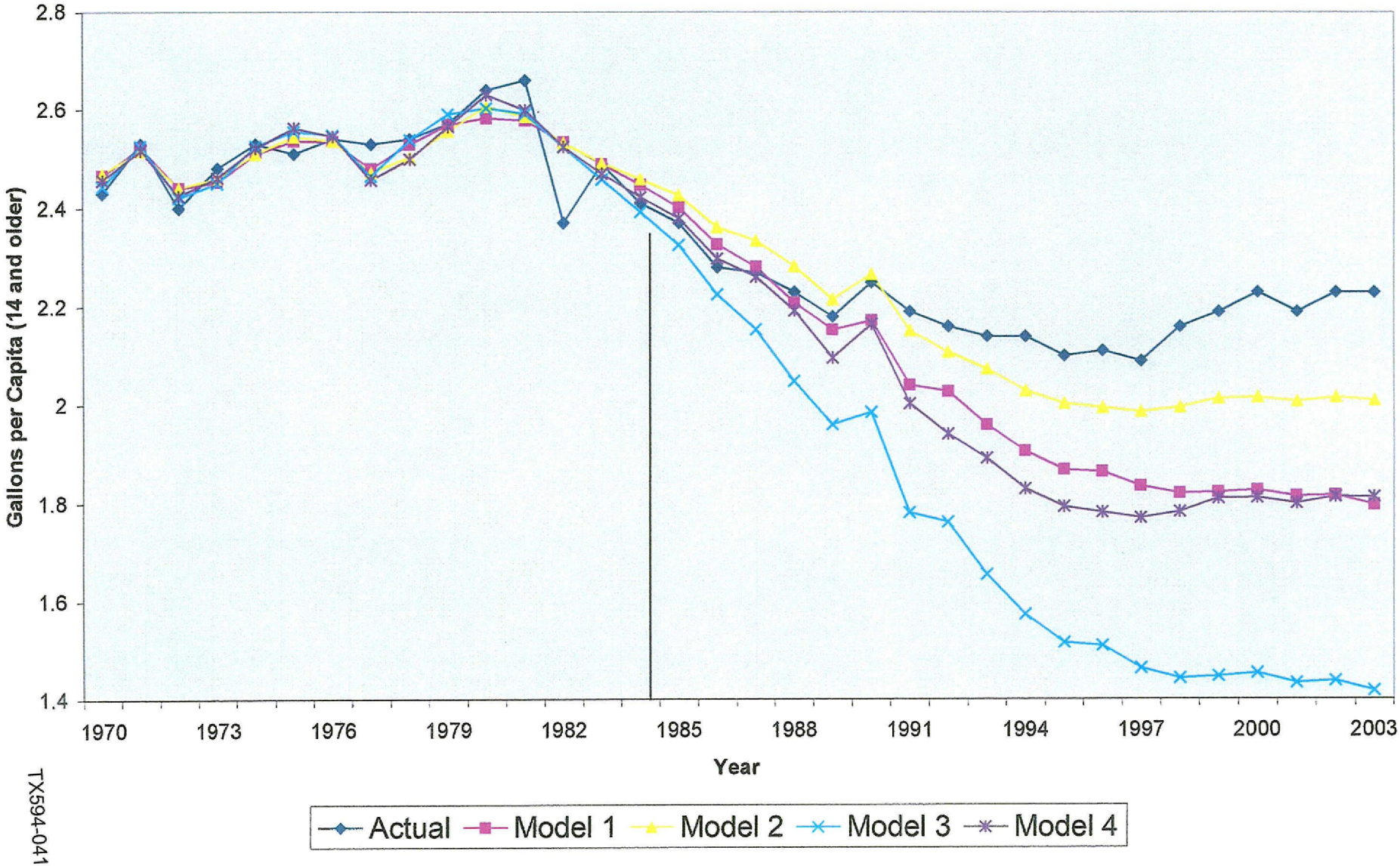
TX579-003

Nebraska: Apparent Consumption per Capita (14 and older): Total Ethanol, 1970-2003

Variable	Model 1	Model 2	Model 3	Model 4
Trend	-0.017 (0.007)	-0.011 (0.006)	-0.024 (0.008)	-0.014 (0.007)
US Consumption	0.822 (0.117)		1.264 (0.279)	
Midwest Consumption		0.916 (0.124)		1.281 (0.286)
Alcohol Tax	-5.741 (2.913)	-4.065 (2.790)	-6.170 (2.825)	-3.753 (2.750)
Policy Indicator	-0.509 (0.080)	-0.374 (0.067)	0.830 (0.776)	0.727 (0.780)
Policy * Trend	0.028 (0.007)	0.018 (0.006)	0.033 (0.008)	0.020 (0.006)
Policy * US Consumption			-0.512 (0.296)	
Policy * Midwest Consumption				-0.439 (0.310)
Constant	0.716 (0.319)	0.474 (0.334)	-0.389 (0.709)	-0.443 (0.725)
F – Joint Significance of Policy Variables (p-value in parentheses)	31.65 (0.0000)	23.46 (0.0000)	23.61 (0.000)	16.87 (0.0000)
F	98.16	104.75	88.15	90.77
R^2	0.946	0.949	0.951	0.953
Actual Consumption, 2003	2.23	2.23	2.23	2.23
Predicted Consumption, 2003	1.80 (0.176)	2.01 (0.152)	1.42 (0.276)	1.81 (0.204)
Difference (gallons of ethanol) (p-value for difference in parentheses)	0.43 (0.0200)	0.22 (0.1561)	0.81 (0.0067)	0.42 (0.0501)

TX594-040

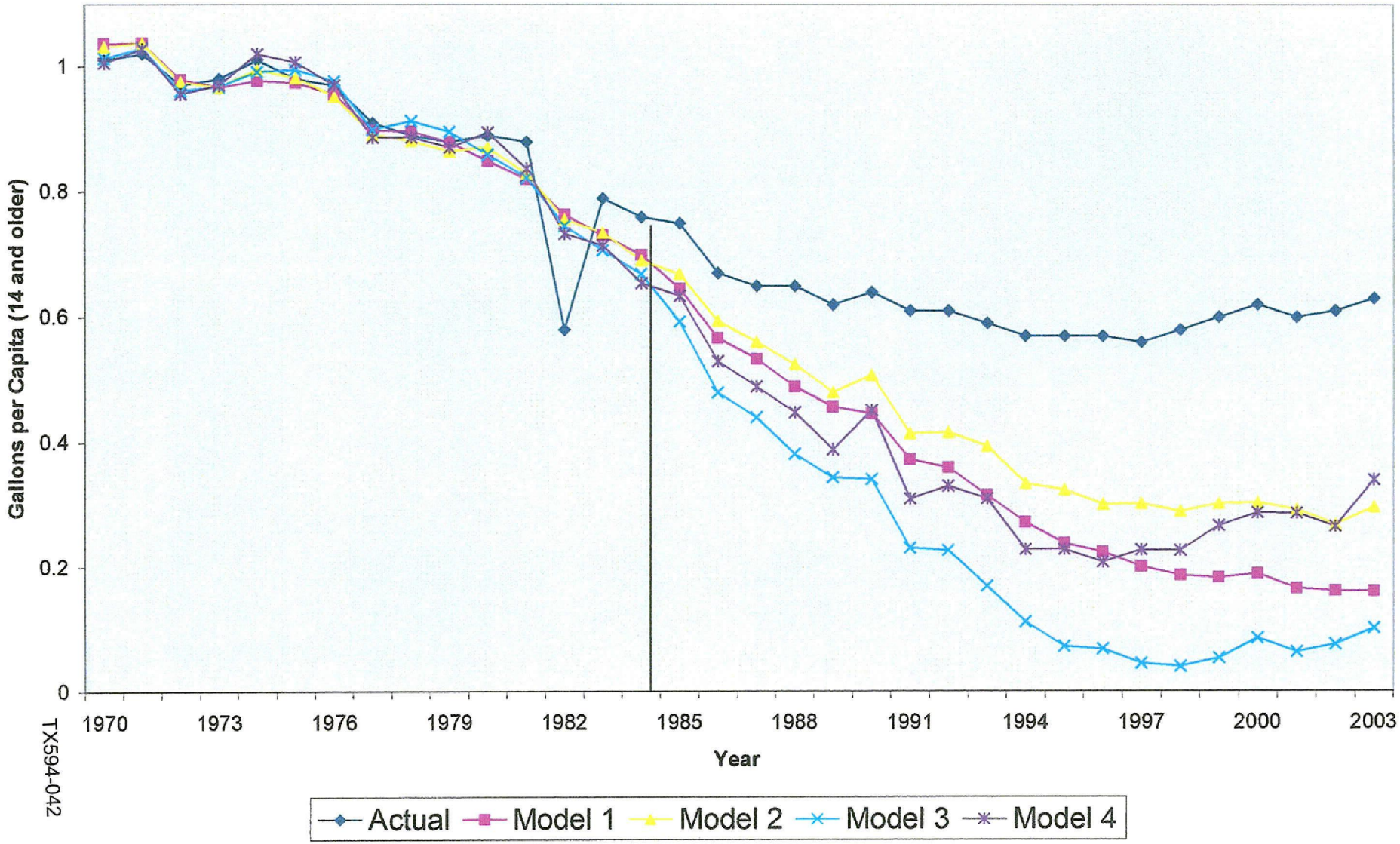
Actual and Predicted Nebraska Consumption
Total Ethanol, 1970-2003



TX594-041

TX579-004

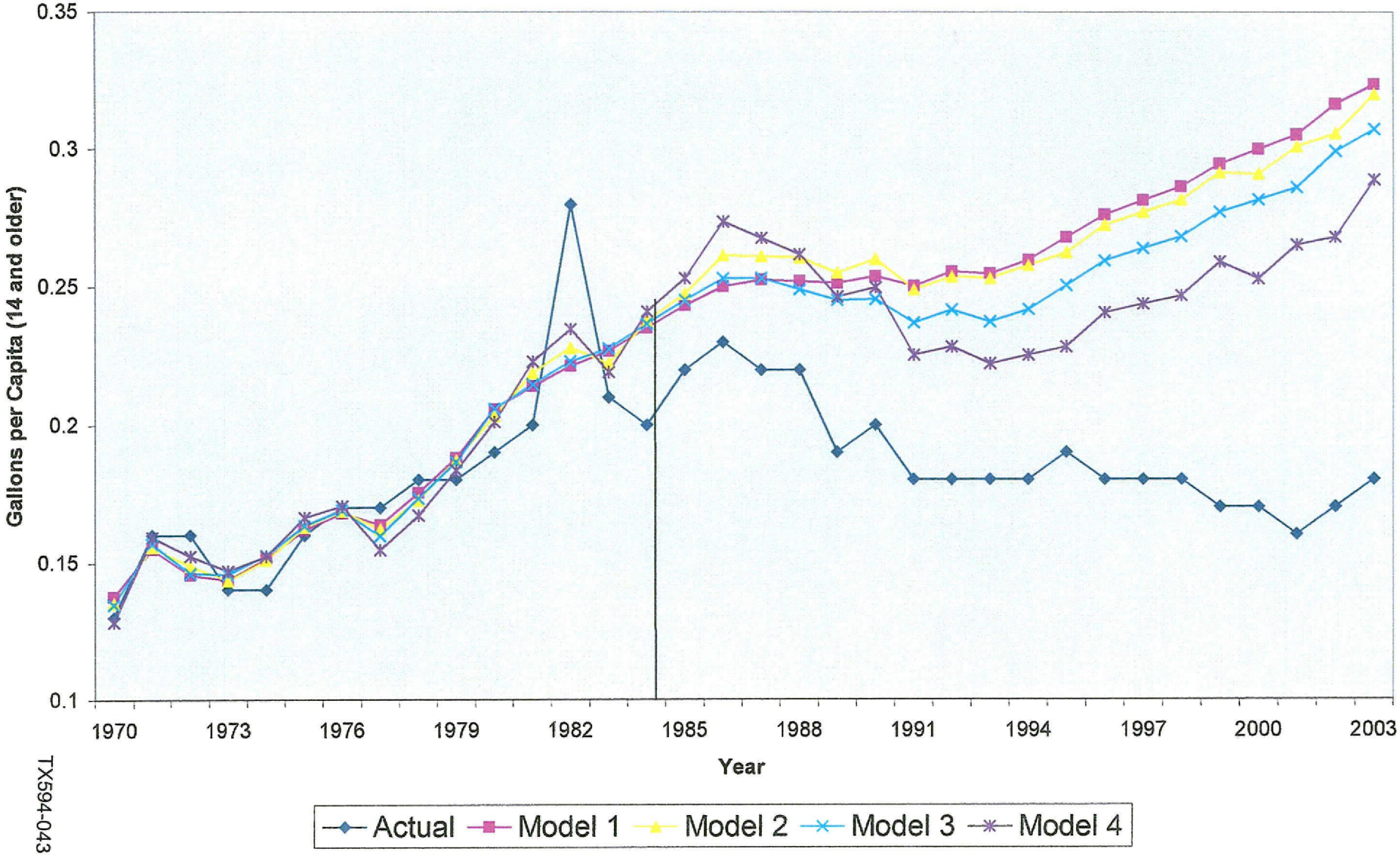
Actual and Predicted Nebraska Consumption Spirits, 1970-2003



TX594-042

TX579-008

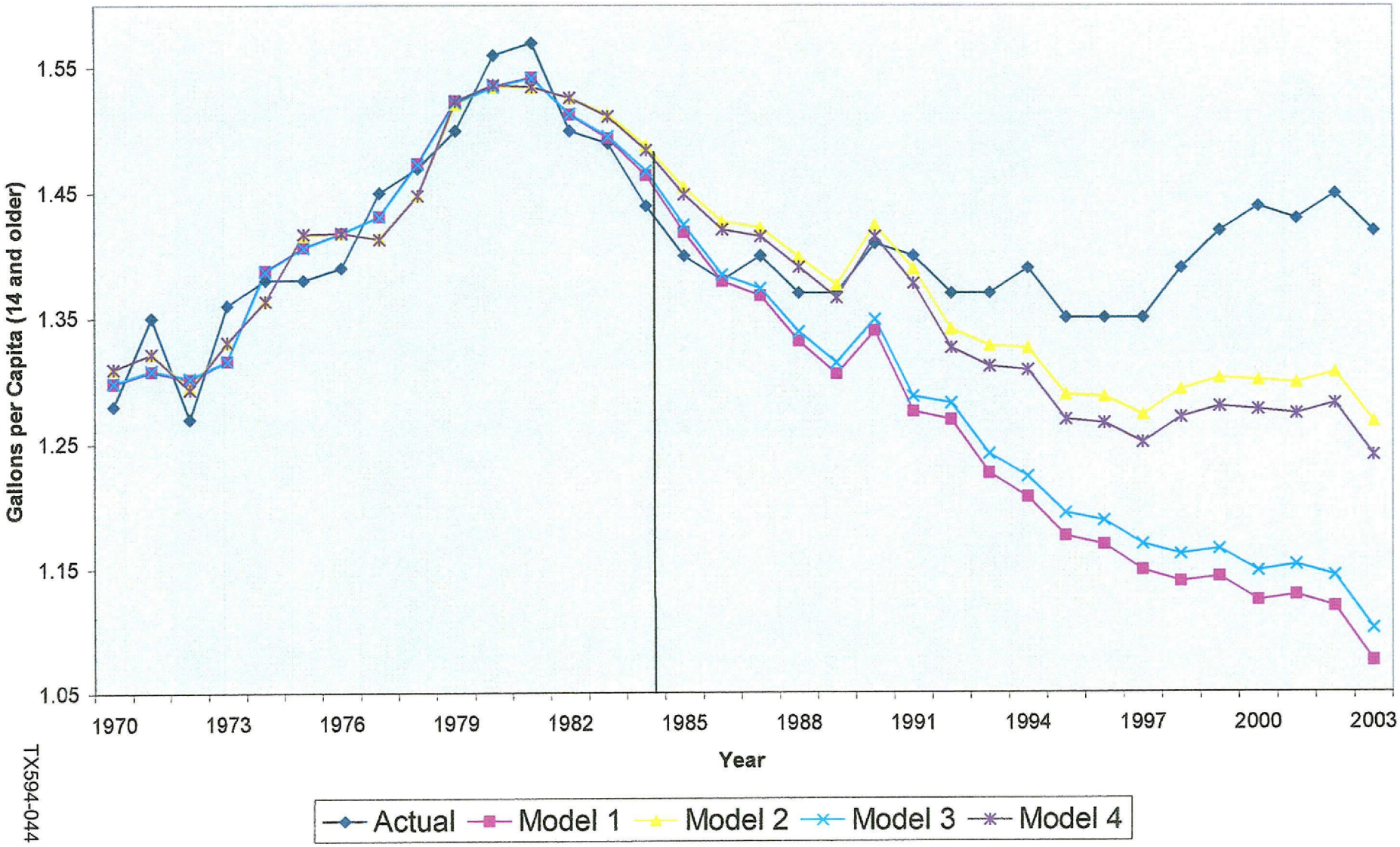
Actual and Predicted Nebraska Consumption
Wine, 1970-2003



TX594-043

TX579-012

Actual and Predicted Nebraska Consumption
Beer, 1970-2003



TX594-044

TX579-016

Summary:

• Downward trend in alcohol consumption in Nebraska slowed after the elimination of price posting requirement and ban on quantity discounts, despite series of state alcoholic beverage tax increases

• Gap between alcohol consumption in Nebraska and in the United States narrowed after the elimination of price posting requirement and elimination of ban on quantity discounts, despite series of state alcoholic beverage tax increases

Elimination of price posting requirement and elimination of ban on quantity discounts contribute to increases in Nebraska's alcohol consumption relative to alcohol consumption in the United States; consumption in Nebraska higher than what it would have been had policies remained in effect

Delaware

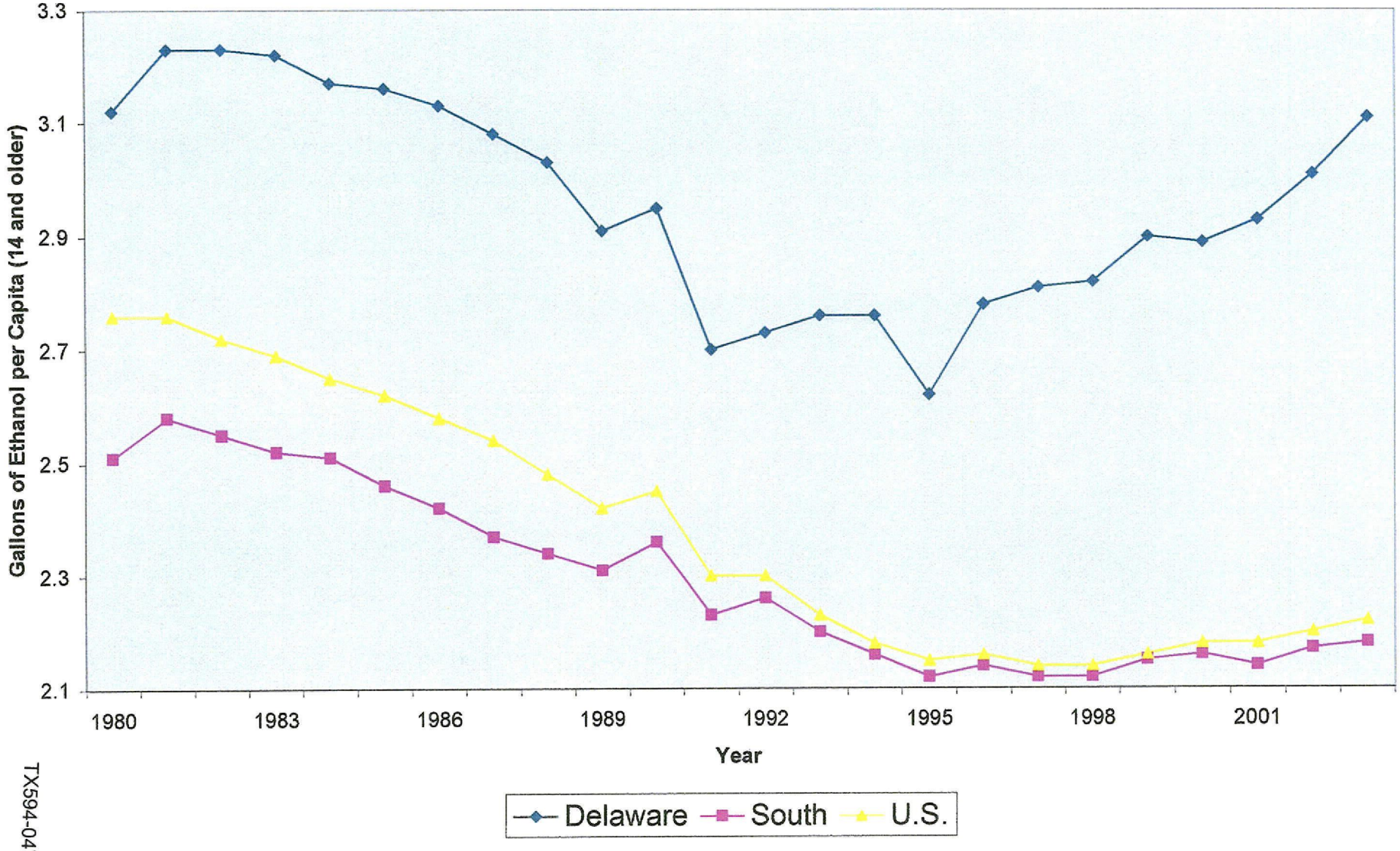
- Quantity discount prohibition for all alcoholic beverages eliminated by amendment to state rules effective June 1, 1992

- Tax changes 1985 to present:
  - 9/1/90: Beer taxes raised from $2/barrel to $4/barrel
    Wine taxes raised from $.40/gal to $.97/gal
    Spirits taxes, 50 proof or below raised from $1.50/gal to $3.64/gal; above 50 proof from $2.25/gal to $5.46/gal
  - 1/2/97: Spirits taxes, 50 proof or below lowered to $2.50/gal; above 50 proof lowered to $3.75/gal

- Apparent consumption data from National Institute on Alcohol Abuse and Alcoholism; based on sales data

TX594-046

Total Ethanol Consumption, per Capita (14 and older)
Delaware, Southern Region, and United States, 1980-2003



TX594-047

TX578-001

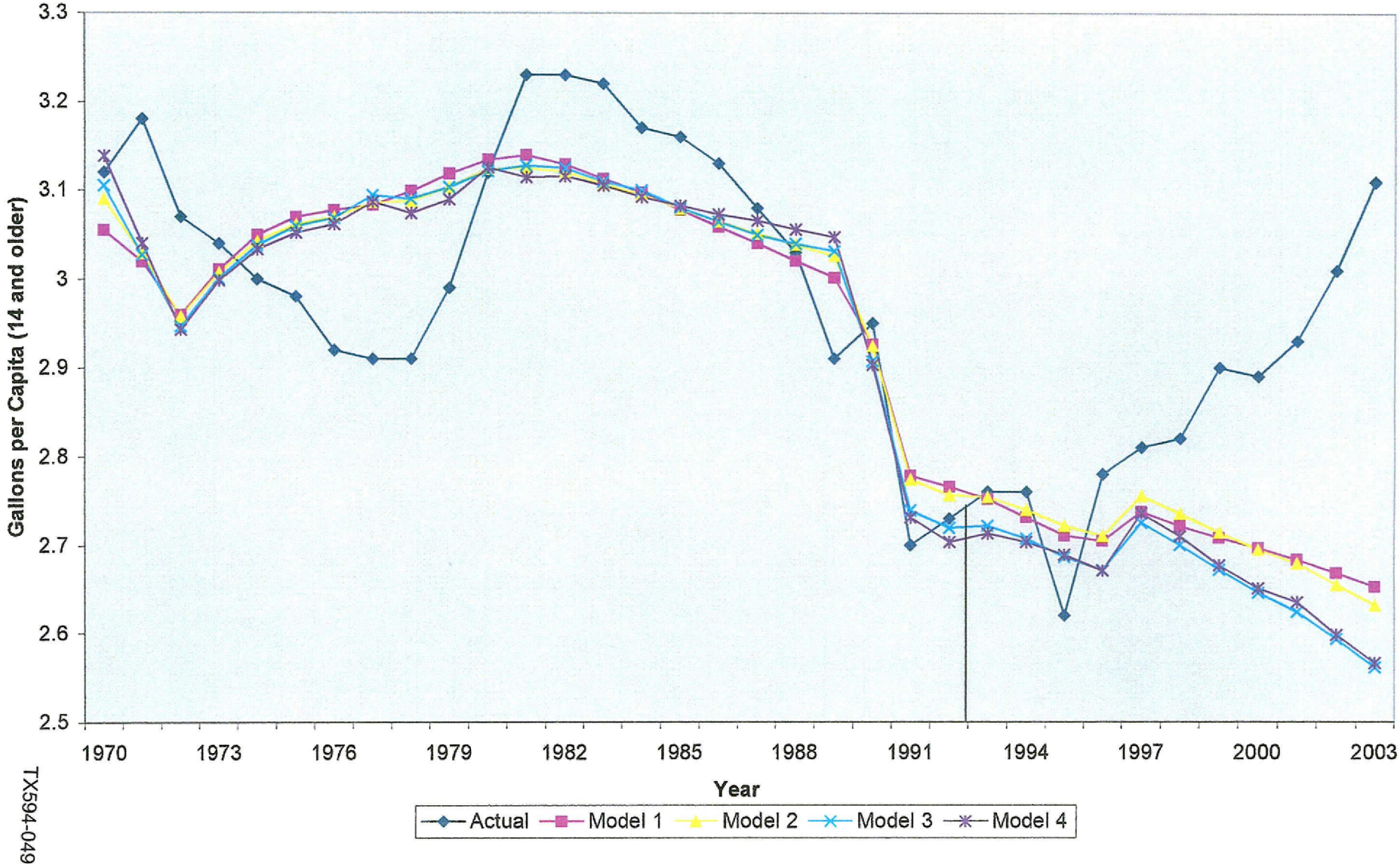
Delaware: Apparent Consumption per Capita (14 and older): Total Ethanol, 1970-2003

TX578-003

Variable	Model 1	Model 2	Model 3	Model 4
Trend	-0.020 (0.010)	-0.024 (0.008)	-0.031 (0.012)	-0.031 (0.008)
US Consumption	0.132 (0.303)		-0.160 (0.338)	
Southern Consumption		-0.067 (0.264)		-0.292 (0.271)
Alcohol Tax	-7.526 (3.557)	-9.307 (3.279)	-11.159 (4.024)	-12.354 (3.412)
Policy Indicator	-1.108 (0.288)	-1.166 (0.262)	-4.745 (2.115)	-5.738 (2.177)
Policy * Trend	0.043 (0.010)	0.045 (0.009)	0.049 (0.010)	0.049 (0.009)
Policy * US Consumption			1.612 (0.929)	
Policy * Southern Consumption				2.090 (0.989)
Constant	3.225 (1.010)	3.859 (0.798)	4.257 (1.143)	4.598 (0.830)
F – Joint Significance of Policy Variables (p-value in parentheses)	9.33 (0.0008)	12.04 (0.0002)	7.67 (0.0007)	10.51 (0.0001)
F	13.53	13.44	12.58	13.34
R^2	0.707	0.706	0.737	0.748
Actual Consumption, 2003	3.11	3.11	3.11	3.11
Predicted Consumption, 2003	2.65 (0.153)	2.63 (0.149)	2.56 (0.157)	2.57 (0.144)
Difference (gallons of ethanol) (p-value for difference in parentheses)	0.46 (0.0058)	0.48 (0.0032)	0.55 (0.0017)	0.54 (0.0008)

TX594-048

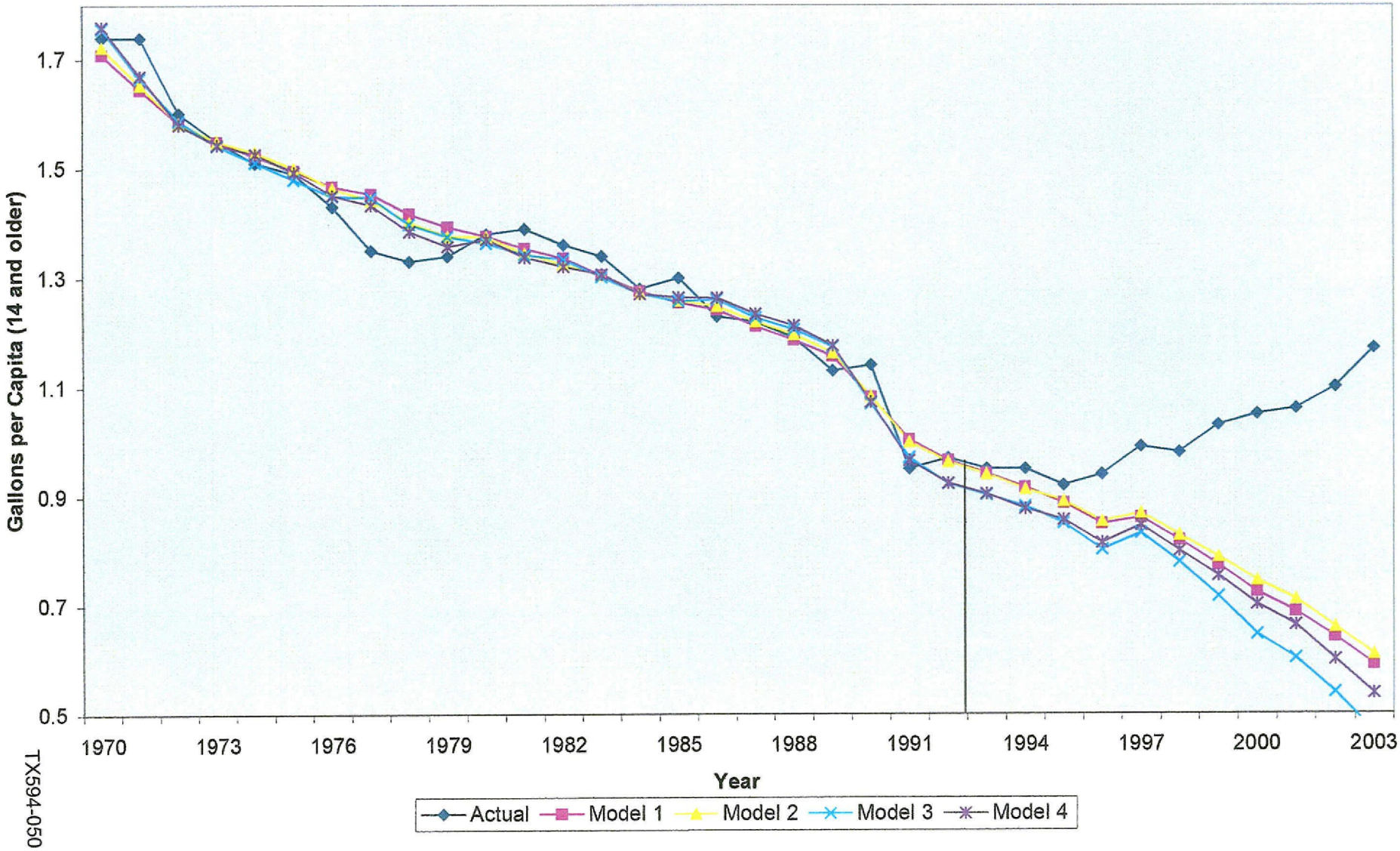
Actual and Predicted Delaware Consumption
Total Ethanol, 1970-2003



TX594-049

TX578-004

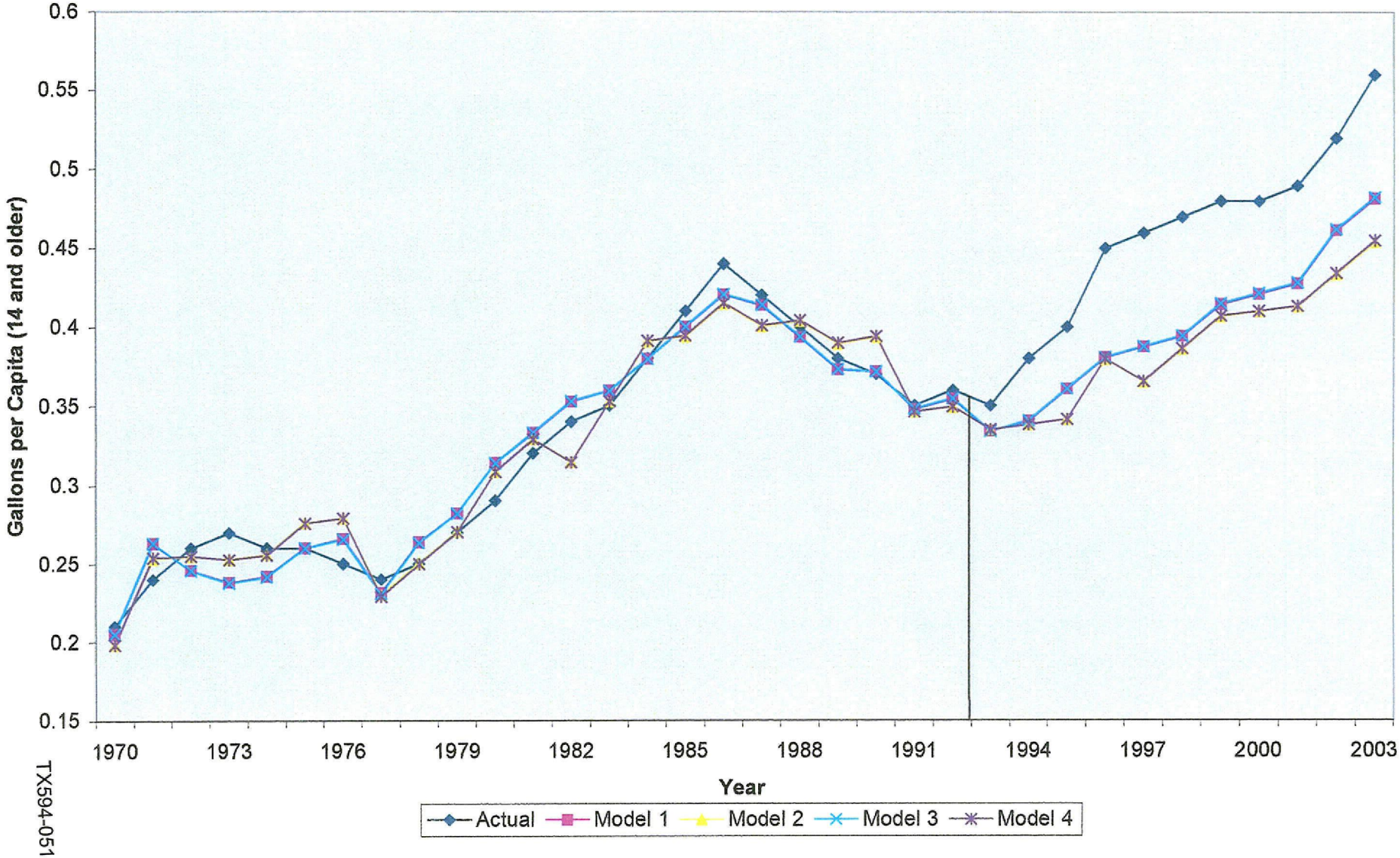
Actual and Predicted Delaware Consumption Spirits, 1970-2003



TX594-050

TX578-008

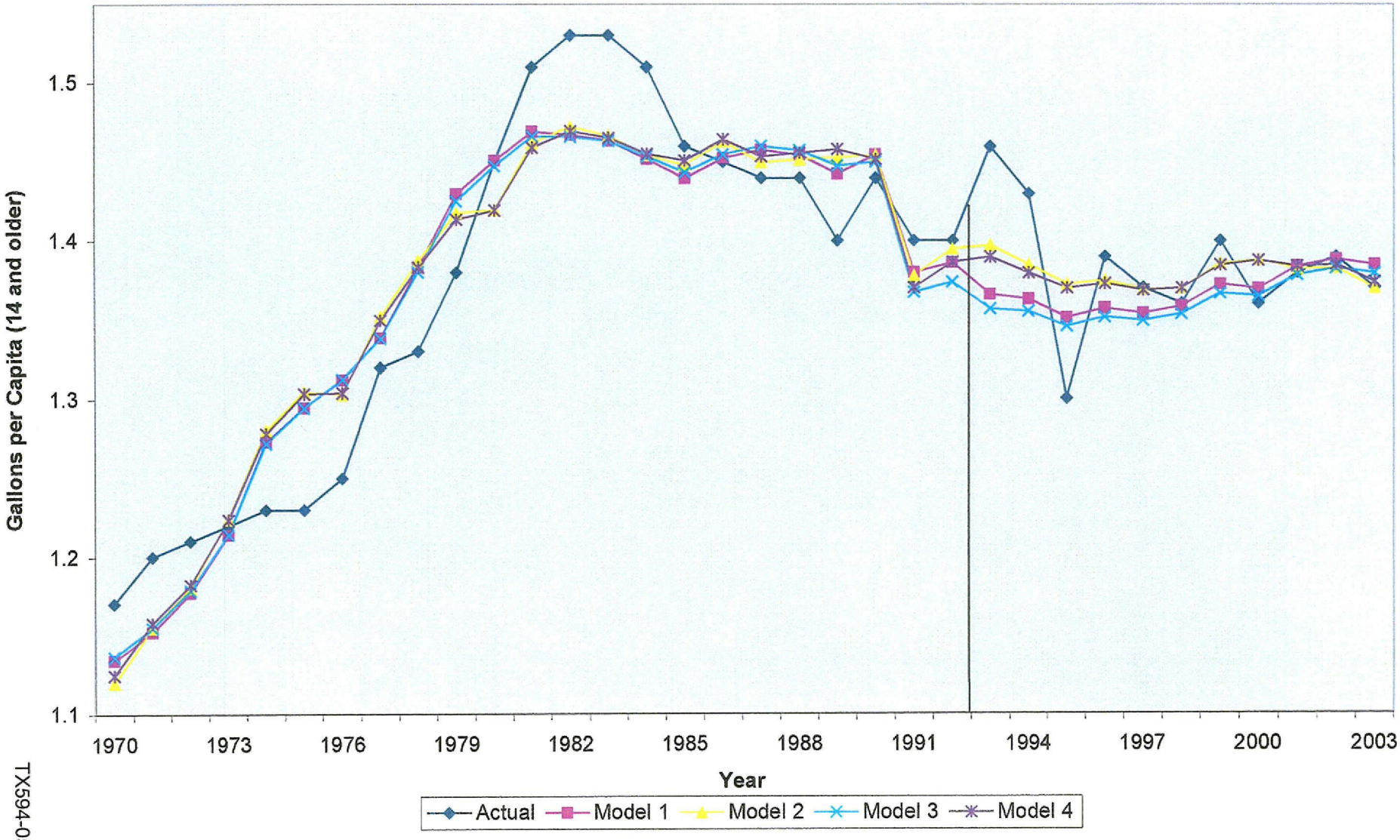
Actual and Predicted Delaware Consumption
Wine, 1970-2003



TX594-051

TX578-012

Actual and Predicted Delaware Consumption
Beer, 1970-2003



TX594-052

TX578-016

Summary:

• Alcohol consumption in Delaware rose relative to alcohol consumption in the United States and the Southern region after the elimination of the state's price posting requirements and its ban on quantity discounts

Elimination of price posting requirement and elimination of ban on quantity discounts contribute to increases in Delaware's alcohol consumption and its consumption relative to alcohol consumption in the United States and the Southern Region; consumption in Delaware higher than it would have been had controls been maintained