METHODOLOGY: UNDERAGE DRINKING FACT SHEETS

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Miller et al.[1] describes methods used to make the national estimates. The 2013 cost estimates used more recent versions of the data sources identified in that document, for example, 2013 Youth Risk Behavior Surveillance System (YRBSS) data.

Problem Definitions

Youth Violence: Alcohol-attributable murders, rapes, robberies, other assaults, and child abuse and neglect perpetrated by youth under age 21.

Youth Traffic Crashes: Alcohol-attributable deaths and nonfatal injuries resulting from crashes involving drivers under age 21 with positive blood alcohol levels.

High-Risk Sex: Alcohol-attributable unplanned pregnancies, HIV/AIDS and other sexually transmitted diseases due to unprotected sex or use of unreliable birth control method among youth ages 14-20.

Youth Property Crime: Alcohol-attributable burglaries, larcenies, and motor vehicle thefts committed by youth under age 21.

Youth Injury: Alcohol-attributable burn, drowning, and suicide deaths and nonfatal suicide attempts among youth under 21.

Poisonings and Psychoses: Fatal and nonfatal alcohol poisonings and psychoses among youth under age 21.

FAS among Teen Mothers: Fetal Alcohol Syndrome births to mothers aged 15-20.

Youth Alcohol Treatment: Treatment for alcohol dependence syndrome including detoxification for youth under age 21.

Cost Methodology

For each alcohol-related problem – traffic crashes, violence, property crime, suicide, burns, drowning, fetal alcohol syndrome, high-risk sex, poisonings and psychoses, and dependency treatment – fatal and nonfatal cases attributable to underage alcohol use were estimated. Costs were limited to alcohol-related problems that can be directly tied to immediate or acute alcohol

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[1] Miller TR, Levy DM, Spicer RS, Taylor DM. (2006). Societal Costs of Underage Drinking. *Journal of Studies on Alcohol* 67:4, 519-528.

use in order to develop conservative estimates. For each problem, we first obtained measures of fatal and nonfatal cases involving underage drinking. We then estimated the percent of *alcohol-involved* cases actually *attributable* to or caused by alcohol use. We multiplied the number of alcohol-attributable cases by the costs per case to obtain total costs.

We estimated three types of costs. We converted all costs to 2005 dollars using a health expenditures index for medical costs, a wage index for wage loss, and the consumer price index for other items.

Medical Costs: Medical costs include payments for hospital, physician, and allied health services, rehabilitation, prescriptions, medical equipment, nursing home, insurance claims processing, and emergency medical transport. Fatality costs include medical examiner/coroner services. Violence costs include mental health treatment for victims. Costs for alcohol treatment are included only under that category of Youth Alcohol Treatment.

Work Loss and Other Costs: Work loss costs are wage and household work losses during the acute recovery from injury, plus the present value of a lifetime's worth of wage and household work that youth and those they injure will be unable to do if they are killed or permanently disabled. The earnings include fringe benefits. This category also includes insurer and employer costs of compensating earnings losses (including their legal expenses). For violence, this category also includes earnings lost by family and friends caring for the injured and the value of school missed when children are temporarily disabled. Other costs include the costs of police and fire services, sanctioning and adjudicating crimes, foster care and property damage.

Pain and Suffering Costs: Quality of life places a dollar value on the pain, suffering, and lost quality of life losses that substance users, their victims and their families experience due to illness, injury, and death. To value quality of life lost to fatal injuries, we start by estimating the value people place on survival. For fatalities, the value of pain, suffering, and lost quality of life is computed based on what people actually and routinely pay for small reductions in their chance of being killed. A review of an extensive literature containing more than 65 sound studies estimate the value of a statistical life in 2000 as at least $3.5 million U.S. dollars.

The quality of life lost to nonfatal injury was valued in four steps. First, physician ratings of the functional capacity typically lost over time by victims of every injury diagnosis cataloged in a common diagnosis system were obtained. The ratings cover six dimensions of functioning: bending/grasping/lifting, cognitive, mobility, sensory, cosmetic, and pain. Second, data were added about the probability of permanent work-related disability by diagnosis. Third, using surveys about the value people place on different dimensions of functioning, we combined the data to obtain a percentage of the value of survival lost to each injury. Fourth, we subtracted lost future earnings to get the pain and quality of life costs per injury.

State Costs

We used several methods to break the national estimates down by state. Youth impaired driving costs by state were computed by multiplying the state impaired driving costs by the percentage of impaired driving deaths in the state that involved an alcohol-impaired driver or non-occupant under age 21. National estimates of nonfatal suicide, burn, and drowning incidents were allocated among states in proportion to youth fatalities from these causes. Youth alcohol treatment counts by state came from the Treatment Episode Data Set (TEDS).

All other costs were allocated using estimates of the percentage of youth who drank alcohol in the past 30 days by state, the percentage of underage binge drinkers by state, or a youth alcohol intensity index constructed by dividing the percentage of youth who were binge drinkers in the state by the mean percentage for the US. For almost all states, this consumption data came from the state's Youth Risk Behavior Survey (YRBS) or a student survey containing the YRBS questions. The specific source for the consumption data is noted in each state fact sheet.

Alcohol-involved crime costs were allocated between states in proportion to the number of crimes reported in the Uniform Crime Reports by state. The percentage of crimes involving alcohol nationally was tailored to the state level by multiplying by the youth alcohol intensity index. Alcohol-attributable high-risk sex and fetal alcohol syndrome were allocated between states in proportion to the ratio of the teen pregnancy rate in the state to the national teen pregnancy rate times the number of underage drinkers in the state times the youth drinking intensity index. Alcohol poisoning, and alcohol psychoses were allocated between states in proportion to the number of underage drinkers in the state times the youth drinking intensity index.

We used state-specific price adjusters to convert from US to state prices. We adjusted work loss based on per capita income by state and used ACCRA medical care and all items price indices (from the US Statistical Abstract) for other items.

Number of Youth Drinkers

We multiplied the percentage of youth who report drinking in the state by the 2003 state population estimates for ages 14-20 to estimate the number of underage drinkers.

Sales of Alcohol Consumed by Underage Youth

To calculate the sales of alcohol consumed by underage youth, we start with the drinks of alcohol consumed monthly per underage drinker from the National Household Survey on Drug Abuse (NHSDA). The NHSDA is known to underestimate underage drinking so we adjust the NHSDA drinker estimate for youth using data from the YRBS, Monitoring the Future, and the Health Behaviors of School Children Survey (HBSC). We then multiply the average number of drinks per drinker (also from the NHSDA) by the number of drinkers to get total consumption by

underage drinkers. We add that to total adult consumption estimated from the NHSDA data and then compute the percentage of alcohol consumed by underage youth. Lastly, we multiply the percentage of alcohol consumed by underage youth in each state by the total amount of alcohol consumed by all ages[2] in that state to arrive at the total amount of alcohol consumed by underage drinkers.

Profits to the Alcohol Industry

Average price and profits per drink come from industry data[3]. To estimate the amount of profit the industry made from underage drinking, we assumed 2 drinks per ounce of ethanol. We also assumed that the profits for wine and spirits were the same as for beer.

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[2] Nephew TM, Williams GD, Yi H-y, Hilton, ME. (August 2005). Apparent per capita alcohol consumption: National, state and regional trends, 1977-2003. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism. Surveillance Report #73.

[3] Miller Brewing Company (2000). Beer is Volume with Profit 2000. Milwaukee, WI: Miller Brewing.