Changes in alcohol consumption: United States, 2001–2002 to 2012–2013

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ARTICLE INFO

ABSTRACT

Background: Documenting changes in alcohol consumption is critical for assessing future health service and alcohol treatment needs, evaluating efforts to modify drinking behavior and understanding the impact of shifting demographics and social norms. For the period since 2000, published data on drinking trends have been scarce and inconsistent.

Methods: Using data from two large, nationally representative surveys of U.S. adults (2001–2002 and 2012–2013) that contained virtually identical questions on consumption, we assessed differences by period in the prevalence of drinking, volume of intake, frequency of drinking and prevalence of ≥monthly heavy episodic drinking (HED) and determined whether changes in consumption were consistent across beverage types and in population subgroups.

Results: Between 2001–2002 and 2012–2013, the prevalence of drinking increased, as did volume and frequency of drinking and prevalence of ≥monthly HED among drinkers. Increases were greater for women than men for all measures and smaller among the formerly married for consumption among drinkers. The increase in overall drinking prevalence was magnified among all race-ethnic minorities, whereas the increase in ≥monthly HED was magnified only among Blacks (all relative to Whites).

Conclusions: Our findings are suggestive of a "wetter" drinking climate in 2012–2013 than in 2001–2002, indicating the need for continued and expanded efforts to prevent chronic and episodic heavy alcohol consumption. Given the across-the-board increases in alcohol consumption in recent years, policy efforts that address drinking at the population level are supported, even if specific drinking behaviors and subgroups of drinkers are additionally targeted for individualized approaches.

Published by Elsevier Ireland Ltd.

1. Introduction

Documenting changes in alcohol consumption is critical for assessing future health services and alcohol treatment needs, evaluating industry and public health efforts to modify drinking behavior and understanding the impact of shifting demographics and social norms regarding drinking. Information on consumption trends comes from two primary sources: alcohol sales data and periodic sample surveys. The former provide estimates of average per capita consumption, the latter of drinking prevalence, volume and pattern. For the period since 2000, published data on drinking trends have been scarce and inconsistent.

Sales-based data revealed that annual U.S. apparent per capita ethanol consumption rose from 2.18 gallons in 2001 to 2.33 gallons in 2012 (LaVallee et al., 2014). This 7% increase was not consistent across beverage types. Ethanol consumption from wine and spirits rose by 34 and 22%, respectively, whereas ethanol consumption from beer declined by 8%. These changes provide a useful marker of alcohol consumption trends at the population level but do not indicate whether they reflect changes in drinking prevalence or in volume consumed among drinkers—much less changes in drinking frequency and quantity or frequency of heavy episodic drinking (HED). Some of these more detailed data were included in two recent studies based on the National Alcohol Surveys (NAS) that have been conducted approximately every five years since 1979. For the period 2000 to 2010, NAS data indicated that the proportion of past-year drinkers among U.S. adults 18 and older rose from 60.7 to 65.9% and mean volume of ethanol consumption increased by 26% (Kerr et al., 2014). In a separate report based on the same data (Kerr et al., 2012) that assessed net age, period and cohort (APC)

effects on volume of consumption, a significant period effect indicated a lower volume of consumption in 2000 than in 2010 among women but not men. Beverage-specific period effects fell short of statistical significance for both sexes. Data from the National Health Interview Surveys (NHIS) showed an increase between 2000 and 2010 in the proportion of high-volume drinkers among U.S. adults 18 and older that was partially offset by a decrease between 2010 and 2011 (National Center for Health Statistics, 2013).

Keyes and Miech (2013) used data from multiple years of the National Survey on Drug Use and Health (NSDUH) to distinguish net APC effects on prevalence of past-month HED (drinking 5+ drinks ≥once in the last 30 days) in the U.S. population aged 15–64 years. Although changes in survey administration obscured examination of long-term trends, unadjusted prevalence estimates for 2002–2009 showed a decline in past-month HED among 15–19 year olds and slight increases for most other age groups. Comparison of period parameters from the APC models indicated an increase between 2000–2004 and 2005–2009 in past-month HED for men, women, Whites, Blacks and Hispanics (all ages combined). Likewise, NHIS data for adults 18 and older indicated modest increases in two measures of past-year HED from 2000 to 2010, with partially offsetting decreases from 2010 to 2011 (National Center for Health Statistics, 2013). Among active duty military personnel, Bray et al. (2013) reported that the prevalence of past-month HED (5+/4+ drinks in a single day for men and women, respectively) increased from 35% in 1998 to 47% in 2008.

NSDUH data for 18–20 year olds showed significant decreases in the prevalence of past-month drinking and HED between 2001 and 2011 and in overall frequency, usual quantity and volume of past-month drinking between 2000–2002 and 2009–2011 (Chen et al., 2013). Likewise, data from the Behavioral Risk Factor Surveillance System for 2001–2005 indicated that past-month HED (5+ drinks in a single day) among persons aged 18–24 years was significantly lower in 2005 than 2001 for men, women and Whites but not for non-Whites (Delnevo et al., 2008).

In summary, data on changes in alcohol consumption since 2000 are scattered, and comparison across studies may be confounded by differences in data source (sales vs. survey), age range and population characteristics, HED definitions and survey methodology. Interpretation of the magnitudes, correlates and interrelationships of these changes would be optimized if data on various aspects of consumption could be drawn from a single source. Data from the recently conducted National Epidemiologic Survey on Alcohol and Related Conditions III (NESARC-III) and its predecessor, the Wave 1 NESARC, provide such a source. Using data from these two surveys, we examined differences between 2001–2002 and 2012–2013 in drinking prevalence, average daily volume (ADV) of ethanol intake, overall frequency of drinking and prevalence of ≥monthly HED.

2. Methods

2.1. Participants

Data were drawn from two nationally representative samples of U.S. adults: the 2001–2002 Wave 1 NESARC ($n = 43,093$, response rate = 81.0%) and the 2012–2013 NESARC-III ($n = 36,309$, response rate = 61.1%) (Grant et al., 2003, 2014). The NESARC-III comprised an independent cross-sectional sample, not a reinterview of prior NESARC respondents. Both surveys were sponsored by the National Institute on Alcohol Abuse and Alcoholism (NIAAA); fieldwork was carried out by the Census Bureau (Wave 1) and Westat Inc. (NESARC-III). Both surveys obtained informed consent after potential respondents were informed in writing about the survey content, uses of the data, voluntary nature of participation and confidentiality of identifiable survey information. Both research protocols received full ethical review and approval.

The eligibility criteria for the two surveys were identical, both having target populations of U.S. adults 18 and older living in households and noninstitutional group quarters. Both surveys oversampled Blacks and Hispanics; the Wave 1 NESARC also oversampled adults aged 18–24 years and the NESARC-III oversampled Asians/Pacific Islanders. Oversampling of minorities was achieved in both surveys by taking higher sampling fractions in geographic areas with high minority

concentrations. Additionally, in the NESARC-III only, two respondents were permitted in minority households with ≥four eligible respondents. Whereas the Wave 1 NESARC interviewed college students in on-campus residences, the NESARC-III interviewed them in their primary off-campus residences (waiting if necessary to interview them at home during school breaks).

Data for both surveys were collected in personal interviews conducted in respondents' homes by interviewers trained extensively regarding survey content and administration. Training materials for the NESARC-III were adapted from Wave 1. The NESARC-III offered a financial incentive for participation, half paid upon consent and half after completion. No financial incentive was offered for the Wave 1 NESARC, although the Wave 2 longitudinal follow-up did employ an identically structured financial incentive. One final difference between the Wave 1 NESARC and the NESARC-III is that the latter included a component in which genetic (saliva) samples were collected from consenting respondents. This occurred after completion of the regular interview, and participation was not required to be counted as a survey respondent or to receive the full financial incentive.

2.2. Measures

The Wave 1 NESARC and NESARC-III contained nearly identical questions on alcohol consumption. These included screening questions to distinguish past-year drinkers, former drinkers and lifetime abstainers and parallel sets of questions for malt/wine/spirits-based coolers, including prepackaged cocktails and hard tea/cider/lemonade; beer, including malt liquor; wine, including fortified wine; and distilled spirits, including mixed drinks that were not prepackaged. For each beverage type, respondents were asked overall frequency of drinking, usual and largest quantity of drinks consumed in a single day, frequencies of drinking 5+ drinks and the largest quantity, usual drink size and usual brand consumed, from which ethanol content by volume was obtained. A separate series of questions for all alcoholic beverages combined replicated the quantity/frequency items above and added frequency of drinking 4+ drinks for women (and additionally for men 65 and older in the NESARC-III). The only other change in the NESARC-III was the addition of questions on frequencies of consuming 8+ and 12+ drinks for all beverages combined.

ADV of ethanol intake was computed from usual and largest quantities of drinks and their associated frequencies as well as frequency of drinking 5+ drinks (Dawson, 2003). The new questions on drinking 8+ and 12+ drinks were not used in estimating ADV for the NESARC-III, to ensure comparability of volume estimates across surveys. Overall volume of consumption was set to the larger of the sum of the beverage-specific volumes or the volume derived from questions for all alcoholic beverages combined. To avoid undue influence of outliers, we top-coded ADV down to 14.4 ounces (≈24 cans of beer). This affected <1% of drinkers. Frequency of drinking in days/year corresponded to the midpoint of the selected response category. Frequency of heavy episodic drinking (HED) was based on drinking 5+ drinks for specific beverages and drinking 5+/4+ drinks (for men and women, respectively) for all beverages combined. To approximate the measure of past-month HED used in many prior studies, we constructed a variable that was positive if frequency of HED for all beverage types combined was ≥1/month.

Sociodemographic characteristics used to define population subgroups comprised age, sex, race-ethnicity, marital status, educational attainment and family income. Individuals endorsing multiple races were systematically assigned to a single "main" race (Smith et al., 2010), with Hispanic origin comprising a separate category irrespective of race. Missing values on these sociodemographic characteristics (generally <1% of the total sample) were imputed identically in both surveys.

2.3. Data analyses

Data from the Wave 1 NESARC and NESARC-III were combined into a single data set, with a dummy variable for survey period. We examined the proportion of past-year drinkers and, among drinkers, ADV, overall frequency of drinking and prevalence of ≥monthly HED for specific beverages in the total population and for all beverages combined within sociodemographic subgroups. All data analysis employed SUDAAN software (Research Triangle Institute, 2008) to account for the complex, multistage survey designs. To assess the significance of consumption changes over time after accounting for changes in sociodemographic composition, we estimated multiple regression models, in which survey period was the primary exposure variable, with controls for sociodemographic characteristics. A second set of models included interactions between survey period and the other covariates to determine whether changes over time varied across population subgroups.

Logistic regression models predicted past-year drinking and ≥monthly HED among past-year drinkers. Linear regression models predicted ADV and overall drinking frequency among past-year drinkers. ADV and drinking frequency were log-transformed to help normalize their distributions and yield multiplicative models. Thus, beta parameters from these models do not represent additive effects but, when exponentiated, indicate the ratio of the outcome measure for each covariate relative to its referent. The main effects models included all main effects; models including interactions included all main effects and interactions significant at the $p < 0.05$ level.