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**Commentary on White and Colleagues: Trends in Alcohol-Related Emergency  
Department Visits in the United States: Results from the Nationwide Emergency  
Department Sample, 2006-2014 (ACER, 2018)**

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Epidemiological research has documented a puzzling disconnect between recent alcohol-  
related trends in the United States. Studies comparing year-to-year prevalence of alcohol use and  
binge drinking have shown that drinking has been decreasing among adolescents and young  
adults (Center for Behavioral Health Statistics and Quality, 2015; Miech et al., 2017;  
Schulenberg et al., 2017). In seeming contradiction to such decreasing use, trends in demand for  
alcohol-related hospital services—particularly for emergency department (ED) and inpatient  
services—have been increasing (National Institutes of Health, 2013). New research by White and  
colleagues (2018) has added further confirmation of increasing demand for alcohol-related health

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27 care, documenting that overall ED visits involving both acute and chronic alcohol consumption  
28 rose dramatically between 2006 and 2014.

29 The new results of White and colleagues (2018) also bring attention to a potential  
30 solution to the puzzle, by identifying divergence in age-specific trends of alcohol-related ED  
31 visits. Specifically, they report that between 2006 and 2014, the rate of change in overall, acute,  
32 and chronic alcohol-related ED visits significantly increased for all adult age groups (18 and  
33 older), with the greatest increases observed for middle-aged adults. Among adolescents (aged 12-  
34 17), overall and acute alcohol-related ED visits significantly decreased, while chronic alcohol-  
35 related ED visits significantly increased (White et al., 2018). Identification of different trends in  
36 alcohol-related ED visits for adolescents, young adults, and adults highlights the importance of  
37 understanding age-specific patterns in alcohol consumption.

38 Here, we comment on existing, age-specific data consistent with two possibly  
39 complementary working theories regarding what may explain the trends in alcohol-related ED  
40 visits. First, increases in alcohol-related ED visits may be attributable to an increasing intensity  
41 of alcohol use among drinkers (Patrick, 2016; Patrick et al., 2013; Patrick et al., 2017a; White et  
42 al., 2018). Second, increased co-ingestion of alcohol with other drugs may be exacerbating risks  
43 and contributing to increases in alcohol-related ED visits.

#### 44 **High-Intensity Drinking**

45 One way to examine the intensity of alcohol use is to document changes in high-intensity  
46 drinking, defined as consuming twice or three times the typical binge drinking threshold of 5  
47 drinks (or 4 for women and 5 for men) in a row (Patrick, 2016). Developmental trends indicate  
48 that the prevalence of high-intensity drinking increases with age from adolescence into young  
49 adulthood (Patrick et al., 2016). Based on U.S. data in 2016, having 10 or more drinks in a row  
50 in the past two weeks was reported by 1% of 8<sup>th</sup> graders (Patrick et al., 2017b), 3% of 10<sup>th</sup>  
51 graders (Patrick et al., 2017b), and 4% of 12<sup>th</sup> graders (Miech et al., 2017). Data from 2005 to  
52 2016 indicate that this level of drinking is reported by 11% of young adults ages 19 to 30  
53 (Schulenberg et al., 2017). From age 30 onward, the prevalence of 10+ drinking decreases with  
54 age (Linden-Carmichael et al., 2017).

55 Historical trends in high-intensity drinking do vary by age. High-intensity drinking  
56 among adolescents has decreased over time (Miech et al., 2017; Patrick et al., 2013), although  
57 the adolescent prevalence of very high-intensity drinking (15+ drinks in a row) has not decreased

58 as quickly as the prevalence of 10+ drinking (Patrick et al., 2013). White et al. (2018)  
59 documented a corresponding significant decrease over time in overall and acute alcohol-related  
60 ED visits among those aged 12 to 17; however, the increase in chronic alcohol-related ED visits  
61 for this age group remains unexplained by available data regarding trends in high-intensity  
62 drinking.

63 Among adults, Monitoring the Future data have shown decreases in binge and high-  
64 intensity drinking among those aged 18-24, relative stability among those aged 25-28, and  
65 increases among those aged 29-30 (Patrick et al., 2017a). Data from the National Epidemiologic  
66 Survey on Alcohol and Related Conditions (NESARC) have shown increased prevalence of  
67 alcohol use, binge drinking, and high-intensity drinking in the past 12 months among adults  
68 overall when comparing prevalence levels from 2001-2002 with those from 2012-2013 (Grant et  
69 al., 2017; Hingson et al., 2017). When NESARC is examined by age group, adults aged 45 and  
70 above had greater increases (Grant et al., 2017). Overall, high-intensity drinking appears to be  
71 increasing particularly for middle-aged adults and is consistent with the particularly notable  
72 increases in acute and chronic ED visits among this age group.

### 73 **Combined Alcohol and Other Drug Use**

74 Changes in alcohol-related ED visits may also be explained, in part, by changes in the  
75 simultaneous use of alcohol and other drugs. Simultaneous use—that is when the effects of  
76 alcohol and the other substance overlap—can exacerbate alcohol-related risk. Whether or not  
77 alcohol intensity has changed, changes in the prevalence or frequency of combining alcohol with  
78 other drugs could lead to changes in acute and chronic alcohol-related problems. White and  
79 colleagues (2018) reported that roughly 1 in 6 alcohol-related ED visits involved alcohol use in  
80 combination with other drugs. Current evidence points to two particular types of simultaneous  
81 use that may be on the rise among adults: use of alcohol with marijuana, and use of alcohol with  
82 non-medical prescription drugs.

83 Simultaneous alcohol and marijuana use is associated with increased alcohol use and  
84 negative outcomes including alcohol dependence, harms to self, and drunk driving (Midanik et  
85 al., 2007; Subbaraman & Kerr, 2015). Among 12<sup>th</sup> grade students, simultaneous alcohol and  
86 marijuana use also is associated with higher-intensity drinking (Patrick et al., 2017c).  
87 Preliminary trend analysis indicated that simultaneous alcohol and marijuana use has been  
88 increasing historically among most young adult age groups (Terry-McElrath & Patrick, 2016).

89 Therefore, simultaneous use of alcohol and marijuana may help explain increases in acute and  
90 chronic ED visits, at least among young adults.

91 Co-ingestion of alcohol and non-medical prescription drugs (i.e., opioids, sedatives,  
92 stimulants, or tranquilizers) is also significantly and positively associated with high-intensity  
93 drinking among 12<sup>th</sup> grade students in the U.S. (McCabe et al., 2017), and is associated with a  
94 range of negative outcomes including blackouts, driving under the influence, illness, and  
95 unplanned sex (McCabe et al., 2006). Existing data show that use of nonmedical prescription  
96 drugs in the U.S. has decreased in recent years for those aged 18 to 28 (Miech et al., 2017;  
97 Schulenberg et al., 2017), has remained generally stable for those aged 26 and older (Center for  
98 Behavioral Health Statistics and Quality, 2015), and has significantly increased for those aged 50  
99 and older (Schepis & McCabe, 2016). It remains an open question whether trends for co-  
100 ingestion of alcohol with non-medical prescription drugs parallel those for the overall  
101 nonmedical use of prescription drugs. If so, increased use of alcohol with nonmedical  
102 prescription drugs may help explain the increase in alcohol-related ED visits, at least among  
103 middle-aged adults.

#### 104 **Summary and Future Directions**

105 Increased alcohol-related ED visits among adults aged 18 and older are consistent with  
106 historical increases in: the prevalence of high-intensity drinking among those aged 29 and older  
107 (Grant et al., 2017; Patrick et al., 2017a), simultaneous use of alcohol and marijuana among  
108 young adults (Terry-McElrath & Patrick, 2016), and nonmedical prescription drug use among  
109 those aged 50 and older (Schepis & McCabe, 2016) that may co-occur with alcohol use.  
110 Increased drinking intensity and increased simultaneous use of alcohol with other substances  
111 provide two possible theories that support the observed increase in alcohol-related consequences  
112 among adults, although trends and explanations differ somewhat based on age. Future research  
113 should examine these and other possibilities as explanations for trends in alcohol-related ED  
114 visits among adults in the U.S., with particular attention to the specific patterns among  
115 adolescents, young adults, middle-age adults, and older adults.

116

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