Published in final edited form as:

Alcohol Clin Exp Res. 2016 September ; 40(9): 1822–1824. doi:10.1111/acer.13161.

Commentary on: The Impact of the Minimum Legal Drinking Age on Alcohol Related Chronic Disease Mortality

Paul J. Gruenewald, Ph.D.

Prevention Research Center, Pacific Institute for Research and Evaluation, 180 Grand Avenue, Ste. 1200, Oakland, CA 94612

In a landmark series of studies, Wagenaar and colleagues (see O'Malley and Wagenaar, 1991; Wagenaar, 1993; Wagenaar and Wolfson, 1995) demonstrated that when states switched to a higher (or lower) minimum legal drinking age (MLDA) alcohol use and related problems decreased (or increased) among young people in the United States. Higher MLDAs make it more difficult for newly underage drinkers to purchase alcohol, reduce drinking among those too young to be directly affected by the MLDA, reduce drinking among of-age youth who grew up with higher MLDAs, and reduce alcohol-related motor-vehicle crashes and other problems (Wagenaar and Toomey, 2002). More recent work has demonstrated that the effectiveness of MLDA laws is to some degree contingent on enforcement (Miron and Teitlebaum, 2009) and other constraints on the alcohol market (e.g., taxes, Ponicki, et al, 2007), but among alcohol policy researchers the consensus opinion appears to be that higher MLDAs reduce problems among underage youth and young adults (Nelson, et al., 2013). The strength of evidence for long-term effects on alcohol related problems among adult drinkers is less secure. Thus, despite the demonstrated effectiveness of MLDA laws, most nations have MLDAs lower than that of the United States and some have moved to reduce the age at which alcohol may be purchased and used. New Zealand lowered its MPA from 20 to 18 in 1999 leading to increases in alcohol related health problems among 18–19 year olds directly affected by the law and among younger drinkers 16–17 years of age (Huckle et al, 2006; Kypri et al, 2006).

On the basis of these observations it remains something of a puzzle as to why any government would maintain or lower MLDAs below age 21. Historical inertia aside, arguments for maintaining or lowering MLDAs appear to be based upon either increased employment and tax receipts or some notion of the normalization of drinking behaviors intended to reduce binge or heavy drinking among young people (Ford, 2013; Chafetz, 2013; New Zealand Ministry of Social Development, 2015). Greater employment and tax receipts would appear to be a weak argument since drinkers under age 21 constitute but a small portion of overall alcohol demand (Cook, 2007). Normalization of problem drinking would be a strong argument if indeed lower MLDAs led to less drinking and fewer problems among young people. In New Zealand that certainly is not the case; the lowered minimum purchase age led to greater use, greater use in higher risk drinking environments and more

problems in directly affected 18–19 year old and underage 16–17 year old age groups (Gruenewald, et al, 2015).

Perhaps the last resort of arguments for lower MLDA could be that, after all, they do not lead to greater long-term health problems among adults. Perhaps there are more drinking and problems among young people but these work themselves out somehow to reduce life-long risks? Into this breach has stepped Plunk and colleagues (2016). Motivated by the observation that alcohol use in early adulthood may have long-term neurocognitive effects (Chambers, et al., 2003), Plunk and colleagues continue a line of research that examines health outcomes later in life among adults who were affected by a change in the MLDA during their youth (e.g., Norberg, et al, 2009; Grucza, et al, 2012); they focus upon mortality related to alcoholic liver cirrhosis, other liver disease, lip/oral/pharynx, esophageal and laryngeal cancers. They find 6% to 8% higher mortality rates among non-college youth who experienced a change to a lower MLDA and no effects among college youth. So it appears, at least statistically, that lowered MLDA may be related to greater alcohol-related morbidity and mortality later in life, but only among those without some college education, at least in terms of the measure of “educational attainment” reported in the Multiple Cause of Death files. How could this be so?

Returns to Education?

The authors provide two suggestions about what might be going on here. First, they note that it is possible that age 21 MLDA laws confer some protection among non-college educated individuals against risks for later alcohol problems. They suggest that life-long drinking habits may be formed during the college years, roughly age 18 through 22, and early differences between college-attending and other youth may extend into adulthood. Presumably, without ready access to alcohol non-college youth do not have opportunities to develop the same patterns of risky drinking seen among college drinkers. And presumably this would lead to greater mortality related to alcohol among college youth; but this is not the case. Table 2 of the study shows that mortality risks were greater among non-college youth than youth with some college attendance, at least on the margins. So whatever effect greater MLDA may have on mortality risks among non-college attendees, they must act to reduce risks that are much greater on average than those among college attendees. The challenge here is to understand how alcohol use in a population which has less access to alcohol, less frequent use, and far less abuse than exhibited by college drinkers comes to have greater mortality risks related to alcohol? The direct neurocognitive argument would seem to suggest quite the opposite (though one must argue that age 18–22, rather than some earlier age range, represents a vulnerable period).

As an alternative explanation, the authors suggest that the differential effect observed between non-college and college attending persons could be explained by the impacts of college education on later health, moderating negative effects of permissive MLDA exposures. With regard to this point, it is one of those rare causal certainties in the social sciences that there are health returns to education that benefit high socioeconomic status groups (Grossman, 2006); the advantages of secondary and tertiary education are such as to provide greater employment opportunities, greater income, better (and more expensive)

health insurance, with subsequent lower mortality rates across a broad spectrum of outcomes. While the causal mechanisms are not fully understood, the effects of education on health, mediated by employment opportunities and proffered health benefits, are fairly well established (Muennig, et al., 2005a,b). From this point of view, heavy college drinking may have immediate health impacts, and these drinkers may continue to drink much later in life, but nevertheless have lower mortality risks due to the ameliorating impacts of improved health care. From this point of view, college attendance is a marker for those socioeconomic conditions which ameliorate mortality risks of all sorts, including mortality risks for outcomes unrelated to alcohol use. Thus, risks related to ethanol exposures at an early age should be selectively related to health outcomes specific to those exposures alone and a suitable counter-factual argument here is to ask whether the age 21 MLDA laws were related to reductions in mortality risks unrelated to alcohol use? We would expect not among non-college attending youth who experience the benefits related to greater MLDAs, but expect so among college attending youth who may drink heavily in college but experience the broad benefits of better health associated with higher education.

Developmental Social Ecology?

The work presented by Plunk and colleagues (2016) takes some first steps toward answering some difficult questions in studies of life course effects of early alcohol use on abuse, dependence and related health outcomes later in life. Independent of the differences observed between college and non-college attending persons, the work suggests that the age 21 MLDA laws may indeed have had long-term impacts on adult health. But, as noted here, since these effects take place over the life course they perforce also take place concurrent with other changing socioeconomic conditions that also affect health outcomes. Thus, there is a third reason why college attending young people might not experience long-term effects related to greater age 21 MLDA laws; after graduation college students experience major life transitions into other social roles and environments, transitions that may protect them from further harms related to prior alcohol use (O'Malley, 2005). In order to illuminate these effects, studies of the impacts of life course transitions on alcohol health are critical. They will help clarify specific effects related to alcohol use and place such studies in the larger conceptual frameworks that affect health outcomes of all sorts. These more encompassing frameworks can help explain not only why we do see effects of MLDA laws among non-college youth, and why an otherwise greater at-risk population of college drinkers might exhibit less mortality risks, but also provide better understandings of long-term health outcomes related to alcohol use. Perhaps non-college youth learn to drink in safer ways subsequent to raising the MLDA? Perhaps college youth subsequently earn more, have better insurance, and exhibit lower problems related to their alcohol use? Perhaps the life transition from college to later life substantially reduces their risks?

These are but a few, and probably not the most important, questions that arise when considering alcohol effects over the life course. They are mentioned here only to underline the fact that we know precious little about these effects and have little idea about the long-term consequences of abstinence, use, heavy use in college or anywhere else, or abuse on long-term health outcomes. In large part this is because social developmental models of life course drinking and problems are in a nascent phase; frameworks that effectively integrate

the genetic preconditions and socioeconomic scaffolds in which development takes place have only recently been introduced into the alcohol research literature (see Masten, et al., 2016; Zucker, 2006). In large part this is also a result of the slow progress that has been made in detailing the social ecological conditions that affect etiologies of alcohol use among youth and adults; the social mechanisms by which social, economic, physical, and legal environments for alcohol use are shaped by and for alcohol users has only recently come under detailed scrutiny (e.g., Gruenewald, 2007). The problem of returns to education that sits at the center of the current study underlines these developing concerns (pun intended); critical research is needed to explain how a population of heavier alcohol users, presumably at greater risk for alcohol problems, exhibits lower risks later in life. It is important to know whether the long-term costs of heavy alcohol use early in life should include the costs of ameliorating alcohol related conditions.

Acknowledgments

This research was supported by National Institute on Alcohol Abuse and Alcoholism Research Center Grant P60-AA006282.

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