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## Collateral Damage from College Drinking: A Conceptual Framework for Alcohol's Harms to Others among US College Students

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### Abstract

**Background:** A growing literature shows that drinkers can harm bystanders through alcohol-related harms to others (HTO). The burden of HTO is particularly consequential in college environments, where heavy alcohol consumption and related harms are highly prevalent. A key limitation to the current literature on HTO among college students is that the determinants of HTO in college settings are not well-described.

**Objective:** This article presents an evidence- and theory-based conceptual framework of HTO among United States college students.

**Methods:** This study used a literature review in Embase, PsycInfo, PubMed, and Web of Science to determine the prevalence of HTO among college students and literature gaps. Researchers supplemented college HTO literature with broader HTO literature to develop a conceptual framework.

**Results:** Prevalence estimates for HTO among college populations range from 59% to 84%. Literature on HTO among college students is mostly confined to brief sections of larger surveys. The college HTO literature lacks the level of detail necessary to support methodologically rigorous research.

**Conclusions:** HTO are prevalent among college populations but their prevalence and etiology are not well understood. This likely leads to systematic undercounting of the impact of alcohol in college settings, exacerbating the “translation” gap between what the research says is effective and what colleges actually do. Better understanding of HTO mechanisms through which drinkers harm those around them would inform alcohol research and policy on college campuses, and lead to more accurate assessments of the degree to which stronger alcohol policies could benefit all students, regardless of their drinking patterns.

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## Introduction

Alcohol's harms to college drinkers are well-documented but alcohol-related harms borne by persons other than the drinker are not. Drinkers may harm others through alcohol's mind-altering effects (e.g., increased violence, decreased workplace productivity) and/or by violating social responses to alcohol consumption (e.g., laws, public decorum) (Rehm, 2010). These alcohol-related harms to others (HTO) include subjective and objective harms attributable to alcohol that occur in the social environment (Rehm, 2010). Youth under age 30 experience a disproportionate amount of HTO in all life domains except work (Connor & Casswell, 2012; Gmel & Rehm, 2003; Greenfield et al., 2009; Hope, 2014; Huhtanen & Tigerstedt, 2012; Laslett et al., 2010; Rossow & Hauge, 2004). College environments are associated with particularly heavy alcohol consumption and related harms (Substance Abuse and Mental Health Services Administration, 2017). However, there is a significant "translation" gap between what the research says is effective (National Institute on Alcohol Abuse and Alcoholism, 2016) and what colleges actually do (Lenk, Erickson, Nelson, Winters, & Toomey, 2012). This suggests that colleges may lack or overlook data documenting the burden of alcohol-related problems on their campuses, so the levels of unrecorded HTO may be substantial in these high-risk settings. Therefore, information on college HTO could feed a greater sense of urgency for school officials to take more effective steps to reduce and prevent alcohol-related harms.

HTO research is an emerging field within alcohol epidemiology and addresses some of the limitations of current approaches to quantifying drinking behaviors and related costs. Excessive drinking was estimated to cost \$249 billion in the US in 2010 (Sacks, Gonzales, Bouchery, Tomedi, & Brewer, 2015). However, this and other estimates of alcohol-related harms are overly conservative because for the most part, they exclude morbidity, mortality, and cost borne by persons around the drinker that occur because of the drinker's behavior under the influence of alcohol. While the HTO evidence base is still relatively new, preliminary data suggest HTO affect substantial portions of the population (Casswell, Harding, You, & Huckle, 2011; Greenfield et al., 2009; Laslett et al., 2010).

The influence that secondhand smoke research had in garnering support for smoke-free laws in airplanes, public transport, workplaces, and public indoor places shows that the HTO frame could play a significant role in garnering public and political support for prevention initiatives such as more effective campus and state-level alcohol policies. People who report having experienced HTO tend to be more supportive of alcohol policies (Greenfield, Karriker-Jaffe, Giesbrecht, Kerr, & Bond, 2015), which suggests that a larger awareness of HTO might help foster public support for alcohol policies. Further, more recent and detailed prevalence estimates of HTO would make it possible to generate more accurate estimates of the total burden of alcohol in college settings. This information could then be used to justify increasing resources for combatting alcohol-related harms to make the level of resources more commensurate with alcohol's burden on campus life and health.

Given this background, this article aims to conduct a literature review on HTO among college students. There are two aims of this literature review: 1) Determine the risk and protective factors for HTO in college settings, and 2) Determine the prevalence of HTO on

college campuses. After performing the review, we consulted with experts to add relevant research on HTO among the general population to develop an evidence- and theory-based conceptual framework proposing key determinants and risk factors for HTO among college students.

## Methods

We conducted a literature review on HTO among college students in order to assess current knowledge regarding the prevalence of HTO among college students and identify gaps in the literature. The review included a search of Embase, PsychInfo, PubMed, and ISI Web of Science articles published since 2000 in English. Table 1 summarizes search terms used to search article abstracts, titles, and topics. MeSH terms were included for PubMed only. Articles were excluded if they were not on HTO or college students, not written in English, used non-probability sampling designs and/or were not original contributions. HTO was operationalized using a two-part definition: 1.) Alcohol consumption preceded the outcome, and 2.) The outcome affected someone other than the drinker. The review included articles on both HTO perpetration and victimization. After conducting this review, we integrated research on HTO from adult populations, and we confirmed our additions/omissions with leading experts in youth alcohol use and HTO.

## Results

Of the 1,457 identified articles, there were 29 articles from 18 studies that met inclusion criteria. Of these, three articles were from data collection efforts designed to measure HTO victimization among college students (Diep, Knibbe, Giang, & De Vries, 2015; Hallett et al., 2012; Langley, Kypri, & Stephenson, 2003). Of the 15 other studies, four included brief sections about HTO (i.e., Harvard's College Alcohol Survey, the Canadian Campus Survey, Ireland's College Lifestyle and Altitudinal Survey, and the Study to Prevent Alcohol-Related Consequences), two included brief sections about alcohol-related consequences in which a fewer than five HTO were included (Rinker, Young, Krieger, Lembo, & Neighbors, 2017; Strunin et al., 2014), and eight focused on a few specific HTO (Araas & Adams, 2008; Fair & Vanyur, 2011; Howard, Griffin, & Boekeloo, 2008; Neal & Fromme, 2007; O'Brien et al., 2017; Presley & Pimentel, 2006; Reed, Amaro, Matsumoto, & Kaysen, 2009; Wilhite, Mallard, & Fromme, 2018). As shown in Figure 2, this means most of the research studies on college HTO included fewer than five harms.

Overall, the articles identified from this review had diverse objectives. The three devoted studies aimed to determine the prevalence and risk factors for HTO among college students (Diep et al., 2015; Hallett et al., 2012; Langley et al., 2003), and one study compared the distribution of HTO among drinkers and non-drinkers (Cabalatungan, 2015). Eleven articles investigated specific populations (e.g., sports fans, athletes), campus settings (e.g., total alcohol bans) or specific HTO (e.g., sexual assault or date fighting) (Fair & Vanyur, 2011; Harford, Wechsler, & Muthen, 2003; Howard et al., 2008; Martin et al., 2009; Neal & Fromme, 2007; Nelson & Wechsler, 2001, 2003; O'Brien et al., 2017; Reed et al., 2009; Rhodes et al., 2009; Wechsler, Lee, Gledhill-Hoyt, & Nelson, 2001; Wilhite et al., 2018). Seven articles investigated associations between independent variables (e.g., drinking levels

and protective behavioral strategies) and HTO (Abar, Mallett, Turrissi, & Abar, 2016; Araas & Adams, 2008; Cabalatungan & McCarthy, 2015; Nelson, Xuan, Lee, Weitzman, & Wechsler, 2009; Presley & Pimentel, 2006; Wechsler, Lee, Nelson, & Lee, 2001; Weitzman & Chen, 2005). One article used HTO to evaluate the A Matter of Degree program (Weitzman, Nelson, Lee, & Wechsler, 2004), and five included HTO as part of an investigation into alcohol-related harms (Adlaf, Demers, & Gliksman, 2015; Hope, 2011; Rinker et al., 2017; Strunin et al., 2014; Townshend, 2013).

The results of the review demonstrate that there is a lack of comprehensive literature on HTO among college students. Available data are overwhelmingly (90%) from brief sections or a few questions on surveys and minimally (10%) from studies devoted to HTO. To the best of our knowledge, there are only three studies that focused comprehensively on HTO among college students (Diep et al., 2015; Hallett et al., 2012; Langley et al., 2003). This means most of the literature to date on college HTO is based on a short section of a survey or a study focusing on a few specific HTO and often at one university or college. This piecemeal approach may give some indication of scope of specific harms, but it is insufficient to understand the full health burden of HTO on college populations.

Looking within the subset of HTO research studies that included the most harms shows that the studies are inconsistent in the harms reported, question wording, and recall period. Further, many of these articles do not report prevalence data for all of the harms measured (Adlaf et al., 2015; Hope, 2011; Martin et al., 2009), and some report only an aggregate measure of experiencing any HTO (Townshend, 2013). This makes it hard to compare HTO estimates across times, places, and subpopulations.

One possible solution to ensure greater depth and harmonize methods is to use the WHO/Thai “gold standard” protocol for measuring HTO (see Table 2). No studies included in this review used this protocol. This suggests there are conceptual and methodological barriers to be resolved in HTO research among college students, perhaps the most important of which is that determinants of HTO among college populations are not well understood. With this being the case, measuring HTO will likely be both difficult and imprecise.

Data gleaned from this review also indicate HTO are common among college students. Between 59% and 84% of college students report experiencing HTO (Diep et al., 2015; Hope, 2011; Langley et al., 2003; Rhodes et al., 2009). This is a considerable segment of the student population experiencing harms that have been largely unexplored. In response to these findings, this article proposes a conceptual framework to organize existing knowledge and guide future HTO research among college populations. Our evidence- and theory-based conceptualization of HTO is shown in Figure 3. Future research based on this framework could identify potential policies and priority populations for interventions to prevent HTO.

This is the first model to synthesize the current evidence base and propose determinants of college HTO using Bronfenbrenner’s Ecological Systems Theory (Bronfenbrenner, 1992). The model shows the potential pathways for interventions, interventions applicable at each level, and mechanisms by which HTO affect multiple levels, from the individual to the environmental. Such a framework inherently looks towards interventions that are multi-level,

which are recommended for preventing alcohol-related harms (Babor, 2010) and have proven to be more effective in college settings (Nelson, Weitzman, & Wechsler, 2005). This section summarizes the determinants described in the current college HTO literature using Figure 3 as a guide.

As shown in the framework, the literature suggests two factors best predict risk for experiencing HTO: a person's own drinking pattern and relationships with heavy drinkers. The college HTO literature contains some examination of drinking patterns. Students who have a score of eight or higher on the Alcohol Use Disorders Identification Test have twice the odds of experiencing HTO compared to students with lower scores (Diep et al., 2015). In addition, drinkers were more likely to report HTO than their non-drinking peers (Cabalatungan, 2015). Further, students who never use protective behavioral strategies (PBS) to reduce excessive alcohol consumption (e.g., pacing drinks, limiting consumption to a set number of drinks) have 6.2 times the odds of physically injuring someone else after drinking compared to students who always use these strategies (Araas & Adams, 2008).

HTO research with the general population corroborates the importance of drinking patterns in predicting HTO among college students (Greenfield et al., 2009; Marmet & Gmel, 2017). Binge drinkers (i.e., persons who drink at least five alcoholic beverages in a row at least one day per month) have 2.4 times higher odds of experiencing two or more HTOs as compared to lifetime abstainers (Greenfield et al., 2009). If a person has an alcohol use disorder (AUD) (i.e., alcohol misuse or dependence), these odds of experiencing two or more HTO increase to eight times higher (Greenfield et al., 2009). This could be explained if heavy drinkers cluster together and harm one another. However, students need not be heavy drinkers to experience these harms; abstainers and non-heavy drinkers also report substantial HTO (Cabalatungan, 2015; Langley et al., 2003). For instance, 72% of students who never drink heavily reported experiencing HTO, most commonly having one's sleep or study interrupted or being insulted or humiliated (Hallett et al., 2012).

None of the studies identified in this review explored relationships with heavy drinkers except briefly in the context of living arrangements. Students who live with weekly drinkers have a 2.7 times the odds of experiencing HTO over the course of one month and 3.7 times the odds of experiencing these harms over the course of a year, as compared to persons who live with non-drinkers (Diep et al., 2015; Wechsler, Lee, Nelson, et al., 2001). Students living with three or more roommates report more HTO than students with fewer than three roommates (Martin et al., 2009). Conversely, students living in substance-free housing report less property damage, serious arguments, taking care of drunk students, finding vomit in the hallways, and having one's study or sleep interrupted (Wechsler, Lee, Nelson, et al., 2001).

However, the general HTO literature contains strong evidence for the role of relationships with heavy drinkers in risk for experiencing HTO. Among persons with heavy drinkers in their lives, 84% reported at least one HTO from that relationship (Casswell et al., 2011). This prevalence rate increases to 95% when looking within the 12–29 year old age group (Casswell et al., 2011), which include typical college ages. There is also a trend where the HTO people who report from drinkers they know stem exclusively from one relationship (Waleewong, Jankhotkaew, Thamarangsi, & Chaiyasong, 2017). In addition, harms from

persons the victim knows tend to be more serious than harms from strangers, and people tend to suffer HTO more frequently from persons they know well (Laslett et al., 2011a).

Moving from the proximal determinants to the innate level, the college HTO literature has begun to explore some individual-level determinants of HTO. Among these, sex/gender was the best described determinant in the college HTO literature. Female college students report being harmed by others' drinking more often than their male counterparts (Casswell et al., 2011; Huhtanen & Tigerstedt, 2012; Laslett et al., 2010; Rossow & Hauge, 2004). The college literature also documents that male and female college students report different types of HTO. Men are more likely to be assaulted or the victim of another crime off campus (Hallett et al., 2012). In particular, men have nearly twice the odds of experiencing bodily harms over a month compared to females (Diep et al., 2015). On the other hand, women are more likely to experience an unwanted sexual assault, babysit a drunk student (Hallett et al., 2012), or get into an argument (Presley & Pimentel, 2006). In addition, women may be more likely to experience psychological harms from others' drinking than their male peers (Waleewong et al., 2017).

However, the college HTO literature may miss nuance in reporting rates and potential effect modification. For example, the differences in HTO prevalence for males and females could be mediated by types of relationships with heavy drinkers or sex/gender dissimilarities in identifying and reporting HTO. Alternatively, women might have lower thresholds for attributing HTO to drinking or pay more attention to the HTO that emerge in their relationships (Huhtanen & Tigerstedt, 2012).

The college HTO literature also contains a cursory exploration of the effect of age on HTO but does not delve into hypotheses. Studies from this review conclude that younger college students report being harmed by others' drinking more often than older college students (Diep et al., 2015; Langley et al., 2003; Weitzman & Chen, 2005); they were also more likely to report serious arguments, being assaulted, babysitting other drunk students, having study or sleep interrupted, and/or unwanted sexual advances (Hallett et al., 2012). General HTO research confirms young adults are at increased risk for being harmed by others' drinking in all life domains except work (Diep et al., 2015; Gmel & Rehm, 2003; Greenfield et al., 2009; Huhtanen & Tigerstedt, 2012; Karriker-Jaffe, Greenfield, & Kaplan, 2017; Laslett et al., 2011b; Rossow & Hauge, 2004; Waleewong et al., 2017). Potential explanations for this association include that young people are in more public places (Huhtanen & Tigerstedt, 2012), and young adults are more likely to be exposed to binge drinkers (Laslett et al., 2011b).

This literature did not identify any college HTO literature that explored the association between HTO and race/ethnicity or family history of drinking. These may be important determinants to consider. Race/ethnicity is a risk regulator (i.e., a risk factor for risk factors) for both HTO and problematic drinking across the life course. Black and Hispanic adults experience more alcohol-related harms at similar consumption levels as White adults (Witbrodt, Mulia, Zemore, & Kerr, 2014; Zemore, Karriker-Jaffe, & Mulia, 2013). The broad HTO literature discovered this can translate to increased levels of HTO like alcohol-related violence (Tobler, Komro, & Maldonado-Molina, 2009). Similarly, genetic profiles



can influence alcohol consumption, though genes are not destiny (Banerjee, 2014; Edenberg & Foroud, 2013). Genetic profiles can influence the chances that a carrier will become dependent on alcohol (Banerjee, 2014; Edenberg & Foroud, 2013). A recent systematic review of phenotype studies concluded individuals with a family history of alcohol dependence have different volumes in the amygdala, hippocampus, basal ganglia, and cerebellum (Cservenka, 2016).

The college HTO literature we identified also did not consider individual behavioral determinants like age of first intoxication or drinking pattern during high school in the context of HTO, which experts on youth drinking emphasized as key variables in shaping college students' drinking patterns. Age of first intoxication is also a risk regulator for HTO. Youth who begin drinking earlier and progress quickly from their first drink to intoxication are more likely to binge or drink heavily in high school (Morean et al., 2014) and at age 20 (Adam et al., 2011). Thus, youth with earlier ages of intoxication are hypothesized to be at higher risk for HTO.

At the social, family, and community networks level, the college HTO literature has begun to examine the impact of student group affiliations, in the form of the potentially harmful or beneficial effects of athletics, the Greek system, and volunteerism. Further exploration is warranted, considering students who participate in sports and/or the Greek system drink more and report more harms from others' drinking (Martin et al., 2009; Weitzman & Chen, 2005) and each one hour increase in volunteerism is associated with a 45% decrease in the odds of having an AUD (Weitzman & Chen, 2005). Still, the literature shows that students who attend school sporting events report more HTO (Nelson & Wechsler, 2003). This is an important finding, but type of athlete may also be an important consideration in exposure to HTO, because intramural athletes tend to drink more than club athletes, intercollegiate athletes, and non-athletes (Barry, Howell, Riplinger, & Piazza-Gardner, 2015), and athletes who are more masculine tend to perpetrate more HTO (O'Brien et al., 2017). Fraternity affiliations can also determine the amount of alcohol students consume, because students who drink at fraternities tend to consume more alcohol than those who drink elsewhere. While these are important explorations, future studies should consider possible protective effects of other student group organizations, such as leadership and religious groups.

While one study adjusted for parental drinking pattern (Cabalatungan, 2015), the larger college HTO literature has not yet explored parent drinking patterns, but there is a rich pocket of HTO literature on children of heavy drinkers. Children of heavy drinkers are at increased risk for both prenatal alcohol exposure and being harmed by others' drinking later in life (Maffli, 2010; May et al., 2014). About 33–40% of children whose parents are dependent on alcohol develop an AUD themselves (Sher, Grekin, & Williams, 2005), and they have a six times higher risk of alcohol misuse/dependence than children of parents who are not dependent on alcohol (Cotton, 1979). The general HTO literature confirms that people with a family history of problematic alcohol use tend to report more HTO from drinkers they know (Karriker-Jaffe et al., 2017), and recent work using population registries shows that children of parents with substance use problems were more likely to be hospitalized or removed from the home by Child Services (Raitasalo, Holmila, Autti-Rämö,

Notkola, & Tapanainen, 2015). Together, this suggests that this group may possess unique risks for HTO, and the manifestation of this risk in college settings could be important.

At the living and working conditions level, the college HTO literature contains an exploration of indicators of socioeconomic status (SES) but does not explore the concept in the depth that might be warranted. Persons of low SES have higher risk for problematic drinking across the life course (Hart, 2015; Huckle, You, & Casswell, 2010), which likely places them at higher risk for HTO. Persons of low SES consume lower quantities of alcohol overall but binge drink more frequently than people of high SES (Huckle et al., 2010). This topic is important for both the college and general HTO literature, because findings to date yield divergent findings (Breen et al., 2011; Wechsler, Lee, Hall, Wagenaar, & Lee, 2002; Wilkinson & Livingston, 2012).

The college HTO literature begins to explore alcohol environments by examining effects of heavy binge drinking on levels of HTO. The alcohol environment plays a key role in determining drinking levels and by extension, heavy drinking that occurs on college campuses. In particular, higher alcohol outlet accessibility has been linked to higher rates of HTO victimization (Wilkinson & Livingston, 2012). This association could be mediated by clustering heavy drinkers or by higher alcohol consumption, as availability theory posits alcohol availability is congruent with alcohol consumption (Single, 1988).

The only alcohol policies explored in the existing college HTO literature are at the campus level and include total alcohol bans (Wechsler, Lee, Gledhill-Hoyt, et al., 2001) and substance-free housing (Wechsler, Lee, Nelson, et al., 2001). These studies conclude that students at colleges with alcohol bans report fewer HTO, including being insulted or humiliated, having a serious argument, and having their property damaged (Wechsler, Lee, Gledhill-Hoyt, et al., 2001). Students at colleges with “wet environments” (e.g., low enforcement of drinking laws) report more HTO (Wechsler & Nelson, 2008).

At the broad social, cultural, and environmental level, the college HTO literature contains a cursory exploration of urbanicity and region. There is insufficient detail in college HTO literature to decipher the effect of these determinants on HTO. Studies found that colleges in the northeast or north central regions of the US have higher rates of binge drinking (Nelson et al., 2009; Wechsler & Nelson, 2008), and students from smaller cities experience higher rates of HTO (Diep et al., 2015). Lone studies are insufficient to determine relationships between key variables, and the broader HTO literature shows urbanicity is associated with HTO but the directionality is unclear (Callinan & Room, 2014; Diep et al., 2015; Marmet & Gmel, 2017; Nelson et al., 2009; Rossow & Hauge, 2004). It is possible that the direction depends on cultural context, as these studies are from different countries. It could also be the case that the association between urbanicity and HTO is mediated through drinking patterns, as youth in inner-urban areas are more likely to report binge drinking than youth in outer-urban areas (MacLean et al., 2014).

State and local alcohol policies are also largely unexplored in the college HTO literature. There is a wide array of evidence-based policies that can regulate alcohol consumption. For example, policies can influence alcohol outlet access as well as other aspects of availability



(e.g., hours of sale) for certain populations (e.g., underage youth). As such, policies or lack thereof put people at risk for heavy drinking. For example, a 10% increase in a composite score of alcohol policy regulation (higher score equals stronger policies) was associated with an 8% decrease in odds of binge drinking and a 10% decrease in odds of consuming 10 or more alcoholic drinks (Xuan et al., 2015). Based on evidence presented in this review, it is likely that HTO prevalence increases as per capita consumption increases.

## Discussion

This paper presents a framework of proposed determinants for HTO among college students using the college HTO literature supplemented by the broader HTO literature. This framework maps HTO among college students based on Bronfenbrenner's Ecological Systems Theory (Bronfenbrenner, 1992). Ecological Systems Theory allows the framework to integrate determinants at multiple levels, which ensures breadth in determinants considered for the framework. Overall, the literature demonstrates that HTO are diverse and prevalent among college students. While researchers have not studied the consequences of experiencing these harms on the college experience in detail, preliminary evidence suggests that students who experience HTO tend to have lower grades and lower satisfaction with school, and these effects may be larger for students who do not drink (Cabalatungan, 2015). Further, the general HTO literature concludes that people who experience HTO, particularly from known drinkers, are more likely to experience distress (Karriker-Jaffe et al., 2017) and reduced mental health (Ferris, Laslett, Livingston, Room, & Wilkinson, 2011; Lewis-Laietmark et al., 2017).

Investigating HTO seeks to broaden the current research and practice paradigms by expanding the focus from exclusively on how drinkers harm themselves to also include how drinkers affect their surroundings. This new frame underscores that persons don't have to be extreme drinkers – or even a drinker at all – to suffer serious alcohol-related harm or to benefit from more effective alcohol policies. Like the conceptual framework presented in this article, this new frame of alcohol-related problems directly supports multi-level, multi-component solutions to combat alcohol-related harms (Karriker-Jaffe, Room, Giesbrecht, & Greenfield, 2018).

There are several limitations to this literature review and conceptual framework. First, associations in the framework are mostly from brief sections of cross-sectional questionnaires. Therefore, details are limited, and causality cannot be inferred. In addition, recall periods and question wording differed, so cross-country and cross-study comparisons are impossible at this stage.

Second, this review only uncovered survey data. Survey data will include lower estimates of alcohol consumption due to underreporting (Nelson, Naimi, Brewer, & Roeber, 2010). It is possible these data include higher estimates of the prevalence of HTO and administrative records than administrative records would uncover; however, these surveys will not identify the rare but serious HTO that would likely be present in administrative records (Room et al., 2010). There haven't been any administrative studies of HTO among college students to date. Future research should address this gap to capture HTO that the surveys may miss. In

addition, HTO studies confined to specific campus(es) or region(s) may be selected because the levels of heavy drinking and/or HTO are atypically high. These studies will likely contain higher prevalence estimates for HTO in the student body.

Lastly, HTO research involves inherent measurement issues. Namely, HTO are bidirectional, so differentiating the perpetrator from the victim can be subjective and challenging. The process of ascribing a specific harm to another's alcohol use is subjective, and the reliability of these determinations may depend on the nature of the harm (Rossow & Ramstedt, 2016). Data might be unreliable because the victim might have consumed alcohol at the time they experienced the HTO. In addition, HTO might be culturally bound, so what one person in one location considers a HTO might differ from what another person considers a HTO (Room et al., 2010).

The current college HTO literature lacks the detail required to support rigorous study designs. Attempts to measure the intensity of HTO in college settings involved either tallying the frequency or recency of occasions in which respondents experienced HTO (Wechsler, Moeykens, Davenport, Castillo, & Hansen, 1995; Weitzman & Chen, 2005) or asking respondents to classify HTOs according to degree of seriousness (Wechsler et al., 2002). These methods give some indication of scope but little insight into the magnitude of the health burden. This design also prevents researchers from comparing the burden of HTO to other established health risks. Thus, significant gaps remain in the knowledge base, particularly understanding the magnitude of HTO among college students, how HTO affect different college subgroups, and the severity of HTO. These gaps create barriers both to identifying interventions that could be effective at reducing such harms and marshalling appropriate resources to devote to such problems.

There is nuance in the relationships between determinants of HTO victimization among US college students, and the way researchers measure these associations matter. Future research should explore HTO among college students in depth and test proposed determinants of HTO. In particular, future research should pay greater attention to the potential moderating roles of sex/gender, race/ethnicity, and SES. Further, research should identify determinants of persons at risk for sustaining multiple relationships with heavy drinkers. This literature was almost non-existent, and this is a critical determinant in the path to experiencing HTO.

One potential tool to help researchers who want to measure HTO in college settings is the WHO/Thai HTO Protocol summarized in Table 2. This set of questions helps researchers to go beyond tallying the number of HTO that students experience to include measures of HTO frequency and severity. In addition, the WHO/Thai questionnaire captures relationships with heavy drinkers, which is a key construct missing from all college HTO studies identified in this review. Lastly, this protocol also integrates measures of the consequences of HTO on mental health, perceived life satisfaction, and support services.

Failure to measure HTO adequately among college populations leads to an undercounting of the impact of alcohol in these settings; conversely, better information on college HTO could feed a greater sense of urgency for school officials to better align their alcohol prevention strategies with current best practices (National Institute on Alcohol Abuse and Alcoholism,

2016). Three out of five colleges do not implement a comprehensive alcohol prevention strategy comprised of many strategies and approaches (Lenk et al., 2012), and the result of this gap is that the prevalence of US college drinking is declining far more slowly than prevalence of high school drinking (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2015).

If supported, this framework could serve as a basis for identifying the combination of intervention opportunities that will have the greatest impact in reducing HTO. This framework supports combining population-level controls with more focused policies that target specific locations (e.g., bars) or high-risk groups (e.g., fraternity members, student athletes). In strategizing how to combine alcohol policies to prevent HTO, it is possible that the effectiveness of the selective policies will depend on the effectiveness, stringency, and level of enforcement of the population-level controls in place (Karriker-Jaffe et al., 2018). The HTO frame is potentially beneficial to support both universal and selective policies because it argues that the benefits of such controls may extend beyond drinkers themselves to the population at large. This is critical in the US context, because policy options that protect innocent victims tend to be more popular than policies that protect persons from harming themselves.

HTO research embodies and explores a concept that is comparable to secondhand smoke research in tobacco prevention, which was instrumental in policy reform (Hyland et al., 2012). Drink driving policy advocates have successfully used the HTO frame to reduce alcohol-related consequences (Connor & Casswell, 2009; Fell & Voas, 2006). Similarly, students who experience these harms drink less later in college (Abar et al., 2016), which means greater awareness of HTO may help prevent alcohol-related harms if individual students regulate their behavior in response to these harms. In this respect, HTO research could be a critical missing piece in making a stronger case for evidence-based actions to reduce excessive alcohol use across the population, including college students.

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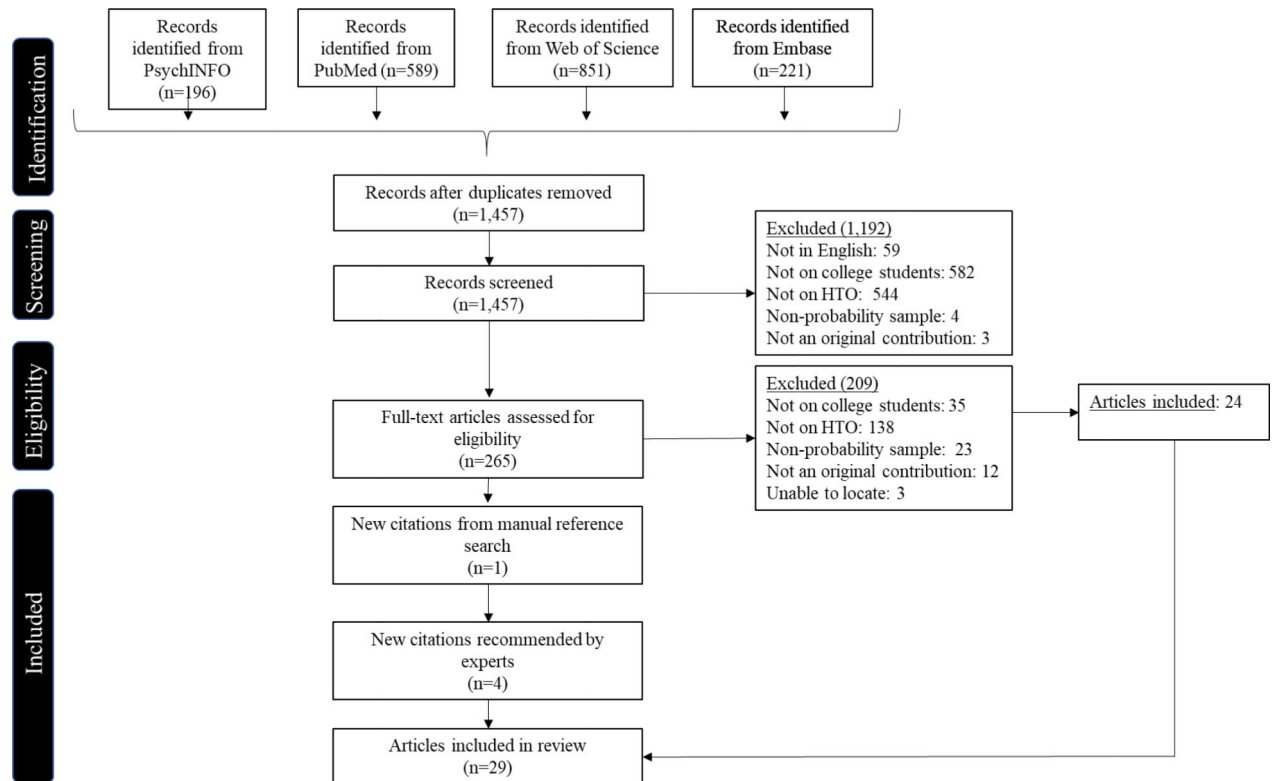
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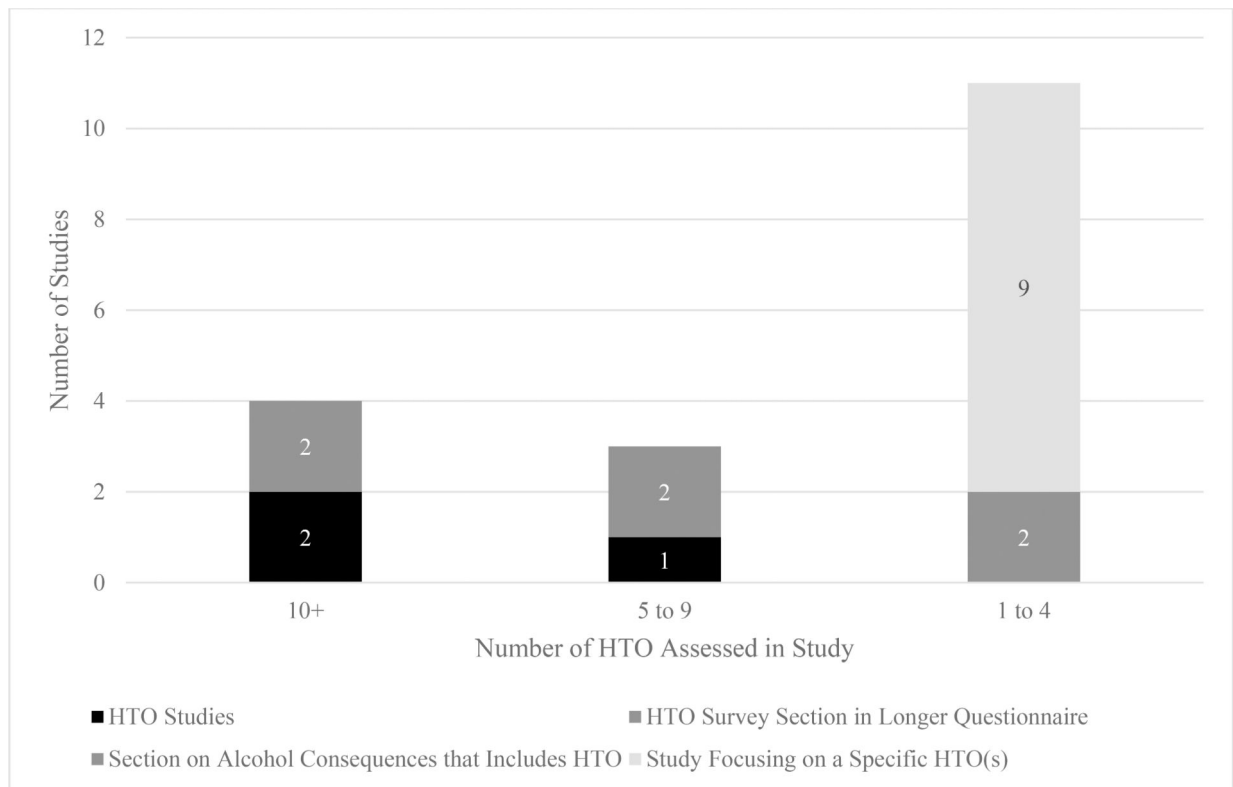


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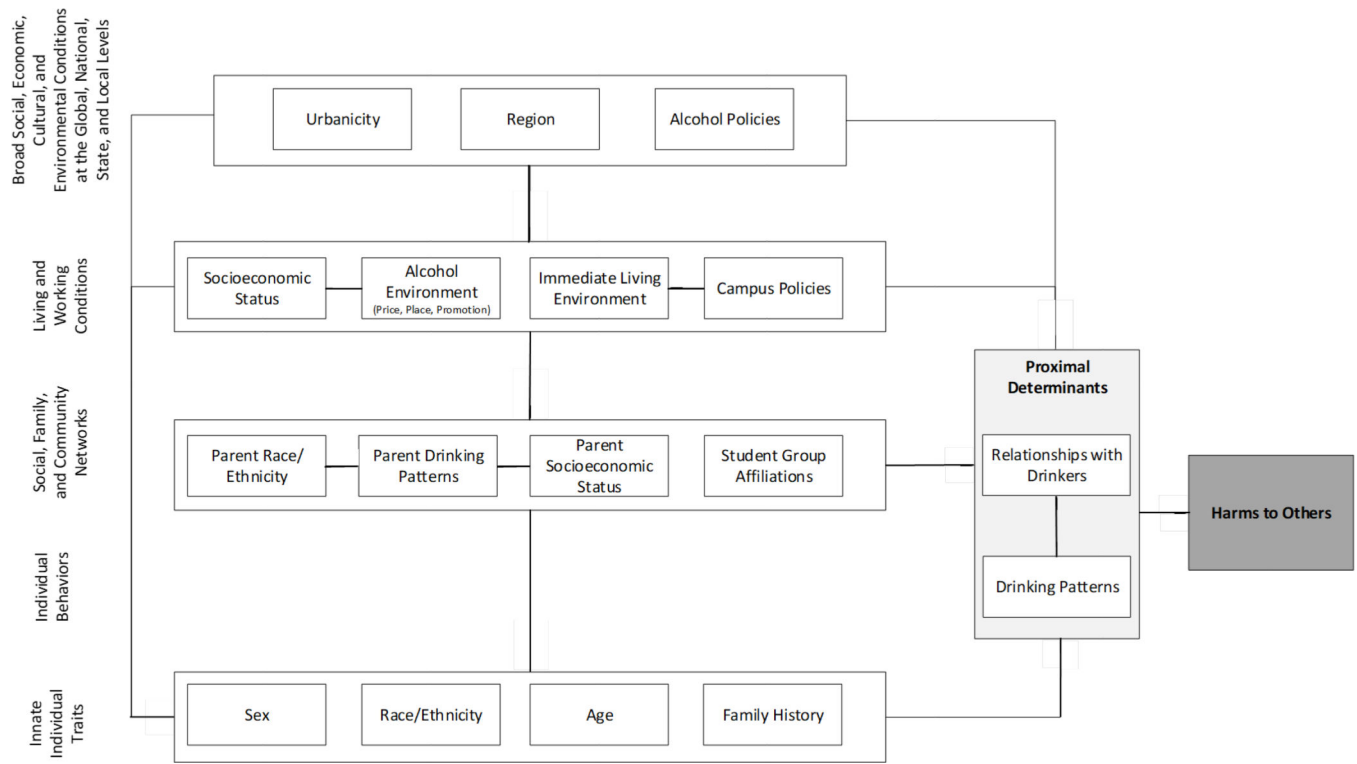
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**Figure 1.**  
Flow diagram of literature review



**Figure 2.**  
Number of HTO Assessed by Type of Study



**Figure 3.**  
Conceptual framework for alcohol's harms to others among US college students

**Table 1.**

Search terms used to identify articles for systematic review

Alcohol	Harms to Others	College
Alcoholism [MeSH] OR “Alcohol Drinking” [MeSH] OR “Alcoholic intoxication” [MeSH] OR heavy drink* [tw] OR risky drink* [tw] OR binge drink* [tw] OR alcohol* [tw]	“social problems” [MeSH] OR “harm to others” [tw] OR social impact* [tw] OR social cost* [tw] OR “secondhand effects” [tw] OR “alcohol’s harm to others” [tw] OR “Harms to others” [tw] OR externalit* [tw] OR “collateral damage” [tw] OR perpetr* [tw]	universities [MeSH] OR undergraduate* [tw] OR college* [tw] OR universit* [tw]



**Table 2.**

Topics assessed in WHO/Thai HTO protocol

Topic	Number of Items
Household and demographics	22
Personal Wellbeing Index & EuroQOL-5	6
Brief assessment of harms from others' drinking	13 <sup>a</sup>
Heavy drinkers in your life	6 <sup>b</sup>
Caring for drinkers	4 <sup>c</sup>
Demographics of identified drinker	6
Children section	7 <sup>b</sup>
Impact of others' drinking on work	3 <sup>c</sup>
Alcohol-related harm in the community	2 <sup>b</sup>
Seeking help	6 <sup>c</sup>
Drinking questions for the respondent	5

<sup>a</sup>Includes frequency and cost.<sup>b</sup>Includes frequency.<sup>c</sup>Includes time spent.