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# How Many More Guns?: Estimating the Effect of Allowing Licensed Concealed Handguns on a College Campus

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## Abstract

Among other arguments, advocates for lifting bans on carrying concealed handguns on campus propose that this would increase the prevalence of legitimately carried handguns, which might then deter crimes or be used to intervene in campus shooting incidents like the one that took place at Virginia Tech in 2007. Opponents suggest that increased prevalence of concealed handguns would lead to increases in other negative consequences, such as accidental shootings. Little empirical research has examined the potential outcomes of such a policy change, nor has existing research examined the prerequisite issue of whether lifting these bans would result in substantial increases in the prevalence of concealed handguns among students. Using a sample of undergraduate classrooms selected from five academic buildings at a public university in Texas, this study examines the potential impact of lifting the concealed handgun ban on the likelihood that a given classroom would contain at least one legally carried handgun. Results reveal that the impact of potential policy changes in this area vary based on the building under consideration and the

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measure of potential handgun prevalence. Limitations of the study and implications for future research on the issue of concealed handgun carrying on college campuses are discussed.

## Keywords

concealed handguns, gun control, campus crime

## Introduction

The last few years have seen increased attention to the issue of concealed handguns on college campuses, at least partly in response to shooting incidents on university campuses like Virginia Tech, Northern Illinois University, and, most recently, the University of Texas. Several states (Alabama, Georgia, Indiana, Louisiana, Oklahoma, South Carolina, South Dakota, Texas, and Washington) have considered legislative initiatives to overturn policies banning students, faculty, and staff from carrying licensed, concealed handguns on campus (Lipka, 2008). In most of these cases, the state legislature had previously invested authority in the university to develop their own policies regarding the carrying of concealed handguns on campus rather than passing specific laws banning guns on campuses.

According to Lipka (2008), until recently, Utah was the only state that allowed concealed handguns on college campuses, with the policy change resulting from a court decision rather than the traditional legislative process. In reviewing a state law that prohibited localities and state agencies from banning possession of firearms, the Utah Supreme Court ruled that colleges and universities could not claim exemption from the law and ban firearms on university property (*University of Utah v. Shurtleff*, 2006), thus the prohibition was overruled. As a result, Utah universities have been required to allow concealed handgun license (CHL) holders to carry their firearms on campuses. Anecdotal evidence suggests that there have been no negative repercussions to date at the University of Utah (Lipka, 2008); however, no empirical studies of the effects of this change have been conducted. Recently, the Colorado Court of Appeals reached a similar decision regarding a lawsuit filed against the University of Colorado by the group Students for Concealed Carry on Campus (*Students for Concealed Carry on Campus v. Regents of the University of Colorado*, 2010). Legislative attempts to ease restrictions on concealed carrying have failed in other states, at least in part because the bills faced stiff opposition from university administrators, campus police chiefs, and from some student groups (Lipka, 2008).

Despite mixed success in changing policy, interest in overturning university restrictions on carrying concealed handguns has remained high among some advocacy groups (Lipka, 2008). For instance, Students for Concealed Carry on Campus (SCCC, 2009) claims 42,000 members nationwide with chapters in every state. The group includes students, faculty, staff, parents, and others “who believe that holders of state-issued concealed handgun licenses should be allowed the same measure of personal protection on college campuses that they enjoy virtually everywhere else” (SCCC, 2009). On the other side of this issue are organizations such as the Brady Campaign to Prevent Gun Violence (BCPGV, 2010), a nonprofit group whose mission statement includes the following: “The Brady Campaign works to pass and enforce sensible federal and state gun laws, regulations, and public policies through grassroots activism, electing public officials who support common sense gun laws, and increasing public awareness of gun violence” (BCPGV, 2010).

This fundamental dichotomy mirrors many aspects of the broader gun control debate in America, with many nuanced but important implications for public health, criminal justice, politics, and economic systems. Although a controversial body of research has examined the influence of less restrictive concealed carrying laws on crime, studies have failed to estimate changes in handgun carrying after less restrictive carrying laws have been adopted. This is an important limitation of our current knowledge as increasing numbers of concealed handguns in public places represents one important and direct mechanism that links “shall issue” laws to declining street crimes (Zimring & Hawkins, 1997). The current study uses survey data collected from students to estimate the prevalence of licensed, concealed handgun carrying on a college campus that may be expected to occur if the law changed and this behavior were permitted.

## **Concealed Handgun Licensing Changes**

Over the last two decades, several states have eased restrictions on carrying concealed handguns in public places, most commonly by shifting from “may issue” laws to “shall issue” laws. “May issue” laws typically require license applicants to demonstrate a need to carry a concealed handgun (e.g., for performance of work-related duties), with designated officials (i.e., a county sheriff in many jurisdictions) being given the discretion to determine who would receive a license. Under “may issue” legal standards, the argument that ordinary citizens are potentially at risk for violent victimization in the public sphere is presumably insufficient in most cases and only those individuals who have special status or occupation are granted CHLs. “Shall

issue” laws stipulate that designated law enforcement officials must issue a CHL to any applicant who meets relevant legal criteria regardless of demonstrable need. The number of states with less restrictive, “shall issue” laws has steadily grown in number, increasing by 20 between 1994 and 2003. Today, 38 states to date fall into this classification (USA Carry, 2010).

Changes to the manner in which states issue CHLs have occurred during a period when public support for increased gun control efforts has waned. For instance, support for stricter gun control laws is at an all-time low according to a recent Gallup poll, which showed that 44% of Americans favored making gun control laws stricter than they are now (Gallup Polls, 2009), down from 78% when this question was first posed in 1990. Recent U.S. Supreme Court cases also seem to suggest future reductions in handgun restrictions across the country. For instance, the Supreme Court ruled in *McDonald v. City of Chicago* (2010) that the *District of Columbia v. Heller* (2008) finding of the Second Amendment being a federally protected individual right was applicable to the states through the Due Process Clause of the Fourteenth Amendment. Whether, and in what manner, these various changes in handgun restrictions at the state and local level will translate to changes in the ability to carry concealed handguns on university campuses is unknown.

## CHL Restrictions and Campus Shootings

As many states have loosened concealed carrying restrictions, there has been a corresponding movement to ease concealed handgun carrying restrictions on college campuses. The movement has gained traction as several state legislatures have debated laws that would allow CHL holders to carry their firearms on college campuses. Texas, for example, has considered provisions specifically related to campus carry in at least three legislative sessions and with four separate bills (Texas House of Representatives, 1997, 1999, 2009; Texas Senate, 2009), with all four bills dying before definitive vote. The BCPGV (2010) lists 13 states in which bills that would have legalized concealed carrying on college campuses were considered during 2009 but were either tabled or defeated. The arguments that surround discussions of concealed carrying on college campuses generally mirrors those about the adoption of “shall issue” concealed carry laws.

One of the often-posed arguments for lifting bans on the licensed carrying of concealed handguns on campuses has been the proposition that doing so would lead to an increased prevalence of legally carried handguns at universities; thus, legally armed individuals would be able to intervene in the event of a campus shooting incident. According to the SCCC (2009), those who

support the maintenance of current bans would suggest that “in an active shooter scenario like the one that occurred at Virginia Tech, a student or faculty member with a gun would only make things worse” (SCCC, 2009). In response, SCCC offers the following counterargument:

What is worse than allowing an execution-style massacre to continue uncontested? How could any action with the potential to stop or slow a deranged killer intent on slaughtering victim after victim be considered “worse” than allowing that killer to continue undeterred? ([http://www.concealedcampus.org/common\\_arguments.php](http://www.concealedcampus.org/common_arguments.php))

Conversely, opponents argue that lifting bans would lead to more guns on campus, which would increase the chances for negative consequences, including accidental shootings, suicides, and various forms of criminal behavior involving guns. In addition, the harm reducing benefits of guns on campus are not acknowledged. According to the BCPGV,

College students engage in a great many high-risk behaviors, including binge drinking and drug abuse, and are also at elevated risks for suicide. Dorms and classrooms provide little room for the safe storage of weapons. Introducing guns into this environment will increase the danger to students every hour of every day. Arming students would not save lives in the extremely rare instances where mass shootings occur on campus. Even trained police officers, on average, hit their intended targets less than 20% of the time. (<http://www.bradycampaign.org/statelgunlaws/publicplaces/gunsoncampus/>)

One commonality between the propositions of each group is that neither set of arguments has been the subject of much empirical study. That is, to date, neither have evaluations examined the impact of lifting bans on concealed handguns on campuses to determine whether doing so would lead to increased deterrence of, or intervention during, campus shootings nor have evaluations examined whether policy changes would lead to increased use of guns in dangerous, costly, or otherwise problematic behaviors such as suicides or campus crimes. Unfortunately, there is no peer-reviewed empirical research focused specifically on gun violence on college campuses prior to the national trend toward shall issue laws. Also, the relatively short comparative history of concealed carry laws since the mid-1990s suggests that CHL holders, in general, are neither accountable for violent crimes on college campuses, nor are anecdotal examples from Utah and Colorado indicative of

any apparent systemic problems linking campus carry to either spree offending or sustained trends in violence. Moreover, some high-profile cases of public school shootings, including those in Pearl, Mississippi in 1997 and in Edinboro, Pennsylvania in 1998, have involved successful responses by armed citizens (Lott, 2003, p. 131).<sup>1</sup> However, these anecdotal examples may not directly or satisfactorily address the range of factors and outcomes to be considered in discussing a potential shift in policy, and anecdotal events surrounding isolated school shootings are not equivalent to a systematic analysis of the potential impact of any policy change.

The debate about concealed handgun carrying on college campuses is partially informed, however, by experiences with the adoption of shall issue laws and the controversial body of evidence about the effects of these laws. Despite controversy about the frequency with which citizens use guns for self-defense (Smith, 1997), the most significant point of contention centers on questions about the crime-reduction benefits of shall issue laws. Lott and Mustard's (1997) results and additional analyses (i.e., Lott, 2000) suggested impressive crime reductions due to the adoption of shall issue laws. This work spawned considerable debate about methodological decisions and led to a series of follow-up studies (see, for instance, Ayres & Donohue, 2003; Black & Nagin, 1998; Kovandzic, Marvell, & Vieraitis, 2005; Moody & Marvell, 2008; Plassman & Whitley, 2003). This body of work has produced highly variable results (National Research Council, 2005) but does not appear to have generated much evidence to suggest these laws have led to increases in street violence (Moody & Marvell, 2008). The National Research Council (2005, p. 150) reviewed the evidence, estimated new models to better understand the sources of variability in results, and concluded "that with the current evidence it is not possible to determine that there is a causal link between the passage of right-to-carry laws and crime rates."<sup>2</sup> In comparison, Moody and Marvell (2008) state, "In our judgment, the weight of evidence—particularly that of peer-review—indicates that shall-issue laws reduce crime" (p. 274).

A related and testable point in the concealed carry debate is the assumption that lifting bans on the concealed carry of handguns on college campuses would lead to sizable increases in the numbers of handguns being carried. If, however, lifting the ban on carrying concealed handguns on campus does not produce a significant increase in the number of individuals legally carrying guns, there may be no meaningful increase in the likelihood of either deterring or intervening to stop a campus shooter. As such, a necessary prerequisite for any attempt to scientifically assess the policy impact of lifting bans on concealed handguns on university campuses is to assess what change in the prevalence of concealed handguns might likely accompany that policy

change. The National Research Council (2005) recommended that future research seek to identify the impact that shall issue laws have on gun carrying, which is a purpose of the analysis reported here.

## **Current Focus**

The current study assesses whether lifting the ban on carrying concealed handguns would lead to an increase in the prevalence of concealed handgun carrying on one public university campus in Texas. Given that much of the debate around this issue has centered on the potential threat posed by a campus shooter, this study takes as its starting place the proposition that allowing concealed handguns on campuses might lead to an increased probability that a student legally armed with a handgun is available to intervene. To this end, the study treats classrooms as the unit of analysis and asks whether a policy change (allowing CHL holders to carry in campus buildings) would lead to more classrooms containing students legally carrying concealed handguns during typical business hours.<sup>3</sup>

## **Method**

### *Procedure*

During the latter half of the fall semester of 2009, undergraduate students taking classes in one of five academic buildings at a public university in Texas were asked to complete a survey described as dealing with the issues of "crime and guns on campus." One of the faculty researchers, along with one of several research assistants, visited each surveyed classroom and introduced themselves and the project to students. Students were informed of the anonymous nature of the survey. They were also informed that their answers would not be known to their instructors and that their status in the class would not be affected by their decision to participate or not.

This university is located in a relatively rural location in eastern Texas, within a city composed of approximately 35,000 residents. Most undergraduate students (about 78%) come from several counties in this region of the state, and the overwhelming majority of undergraduate students are originally from Texas. Resource limitations precluded the sampling of students from every academic building on campus (approximately 15 such buildings), so a set of five, large "representative" buildings with relatively large numbers of classes offered per day was selected for inclusion in the study. These buildings are typical of most academic buildings on this campus and contain a



range of classroom sizes. Specifically, the five selected buildings vary in the numbers of course sections offered per day (from 64 in Building “C” to 336 in Building “D”) and capture a diversity of fields of study, including arts, humanities, physical and social sciences, and business.

## Data and Measures

Paper-and-pencil surveys were administered to students during their class meeting times, taking place weekdays between 8:00 a.m. and 5:00 p.m. The instrument contained questions about the students’ demographic characteristics (e.g., age, gender, race/ethnicity), their personal backgrounds (e.g., political viewpoint, prior military experience), experiences with crime victimization (both on and off campus), and opinions related to campus crime. Most important for the current study, students were asked about whether they currently held a valid CHL. This measure is used to estimate the number of individuals who might be in a given location with a concealed handgun if concealed carry were allowed in campus buildings.

It is also possible that lifting the ban would motivate additional individuals to obtain a CHL and carry concealed handguns in campus buildings. To capture the number of new individuals who might seek out a CHL if concealed carrying was allowed on campus, students were also asked the following question: “If carrying a concealed handgun on campus were legal, how likely would you be to obtain a permit to do so?” Finally, students were asked to respond to the question “If carrying a concealed handgun on campus were legal, how likely would you be to obtain a permit *and actually carry* a handgun when visiting campus?” Response options for the latter two items allowed students to offer a range from 0% likely (anchored with “not at all”) to 100% (anchored with “very”) likely.

Determining whether students would actually obtain a CHL and carry a handgun on campus using these measures presents data coding challenges because it is not clear at what likelihood value a student should be classified as one who would obtain a CHL in response to a change in the law. As such, three dichotomous measures (e.g., 1 = *likely would obtain a CHL* and 0 = *likely would not obtain a CHL*) were created from these items using different thresholds to reflect the chance they would obtain a CHL if the law changed: a 100% chance, a 75+% chance, and a 51+% chance. The same set of three criteria (100%, 75+%, and 51+%) were used to classify students based on the chance they would obtain a CHL *and actually carry* a concealed handgun if the law changed.

An additional complication is that estimates derived for each of these two hypothetical likelihood items (obtain CHL, obtain CHL and carry) across all three criterion levels (100%, 75%+, and 51%+) are to some extent

compromised by the fact that it is not possible to know how many individuals would actually follow through on their reported intentions. Assuming that not all individuals will actually apply for and successfully obtain a CHL (even at the 100% reported likelihood level), estimates of the prevalence concealed handguns available in campus classroom buildings based on these hypothetical intention items are likely inflated and should be interpreted cautiously.

### *Sampling Strategy*

The survey was administered with a modified multistage sampling design featuring classrooms as the final sampling unit. As noted above, a set of five classroom buildings were purposefully selected to serve as examples of the typical, large academic building on this campus.<sup>4</sup> To accommodate resource limitations, a set of time periods in which surveys were to be conducted was randomly selected using a sampling frame of all daytime class times for each building. Only undergraduate classes taking place between 8:00 a.m. and 5:00 p.m. were included in the population of classes for each building (graduate students comprise less than 12% of students on this campus). The specific objective was to survey 16 classes from each building (an intended total of 80), with four of those classes meeting in the morning (8:00 a.m. to 12:00 noon) and four in the afternoon (1:00 p.m. to 5:00 p.m.) on a Monday-Wednesday-Friday (MWF) schedule, and four each taking place in the morning and afternoon of Tuesday-Thursday (TTH) classes.

Within each morning and afternoon time frame, a class start time (e.g., 9:00 a.m.) was randomly selected so that the surveyed classroom would represent all classrooms with start times within that time frame. For instance, we assume a class that starts at 9:00 a.m. represents all start times between 8:00 a.m. and 12:00 noon as the start time was randomly selected. Finally, within each randomly selected class start time (e.g., 9:00 a.m.), two lower division (100- and 200-level courses, featuring mostly freshmen and sophomores) and two upper division (300- and 400-level courses, featuring mostly juniors and seniors) courses were randomly selected to ensure equal representation of lower and upper division courses within each selected class start time. Instructors responsible for each selected section were contacted by email and asked to allow 15 min of their class time for the researchers to distribute and collect surveys from students in the class. Sampling in this fashion ensured that estimates derived from classroom survey data account for intrinsic variations in class level and meeting day and time.

Although this relatively sophisticated multistage sampling process was intended to help ensure that surveyed classes were representative of the entire

population of undergraduate classes offered in each building during regular business hours, the selection procedure was partially compromised due to nonresponse from instructors and refusals to participate. The typical reason offered for not participating was that the instructor could not spare any class time with the semester nearing completion (surveys were completed in mid-November, 2009). A few instructors volunteered other classes they were teaching, but that were not part of the original, randomly selected sample of classes. In some cases, these volunteered classes did not represent one of the four class start times that had been randomly selected for each building. In spite of this limitation, when instructors volunteered other courses, we included them in the sample. Thus, the final sampling solution approximates the original strategy to ensure adequate representation of different class levels, meeting days, and meeting times in all five selected buildings, but some variation in these factors exists.

## *Sample*

The final sample of surveyed classrooms included 38 total classes representing 26 separate class start times and 1,396 total student surveys. The total number of surveyed classes in each building ranged from 4 to 11 classes, and classes that were surveyed ranged from 6% to 42% of the population of course sections offered in each building during the surveyed class start times. At least one class was surveyed from each of the four randomly selected class start times in each building, with the exception of Building "A" from which only the two randomly selected afternoon class start times were represented (one each for MWF and TTH).

Although it was not possible to implement the original sampling procedure as intended, for most buildings, the sample of surveyed classes closely resembles the population of course sections offered during the surveyed class times (see Table 1). In particular, the three buildings with larger numbers of surveyed classes appear to have generated more representative samples (Building "B",  $n = 9$ ; Building "C",  $n = 11$ ; Building "D",  $n = 10$ ; see Table 1). These samples of surveyed classes generally approximated the populations of offered classes in terms of mean class size, percent of surveyed classes that were upper division courses, and proportion of classes from a particular college. For instance, in Building "B," the average class size is 30 and the sample classes had, on average, 30 students; 91% of the classes offered in this building were business courses and all of the surveyed classes were business courses; and 68% of the classes in this building were upper division courses, while 78% of surveyed classes were upper division courses.

**Table 1.** Comparison of Surveyed Classes With Population of Buildings' Class Offerings During Surveyed Class Start Times

Variable	Sample of classes (% of those offered)	Population of classes offered during survey times
<b>Building "A"</b>		
Number of classes	4	20
Mean class size	29	39
% upper division (Upper division / Sample size)	75 (3 / 4)	50 (8 / 16)
% of classes from College 1	100	100
<b>Building "B"</b>		
Number of classes	9	118
Mean class size	38	38
% upper division	78	68
% of classes from College 2	100	91
<b>Building "C"</b>		
Number of classes	11	26
Mean class size	65	56
% upper division	55	87 <sup>a</sup>
% of classes from College 3	82	93
<b>Building "D"</b>		
Number of classes	10	170
Mean class size	30	31
% upper division	30	23
% of classes from College 4	80	91
<b>Building "E"</b>		
Number of classes	4	34
Mean class size	108 (63) <sup>b</sup>	53
% upper division	25	43
% of classes from College 1	100	100

a.  $p = .068$ . Building C offers only classes at the 200 level or higher.

b.  $p = .063$ . One of the four surveyed classes had an enrollment of 243 students. The average of the remaining three classes (63) was closer to the population's average class size (53).

In the buildings where smaller numbers of classes were surveyed (four classes each in Buildings "A" and "E"), the surveyed classes also closely resembled the population of offered classes, in terms of the college of classes offered (100% humanities and social sciences for both buildings). Mean class size was somewhat comparable in Building "A" (29 vs. 39 for the sample and

population of classes, respectively), whereas the proportion of upper division classes was less comparable (3 of 4 vs. 8 of 16). Average class size in Building “E” was considerably higher in the sample of four classes than it was for the population of classes in that building. This resulted primarily from having surveyed one large class; removing this class from the average leads to greater comparability between sample and population (63 and 53, respectively). Surveyed classes in Building “E” also did not match the population of classes in terms of the proportion of upper division classes. Chi-square tests, however, revealed that upper division classes did not have significantly different numbers either current CHL holders, or of individuals reporting 100% likelihood that they would obtain a CHL, or obtain a CHL and carry.

In addition, although the objective of the random selection procedure was to generate a sample of *classes* that represented the population of classes offered in each building (not necessarily a sample of students that represented the population of undergraduate students on campus), the nonrandom sample of surveyed classes resulted in a sample of surveyed *students* ( $n = 1,396$ ) who closely matched the overall, undergraduate campus population ( $N = 14,595$ ) on several available demographic factors (see Table 2). Specifically, the sample of surveyed students was similar in age to the campus population (21.4 and 22 years, respectively) and in the proportion of males (46% and 42%, respectively). Note that both groups were, on average, more than 21 years old—the age at which an individual can legally apply for a CHL in Texas. In terms of race and ethnicity, the sample appeared relatively comparable with the campus population, with similar proportions of Whites (65% and 68%, respectively), African Americans (16% and 15%, respectively), students of Asian descent (3% and 2%, respectively), and those identifying themselves as Hispanic (19% and 16%, respectively). These results, and the generally good match between the sample of surveyed classes and the population of offered classes, suggests that the estimates of gun-carrying behaviors presented in this study are reasonably generalizable to the overall classroom and student populations at the university.

### *Analytic Plan*

Having demonstrated the relative comparability between the sample and population of classes in these five buildings, as well as between the sample of surveyed students and the campus population, the study proceeds to examine the potential impact of allowing undergraduate students (who are above 21 years old) to carry concealed handguns on this university campus. Students below 21 who completed the survey were excluded from the current

**Table 2.** Comparison of Surveyed Students With the University Population

Variable	Sample	Population
Number of undergraduate students	1,396 (9.6% of population)	14,595
Age	21.4	22
Male	46%	42%
Race/Ethnicity		
White	65%	68%
African American	16%	15%
Asian	3%	2%
Hispanic	19%	14%

analyses as they could not obtain a CHL under current laws. Carrying concealed handguns in campus buildings is currently prohibited, so the study assumes that the existing probability that a given classroom contains at least one concealed handgun is zero. Although it is possible that some individuals do currently legally carry concealed handguns in campus buildings (i.e., off-duty police officers not subject to the ban), it seems unlikely that the number of such individuals would change substantially if the concealed carry ban was lifted, thus this rate of carrying is assumed to be constant before and after a potential policy shift.

The analysis first examines what would happen if only individuals who currently possess a CHL were allowed to actually carry on campus. It is possible, however, that additional students who do not currently possess a CHL would obtain one if they were allowed to carry a concealed handgun on campus. To address this issue, analyses then examine any potential changes in the prevalence of concealed handgun carrying using the two hypothetical behavior questions described in the methods section (i.e., likelihood to obtain a CHL and to obtain a CHL *and* carry on campus, if it were allowed). Where it is relevant to estimating the impact of allowing concealed handguns on campus, prevalence estimates are also adjusted by 40%, which represents the average proportion of two national samples of CHL holders who reported on a telephone survey that they actually carried their handgun on a daily basis (Smith, 2003).

The initial set of analyses (Table 3) examines the impact of lifting the ban on campus concealed handgun carrying on the likelihood that a given surveyed classroom would have *at least one* student legally carrying a concealed handgun (measured with current CHL holders and the two hypothetical

**Table 3.** Percent of Surveyed Classes With At Least One Current CHL Holder or Student Likely to “Obtain a CHL” or “Obtain CHL and Carry,” by Building

Measure	Buildings (Total surveyed classrooms)					All-buildings meta-average (38) <sup>a</sup>
	A (4)	B (9)	C (11)	D (10)	E (4)	
Current CHL holder	50	33	82	10	50	45
100% obtain CHL	100	100	91	50	75	83
75+% obtain CHL	100	100	91	80	100	94
51+% obtain CHL	100	100	100	80	100	96
100% obtain CHL and carry	100	100	91	50	75	83
75+% obtain CHL and carry	100	100	91	80	100	94
51+% obtain CHL and carry	100	100	100	80	100	96
Current CHL holder <sup>b</sup>	18	20	13	33	4	20
100% obtain CHL <sup>b</sup>	33	40	40	36	20	30
75+% obtain CHL <sup>b</sup>	38	40	40	36	32	40
51+% obtain CHL <sup>b</sup>	38	40	40	40	32	40
100% obtain CHL and carry <sup>b</sup>	33	40	40	36	20	30
75+% obtain CHL and carry <sup>b</sup>	38	40	40	36	32	40
51+% obtain CHL and carry <sup>b</sup>	38	40	40	40	32	40

Note: CHL = concealed handgun license.

a. The authors suggest caution in interpreting the meta-averages (cross building averages), given the wide variation in the proportion of surveyed classes with at least one CHL/student likely to obtain a CHL across the five buildings.

b. Adjusted estimates (multiplied by 40% daily carry rate).

intention items). The ability of armed students to effectively intervene in a shooting incident may be related to the number of legally concealed handguns in a given classroom (i.e., more armed students might mean more ability to effectively subdue an attacker), and, as such, a second set of analyses (Table 4) demonstrate the potential impact of a policy change on the *number* of current or hypothetical CHL holders in a given surveyed classroom, among those rooms with at least one. As described above, both sets of results presented in Tables 3 and 4 are also weighted by the 40% daily carry rate reported by Smith (2003). Finally, in an effort to address the validity of the findings, results presented in Table 5 address the concern that the sampling strategy may have inadvertently located all of the students in a given building who currently possess or are likely to obtain a CHL and carry on campus.

## Results

### *Prevalence of Concealed Handguns*

Results presented in Table 3 indicate that estimates based on the number of current CHL holders vary substantially across buildings, with the highest apparent concentrations of current license holders in Building "C" (82% of classes with at least one) and the lowest in Building "D" (10% of surveyed classes with at least one current CHL holder). These differences are likely attributable at least partially to the different types of students that populate these classroom buildings. For instance, Building "C" contains classes primarily offered to criminal justice students, whereas Building "D" offers classes in mathematics and the physical sciences.

Turning to the potential impact of a policy change on the numbers of students that might acquire a CHL when they do not currently possess one, the percentages of classes with at least one student reporting a 100% likelihood of obtaining a CHL and/or obtaining a CHL and carrying a handgun are considerably higher and relatively more consistent across buildings than are the proportions of surveyed classes that include a student who currently holds a valid CHL. For instance, in all buildings except "D" (half of surveyed classes), more than three quarters of classes contain at least one person who reported a very high likelihood (100%) of obtaining a CHL or doing so and carrying (see Table 3). In addition, the proportions of surveyed classes are 80% or higher for all buildings when the criteria for assuming someone would actually obtain their CHL is lowered to either 75%+ or 51%+ self-reported likelihood.



**Table 4.** Number of CHL Holders or Students Likely to “Obtain CHL and Carry” Per Classroom, by Building

Variables	Buildings (Total surveyed classrooms)					All-buildings meta-average (38)
	A (4)	B (9)	C (11)	D (10)	E (4)	
Surveyed classes with at least one current CHL holder	2	3	9	1	3	3.6
Total students with CHL	3	4	26	2	7	8.4
Average number per surveyed classroom	1.5	1.3	2.9	2.0	2.3	2.0
Adjusted average number (*40%) per surveyed classroom	0.6	0.5	1.2	0.8	0.9	0.8
Range	1-2	1-2	1-10	2	1-4	1-10
Surveyed classes with at least one student 100% likely to get “CHL and carry”	4	9	10	5	3	6.2
Total students 100% likely	6	21	59	6	12	21
Average number per surveyed classroom	1.5	2.3	5.9	1.2	4.0	3.0
Adjusted average number (*40%) per surveyed classroom	0.6	0.9	2.4	0.5	1.6	1.2
Range	1-3	1-7	1-16	1-2	1-8	1-16
Surveyed classes with at least one student 75+% likely to get “CHL and carry”	4	9	10	8	4	7.0
Total students 75% likely	12	37	91	14	18	35
Average number per surveyed classroom	3.0	4.1	9.1	1.8	4.5	4.7
Adjusted average number (*40%) per surveyed classroom	1.2	1.6	3.6	0.7	1.8	1.8
Range	1-5	1-12	1-28	1-3	1-8	1-28
Surveyed classes with at least one student 51+% likely to get “CHL and carry”	4	9	11	8	4	7.0
Total students 51+% likely	14	45	100	15	19	39.2
Average number per surveyed classroom	3.5	5.0	9.1	1.9	4.8	5.0
Adjusted average number (*40%) per surveyed classroom	1.4	2.0	3.6	0.8	1.9	1.9
Range	2-6	2-8	1-31	1-3	1-12	1-31

Note: CHL = concealed handgun license; \* = multiplied by.

**Table 5.** Probability of Locating “X” Number of Guns If There Were Only “X” Number in Each Building

Building	Sample size (Population of surveyed classes)	Rooms with at least one CHL holder (Probability)	Rooms with at least one “100% get and carry” (Probability)
A	4 (20)	2 (4.90%)	4 (0.16%)
B	9 (118)	3 (0.10%)	8 (0.00%)
C	11 (26)	9 (0.20%)	10 (0.05%)
D	10 (170)	1 (5.70%)	7 (0.00%)
E	4 (34)	3 (0.20%)	4 (0.02%)

Initially, these estimates of the potential prevalence of concealed handgun carrying might suggest that lifting the ban on campus concealed carry would lead to a sizeable increase in the number of classrooms with a legally carried handgun; however, as noted above, the extent to which these individuals would actually follow through and obtain a CHL is unknown (especially among those who reported a likelihood lower than a 100%). Nevertheless, there is a substantial difference in the number of students who apparently refrain from obtaining a CHL simply because they are not currently allowed to carry concealed handguns on campus (i.e., estimates based on the two intentions measures) and those who held a valid CHL at the time of the survey. This difference would suggest either that a relatively large number of undergraduate students on this campus have refrained from obtaining a CHL primarily because they are not allowed to carry on campus or that individuals surveyed here reported levels of interest in obtaining a CHL that they would not necessarily follow through on by obtaining a license and actually carrying. It is beyond the scope of the current study to determine which of these interpretations is correct.

Estimates of the proportion of classes with at least one current CHL, when adjusted for the 40% daily carry rate projection, ranged from a low of 4% of surveyed classes in Building “D” to a high of 33% of surveyed classes in Building “C.” In other words, lifting the ban on concealed carry on campus might have a negligible effect in buildings that are similar to Building “D” and it might increase the proportion of “armed” classrooms from zero (assumed under the ban) to one-third if the ban was lifted, when consideration is given to the national estimates of daily carry rates among CHL holders.

As would be expected, these adjusted estimates for the proportion of classrooms that would be “armed” (with at least one current CHL holder) were

also lower than the adjusted estimates for the proportion of potentially “armed” classrooms (with at least one student reporting a 100% likelihood of carrying a legally concealed handgun). Specifically, the proportion of “armed classrooms” using the 100% likelihood item ranged from a low of 20% of classrooms in Building “D” to a high of 40% in Building “A.” When the criterion for assuming the individual would actually obtain a CHL and carry are lowered to 75+% or 51+% levels of reported likelihood, estimates of the proportion of surveyed classes that would be “armed” (i.e., contain at least one student carrying a concealed handgun on any given day, adjusted by the 40% daily carry rate) are obviously lower. These estimates also tend to exhibit less variability, ranging from 20% to 40% of surveyed classrooms, than those based on the number of current CHL holders.

As a way to summarize the results presented for each building, an “all-buildings meta-average” is presented in the right hand column of Table 3. This is simply the average of the values presented for each of the five individual buildings. Overall, the all-buildings meta-average for the proportion of all surveyed classes with at least one current CHL holder was 45%; however, this all-building average masks wide variation across buildings (range = 10% to 82%). Also, adjusting this proportion by the 40% daily carry rate (Smith, 2003) reduces the chances that the average surveyed classroom contains a student who is actually carrying a handgun on a given day to 18% of classrooms (see Table 3, right-hand column).

Using the two intentions measures, the meta-averages were the same for each measure and ranged from 83% to 96% of classrooms (depending on the criterion level used: 100%, 75+%, 51+% self-reported likelihood) containing a student who would hypothetically be carrying a concealed handgun. Again, adjusting these rates by 40% reduces the range of likelihood meta-averages to 33% to 38%, depending on the criterion level used (the range was again identical for both hypothetical intentions measures).

### *Numbers of Concealed Handguns*

Table 4 presents the number of current CHL holders and the number of students likely to obtain a CHL *and* carry a handgun per classroom in which at least one was reported. Given the similarity between responses to the “obtain a CHL” and “obtain a CHL and carry” items seen in Table 3 (and the presumption that “obtain a CHL and carry” is a better approximation of an individual’s hypothetical likelihood of actually carrying a concealed handgun), the analysis presented in Table 4 makes use of only the “obtain a CHL and carry” item. Averages were calculated by dividing the observed counts

(e.g., total number of current CHL holders in a building) by the total number of classrooms surveyed in that building that included at least one such person (i.e., “armed classrooms”). These estimates offer a way to approximate the number of legally concealed guns likely to be present within a given “armed” classroom. These estimates were also adjusted for the 40% daily carry rate (Smith, 2003). This is a potentially more important indicator than the simple prevalence of at least one legally concealed handgun because a common argument in favor of allowing concealed handguns is that greater numbers of legal guns are likely to increase the odds of stopping a critical shooting incident; thus, one might expect that more guns per room would mean a higher likelihood of successfully intervening in such an event.<sup>5</sup>

As before, estimates vary across buildings and according to which variable is used to represent the number of potential concealed handguns. Estimates based on the number of current CHL holders are reasonably consistent across buildings, with the average number of CHL holders per “armed” classroom ranging from 1.3 to 2.9 students (0.5 to 1.2 when the 40% daily carrying adjustment is applied; see Table 4). Estimates based on the number of students who reported 100% likelihood of obtaining a CHL and carrying were typically higher than those based on the number of current CHL holders, varying from 1.2 to 5.9 per “armed” classroom (0.5 to 2.4 for the adjusted values). The number of potential concealed handguns per “armed” classroom ranged from 1.8 to 9.1 when those who reported at least a 75% chance of obtaining a CHL and carrying are examined (0.7 to 3.6 when adjusted by 40%), with a similar range (1.9 to 9.1) for students reporting at least a 51% likelihood (0.8 to 3.6 when adjusted). Note that each of these per-armed classroom rates would be somewhat lower if the numbers of potentially armed students were divided by the entire set of surveyed classes rather than by the smaller number of surveyed classrooms with at least one such student.

Within buildings, the ranges of students per “armed” classroom in each category were highly variable across all measures. For example, when examining those students who reported a 100% likelihood, between 1 and 16 students were observed in Building “C” (0.4 to 4 when adjusted for the 40% daily carry rate; Smith, 2003), whereas in Building “D,” the range was restricted to between 1 and 2 students per classroom, but less than 1 per classroom if the 40% daily carrying rate is applied (0.4 to 0.8 per class). Also, in all cases, the largest numbers and highest rates of individual students per armed classroom who reported current CHLs or 100% likelihood to carry a concealed gun were observed in Building “C,” which offers primarily criminal justice courses.

Overall, these results indicate that among classrooms with at least one individual likely to carry a legally concealed gun, the average number of guns ranged from a low of 1.2 potential concealed handguns per “armed” classroom to 9.1 handguns per “armed” room, depending on the indicator used and the building from which data were drawn. Applying Smith’s (2003) 40% daily carry rate to these estimates lowers them to a range from less than 1 (0.5) per room to 3.6 per room. As was the case in the estimates of the potential for increased prevalence of concealed handguns presented above (Table 3), these results suggest that lifting the ban on campus concealed carry could result in widely disparate impacts in different types of campus buildings. These results also suggest that any potential impact will also vary widely based on how many students who currently do not possess a CHL would actually obtain one, solely because the ban was lifted.

One interesting point of comparison between the numbers of current CHL holders and the numbers of those reporting that they would be likely to obtain a CHL if campus concealed carry were allowed is worth noting here. In Building “B,” only four students were surveyed who reported that they currently possessed a valid CHL, yet 21 students reported a 100% likelihood and 45 students reported a 51+% likelihood of obtaining a CHL and carrying on campus, if it were allowed. If accurate and representative, these differences suggest that the number of concealed handgun licensees would increase by 500% to 1,000% solely in response to a change in policy allowing concealed carry on campus. Although there is no way to empirically assess whether this is accurate, it does seem unlikely that the presence of the current ban has such a strong suppressing effect on students obtaining CHLs.

Taken collectively, these findings underscore the potential for wide variation in the impact of any policy change that would allow students to carry concealed handguns on campus. In addition, the authors would suggest caution in interpreting the estimated numbers of students likely to obtain a CHL and carry on campus that are based on the intentions measures alone as it is unclear how many of these individuals would follow through (especially at levels below 100% likelihood) on their expressed desire to obtain a CHL and carry, in response to a change in policy.

### *Examining Potential Sampling Bias*

Before summarizing the results from this study, it is worth addressing one potentially important shortcoming of the sample. It is possible that too few classes were sampled to adequately capture the number of individuals who currently possess a CHL and, likewise, those who reported a high likelihood

of obtaining one if concealed carry were allowed on campus. Given that a relatively large proportion of sampled classes were found to contain at least one CHL holder and/or a student reporting a high likelihood of obtaining a CHL, the potential impact of small sample size (in leading to false negative results) seems unlikely.

Conversely, it is possible that only those classrooms were included in the sample that had a higher likelihood of including CHL holders and students who were highly likely to obtain a CHL. In other words, the sampling procedure may have inadvertently led to the inclusion of a large number of students interested in carrying guns on campus. Table 5 reports the probability of finding a given number of "armed" students (or students highly interested in being armed) in the sample of surveyed classes, if in fact those were the only such students in each building during those surveyed times. For instance, in Building "D," where 10 of the 170 classes taking place during the sampled time periods were surveyed, the likelihood of sampling ten classes and finding one current CHL holder, if there was in fact only one CHL holder in the building during those times, is 5.7% (just slightly larger than the standard significance threshold,  $p < .05$ ). At the other end of the spectrum, the likelihood of surveying 4 of the 34 classes offered during the surveyed times in Building "E," and finding four students who reported a 100% likelihood of obtaining a CHL and carrying, if there were only four such students taking classes in the building during those times, is less than 1% (0.02% or a  $p$  value of .0002). As such, it appears highly unlikely that our samples of classrooms yielded the entire count of students within each building who were interested in carrying a concealed handgun on campus.

## **Summary**

From these estimates, it appears that the likelihood of increasing the overall prevalence and the average number of legally carried handguns present in a given classroom following a change in policy is dependent on several factors, including the building from which estimates are derived and the dependent variable chosen to represent the projected prevalence of legal handguns (e.g., the number of current CHL holders or various levels of self-reported likelihood to obtain a CHL and carry a handgun on campus). In general, however, it appears that the prevalence of at least one legally concealed handgun (current CHL) in a given classroom located within one of five sampled buildings on this campus can range from 10% of classes to 82% of classes, although the range of these estimates declines to 4% to 33% when adjusted for Smith's (2003) 40% actual daily carry rate. Estimates based on

those students with a 100% intention to obtain a CHL and carry on campus, if allowed, suggest that such a policy change would lead to anywhere from 20% of classrooms to 100% of classrooms containing a concealed handgun, depending on the building in question, the likelihood criterion used, and whether the 40% projected daily carry rate is applied. It is important to note that these estimates should be interpreted cautiously in light of our lack of knowledge about students' potential follow-through on their expressed intentions. These proportions increase somewhat if even lower levels of reported likelihood are used (75+% or 51+%); however, these estimates are increasingly speculative.

Results for the number of potentially armed students per "armed" classroom (those with at least one such student; Table 4) indicate that on average such classroom might contain anywhere from less than one (0.5 current CHL holders, adjusted by the 40% daily carry rate) to as many as nine per classroom (based on those 51+% likely, unadjusted by the 40% daily carry rate).

## Discussion

The primary objective for this study was to provide the first empirically based estimate of the impact of allowing legally concealed handguns on a university campus, in the event of a policy change enabling their possession. Although this issue is contemporary and hotly debated, very little published scientific evidence of any kind exists to inform discourse, and, to date, this study is the first to attempt such estimates with a large sample and statistical testing rather than anecdotal or attitudinal information alone. Results from this first empirical exploration of this issue generally indicate that the projected impact of changes to state statutes and/or university policies regarding concealed handguns are complex and nuanced and that estimates of the likely increase in obtaining CHLs and legal concealed carry on campus vary widely depending on which building was surveyed and which outcome measure was used. Importantly, an established projection for the rate of daily concealed carry among CHL holders (Smith, 2003) provides another set of estimates that may more closely approximate actual prevalence.

## Implications and Future Directions

The important implication for policy makers based on these results is that the potential impact of any change in laws prohibiting concealed handguns on campus (at least as they relate to the potential to intervene in a campus shooting incident which informed the current analysis) is unknown and potentially

highly volatile across different campus buildings. Little empirical research exists on this issue, and, as such, little scientific knowledge has been used to inform the current debate about whether to lift such campus bans.

One particularly important issue for future research is the number of individuals that do not currently possess CHLs who would actually obtain one, simply if concealed carry on campus were allowed. Our results revealed substantial differences between the numbers of current CHL holders and those reporting some intention to obtain one if campus concealed carry was legalized. It seems unlikely that the number of students with a CHL would increase 1,000% simply because campus concealed carry were allowed, as some of the current estimates would suggest. However, the theory of reasoned action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), and its later expansion in the form of Azjen's (1991) theory of planned behavior, would suggest that intentions to engage in a particular behavior are significantly, though not always, strongly correlated with actual behaviors. This is especially true for conventional behaviors (i.e., eating in a restaurant, voting) on which most of the existing research on these theories has been conducted (Sheppard, Hartwick, & Warshaw, 1988). In a meta-analysis of the strength of the intentions-behavior (IB) relationship among 87 published studies, the average IB correlation was 0.53 but had a 95% confidence interval that included values ranging from 0.15 to 0.92 (Sheppard et al., 1988). As such, although one could expect some number of those who do not currently possess a CHL to obtain one if they expressed interest in doing so, exactly what proportion would follow through with their intentions is unknown.

To obtain a CHL in Texas, an individual must take a 10-hr firearms proficiency course (which can cost more than US\$100) and pay application fees of US\$140. It is possible, if not likely, that these factors prevent some students from applying for and obtaining a CHL to the same or even greater extent than does the current ban on campus carry. Students in particular, with more limited financial means, may be even more dissuaded from acquiring a CHL given these barriers than might faculty or staff members. Future research is needed to better understand the predictors of students actually obtaining CHLs and how these may vary across states (as CHL costs and requirements vary). Allowing current CHL holders to carry concealed handguns on campus in some cases would appear to have minimal impact on the prevalence of concealed handgun carrying on campus (4% of classrooms with a current CHL holder); however, if all of those who expressed strong interest in obtaining a CHL and carrying on campus were to actually do so, then a policy change might have a much larger impact (100% of classrooms with a student who strongly intends to obtain a CHL and carry in some buildings).



Whether an increase in the number of handguns on university campuses would then be used in other ways, as opponents suggest (i.e., student suicides, criminal activities, etc.), is beyond the scope of the current study. In other words, this study was not designed or intended to examine *how* any additional concealed handguns on campus would actually be used. Rather, its purpose was merely to estimate whether a given classroom is more likely to contain an individual carrying a legally concealed handgun if the current ban was lifted. Likewise, the study's results are not intended to assess the impact of lifting a concealed handgun ban on the prevalence of concealed handguns among the general population of students (i.e., would a policy change increase the likelihood that any individual student now carries a concealed handgun that might be used for defense against an armed robbery on a campus street after dark?).

At the same time, finding that a given classroom might have an increased probability of containing a student with a legally carried handgun would not constitute sufficient evidence that those handguns could be effectively used to either deter or intervene in a campus shooting incident. An evaluation of that second aspect of the impact of any policy change would require (a) an analysis of the nature of crimes on a specific campus to determine how many we could reasonably expect to be influenced by public gun carrying on campus (i.e., sexual assaults between acquaintances in private settings compared with robberies in public places) and (b) scientific study of how effectively the average university student CHL holder could respond in a crime situation. Some research concerning the first question suggests that the majority of crimes on and around college campuses are alcohol or drug related, and largely nonviolent in nature (see Nobles, Fox, Khey, & Lizotte, 2010), thus obviating the overall impact of legal concealed carry. In any case, these questions are beyond the scope of the current study but are nonetheless significant in evaluating proposals to ease concealed carrying restrictions on college campuses.

### *Limitations*

This study is not without limitations. First, the study made use of a single, rurally located university in Texas; a state with relatively restrictive procedures for acquiring a CHL. Whether the estimates derived from this single university in Texas generalize to other universities or other states remains to be seen as this is the first study of its kind. In any event, these factors could serve to attenuate the likely increases in available concealed handguns under the type of hypothetical policy change examined here. At the same time, one

might suspect that Texas has a relatively strong “gun culture” which could result in higher estimates of gun-carrying behavior than might be seen in other states. Second, the sample included only undergraduate students. The estimated number of potentially available concealed handguns are likely reduced by the omission of faculty, staff, and graduate students who would also populate academic buildings. Third, the sampling strategy employed here neither may provide data representing all buildings on this campus nor does it necessarily generalize to other campuses or other states. The estimates produced from our sampling and surveying procedures could be regarded as conservative, given that individuals who were not situated within classrooms (e.g., in hallways or other common areas) were not represented in the research design. We believe that this method has resulted in an appropriate example of how one type of policy change could manifest in terms of campus environments, but the suitability of our method should ideally be addressed through replication. Second, because of the prospective design of this study, it is worth noting that some of the survey questionnaire items captured data on *intended* behaviors, in this case, the intention to obtain a CHL and carry a handgun, rather than actual outcomes. Although there is strong empirical evidence to suggest that intentions and behaviors are significantly correlated (Sheppard et al., 1988), it is possible that actual outcomes would differ substantially from intended behaviors. Ultimately, this cannot be determined until such a time as the policy change takes place and its effects are measured, again suggesting the importance of replication. Third, this study is poorly suited to comment on the broader, long-term costs and benefits of legalizing concealed carry on college campuses because it does not include a full accounting of aggregate or individual-level factors such as crime rates, spatial concentrations, or protective factors beyond the presence of legal concealed handguns. Although they are unaddressed here, we consider these issues to be important considerations in the larger debate over guns on campus.

As policy makers, administrators, police, faculty, students, and others debate the issues of violence and safety on college campuses, objective and empirical estimates of the impact from hypothetical gun policy shifts become even more important. Given the salience of this topic and the likelihood that it will continue to be underscored by passionate views on all sides, we recommend greater efforts to systematically measure and understand the factors at work. We view the current study as one positive step in this direction and encourage the use of more and better scientific inquiry to bring to light the possible advantages and disadvantages of radically altering the social dynamics on college campuses.

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## Notes

1. An additional example cited by Lott (2003, p. 131) involving a shooting in Santee, California in 2001 is excluded here because it apparently involved a response from two armed off-duty police officers, thus the “armed citizen” label does not apply.
2. As additional evidence of the controversial nature of this body of research, the National Research Council (2005) report devoted appendixes to a dissention by one committee member about the appropriate conclusion to draw about the body of existing results and the committee’s response to the dissention.
3. Concealed handguns are banned from campus buildings under current Texas state law and university policy, although they could be stored in locked vehicles or transported on streets on campus. In addition, only individuals above the age of 21 are currently eligible to obtain a concealed handgun license (CHL) in the state of Texas (with an exception made for individuals who are members, or honorably discharged veterans, of the U.S. Armed Forces and are above 18 years of age; Texas Department of Public Safety, 2009).
4. Although we consider these buildings to be typical examples, no claim is made that these five buildings perfectly represented the entire population of academic buildings at this university (particularly small, special-purpose buildings, such as those for various visual arts specialties). Estimates of concealed handguns present in an athletic facility or administration building, for example, might vary substantially from the results presented here.
5. The authors of this study make no claims as to the validity of this argument, though it is frequently proffered as a rationale for eliminating concealed carry bans on college campuses.

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