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Hospitalizations and Costs associated with Firearm-Related Violence and Injuries (FREVI) in the United States

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Hospitalizations and Costs associated with Firearm-Related Violence and Injuries in the United States

by

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DEDICATION

This work is dedicated to my father who always encouraged me and provided positive energy to do my best, to my mother who always believed in me, and my wife who loves me unconditionally

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ABSTRACT

Purpose

To evaluate costs associated with hospitalization due to Firearm-Related Violence and Injuries (FREVI) in the United States over the last decade, 2001-2009. We explored the following research questions:

1. Is there an increase in the prevalence of firearm injuries over the last decade (2001-2009)?
2. What are the demographic patterns that characterize FREVIs in the U.S (i.e., age, sex, racial and ethnic variations, urban/rural locations)?
3. What are the costs associated with firearm-related hospitalizations in the US?

Methods

This is a descriptive cross-sectional study. A stratified sample of 54,875 hospital discharges were extracted from the National Inpatient Sample Database (NIS-HCUP) using E-Codes (ICD-9) for FREVI. We performed trend analyses to determine the cost and prevalence of the firearm related injuries.

Results

An estimated 268,639 firearm-related hospital discharges were observed from 2001-2009. Homicidal intent was the leading cause of FREVI, followed by accidents. Hispanic and blacks were more likely to become injured by firearms as compared to whites. Young adults

aged 18-34 were more prone to firearm injuries than children and the elderly. Male sex, urban residence and being black or Hispanic were the m

ain risk factors for firearm-related hospitalizations. The average cost of firearm-related hospitalization to the United States is $60,000 every hour, $17,700 per firearm injury related admission, and total of

$5.28 billion for the last decade. The prevalence of FREVI and cost trends remained constant over the last decade.

Conclusion

Firearm Related Violence and Injuries (FREVI), and associated costs remain a major source of hospital-related expenditures in the United States. The constant trend in number of firearm injuries per year over the last decade suggests the absence of effective policy measures to curtail firearm injuries.

CHAPTER I : INTRODUCTION

Firearm-Related Violence and Injuries (FREVI) are an important public health problem in the United States. FREVI account for a significant amount of healthcare expenditures in the United States with substantial impact on the economy, and is also associated with considerable loss in national productivity. The prevalence of FREVI in the US has remained constant over the years indicating a persistent and major public health issue that remains resistant to instituted preventive policies and regulations. An assessment of the Federal Bureau of Investigation (FBI) Census Database shows that, on average, more than one case of FREVI homicide is committed every hour, totaling about 12000 (68 percent of all homicides) homicidal cases every year. In addition, in 2008, firearms were estimated to be involved in 18,200 suicides (50 percent of all suicides) across the United States.[1] Further, FREVI has also been established to be an important threat to the lives of the US Workforce. On average, one worker is murdered through FREVI on a daily basis according to the U.S. Department of Labor.[2]

Assault involving a firearm is the eighth leading cause of non-fatal violence-related injuries in the United States[3] while FREVI related homicide rate in the U.S. is 20 times greater than in 22 other high-income countries.[4] The higher prevalence of gun ownership and considerably less restrictive gun laws are important reasons why violent crime in the U.S. is much more than in countries of similar income levels. [5] Despite the high amplitude of this problem and considerable variations in firearm-related injuries over time, there is currently no nationwide surveillance system for FREVI.[6]

Information on firearm-related fatalities is available from the U.S. Centers for Disease Control and Prevention (CDC) and the Federal Bureau of Investigation (FBI) Vital Statistics census database. Despite this, there remains a paucity of up to date information on nonfatal firearm injuries. The prevalence of nonfatal firearm injuries are typically estimated from the National Electronic Injury Surveillance System (NEISS), which is based on a national probability sample of hospital emergency departments(EDs).[6] While NEISS data have generated useful prevalence estimates, the ED-based system does not provide needed information on inpatient hospitalizations about FREVI cases such as intent for injuries, racial and demographic distribution, or on costs associated with various healthcare systems and different payers for non-ED hospitalized cases.[6] Although progress has been made over the last two decades regarding improvement in the surveillance system, significant gaps are still notable with respect to information and monitoring of costs related to non-fatal cases of FREVI nationally.

A study by Miller et.al (2006) reported that a decline in firearm ownership over time is associated with a significant drop in the rate of suicide among all age groups. Thus, the changes occurring in household firearm ownership seem to correlate well with appreciable reductions in suicide rates. Given these findings, it is logical to posit that restrictions in the availability of firearms play a major role in preventing FREVI and premature loss of lives across all age groups and especially, among the youth in the U.S.[7]

Another important parameter that could enhance our ability to prevent FREVI resides in timely information on vulnerable populations at high-risk of FREVI as well as geographical distribution of location where the burden of FREVI is relatively high. This kind of information is very important and has the potential to provide objective information for policy decision-

making at the national level. The purpose of our study is to determine the magnitude and burden of hospitalized fatal and nonfatal cases of FREVI in the United States and to estimate costs associated with hospitalization of FREVI cases. We explored the following research questions:

Specific Study Questions

1. Is there an increase in the prevalence of firearm injuries over the last decade (2001-2009)?
2. What are the demographic patterns that characterize FREVIs in the U.S.? (i.e, age, sex, racial and ethnic variations, urban/rural locations)?
3. What are the costs associated with firearm-related hospitalizations in the US?

Research Hypotheses

Hypothesis 1: The prevalence of firearm injuries in the U.S. is increasing

Hypothesis 2: Firearm injuries negatively impact the US economy.

CHAPTER II: METHODS

Study Sample

Our study sample was obtained from the Healthcare Cost and Utilization Project (HCUP) database, which is maintained by the Agency for Healthcare Research and Quality (AHRQ). HCUP data are derived from hospital discharge abstracts and summaries, created primarily for billing and payment purposes by hospitals. The hospital discharge summary contains the patient's conditions, demographic information, the procedures the patient received, and other features about the hospital stay. Hospitals in many states provide discharge summaries to the state government, a hospital association, or some other designated health information organization.

HCUP is built through a partnership between AHRQ and the state data organizations. Over time, beginning with data year 1988, [8] the number of states contributing to HCUP has grown to 46. The state data organizations arrange for their unique statewide database to HCUP. The data are then subjected to internal consistency and edit checks. All the data elements collected from different states of the country are recoded so that a uniform coding scheme is incorporated. The National Inpatient Samples (NIS) is the largest all-payer inpatient health care database in the United States, yielding national estimates of hospital inpatient stays. The NIS data are provided by National Inpatient Samples and Health Care Cost & Utilization Project (NIS-HCUP) from 1045 hospitals located in 46 States, which in turn is a guesstimate of 20 percent stratified sample collected from the community hospitals. HCUP contains un-

weighted data from approximately 8 million hospital stays each year. Weighted, it estimates roughly 40 million hospitalizations in the United States.[8]

Types of hospitals included in HCUP

HCUP is based on data from community hospitals, which are defined as short-term, non-Federal, general, and other hospitals, excluding hospital units of other institutions (e.g., prisons). HCUP data include obstetrics and gynecology, orthopedic, otolaryngology, cancer, pediatric, public, and academic medical hospitals. Excluded are long-term care, rehabilitation, psychiatric, alcoholism and chemical dependency hospitals. However, if a patient received long-term care, rehabilitation, or treatment for psychiatric or chemical dependency conditions in a community hospital, the discharge record for that stay would be included in the NIS.
The data collected by NIS-HCUP are publicly available in the form of a de-identified database.
Sample Size

In order to conduct an analysis of our study a stratified sample of 54, 875 discharges related to Firearm Injuries were taken from the NIS-HCUP database. This raw sample data was weighted using *Statistical Analysis System* (SAS) software and the total number of discharges were estimated with 95 % confidence interval of the national estimates. Our sample includes cases of Firearm Related Violence and Injury (FREVI), who were discharged from hospitals or who died in the hospitals. Our sample does not include emergency room discharges or deaths. In order to examine hospitalizations associated with FREVI, E-codes were used as identifiers. E-codes are defined as those injuries related to external causes in the International Classification of Diseases- Ninth Revision and Clinical Modification (ICD-9 CM) coding system. Following codes with guide from the CDC were used to extract the data related to Firearm Injuries. Since

E-codes by definition are a secondary diagnosis, we queried all secondary diagnosis fields for cases that contained codes as presented in Table 1.

E Codes used for data extraction

Table 1: ICD-9 Codes used for data extraction (Ref: CDC.gov)[9]

	Handgun	Shotgun	Hunting Rifle	Military Firearm	Other	Unspecified
Accident	E922.0	E922.1*	E922.2	E922.3	E922.8	E922.9
Suicide or self-inflicted injury	E955.0	E955.1	E955.2	E955.3	E955.4	
Assault	E965.0	E965.1	E965.2	E965.3	E965.4	
Legal intervention	-	-	-	-	-	E970
Undetermined intent	E985.0	E985.1	E985.2	E985.3	E985.4	

For each identified firearm-related case, the variables extracted were; age, sex, geographical location (e.g., urban vs rural), intent of using firearms, hospital charges, ethnicity/race, and location of hospital. Urban and Rural Location were identified according to population census of the area as per the US National Center for Health Statistics. Further, four geographical regions were identified as mentioned in US Census Bureau; Northeast, Midwest, South and Western.

Table 2: E-Codes used for place of occurrence of FREVI[9]

E849.0	E849.1	E849.2	E849.3	E849.4	E849.5	E849.6	E849.7	E849.8	E849.9
Home	Farm	Mine & Quarry	Industrial Places & Premises	Recreational & Sports Places	Street & Highways	Public Buildings	Residential Institutions	Other Specified Places	Un-specified Places

Unit of analysis

The unit of analysis in our study was the hospital discharge (i.e., hospital stay) not the person or patient. This means that an individual admitted to the hospital multiple times in one year would have each hospital stay (or hospitalization) as a separate "discharge". Discharge status indicates the disposition of the patients from the hospital, like routine discharge to home, transfer to another short or long term hospital or facility. The term also encompasses cases in which patients left against medical advice (AMA), or died in the hospital.

Methods of Cost estimation: Cost and Charges

Total hospital charges were converted to costs using HCUP Cost-to-Charge Ratios based on hospital accounting reports from the Centers for Medicare & Medicaid Services (CMS).[10] Costs will reflect the actual expenses incurred in the production of hospital services, such as wages, supplies, and utility costs; charges represent the amount a hospital billed for the case. For each hospital, a hospital-wide cost-to charge ratio was used. Hospital charges reflect the amount the hospital billed for the entire hospital stay and do not include professional (physician) fees. For the purposes of this Statistical Brief, costs are reported to the nearest hundred.

Cost to hospitals = Charges x Adjustment Factor x Cost/Charge Ratio [10]

Mean costs were calculated using SAS software with 95% CI for each Firearm Related discharge as per intent, geographical location, and anatomical site of the injuries. Final total cost estimate was calculated by multiplying number of incidents and average mean cost per incident. The dollar amount mentioned in the final calculation is the actual cost at the time of the incident without evaluation of inflation index.

Type of Payer

Payer is the expected primary payer for the hospital stay. To make coding uniform across all HCUP data sources, payer combines detailed categories into general groups:

I. Government; Medicare and Medicaid,
II. Private Insurance: Includes Blue Cross, commercial carriers, and private health maintenance organizations (HMOs) and preferred provider organizations (PPOs)
III. Other: includes Worker's Compensation, TRICARE/CHAMPUS, CHAMPVA, Title V, and other government program.
IV. Uninsured: includes an insurance status of "self-pay" and "no charge."

Statistical analyses: Cross-sectional analyses were performed by weighting the selected observations by the sampling weights. Frequency distributions were performed using the ag-

gregate data for all cases identified, by the type of firearm according to E code groupings. Frequency distribution is evaluated for all the FREVI case discharges, demographics like age, sex, geographic locations like rural vs urban, intent of firearm injuries, anatomical site of injury, and ethnic/racial distributions. The software program Clinical Classifications Software (CCS) was used to convert raw counts into weighted counts that represent national estimates and 95% confidence intervals (CIs).

Descriptive methods used include frequency distributions and analytical methods and applied probability comparisons between injuries that occurred at home and away from home (e.g., public places, streets or highways). Clinical diagnoses and procedures were classified using CCS.

CHAPTER III: RESULTS

A total of 54,875 cases of FREVI were identified over the period in the NIS database. When weighted, these represent an estimated 268,639 of all firearm-related hospital discharges nationwide from 2001 to 2009, equivalent to a mid-yearly period prevalence on an average of 10 cases of FREVI per 100K US Population. (Figure 1 &2). Approximately, 61% of all cases were young adults in the age group18-34 years while 22% were in the age group 35 to 54 years. Sex distribution of individuals with the diagnosis of FREVI represents 89% of males and only 11% females.

Overall Intent of FREVI: Homicide, Suicide or Accident (HSA)

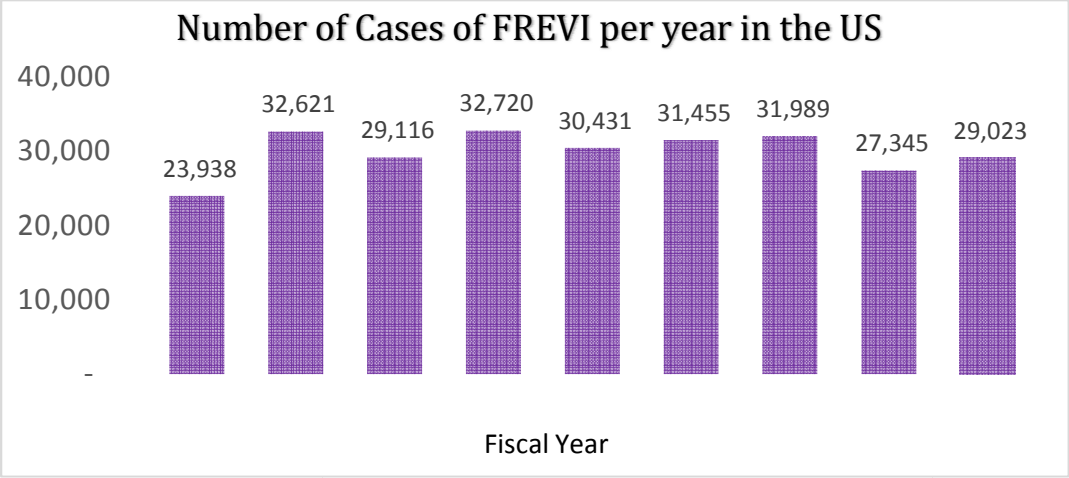

Figure 1: Number of cases of FREVI Hospitalization

Homicide was the number one cause of all FREVI cases, and accounted for 61% of all hospitalizations followed by Accidents and Suicides comprised 23% and 8% of all FREVI cases respectively. (Figure 3).

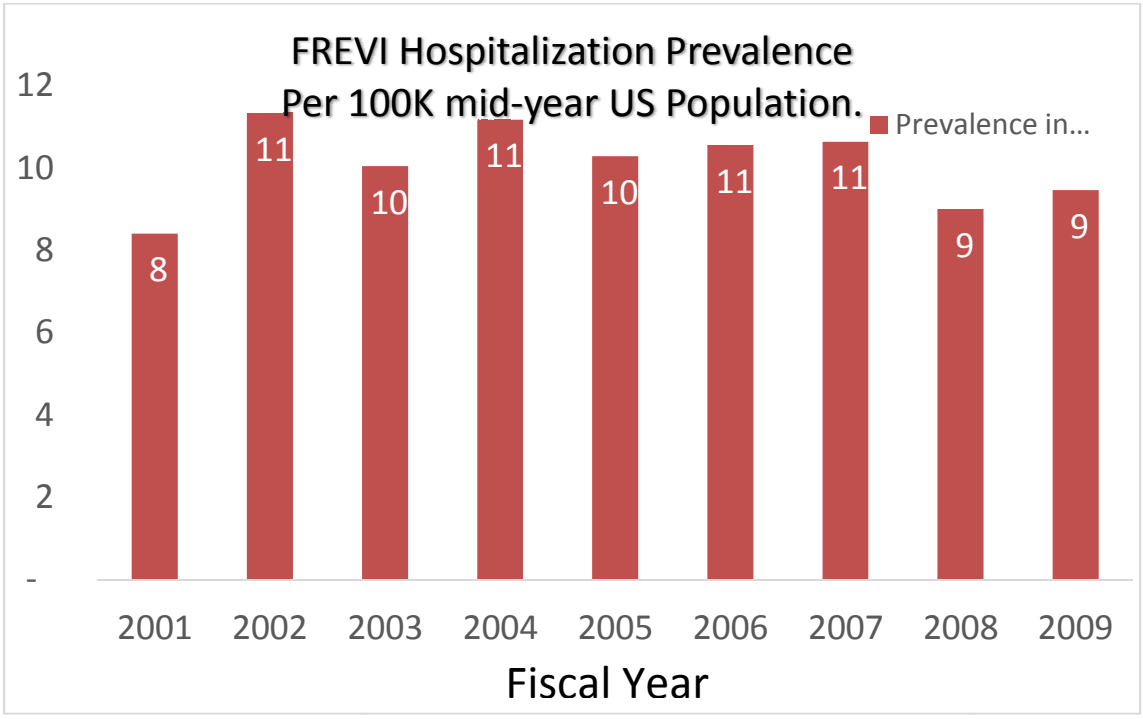

Figure 2: FREVI Hospitalization prevalence in the US

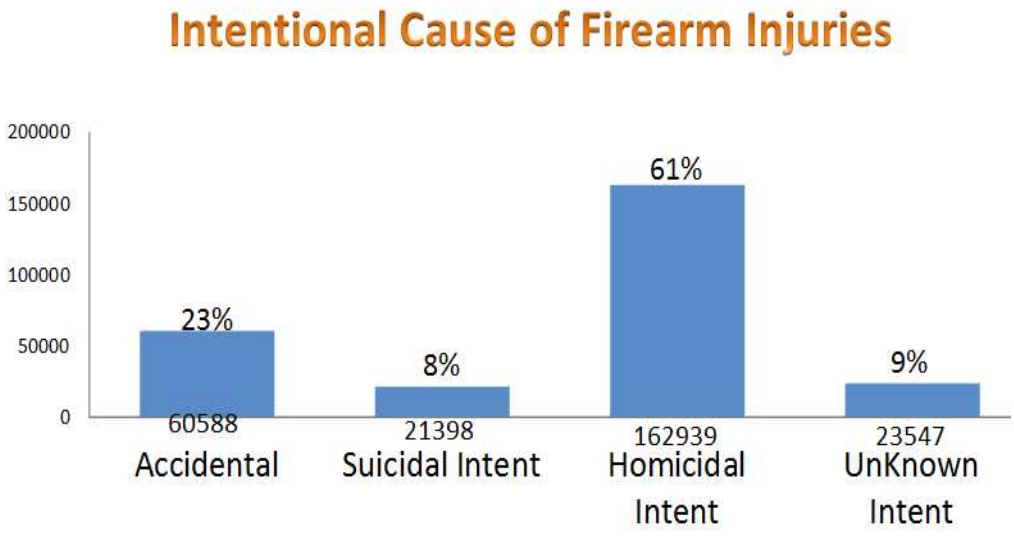

Figure 3: Firearm Related Intent: Homicidal, Suicidal or Accident (HSA)

Intent of FREVI among Children

Accident and homicide are the number one causes of firearm related hospitalization among children <14 year of age in the United States. (Figure: 4)

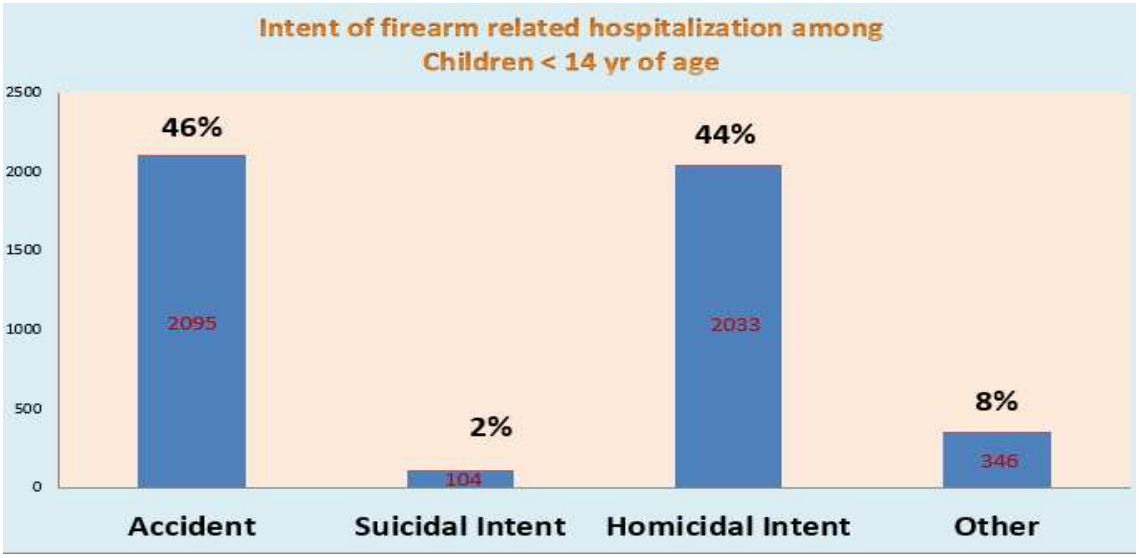

Figure 4: Firearm Related Intent among Children <14 years of age: HAS

Urban and Rural Locations

FREVI cases were much more likely to occur in urban than rural areas. Urban areas accounted for 96% of all FREVI cases with the rest 4% documented in rural locales. The majority of patients admitted with firearm-related injuries lived in low-income areas and were admitted to large urban teaching hospitals. Hospitalization rates were highest among hospitals located in the South and Western United States. There were significant differences in the hospital type and location for firearm cases according to the intent of the injury. Firearm injuries caused by suicidal intent or accidental injuries were more likely to be admitted to rural hospitals, while injuries caused by homicidal intent were more likely to be admitted to

urban teaching hospitals.

Ethnic and racial variations for FREVI

African Americans were at a greater risk of being victims of firearm-related injuries than any other racial or ethnic group in the United States. Among all the FREVI cases, the highest prevalence was among blacks who accounted for 34% of all cases followed by whites (21%) and Hispanics (14%). (Figure 5).

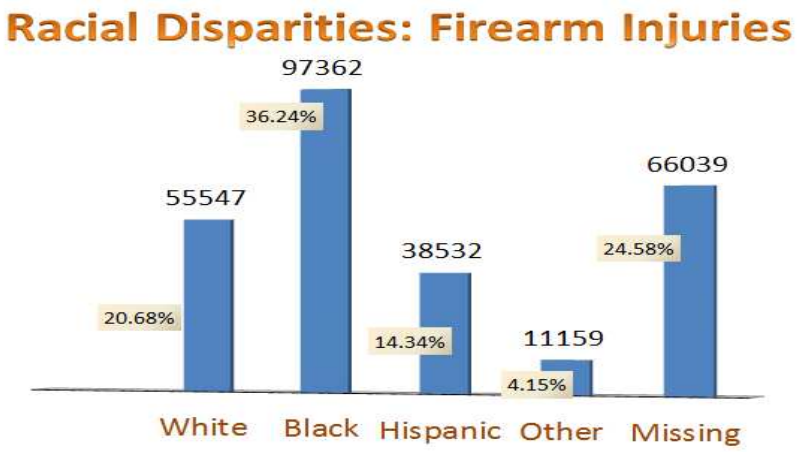

Figure 5: Firearm Related Violence and Injuries among Different ethnic and racial groups

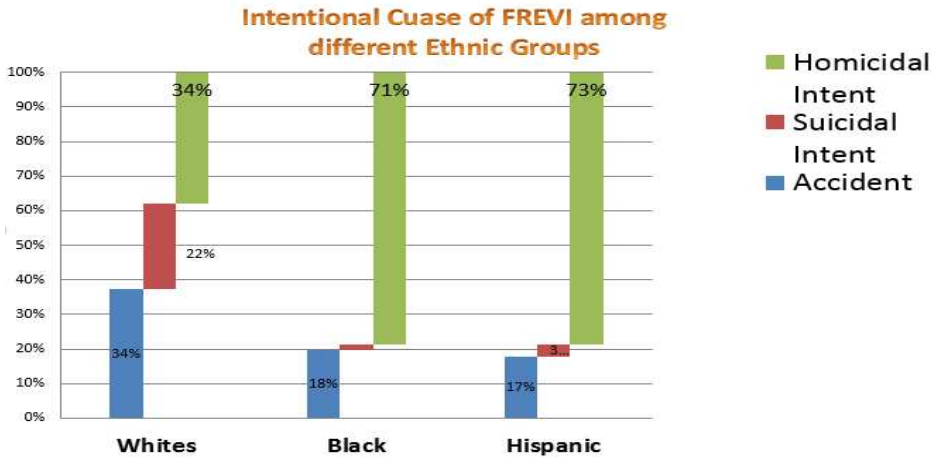

Figure 6: Intentional cause of FREVI among Different ethnic/racial groups

Further analysis revealed important racial/ethnic variations with respect to intent associated with

FREVI. While homicide was the number one cause of FREVI among blacks (71% of all FREVI) and Hispanics (73% of all FREVI), among whites the proportional representation was strikingly different. For whites, accident (34%) and homicide (34%) were equally likely. Regardless of race/ethnicity, suicide was the least likely form of FREVI. (Figure 6)

Firearm Injuries occurring at home and away from home

We tried to estimate the probability for injuries occurring at home and away from home. Because of limited reporting in discharge summaries, we were only able to identify the location of incident for only 17% of all injuries. Among the known locations, 22,908 (or 49%) injuries occurred at home and 23,758 (or 51%) occurred away from home, i.e., highways, public places, sports, work and all other locations. Although not much difference was observed between overall percentages of injuries at home versus away from home, there were still remarkable findings on further analysis for intent of FREVI. These differences with intent are illustrated in Figure 7. Homicidal intent comprised is 66% of all FREVI cases occurring more likely to be the cause of FREVI for away from home locations whereas suicide was 94% more likely to occur at home. (Table 3).

Table 3: Intent of Firearm injuries occurring at home and away from home

	Exposure		
	Home		Away
Homicidal	34%		66%
Suicidal	94%		7%
Accident	68%		32%

FREVI hospitalizations occurring away from home were highest on highways (68%) followed by public places like stations and airports (17%) and rest of injuries happened in residential facilities, in sports industry, general industries, mining and farms. (Figure 7).

Trend of FREVI Hospitalizations in the United States

Total number of firearm related hospital discharges has gone up slightly over the last decade. (Table 4).

Table 4: Trend firearm related hospital discharges per 100K US Population

Fiscal Year	US Population in Million	FREVI hospitalizations during fiscal year	FREVI Hospitalization per 100K US Population	95% CI Lower Limit	95% CI Upper Limit
2001	285	23938	8.4	8.39	8.41
2002	288	32621	11.3	11.31	11.34
2003	290	29116	10.0	10.03	10.05
2004	293	32720	11.2	11.16	11.18
2005	296	30431	10.3	10.27	10.29
2006	298	31455	10.6	10.54	10.57
2007	301	31989	10.6	10.62	10.64
2008	304	27345	9.0	8.98	9.01
2009	307	29023	9.45	9.44	9.47

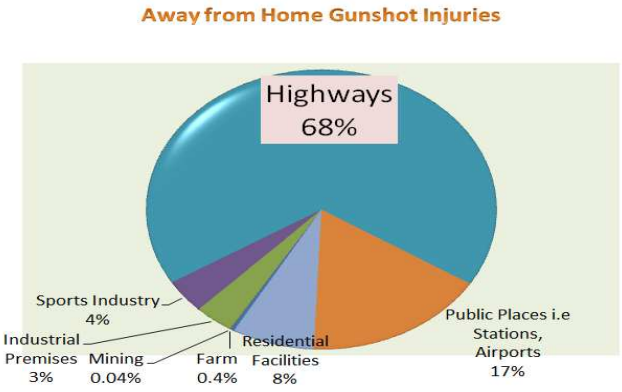

Figure 7: Specific place of occurrence if away from home of FREVI

Cost Results

Estimated costs for FREVI hospitalization were $60,000 per hour with a constant trend for the last decade. This was equivalent to $528 million per year totaling $ 4.75 billion from 2001-09. More than half of these costs were associated with homicide-related cases, followed by costs for self-inflicted and unintentional injuries.

Average costs per incident of FREVI

Overall, the average cost of hospitalization for one case of FREVI was $17,700. However, the average cost to treat suicidal injuries was $19,570, which was significantly higher than costs associated with an accidental case of FREVI. Cost to treat head, chest and abdominal injuries were more than $20,000 and was significantly higher than costs for treatment of extremity injuries, which was less than $10,000 (Table 4).

Table 5: Average cost per injury

Type of Injury	Average cost per injury	95 % Lower Confidence level	95% Upper Confidence level
Overall Average cost	$ 17,700.00	16697	18702
Intent of Injury			
Accidental	$ 13,885.00	12877	14892
Suicidal	$ 20,754.00	19570	21937
Assault	$ 18,641.00	17277	20005
Cost per injury according to anatomical site			
Head	$ 20,239.00	19021	21457
Trunk	$ 22,494.00	20966	24020
Extremities	$ 9,471.00	8983	9960
Cost per injury as per location			
Home	$ 18,136.00	16836	19435
Away from home	$ 17,088.00	15750	18425

Total costs of FREVI per year

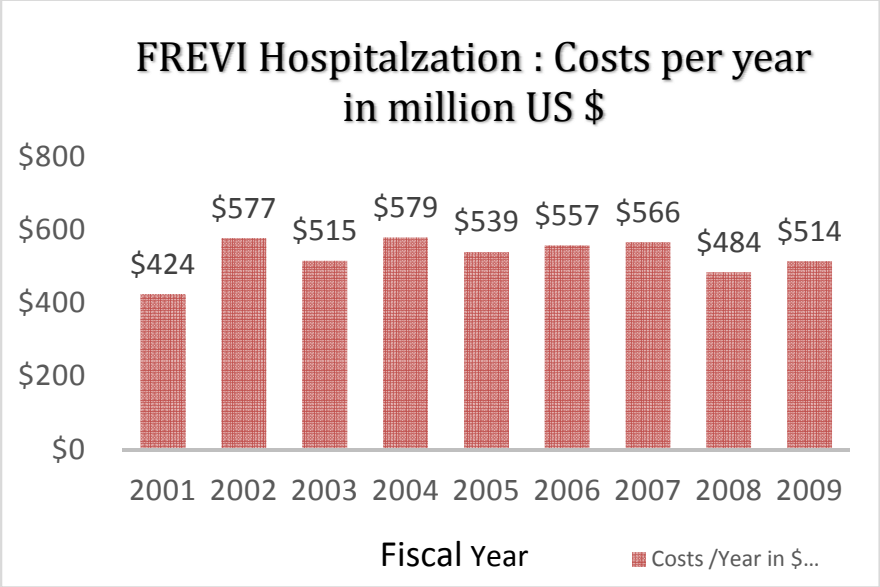

Figure 8: Costs of FREVI Hospitalization per year in million US Dollars

FREVI costs home and away from home

Cost to treat each case of FREVI was comparable for FREVI sustained at home and away from home. The intent of injuries at home and away from home showed remarkable differences as mentioned in Table 3, which impacted the costs of home and away from home incidents. (Figure 9)

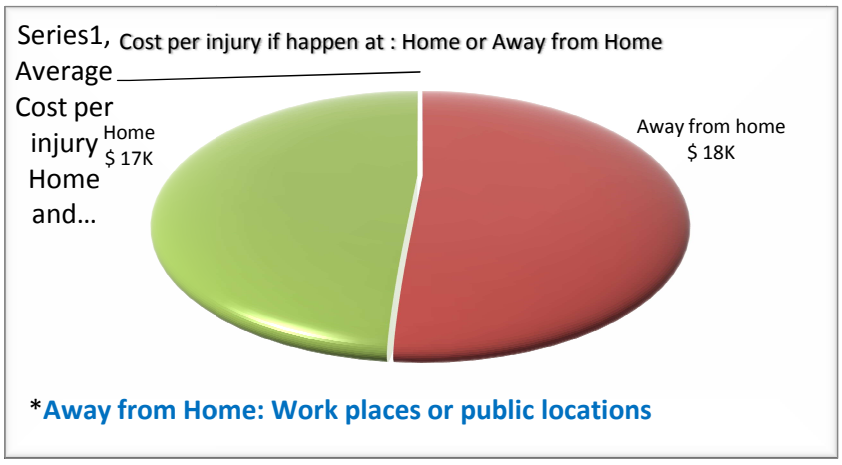

Figure 9: Average costs for FREVI hospitalization per incident home v/s away

Primary Payer

Government insurance programs like Medicare, Medicaid, SCHIP and others were responsible for paying 31% of all the FREVI cases, followed by private insurance companies who paid 23%of the cost. Rest of the costs (46%) was defrayed by self-pay, workers' compensation or remained unpaid or un-reported regarding payment source (Figure 10).

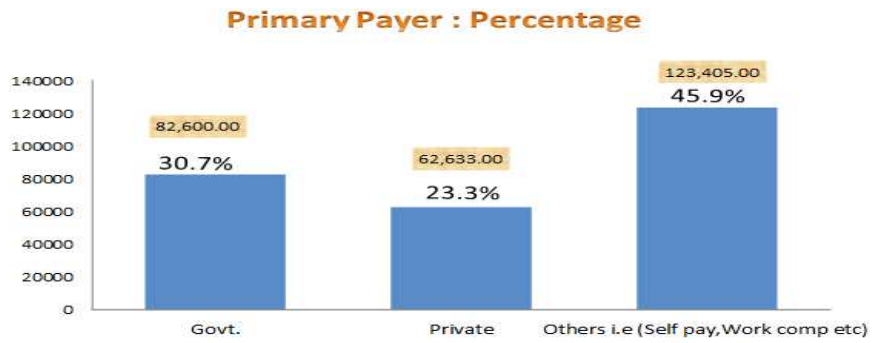

Figure 10: Primary Payer Percentage wise for FREVI

CHAPTER IV: DISCUSSION

Analysis of the NIS database yielded an estimate of 268,639 (95% CI) FREVI hospital discharges nationwide from 2001 to 2009 with 29,848 cases per year. These results are consistent with findings from other studies from the NIS database. Cuellar et al. 2009 examined Emergency Department (EDs) visits related to FREVI and showed similar results of higher prevalence among males than females, more injuries in urban versus rural areas, homicide is the number one intent for FREVI, and about 7% mortality among victims.[11] Another study by Jeffrey et al (1997) showed similar results, with 35,810 firearm-injury related hospitalizations in 1997, and a slightly higher mean cost of about $23,000 per injury. Costs associated with treatment of suicidal injuries were higher than homicidal or accidental injuries, similar to findings in our study.[6]

Our study contained only hospitalization visits and; EDs visits or patient fatality in the EDs were not examined. The actual cost related to FREVI is much higher than just the cost of hospitalization. Firearm injuries are associated with many other costs, e.g., emergency department visits, disabilities caused by firearms, costs of deaths and years of potential life lost. In addition there is legal burden containing costs related to court expenses, lawyer fees, including murder trials and imprisonments etc. There is no one single system to estimate the burden of FREVI incidents in the US. However there is a need to implement some sort of surveillance system to monitor the impact of firearms in our life.

There are a few limitations in our data. First, NIS data are derived from administrative hospital discharge data, and analysis for FREVI relies on the use of E codes. As of 2014 there are several states participating in NIS that require the use of E codes, while others did not have this mandate. In addition, the validity of E codes in hospital discharge data has not been well documented. We feel that FREVI are likely to be identified with E codes, and our data generally support this belief, but further analysis of the state-level hospital-discharge data that comprise the NIS is needed to determine the accuracy of E codes for all injury causes, including FREVI cases. There are limitations in the data regarding E code specificity, as illustrated by the large number of firearms classified as "not otherwise specified" or "other". It is possible that some of these cases may represent air guns or other similar non-powder firearms. In-depth analysis of the validity of these codes will guide the potential use of this data for future research and injury surveillance. This limitation in NIS-HCUP could be secondary to ICD-9 CM system which contains "others" and "unspecified" terms in its data collection. The newer version ICD-10 CM has 68,000 existing codes, as opposed to the 13,000 in ICD-9. The new coding system will provide a significant increase in the specificity of the reporting and allow more information to be conveyed. The terminology has been modernized and is consistent throughout the coding system. In future the ICD-10 CM coding system will further strengthen the data collection in the NIS-HCUP database.

There were a substantial number of missing cases in the NIS data. For example, only 17% of FREVI cases contain location of incident if it was home or away from home. Therefore, NIS estimates for location of occurrence requires further analysis. Despite these limitations, our findings suggest that NIS-HCUP is a useful source of data on FREVI hospitalizations. National estimates derived from the NIS are consistent with previous esti-

mates of hospitalization from firearm-related injuries. Due to its larger sampling frame and the ability to provide important clinical and epidemiologic information not available from other data sources, NIS-HCUP may serve as a gold standard for inpatient data. Despite constant trend of FREVI over the last decade this data illustrate the substantial disability, health, and economic impact of these injuries.

Conclusion

Firearm Related Violence and Injuries (FREVI), and associated costs remain a major source of hospital-related expenditures in the United States. The constant trend in number of firearm injuries per year over the last decade could be due to the absence of effective policy measures to curtail firearm injuries i.e., lacking appropriate population mental health assessment, poor tracking of gun ownership from one individual to another and preventing gun accesses to individuals with criminal background might reduce FREVI hospitalization. Lack in mental health care and higher health care costs to treat with mental health appears to be the weak link in controlling suicides related with firearms. There had been a constant debate if the change in gun ownership policies could impact FREVI prevalence. So far different studies had shown dissimilar views to control gun related violence. Our review of the academic literature found that a broad array of evidence indicates that gun availability is a risk factor for homicide, both in the United States and across high-income countries.[4] Case-control studies, ecological time-series and cross-sectional studies indicate that in homes, cities, states and regions in the US, where there are more guns, both men and women are at higher risk for homicide, particularly firearm homicide.[7] However, more importantly, gun control laws restrict our natural right to self-defense and undermine the intent of our Constitutional republic to protect individual rights. Other policies which could help to curve down FREVI hospitalization are, firearms use and possession for

self-defense could be protective, however more scientific evidenced based studies are needed to demonstrate the fact that firearms are more protective versus harmful. Use of firearms during riots by the offenders could be harmful for the public and we need more prevention education at elementary level regarding the use and possession of firearms. Strict probation laws for the offenders not to possess firearms could be helpful to reduce FREVI. Probation in criminal law is a period of supervision over an offender, ordered by a court instead of serving time in prison. In some jurisdictions, the term probation only applies to community sentences (alternatives to incarceration), such as suspended sentences. In others, probation also includes supervision of those conditionally released from prison on parole.[12] Definitely, we need more studies to find exact interventions to curve down FREVI hospitalizations.

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APPENDIX A: DATA

Table 6	All	Long LOS				Died			
		1)Yes		2)No		1)Yes		2)No	
	N	N	R%	N	R%	N	R%	N	R%
All	46,666	1,870	4	44,795	96	4,294	9.2	42,372	90.8
injurylocation 1-HOME	22,908	1,056	4.6	21,852	95.4	2,912	12.7	19,996	87.3
2-AWAY	23,758	815	3.4	22,943	96.6	1,382	5.8	22,376	94.2

Table 3	All		Know Location?					
			1)Yes			2)No		
	N	C%	N	R%	C%	N	R%	C%
All	268,639	100	46,972	17.5	100	221,666	82.5	100
AgeGrp 1)<14	4,578	1.7	1,368	29.9	2.9	3,210	70.1	1.4
2)14-17	24,746	9.2	4,981	20.1	10.6	19,764	79.9	8.9
3)18-24	89,252	33.2	14,675	16.4	31.2	74,577	83.6	33.6
4)25-34	74,981	27.9	11,456	15.3	24.4	63,525	84.7	28.7
5)35-44	37,462	13.9	6,401	17.1	13.6	31,061	82.9	14
6)45-54	21,211	7.9	4,185	19.7	8.9	17,026	80.3	7.7
7)55-64	8,515	3.2	1,860	21.8	4	6,655	78.2	3
8)65+	7,262	2.7	1,819	25	3.9	5,443	75	2.5
~ missing	632	0.2	228	36.1	0.5	404	63.9	0.2
Indicator of sex 1)Male	238,157	88.7	39,926	16.8	85	198,232	83.2	89.4
2)Female	28,295	10.5	6,261	22.1	13.3	22,034	77.9	9.9
~ missing	2,186	0.8	785	35.9	1.7	1,401	64.1	0.6
RaceGrp 1)NH-White	55,547	20.7	12,215	22	26	43,332	78	19.5
2)NH-Black	97,362	36.2	15,323	15.7	32.6	82,039	84.3	37
3)Hispanic	38,532	14.3	9,829	25.5	20.9	28,703	74.5	12.9
4)Other	11,159	4.2	1,975	17.7	4.2	9,184	82.3	4.1
~ missing	66,039	24.6	7,630	11.6	16.2	58,408	88.4	26.3
hIncome 1)Lowest	129,403	48.2	20,106	15.5	42.8	109,297	84.5	49.3
2)2nd	66,434	24.7	11,614	17.5	24.7	54,820	82.5	24.7
3)3rd	42,579	15.8	8,742	20.5	18.6	33,837	79.5	15.3
4)Highest	19,840	7.4	4,892	24.7	10.4	14,949	75.3	6.7
~ missing	10,382	3.9	1,618	15.6	3.4	8,764	84.4	4
Alcohol 1)Yes	25,592	9.5	4,808	18.8	10.2	20,784	81.2	9.4
2)No	243,047	90.5	42,164	17.3	89.8	200,882	82.7	90.6
ANYDRUG Comp 1)Yes	29,841	11.1	5,081	17	10.8	24,761	83	11.2
2)No	238,797	88.9	41,892	17.5	89.2	196,906	82.5	88.8
primPayer 1)Gov't	82,600	30.7	15,316	18.5	32.6	67,283	81.5	30.4
2)Private	62,633	23.3	11,481	18.3	24.4	51,152	81.7	23.1
3)Other	123,405	45.9	20,175	16.3	42.9	103,231	83.7	46.6

Appendix: A (continued)

Table 1	All		How Injury Occurred														
			1-ACCIDENT			2-SELF			3-ASSAULT			4-OTHER			5-MULT		
	N	C%	N	R%	C%	N	R%	C%	N	R%	C%	N	R%	C%	N	R%	C%
All	268,639	100	60,588	22.6	100	21,398	8	100	162,939	60.7	100	23,547	8.8	100	166	0.1	100
AgeGrp																	
1)<14	4,578	1.7	2,095	45.8	3.5	104	2.3	0.5	2,033	44.4	1.2	346	7.6	1.5	0	0	0
2)14-17	24,746	9.2	5,794	23.4	9.6	801	3.2	3.7	16,198	65.5	9.9	1,930	7.8	8.2	23	0.1	13.6
3)18-24	89,252	33.2	17,778	19.9	29.3	3,376	3.8	15.8	60,899	68.2	37.4	7,157	8	30.4	42	0	25.3
4)25-34	74,981	27.9	15,186	20.3	25.1	4,425	5.9	20.7	48,504	64.7	29.8	6,819	9.1	29	48	0.1	28.7
5)35-44	37,462	13.9	9,119	24.3	15.1	3,834	10.2	17.9	20,653	55.1	12.7	3,842	10.3	16.3	15	0	9
6)45-54	21,211	7.9	5,580	26.3	9.2	3,965	18.7	18.5	9,664	45.6	5.9	1,992	9.4	8.5	9	0	5.7
7)55-64	8,515	3.2	2,679	31.5	4.4	1,967	23.1	9.2	3,085	36.2	1.9	764	9	3.2	20	0.2	11.9
8)65+	7,262	2.7	2,195	30.2	3.6	2,906	40	13.6	1,492	20.5	0.9	660	9.1	2.8	10	0.1	5.8
~ missing	632	0.2	162	25.6	0.3	19	3.1	0.1	412	65.2	0.3	39	6.2	0.2	0	0	0
Indicator of sex																	
1)Male	238,157	88.7	53,374	22.4	88.1	17,069	7.2	79.8	146,530	61.5	89.9	21,037	8.8	89.3	148	0.1	88.7
2)Female	28,295	10.5	6,699	23.7	11.1	4,290	15.2	20	14,925	52.7	9.2	2,362	8.3	10	19	0.1	11.3
~ missing	2,186	0.8	515	23.5	0.8	39	1.8	0.2	1,484	67.9	0.9	149	6.8	0.6	0	0	0
RaceGrp																	
1)NH-White	55,547	20.7	18,762	33.8	31	12,452	22.4	58.2	19,003	34.2	11.7	5,250	9.5	22.3	80	0.1	48.4
2)NH-Black	97,362	36.2	17,289	17.8	28.5	1,411	1.4	6.6	69,215	71.1	42.5	9,403	9.7	39.9	44	0	26.2
3)Hispanic	38,532	14.3	6,427	16.7	10.6	1,242	3.2	5.8	28,304	73.5	17.4	2,540	6.6	10.8	18	0	11.1
4)Other	11,159	4.2	2,171	19.5	3.6	609	5.5	2.8	7,352	65.9	4.5	1,018	9.1	4.3	10	0.1	5.8
~ missing	66,039	24.6	15,939	24.1	26.3	5,684	8.6	26.6	39,064	59.2	24	5,337	8.1	22.7	14	0	8.5
hIncome																	
1)Lowest	129,403	48.2	27,447	21.2	45.3	7,396	5.7	34.6	83,133	64.2	51	11,358	8.8	48.2	70	0.1	42.2
2)2nd	66,434	24.7	15,436	23.2	25.5	5,962	9	27.9	39,386	59.3	24.2	5,602	8.4	23.8	47	0.1	28.5
3)3rd	42,579	15.8	10,664	25	17.6	4,375	10.3	20.4	23,802	55.9	14.6	3,719	8.7	15.8	19	0	11.5
4)Highest	19,840	7.4	5,005	25.2	8.3	2,760	13.9	12.9	10,193	51.4	6.3	1,869	9.4	7.9	15	0.1	9
~ missing	10,382	3.9	2,036	19.6	3.4	905	8.7	4.2	6,426	61.9	3.9	1,000	9.6	4.2	15	0.1	8.8
Alcohol																	
1)Yes	25,592	9.5	4,997	19.5	8.2	4,553	17.8	21.3	13,566	53	8.3	2,461	9.6	10.5	15	0.1	9.2
2)No	243,047	90.5	55,591	22.9	91.8	16,845	6.9	78.7	149,373	61.5	91.7	21,087	8.7	89.5	151	0.1	90.8
ANYDRUG Comp																	
1)Yes	29,841	11.1	5,377	18	8.9	3,024	10.1	14.1	18,569	62.2	11.4	2,843	9.5	12.1	29	0.1	17.3
2)No	238,797	88.9	55,211	23.1	91.1	18,374	7.7	85.9	144,370	60.5	88.6	20,705	8.7	87.9	138	0.1	82.7
primPayer																	
1)Gov't	82,600	30.7	17,792	21.5	29.4	7,465	9	34.9	50,312	60.9	30.9	6,968	8.4	29.6	63	0.1	37.6
2)Private	62,633	23.3	17,706	28.3	29.2	7,302	11.7	34.1	32,481	51.9	19.9	5,101	8.1	21.7	42	0.1	25.3
3)Other	123,405	45.9	25,089	20.3	41.4	6,630	5.4	31	80,146	64.9	49.2	11,478	9.3	48.7	62	0.1	37.1
Region of hospital																	
1)Northeast	42,546	15.8	7,807	18.3	12.9	2,154	5.1	10.1	29,233	68.7	17.9	3,342	7.9	14.2	10	0	6
2)Midwest	59,728	22.2	12,014	20.1	19.8	4,109	6.9	19.2	38,402	64.3	23.6	5,199	8.7	22.1	5	0	2.8
3)South	112,117	41.7	31,533	28.1	52	11,326	10.1	52.9	57,699	51.5	35.4	11,463	10.2	48.7	96	0.1	57.6
4)West	54,248	20.2	9,235	17	15.2	3,809	7	17.8	37,605	69.3	23.1	3,543	6.5	15	56	0.1	33.6
Bed size of hospital																	
1)Small	10,750	4	3,158	29.4	5.2	598	5.6	2.8	5,683	52.9	3.5	1,307	12.2	5.6	5	0	2.9
2)Medium	60,156	22.4	14,648	24.3	24.2	4,953	8.2	23.1	35,626	59.2	21.9	4,893	8.1	20.8	37	0.1	22.1
3)Large	196,407	73.1	42,454	21.6	70.1	15,726	8	73.5	120,866	61.5	74.2	17,240	8.8	73.2	120	0.1	72.2
~ missing	1,325	0.5	328	24.8	0.5	121	9.1	0.6	765	57.7	0.5	107	8.1	0.5	5	0.3	2.8
Location (urban/rural) of hospital																	
1)Urban	255,502	95.1	54,768	21.4	90.4	19,398	7.6	90.7	158,972	62.2	97.6	22,203	8.7	94.3	162	0.1	97.2
2)Rural	11,811	4.4	5,492	46.5	9.1	1,879	15.9	8.8	3,203	27.1	2	1,237	10.5	5.3	0	0	0
~ missing	1,325	0.5	328	24.8	0.5	121	9.1	0.6	765	57.7	0.5	107	8.1	0.5	5	0.3	2.8
Teaching status of hospital																	
1)Teaching	208,175	77.5	41,551	20	68.6	15,060	7.2	70.4	133,078	63.9	81.7	18,362	8.8	78	123	0.1	74.1
2)Non-teaching	59,138	22	18,709	31.6	30.9	6,217	10.5	29.1	29,096	49.2	17.9	5,078	8.6	21.6	38	0.1	23.1
~ missing	1,325	0.5	328	24.8	0.5	121	9.1	0.6	765	57.7	0.5	107	8.1	0.5	5	0.3	2.8
YEAR_CHAR																	
2001	23,938	8.9	6,086	25.4	10	2,127	8.9	9.9	13,305	55.6	8.2	2,401	10	10.2	19	0.1	11.4
2002	32,621	12.1	7,294	22.4	12	2,246	6.9	10.5	20,472	62.8	12.6	2,600	8	11	9	0	5.4
2003	29,116	10.8	6,586	22.6	10.9	2,453	8.4	11.5	17,253	59.3	10.6	2,799	9.6	11.9	24	0.1	14.6
2004	32,720	12.2	6,909	21.1	11.4	3,008	9.2	14.1	19,707	60.2	12.1	3,088	9.4	13.1	9	0	5.6
2005	30,431	11.3	7,256	23.8	12	2,034	6.7	9.5	18,488	60.8	11.3	2,639	8.7	11.2	14	0	8.3
2006	31,455	11.7	6,462	20.5	10.7	2,344	7.5	11	19,955	63.4	12.2	2,670	8.5	11.3	23	0.1	13.7
2007	31,989	11.9	7,201	22.5	11.9	2,207	6.9	10.3	19,599	61.3	12	2,981	9.3	12.7	0	0	0
2008	27,345	10.2	6,293	23	10.4	2,437	8.9	11.4	16,507	60.4	10.1	2,068	7.6	8.8	39	0.1	23.6
2009	29,023	10.8	6,500	22.4	10.7	2,541	8.8	11.9	17,653	60.8	10.8	2,301	7.9	9.8	29	0.1	17.4
injurysite																	
1-HEAD	36,436	13.6	5,797	15.9	9.6	11,213	30.8	52.4	15,778	43.3	9.7	3,628	10	15.4	19	0.1	11.6
2-TRUNK	67,662	25.2	12,829	19	21.2	5,301	7.8	24.8	43,368	64.1	26.6	6,122	9	26	42	0.1	25.3
3-EXTREM	87,229	32.5	29,694	34	49	2,267	2.6	10.6	48,757	55.9	29.9	6,461	7.4	27.4	49	0.1	29.8
4-MULT	71,623	26.7	10,033	14	16.6	1,730	2.4	8.1	53,630	74.9	32.9	6,175	8.6	26.2	55	0.1	33.3
9-MISSING	5,689	2.1	2,234	39.3	3.7	887	15.6	4.1	1,406	24.7	0.9	1,161	20.4	4.9	0	0	0