

NEVADA STATE HEALTH DIVISION

**Dog Bite Injuries and Costs
Nevada, 1999-2002**



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DOG BITES INJURIES and COSTS
NEVADA, 1999-2002

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Table of Contents

Background.....	Page 1
Introduction.....	Page 3
Limitations.....	Page 4
Highlights.....	Page 5
Total Dog Bite Injuries.....	Page 8
Inpatient Hospitalization.....	Page 10
Outpatient Hospitalization.....	Page 12
Cost of Inpatient Hospitalization.....	Page 14
Length of Stay of Hospitalization.....	Page 16
Primary Payer of Inpatient Injuries.....	Page 18
Outpatient Average Charge and Cost.....	Page 19
Outpatient Care by Hospital with Cost.....	Page 20
Total Dog Bite Injuries for Clark County	Page 21
Total Dog Bite Injuries for Washoe County	Page 23
Total Cat Bites with comparison to Dog Bites.....	Page 25
Narrative.....	Page 27
Discussion.....	Page 29
Conclusion.....	Page 30
References.....	Page 31

Background

Millions of Americans share their homes with dogs. The vast majority of interactions between people and dogs are happy and benign whereby making dogs great companions. In the United States there are approximately 53 million dogs sharing the human canine bond. 58.9% of all US households own a pet, dogs make up 31.6 % (cats make up 27.3%) of ownership.¹ Even a friendly dog may bite if threatened, angry, afraid or hurt.

Nationally data available on dog bite injuries are limited. 1994 was the most recent year for which published data on dog bites exist. Some 4.7 million incidents were reported in the United States that year and nearly 800,000 people required medical treatment.^{1,2,3} The actual number of dog bites within a community is difficult to know especially if the injury was not serious. People are bitten by dogs, ranging from minor nips to major attacks. Injury rates were highest among five to nine year old children.

“Often people ask what breed of dogs are most “dangerous”? The question can be prompted by a high profile attack by a specific dog or may be the result of a media driven portrayals of a specific breed deemed “dangerous”^{4,5} Singling out one or two specific breeds for control can result in a false sense of accomplishment.⁶ This often ignores the true scope of the problem at hand. Although sex differences do emerge from data on various types of aggression. Intact (unneutered) males dogs are involved in 70% to 76% of reported dog bite incidents.^{7,8} Hence unspayed female dogs can attract free roaming male dogs, which increases the risk to people through increased exposure to unfamiliar dogs. In addition dams are protective of there puppies and may bite a person who tries to handle them. A dog’s tendency to bite depends on such factors as heredity, early experience, later socialization, training, health and the victim’s behavior.⁷

Dog bites can also result in criminal and civil liability for pet owners⁹ :

- In January, a Kansas woman was convicted of second degree murder when her dogs fatally mauled an 11-year old boy.
- The Insurance Information Institute estimated that insurance companies paid out \$250 million in dog bite liability claims in 1996.
- In 1997, State Farm alone paid \$80 million for over 14,000 dog bite-related claims.
- State Farm, Fire and Casualty Company paid nearly \$80 million in dog bite related claims in 1997.
- It was estimated that insurance claims for dog bite related injuries cost the industry \$310 million in 2001.

In Nevada the paid losses from State Farm Insurance Companies are as follows:

Table 1. State Farm Insurance Companies Claims Payout 1998-2002

Year	Paid Losses	Paid Counts
1998	\$ 680,764	106
1999	\$ 1,298,762	75
2000	\$ 490,548	46
2001	\$ 410,890	67
2002	\$ 1,114,088	88
Total	\$ 3,995,053	382

Introduction

The main purpose of this study is to identify the number of reported dog bite incidences in Nevada's urban areas. The study ultimately provides an initial base to present dog bite injuries in the State of Nevada that could be used as a tool in measuring the effectiveness of educational programs targeted at children to prevent such incidences. Reducing the incidence of dog bites requires active community involvement on many different levels.

Both the Nevada State Health Division and the Nevada Department of Agriculture collaborated on a retrospective study to evaluate the incidence of dog bite related injuries, public health impacts, and the associated medical costs. The study includes dog bite patients from urban areas in Nevada from 1999 to 2002. The study examines both inpatient hospital discharge and outpatient hospital discharge data for dog bite patients. The International Classification of Diseases, (ICD-9-CM) diagnosis code for dog bites is E906.0¹⁰. (ICD-9-CM) is used to code and classify morbidity data from the inpatient and outpatient records, physician offices, and most National Center for Health Statistics (NCHS) surveys.

Patients diagnosed with E906.0, although not necessarily the primary diagnosis of the patient were also considered in this report. This study looked at data from state hospital discharges as provided by the Center for Health Information Analysis (CHIA) and data were directly collected from hospitals. Medical records staff from ten major hospitals, which represent over 90% of hospitalizations in the state, were asked to query outpatient and inpatient records for those treated for dog bite related-injuries.

Selected estimates used in this study were calculated by establishing ratios between the data from CHIA and the data collected by individual hospitals. Estimates used from the CHIA data, are noted in the study. The majority of the study was based on reporting from the hospitals and such reporting was found to be a more reliable data source. The ten hospitals that provided data for this study were Desert Springs Hospital, Lake Mead Hospital, Mountain View Hospital, St. Rose Sienna Hospital, Summerlin Hospital, Sunrise Hospital, University Medical Center, and Valley Hospital in Clark County, St. Mary's Medical Center and Washoe Medical Center in Washoe County.

Limitations

This study provides a base for evaluating the scope of Nevada's dog bite occurrences. This study aggregates the data and is not able to describe the specific details of each bite or the emotional effect the bite may have. This may underreport the circumstances caused by dog bite injuries. Not all medical treating facilities in the state of Nevada are accurate in recording E-codes for the hospital discharge database that is maintained by CHIA. This limitation results in underestimates of data reported, and necessitates further review of hospital records in order to obtain more accurate accounts of this injury.

The underestimates of data reported in the hospital discharge database were recognized after an extensive review of the data that contrasted regular inpatient hospitalizations and E-coded injury hospitalizations at each hospital. Many hospitals appeared to be under representing E-coded injuries in comparison to the caseload they handle in general. In addition it is possible that a proportion of E-coded injuries at hospitals could vary greatly from year to year which might be related to turnover of staff responsible for the coding. In some hospitals no E-coded injuries were reported in given years, though they represented a fairly large portion of hospitalizations for the state.

When the underestimation of data was discovered in this report it was decided to contact the hospitals directly for dog bite data. The data from CHIA were used to establish length of stay, payer, and cost information and those data were extrapolated to the data received directly from the hospitals. Two major hospitals that had consistent E-coded injury data over the years of this study matched with data collected directly from the hospitals for dog bites, helping to validate the data collection method from hospitals directly. The hospitals that were underreporting E-coded injuries in the hospital discharge database were able to provide accurate data when asked for it directly. Data were proportional to the total size of patients discharged, based on the two hospitals that were established as reliable in both CHIA and direct from hospital data.

The outpatient injury data also presented obstacles for this report. Since the outpatient data were not available at the time of this report in a large database format, reporting was taken from representatives at hospitals. In order to associate cost with this type of injury, rates were established for Emergency Department (ED) data from area hospitals representing Clark County for the years 2002 and 2003, including University Medical Center, Summerlin Hospital, Valley Hospital and Desert Springs Hospital. The average dog bites charge as established by these hospitals for ED visits was \$869.1. Since University Medical Center represented over 99% of quick care injuries in this report, their average cost for these injuries was applied at \$155. The reason University Medical Center represents such a large portion of the quick care injuries is that they have the largest quick care facility in the State and other hospitals were not able to provide data on their quick care services at this time. This means that dog bite injuries treated at other quick care facilities are not included in this report, resulting in possible underestimates of dog bite injuries and costs.

Highlights

- Inpatient hospitalizations resulted in total billed charges of \$803,481 due to dog bites. From 1999 to 2002 the best estimate for total hospital billing amounts, which includes both inpatient and outpatient injuries, to Nevadans for dog bites is \$2,142,049 per year during 1999-2002. The actual amount may be higher since these figures represent only 90% of hospital injuries in the State, and non-hospital injuries are not included.
- The average dog bite patient in Nevada that had an inpatient hospitalization spent almost three days in the hospital and incurred slightly over \$10,000 in hospital charges.
- There were an estimated 316 individuals with inpatient hospitalization from dog bites in Nevada from 1999 to 2002 and at least 9,283 dog bite injuries that resulted in outpatient care over the same period. Of the 9,599 injuries, 46.0 percent occurred to individuals 19 years of age or younger. Overall there was a 56.4 percent decline in dog bite injuries after 15 years of age (N=1,248 to N=544).
- Overall there was a higher number of inpatient individuals under ten years of age that were hospitalized over night due to a dog bite versus the subsequent three age groups combined (10-19 year olds, 20-29 year olds, and 30-39 year olds) .
- The outpatient hospital rate from dog bites for less than nine year olds (285.74 per 100,000) is almost double the total hospital outpatient rate due to dog bites for all ages (152.23 per 100,000).
- The inpatient hospitalization rate for Nevadans due to dog bites was at least 5.18 per 100,000 and the rate for outpatients was 152.23 per 100,000. This means outpatient injuries occurred at a rate of 29 to one to inpatient injuries.

- 50 % of the reported injuries resulting in outpatient care in this study were treated at the University Medical Center (N= 4,939) in Clark County. 41 % of these cases occurred at their Quick Care facilities (N =3,779). Other Quick Care facilities did not report their injuries and could not be included this report.

Figure 1. Outpatient Hospital Discharges

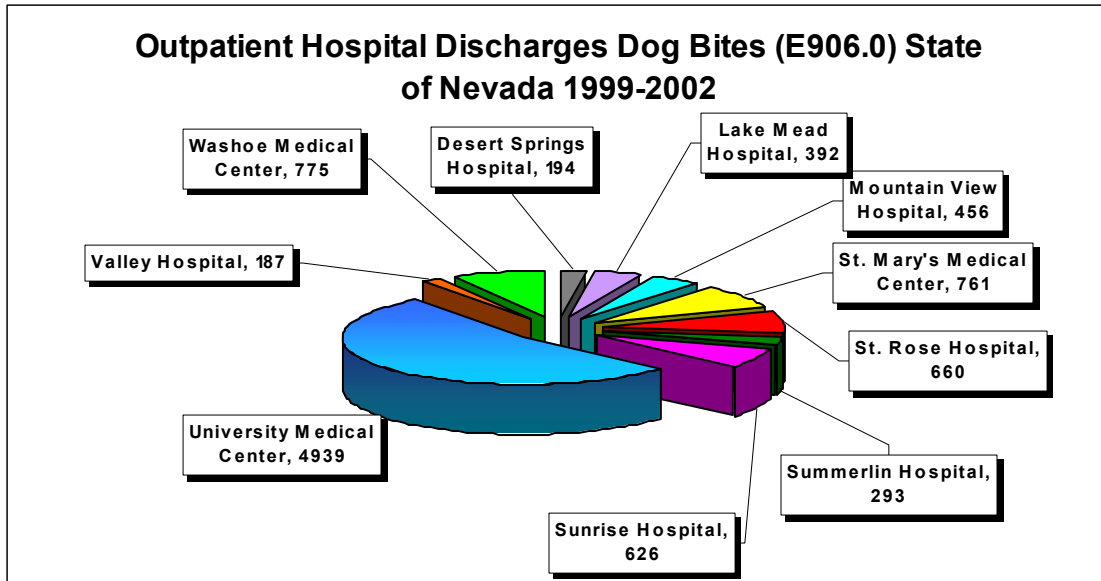
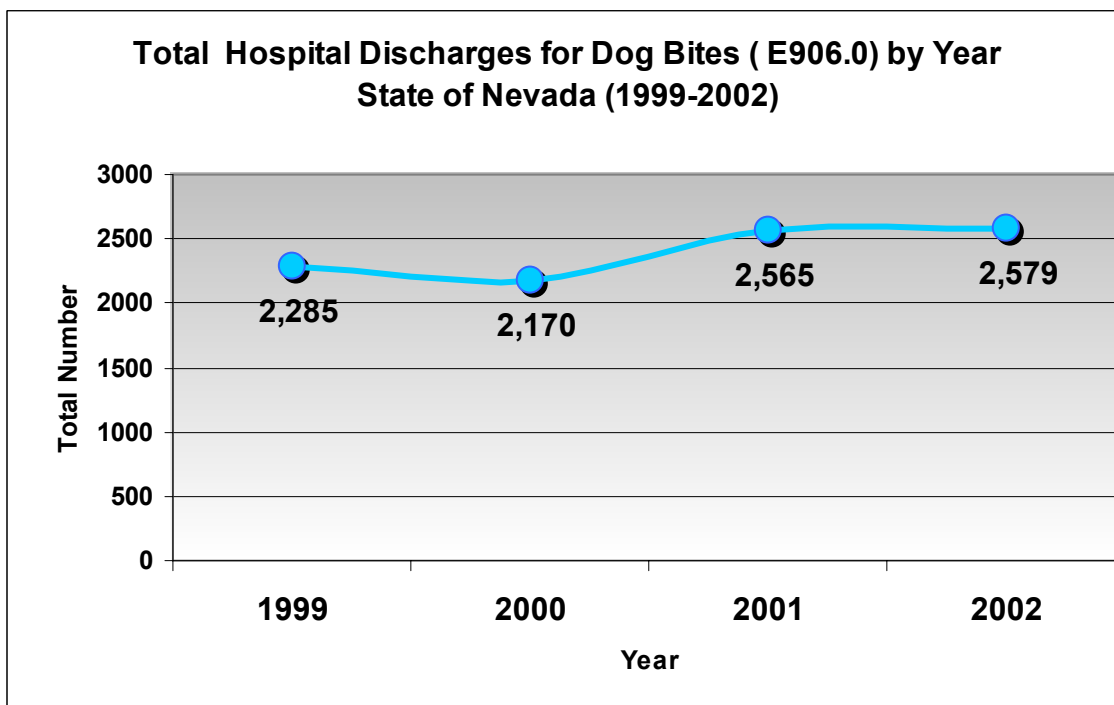


Figure 2. Total Hospital Discharges for Dog Bites



- Total hospital discharges for dog bites decreased 5.03 percent from 1999 to 2000, it increased 18.20 percent from 2000 to 2001 and slightly increased 0.5 percent from 2001 to 2002.
- The total confirmed number cat bites in the state of Nevada was 1,334 from 2001-2002 where as the total number of dog bites for 2001-2002 was 5,144 which is nearly four times higher.
- The average charge for cat bites is \$970.96. Since University Medical Center represented over 99% of quick care injuries in this report, their average cost for these injuries was applied at \$156 as described in the limitations section of this report.

**Total Inpatient and Outpatient Injuries and Injury Rate (per 100,000)
from Dog Bites (E906.0) State of Nevada 1999 - 2002**

Table 2. Nevada Dog Bite Injuries								
Year	Type / Age Group	0-4	5-9	10-14	15-19	20-39	40+	TOTAL
	Dog Bite Injuries	290	382	282	132	589	610	2,285
1999	Population	144,301	146,681	136,476	125,211	597,651	817,331	1,967,650
	Injury Rate (per 100,000)	200.97	260.43	206.63	105.42	98.55	74.63	116.13
	Dog Bite Injuries	229	303	297	130	607	604	2,170
2000	Population	148,447	152,007	141,659	129,416	613,447	849,073	2,034,050
	Injury Rate (per 100,000)	154.26	199.33	209.66	100.45	98.95	71.14	106.68
	Dog Bite Injuries	309	439	329	122	663	703	2,565
2001	Population	155,714	159,396	148,408	135,560	643,646	889,774	2,132,498
	Injury Rate (per 100,000)	198.44	275.41	221.69	90.00	103.01	79.01	120.28
	Dog Bite Injuries	270	398	340	160	711	700	2,579
2002	Population	156,433	143,537	145,925	140,101	668,152	912,219	2,166,367
	Injury Rate (per 100,000)	172.60	277.28	233.00	114.20	106.41	76.74	119.05
	Dog Bite Injuries	1,098	1,522	1,248	544	2,570	2,617	9,599
TOTAL	Population	604,895	601,622	572,468	530,288	2,522,895	3,468,398	8,300,565
	Injury Rate (per 100,000)	181.52	252.98	218.00	102.59	101.87	75.45	115.64

- The average injury rate from dog bites for those five to nine years of age (252.98 per 100,000) is double the total injury rate of the total population (115.64 per 100,000).
- The injury rate from dog bites is based on confirmed cases from ten hospitals and was at its highest in 2001 (120.28 per 100,000).
- There were a total of 9,599 confirmed dog bite injuries resulting in either inpatient or outpatient hospital care in Nevada for a four year period from 1999-2002.
- The largest age group of persons with the highest rate from dog bite injuries (252.98 per 100,000) was five to nine year olds (N=1,522); the second largest group was (218.00 per 100,000) ten to fourteen year olds (N=1,248).
- There was a 56.4 percent decline in dog bite injuries after 15 years of age (N=1,248 to N=544).

Figure 3. Total Dog Bite Injury Rate (per 100,000)

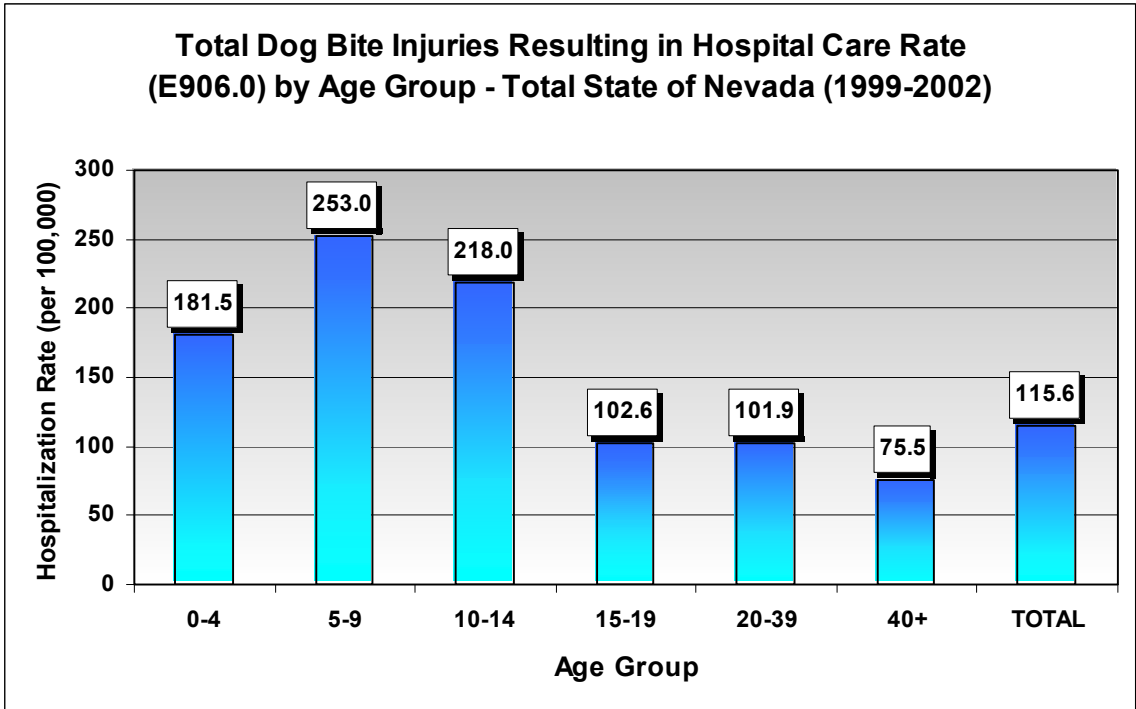
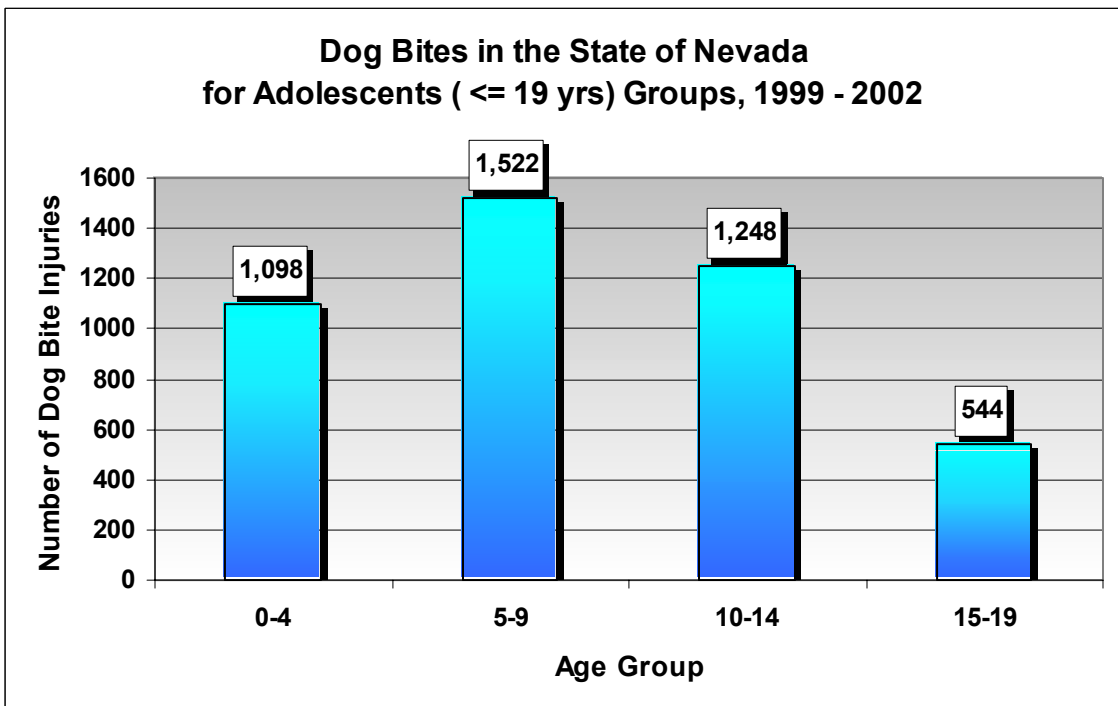


Figure 4. Inpatient and Outpatient Injuries from Dog Bites



**Inpatient Hospitalization Rate (per 100,000 population) for Dog Bites ,(E906.0)
State of Nevada 1999-2002**

Table 3. Inpatient Injuries Caused by Dog Bites

Year	Type / Age Group	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70+	TOTAL
	Dog Bite Injuries	16	7	7	12	13	12	0	5	72
1999	Population	270,969	254,371	269,922	342,000	302,978	227,431	157,283	142,471	1,967,425
	Injury Rate (per 100,000)	5.90	2.75	2.59	3.51	4.29	5.28	0.00	3.51	3.66
	Dog Bite Injuries	19	8	4	12	12	8	4	8	75
2000	Population	295,139	266,362	273,093	330,593	298,520	230,480	156,518	147,553	1,998,258
	Injury Rate (per 100,000)	6.44	3.00	1.46	3.63	4.02	3.47	2.56	5.42	3.75
	Dog Bite Injuries	46	8	4	18	13	7	7	9	112
2001	Population	315,111	283,968	297,839	345,807	315,892	249,470	167,090	157,322	2,132,499
	Injury Rate (per 100,000)	14.60	2.82	1.34	5.21	4.12	2.81	4.19	5.72	5.25
	Dog Bite Injuries	21	7	5	3	6	6	1	8	57
2002	Population	299,970	286,026	292,641	375,511	350,585	268,902	182,543	110,189	2,166,367
	Injury Rate (per 100,000)	7.00	2.45	1.71	0.80	1.71	2.23	0.55	7.26	2.63
	Dog Bite Injuries	102	30	20	45	44	33	12	30	316
TOTAL	Population	886,050	824,365	860,402	1,063,318	969,455	745,803	506,916	409,982	6,098,182
	Injury Rate (per 100,000)	11.51	3.64	2.32	4.23	4.54	4.42	2.37	7.32	5.18

- The average inpatient hospitalization rate for those less than ten years old (11.51 per 100,000) is more than double the average overall rate (5.18 per 100,000). The next highest inpatient hospitalization rate for a ten-year age group is those 40 to 49 years of age (4.54 per 100,000).
- The inpatient hospitalization rate was highest in 2001 (5.25 per 100,000) and was lowest in 2002 (2.63 per 100,000).
- The average number of persons that received inpatient hospitalization care each year from dog bites occurring in Nevada was 79 based on data collected from 1999 to 2002.

Figure 5. Inpatient Hospitalization Rate

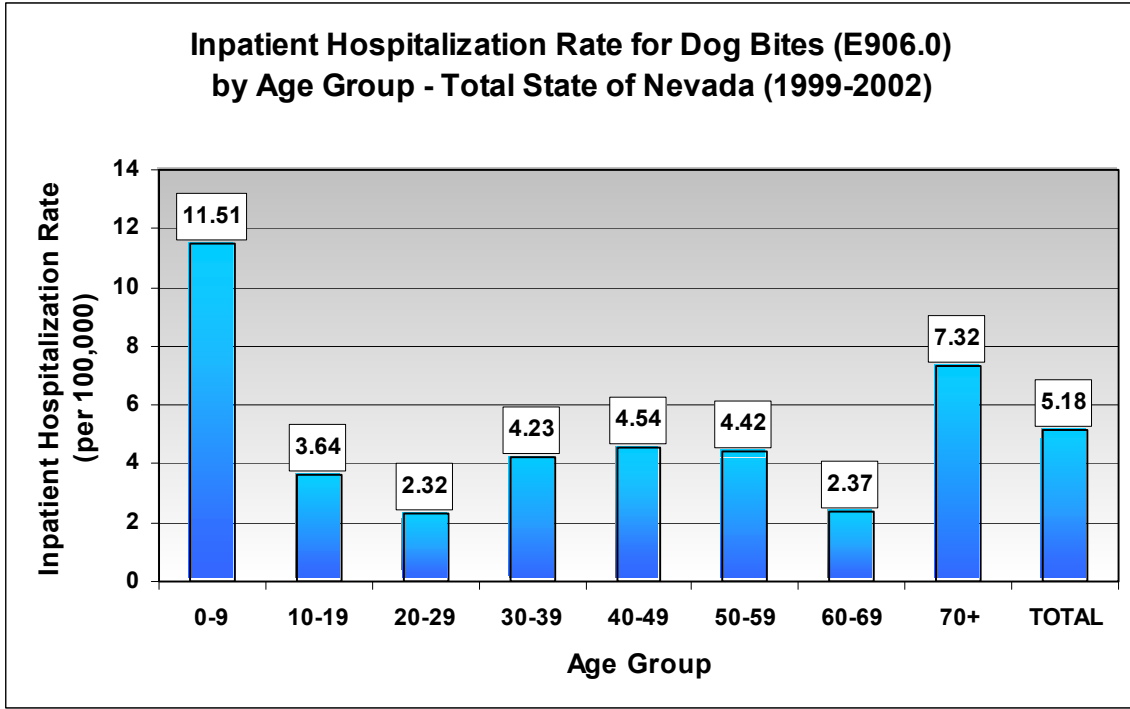
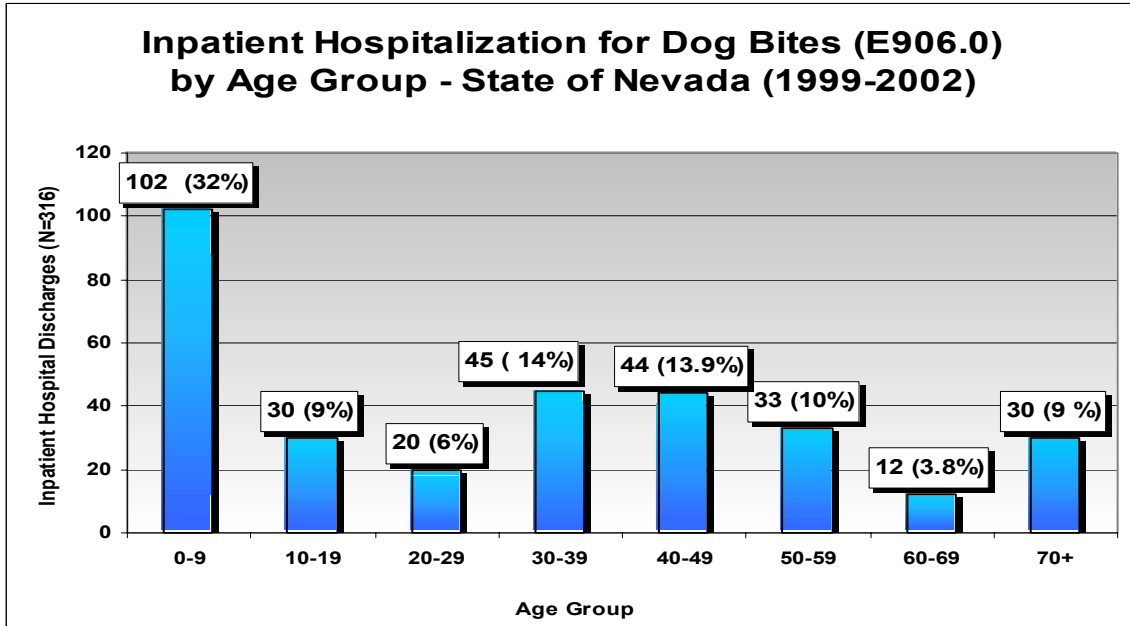


Figure 6. Inpatient Hospital Discharges



**Outpatient Hospitalization Rate (per 100,000 population) for Dog Bites
(E906.0) State of Nevada 1999-2002**

Table 4. Outpatient Injuries Caused by Dog Bites

Year	Type / Age Group	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70+	TOTAL
	Dog Bite Injuries	656	407	291	279	255	145	90	90	2,213
1999	Population	270,969	254,371	269,922	342,000	302,978	227,431	157,283	142,471	1,967,425
	Injury Rate (per 100,000)	242.09	160.00	107.81	81.58	84.16	63.76	57.22	63.17	112.48
	Dog Bite Injuries	513	419	256	335	281	147	76	68	2,095
2000	Population	295,139	266,362	273,093	330,593	298,520	230,480	156,518	147,553	1,998,258
	Injury Rate (per 100,000)	173.82	157.30	93.74	101.33	94.13	63.78	48.56	46.09	104.84
	Dog Bite Injuries	702	443	286	355	270	192	94	111	2,453
2001	Population	315,111	283,968	297,839	345,807	315,892	249,470	167,090	157,322	2,132,499
	Injury Rate (per 100,000)	222.78	156.00	96.03	102.66	85.47	76.96	56.26	70.56	115.03
	Dog Bite Injuries	647	493	323	380	285	189	112	93	2,522
2002	Population	299,970	286,026	292,641	375,511	350,585	268,902	182,543	110,189	2,166,367
	Injury Rate (per 100,000)	215.69	172.36	110.37	101.20	81.29	70.29	61.36	84.40	116.42
	Dog Bite Injuries	2,518	1,762	1,156	1,349	1,091	673	372	362	9,283
TOTAL	Population	881,219	804,701	840,854	1,018,400	917,390	707,381	480,891	447,346	6,098,182
	Injury Rate (per 100,000)	285.74	218.96	137.48	132.46	118.92	95.14	77.36	80.92	152.23

- The outpatient hospitalization rate, which includes Emergency Room and Quick Care services, for less than ten year olds (285.74 per 100,000) is almost double the hospital outpatient rate for all ages for this injury (152.23 per 100,000).
- The outpatient hospitalization rate for the total population in Nevada from dog bites was 152.23 per 100,000 people from 1999 to 2002.
- The estimated number of dog bite injuries resulting in outpatient hospitalization (N=9,283) is 29 times greater than the total number of hospital discharge inpatients from dog bites (N=316).
- Of the 9,283 outpatient hospital treatments for dog bites over this four-year period, 46.1% (N=4,280) of the injuries occurred to those 19 years of age or younger.

Figure 7. Outpatient Hospitalization

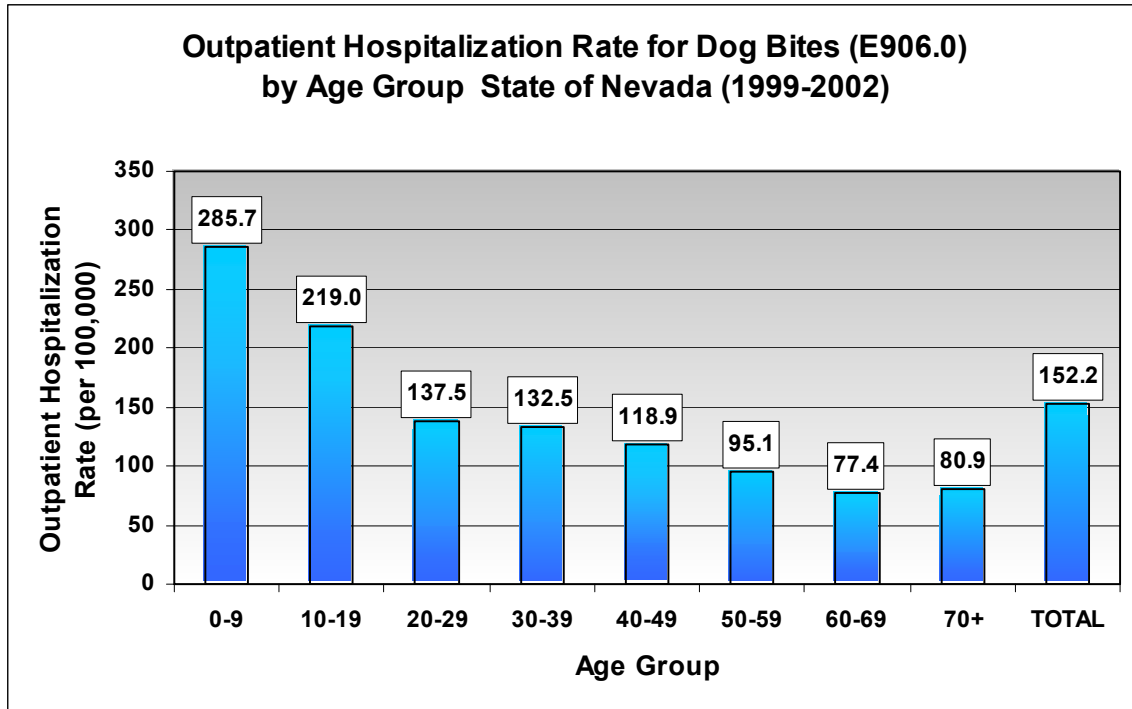
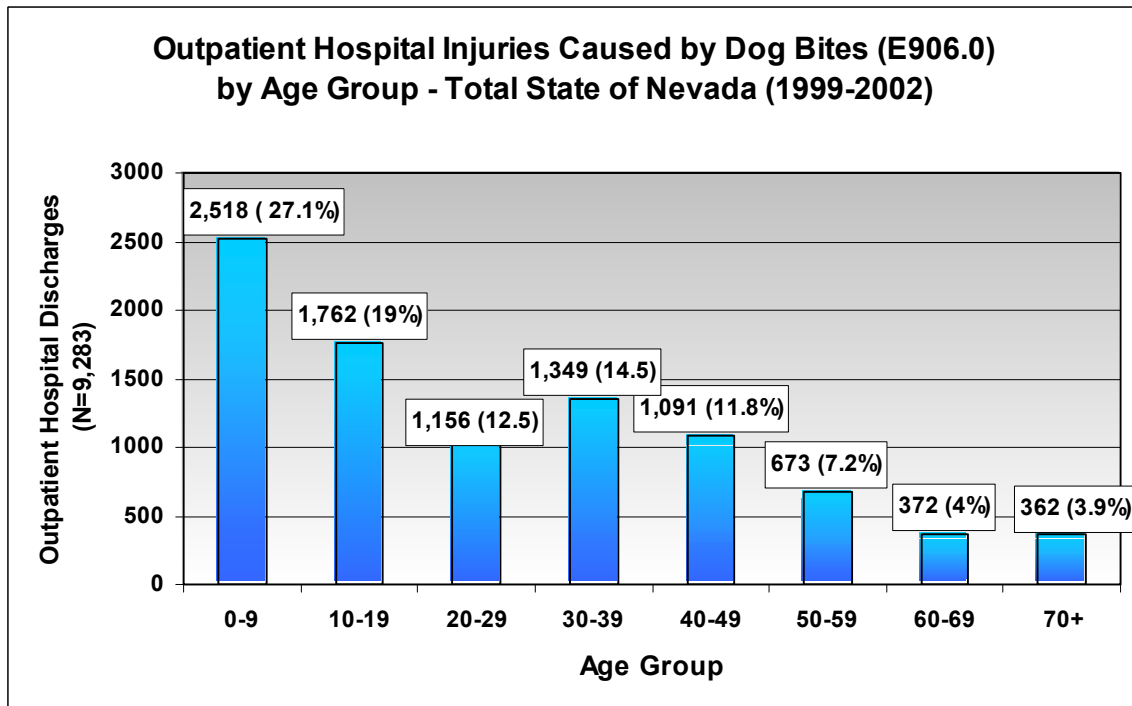


Figure 8. Outpatient Hospital Discharges



**Amounts Billed for Hospitalization Due to Dog Bites (E906.0) State of Nevada
1999-2002**

Table 5. Nevada Billing Data from Partial Hospitalization, 1999-2002						
Age Group	Number	Mean	Minimum	Maximum	Median	Total
0-10	49	7,622.92	1,479.00	23,416.00	6,507.00	373,523.00
10-19	9	5,834.22	1,701.00	12,824.00	3,751.00	52,508.00
20-29	8	13,855.88	3,909.00	26,327.00	12,634.50	110,847.00
30-39	20	8,567.75	1,302.00	19,576.00	8,030.50	171,355.00
40-49	31	14,563.77	1,793.00	125,387.00	8,274.00	451,477.00
50-59	15	6,731.53	2,793.00	15,275.00	6,673.00	100,973.00
60-69	9	10,864.33	1,636.00	22,824.00	8,030.00	97,779.00
70 over	23	13,457.57	2,567.00	43,550.00	9,491.00	309,524.00
Total	164	10,170.65	1,302.00	125,387.00	7,664.50	1,667,986.00

- Of the 164 dog bite injuries found in the hospital discharge database, the average bill was \$10,170.65. The inpatient data set is not complete so data collected directly from hospitals were used for total cost estimates as is discussed in the limitations sections of this report. The best estimate of the number of inpatient injuries is 316 over this four-year period, which would result in bills of \$803,481 per year for these types of injuries (mean=10,170.65*N=316/4 yrs).
- The mean amount billed for a dog bite hospitalization for a ten-year age group was highest for those in the population 40 to 49 year olds at \$14,563.77 with the median value for this age group at \$8,274.00.

Table 6. Nevada Billing Data from Partial Hospitalization, 1999-2002						
Age Group	Number	Mean	Minimum	Maximum	Median	Total
0- 5	30	5,353.93	1,479.00	13,683.00	4,409.50	160,618.00
5-9	19	11,205.53	2,649.00	23,416.00	9,314.00	212,905.00
10-14	7	5,682.86	2,384.00	12,824.00	3,751.00	39,780.00
15-19	2	6,364.00	1,701.00	11,027.00	6,364.00	12,728.00
20-39	28	10,078.64	1,302.00	26,327.00	9,655.00	282,202.00
40 over	78	12,304.53	1,636.00	125,387.00	8,093.00	959,753.00
Total	164	10,170.65	1,302.00	125,387.00	7,664.50	1,667,986.00

Figure 9. Inpatient Hospitalization Mean Total Charge

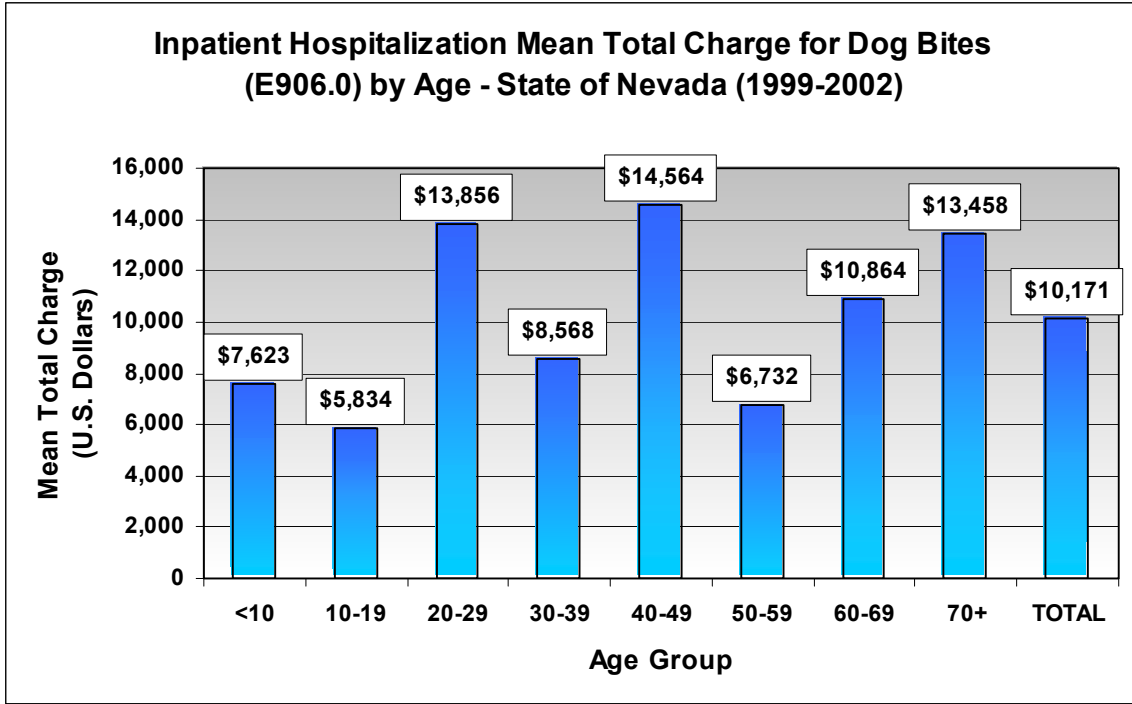
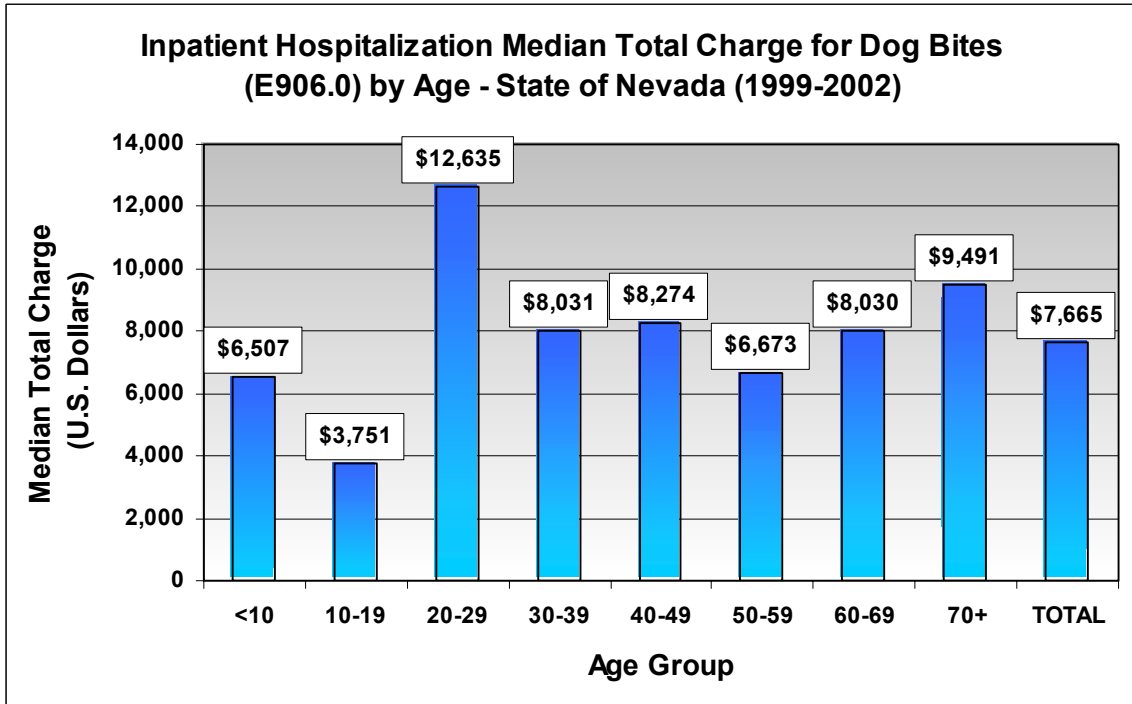


Figure 10. Inpatient Hospitalization Median Total



Length of Stay for Inpatient Hospitalization Due to Dog Bites (E906.0) State of Nevada 1999-2002

Table 7. Nevada- Length of Stay from Partial Inpatient Hospitalization, 1999-2002

Age Group	Number	Mean	Minimum	Maximum	Median	Total
0-10	49	2.00	1.00	6.00	2.00	98
10-19	9	1.56	1.00	4.00	1.00	14
20-29	8	3.75	2.00	7.00	3.00	30
30-39	20	2.45	0.00	8.00	2.00	49
40-49	31	4.10	1.00	28.00	2.00	127
50-59	15	2.67	1.00	5.00	3.00	40
60-69	9	3.22	1.00	7.00	3.00	29
70 +	23	4.48	1.00	24.00	3.00	103
Total	164	2.99	0.00	28.00	2.00	490

- The 164 cases found in the hospital discharge database, of the possible 316 inpatient dog bite injuries statewide, showed an average stay of slightly less than three days in length. A discussion of the data from the discharge database can be found in the limitations section of this report.
- The mean and median length of stay from dog bite hospitalization was highest for those in the population 70 years and older at four and three day's duration respectively.

Table 8. Nevada- Length of Stay from Partial Inpatient Hospitalization, 1999-2002

Age Group	Number	Mean	Minimum	Maximum	Median	Total
0-5	30	1.90	1.00	6.00	2.00	57
5-9	19	2.16	1.00	5.00	2.00	41
10-14	7	1.71	1.00	4.00	1.00	12
15-19	2	1.00	1.00	1.00	1.00	2
20-39	28	2.82	0.00	8.00	3.00	79
40 +	78	3.83	1.00	28.00	3.00	299
Total	164	2.99	0.00	28.00	2.00	490

Figure 11. Inpatient Hospitalization Mean Length of Stay

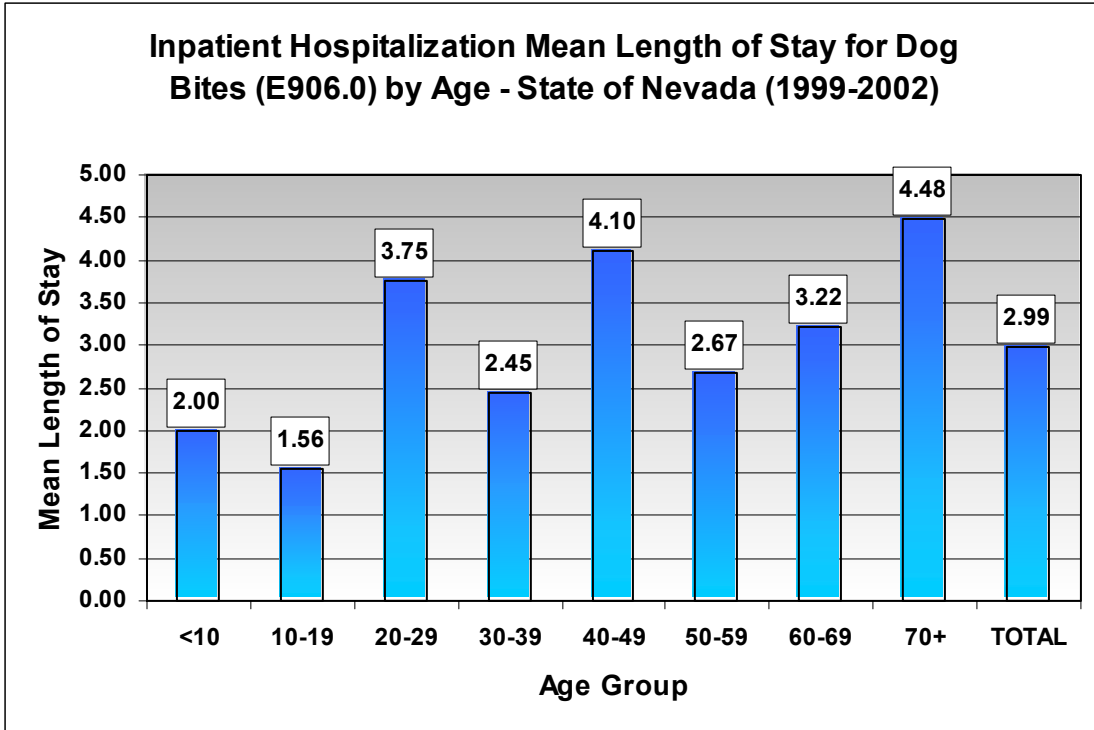
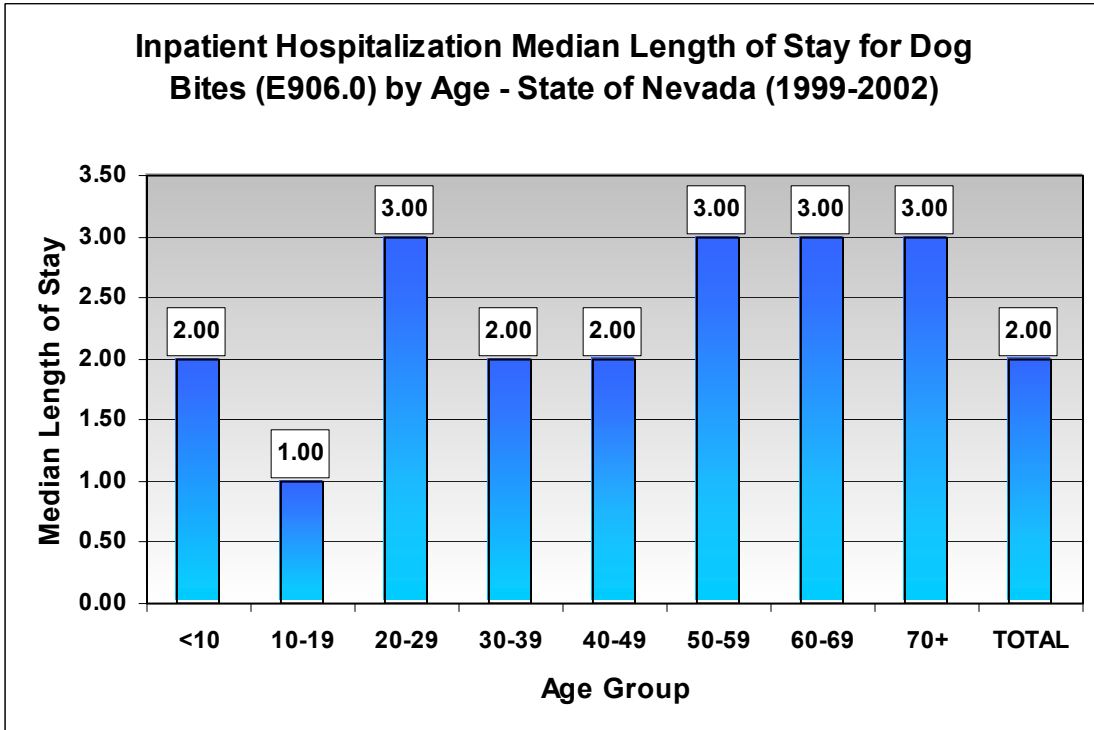
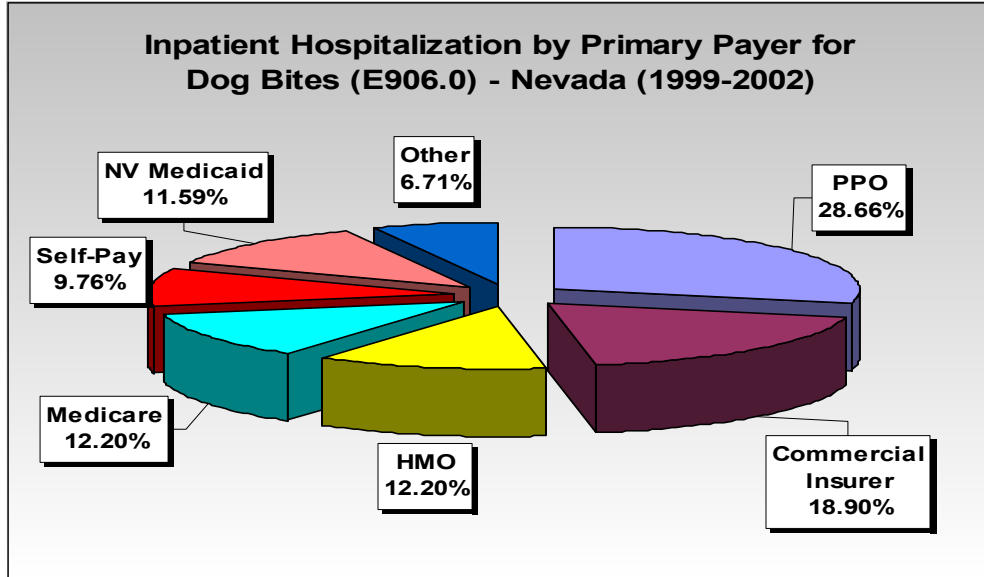


Figure 12. Inpatient Hospitalization Median Length of Stay



**Primary Payer for Inpatient Hospitalization Due to Dog Bites (E906.0)
State of Nevada 1999-2001**

Figure 13. Primary Payer for Inpatient Hospitalization Due to Dog Bites



- PPOs paid for more than one out of every four dog bite injuries that resulted in inpatient care.
- Slightly less than 10 percent of dog bite injuries found in the partial inpatient hospitalization data are paid for by injured persons that do not have insurance.

Payer/Year	1999	2000	2001	2002	TOTAL	Percent
PPO	11	11	14	11	47	28.66
Commercial Insurer	6	14	8	3	31	18.90
HMO	4	3	9	4	20	12.20
Medicare	1	5	8	6	20	12.20
Self-Pay	5	2	6	3	16	9.76
NV Medicaid	4	7	2	6	19	11.59
Other	3	1	3	4	11	6.71
TOTAL	34	43	50	37	164	100

Outpatient Hospital Average Charges and Costs Dog Bites (E906.0) & Cat Bites (906.3) Nevada 2002-2003

Table 10. Average Charge and Costs for Outpatient Injuries from Dog Bites (E906.0) & Cat Bites (E906.3)			
Average Charges for (E906.0)		Average Charges for (E906.3)	
Valley 2002	\$898.67	Valley 2002	\$1,345.88
Desert 2002	\$698.04	Desert 2002	\$677.12
Summerlin 2002	\$847.68	Summerlin 2002	\$984.84
UMC Jan-Jun 2003	\$1,032.00	UMC Jan-Jun 2003	\$876.00
<i>Average Charge</i>	<i>\$869.10</i>	<i>Average Charge</i>	<i>\$970.96</i>
Average Costs for (E906.0)		Average Costs for (E906.3)	
UMC Jan-Jun 2003	\$155.00	UMC Jan-Jun 2003	\$156.00

- The outpatient hospital average charges and cost data were provided directly from hospitals representing Clark County which includes more than half of the injuries resulting in outpatient care.

Table 11. Average Charges and Costs for Dog Bites (E906.0) per Year		
Charge/Cost	Number	Calculation
Average Dog Bite Charge	\$869.10	
Total Outpatient Charges Per Year	\$2,016,963.83	$(869.1 \times 9283) / 4$
Quick Care Cost Per Year	\$147,250.00	$(155 \times 3800) / 4$
Total Outpatient Cost	\$1,869,713.83	$(2,016,963.825 - 147,250)$
Total Estimate of Charges Per Year	\$1,191,318.83	$(869.1 \times 5483) / 4$
Total Outpatient Care Estimated Cost	\$1,338,568.83	$(147,250 + 1,191,318.83)$
Estimate of Inpatient	\$803,481.35	$(10,170.65 \times 316) / 4 \text{ yrs}$
Total Inpatient and Outpatient Costs	\$2,142,049.83	$(1,338,568.83 + 803,481.35)$

Outpatient Hospital Discharges Dog Bites (E906.0) Nevada 1999-2002

Table 12. Nevada - Outpatient Hospitalization from Dog Bites (E906.0), 1999 - 2002				
Hospital/Year	Emergency Room	Quick Care	TOTAL	Percent
Desert Springs Hospital	194	-	194	2.09%
Lake Mead Hospital	392	-	392	4.22%
Mountain View Hospital	456	-	456	4.91%
St. Mary's Medical Center	761	-	761	8.20%
St. Rose Hospital	639	21	660	7.11%
Summerlin Hospital	293	-	293	3.16%
Sunrise Hospital	626	-	626	6.74%
University Medical Center	1,160	3,779	4,939	53.20%
Valley Hospital	187	-	187	2.01%
Washoe Medical Center	775	-	775	8.35%
TOTAL	5,483	3,800	9,283	100.00%

- More than half (53%) of the injuries resulting in outpatient care reported from dog bites were treated at the University Medical Center (UMC) (N=4,939). This results from the fact that UMC was able to provide quick care injury data along with Emergency Room data, while other hospitals with quick care facilities were unable to report on those data at this time. The second largest hospital representing dog bite treatment in this study was Washoe Medical Center at 8.3 percent (N=775).
- The average charge of an outpatient injury was \$869.1. This was calculated by taking the average facility charge and doctor's fee from dog bites at University Medical Center, Summerlin Hospital, Valley Hospital and Desert Springs Hospital. Since UMC represented over 99% of quick care injuries in this report their average cost for these injuries was applied at \$155. When the estimated average billed amount for these types of dog bite injuries was used in conjunction with the number of outpatient care services provided for dog bites throughout the State, it resulted in an estimated total amount of \$1,338,569 per year. A more detailed discussion regarding this topic can be found in the limitations section of this report.

**Total Inpatient and Outpatient Injuries and Injury Rate (per 100,000)
from Dog Bites (E906.0) Clark County, Nevada 1999-2002**

Table 13. Clark County Dog Bite Injuries								
Year	Type / Age Group	0-4	5-9	10-14	15-19	20-39	40+	TOTAL
1999	Dog Bite Injuries	236	331	238	115	493	500	1913
	Population	101,168	101,371	90,506	82,721	424,141	543,633	1,343,540
	Injury Rate (per 100,000)	233.28	326.52	262.97	139.02	116.23	91.97	142.39
2000	Dog Bite Injuries	167	233	255	112	507	473	1747
	Population	105,504	106,490	95,118	86,441	440,990	570,556	1,405,099
	Injury Rate (per 100,000)	158.29	218.80	268.09	129.57	114.97	82.90	124.33
2001	Dog Bite Injuries	254	382	267	106	573	586	2168
	Population	111,567	112,611	100,585	91,409	466,336	603,348	1,485,855
	Injury Rate (per 100,000)	227.67	339.22	265.45	115.96	122.87	97.12	145.91
2002	Dog Bite Injuries	196.00	322.00	291.00	125.00	544.00	583.00	2061.00
	Population	116,119	111,289	108,606	107,145	478,765	638,729	1,560,653
	Injury Rate (per 100,000)	168.79	289.34	267.94	116.66	113.63	91.28	132.06
TOTAL	Dog Bite Injuries	853	1,268	1,051	458	2,117	2,142	7,889
	Population	434,358	431,761	394,814	367,715	1,810,232	2,356,267	5,795,147
	Injury Rate (per 100,000)	196.38	293.68	266.20	124.55	116.95	90.91	136.13

- The injury rate for those five to nine years of age (293.68 per 100,000) is more than double the total injury rate (136.13 per 100,000) for Clark County from 1999-2002. The second highest injury rate for any age group is ten-fourteen year olds (266.20 per 100,000).
- The Clark County dog bite injury rate is based on inpatient and outpatient hospitalization data from eight area hospitals and was at its highest in 2001 (145.91 per 100,000).
- The largest five-year age group for total dog bite injuries was five to nine year olds (N=1,268) and the second largest group was ten to fourteen year olds (N=1,051).
- The average number of dog bite related injuries resulting in either inpatient or outpatient hospitalization per year in Clark County was 1,972 from 1999 to 2002.

Figure 14. Dog Bite Injury Rate for Clark County

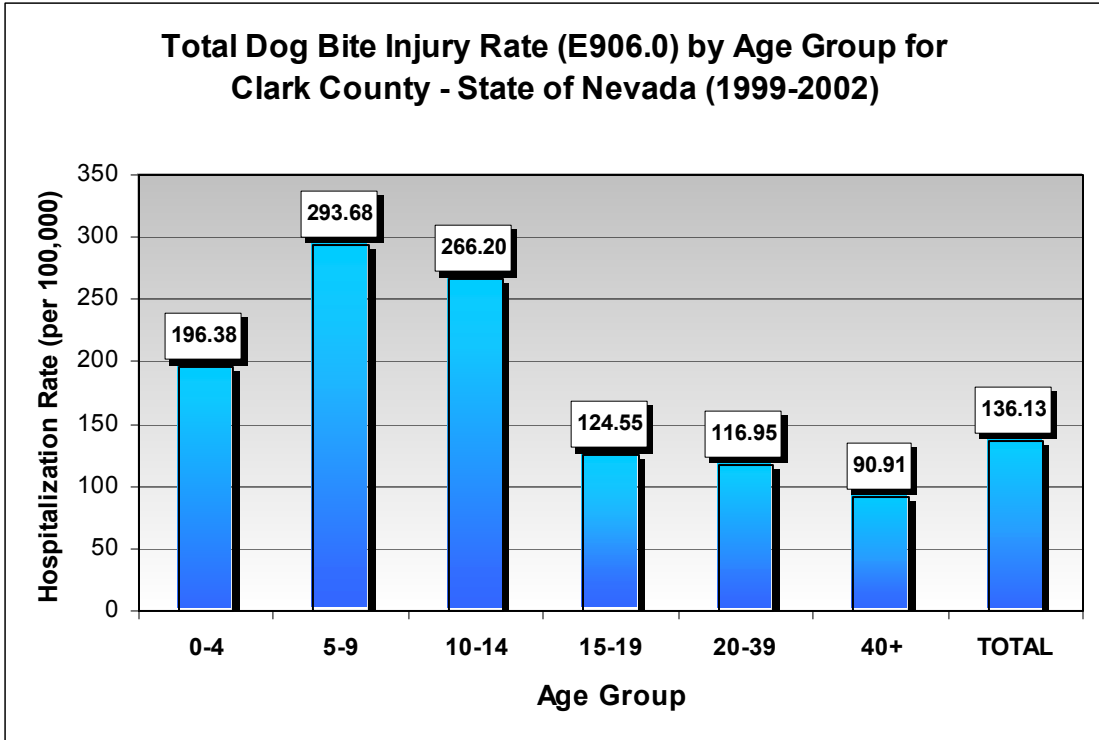
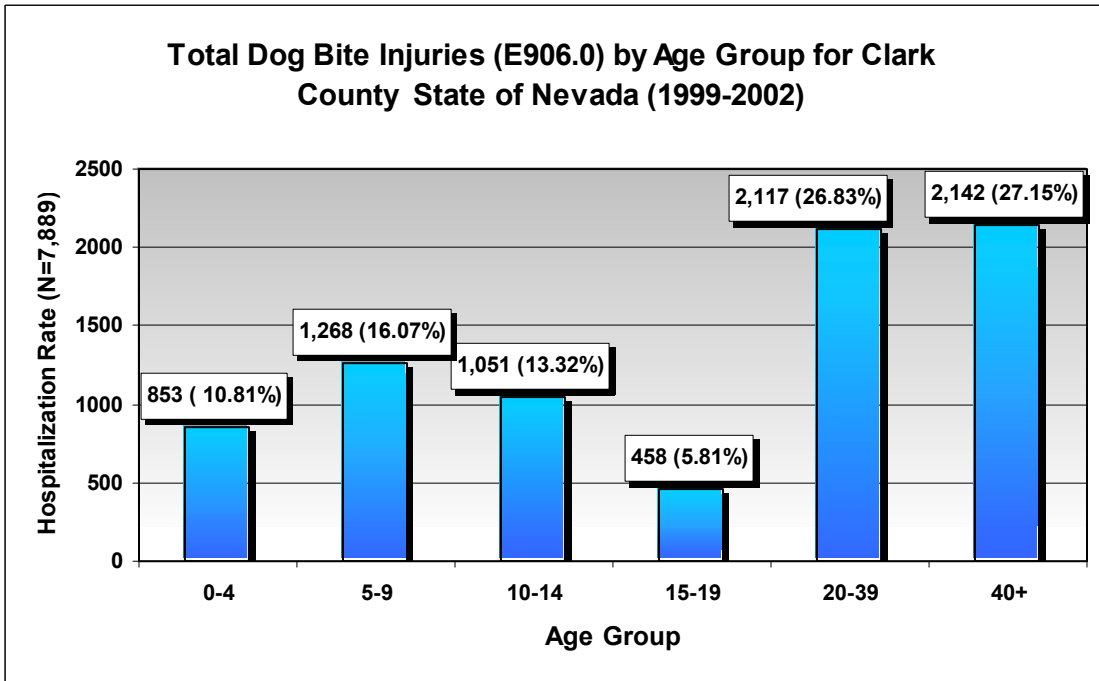


Figure 15. Dog Bite Injuries for Clark County



Total Inpatient and Outpatient Injuries and Injury Rate (per 100,000 pop.) from Dog Bites (E906.0) Washoe County, Nevada 1999-2002

Table 14. Washoe County Dog Bite Injuries								
Year	Type / Age Group	0-4	5-9	10-14	15-19	20-39	40+	TOTAL
1999	Dog Bite Injuries	54	51	44	17	96	110	372
	Population	22,662	22,839	22,262	21,476	97,491	136,940	323,670
	Injury Rate (per 100,000)	238.28	223.31	197.64	79.16	98.47	80.33	114.93
2000	Dog Bite Injuries	62	70	42	18	100	131	423
	Population	23,788	24,243	23,843	22,813	101,332	145,916	341,935
	Injury Rate (per 100,000)	260.63	288.75	176.15	78.90	98.69	89.78	123.71
2001	Dog Bite Injuries	55	57	62	16	90	117	397
	Population	24,577	25,046	24,633	23,570	104,691	150,754	353,271
	Injury Rate (per 100,000)	223.79	227.58	251.69	67.88	85.97	77.61	112.38
2002	Dog Bite Injuries	61	57	49	24	68	63	322
	Population	24,476	23,207	23,177	22,680	104,711	159,303	357,554
	Injury Rate (per 100,000)	249.22	245.62	211.42	105.82	64.94	39.55	90.06
TOTAL	Dog Bite Injuries	232	235	197	75	354	421	1514
	Population	95,503	95,335	93,915	90,539	408,225	592,913	1,376,430
	Injury Rate (per 100,000)	242.92	246.50	209.76	82.84	86.72	71.01	109.99

- The average injury rate for those five to nine years of age (246.50 per 100,000) and those four years old and younger (242.92 per 100,000) was more than double the total average injury rate (109.99 per 100,000) for Washoe county from 1999 to 2002.
- The Washoe County dog bite injury rate is based on both inpatient and outpatient hospitalization data from St Mary’s and Washoe Medical the two largest area hospitals, and was at its highest in 2000 (123.71 per 100,000).
- The largest five-year age group of total dog bite injuries was five to nine year olds (N=235) and the second largest group was four year olds and younger (N=232).
- The average number of dog bite related injuries resulting in either inpatient or outpatient hospitalization per year in Washoe County was 379 from 1999 to 2002.

Figure 16. Dog Bite Injury Rate for Washoe County

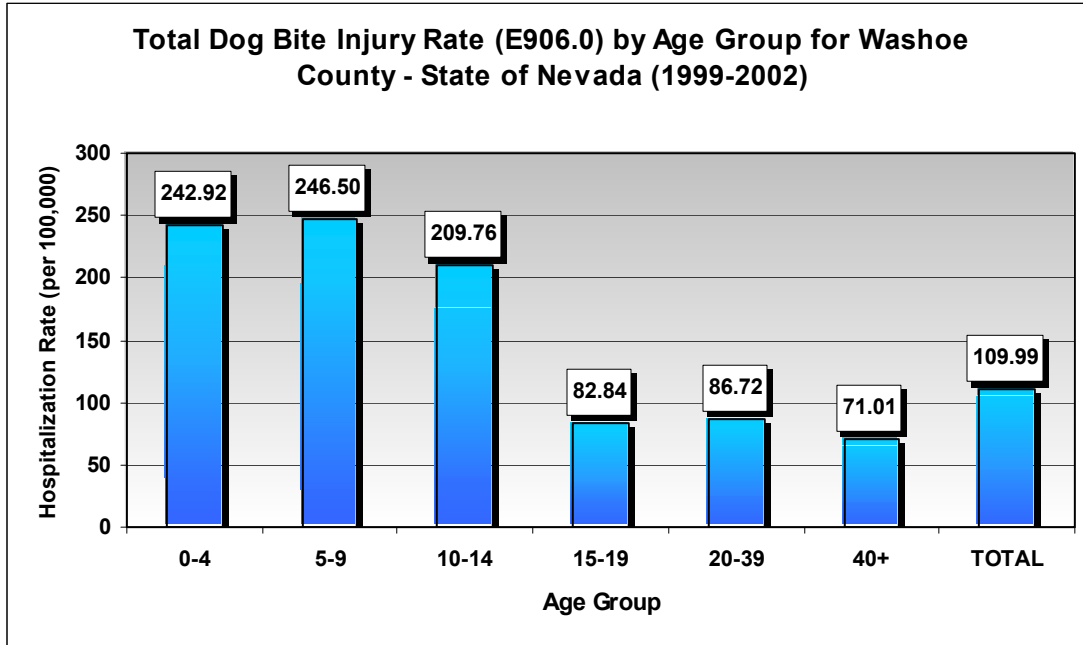
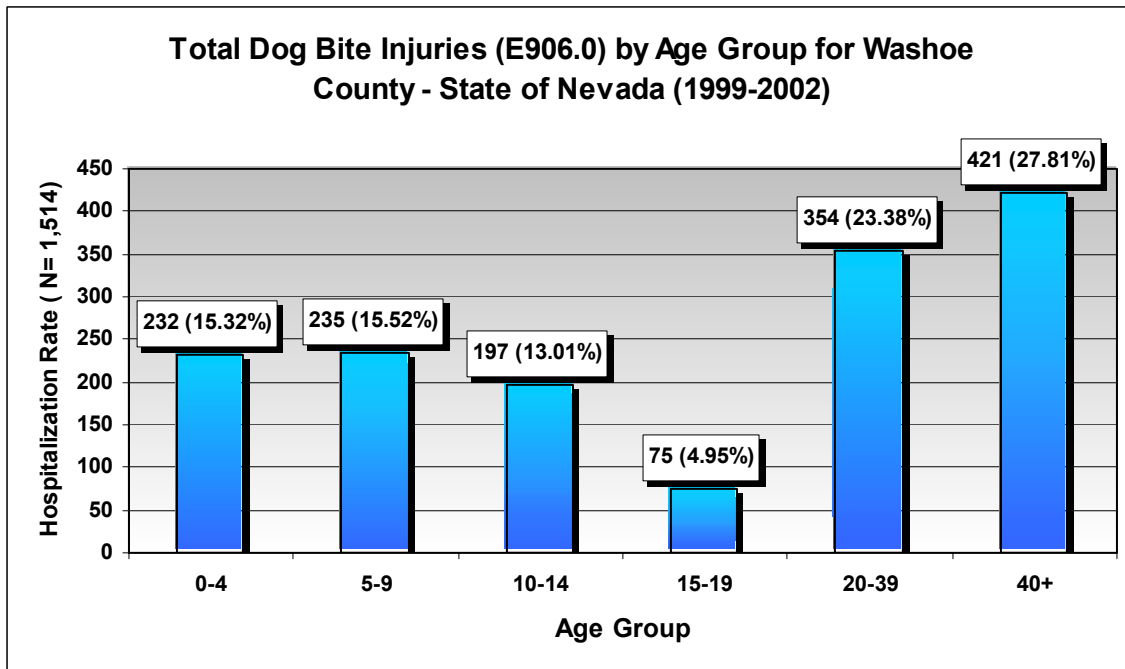


Figure 17. Dog Bite Injuries for Washoe County



**Total Inpatient and Outpatient Injuries and Injury Rate (per 100,000)
from Cat Bites (E906.3) State of Nevada 1999 - 2002**

Table 15. Outpatient and Inpatient Injuries Caused by Cat Bites 2001-2002										
Year	Type / Age Group	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70+	TOTAL
	Cat Bite Injuries	44	56	91	120	78	108	61	47	605
2001	Population	315,111	283,968	297,839	345,807	315,892	249,470	167,090	157,322	2,132,499
	Injury Rate (per 100,000)	13.96	19.72	30.55	34.70	24.69	43.29	36.51	29.88	28.37
	Cat Bite Injuries	72	52	120	117	131	87	91	59	729
2002	Population	299,970	286,026	292,641	375,511	350,585	268,902	182,543	110,189	2,166,367
	Injury Rate (per 100,000)	24.00	18.18	41.01	31.16	37.37	32.35	49.85	53.54	33.65
	Cat Bite Injuries	116	108	211	237	209	195	152	106	1,334
TOTAL	Population	881,219	804,701	840,854	1,018,400	917,390	707,381	480,891	447,346	6,098,182
	Injury Rate (per 100,000)	13.16	13.42	25.09	23.27	22.78	27.57	31.61	23.70	21.88

- The average injury rate from cat bites is highest among the 60-69 years of age group at (31.61 per 100,000). And was higher than the total injury rate of the total population at a rate of (21.88 per 100,000).
- The total number of confirmed cat bites was 1,334 where as the total number of dog bites were 5,144 for 2001-2002.
- The average charge of an outpatient injury was \$970.96. This was calculated by taking the average facility charge and doctor's fee from cat bites at University Medical Center, Summerlin Hospital, Valley Hospital and Desert Springs Hospital. Since UMC represented over 99% of quick care injuries in this report their average cost for these injuries was applied at \$156.

Figure 18. Total Cat and Dog Bites Injury Rate

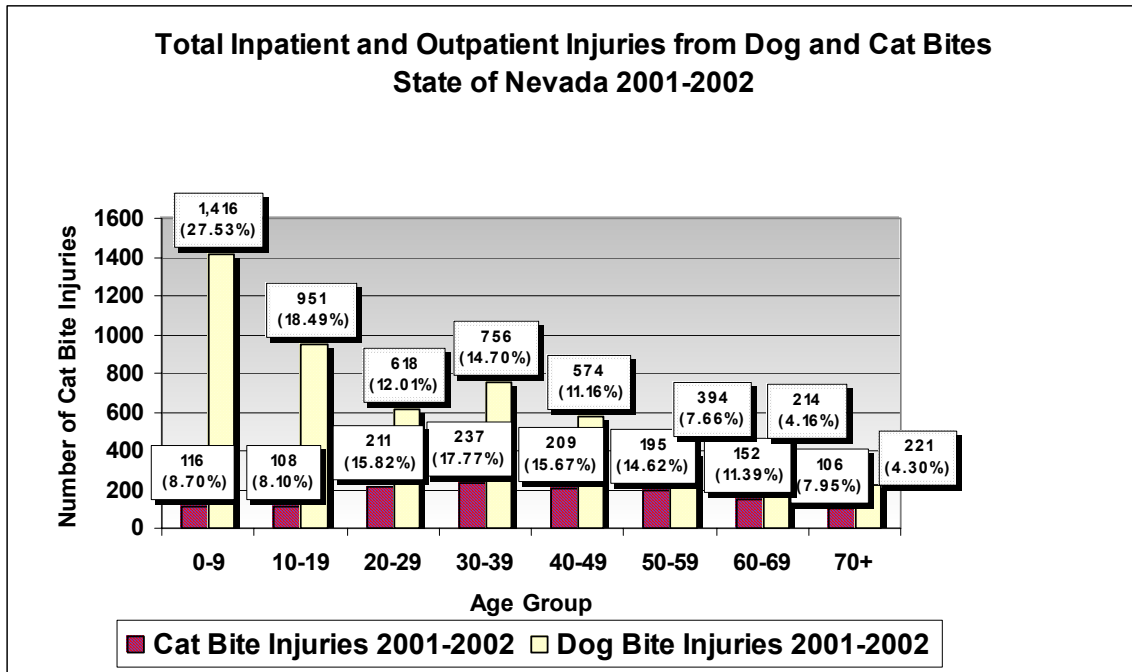
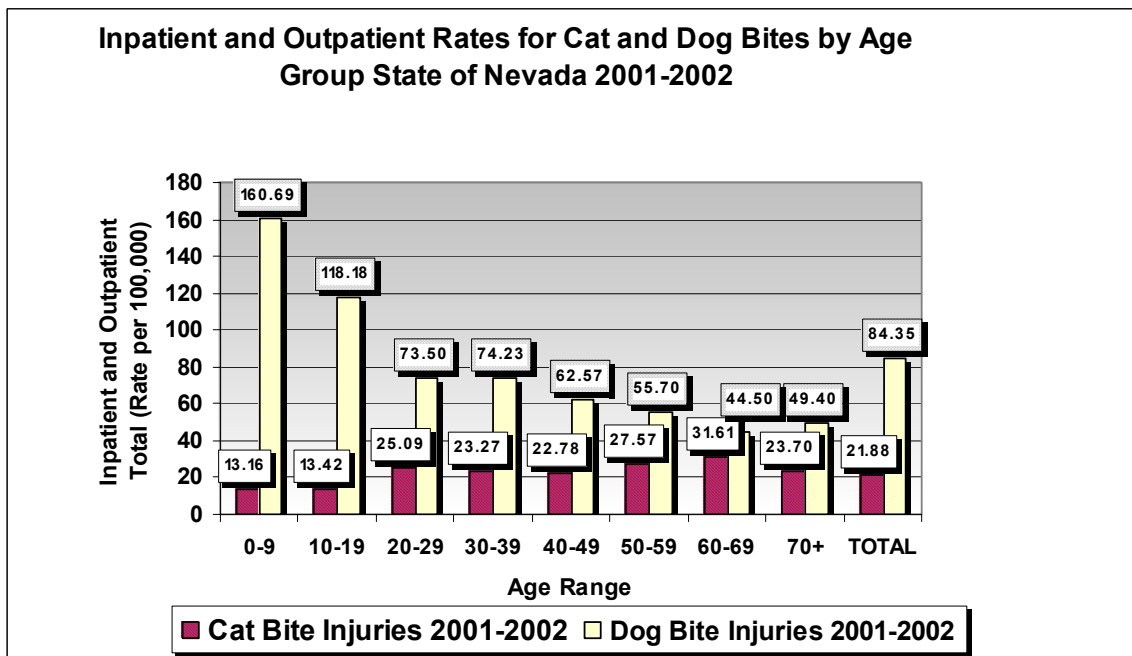


Figure 19. Inpatient and Outpatient Injuries from Cat and Dog Bites



Narrative

In this study, the outpatient visits for Dog Bites were highest in the nine years and younger age group (285.74 per 100,000 persons). The outpatient rate for all ages was 152.23 per 100,000 persons. A three-year study conducted by Weiss HB, Friedman DI, Coben JH annualized, adjusted, and weighted estimate of new dog bite-related injury visits to US Emergency Departments (EDs) was 333,687, a rate of 129 per 100,000 persons (95% confidence interval, 105-154). This represents approximately 914 new dog bite injuries requiring ED visits per day. The median age of patients bitten was 15 years, with children, especially boys five to nine years, having the highest rate (607 per 100,000 persons for boys aged five to nine years).¹¹ Langley J. and Hoff GL, Brawley J, Johnson K. show the rate ranges from 175 per 100,000¹² to approximately 400 per 100,000 persons.¹³

The total number of children treated as outpatients and inpatients for dog bite injuries under ten years was 2,620 of which the age group less than five years was 1,098 and the five to nine years age group was 1,522. Of the 9,283 outpatient visits over the four-year period, 46.1% (N=4,280) of these injuries occurred to patients under 20 years of age. Overall, the average number of visits to outpatient facilities (which includes quick care and EDs) due to dog bites was 8.5 per day (N=9,283). Inpatient hospitalizations were much less common and averaged a little over 0.3 visits a day (N=316) during the four years of this study.

The rate of inpatient hospitalization for dog bites for Nevada's population was 5.18 per 100,000 persons. The inpatient hospitalization rate from dog bites for those less than 10 years of age was 11.51 per 100,000 persons. Langley J. conducted a nationwide study in New Zealand on the incidence of dog bites, and predicted an incidence of inpatient hospitalization due to dog bites in the year 2000 of 9.6 per 100,000 persons.¹¹ The age group under ten years was the largest group hospitalized (N=102) followed by the 30-39 age group (N=45). The 30-39 age group could represent service-related professions e.g., mail carriers and utility workers.

The mean hospital stay for those receiving inpatient care was 2.99 days (N=164). For persons 70 and over the average hospital stay was approximately four days. The Centers for Disease Control and Prevention (CDC) found that the length of stay on average was 3.6 days and was longer for older persons (ranging from 2.7 days for less than five year olds compared to 4.7 days for those aged 40 years or older).¹⁴

The mean inpatient hospital bill was \$10,170.65 (N=164) and was applied to the data collected directly from the hospitals for inpatient injuries (N=316) resulting in a total estimated cost of \$803,481 per year of this study. The median bill for the 70 years and older age group that were hospitalized was \$9,491.00 with an average bill of \$13,457.57. The CDC study found the mean hospital charges were highest at age extremes with the mean charge for those less than five year old at \$6,369 and at \$6,842 for the 40 year olds

and older age group. However, these charges do not include charges for physician services or subsequent post discharge care.¹⁴

The average Nevada cost for outpatient ED visits (hospital charges and average doctor fee) was estimated at \$869.1 as was discussed in the limitations section of this report for a total estimate of charges at \$1,191,319 per year (N=5,483). The average cost for quick care injuries was estimated at \$155 for a total of \$147,250 per year (N=3800). This results in a total outpatient care estimated cost of \$1,338,569 per year (N=9,283).

In order to associate cost with this type of injury, rates were established for Emergency Department (ED) data from area hospitals representing Clark County, including University Medical Center, Summerlin Hospital, Valley Hospital and Desert Springs Hospital. The average charge for cat bites \$970.96 as discussed in the cat bite section. Since University Medical Center represented over 99% of quick care injuries in this report, their average cost for these injuries was applied at \$156.

During the four-year study dog bite-related injuries amounted to bills of \$2,142,049 per year. PPOs paid for 28.66% (N=47) of costs from dog bites found in the partial inpatient hospitalization data. PPOs were followed by Commercial Insurers at 18.90% (N=31). Medicare paid 12.20% (N=20) and Nevada Medicaid paid 11.59% (N=19) of the inpatient hospitalization costs.

Discussion

Dog bites are a serious public health problem that inflict both physical and emotional damage on patients and incur immeasurable hidden costs to communities. Following a severe attack there is usually an outcry to do something, and that something that is done often reflects a readily predictable response. Only later do officials realize that the response was not effective.¹

Dog bite injuries can have serious ramifications that warrant description to relate the seriousness of this problem. After a dog bite, there is concern about contracting rabies, hence the primary reason for investigating animal bites. Issues that may be overlooked are infections and the tetanus status of the victim. In severe dog bite cases children can have disfigurement caused by scaring.¹⁵ Bites may possibly crush the airway or penetrate the abdominal or thoracic cavities, resulting in life-threatening injuries.¹⁶ Other serious complications of dog bite injuries could include craniocerebral injury¹.

A dog's tendency to bite depends on such factors as heredity, early experience, later socialization and training, health and the victim's behavior.⁷ Dog bites are largely preventable and prevention must begin with the owner and how the owner interacts with the dog. A dog should be properly socialized with all members of the family, people outside the family, and other animals.¹³ Dog owners should participate in basic humane obedience training and educate themselves on how to be an appropriate dog owner. Hence a dog left alone in a backyard and neglected contributes to poor behavior. Therefore adequate safe confinement, supervision and sterilization play a big role in well behaved animals. Dog owners and their family need to interact with the dog in such a manner that overly aggressive behavior is not elicited. For instance playing aggressive games with dogs such as wrestling, tug-of-war, or "sicking" your dog on another person is not appropriate play.¹⁷ Setting appropriate limits for a dog's behavior is a must.

Costs associated with dog bite injuries cannot readily be measured. Therefore evaluation of the intervention strategies already in place requires improved surveillance of dog bites. The required reporting of all e-coded injuries including E906.0 (dog bite) by all medical treating facilities in the state hospital discharge database would greatly enhance the ability to obtain the true cost of dog bites injuries and help evaluate the effectiveness of existing preventive intervention programs. It would also help reduce the confusion between data collection from different sources for this or other injury related reports.

Conclusion

There were a total of 9,599 (2,400 per year) confirmed dog bite injuries resulting in either inpatient or outpatient hospital care in Nevada from 1999-2002. These bites come at a large cost financially, physically, and emotionally to the State, especially to those in the population nine years and younger. The average dog bite victim in Nevada that had inpatient hospitalization spent approximately three days in the hospital and incurred slightly over \$10,000 in hospital charges. During the four-year study dog bite-related injuries amounted to bills for patients at \$2,142,049 per year. More persons under ten years of age were hospitalized over night due to a dog bite than 10-19 year olds, 20-29 year olds, and 30-39 year olds combined. The outpatient hospitalization rate for less than ten year olds (285.74 per 100,000) is almost double the total outpatient rate for all ages (152.18 per 100,000).

This report illustrates a good initial starting point in which further tracking of dog and/or cat bite injuries throughout the State will be necessary in order to measure the success or failure of programs that seek to reduce bite injuries. As the data available for these types of injuries improve so should the overall accuracy of such studies.

Bibliography

1. AVMA Task Force on Canine Aggression and Human -Canine Interactions. A community approach to dog bite prevention. *JAVMA* 2001;218:1732-1749.
2. Sacks JJ, Kresnow M, Houston B. Dog bites: how big a problem? *Inj Prev* 1996; 2:52-4.
3. Gilchrist . Convention Daily News AVMA July 21, 2003 Denver CO.
<http://www.avma.org/convention/2003/news/monday15.asp>.
4. Lockwood R. Vicious dogs: communities, humane societies, and owners struggles with a growing problem. *Comm Anim Control* 1996; Mar/Apr 12-14.
5. Podberscek AL. Dog on a tightrope: the position of the dog in British society as influenced by press reports on dog attacks (1988 to 1992) *Anthrozoos* 1994; 7:232-241.
6. Sacks JJ, Sinclair L, Gilchrist J, et al. Breeds of dogs involved in fatal human attacks in the United States between 1979 and 1998. *J Am Vet Med Assoc* 2000; 217:836-4.
7. Wright JC Canine aggression toward people: bite scenarios and prevention. *Vet Clin North Am Small Anim Pract* 1991; 21:299-314.
8. Gershman KA, Sacks JJ, Wright JC, Which dogs bite? A case control study of risk factors. *Pediatrics* 1994;93:913-917.
9. AVMA Dog bite prevention message points, copyright 2003.
<http://www.avma.org/press/publichealth/dogbite/messpoints.asp>.
10. The Center for Disease Control, NCHS Classification of Diseases.
<http://www.cdc.gov>.
11. Weiss HB, Friedman DI, Coben JH. Incidence of dog bite injuries treated in emergency departments. *JAMA* 1998;279:51-3.
12. Langley J. The incidence of dog bites in New Zealand. *New Zealand Medical Journal* 1992;105:33-5.
13. Hoff GL, Brawley J, Johnson K. Companion animal issues and the physician. *South Med J* 1999;92:651-9.
14. Quinlan KP, Sacks JJ. Hospitalization for dog bite injuries (Letter, Comment). *J Am Med Assoc* 1999;281:232-233.

- 15 Lauer EA, White CW, Lauer BA. Dog Bites- a neglected problem in accident prevention. *Am J Dis Child* 1982;136:202-204.
16. Holt DE, Griffin G. Bite wounds in dogs and cats. *Vet Clin North Am Small Anim Pract* 2000;30:669-79, viii.
17. The Humane Society of the United States Preventing Dog Bites <http://www.hsus.org>.