

Facts & Prevention Strategies

Dog Bite Injuries in Pennsylvania

1995



An Injury Profile Monograph

WE'RE THERE.

For Your Health. For Your Community.

DEPARTMENT OF
HEALTH
Tom Ridge, Governor

Facts & Prevention Strategies

Dog Bite Injuries in Pennsylvania



An Injury Profile Monograph

**Injury Prevention Program
Pennsylvania Department of Health
P.O. Box 90, Room 1003
Harrisburg, PA 17108-0090
(717) 787-5900**

August 1999

Acknowledgments

This monograph was prepared by Stephen J. Strotmeyer, M.P.H., Samuel N. Forjuoh, M.B., Ch.B., Dr.P.H., and Jeffrey H. Coben, M.D. from the Center for Violence and Injury Control (CVIC), Allegheny University of the Health Sciences, One Allegheny Center, Suite 510, Pittsburgh, PA 15212-5406. Telephone (412) 330-6125; Fax (412) 330-6122; E-mail: CVIC@CVIC.EDU.

The Pennsylvania Department of Health financed this report under a contract funded by the Preventive Health and Health Services Block Grant. The hospitalization data were provided by the Pennsylvania Health Care Cost Containment Council (PHC4).

Copies of this document may be obtained by contacting:

Injury Prevention Program
Division of Health Risk Reduction
Pennsylvania Department of Health
P. O. Box 90, Room 1003
Harrisburg, PA 17108-0090
717-787-5900

On the Internet: <http://www.health.state.pa.us/php/InjPrev/reports.htm>

Suggested Citation

Strotmeyer SJ, Forjuoh SN, Coben JH. Dog Bite Injuries in Pennsylvania, 1995. Pittsburgh, Pennsylvania: Center for Violence and Injury Control (CVIC), Department of Emergency Medicine, Allegheny University of the Health Sciences, 1999.

Data used in this report were provided to the Pennsylvania Department of Health by the Pennsylvania Health Care Cost Containment Council. The Pennsylvania Health Care Cost Containment Council specifically disclaims responsibility for any interpretations or conclusions.

This monograph was funded, in part, under a contract administered by the Pennsylvania Department of Health. The Department specifically disclaims responsibility for any interpretations or conclusions. Contents may be republished or reproduced whole or in part, with attribution.

Table of Contents

| <i>Content</i> | <i>Page</i> |
|---|-------------|
| Executive Summary | 1 |
| Dog Bite Injuries in Pennsylvania - FACT SHEET | 2 |
| Introduction | 3 |
| Hospitalized Dog Bite Injuries in Pennsylvania | 4 |
| Demographics | 4 |
| Diagnoses | 7 |
| Severity | 9 |
| Admission Source and Disposition | 10 |
| Length of Stay and Hospital Charges | 11 |
| Time and Place | 12 |
| Recommendations and Prevention Strategies | 14 |
| Appendix | 15 |
| Detailed Supplemental Tables | 16 |
| Technical Notes on Methods | 25 |
| References | 27 |

List of Figures

| | |
|--|----|
| Figure 1. Dog Bite Injuries By Age | 4 |
| Figure 2. Rate of Dog Bite Injuries By Age Group and Gender..... | 5 |
| Figure 3. Rate of Dog Bite Injuries By Age Group and Race-Gender | 6 |
| Figure 4. Leading Principal Diagnoses for Dog Bite Injuries By Age Group | 7 |
| Figure 5. Body Location of Open Wound Dog Bite Injuries..... | 8 |
| Figure 6. Mean Injury Severity of Dog Bite Injuries By Age Group and Gender..... | 9 |
| Figure 7. Admission Source for Dog Bite By Age Group..... | 10 |
| Figure 8. Median Charges for Dog Bite Injuries By Nature of Injury Length of Stay and Hospital Charges..... | 11 |
| Figure 9. Total Charges (in Dollars) for Dog Bite Injuries By Payer Source | 12 |
| Figure 10. Dog Bite Injuries By County Status and Month of Admission | 13 |

List of Tables

| | |
|---|----|
| Table 1. Dog Bite Injuries By Age Group and Gender, Number and Rate..... | 16 |
| Table 2. Dog Bite Injuries By Age Group and Gender, Number and Rate, White Race | 17 |
| Table 3. Dog Bite Injuries By Age Group and Gender, Number and Rate, Black Race | 18 |
| Table 4. Hospital Charges for Dog Bite Injuries By Age Group | 19 |
| Table 5. Age Group and Charges By Length of Stay, Principal Diagnosis, Disposition and Payer Source..... | 20 |
| Table 6. Descriptive Statistics By Age, LOS, ISS & Charges | 21 |
| Table 7. Diagnosis Group By Length of Stay..... | 22 |
| Table 8. Admission Source and Disposition | 23 |
| Table 9. Number and Rates of Dog Bite Injuries By County and Gender..... | 24 |

Executive Summary

This monograph, the seventh in a series, reports on the epidemiology, outcome and hospital charges for dog bite injuries to persons discharged from all non-federal, acute care Pennsylvania hospitals during 1995. The data are derived from statewide hospital discharge data collected by the Pennsylvania Health Care Cost Containment Council (PHC4). The report covers dog bite injuries identified in the external cause of injury data field (E-code). Hospital charges are based on the most likely payer source (because not all charges are actually collected). Data on individuals who died before being admitted to a hospital and those treated and released from emergency departments are excluded.

In 1995, there were 469 hospital discharges associated with dog bite injuries (rate=3.9 per 100,000 persons); over 96 percent involved Pennsylvania residents. Only one case died in the hospital. Males had a slightly higher dog bite injury hospitalization rate (4.2/100,000) than females (3.6/100,000). The median age for all cases was 30 years (mean=31.9, SE=1.2). Children under the age of 9 years had the highest rate (9.2/100,000) and accounted for 31 percent of all dog bite injuries. The rate for blacks was slightly higher (4.4/100,000) than that for whites (3.5/100,000). Almost 40 percent of all hospitalizations were to children under age 15. The mean injury severity was highest among adult males 80-84 years of age. Dog bite injuries occurred mostly between May and August with a peak in July. Most dog bites occurred in urban counties (52.5%), which also had the highest rates.

The leading principal diagnosis on admission was open wounds (47.5%), followed by fractures (5.5%), and traumatic complications (1.1%). Over 20 percent of the open wounds were to the face and head. Overall, patients stayed in the hospital for a median of 3 days (mean=3.4, SE=0.13). The longest hospital stay recorded was 30 days.

Charges associated with these hospitalizations totaled more than \$3.4 million. The median charge was \$4,569 (mean=\$7,288). The maximum charge for a single case was reported as \$119,798. Government payment sources were responsible for more than \$1.6 million, about 48 percent of the total hospital charges.

A public health approach has been advocated to reduce the epidemic of dog bite injuries. Dog bite prevention strategies utilizing this approach focus on stopping attacks before they start and limiting the damage to victims. This approach requires a commitment by citizens and multiple services ranging from social services to medicine, education, and law enforcement within the community. Employing the public health approach entails conducting surveillance and data collection, establishing objectives, implementing prevention/intervention strategies, and evaluating programs for effectiveness. Successful programs can then be replicated in other high risk populations.

This publication is intended to assist state and local public health planners and policy makers with selecting priorities, targets, and setting goals for injury prevention activities specific to dog bites. The severity, costly impact and the disparity of rates among age groups are areas deserving of particular attention.

Dog Bite Injuries in Pennsylvania - FACT SHEET

United States

- Every year in the United States, almost 2% of the population is bitten by a dog.
- The Centers for Disease Control and Prevention (CDC) estimates that of the 4.5 million dog bites, almost 800,000 are serious enough to require medical attention.
- In extreme cases, approximately 18 people die from dog bites each year.
- According to the CDC, about 60% of dog bite fatalities are among children 10 years of age or younger.

Pennsylvania

- A study in Pennsylvania found that 46% of school children had been bitten by a dog by the time they reached grade 12.
- In 1995, 469 hospital discharges from dog bite injuries were reported in Pennsylvania.
- Over fifty percent of persons hospitalized in Pennsylvania during 1995 for dog bite injuries were aged 30 years or younger.
- The dog bite injury hospitalization rate in Pennsylvania during 1995 was highest in persons ages 0-9 years.
- Males had a slightly higher dog bite injury hospitalization rate (4.2/100,000) than females (3.6/100,000) in Pennsylvania during 1995.
- The rate for hospitalized dog bite injuries in Pennsylvania during 1995 for blacks (4.4/100,000) was slightly higher than that of whites (3.5/100,000).
- The rate for hospitalized dog bite injuries in Pennsylvania during 1995 for Hispanics (3.6/100,000) was comparable to that of non-Hispanics (3.8/100,000).
- Among persons hospitalized for dog bite injuries in Pennsylvania during 1995, 1 (0.2%) died during the hospitalization period.
- The hospital charges for dog bite injury discharges in Pennsylvania during 1995 exceeded \$3.4 million.
- The median length of hospital stay for dog bite injuries in Pennsylvania during 1995 was 3 days.

Introduction

The close relationship between humans and domesticated dogs began thousands of years ago. Not only have dogs been used for labor, but they have also been used as companions and popular household pets. However, the domesticated dog still retains many of its wild instincts, including behaviors which often lead to human attacks.¹

Every year in the United States, approximately 2% of the population is bitten by a dog. The Centers for Disease Control and Prevention (CDC) estimate that of these 4.5 million bites, roughly 18%, or 800,000 are serious enough to require medical attention.² The reported incidence of dog bite injuries treated in emergency departments in the United States ranges from 0.3% to 1.1% of all visits.^{3,4} In the most extreme instances, dog bite injuries result in 18 fatalities a year. Error! Bookmark not defined. These statistics illustrate that dog bite injuries are an important public health problem among the United States population.

A Higher Toll for Children

Children and dogs are natural partners. Unfortunately, when dogs bite, children pay a disproportionate price.⁵ The CDC reports that about 26% of dog bites in children require medical care, compared to 12% in adults. Error! Bookmark not defined. Additional studies estimate that almost half of all children have been bitten by a dog at some point in their lives.⁶ This same study discovered that 46% of school children had been bitten by a dog by the time they entered their senior year in high school in Pennsylvania. Because of obvious disparities in body size, 50% of documented bites among children have been to the face, head and neck.^{7,8,9} About 60% of dog bite injury fatalities occur among children 10 years old or younger. Error! Bookmark not defined.

The exact nature and pattern of dog bite injuries requiring hospitalization, though, is hard to grasp from these statistics alone. The above estimates of dog bite injuries are derived from data collected using household surveys, school-based surveys, local animal control monitoring, police reports, and media coverage. Since there is lack of a national standard reporting system and variation in reporting procedures, accurate national incidence rates of hospitalizations for dog bite injuries have not been quantified. This is an important gap in the epidemiologic data related to this public health problem.

Fortunately, in 1993 the Pennsylvania Health Care Cost Containment Council (PHC4) began requiring the use of external cause of injury codes (E-codes) in the statewide hospital discharge data collection system. With the addition of this data element, it became possible to track large scale patterns of injury related morbidity. In 1995, 469 dog bite related discharges were reported. These cases are the focus of this report.

Hospitalized Dog Bite Injuries in Pennsylvania

This monograph describes the epidemiology and hospital charges of dog bite injuries treated and discharged from Pennsylvania hospitals in 1995. The cases are derived from statewide hospital discharge data collected and distributed by the Pennsylvania Health Care Cost Containment Council (PHC4). The Council compiles data on inpatient discharges from all non-federal, acute care hospitals in Pennsylvania. This report covers dog bite related cases, defined by the external cause of injury code, E906.0. These data contain an array of information about hospitalized cases including demographics, diagnoses, disposition, total charges and payer sources, among other variables. This data set does not, however, contain detailed information on animal-victim relationships (i.e., family pet), or safety-related behaviors, nor does it include injured individuals who died before being admitted to a hospital.

Demographics

In 1995, there were 469 hospital discharges related to dog bite injuries in all non-federal, acute care Pennsylvania hospitals, of which nearly ninety-seven percent (96.6%) occurred to Pennsylvania residents. Over fifty-one percent (51.8%) of the cases were male. The highest frequency of cases occurred to persons under 9 years of age (Figure 1). The median age for all cases was 30 years (mean=31.9, SE=1.2). The overall rate of injury hospitalizations for dog bite injuries was 3.9 per 100,000 persons.

Figure 1

Dog Bite Injuries By Age
Hospital Discharges, Pennsylvania, 1995

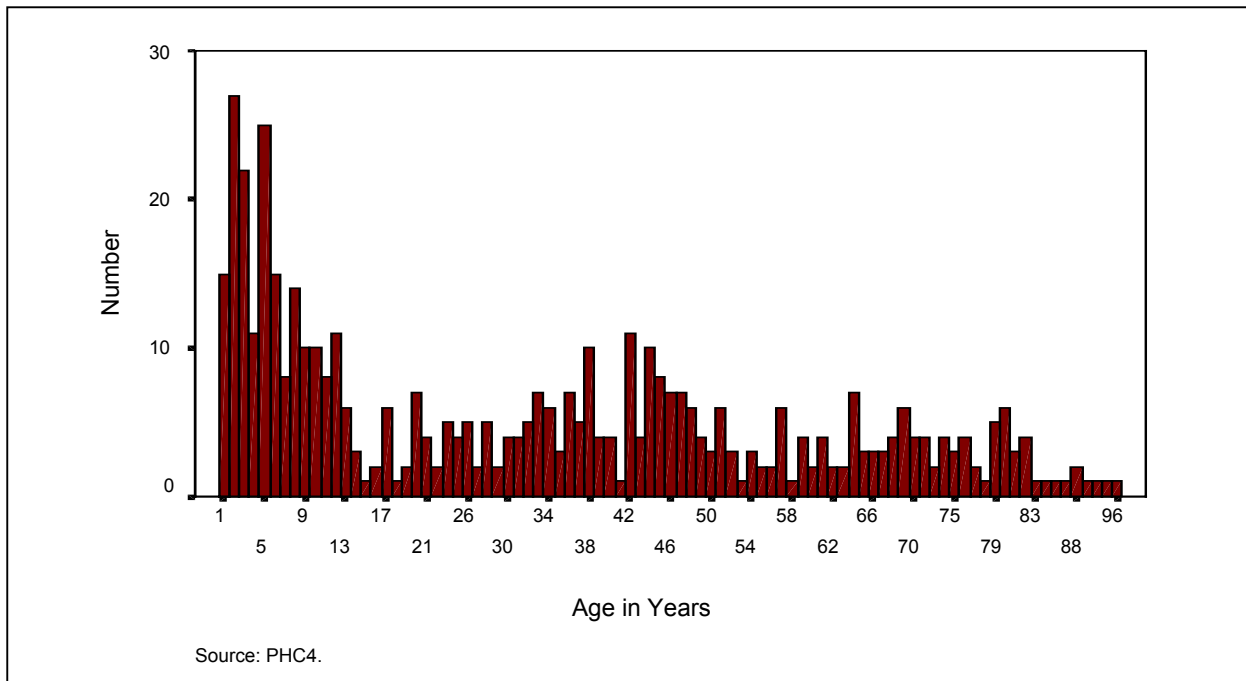
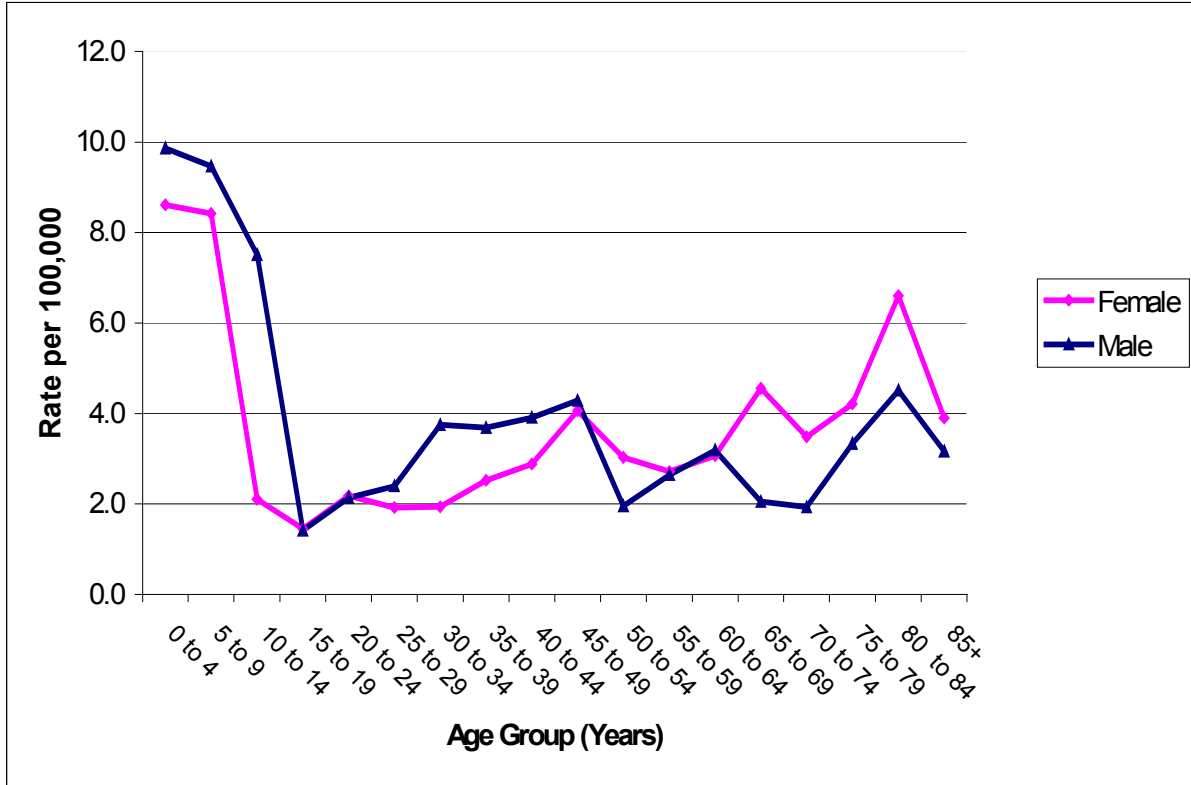


Figure 2

Rate of Dog Bite Injuries By Age Group and Gender Hospital Discharges, Pennsylvania, 1995

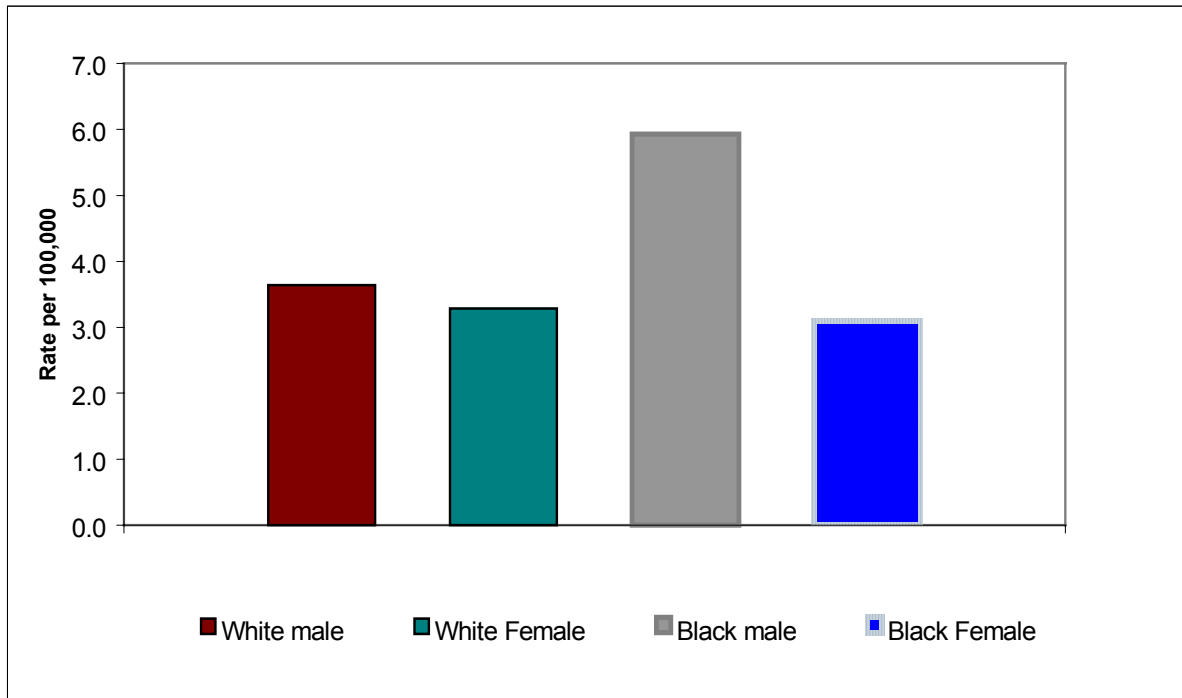


Source: PHC4.

Gender - The hospital discharge rate for males was 4.2 per 100,000 persons compared to 3.6 for females. Males under age 5 had the highest rate (9.9) accounting for 9% of all dog bite injuries. For females, the highest rate was observed in the same under 5 year old age group at a similar level (8.6) (Figure 2).

Figure 3

Rate of Dog Bite Injuries By Age Group and Race-Gender Hospital Discharges, Pennsylvania, 1995



Source: PHC4.

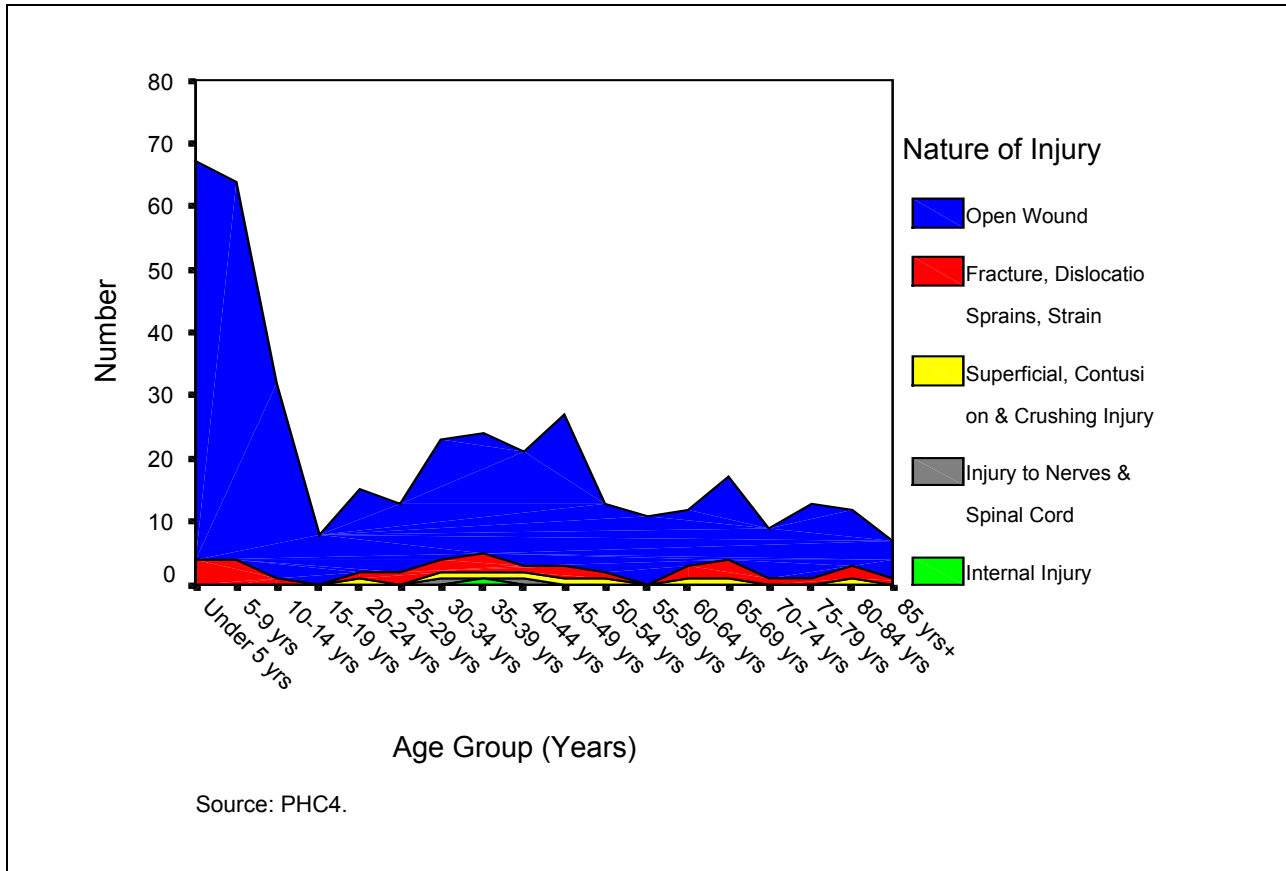
Race - Blacks had a higher overall rate than whites, (4.4 vs. 3.5). The highest rate occurred among black males ages 45-49 (21.6) whereas the highest rate for white males (10.6) was among children under 5 years. Black females had their highest rate (13.8) among the 50-54 year old age group, but had the lowest overall rate of 3.1 (Figure 3).

Ethnicity - There were only 10 (male=5; female=5) reported dog bite discharges involving persons of Hispanic origin. The rate for Hispanics was comparable to that of non-Hispanics.

Figure 4

Leading Principal Diagnoses for Dog Bite Injuries By Age Group

Hospital Discharges, Pennsylvania, 1995



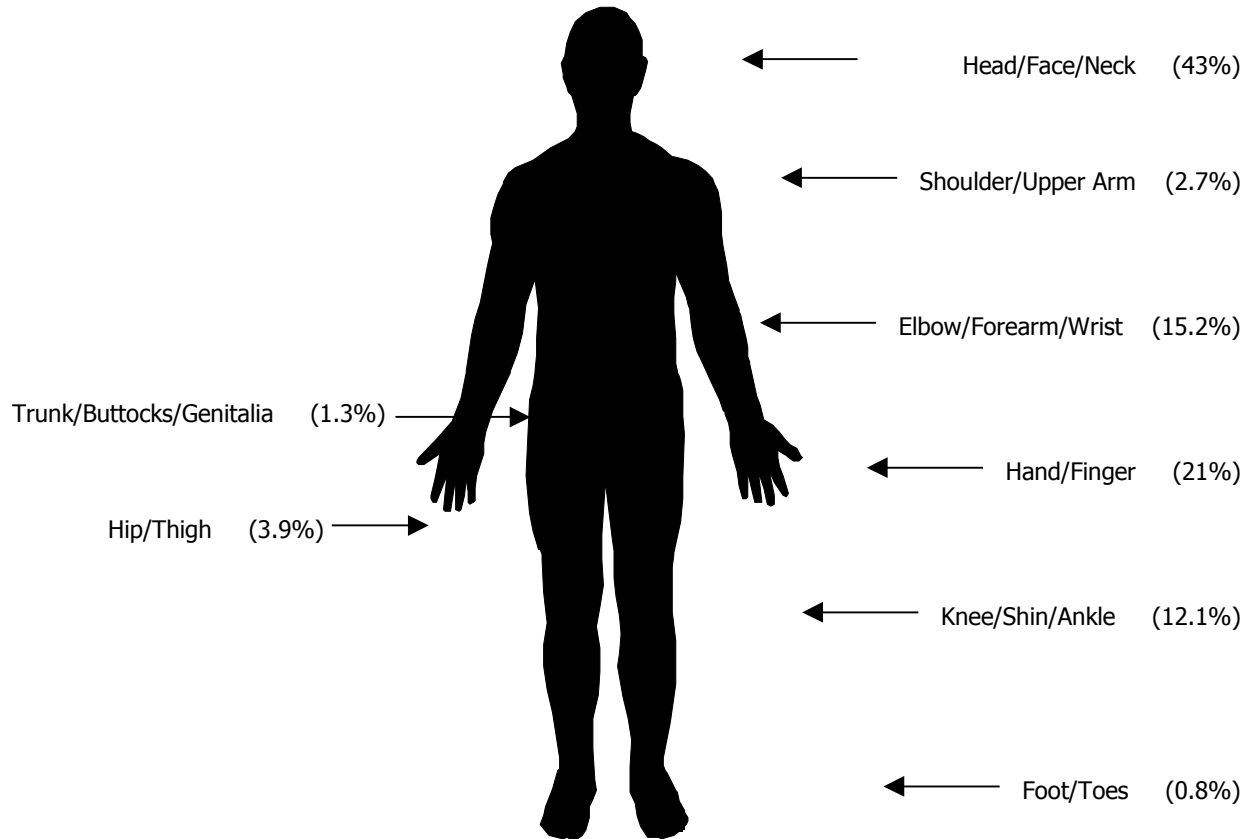
Diagnoses

The leading principal diagnosis was open wounds (47.5%), followed by fractures, dislocations, sprains and strains (5.5%) and traumatic complications (1.1%). The majority of injuries to children under 16 years were open wounds (n=119, 63.9%), and 82 (46.6%) of these open wounds were to the head and neck. Among patients aged 65 years and older, 24 (33.8%) had open wounds, and only 4.6% of these involved the head and neck body region.

Figure 5

Body Location of Open Wound Dog Bite Injuries (n=223)

Hospital Discharges, Pennsylvania, 1995



Source: PHC4.

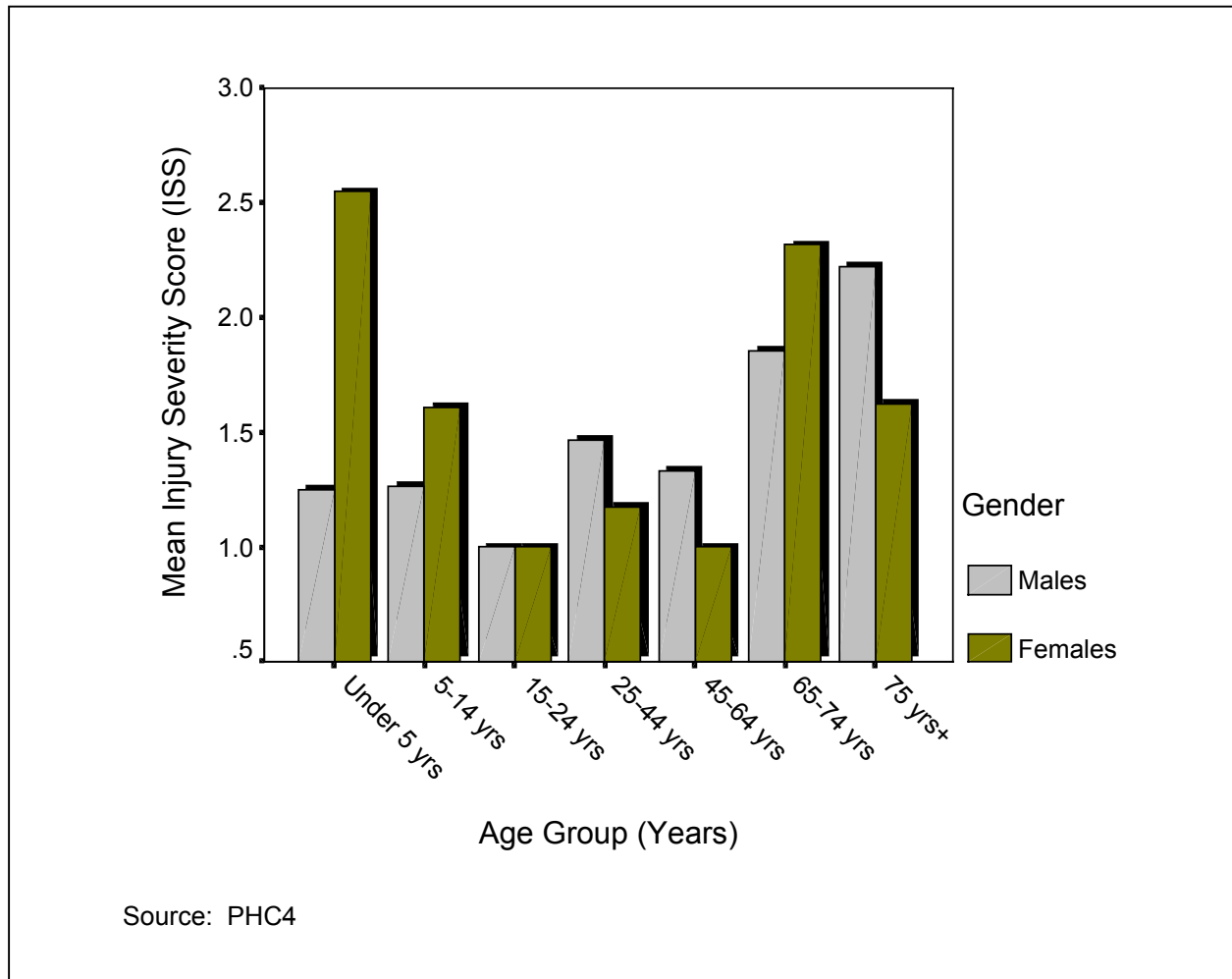
Body Location

Over 47% of all dog bites resulted in open wounds. The majority of these (43%) involved the head, face and neck. The second highest body location of open wounds was to the hand or finger (21%). The remaining wounds were to elbow, forearm and wrist (15.2%) and to the knee, shin and ankle (12.1%) regions (Figure 5).

Figure 6

Mean Injury Severity of Dog Bite Injuries By Age Group and Gender

Hospital Discharges, Pennsylvania, 1995



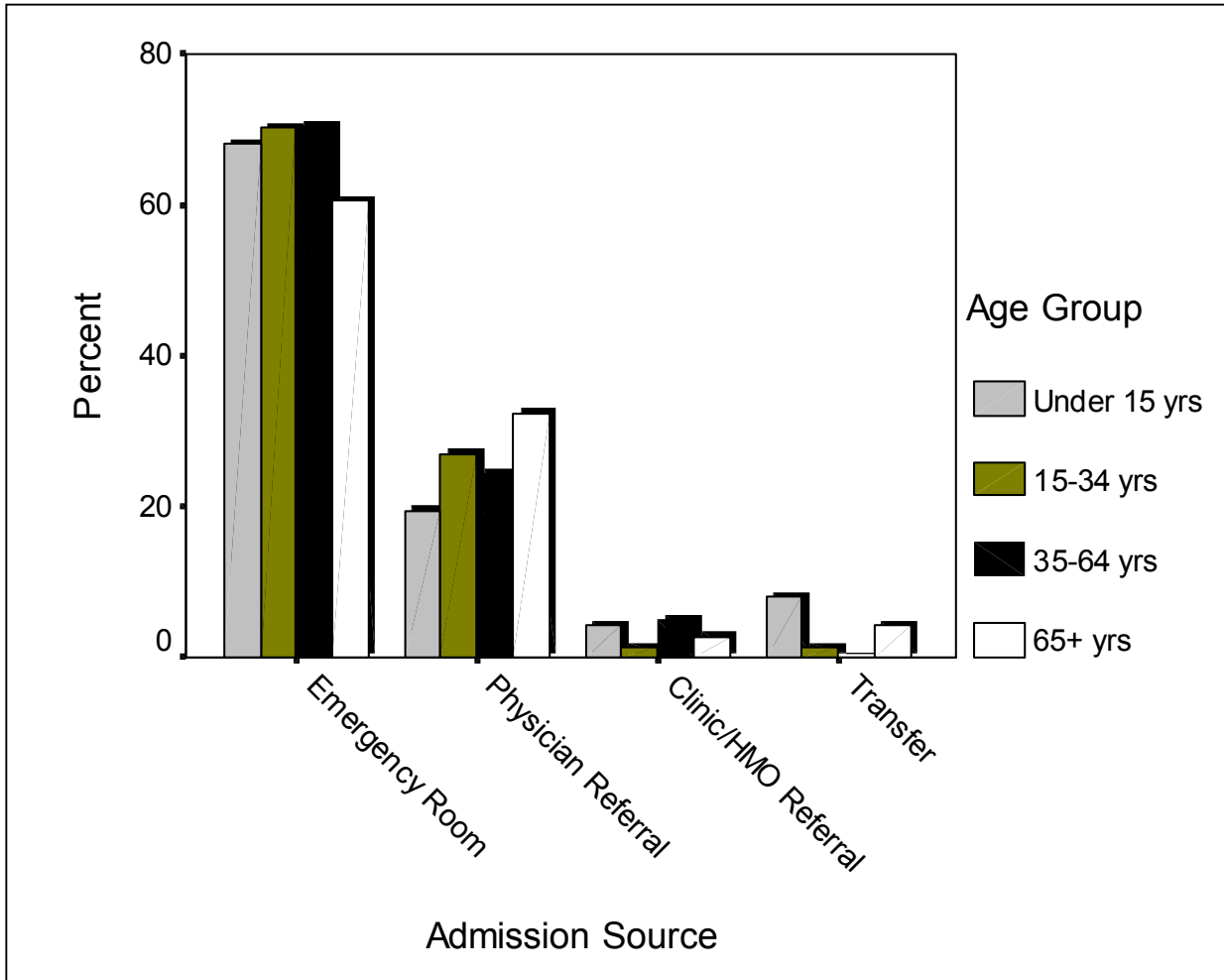
Severity

The mean injury severity score (ISS) was highest among females under 5 years (Figure 6). These injuries included fractures, dislocations, sprains and strains (42.3%), open wounds and superficial contusions. Most other age groups had similar mean scores (ISS \cong 1-1.5), and some peaks were scattered throughout the age groupings.

Figure 7

Admission Source for Dog Bite Injuries By Age Group

Hospital Discharges, Pennsylvania, 1995



Source: PHC4.

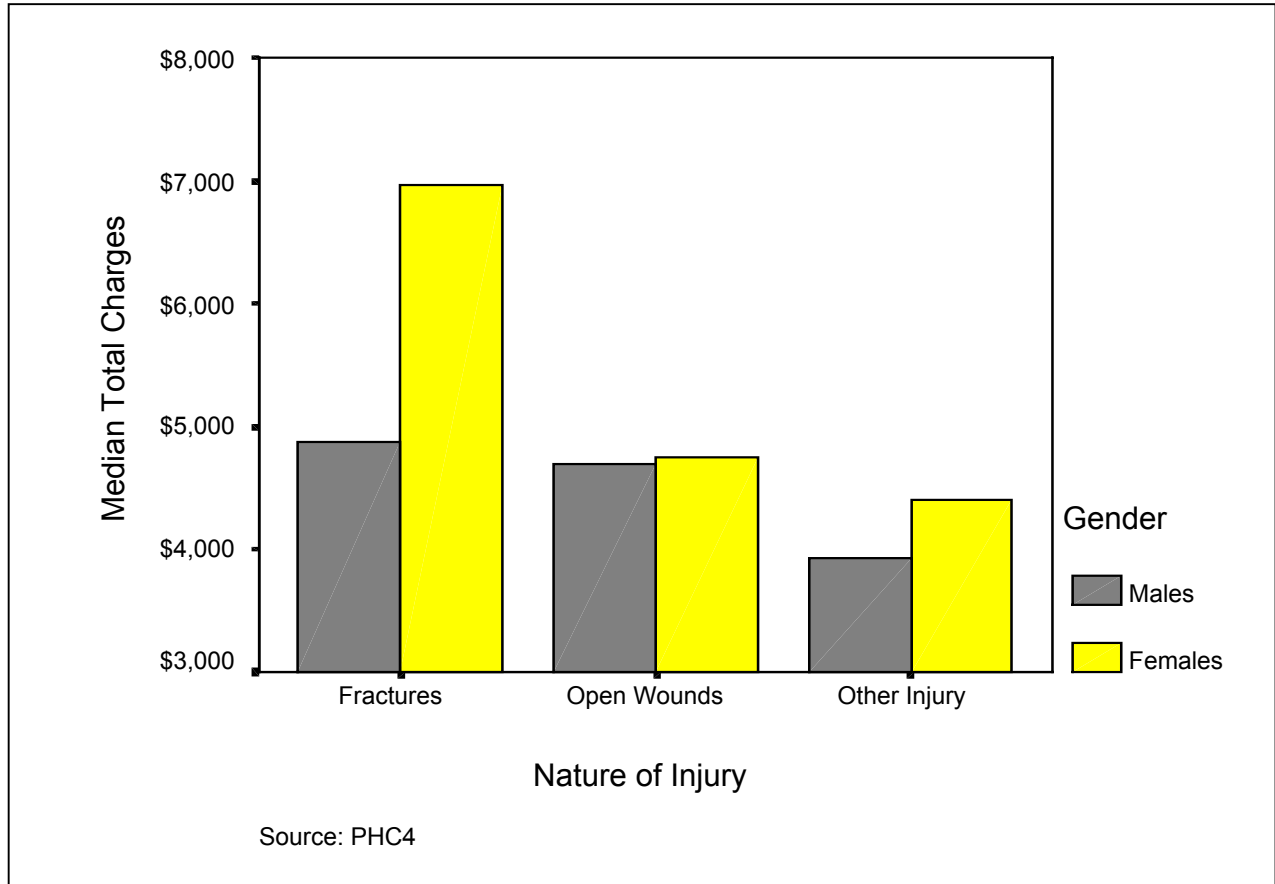
Admission Source and Disposition

The majority of dog bite injury patients were admitted through emergency departments (n=319, 68.0%). Physician referrals accounted for an additional 113 patients (24.1%) and the remainder were referred by clinics or HMOs (3.8%) or transferred from other healthcare facilities (4.1%). Most patients were routinely discharged to home or self-care (93.8%), or transferred to other healthcare facilities (2.1%). There was a single fatality during the hospitalization period, and one other patient left against medical advice or discontinued his or her care at the hospital (See Table 8).

Figure 8

Median Charges for Dog Bite Injuries By Nature of Injury and Gender

Hospital Discharges, Pennsylvania, 1995



Length of Stay and Hospital Charges

Overall, patients stayed in the hospital for a median of 3 days (mean = 3.36 days, SE = 0.13). The longest patient stay recorded was 30 days. For persons ages 12 years and younger, the median length of stay was 2 days (mean = 2.64 days, SE = 0.13). In contrast, the median stay of persons hospitalized aged 65 years and older was 4 days (mean = 4.94 days, SE = 0.34).

Charges associated with these hospitalizations totaled more than \$3.4 million. The median charge for a dog bite injury was \$4,569 (mean = \$7,288). The maximum charge for a single case was reported to be \$119,798. The median charge for children 12 years and younger was \$3,821, which was less than that of persons ages 65 years or older (\$6,690). For all dog bite injuries, government payment sources were responsible for more than \$1.6 million, about 48 percent of the total (Figure 9).

Figure 9

Total Charges (in Dollars) for Dog Bite Injuries By Payer Source

Hospital Discharges, Pennsylvania, 1995

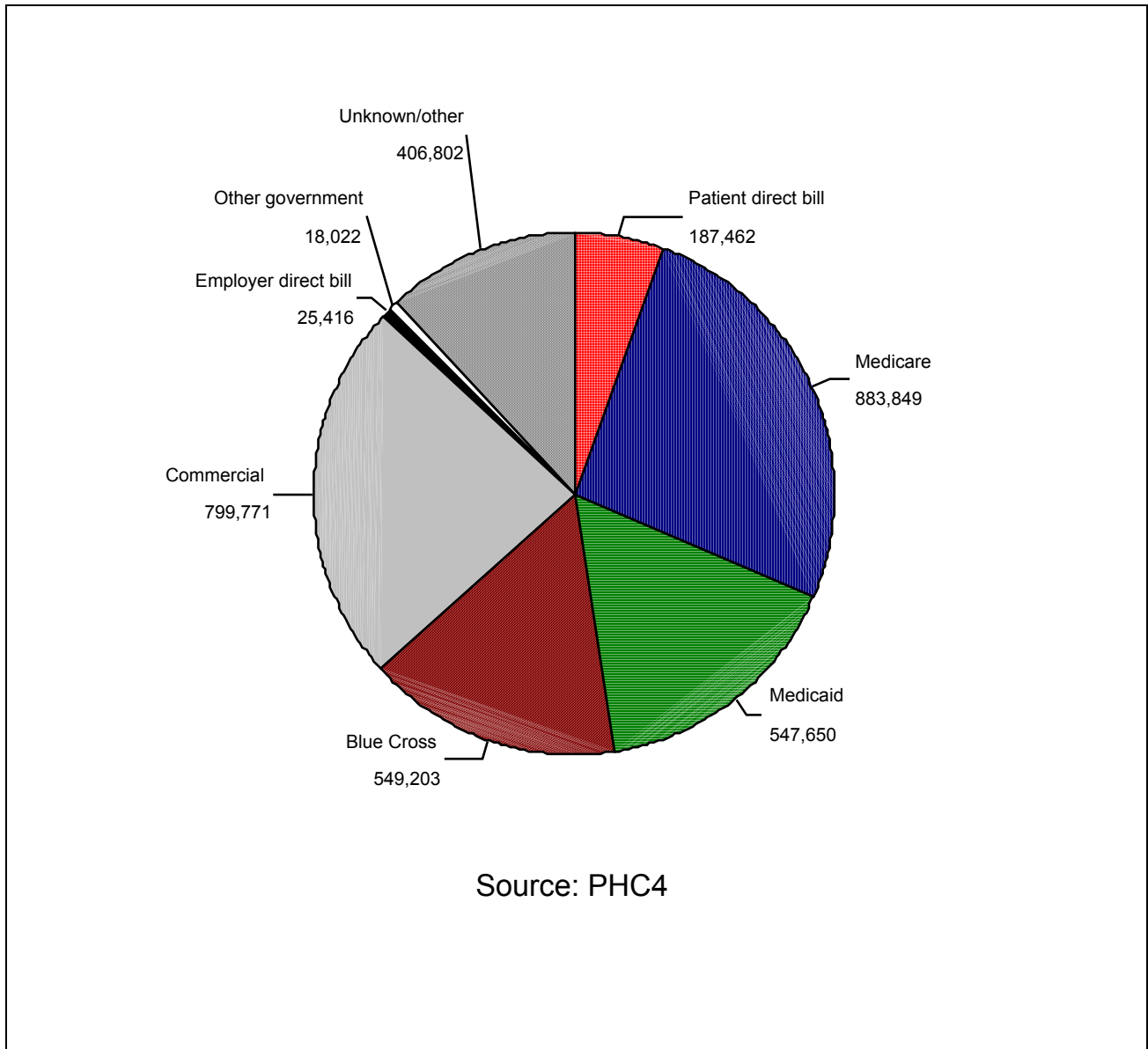
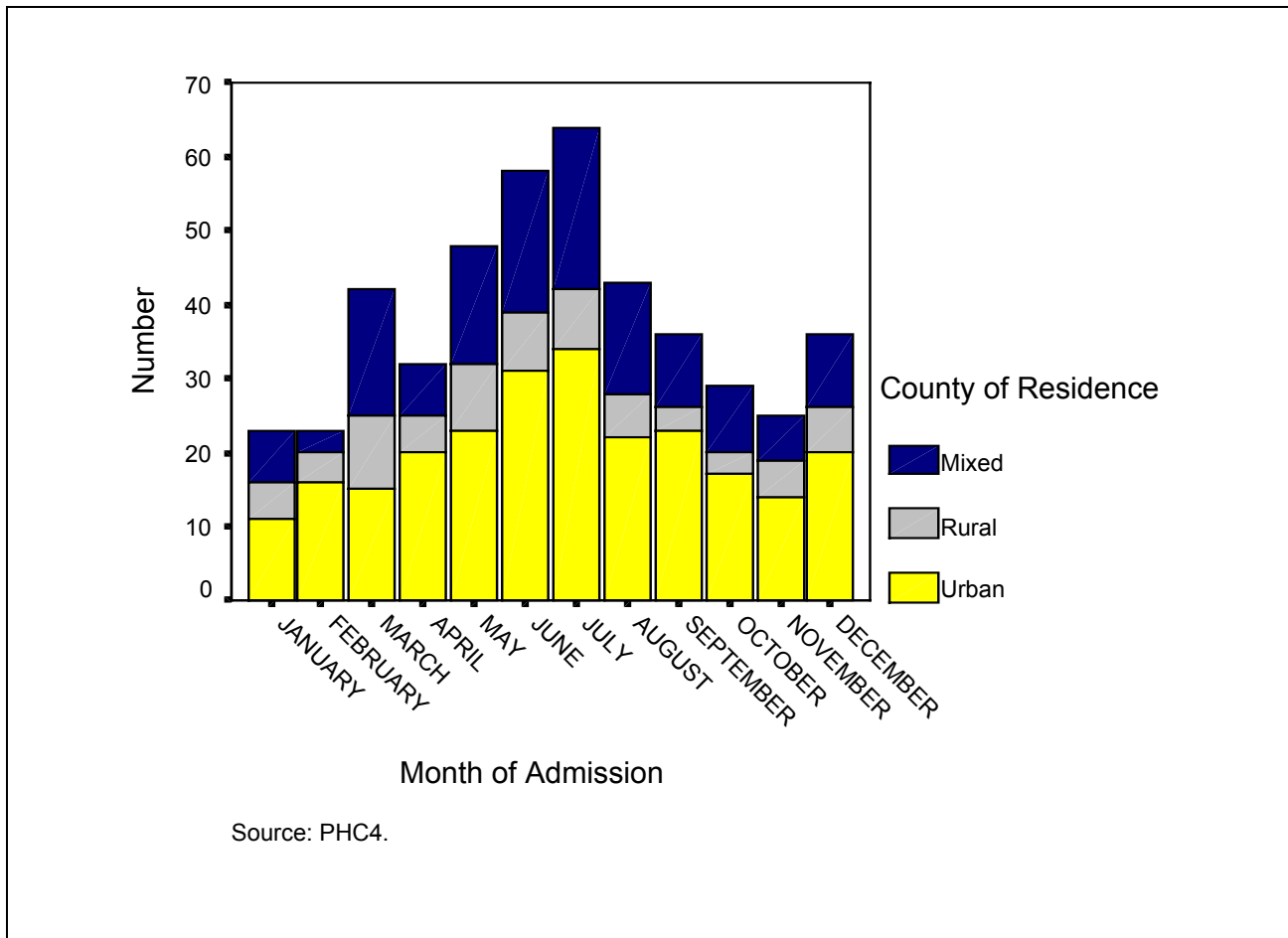


Figure 10

Dog Bite Injuries By County Status and Month of Admission

Hospital Discharges, Pennsylvania, 1995



Time and Place

Dog bite injuries mostly occurred in the late spring to summer months (May–August), with a peak in July (Figure 10).

The rate of dog bite hospitalizations in urban counties was 3.8 per 100,000 compared with 3.7 per 100,000 for mixed, and 4.1 per 100,000 for rural counties. The three counties reporting the highest rates were Blair (rate=10.7), Washington (rate=9.6) and Indiana (rate=8.8). The largest urban centers, Philadelphia and Allegheny counties combined for 112 of the total cases (23.8%). A detailed county breakdown is shown in Table 9 in the appendix.

Recommendations and Prevention Strategies

Dog bite prevention strategies utilizing a public health approach focus on stopping an attack before it starts and limiting the damage caused to the victim. This requires an ongoing commitment from multiple services ranging from social and health services to medicine, education, and law enforcement within the community. Employing the public health approach follows a logical progression: surveillance and data collection; establishing objectives; implementing prevention/intervention strategies; and evaluating programs for efficacy. Successful programs should then be reproduced in high risk communities.

From the Centers for Disease Control and Prevention (CDC)¹⁰

Measures for Preventing Dog Bites

- Realistically evaluate environment and lifestyle and consult with a professional (e.g., veterinarian, animal behaviorist, or responsible breeder) to determine suitable breeds of dogs for pet consideration. Dogs with histories of aggression are inappropriate in households with children.
- Be sensitive to cues that a child is fearful or apprehensive about a dog and, if so, delay acquiring a dog.
- Spend time with a dog before buying or adopting it. Use caution when bringing a dog or puppy into the home with an infant or a toddler.
- Spay/neuter virtually all dogs to reduce aggression. Dogs which have not been spayed or neutered can be up to three times more likely to bite than those which have been spayed or neutered.
- Never leave infants or young children alone with any dog.
- Properly socialize and train any dog entering the household. Teach the dog submissive behaviors (e.g., rolling over).
- Immediately seek professional advice (e.g., veterinarian, animal behaviorist, or responsible breeder) if the dog develops aggressive or undesirable behaviors.
- Do not play aggressive games with your dog (e.g., tug-of-war, wrestling). Play and teach cooperative games and skills such as fetching or shaking a paw.
- Teach children basic safety around dogs and review regularly:
 - ❑ Never approach an unfamiliar dog.
 - ❑ Never run from a dog and scream.
 - ❑ Remain motionless when approached by an unfamiliar dog (e.g., “be still like a tree”).
 - ❑ If knocked over by a dog, roll into a ball and lie still (e.g., “be still like a log”).
 - ❑ Never play with a dog unless supervised by an adult.
 - ❑ Immediately report stray dogs, or dogs displaying unusual behavior to an adult.
 - ❑ Avoid direct eye contact with a dog.
 - ❑ Do not disturb a dog who is sleeping, eating, or caring for puppies.
 - ❑ Do not pet a dog without allowing it to see and sniff you first.
 - ❑ If bitten, immediately report the bite to an adult.

Appendix

Detailed Supplemental Tables

Technical Notes on Methods

Note: All tables exclude missing data. Rates are not calculated for cells with less than 5 observations except for plotting graphs.

Detailed Supplemental Tables

Table 1

Dog Bite Injuries By Age Group and Gender, Number and Rate

Hospital Discharges, Pennsylvania, 1995

| | Sex | | | | | |
|----------|--------|-------|--------|-------|--------|-------|
| | Male | | Female | | Total | |
| | Number | Rate* | Number | Rate* | Number | Rate* |
| Under 5 | 41 | 9.9 | 34 | 8.6 | 75 | 9.3 |
| 5 to 9 | 39 | 9.5 | 33 | 8.4 | 72 | 9.0 |
| 10 to 14 | 30 | 7.5 | 8 | 2.1 | 38 | 4.9 |
| 15 to 19 | 6 | 1.4 | 6 | 1.4 | 12 | 1.4 |
| 20 to 24 | 9 | 2.1 | 9 | 2.2 | 18 | 2.2 |
| 25 to 29 | 10 | 2.4 | 8 | 1.9 | 18 | 2.2 |
| 30 to 34 | 17 | 3.7 | 9 | 1.9 | 26 | 2.8 |
| 35 to 39 | 17 | 3.7 | 12 | 2.5 | 29 | 3.1 |
| 40 to 44 | 17 | 3.9 | 13 | 2.9 | 30 | 3.4 |
| 45 to 49 | 16 | 4.3 | 16 | 4.1 | 32 | 4.2 |
| 50 to 54 | 6 | 2.0 | 10 | 3.0 | 16 | 2.5 |
| 55 to 59 | 7 | 2.6 | 8 | 2.7 | 15 | 2.7 |
| 60 to 64 | 8 | 3.2 | 9 | 3.1 | 17 | 3.1 |
| 65 to 69 | 5 | 2.1 | 14 | 4.6 | 19 | 3.4 |
| 70 to 74 | 4 | . | 10 | 3.5 | 14 | 2.8 |
| 75 to 79 | 5 | 3.3 | 10 | 4.2 | 15 | 3.9 |
| 80 to 84 | 4 | . | 11 | 6.6 | 15 | 5.9 |
| 85+ | 2 | . | 6 | 3.9 | 8 | 3.7 |
| All Ages | 243 | 4.2 | 226 | 3.6 | 469 | 3.9 |

*Per 100,000 population, 1994; totals exclude missing data.
Source: PHC4.

Table 2

Dog Bite Injuries
By Age Group and Gender, Number and Rate, White Race
 Hospital Discharges, Pennsylvania, 1995

| | Sex | | | | | |
|-----------------|--------|-------|--------|-------|--------|-------|
| | Male | | Female | | Total | |
| | Number | Rate* | Number | Rate* | Number | Rate* |
| 0 to 4 | 37 | 10.6 | 27 | 8.1 | 64 | 9.4 |
| 5 to 9 | 31 | 8.8 | 26 | 7.7 | 57 | 8.3 |
| 10 to 14 | 20 | 5.8 | 4 | . | 24 | 3.6 |
| 15 to 19 | 4 | . | 5 | 1.4 | 9 | 1.2 |
| 20 to 24 | 5 | 1.4 | 6 | 1.7 | 11 | 1.5 |
| 25 to 29 | 9 | 2.5 | 7 | 1.9 | 16 | 2.2 |
| 30 to 34 | 8 | 2.0 | 8 | 2.0 | 16 | 2.0 |
| 35 to 39 | 15 | 3.6 | 9 | 2.1 | 24 | 2.9 |
| 40 to 44 | 15 | 3.8 | 12 | 3.0 | 27 | 3.4 |
| 45 to 49 | 8 | 2.4 | 16 | 4.5 | 24 | 3.5 |
| 50 to 54 | 6 | 2.1 | 10 | 3.4 | 16 | 2.8 |
| 55 to 59 | 4 | . | 4 | . | 8 | 1.6 |
| 60 to 64 | 6 | 2.6 | 6 | 2.2 | 12 | 2.4 |
| 65 to 69 | 5 | 2.2 | 9 | 3.2 | 14 | 2.7 |
| 70 to 74 | 4 | . | 10 | 3.7 | 14 | 3.0 |
| 75 to 79 | 5 | 3.5 | 10 | 4.5 | 15 | 4.1 |
| 80 to 84 | 4 | . | 9 | 5.8 | 13 | 5.4 |
| 85+ | 2 | . | 5 | 3.5 | 7 | 3.4 |
| All Ages | 188 | 3.6 | 183 | 3.3 | 371 | 3.5 |

*Per 100,000 population, 1994; totals exclude missing data.
 Source: PHC4.

Table 3

**Dog Bite Injuries
By Age Group and Gender, Number and Rate, Black Race**

Source: PHC4Hospital Discharges, Pennsylvania, 1995

| | Sex | | | | | |
|----------|--------|-------|--------|-------|--------|-------|
| | Male | | Female | | Total | |
| | Number | Rate* | Number | Rate* | Number | Rate* |
| Under 5 | 2 | . | 2 | . | 4 | . |
| 5 to 9 | 4 | . | 1 | . | 5 | 5.0 |
| 10 to 14 | 3 | . | 1 | . | 4 | . |
| 15 to 19 | 2 | . | 0 | . | 2 | . |
| 20 to 24 | 1 | . | 1 | . | 2 | . |
| 25 to 29 | 1 | . | 1 | . | 2 | . |
| 30 to 34 | 6 | 13.8 | 1 | . | 7 | 7.6 |
| 35 to 39 | 2 | . | 2 | . | 4 | . |
| 40 to 44 | 2 | . | 1 | . | 3 | . |
| 45 to 49 | 6 | 21.6 | 0 | . | 6 | 9.6 |
| 50 to 54 | 2 | . | 4 | . | 0 | . |
| 55 to 59 | 1 | . | 0 | . | 6 | 13.6 |
| 60 to 64 | 0 | . | 3 | . | 1 | . |
| 65 to 69 | 0 | . | 0 | . | 3 | . |
| 70 to 74 | 0 | . | 0 | . | 0 | . |
| 75 to 79 | 0 | . | 0 | . | 0 | . |
| 80 to 84 | 0 | . | 1 | . | 1 | . |
| 85+ | 0 | . | 1 | . | 1 | . |
| All Ages | 32 | 5.9 | 19 | 3.1 | 51 | 4.4 |

*Per 100,000 population, 1994; totals exclude missing data.
Source: PHC4.

Table 4

Hospital Charges for Dog Bite Injuries By Age Group

Hospital Discharges, Pennsylvania, 1995

| | Number | Sum |
|-------------|--------|-------------|
| Under 5 yrs | 75 | \$475,951 |
| 5-9 yrs | 72 | \$400,364 |
| 10-14 yrs | 38 | \$253,090 |
| 15-19 yrs | 12 | \$37,261 |
| 20-24 yrs | 18 | \$88,862 |
| 25-29 yrs | 18 | \$81,810 |
| 30-34 yrs | 26 | \$171,562 |
| 35-39 yrs | 29 | \$197,564 |
| 40-44 yrs | 30 | \$158,188 |
| 45-49 yrs | 32 | \$287,553 |
| 50-54 yrs | 16 | \$119,183 |
| 55-59 yrs | 15 | \$255,307 |
| 60-64 yrs | 17 | \$190,791 |
| 65-69 yrs | 19 | \$259,771 |
| 70-74 yrs | 14 | \$103,972 |
| 75-79 yrs | 15 | \$136,853 |
| 80-84 yrs | 15 | \$138,964 |
| 85 yrs+ | 8 | \$61,128 |
| All Ages | 469 | \$3,418,174 |

Source: PHC4.

Table 5

**Age Group and Charges By Length of Stay, Principal Diagnosis,
Disposition and Payer Source
Dog Bite Injuries**

Hospital Discharges, Pennsylvania, 1995

| | | Age Group (Years) | | | Total Number | Total Charges | |
|-----------------------------|---------------------------------------|----------------------------|---------------------|-------------------|-----------------|----------------------------|----------------------------|
| | | Under 16 yrs Number | 16-64 yrs Number | 65 yrs+ Number | | Mean Charge of Group | Sum of Group Charges |
| | | Length of Stay Category | 1 Day | 62 | 34 | 2 | 98 |
| | 2-3 Days | 88 | 104 | 25 | 217 | \$4,928 | \$1,069,371 |
| | 4-7 Days | 30 | 59 | 34 | 123 | \$8,591 | \$1,056,693 |
| | 8+ Days | 6 | 15 | 10 | 31 | \$24,808 | \$769,041 |
| Diagnosis Group | Open Wound | 119 | 80 | 24 | 223 | \$7,588 | \$1,692,034 |
| | Fracture | 9 | 11 | 6 | 26 | \$11,634 | \$302,473 |
| | Other Injury | 58 | 121 | 41 | 220 | \$6,471 | \$1,423,667 |
| Patient Discharge Status | Discharged to home/self-care | 184 | 197 | 59 | 440 | \$6,802 | \$2,993,084 |
| | Discharged to other facility/left AMA | 2 | 15 | 11 | 28 | \$14,940 | \$418,313 |
| | Expired | 0 | 0 | 1 | 1 | \$6,777 | \$6,777 |
| Payer Source | Patient direct bill | 7 | 19 | 2 | 28 | \$6,695 | \$187,462 |
| | Medicare | 0 | 14 | 63 | 77 | \$11,479 | \$883,849 |
| | Medicaid | 62 | 36 | 0 | 98 | \$5,588 | \$547,650 |
| | Blue Cross | 46 | 58 | 3 | 107 | \$5,133 | \$549,203 |
| | Commercial | 38 | 60 | 2 | 100 | \$7,998 | \$799,771 |
| | Other/unknown | 33 | 25 | 1 | 59 | \$7,631 | \$450,239 |
| Total | | 186 | 212 | 71 | 469 | \$7,288 | \$3,418,174 |

Source: PHC4.

Table 6

**Descriptive Statistics
By Age, LOS, ISS & Charges
Dog Bite Injuries**

Hospital Discharges, Pennsylvania, 1995

| | Valid Number | Mean | Standard Error of Mean | Median | Minimum Statistic | Maximum Statistic |
|--------------------------------|-----------------|---------|------------------------------|---------|----------------------|----------------------|
| Age (Years) | 469 | 31.9 | 1.2 | 30.0 | 1 | 96 |
| Length of Stay | 469 | 3.4 | .1 | 3.0 | 1 | 31 |
| Injury Severity Score (ISS) | 393 | 1.5 | .1 | 1.0 | 1 | 26 |
| Total Charges | 469 | \$7,288 | \$493 | \$4,569 | \$.00 | \$119,799 |

Source: PHC4.

Table 7

**Diagnosis Group By Length of Stay
Dog Bite Injuries**

Hospital Discharges, Pennsylvania, 1995

| | | Diagnosis Group | | | Total | |
|----------------------------|-----------|-----------------|-----------|--------------|-------------|------|
| | | Open Wound | Fracture | Other Injury | | |
| Length of Stay | Mean | 3 | 3 | 4 | 3 | |
| | Valid N | N=223 | N=26 | N=220 | N=469 | |
| Length of Stay Category | 1 Day | Count | 70 | 6 | 22 | 98 |
| | | Col % | 31% | 23% | 10% | 21% |
| | 2-3 Days | Count | 91 | 13 | 113 | 217 |
| | | Col % | 41% | 50% | 51% | 46% |
| | 4-7 Days | Count | 45 | 6 | 72 | 123 |
| | | Col % | 20% | 23% | 33% | 26% |
| | 8-14 Days | Count | 16 | | 13 | 29 |
| | | Col % | 7% | | 6% | 6% |
| | > 2 Weeks | Count | 1 | 1 | | 2 |
| | | Col % | 0% | 4% | | 0% |
| | Total | Count | 223 | 26 | 220 | 469 |
| | | Col % | 100% | 100% | 100% | 100% |
| Total Charges | Mean | \$7,588 | \$11,634 | \$6,471 | \$7,288 | |
| | Sum | \$1,692,034 | \$302,473 | \$1,423,667 | \$3,418,174 | |

Source: PHC4

*May not add up to the total due to missing data.

Table 8

**Admission Source and Disposition for
Dog Bite Injuries**

Hospital Discharges, Pennsylvania, 1995

| | | Number | Col % |
|--------------------------|---------------------------------------|--------|--------|
| Admission Source | Emergency Room | 319 | 68.0% |
| | Physician Referral | 113 | 24.1% |
| | Transfer | 19 | 4.1% |
| | Clinic/HMO Referral | 18 | 3.8% |
| Group Total | | 469 | 100.0% |
| Patient Discharge Status | Discharged to home/self-care | 440 | 93.8% |
| | Discharged to other facility/left AMA | 28 | 6.0% |
| | Expired | 1 | .2% |
| Group Total | | 469 | 100.0% |

Source: PHC4

Table 9

Number and Rates of Dog Bite Injuries By County of Residence and Gender

Hospital Discharges, Pennsylvania, 1995

| County | Male | | Female | | Total | County | Male | | Female | | Total |
|------------|------|------|--------|------|-------|----------------|------|------|--------|------|-------|
| | No. | Rate | No. | Rate | Rate | | No. | Rate | No. | Rate | Rate |
| Adams | 1 | . | 1 | . | . | Lackawanna | 4 | . | 3 | . | 3.2 |
| Allegheny | 32 | 5.2 | 30 | 4.3 | 4.7 | Lancaster | 6 | 2.8 | 5 | 2.2 | 2.5 |
| Armstrong | 0 | - | 5 | 12.9 | 6.7 | Lawrence | 1 | . | 1 | . | . |
| Beaver | 3 | . | 2 | . | 2.7 | Lebanon | 2 | . | 1 | . | . |
| Bedford | 1 | . | 0 | - | . | Lehigh | 5 | 3.5 | 3 | . | 2.7 |
| Berks | 7 | 4.1 | 9 | 5.0 | 4.6 | Luzerne | 4 | . | 4 | . | 2.5 |
| Blair | 6 | 9.6 | 8 | 11.5 | 10.6 | Lycoming | 2 | . | 1 | . | . |
| Bradford | 1 | . | 2 | . | . | McKean | 1 | . | 1 | . | . |
| Bucks | 7 | 2.5 | 9 | 3.1 | 2.8 | Mercer | 5 | 8.3 | 3 | . | 6.5 |
| Butler | 2 | . | 2 | . | . | Mifflin | 0 | - | 0 | - | - |
| Cambria | 0 | - | 2 | . | . | Monroe | 1 | . | 4 | . | 4.3 |
| Cameron | 0 | - | 0 | - | - | Montgomery | 5 | 1.5 | 11 | 3.0 | 2.3 |
| Carbon | 3 | . | 0 | - | . | Montour | 1 | . | 1 | . | . |
| Centre | 0 | - | 0 | - | - | Northampton | 2 | . | 3 | . | 1.9 |
| Chester | 6 | 3.0 | 5 | 2.4 | 2.7 | Northumberland | 0 | - | 1 | . | . |
| Clarion | 1 | . | 1 | . | . | Perry | 1 | . | 0 | - | - |
| Clearfield | 1 | . | 1 | . | . | Philadelphia | 45 | 6.5 | 35 | 4.4 | 5.3 |
| Clinton | 0 | - | 0 | - | - | Pike | 0 | - | 0 | - | - |
| Columbia | 1 | . | 3 | . | . | Potter | 0 | - | 0 | - | - |
| Crawford | 2 | . | 0 | - | . | Schuylkill | 1 | . | 5 | 6.4 | 3.9 |
| Cumberland | 2 | . | 3 | . | 2.4 | Snyder | 1 | . | 0 | - | - |
| Dauphin | 7 | 5.9 | 7 | 5.4 | 5.7 | Somerset | 3 | . | 3 | . | 7.5 |
| Delaware | 14 | 5.3 | 5 | 1.8 | 3.5 | Sullivan | 0 | - | 0 | - | - |
| Elk | 1 | . | 0 | - | . | Susquehanna | 0 | - | 2 | . | . |
| Erie | 2 | . | 4 | . | 2.1 | Tioga | 0 | - | 1 | . | . |
| Fayette | 8 | 11.4 | 1 | . | 6.1 | Union | 1 | . | 0 | - | - |
| Forest | 1 | . | 0 | - | . | Venango | 0 | - | 3 | . | . |
| Franklin | 0 | - | 0 | - | - | Warren | 2 | . | 1 | . | . |
| Fulton | 1 | . | 1 | . | . | Washington | 13 | 13.0 | 7 | 6.5 | 9.6 |
| Greene | 1 | . | 0 | - | . | Wayne | 1 | . | 2 | . | . |
| Huntington | 0 | - | 1 | . | . | Westmoreland | 7 | 3.9 | 10 | 5.1 | 4.5 |
| Indiana | 4 | . | 4 | . | 8.8 | Wyoming | 1 | . | 0 | - | - |
| Jefferson | 0 | - | 1 | . | . | York | 7 | 3.9 | 2 | . | 2.5 |
| Juniata | 1 | . | 1 | . | . | ALL Counties | 238 | 4.1 | 221 | 3.5 | 3.8 |

*Per 100,000 population

. = rate not computed when n < 5

- = no observations to compute rate

Source: PHC4.

Excludes out-of-state cases.

Technical Notes on Methods

Definitions

Dog bite injury – A dog bite injury used for this monograph was defined as one with an ICD-9-CM external cause of injury code E906.0.

The Injury Severity Score (ISS) – The ISS ranks injury severity mainly in terms of threat to life. An ISS of 1-3 was considered “minor,” 4-7 was considered “moderate,” 8-15 was considered “serious,” and 16 and 75 was considered “severe to critical” in this monograph. The ISS was computed from the primary and secondary diagnosis fields. In this report the ISS was derived by automated translation of the ICD-9 diagnoses using Trianalytics’ Tricode[®] software.

Charges – Hospital charges were defined as the total hospital charges associated with the hospital stay. Because actual payments were made after the hospital discharge they were the expected payment; not all charges are actually collected. Payer sources were also the expected source of payment.

Rural/urban/mixed – The classifications of “urban”, “rural”, and “mixed” were derived from Pennsylvania Partnerships for Children in collaboration with the Pennsylvania State Data Center, using population categories and data from the 1990 US Census of Population and Housing. Counties are assigned to one of three categories by the proportion of their 1990 population that was “urban” or “rural”: “rural” if 2/3 population was “rural”; “urban” if 2/3 population was “urban”; and “mixed” if population was neither 2/3 “rural” nor 2/3 “urban”. Pennsylvania has 12 “urban”, 33 “rural” and 22 “mixed” counties.

Median – In a sample of observations ordered from lowest to highest, the median is the middle observation if n is odd and the average of the two middle observations if n is even.

SE – Standard error, the standard deviation of an estimate computed by taking the square root of the variance divided by the sample size. It is a measure of how widely dispersed the observed values are around the point of central tendency.

Limitations of the data

The 1995 hospital discharge database includes those persons discharged in the year under study. Persons may have been injured in 1995 but not discharged until later. Conversely, some persons may have been injured in 1994 and discharged in 1995. Because of the offsetting nature of these temporal situations, no adjustment was made.

The hospital discharge database includes non-Pennsylvania residents hospitalized for injury in Pennsylvania hospitals. Because we have not sought records of Pennsylvania residents hospitalized in other states for dog bite injuries, it is assumed that the numbers gained and lost through this assumption are about equal.

The hospital discharge database includes persons who may have been admitted to one hospital, discharged to another hospital, and discharged again in the same calendar year. This double counting probably results in an inflation of the incidence count of less than 5 percent (based on reports of multiple hospitalizations in other studies). Because the E-coding completeness by which dog bite injury hospitalizations could be identified was about 90 percent, this means that perhaps as many as 10 percent of the assault-related hospitalizations could not be identified from the PHC4 database.

There was no verification of the cause of injuries reported by hospitals in the PHC4 data. While it is possible that some reports of dog bite injuries may have been miscoded (false positives), it is also possible and probably more likely that a number of actual dog bite injuries may not have been properly identified and coded correctly (false negatives).

PHC4 data does not contain discharges from Veterans Affairs (VA) hospitals. Typically VA hospitals do not treat acute cases. It is therefore possible that a few cases may not be counted in this report.

References

- ¹ Weiss HB, Friedman DI, Coben JH. Incidence of Dog Bite Injuries Treated in Emergency Departments. *JAMA* 1998;279(1):51-53.
- ² Sacks JJ, Kresnow M, Houston B. Dog bites: how big a problem? *Injury Prevention* 1996;2:52-54.
- ³ Aghababian RV, Conte JE. Mammalian bite wounds. *Annals of Emergency Medicine* 1980;9:79-83.
- ⁴ Avner JR, Baker MD. Dog bites in urban children. *Pediatrics* 1991;88:55-57.
- ⁵ Voelker R. Dog bites recognized as public health problem. *JAMA* 1997;277(4):278-279.
- ⁶ Beck AM, Jones BA. Unreported dog bites in children. *Public Health Reports* 1985;100:315-321.
- ⁷ Brogan TV, Bratton SL, Dowd d, Hegenbarth MA. Severe dog bites in children. *Pediatrics* 1995;96:947-950.
- ⁸ Chin Y, Berkelhamer JE, Herold TE. Dog bites in children less than 4 years old. *Pediatrics* 1982;69:25-31.
- ⁹ Kizer KW, Town M. Epidemiologic and clinical aspects of animal bite injuries. *Journal of the American College of Physicians* 1979;8:134-141.
- ¹⁰ Centers for Disease Control and Prevention. Dog bite-related fatalities – United States, 1995-1996. *MMWR* 1997;46:463-467.

Notes

Pennsylvania Department of Health
Injury Prevention Program
P. O. Box 90

Harrisburg, PA 17108-0090
(717) 787-5900

<http://www.health.state.pa.us>

Robert S. Zimmerman, Jr., M.P.H.
Secretary of Health

The Department of Health is an equal opportunity provider of grants, contracts, services, and employment.

This publication was supported by the Preventive Health and Health Services Block Grant from the Centers for Disease Control and Prevention (CDC).

