Pediatric Trauma in Alameda County

By

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THESIS

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Chair: ..... 5/20/91 .....
Date

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..... 5/13/91 .....

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DEDICATION

To Doug,
for your endless support and encouragement.

To Timothy,
for waiting until this work was completed
before making your arrival.

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I. INTRODUCTION

Traumatic injury is the current leading cause of death among people in the United States under the age of forty-four.[1] Among the pediatric population, six out of ten deaths are attributed to trauma.[2] Each year, thousands of children fall victim to fatal injuries, and many more are left with permanent disabilities and impairments such as paralysis, seizure disorders, blindness, and disfigurement. The toll on society is also immense in terms of the costs of intensive care and extended care facilities, special education, and rehabilitation programs.

Although the terms "accident" and "injury" are often used interchangeably, they have quite different meanings when etiology is examined. "Accident" implies a random event occuring by chance that happens to a person who has the misfortune of being in the wrong place at the wrong time. However, "injury" is believed to be a non-random event that occurs with greater frequency in some groups of people sharing certain characteristics that put them at greater risk of injury. The key difference between these two terms, then, is that accidents, if truly random, are not preventable; while injuries are preventable if the predisposing characteristics can be identified, and controlled or eliminated. While some cases of childhood trauma are undoubtably accidental, the vast majority are

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[1]Baker SP, O'Neill B, Karpf RS: The Injury Fact Book, Lexington, MA: Lexington Books, 1984.

[2]National Center for Health Statistics: Vital Statistics of the United States, 1984. Hyattsville, MD: Us Dept. of Health and Human Services, Public Health Service, 1987.

believed to be truly preventable. As a result, numerous studies have been undertaken to identify the various determinants of pediatric injuries with the goals of intervention and prevention in mind.

It is now well established that boys have a higher injury rate than girls, and that blacks and Native American children suffer more injuries overall than white and Asian children. It is also well known that the age, sex, and race of the child are important determinants of the type of injury suffered. However, many other factors also affect the incidence of childhood injuries. As a result, recent studies have focused on social factors as predictors of childhood injuries.

The trends are less clear when behavioral, familial, and environmental factors are studied. However, a strong correlation has repeatedly been found between socioeconomic status (SES) and the incidence of traumatic injuries in children. Although it is not known what aspect of low SES is associated with increased risk of injury (i.e., substandard housing, inadequate adult supervision, dangerous neighborhoods, etc.), poverty is clearly a determinant of pediatric trauma.

Previous studies have used a variety of methods to define a population of pediatric trauma victims, including police reports of injuries, death certificates, and HMO/PPO medical records. The drawbacks to retrospective studies using police reports, emergency room records, and death certificates is that many cases are missed, and the sample population tends to be biased toward the most severely injured. In fact, many studies focus only on childhood injury mortality statistics because deaths are more easily measured than non-fatal injuries. Although HMO/PPO studies eliminate these

problems, the results are not widely generalizable because prepaid health plans tend to have a homogeneous population of mostly white, educated, and healthy subscribers.

To develop community intervention programs, the study population must be representative of the community. Furthermore, although state-wide and national studies are useful for evaluating geographical trends and overall statistics, the results cannot be practically used for policy changes and implementation on a local level.

This study was undertaken to identify the types of childhood injuries that occur most often in the community of Alameda County, and to determine which subgroups of the pediatric population suffer the greatest number of traumatic injuries. The study population includes all children from Alameda County, age fourteen years and younger, who were seen at Oakland's Children's Hospital trauma center during the one year period from January 1 to December 31, 1989.

Since Children's Hospital of Oakland has the only regional trauma center in northern California designated for children, nearly all pediatric trauma cases in the local community will be included in this study. All local ambulance services in the region act under the policy that all children go to Children's Hospital of Oakland (CHO). Even children brought by private car to the closest area hospital will be transferred to Children's Hospital of Oakland if the injury is severe.

Overall, half of the patients seen at CHO trauma center are admitted and half are discharged, so the study population includes

both mild and severe injury victims. Therefore, study results of this pediatric population will likely provide an accurate assessment of injury patterns in the community of Alameda County and be useful in development and implementation of prevention programs.

II. BACKGROUND

Motor Vehicle Accidents

Epidemiologic studies have revealed that the predominant mechanism of pediatric injury in the U.S. is motor vehicle accidents (MVA's) in which the child was either a passenger, pedestrian or cyclist. Over half of the deaths of youths age 16 to 19 occur while either driving or riding in a motor vehicle.[3] However, among children under age 14, pedestrian injuries are the most common cause of motor vehicle-related morbidity and mortality. Children age 5-9 years have the highest incidence of pedestrian and bicycle injuries, and boys have nearly a two-fold higher risk of pedestrian injuries than girls.[4]

Several studies have demonstrated that socioeconomic status (SES) is strongly correlated with pedestrian and cyclist injuries, but no relationship has been shown for passenger injuries. Pless et al. determined that the risk of pedestrian and cyclist injury in low versus high SES areas of Montreal is as high as 9:1 for boys and 6:1 for girls, but no increased risk exists for child passengers.[5] It seems probable that in areas of low SES fewer people would own cars, and children would be more likely to walk or ride a bicycle. No trend is

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[3] Brown RC, Sanders JM, Schonberg SK: Driving Safety and Adolescent Behavior. Pediatrics, 1986; 77:603-7.

[4] Rivara FP, Barber M: Demographic Analysis of Childhood Pedestrian Injuries. Pediatrics, 1985; 76:375-381.

[5] Pless IB, Verreault R; Arsenault L, Frappier JY, Stulginskas J: The Epidemiology of Road Accidents in Childhood. Amer. Journal of Public Health, 1987; 77:358-360.

seen with SES and passenger injuries because MVA's occur in all socioeconomic groups, and poverty is not thought to be a risk factor.

A demographic analysis of childhood pedestrian injuries in Memphis used multiple regression analysis to show that high density housing alone accounted for 65% of the variance in injury rates among the census tracts.[6] It was hypothesized that because crowded housing areas have fewer parks and playgrounds, the streets become the play areas for children of low SES. They concluded that behavior modification of children and drivers would have little impact on pedestrian and cyclist injury rates, and that only better urban planning and traffic engineering would be effective.

After MVA's, the most frequent types of childhood injuries are falls, burns, and assault or abuse, but the injury patterns vary widely by age, sex, race, geography and seasonality.

Gender

For all age groups, boys have been shown to have more injuries than girls. Many studies have tried to identify what factors associated with boys makes them more at risk for injuries. A British study looked at a large cohort of children aged five to ten and found that the best predictors of injuries, in order, were previous injuries before age five, male sex, aggressive behavior, young maternal age, and many older siblings.[7] This study relied primarily on parental

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6 Rivara FP, Barber M: Demographic Analysis of Childhood Pedestrian Injuries. Pediatrics, 1985; 76:375-381.

7 Bijur PE, Golding J, Haslum M: Persistence of Occurrence of Injury: Can Injuries of Preschool Children Predict Injuries of School-Age Children? Pediatrics, 1988; 82:707-11.

recall of previous injuries and an assessment of their child's behavior, and therefore, could be skewed by some recall bias, as parents may overstate their child's aggressivity after an injury.

However, other studies have confirmed that aggressive behavior increases the risk of childhood injury. In fact, it has generally been shown that children described as impulsive, hyperactive or aggressive have more injuries. The strongest association is between injuries and aggression.[8] And the correlation appears to be greater for boys than for girls. One explanation is that increased risk-taking behavior and decreased impulse control associated with aggresssion leads to reduced ability for injury avoidance. Therefore, boy's play activities being characteristically more rough and more often involving hazardous conditions may put boys at higher risk for injury than girls.

An interesting alternative hypothesis suggests that boys are more vulnerable than girls in dangerous situations (such as crossing a busy street) because they appear to perceive sensory stimuli differently.[9] In a controlled experiment, researchers found that girls overestimated the speed of approaching vehicles, whereas boys tended to underestimate the speed of oncoming cars.[10] This study shows that there may be other unexplored perceptual, developmental or behavioral differences between the sexes that

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[8]Bijur PE, Golding J, Haslum M, Kurzon M: Behavioral Predictors of Injury in School-Age Children. American Journal of Diseases of Children, 1988;142:1307-12.

[9]Bijur PE, Golding J, Haslum M, Kurzon M: Behavioral Predictors of Injury in School-Age Children. American Journal of Diseases of Children, 1988;142:1307-12.

[10]Salvatore S: The Ability of Elementary and Secondary School Children to Sense Oncoming Car Velocity. Journal of Safety Research, 1974;6:118-125.

explain the disparity in injury rates besides the rough/docile behavior stereotype.

Family and Environment

In addition to understanding child behavioral effects on injury rates it is important to explore familial and environmental factors to decipher the reasons for certain child behaviors. Familial studies, in general, have provided conflicting results. For instance, some studies of family type have shown that single-parent families have higher child injury rates, while other studies have shown no correlation. Parental occupation has been a significant predictor of child injuries in some studies, but not in others. Nonetheless, some familial trends have emerged in relation to childhood trauma. Significant acute family events such as unemployment, serious illness, moves, and divorce have been shown to be associated with childhood injuries.[11] Large family size has been associated with increased injuries in children, particularly of the younger siblings.[12] It is thought that decreased parental supervision, and caretaking by older siblings is causally related. Maternal factors such as young age, depression, serious illness, and work outside the home have all been correlated with higher rates of childhood injury. The underlying cause may, again, be inadequate adult supervision, although this has not been thoroughly documented.

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[11] Horwitz SM, Morgenstern H, Dipietro L, Morrison C: Determinants of Pediatric Injuries. American Journal of Diseases of Children, 1988; 142:605-611.

[12] Horwitz SM, Morgenstern H, Dipietro L, Morrison C: Determinants of Pediatric Injuries. American Journal of Diseases of Children, 1988; 142:605-611.

The challenge in all studies of behavioral and familial effects on injury rates is accurate measurement and assessment of risks. Although variables such as number of siblings and maternal age are easily measured, the influence of confounding variables is difficult to ascertain. For instance, do large families really mean more child injuries or are they both related to a common factor such as low SES? Other factors such as child aggression or maternal depression can only be subjectively measured, at best. Still other factors such as family dynamics and parenting skills cannt be accurately assessed at all.

Socioeconomic Status

While several studies have documented poverty as a risk factor for childhood injuries, it is not clear what aspect of low SES is most strongly correlated. It may be that different aspects of poverty are important in different types of injury. It has already been shown that poor urban planning and crowded neighborhoods lead to increased numbers of pedestrian injuries. Substandard housing and lack of smoke detectors could increase the incidence of burn injuries in poor areas. Higher crime rates and greater access to firearms may explain higher gunshot and stabbing injuries. Drug and alcohol abuse may contribute to higher injury rates in nearly all categories. In addition, one study found that child aggression and overactivity were strongly associated with low SES.[13]

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[13]Bijur P, Golding J, Haslum M, Kurrzon M: Behavioral Predictors of Injury in School-Age Children. American Journal of Diseases of Children, 1988; 142:1307-12.

Much of the information on SES effects, age and race differences, and geographical variations comes from studies of childhood mortality. Although this approach certainly selects for the severest of childhood injuries, it is useful to evaluate the risk factors involved in the worst-case outcome of pediatric trauma.

Injury Mortality

From 1980 to 1985 nearly 10,000 children under age 14 died each year from injuries.[14] This rate of 17 deaths per 100,000 children per year represents a 35% decline from injury mortality rates a decade earlier.[15] Pedestrian-related death rates declined the most, while homicides and suicides were the only major groups to show an overall increase during this 15-year period. Despite the decline in injury mortality, the overall annual incidence of injuries among children remained essentially unchanged from 1970-1984 at 37-39 per 100 children under age 17 years.

Age

Several studies have shown injury death rates to be higher among younger children than older children. During the years 1980-85 injury death rates were the following:[16]

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[14]Waller AE, Baker SP, Szocka A: Childhood Injury Deaths: National Analysis and Geographic Variations. American Journal of Public Health, 1989; 79:310-15.

[15]Fingerhut LA, Kleinman JC, Malloy MH, Feldman JJ: Injury Fatalities Among Young Children. Public Health Reports, 1988; 103:399-405.

[16]Waller AE, Baker SP, Szocka A: Childhood Injury Deaths: National Analysis and Geographic Variations. American Journal of Public Health, 1989; 79:310-15.

Age (years)	Mortality Rate/100,000/yr
<1	33.9
1-4	25.4
5-9	14.4
10-14	16.2

The most significant age mortality differences were among fire, drowning and homicide rates which were 2.5 times higher in the 1-4 age group than the 5-9 year olds. Pedestrian injuries accounted for 47% of deaths at ages 5-9, while bicycle injuries were responsible for 60% of deaths among children age 10-14. Overall, motor vehicle-related injuries, including passenger, pedestrian, and bicycle incidents were the largest single category of injuries causing death, except among children less than one year for whom homicide accounted for more deaths.

Gender differences in mortality rates also increased with age. Boys had two times higher drowning death rates than girls at age 1-4, and more than three times higher rates at ages 5-9.[17] Pedestrian-related deaths in boys compared to girls increased from 1.5:1 to 2:1 in the two age groups. Passenger-related deaths exhibited no relationship with gender.

Race

Among different racial groups, injury death rates are lowest for whites and Asians, and highest for blacks and Native Americans

[17]Fingerhut LA, Kleinman JC, Malloy MH, Feldman JJ: Injury Fatalities Among Young Children. Public Health Reports, 1988; 103:399-405.

(with Hispanics considered as whites). Differences in injury death rates between blacks and whites decrease with age from a high of 2.5 times greater for black children less than one year, to a rate 1.2 times higher for black children ages 10-14. The racial differences are most pronounced for fires and homicides, with blacks having three-fold higher death rates than whites for all ages.

Pedestrian death rates among black children ages 1 to 9 were nearly two-fold higher than whites, whereas passenger fatality rates were the same between the racial groups. Only Native American children showed a substantially higher death rate due to passenger-related injuries with rates 2.2 times higher than all other racial groups.[18]

Death rates due to drownings are two-fold higher for whites than blacks for children ages 1 to 4, but the ratio reverses for older children. In fact, one study found the most pronounced racial difference was a 3.4 times higher drowning rate for blacks compared to whites in the age group 10-14.[19] One explanation is that whites tend to have more residential swimming pools and therefore have more exposure to drowning situations at a young age than blacks. The higher rates among older black children may be related to a lack

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[18]Waller AE, Baker SP, Szocka A: Childhood Injury Deaths: National Analysis and Geographic Variations. American Journal of Public Health, 1989; 79:310-15.

[19]Fingerhut LA, Kleinman JC, Malloy MH, Feldman JJ: Injury Fatalities Among Young Children. Public Health Reports, 1988; 103:399-405.

of proper swimming instruction and/or swimming in unsupervised and dangerous areas such as rivers, lakes, and oceans.[20]

Socioeconomic Status

Clearly, the differences in injury rates among racial groups are confounded by cultural, geographical, and socioeconomic factors. In particular is the dominating influence of SES disparities among the racial groups. For example, in 1984, 51% of black children age six and under were living below the poverty level compared to just 18% of white children.[21] As previously discussed, low SES is a well-tested risk factor for childhood injury and mortality. For example, research has shown that racial differences in homicide rates disappear when SES is taken into account.[22] Risk factors for death due to residential fires, such as lack of smoke detectors, inappropriate heating devices, poor escape routes, and smoking in bed, are also more commonly associated with poverty.

In summary, the theorized risks of childhood injury and death related to low SES include decreased access to safe recreational areas, crowded and substandard housing, increased drug and alcohol abuse, high crime rates, increased firearm possession, and inadequate adult supervision.

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[20]MMWR: Differences in Death Rates due to Injury Among Blacks and Whites, 1984. Journal of the American Medical Association, 1989; 261:214-216.

[21]U.S. Bureau of the Census: Characteristics of the population below the poverty level: 1984. Current Population Reports, Series P-60, No. 152, June 1986.

[22]Williams KR: Economic Sources of Homicide: Reestimating the Effects of Poverty and Inequality. Am Soc Rev, 1984; 49:283-9.

Geography

Analysis of mortality data for 1980 through 1985 from the National Center for Health Statistics revealed that the highest death rates were in the mountain states and the south. Injury death rates per 100,000 children per year ranged from a high of 35.5 in Alaska to 11.2 in Massachusetts.[23]

Motor vehicle passenger death rates were highest in Idaho, New Mexico, and Wyoming, possibly related to difficult winter driving conditions in these mountainous states. Interestingly, neighboring Utah had a distinctly lower rate of passenger-related deaths, as well as the lowest per capita consumption of alcohol in the country, which is likely to be relevent.[24]

California, Oregon, Utah, Hawaii and the other western states as well as the gulf coast states had the highest child drowning rates in the U.S. It is likely that coastal access and mild climate are contributing factors to this trend.

Death rates due to house fires were distinctly higher in the east and southeast. The National Fire Data Center suggests that the many older, wooden houses and large numbers of families living in poverty, particularly in the southeast, may be causally related.

Suicide rates for children were generally highest in the northern and mountain states, while high homicide rates were seen in the

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[23]Waller AE, Baker SP, Szocka A: Childhood Injury Deaths: National Analysis and Geographic Variations. American Journal of Public Health, 1989; 79:310-315.

[24]Waller AE, Baker SP, Szocka A: Childhood Injury Deaths: National Analysis and Geographic Variations. American Journal of Public Health, 1989; 79:310-315.

southwestern states. Homicide was the leading cause of child injury death in the District of Columbia.

While national injury mortality statistics are interesting and useful for studying overall epidemiologic trends, these data are not suitable for developing injury prevention strategies on a small area basis. For this task, local community studies are needed.

Kaiser Study

In 1955, the California State Department of Public Health embarked on a major project to study childhood injuries. As part of this project, a large-scale study was undertaken of the accident experiences of 8,874 children who received pre-paid health care at the Oakland Kaiser Permanente Health facility.[25] The study was limited to children ages 4 to 18 as of May, 1960 who resided in the cities of Berkeley and Oakland. Only non-fatal, medically attended injuries were included. Medical records from the Oakland facility were the source of data on injuries.

The overall injury rate was calculated to be 24.6 per 100 children per year. Falls were the leading cause of injury, followed by contact with sharp or rough objects or another person, and dog bites. Passenger and pedestrian-related injuries ranked 10th and 12th respectively in frequency. Today, these two injury types along with falls are the three most frequent injuries to children, nationwide.

Boys had more accidents than girls, and the gender difference became more pronounced with increasing age. They discovered that

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[25]Manheimer DI, Dewey J, Mellinger GD, Corsa L: 50,000 Child-Years of Accidental Injuries. Public Health Reports, 1966; 81:519-32.

Asians had the lowest injury rates, and that whites had 40% higher injury rates than blacks. These findings on white and on black children were in sharp contrast to national findings at that time, and also conflict with current studies on race and injury rates. Furthermore, this study revealed that injury rates were highest among children of professionals and lowest among children of unskilled workers, although this trend was greatly reduced when race was taken into account. It is possible that by eliminating fatal injuries from the study population, they skewed the data to less severe injuries and failed to include many children of low SES who were clustered in the category of fatal outcomes. Since black children are more often of low SES than white children, they may have underestimated the total injuries among black children.

The authors could not explain the racial differences other than to state that their Kaiser population, in general, was of higher SES than a typical community cross-section, which may have ameliorated the social trends seen in other studies. This problem with pre-paid health plan studies exists to an even greater extent today, as tight health care budgets force HMO's to select a homgeneous group of subscribers who are overall more healthy, highly educated, and of higher SES than the community in general. They are not ideal study groups for injury statistics in the overall population.

III. METHODS

The trauma services group of Children's Hospital of Oakland (CHO) keeps records of all trauma patients by incorporating information into the Bay Area Trauma Registry, a mainframe computer system. Approximately two months after discharge of the patient, the chart is pulled from the medical records department, abstracted, and inputed into the trauma registry. From the registry, a summary sheet can be generated for each patient, and overall trauma statistics can be obtained for any time period of interest.

For this study, data were obtained from the trauma registry for all patients seen at the trauma center from Jan 1 to Dec. 31, 1989. The data were downloaded from the mainframe into a DBASE 3+ file and then transferred into a LOTUS 123 spreadsheet for analysis. Specific measures included the following:

Data Taken From Trauma Registry

Medical Number	Date of Arrival
Age	Mode of Arrival
Gender	Days in Hospital
Race	Patient Outcome
Injury Type	Residential Zip Code
Injury Severity	Source of Pay

For identification purposes, only the medical record number was taken from the registry. By not including names or initials of the child, the patient's anonymity was protected.

The mode of arrival at the trauma center was categorized as either ambulance, private transport (usually personal car), helicopter, public transport (police, fire department etc), or intensive care transport from another hospital.

The patient outcome was a record of disposition after being treated in the trauma center, or after discharge if the patient was admitted to the hospital. The outcome categories included discharged home; transferred to another hospital; expired; left against medical advice; foster care; and police custody.

The information on source of pay was collapsed down from twelve categories to the three categories of private health coverage (i.e., Blue Cross, Kaiser, etc); Medi-Cal; and self-pay or uninsured. The original twelve categories included many different types of private insurance and government coverage, and were too specific for this study.

The data on types of injuries was also very detailed and was therefore narrowed down from twenty four categories to the fourteen categories shown below:

Types of Childhood Injuries

Motor vehicle accident	Near Drowning
Auto. vs. Bicycle	Burn
Auto. vs. Pedestrian	Child Abuse/Assault
Auto. vs. Skateboard	Motorcycle/Moped
Bicycle Accident	Gunshot
Skateboard Accident	Stabbing
Fall	Other

The motor vehicle accident category included mostly children who were passengers in the automobile, although a few cases involved the child as driver. Bicycle and skateboard accident categories included all those incidents which did not involve contact with an automobile. When the "Other" category was encountered, the ICD injury code (E code) was checked to determine if the injury fit into a more descriptive category. If the injury fell into one of the other categories, the injury type was changed in the spreadsheet. Otherwise, the code was kept as an "Other" injury. In only a few cases was the type of injury changed from "Other" to another type.

When two or more injury types were listed for one patient, a decision was made on the major mechanism of injury and only this one was listed in the spreadsheet. This situation arose most often with child abuse cases in which the mechanism of abuse was also listed (scald, fall etc.) In these cases, child abuse was listed as the injury type. Therefore, each patient had only one injury type for the purpose of facilitating data analysis.

Injury severity was measured in terms of an Injury Severity Score (ISS). The ISS is calculated from the Abbreviated Injury Scale (AIS) which is determined upon discharge from the trauma center, after evaluation and diagnosis of injuries. With the AIS system, a value from one to six is assigned for each of six body regions, with one representing a mild injury and six being a very severe injury. The body regions used in the AIS are shown below:[26]

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[26]Copes WS, Champion HR, Sacco WJ, Lawnick MM, Keast SL, Bain LW: The Injury Severity Score Revisited. The Journal of Trauma, 1988; 28:69-76.

Number	Body Region
1	Head and Neck
2	Face
3	Thorax
4	Abdomen
5	Extremities
6	External

The ISS is the sum of squares of the highest AIS scores in each of the three most severely injured body regions. For example, a child with moderate injuries (AIS = 3) in the face, head and abdomen, and mild injuries in the other three regions (AIS = 1) would have an ISS of 27. Thus, the ISS is a summary measure of trauma to either single or multiple body regions.

One study concluded that an ISS greater than or equal to sixteen, and/or an AIS greater than or equal to four in any body region constitutes a major trauma incident.[27] They further determined that an ISS greater than 59, and/or an AIS of six in any body region, or greater than or equal to five in the head and neck region was an unsurvivable injury. An ISS greater than 40 has been shown to correlate with a mortality rate of 50% in patients aged 0 to 49 years.[28]

The residential zip codes were used to determine which of the patients resided in Alameda County. All of those who resided outside the county were eliminated from the study population. The

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[27]Dykes EH, Spence LJ, Young JG, Bohn DJ, Filler RM, Wesson DE: Preventable Pediatric Trauma Deaths in a Metropolitan Region. Journal of Pediatric Surgery, 1989; 24:107-10.

[28]Baker SP, O'Neill B, Haddon W et al: The Injury Severity Score: A Method for Describing Patients with Multiple Injuries and Evaluating Emergency Care. Journal of Trauma, 1974; 14:187-196.

study population was limited to residents of Alameda County to ensure that nearly all children who suffered injuries in this area would be included in this study. The local ambulance companies act under the premise that all children age fourteen years and under go to Children's Hospital of Oakland. Furthermore, children transported by private car will likely be brought to CHO because it is the only pediatric trauma center in northern California. Even children who are brought to their closest area hospital will eventually be transferred to CHO if the injuries require specialized trauma care.

The zip codes were also used to determine the mean household income (MHI) for the region in Alameda County where each trauma patient lived. The MHI data was obtained from the California Census Data Center in Sacramento, whose source was the 1980 national census. MHI data was used as a gauge of socioeconomic status for this study population.

All patients fifteen years and older were eliminated from the study population. This ruled out the possibility that some of these older trauma patients would be missed because they were brought to an adult trauma center in the region instead of CHO. In addition, the vast majority of older adolescent trauma victims are injured in car accidents where they were either the driver or passenger. This fact would skew the data on types of injuries suffered, and make the results less descriptive of a "true" pediatric population.

Data analysis involved sorting and manipulating the spreadsheet to evaluate trends and averages in the population. Tests for statistical significance included Chi-Square analysis, T tests, and analysis of variance.

A total of 748 patients were seen at the CHO trauma center in 1989 and were recorded in the trauma registry. Another 49 patients were seen that year, but not included in the registry at the time of this study. These 49 cases are not believed to be significantly different from the total population of trauma patients, and were just random omissions from the chart abstraction and registry entry process.

Fifty eight patients (8%) were fifteen years or older and, therefore, excluded from the study based on the age criterion.

One hundred forty patients (19%) were eliminated from the study because they resided outside of Alameda County.

The study population then included 550 patients who were fourteen years or younger and resided in Alameda County. Of this group, 112 cases were missing one or more of the twelve data measures. The missing data was most often the home zip code, followed by source of pay, and mode of arrival. The registry was then rechecked for the missing information. The cases that were incomplete in the registry were subsequently pulled from medical records and manually reviewed. After this process, only eighteen cases remained incomplete, either because the chart could not be located, or the information was not included in the medical record. These eighteen cases were eliminated from the study population, leaving a total of 532 patients (97%) in the sample. The entire data set for these 532 patients is included in the Appendix.

IV. RESULTS

Injury Summary

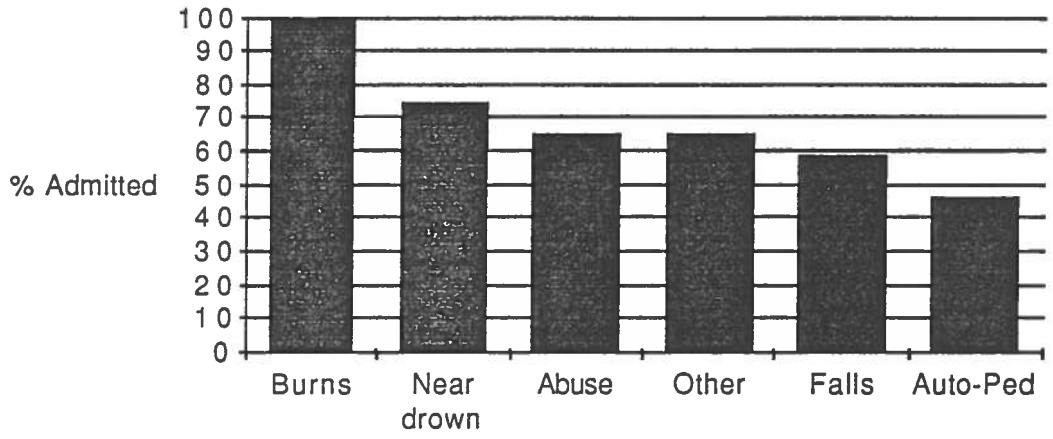
Of the 532 trauma cases, falls were the most frequent type of injury followed closely by auto-pedestrian injuries and MVA's. (Table 1) The average ISS is also shown in Table 1 for all injury types except for those with very small totals. The injuries with the highest average ISS also had the highest rates of hospital admittance. As seen in Figure 1, the injuries with the highest rates of hospitalization were among the least frequent types of injuries. Falls and auto-pedestrian injuries ranked 5th and 6th in hospitalization rates, respectively, while MVA's ranked 12th out of 14 injury categories in rates of admission.

Table 1. Injury Totals, ISS Values, and Hospitalization Rates.

	Number	% of Total	Avg. ISS	% Admitted
Fall	130	24.4%	5.28	59%
Auto-pedestrian	127	23.9%	5.56	46%
MVA	119	22.4%	3.24	21%
Auto-bicycle	36	6.8%	3.83	25%
Bicycle	27	5.1%	3.96	38%
Abuse	22	4.1%	5.77	64%
Burn	21	3.9%	8.67	100%
Other	20	3.8%	9.60	65%
Gunshot	16	3.0%	2.64	27%
Near Drowning	4	0.8%	-	-
Skateboard	4	0.8%	-	-
Motorcycle	3	0.6%	-	-
Auto-skateboard	2	0.4%	-	-
Stabbing	1	0.2%	-	-

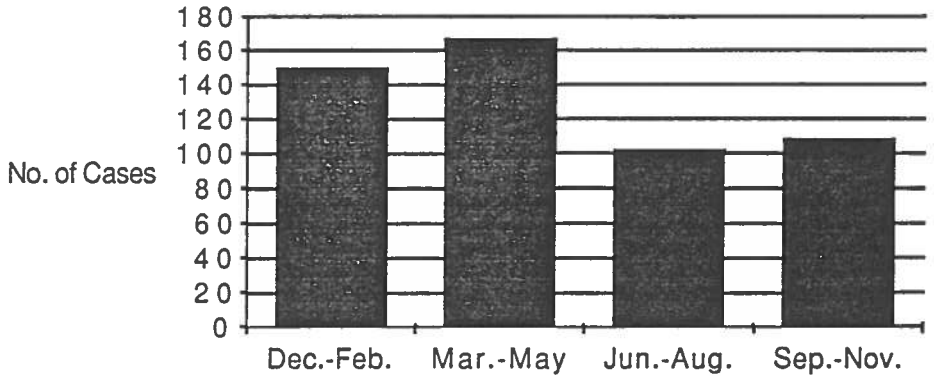
Seven of the 532 patients died as a result of their injuries. Two of them were drowning cases, one as a result of a fall, one due to burns, one because of an auto-pedestrian incident, and two because of other injuries.

Figure 1. Injuries with the Highest Rates of Hospitalization.



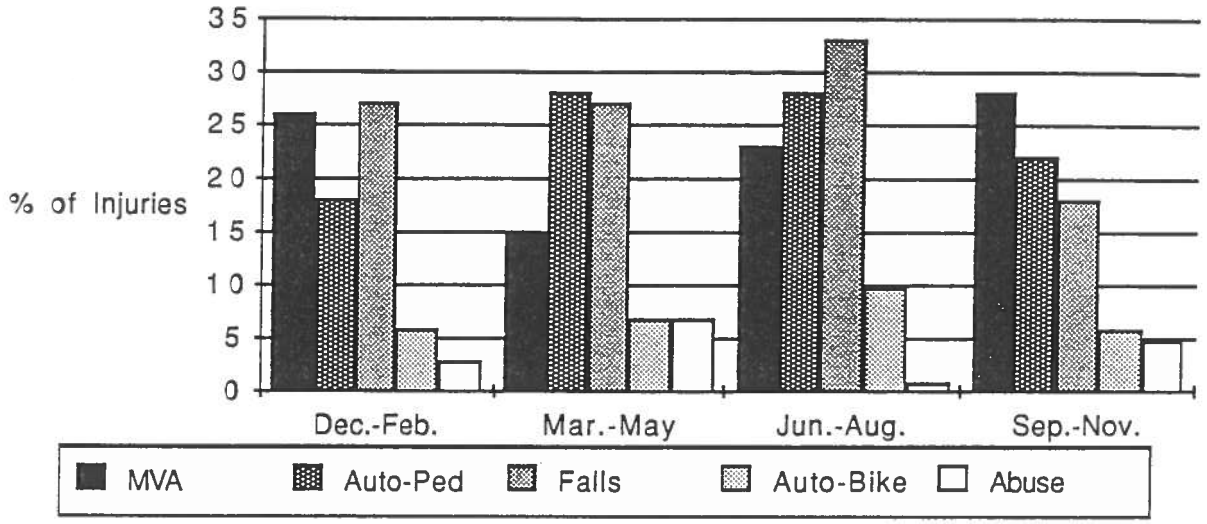
As seen in Figure 2, the number of injuries varied with the season of the year. The highest incidence of trauma cases occurred in the spring, followed by the winter season. Contrary to what might be expected, the summer season showed the lowest number of injuries. This may be a true reflection of injury patterns, implying that many injuries occur as children travel to and from school, or at school. However, it may also be an aberration because children are more likely to be out of the area on vacation in the summer months.

Figure 2. Seasonal Variation in Total Injury Cases.



The most frequent types of injuries also showed seasonal variations. (Figure 3) Falls and auto-pedestrian injuries were the leading causes of injuries in the spring and summer months. MVA's were highest in the fall and winter. The incidence of abuse was highest in the spring and lowest in the summer. Burn injuries exhibited no variation with season, accounting for 4-5% of all injuries throughout the year. Surprisingly, there were no near drowning episodes during the summer, suggesting that, at least in this sample, swimming accidents were not a major risk factor.

Figure 3. Seasonal Variations in Injury Type.



Gender

The patient population was comprised of 65% males and 35% females. This sex differential is larger than that found in many other studies. Although the number of boys and girls differed significantly in this study, there were no gender differences in injury severity, mortality rates, or hospital admission rates.(Table 2) .

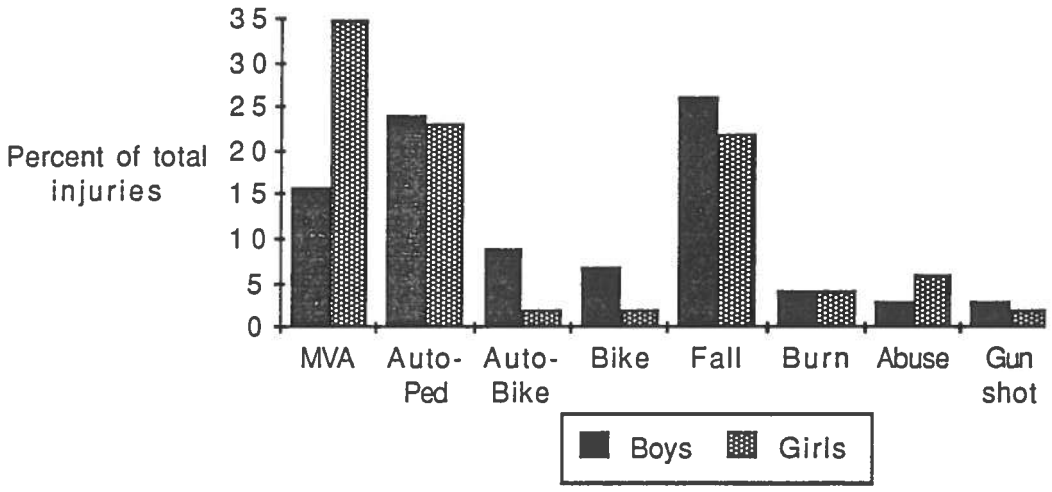
Table 2. Gender Differences in Injury Severity and Mortality

	BOYS	GIRLS
Number	345	187
Percent of Total	65%	35%
Average ISS *	4.67	5.35
Percent Admitted	46%	43%
Mortality Rate	1.2%	1.6%

* ($T=1.1$, $p > 0.20$)

Boys and girls differed in the types of injuries they suffered. As shown in Figure 4, boys had proportionally more falls, auto-pedestrian and bicycle injuries than girls. Girls were more often victims of MVA's or abuse than were boys. Burns were the only injuries which did not exhibit a gender difference. Eleven of the sixteen gunshot victims and the one stabbing victim were males.

Figure 4. Types of Injuries in Boys Versus Girls.



In Figures 5 and 6 are shown the five most common injuries for boys and girls, respectively. Girls were more likely to be "passive" injury victims such as motor vehicle passengers, or victims of abuse and burns. Boys had more "active" injuries such as bicycle injuries and falls.

Figure 5. Five Most Common Injuries in Boys.
(n=341)

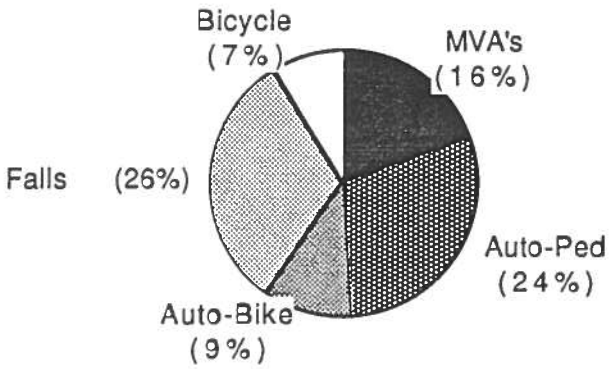
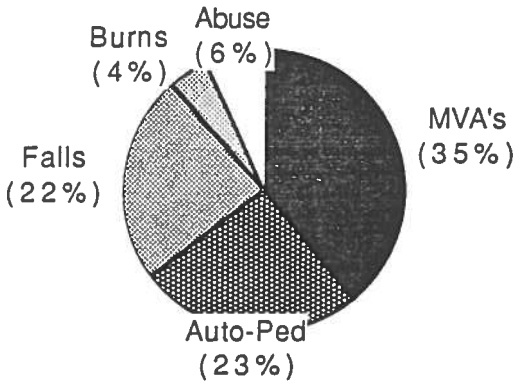


Figure 6. Five Most Common Injuries in Girls.
(n=187)



Age

The number and types of injuries showed great variation with age of the child. As seen in other studies, the age group 5-9 years had the highest number of injuries in the population (181 or 34%). However, unlike the gender differences, there was a statistically significant difference in injury severity with age. As seen in Table 3, the average ISS was highest for children less than one year and steadily decreased with increasing age.

Table 3. Age Differences in Injury Severity and Mortality

Age (years)	<1	1-4	5-9	10-14
Number	58	152	181	141
% of Total	11%	29%	34%	26%
Avg. ISS *	5.93	5.87	4.46	4.02
% Admitted	48%	57%	44%	31%
Mortality Rate#	3.4%	2.6%	0%	0.7%

* $F=2.4$, $p=0.05$ # $X^2=6$, $p=0.11$

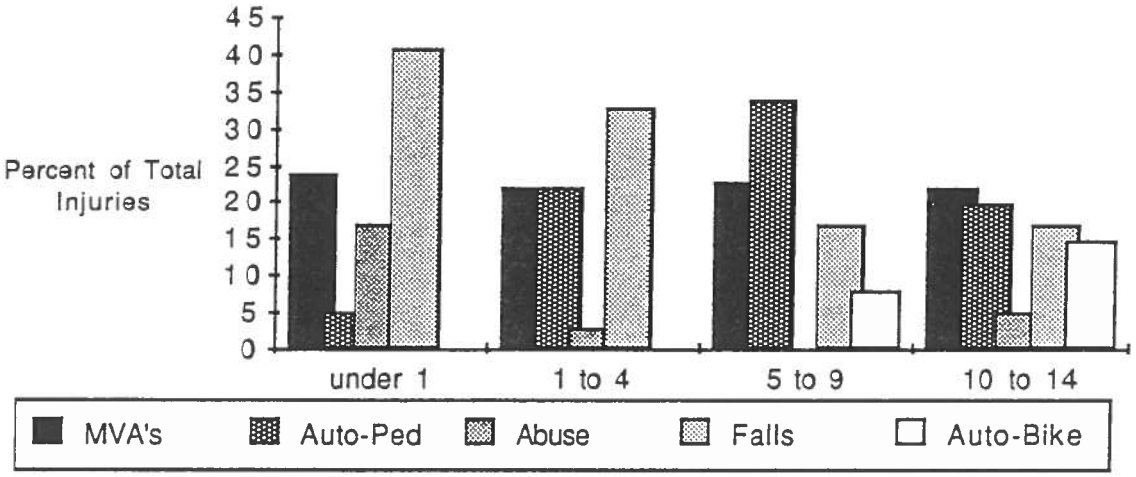
Although the variation in mortality rates was not statistically significant, six of the seven trauma-related deaths occurred in children under age five.

As seen in Figure 7, the most common types of injuries varied with age group. By a wide margin, falls were the leading cause of injury among children under age five. Auto-pedestrian injuries and auto-bicycle injuries were much more common among children ages 5 to 14. MVA's showed the least age variation, accounting for 22-24% of injuries in all age categories.

Abuse was the third leading cause of injury among children under one year of age. Accounting for roughly 17% of all injuries in this age group, the incidence of abuse was statistically higher than among children older than one year. ($p<0.0005$) Eleven of the sixteen gunshot injuries occurred among children ages 5-9. Children ages 1 to 4 had the highest number of burn injuries, accounting for 9% of

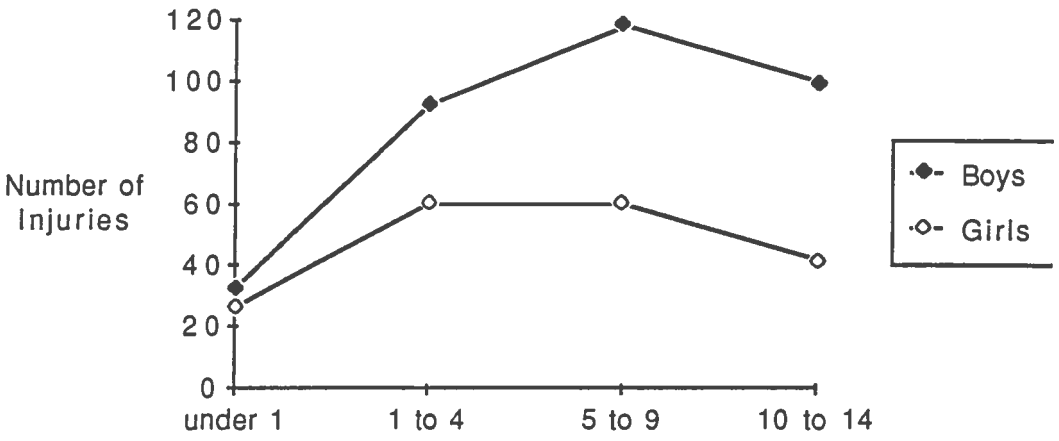
injuries in this age group and two-thirds of all burns in the total study population.

Figure 7. Most Frequent Injuries by Age Group.



The gender difference in number of injuries also varied with age of the child. As seen in Figure 8, the gap between injuries in boys versus girls grows larger with increasing age. The greatest difference in injuries between boys and girls occured among the oldest children, ages 10-14 years. This trend seems to support the theory that gender differences in injury rates correlate with differences in sex-role behavior. Infants and young children may have less gender-dependent differences in play, while older children may exhibit very different play behaviors between boys and girls.

Figure 8. Gender Differences in Injury Rates by Age Group.



Race

Blacks were the largest racial group in the study population, comprising 54% of all children studied. The breakdown by race is listed in Table 4 along with the racial population statistics for Alameda County from the 1990 U.S. census. Compared to the county population, blacks are over-represented and whites are under-represented in our sample, while the percentage of Hispanics and Asians are about the same as the community. Using 1990 U.S. Census population data for Alameda County, the injury rates per 100,000 were calculated for each racial group and listed in Table 4. The large injury rate for black children may be due to the predominantly black population in which the hospital is located, or may represent actual differences in injury rates or health care utilization as discussed later.

Table 4. Comparison of Injury Rates Between Different Races.

	Number	% of Total	Percent in Alameda Co.*	Injury Rate per 100,000
White	110	21%	53%	16.2
Black	285	54%	18%	123.8
Hispanic	72	14%	14%	40.2
Asian	37	7%	15%	19.3
Native Amer.	3	1%	N/A	-
Other	17	3%	N/A	-
Unknown	8	1%	N/A.	-

* (1990 U.S. Census Data)

Injury severity differed with race as shown in Table 5. On the average, blacks had the least severe injuries, and Asians had the most severe injuries, although the number of Asian patients in the sample was low (n=37). Analysis of variance demonstrated significant differences in average ISS between the different races ($p < 0.01$), but the differences in mortality rates were not statistically important. Racial differences in utilization may again explain these findings.

Only 40% of black children were admitted for their injuries, while 55% of whites were admitted. This likely reflects differences in injury severity, but may also be confounded by type of insurance coverage.

Table 5. Racial Comparisons of Injury Severity and Mortality Rate.

	Avg. ISS *	Mortality Rate	% Admitted
White	6.14	1.8%	55%
Black	3.83	1.1%	40%
Hispanic	6.17	1.4%	44%
Asian	7.89	2.7%	48%
Native Amer.	5.33	0%	67%
Other	4.88	0%	65%
Unknown	1.63	0%	13%

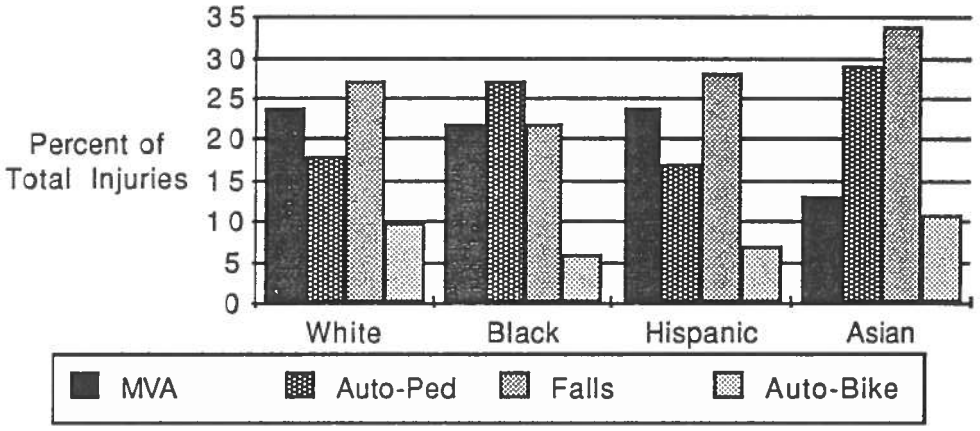
* ($F = 3.6$, $p < 0.01$)

The most frequent injuries suffered are shown by race in Figure 9. Falls were the leading cause of injury among all races except blacks, for whom auto-pedestrian accidents were most frequent. Consistent with other studies, the number of falls were proportionally higher among Asians than among other racial groups.

MVA's were the second leading cause of injury for whites, blacks, and Hispanics, accounting for between 22-24% of injuries in these groups. However, among Asians, MVA's ranked third and accounted for just 13% of injuries in this group.

Although not statistically significant, abuse was the fourth leading cause of injury among blacks, accounting for 73% of all cases of abuse in the study population. Black children also suffered two-thirds of the gunshot injuries and the only stabbing injury in the population.

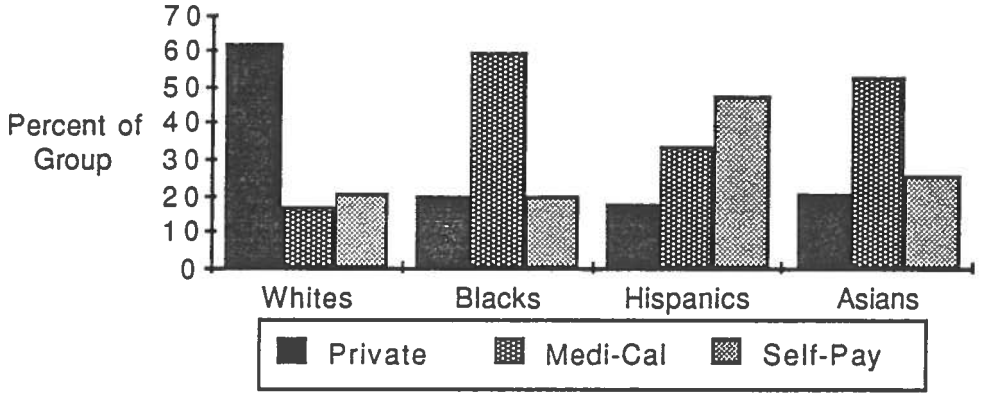
Figure 9. Most Frequent Injuries by Race.



Insurance Coverage

As shown in Figure 10, there were large differences in insurance coverage between the different racial groups. More than one-half of black and Asian children, and one-third of Hispanic children had Medi-Cal coverage. In contrast, only 16% of white Children were Medi-Cal patients. The trend reversed for private insurance as only 20% of blacks, Asians, and Hispanics were covered either by private plans or HMO/PPO membership, while fully 65% of white children had such benefits. The self-pay category averaged 20-27% for all patients, except for Hispanic children, among whom 49% had no insurance coverage.

Figure 10. Insurance Status of Racial Groups.



As shown in Table 6, Medi-Cal patients made up nearly one-half of the study population, with the remaining half being about equally self-pay and private coverage patients.

Table 6. Patient Comparison Based on Type of Insurance Coverage.

	Private	Medi-Cal	Self-Pay
Number	154	243	135
% of Total	29%	46%	25%
Average ISS*	5.69	5.19	3.54
% Admitted**	56%	47%	29%
Avg. Hosp. Days#	2.2	2.8	0.8

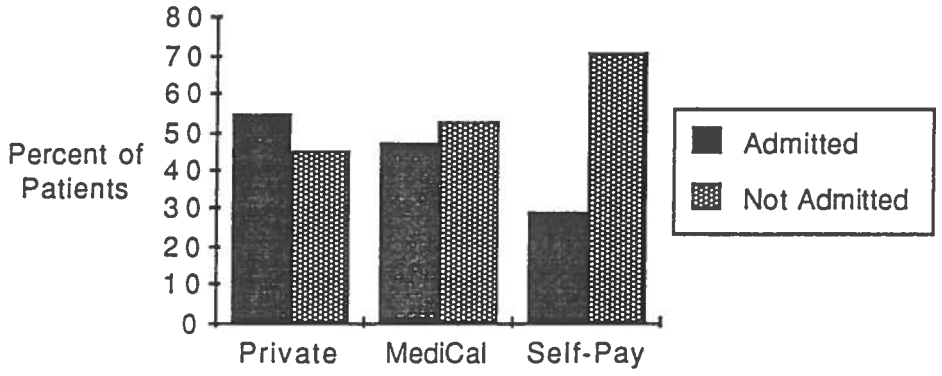
* (p value < 0.05) ** (p value < 0.0005) # (p value < 0.01)

Considering the high cost of tertiary medical care, these results seem to counter expected findings. One would expect to see less utilization by those families who can least afford the expense of a visit to the trauma center. However, as seen in Table 6, the average injury severity score of self-pay patients is significantly lower than

Medi-Cal and private coverage patients. In addition, only 29% of self-pay patients were admitted to the hospital compared to roughly half of other patients. (Figure 11) Therefore, the trauma center is being heavily utilized by patients with less severe injuries who are least able to pay for the services.

One possible explanation is that people without health coverage are less likely to have a regular primary care physican or usual source of care. Therefore, they do not have easy access to health information or medical advice, and may tend to use hospital emergency rooms and trauma centers as a clinic for relatively minor medical problems.

Figure 11. Insurance Coverage and Hospital Admissions.



However, there also seems to be some cultural differences in utilization. Looking again at Figure 10, both blacks and Asians have very high rates of Medi-Cal coverage, however they differ greatly in utilization statistics. As shown in Table 4 the injury rate per 100,000 was six times higher for blacks than for Asians. But, it is not

known whether this is a true difference in injury rates, or a result of differences in utilization. On the average, Asian patients had much higher injury severity scores, mortality rates, and hospital admission rates than did black patients. This leads to the hypothesis that blacks may utilize the trauma center more often for less severe injuries, either because of close proximity to the hospital, or again, because of a lack of access to primary care facilities.

Insurance coverage can be used as an indicator of socioeconomic status (SES) with private insurance considered a sign of high SES, and Medi-Cal and Self-Pay considered a marker for low SES. By comparing the insurance coverage of patients who suffered different types of injuries, the relationship of SES and injury type can be assessed.

As shown in Figure 12, Medi-Cal patients accounted for more than 50% of auto-pedestrian injuries, falls, abuse cases, gunshots, and bicycle injuries. Only auto-bicycle injuries had a higher representation of private insurance patients than either Medi-Cal or self-pay patients. Burns and MVA's were the only injuries which did not show much variation with insurance status, with roughly one-third each being private, Medi-Cal, and self-pay patients. While other studies have shown that MVA's occur at all SES levels, burn injuries have clearly been linked with low socioeconomic status.[29]

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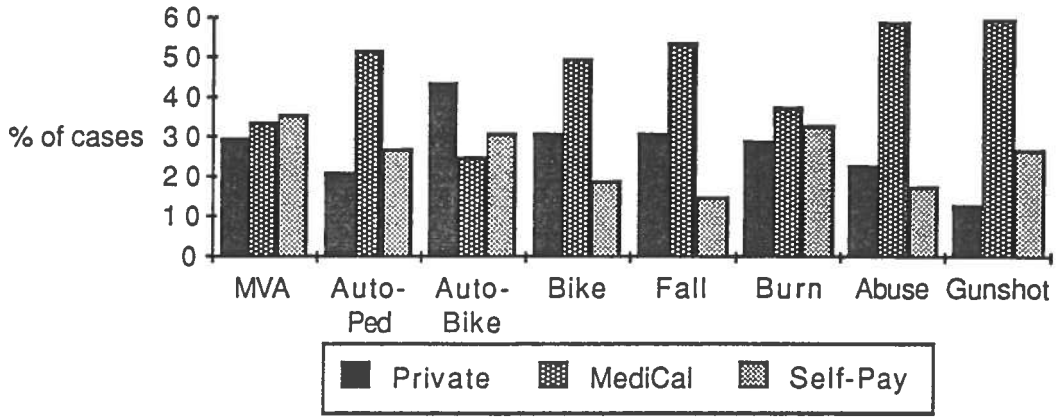
[29]MMWR: Differences in Death Rates due to Injury Among Blacks and Whites, 1984. Journal of the American Medical Association, 1989; 261:214-216.

Figure 12. Injury Type Broken Down by Insurance Status.



Regional Variations

The age-specific injury rates for children under age 15 were calculated for each city in Alameda County. (Table 7) City population data was taken from the1990 U.S. Census, and the fraction of children in each locale was obtained from 1980 census data and scaled-up for regional growth to 1990 values.

Table 7. Injury Rates in Cities of Alameda County.

	Number of Injuries	Injury Rates per 10,000 children < 15 yr
Alameda	17	13.1
Albany	5	21.1
Berkeley	44	28.5
Dublin	2	3.3
Emeryville	32	80.1
Fremont	10	2.4
Hayward	38	7.6
Livermore	5	3.2
Newark	3	2.8
Oakland	340	51.2
Piedmont	11	22.2
Pleasanton	2	1.5
San Leandro	13	10.0
Union City	8	5.1

The injury rates varied widely from a low of 1.5 per 10,000 children in Pleasanton to a high of 80.1 per 10,000 in Emeryville. Oakland, Berkeley and Piedmont also had very high injury rates. Overall, the average injury rate for Alameda County was 19.5 per 10,000 children under age 15.

To investigate the hypothesis that utilization of the trauma center is higher in areas that are closer to CHO, age-specific injury rates were calculated based on distance of the residential zip code from the hospital. (Table 8)

Table 8. Variation in Injury Rates with Distance from Trauma Center.

Distance from CHO	No. of Injuries	Injury Rate per 10,000 <15	Mode of Arrival Trauma sys.	Non system
< 3 miles	185	51.1	64%	36%
3-6 miles	135	32.0	70%	30%
6-10 miles	137	45.7	76%	24%
10-15 miles	19	7.0	74%	26%
15-20 miles	25	13.4	92%	8%
20-25 miles	17	3.2	94%	6%
> 25 miles	14	2.8	93%	7%

The regions closest to Children's Hospital clearly have the highest injury rates, most likely due to higher utilization rather than higher incidence of injury. Although it is expected that people would more often utilize the hospital closest to their home for most emergencies, this trend would not be typical of centers specializing in critical care such as trauma centers, neonatal units, and burn centers. These centers would be expected to draw patients from a wide geographical area and have a high percentage of intensive care transport such as helicopters and hospital transfers.

The mode of arrival at the CHO trauma center was divided into two categories: trauma system and non-trauma system. Trauma system arrivals include ambulance, helicopter, and transfers from another hospital. Non-system arrivals include private car and public transport such as police vehicles. It is evident from Table 8 that the percentage of non-trauma system arrivals decreases with distance from CHO. While one-third of patients who live less than 3 miles

from the trauma center arrive by car or public means, less than 10% of children who live 15 or more miles away come by non-trauma system transportation. Two factors may contribute to this pattern of use. First, a person may be less likely to call and wait for an ambulance when they live nearby and can drive the child directly to the trauma center. In addition, persons living closest to the trauma center may over-utilize it, because by not interacting with the trauma system (i.e. EMT's, paramedics etc.) patients with minor injuries are not diverted to more basic medical care.

In Table 9 is a comparison of the different modes of arrival and the rates of hospital admissions. The largest number of patients arrived by ambulance (69%), followed by private car (27%). Although only two patients in this study arrived by helicopter, the majority of patients who came by this means were from outside Alameda County.

Table 9. Comparison of Arrival Modes and Hospital Admissions.

	Number	% of Total	% Admitted
Ambulance	365	69%	45%
Private	142	27%	39%
Hosp. Transfer	17	3%	94%
Public	3	<1%	33%
Other	3	<1%	67%
Helicopter	2	<1%	100%

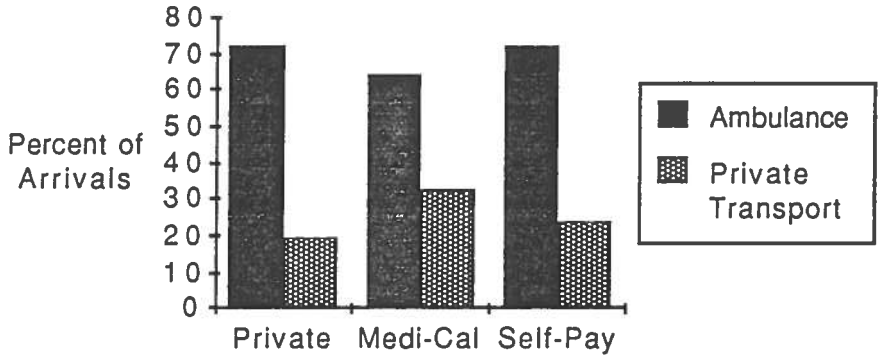
The trauma system arrivals, including ambulance, helicopter, and hospital transfer had the highest rates of admission, with an

overall average of 47% of patients admitted. The non-trauma-system arrivals averaged an admission rate of 39%. However, this difference in admission rates is not significant, and, indicates that many children in Alameda County with severe injuries are not accessing the trauma system.

The patients who were transferred from another hospital had the highest average ISS (13.7) followed by ambulance patients (5.1). Patients arriving by helicopter and private transportation had the lowest average ISS's of 3.5 and 3.9, respectively.

To evaluate if insurance coverage is a factor in determining the mode of arrival, the percentage of ambulance versus private transport arrivals was compared for private, Medi-Cal, and self-pay patients. (Figure 13)

Figure 13. Comparison of Arrival Modes Based on Type of Insurance.



Surprisingly, self-pay patients were just as likely as private patients to arrive by ambulance, despite the high cost of this service. This finding seems more puzzling when recalling that self-pay patients had a significantly lower average ISS and hospital admission rate than other patients. There was not a significant difference in

the average ISS of self-pay patients who arrived by ambulance versus those who came by private means (3.0 and 3.4 respectively).

Figure 13 seems to indicate that type of insurance is not an important factor in the decision of how to transport an injured child to the trauma center. However, it is not known how many injuries actually happened at home where a parent or caregiver would decide how to seek medical care. It is possible that many times the decision to call an ambulance is made without knowledge of the child's insurance status.

Socioeconomic Status

The mean household income for each zip code region in Alameda County was obtained from the 1980 Census. The lower and upper quartiles of patients were identified based on the mean household incomes for the zip code regions in which they lived. Thus, the lower 25% of regional mean income patients constituted a group of low SES, and the upper 25% of regional mean income patients were designated as a group of high SES. These two groups of patients are compared in Table 10.

Children from high SES areas were slightly more likely to arrive at the trauma center via the trauma system. Although not statistically significant, patients from high SES areas, on the average, had higher ISS's, and were more likely to be admitted than patients from low SES areas. The racial differences were striking especially for whites and blacks. Only 5% of low SES patients were white in contrast to 48% of patients of high SES. Blacks, however made up 79% of the low SES group but comprised just 35% of the patients

from high SES regions. The injury rates were dramatically different between the two groups, with the rate being eight times higher in the low SES areas than the high SES areas. This finding agrees with racial, geographical and insurance results.

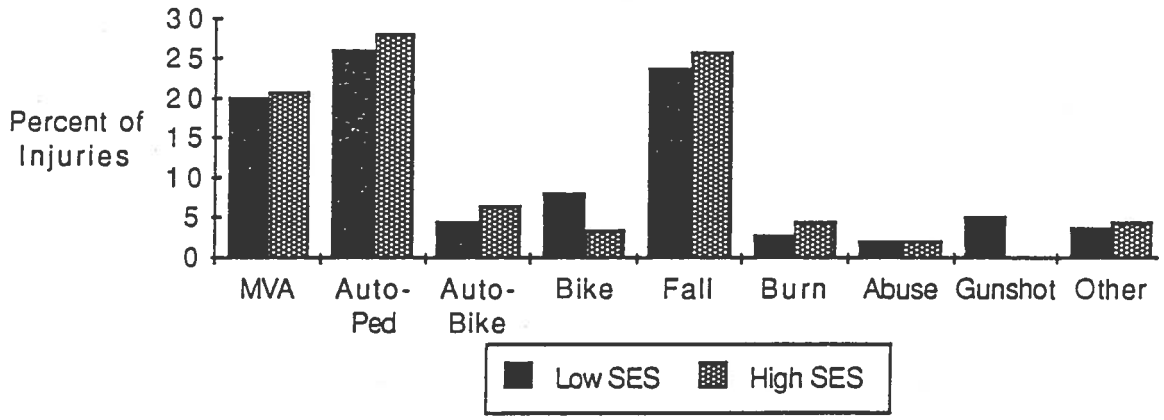
The insurance breakdown for low SES patients followed the expected pattern with a high proportion of Medi-Cal and self-pay patients. However, it is surprising that Medi-Cal patients would comprise 31% of the high SES group. Certainly, the zip code areas are not homogeneous in terms of socioeconomic factors, and the mean household income is just a rough approximation of the overall status of the region.

Table 10. Comparison of Patients of Low SES Versus High SES.

	Low SES	High SES
Avg. Mean Household Income	$12,209	$24,538
Arrival Mode		
Trauma system (p> 0.50)	71%	75%
Non Trauma system	29%	25%
Percent Admitted (p= 0.20)	41%	49%
Average ISS (p> 0.50)	4.92	5.43
Race		
% White	5%	48%
% Black	79%	35%
% Hispanic	8%	13%
%Asian	8%	4%
Insurance Type		
Private	20%	47%
Medi-Cal	50%	31%
Self-Pay	30%	22%
Injury Rate per 10,000 < 15 yr.	75.5	9.5

The frequencies of different injuries were remarkably similar between the two groups. (Figure 14) Children from low SES areas suffered proportionally more gunshot and bicycle injuries, while children from high SES areas suffered more auto-pedestrian and auto-bicycle injuries. However, in general there were no significant differences in the other injury types between the two groups. According to this study, then, socioeconomic status, as determined by mean household income of the zip code area, does not play an important role in predicting the type of injury suffered.

Figure 14. Types of Injuries in Low Versus High SES Groups.



V. DISCUSSION

In the population of 532 children seen at CHO trauma center in 1989, falls were the most frequent type of injury, followed closely by auto-pedestrian injuries. Falls were also the leading cause of injury in the Oakland Kaiser study done 35 years earlier. However auto-pedestrian injuries are now much more common than when the Kaiser study was performed. Nationwide, auto-pedestrian injuries are generally the leading cause of childhood injury.

Although not common injuries, burns and abuse constituted the most severe injuries and had the highest rates of hospital admissions.

The highest incidence of traumatic injuries occurred in the spring, and the lowest number in the summer. This may be a true reflection of injury patterns, suggesting that more injuries occur as children travel to and from school, or at school. However, it may also be an aberration because children are more likely to be out of the area on vacation during the summer.

MVA's were highest in the fall and winter months, possibly due to decreased daylight hours and poorer driving conditions. The proportion of falls and auto-pedestrian injuries were highest in the spring and summer, when children more often play outside, and windows are more likely to be left open. The incidence of abuse was lowest in the summer, possibly due to decreased recognition and reporting of abuse by school teachers and authorities.

The gender difference in number of injuries (65% males, 35% females) was more pronounced than that found in other studies. For example, the Kaiser study population was 52% males and 48%

females.[30] Similiarly, Bijur's large-scale study of injuries among British children found that between ages 5 and 10, the injury group was comprised of 52% boys, and 48% girls.[31]

There were no gender differences in injury severity, mortality rates, or hospital admission rates. Gender differences were noted in the types of injuries suffered. Boys had proportionally more falls, auto-pedestrian injuries, and bicycle mishaps. Girls had a much higher fraction of MVA's and abuse than did boys.

Children ages 5 to 9 had the highest number of injuries in the population. Younger children suffered more severe injuries than older children. Six of the seven trauma-related deaths occurred in children under age five. This finding agrees with mortality data reported in the literature which showed that injury death rates are highest among children less than one year, and death rates decrease among older children. [32]

The most frequent types of injuries varied by age group. Falls were the leading cause of injury among children less than five. Auto-pedestrian and auto-bicycle injuries were more common among children older than five. Children under one year suffered the highest incidence of abuse, and children ages 1 to 4 had the most burn injuries. The gender difference in number of injuries widened with increasing age of the child.

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[30]Manheimer DI, Dewey J, Mellinger GD, Corsa L: 50,000 Child-Years of Accidental Injuries. Public Health Reports, 1966; 81:519-32.

[31]Bijur P, Golding J, Haslum M, Kurzon M: Behavioral Predictors of Injury in School-Age Children. American Journal of Diseases of Children, 1988; 142:1307-12.

[32]Waller AE, Baker SP, Szocka A: Childhood Injury Deaths: National Analysis and Geographic Variations. American Journal of Public Health, 1989; 79:310-15.

Black children made up the largest percentage of the study population, far exceeding the racial makeup of Alameda County. In contrast, white children made up a much smaller fraction of the patient population than indicated by county demographics. On the average, blacks had the least severe injuries, and Asians had the most severe injuries. White children had the highest rate of hospital admissions, and blacks had the lowest. Falls were the leading cause of injury among all races except blacks, for whom auto-pedestrian injuries were most frequent. However, Asians suffered proportionally more falls than children of other races. MVA's accounted for 22-24% of injuries in all children except Asians, for whom MVA's made up just 13% of all injuries. Seventy three percent of cases of abuse occurred in black children.

Medi-Cal patients made up nearly one-half of the study population, with the remaining half being about equally self-pay and private coverage patients. In the fiscal year 1988-89, 3.2 million Californians, or 11.2% of the state's population were eligible for Medi-Cal.[33] In Alameda County, 11.6% of the population was eligible for Medi-Cal benefits. Comparing the insurance coverage of the children seen at the trauma center to state and county averages, it is clear the Medi-Cal patients are greatly over-represented in the study population. More than one-half of black and Asian children had Medi-Cal coverage. These patients suffered proportionally more abuse, falls, gunshots, and auto-pedestrian and auto-bicycle injuries.

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[33] Medi-Cal County Program Monthly Averages. FY 1988-89. Medi-Cal Reports. Dept. of Health Services.

Statewide, according to a 1986 Current Population Survey, 21% of Californians do not have health insurance.[34] When analyzed by race, Hispanics have the largest percentage of uninsured, about 37%, compared to appoximately 16% for blacks and whites. In this study, 25% of the children seen at the trauma center were uninsured, including 49% of the Hispanic children. On average, self-pay patients had the least severe injuries and the lowest rates of hospital admissions.

Within Alameda County, Emeryville had the highest age-specific injury rate, followed by Oakland and then Berkeley. Pleasanton had the lowest injury rate followed by Fremont, Newark, and Livermore. The highest injury rates occurred within a three mile radius of Children's Hospital, and the rates decreased according to distance from the trauma center. This trend appears to represent differences in utilization, as people living near CHO more frequently visit the trauma center. In a similar way, the percentage of non-trauma-system arrivals decreased with distance from the trauma center.

Nearly 70% of patients arrived at the trauma center by ambulance, with private transport being the second most frequent arrival mode. Importantly, hospitalization rates were not significantly different for trauma system arrivals versus non-trauma system arrivals. This finding indicates that the trauma system is missing some severely injured children, while also being heavily used by children with minor injuries.

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[34]Current Population Survey, March 1986.

In general, patients transferred from another hospital had the most severe injuries, while children brought in by private means had less severe injuries. Insurance status did not appear to be an important factor in deciding how to transport an injured child.

Children from low SES areas were slightly less likely to use the trauma system for transportation to the trauma center than children from high SES areas. Children of low SES areas also had lower injury severity scores, and were less often admitted to the hospital than children of high SES areas. Low SES patients were predominantly black and covered by Medi-Cal. High SES patients were mostly white and had private insurance. Age-specific injury rates were eight times higher in the low SES zip code areas than in high SES regions, probably reflecting the fact that low SES areas are closer to the hospital.

From the results of this study, some general trends were observed that enable some implications to be made about factors that influence the type and severity of injuries suffered, and the patterns of utilization of the trauma center.

Injury Type

Falls were the most common type of injury, and occurred most often in the summer months. Age showed a strong association, as children under age five suffered the greatest number of falls. Asian children and Medi-Cal patients had proportionally more falls than other children. Boys were slightly more likely than girls to suffer falls. SES did not appear to be an important factor in fall injuries.

Children ages 5 to 9 had proportionally more auto-pedestrian injuries than children of other ages, and most such injuries occurred in the spring and summer. Black and Asian children had the highest numbers of auto-pedestrian injuries. Gender was not a significant risk factor. Medi-Cal patients had the highest percentage of auto-pedestrian injuries, however, SES was not an important determinant in this study.

Being male and between the ages of 10 to 14 was associated with an increased incidence of auto-bicycle and bicycle injuries. The highest proportion of these injuries occurred in the summer. While private insurance patients had more auto-bicycle injuries, Medi-Cal patients had the highest proportion of other bicycle injuries.

Child abuse was strongly dependent on age, with children less than one year at the greatest risk of abuse. Being female, black and/or insured by Medi-Cal was also associated with higher incidence of abuse, though not as strongly correlated as age. With child abuse statistics, it is important to consider the effect of reporting bias, as physicians, teachers and other officials may have a higher suspicion of abuse with some kids, such as poor, black and young children. In this study, SES was not a determining factor, as equal number of abuse cases occurred in low and high SES groups.

Gunshot injuries occurred two times more often in boys than girls, and two-thirds of these injuries were suffered by black children. Ninty percent of gunshot victims were either Medi-Cal or self-pay patients. There was a strong correlation with SES, as half of gunshot injuries occurred in children from low SES areas, and none occurred in the high SES regions.

MVA's showed little variation with the factors studied, occurring with nearly equal frequency in all age groups, racial groups, and independently of insurance status or SES. Only gender played an important role in the incidence of MVA's, accounting for 35% of injuries in girls, but just 16% of injuries in boys. Since children are most often passenger victims, it remains to be studied why girls have more MVA injuries than boys. Perhaps girls are less often properly restrained in the vehicle than boys. It may also be that the proportion of MVA's is lower in boys because they more often suffer other types of injuries. However, in this study girls suffered more total MVA injuries as well as proportionally more MVA injuries.

Burn injuries showed little variation with gender, race, seasonality, insurance status, or SES. These results are in contrast to other studies which showed burns to be strongly associated with poverty. Only age appeared to be important, with children less than five having seven times more burn injuries than older children.

Injury Severity

Injury severity was gauged by the ISS calculated upon discharge from the trauma center. The average ISS for different subgroups of the population were then compared using statistical measures to identify important associations.

Injury severity was strongly associated with age of the child, with children less than one suffering the most severe injuries. The average ISS then decreased steadily with increasing age. An age bias should be considered, as injuries may be rated more severe in

infants and young children because of their small body size. However, studies on injury mortality have shown that younger children have higher death rates due to injury than older children.

Gender was not an important factor in injury severity, as boys and girls had very similar average severity scores.

The type of injury was a statistically significant factor in injury severity. Burns, abuse, and "other" injuries had the highest severity scores. MVA's, auto-bicycle, and bicycle injuries had the lowest average severity scores.

Race was a statistically important determinant of injury severity. Black children had the lowest average ISS, and Asian children had the highest scores. However, it is not clear whether there was an actual racial difference in the severity of injuries, or if this, instead, reflects racial differences in utilization. Both factors may be influencing the results seen in this study.

Injury severity also showed significant variation with insurance status, as private-pay patients had the highest average ISS and self-pay patients had the lowest. This is less an indication of injury severity than of utilization, as patients without a source of primary medical care may use the trauma center as a clinic for less severe injuries. This same pattern is seen with SES results, as children from low SES areas had a slightly lower average ISS than children from high SES areas.

In general, children who arrived at CHO via the trauma system had a higher average ISS than children who came by private transportation.

Hospital Admissions

The decision to admit a patient appears to be strongly linked to injury severity and the factors associated with it. The average ISS of admitted patients was 8.3 compared to 2.2 for non-admitted patients. Overall, 45% of patients seen at the trauma center were admitted for their injuries.

Private-pay patients had the highest admission rates, followed by Medi-Cal patients, with self-pay patients having the lowest rates of admission. This pattern directly followed the average ISS of the different insurance categories.

In a similar way, the types of injuries with the highest average ISS also had the highest hospital admission rates. Burn injuries, with an average ISS of 8.7, had a 100% admission rate. However, only 21% of MVA injuries (average ISS of 3.2) were admitted.

This trend was not so evident between racial groups. Although, on average, Asians had the most severe injuries, whites had the highest hospitalization rate. It is likely that insurance status is confounding these results, because Asians were proportionally more often Medi-Cal and self-pay patients than whites. Black children had both the lowest average ISS and the lowest admission rate.

Children arriving via the trauma system had nearly the same rate of admission as children arriving outside the system. This surprising finding indicates that many children with significant injuries are not accessing the trauma system, and/or the trauma system is being heavily used by children with minor injuries not requiring hospitalization. The trauma system appears to lack the

sensitivity and specificity to pick up the children who most need the critical care transportation to the trauma center.

Hospitalization of an injured child is clearly influenced by many conditions. Multivariate analysis is necessary to identify the most important factors affecting the hospital admission rates of the trauma center patients.

Utilization

Oakland Children's Hospital trauma center is the only trauma center in northern California dedicated to the care of critically injured children. Because it is a tertiary care center requiring 24-hour staffing by a wide variety of pediatric specialists, it is a very high cost operation. Because of its high cost and exclusiveness in the region, its patient population would be expected to be the most critically injured children from throughout the northern California region.

But, based on this study, the patient population is quite different than expected for a specialized critical care center. Eighty percent of the patients came from Alameda County, in which Children's hospital is located. Sixty-six percent lived within a 10 mile radius of the hospital, and 27 percent lived less than 3 miles away from the trauma center. Thus, there is very heavy utilization of the trauma center by local residents.

Overall, about 45% of the patients seen at the trauma center were admitted to Children's Hospital for their injuries. This means that over one-half of the injuries were not severe enough to necessitate hospitalization. It seems likely that many of these minor

injuries could have been treated in an outpatient clinic or basic emergency service. It is important to determine what factors influence the decision to bring an injured child to the trauma center. Possible reasons may include its close proximity; high level of trust in quality of care; previous good experience at CHO; no other options for medical care; or a lack of medical information about what constitutes a severe versus a minor injury. This last reason may be due to having no source of medical advice such as a clinic number to call, and may be complicated by language and cultural barriers.

Only two patients left the center against medical advice, which indicates that compliance with hospitalization was high on the part of the families, despite the high cost to uninsured or underinsured patients. In fact, utilization of the trauma center was very high by people who seem least able to afford it. Even more striking was the finding that patients with no insurance presented with the least severe injuries. The self-pay patients do not come to the trauma center only with catastrophically severe injuries, but with relatively minor injuries as well. This indicates that for many people there is no other alternative for medical care, and the trauma center serves as a clinic for treatment of mild injuries.

Utilization of the trauma center also varied greatly among different racial groups. Black children made up the majority of the patient population, followed by whites, then Hispanics, and Asians. The high fraction of black patients is probably a local/regional effect due to the predominantly black community in which the hospital is located. Black patients had the lowest average injury severity score,

and the lowest hospitalization rate indicating, again, high utilization for relatively minor injuries.

Insurance coverage alone does not adequately explain these findings. Fifty percent of both blacks and Asians had Medi-Cal coverage, and yet Asians made up a proportionally small fraction of the patient population. Furthermore Asian patients presented with the most severe injuries, on average, of all patients. In addition, one-half of Hispanic children had no insurance, and yet their average injury severity and hospitalization rates approached those of whites, who mostly had private insurance. Therefore, despite some similarities in insurance status, blacks had much higher utilization than the other racial groups. This may be a true reflection of a higher incidence of injuries in black children, or may be simply explained by the high local utilization of the trauma center.

By using mean household incomes of the zip code regions in Alameda county, socioeconomic status was assessed as a factor in utilization of the trauma center. The injury rate was eight times higher in the low SES areas than in the high SES areas. This finding is likely confounded by the regional variation in utilization, as many of the low SES zip code regions are in close proximity to CHO. In addition, 80% of the population was black in the low SES areas. Therefore, the effects of race and geographical location cannot be separated from the SES effect.

Limitations of Study

The focus of this study was the trauma patient ... his/her age, gender, race, the type and severity of injury, length of

hospitalization, type of insurance and area of residence. Many factors which likely influence the occurrence and severity of pediatric trauma were not included in this study. Some of these factors include sibling and family information, previous childhood injuries, level of adult supervision, and child behavioral characteristics. This study was not, therefore, an all-inclusive evaluation of the risk factors of pediatric trauma.

This study also focused on the trauma center and the makeup of patients who utilize it. While this center is heavily used by the local population, it would be important to characterize the patients who come from outside the local area to fully describe the patient population. By limiting the study group to Alameda County residents, it was intended to fully describe pediatric trauma in this community. However, it is clear from the results that the majority of patients come from a small area around the hospital, and therefore, these conclusions do not generally apply to outlying regions of the county.

No assessment was made of the patient's condition after discharge from the trauma center. Therefore, although mortality rates were very low for this population, it is not known what level of chronic morbidity and/or disability exists among these patients. Patient followup would be a vital part of any further study.

The evaluation of socioeconomic status used a very crude measure of zip code mean household incomes. Zip code areas are not homogeneous in terms of socioeconomic factors, and mean household income is a very rough approximation of the overall status of the region. In addition, the census data on mean household incomes was

10 years old, and major demographic shifts would certainly be expected during this time.

Finally, to fully assess the individual impact of each of the factors studied, it would be necessary to control for the confounding influence of the variables on one another. For instance, it is evident from the results that insurance status, race and socioeconomic status are interrelated. Multiple regression analysis is needed to determine which factors most strongly predict the type and severity of injuries suffered, and the clinical course and outcome of the patient.

APPENDIX

RECORD NUMBER	HOSPITAL NUMBER	PATIENT AGE IN YEARS	PATIENT GENDER	MODE OF ARRIVAL	MECHANISM OF INJURY	PATIENT HOME ZIP	MEAN INCOME	DATE OF ARRIVAL	PATIENT RACE	DAYS IN HOSPITAL	INJURY SEVERITY SCORE	PATIENT OUTCOME	PAY SOURCE
1	427372	6	2	1	7	94608	14052	20-Mar-89	2	0	0	1	3
2	427720	14	1	1	14	94601	14697	26-Mar-89	2	0	1	4	3
3	291470	14	1	1	13	94702	14492	25-Mar-89	2	0	1	1	2
4	420556	2	1	1	7	94621	12992	20-Mar-89	2	0	1	1	2
5	424103	11	2	3	7	94605	21499	30-Jan-89	2	2	10	1	1
6	299836	8	1	1	2	94606	14308	26-Jan-89	2	3	10	1	2
7	254086	12	2	1	7	94703	15551	20-Mar-89	2	0	0	1	1
8	426407	5	2	1	1	94603	14754	04-Mar-89	2	0	0	1	1
9	424604	1.167	1	1	1	94606	14308	13-Mar-89	2	0	1	1	2
11	410150	4	2	5	1	94602	22939	19-Mar-89	1	0	1	1	1
13	303601	10	2	1	2	94605	21499	07-Mar-89	2	0	5	1	2
14	426207	14	1	3	10	94705	25535	01-Mar-89	1	0	5	1	1
15	426967	3	2	1	1	94606	14308	13-Mar-89	8	0	1	1	3
16	288053	14	1	1	5	94707	32748	26-Mar-89	1	0	5	1	1
19	427871	6	2	1	2	94612	9985	28-Mar-89	2	0	1	1	3
20	422258	0.667	1	3	7	94602	22939	17-Mar-89	5	0	5	1	2
21	422417	9	2	1	2	94611	29731	04-Jan-89	1	3	10	1	1
22	243928	14	2	1	1	94607	10931	13-Jan-89	2	0	10	1	2
23	240694	13	1	1	2	94603	14754	15-Jan-89	2	7	14	1	2
24	347044	5	2	3	7	94602	22939	05-Jan-89	3	2	9	1	2
25	423134	12	1	3	12	94609	12354	15-Jan-89	2	0	1	1	2
26	423023	3	2	1	14	94611	29731	13-Jan-89	1	1	9	1	1
30	422630	1.250	1	3	1	94611	29731	08-Jan-89	1	0	10	1	3
31	315326	9	1	3	5	94607	10931	14-Jan-89	2	0	1	1	2
32	423522	4	1	1	2	94501	21455	21-Jan-89	7	3	17	1	1
35	399252	1.333	1	3	7	94603	14754	28-Jan-89	3	0	2	1	2
38	422317	12	1	1	3	94501	21455	03-Jan-89	5	3	5	1	1
39	378457	3	2	1	7	94586	32051	12-Jan-89	1	1	5	1	1
41	422352	12	1	1	5	94541	20680	03-Jan-89	1	2	5	1	2
42	379856	12	1	1	7	94702	14492	11-Jan-89	2	2	5	1	2

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43	276345	10	2	1	1	94608	14052	15-Jan-89	2	1	12	1	2
44	402742	1.667	1	3	7	94609	12354	20-Jan-89	2	1	2	1	2
45	422822	8	1	1	2	94501	21455	10-Jan-89	1	0	2	1	2
46	322610	8	2	1	1	94611	29731	10-Jan-89	1	0	1	1	1
47	423979	10	1	1	3	94606	14308	27-Jan-89	3	0	5	1	3
48	423437	9	2	1	1	94544	20819	20-Jan-89	3	0	2	1	3
49	423434	9	1	1	1	94544	20819	20-Jan-89	3	0	5	1	3
50	394975	7	1	3	1	94612	9985	17-Jan-89	2	0	1	7	2
51	422631	14	2	1	1	94609	12354	08-Jan-89	1	0	1	1	3
52	279403	12	1	1	7	94621	12992	30-Jan-89	2	0	5	1	1
53	305984	8	1	1	1	94608	14052	21-Jan-89	2	0	1	9	3
54	423119	11	2	1	1	94601	14697	15-Jan-89	2	0	2	1	3
57	423313	7	1	1	2	94619	23798	18-Jan-89	7	0	1	1	3
59	423122	4	2	1	1	94610	21468	15-Jan-89	2	0	1	1	3
60	423121	6	1	1	1	94610	21468	15-Jan-89	2	0	1	1	3
61	421964	1.667	1	1	7	94601	14697	29-Jan-89	1	0	1	1	2
62	422646	12	1	1	1	94609	12354	08-Jan-89	6	0	1	1	3
63	423091	1.667	1	1	9	94501	21455	14-Jan-89	1	8	4	1	1
64	420288	0.250	1	1	9	94621	12992	02-Jan-89	2	1	0	1	3
67	366549	4	2	1	7	94608	14052	24-Jan-89	2	0	1	1	3
69	421022	1.500	1	3	7	94609	12354	20-Jan-89	2	3	2	1	2
70	423474	4	2	1	2	94605	21499	24-Jan-89	2	0	1	1	3
71	326382	6	2	1	3	94603	14754	28-Jan-89	2	0	5	1	2
72	423654	8	1	3	5	94607	10931	23-Jan-89	3	1	9	1	3
73	401176	4	1	1	12	94609	12354	30-Jan-89	2	0	1	1	1
75	424346	5	2	3	1	94608	14052	31-Jan-89	3	0	1	1	3
77	424985	0.083	1	3	7	94709	17009	12-Feb-89	2	0	2	1	3
79	426162	0.833	2	1	1	94607	10931	28-Feb-89	8	0	0	1	3
80	424789	10	2	1	2	94609	12354	08-Feb-89	6	0	1	1	1
81	425085	1.833	1	1	8	94619	23798	13-Feb-89	1	1	0	1	1

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82	425978	0.083	2	1	10	94608	14052	25-Feb-89	3	1	9	2	1
83	260750	12	1	1	14	94601	14697	28-Feb-89	2	0	5	1	2
85	397604	1.667	1	1	9	94621	12992	22-Jan-89	2	12	25	1	2
86	424794	5	2	1	1	94544	20819	08-Feb-89	1	0	2	1	1
88	424793	12	2	1	1	94544	20819	08-Feb-89	1	1	6	1	1
90	297776	10	1	1	2	94608	14052	23-Feb-89	2	0	1	1	2
91	426001	8	1	1	3	94621	12992	26-Feb-89	3	0	1	1	3
92	315488	14	1	1	10	94606	14308	25-Feb-89	3	0	2	1	3
93	315349	8	1	1	11	94606	14308	21-Feb-89	2	0	1	1	2
94	400421	1.583	2	3	1	94605	21499	20-Feb-89	2	0	1	1	1
97	290196	10	1	1	3	94602	22939	12-Feb-89	1	0	1	1	2
98	326410	6	2	1	12	94603	14754	01-Jan-89	2	0	1	1	2
99	426078	0.667	2	1	12	94603	14754	27-Feb-89	2	0	1	1	2
100	402505	13	1	1	2	94612	9985	22-Feb-89	2	0	10	1	2
101	424927	0.500	1	3	7	94710	13608	10-Feb-89	1	0	10	1	2
102	330891	0.167	2	3	5	94705	25535	24-Feb-89	1	0	10	1	1
105	392937	1.750	2	1	7	94612	9985	28-Jan-89	1	2	10	1	2
107	425351	1	2	1	10	94606	14308	16-Feb-89	2	5	14	9	2
109	411351	0.083	1	1	2	94546	26142	20-Feb-89	1	5	6	1	2
110	246254	13	1	3	7	94603	14754	21-Feb-89	2	0	1	1	2
111	425747	14	1	1	3	94580	24494	22-Feb-89	1	0	5	1	3
112	425464	4.083	1	1	2	94501	21455	17-Feb-89	1	0	5	1	3
113	425668	0.500	2	1	1	94541	20680	21-Feb-89	1	2	10	1	1
114	425913	12.083	1	6	7	94541	20680	24-Feb-89	3	0	9	1	3
115	408381	6	1	4	12	94606	14308	11-Feb-89	3	0	1	1	3
117	407491	3	1	1	14	94606	14308	21-Feb-89	5	1	75	5	2
118	425765	0.750	2	3	7	94605	21499	22-Feb-89	2	0	9	1	2
119	425962	2	1	3	2	94606	14308	25-Feb-89	5	0	4	1	2
120	425465	3.083	1	1	2	94501	21455	17-Feb-89	1	0	5	1	2
121	254546	12	1	1	5	94609	12354	09-Feb-89	2	0	1	1	2

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124	352502	7	1	1	1	94703	15551	28-Feb-89	2	0	0	1	2
127	425031	10	1	1	7	94587	24923	13-Feb-89	2	1	0	2	1
128	377952	4	2	1	9	94601	14697	14-Feb-89	4	5	11	1	2
129	371987	5.083	1	1	1	94606	14308	18-Feb-89	7	3	14	1	2
130	382843	3	1	1	1	94606	14308	18-Feb-89	7	3	3	1	2
131	425510	14	1	3	1	94606	14308	18-Feb-89	7	0	4	1	2
132	283478	10	1	1	11	94621	12992	03-Mar-89	2	0	2	1	3
133	427098	0.083	1	1	10	94603	14754	15-Mar-89	2	1	0	1	2
134	357281	4	2	3	10	94601	14697	08-Mar-89	2	2	4	1	2
135	388631	2	1	3	5	94710	13608	21-Mar-89	2	0	1	1	2
136	423518	11	1	1	3	94602	22939	21-Jan-89	3	0	1	1	1
137	423873	2	1	1	7	94601	14697	26-Jan-89	1	1	2	1	1
141	424799	1.417	1	1	9	94605	21499	08-Feb-89	2	5	4	1	1
142	427177	2	1	1	7	94545	23873	16-Mar-89	1	3	5	1	2
143	427095	2	2	1	1	94587	24923	15-Mar-89	1	2	5	1	2
144	426686	3	1	1	7	94544	20819	08-Mar-89	1	2	5	1	1
145	427933	0.417	1	1	7	94550	25996	29-Mar-89	1	0	9	2	1
146	427438	0.417	2	3	10	94578	20118	21-Mar-89	1	1	9	1	1
147	298261	6	2	1	7	94611	29731	25-Mar-89	1	2	10	1	1
148	426328	8	1	1	2	94705	25535	02-Mar-89	1	3	10	1	1
150	406029	1.083	2	1	7	94621	12992	25-Feb-89	5	5	17	1	2
151	405052	5	2	1	2	94603	14754	22-Feb-89	2	22	22	9	2
152	368859	3	1	1	2	94601	14697	17-Mar-89	2	0	1	1	2
156	427620	6	1	1	2	94601	14697	24-Mar-89	3	0	0	1	2
157	427065	11	1	1	7	94603	14754	15-Mar-89	2	1	1	1	2
159	414541	3	1	1	7	94601	14697	16-Mar-89	2	1	1	1	2
160	283047	13	2	1	7	94710	13608	20-Mar-89	2	0	0	1	2
161	427500	4	2	1	7	94602	22939	22-Mar-89	3	0	5	1	3
162	426537	8	2	1	2	94601	14697	06-Mar-89	1	3	5	1	3
164	323577	9	1	1	2	94536	25928	07-Mar-89	1	3	5	1	1

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165	427724	12	1	1	2	94621	12992	26-Mar-89	2	0	9	1	1
166	426625	3	2	1	7	94607	10931	07-Mar-89	2	6	10	9	3
167	427290	6	1	1	1	94602	22939	19-Mar-89	1	2	16	1	1
168	425653	5	2	1	7	94541	20680	21-Feb-89	1	21	9	1	1
169	387370	2	1	3	2	94609	12354	19-Mar-89	2	3	10	1	2
170	426388	4	2	1	2	94603	14754	03-Mar-89	2	25	14	1	1
171	384984	9	1	1	3	94544	20819	24-Mar-89	2	0	2	1	1
172	348067	5	1	1	2	94609	12354	28-Mar-89	2	0	1	1	2
173	427886	9	2	1	1	94545	23873	29-Mar-89	1	0	1	1	1
174	427887	12	2	1	1	94545	23873	29-Mar-89	1	0	1	1	1
176	422375	6	1	1	1	94601	14697	04-Jan-89	2	0	1	1	1
177	383074	2	2	1	7	94601	14697	20-Mar-89	5	1	1	1	2
178	393424	10	1	1	3	94603	14754	17-Mar-89	2	0	2	1	2
179	296092	8	2	1	1	94609	12354	05-Mar-89	2	0	1	1	1
180	327928	10	2	1	1	94609	12354	05-Mar-89	2	0	1	1	1
181	384398	5	2	1	1	94609	12354	05-Mar-89	2	0	5	1	1
184	274812	10	2	3	1	94603	14754	18-Mar-89	2	0	2	1	2
186	375139	3	1	1	7	94607	10931	13-Mar-89	5	10	17	1	2
187	304122	9	2	3	14	94603	14754	10-Mar-89	2	13	16	1	2
189	311075	7	2	1	12	94607	10931	06-Apr-89	2	2	1	1	2
190	385059	2	1	1	9	94605	21499	16-Mar-89	2	4	1	1	2
191	423694	9	1	1	9	94606	14308	24-Jan-89	7	3	1	2	1
195	364632	4	2	3	2	94621	12992	04-Apr-89	3	0	1	1	3
196	325544	7	2	1	2	94607	10931	05-Apr-89	2	0	1	1	3
197	379241	3	1	1	2	94601	14697	08-Apr-89	2	2	2	1	2
199	428123	14	1	1	1	94621	12992	01-Apr-89	2	0	14	2	1
200	328203	7	1	3	12	94601	14697	04-Apr-89	3	0	1	1	3
201	413537	9	1	1	1	94608	14052	02-Apr-89	2	0	1	1	2
202	277599	14	2	1	11	94546	26142	05-Apr-89	1	1	9	1	1
203	428384	14	1	1	2	94702	14492	06-Apr-89	2	0	1	1	1

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204	428207	0.917	1	1	1	94602	22939	03-Apr-89	1	0	1	1	3
205	303343	11	1	1	7	94544	20819	15-Mar-89	1	19	21	1	2
207	378714	3	1	1	7	94607	10931	12-Apr-89	2	4	5	1	2
209	428446	3	1	1	7	94601	14697	07-Apr-89	2	0	1	1	1
210	389410	2	1	1	7	94607	10931	11-Apr-89	2	0	5	1	2
211	375249	5	1	1	7	94578	20118	12-Apr-89	1	0	1	1	1
212	350644	4	1	1	2	94609	12354	22-Apr-89	2	1	1	1	2
216	423241	10	2	3	3	94702	14492	19-Apr-89	1	0	1	1	1
217	411027	1	2	1	1	94578	20118	19-Apr-89	1	0	0	1	1
220	382290	5	1	3	2	94605	21499	01-Apr-89	2	0	1	1	3
221	351665	4	1	3	5	94610	21468	07-Apr-89	2	0	1	1	3
223	428002	5	1	1	3	94501	21455	30-Mar-89	1	5	10	1	1
225	361701	4	1	1	7	94605	21499	22-Apr-89	2	1	2	1	2
227	429446	8	2	1	7	94707	32748	23-Apr-89	8	1	5	2	1
231	332069	9	1	1	3	94703	15551	21-Apr-89	1	1	5	1	1
233	425493	8	2	1	1	94606	14308	18-Feb-89	7	21	10	1	2
234	342272	6	1	3	7	94602	22939	26-Apr-89	5	0	5	1	2
235	428794	0.333	2	1	1	94609	12354	12-Apr-89	2	0	1	1	3
236	428817	1.583	1	3	7	94601	14697	12-Apr-89	3	1	1	1	3
237	429230	7	1	1	2	94603	14754	19-Apr-89	2	1	3	1	1
238	316540	7	1	1	2	94605	21499	13-Apr-89	2	0	2	1	2
240	429424	9	2	1	7	94707	32748	22-Apr-89	1	0	5	1	1
242	428950	7	1	1	2	94577	21982	14-Apr-89	7	2	6	1	2
243	403216	1.583	2	3	9	94603	14754	09-Apr-89	2	7	4	1	1
244	316118	12	1	1	7	94608	14052	24-Apr-89	2	3	6	1	2
249	289329	9	2	1	1	94605	21499	03-Apr-89	2	0	1	1	3
251	427988	12	1	1	5	94542	27965	30-Mar-89	7	3	6	1	2
252	428548	7	2	1	2	94706	19819	08-Apr-89	2	1	5	1	1
253	249255	13	2	1	2	94607	10931	07-Apr-89	2	1	2	1	3
255	326340	6	1	1	2	94621	12992	25-Apr-89	2	0	1	1	2

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256	327367	8	2	1	2	94605	21499	29-Apr-89	2	0	1	1	2
263	392171	2	1	3	2	94612	9985	01-May-89	2	0	1	1	2
265	329871	8	1	3	7	94710	13608	12-May-89	2	1	2	1	2
266	335861	6	1	1	2	94606	14308	17-May-89	2	0	4	1	2
267	385537	14	2	4	10	94603	14754	07-May-89	2	1	12	1	1
269	431459	8	1	1	3	94602	22939	28-May-89	1	0	1	1	1
270	430996	10	1	1	3	94606	14308	19-May-89	2	0	2	1	3
271	385822	2	2	3	2	94621	12992	29-May-89	2	0	1	1	3
273	430228	0.020	1	3	10	94621	12992	06-May-89	2	2	1	1	3
274	430359	2	2	1	7	94609	12354	08-May-89	7	1	4	1	3
275	384603	3	2	1	7	94621	12992	27-May-89	2	0	5	1	2
276	394766	2	1	1	7	94609	12354	03-May-89	2	0	1	1	2
277	378086	3	2	1	2	94608	14052	06-May-89	2	1	1	1	2
278	263523	14	2	1	1	94609	12354	26-May-89	2	0	0	1	2
280	430618	0.833	2	1	7	94601	14697	12-May-89	3	0	1	1	2
282	431002	5	1	3	7	94710	13608	19-May-89	8	0	1	1	1
283	422948	1.250	1	3	7	94607	10931	03-May-89	2	0	0	1	2
284	339478	5	1	1	2	94606	14308	02-May-89	2	0	1	1	2
285	267724	11	1	1	2	94702	14492	12-May-89	2	0	1	1	1
286	290812	9	1	1	2	94605	21499	03-May-89	2	0	5	1	2
287	341599	5	2	1	2	94601	14697	30-May-89	2	0	1	1	2
288	305742	8	2	1	2	94605	21499	11-May-89	2	0	1	1	3
289	430355	10	1	1	3	94611	29731	08-May-89	1	0	1	1	3
290	430748	11	1	1	2	94619	23798	15-May-89	8	0	1	1	3
291	280149	10	1	1	3	94606	14308	11-May-89	2	0	1	1	3
293	430569	4	2	1	1	94577	21982	12-May-89	8	0	4	1	1
294	388533	11	2	1	2	94710	13608	23-May-89	2	0	1	1	1
295	430558	4	2	1	2	94501	21455	11-May-89	1	4	5	1	1
296	415159	0.750	1	3	7	94621	12992	21-May-89	2	1	5	1	2
297	430371	6	2	1	1	94544	20819	08-May-89	3	1	2	1	1

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298	431223	8	1	1	7	94603	14754	23-May-89	2	1	2	1	3
299	430641	9	1	1	6	94578	20118	13-May-89	7	0	2	1	3
300	256596	12	1	1	5	94601	14697	28-May-89	3	0	5	1	3
301	293324	10	1	3	7	94602	22939	06-May-89	2	0	1	1	1
303	252615	13	2	1	1	94621	12992	01-May-89	2	0	1	1	2
304	419872	0.583	1	3	7	94603	14754	25-May-89	2	0	5	1	2
306	427729	9	1	1	3	94709	17009	01-Mar-89	3	0	1	1	3
307	425756	4	1	2	2	94539		22-Feb-89	1	1	2	1	1
310	316396	13	1	1	7	94608	14052	24-Jan-89	2	3	1	1	3
312	428334	1.167	2	1	9	94621	12992	05-Apr-89	3	8	39	1	1
313	430453	8	1	6	12	94568		10-May-89	1	8	29	2	1
315	282426	10	1	1	14	94607	10931	14-May-89	2	0	1	1	2
317	430226	7	1	1	14	94566	29619	05-May-89	1	1	8	1	1
318	277452	11	1	1	14	94621	12992	05-May-89	2	1	5	1	1
319	400663	2	1	3	14	94605	21499	26-May-89	2	1	1	1	2
321	430287	3	2	1	2	94601	14697	07-May-89	3	1	1	1	3
326	429573	3	2	1	2	94606	14308	25-Apr-89	6	6	43	2	2
327	431407	6	1	1	7	94537		26-May-89	1	4	17	1	1
328	431463	3	1	1	7	94577	21982	28-May-89	1	2	17	1	1
329	430818	0.083	2	3	10	94608	14052	16-May-89	2	1	0	1	1
330	272602	11	1	1	14	94621	12992	09-May-89	2	0	4	1	2
332	432686	0.667	1	1	1	94601	14697	16-Jun-89	3	0	1	1	3
335	433348	10	2	1	1	94603	14754	27-Jun-89	3	0	1	1	3
336	432436	9	1	1	2	94606	14308	13-Jun-89	2	0	5	1	2
337	431829	0.167	1	1	1	94702	14492	02-Jun-89	2	0	1	1	3
338	433154	0.583	1	3	7	94501	21455	23-Jun-89	1	1	5	1	2
340	417860	0.583	2	3	10	94703	15551	13-May-89	2	0	5	1	2
344	429202	4	1	3	10	94619	23798	19-Apr-89	2	23	4	9	2
348	337453	5	1	1	9	94606	14308	24-May-89	3	2	1	1	2
351	356373	5	2	1	2	94607	10931	09-Jun-89	2	3	10	1	2

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352	431985	8	1	1	3	94577	21982	05-Jun-89	1	4	19	1	1
353	402544	5	1	1	1	94587	24923	28-May-89	3	7	21	1	3
354	431270	5	1	1	2	94621	12992	24-May-89	2	7	13	1	1
355	433067	4	1	1	7	94538	27994	22-Jun-89	1	0	9	1	1
356	330369	7	1	3	7	94606	14308	20-Jun-89	3	2	9	1	2
357	403814	1.583	2	3	10	94619	23798	20-May-89	2	0	9	1	2
358	432682	1.917	2	5	14	94536	25928	16-Jun-89	1	5	20	1	1
361	431514	11	2	1	2	94607	10931	30-May-89	2	4	14	1	2
362	433179	1.167	2	1	7	94546	26142	24-Jun-89	3	1	2	1	2
363	349470	6	1	1	7	94603	14754	06-Jun-89	2	1	5	1	2
364	410107	1.167	1	3	7	94608	14052	05-Jun-89	2	3	1	1	1
365	361909	5	1	1	1	94603	14754	06-Jun-89	2	0	1	1	3
366	352853	5	2	1	2	94621	12992	15-Jun-89	2	3	9	1	2
367	432063	0.833	2	1	1	94605	21499	06-Jun-89	2	0	0	1	2
368	432062	1	1	1	1	94603	14754	06-Jun-89	2	0	2	1	3
374	432447	2	1	1	2	94587	24923	13-Jun-89	3	0	1	1	3
376	433005	14	1	1	3	94606	14308	22-Jun-89	5	0	5	1	3
377	350233	5	1	1	2	94602	22939	08-Jun-89	3	1	1	1	2
378	322371	7	1	1	4	94609	12354	16-Jun-89	2	0	0	1	2
380	432066	0.750	1	1	9	94560	27215	06-Jun-89	1	1	4	1	2
381	433651	2	1	5	7	94705	25535	02-Jul-89	1	1	9	1	1
382	433968	6	1	1	2	94621	12992	07-Jul-89	2	1	14	2	1
383	434033	0.083	2	3	7	94501	21455	08-Jul-89	1	1	9	1	1
384	433658	7	2	3	6	94605	21499	02-Jul-89	2	11	9	1	1
385	433622	0.417	1	1	1	94541	20680	01-Jul-89	3	10	50	2	2
387	366600	5	2	1	2	94608	14052	24-Jun-89	2	18	10	1	2
388	433660	13	1	1	2	94587	24923	02-Jul-89	1	1	10	2	1
389	433617	12	1	1	5	94568		01-Jul-89	1	1	5	1	1
390	276099	11	2	1	1	94603	14754	06-Jun-89	2	0	1	1	3
392	432252	2	1	1	1	94621	12992	09-Jun-89	5	1	1	1	3

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394	431755	10	1	1	3	94544	20819	01-Jun-89	1	0	9	2	1
395	433591	3	2	1	7	94577	21982	30-Jun-89	3	1	5	1	3
396	433629	11	2	3	1	94703	15551	01-Jul-89	2	1	0	1	1
397	433584	2	1	1	7	94608	14052	30-Jun-89	2	1	1	1	2
398	289544	9	1	3	7	94601	14697	23-May-89	2	1	2	1	2
399	332423	0.583	2	3	2	94611	29731	08-May-89	2	0	5	1	2
400	427692	2	2	3	14	94601	14697	24-Mar-89	2	5	8	1	2
401	422120	6	2	1	1	94544	20819	07-Jan-89	3	0	1	1	1
402	264891	13	1	3	7	94621	12992	14-Jan-89	2	0	5	1	1
403	343435	0.417	1	3	7	94608	14052	28-Jan-89	2	1	2	1	2
404	353289	8	1	1	3	94601	14697	27-Feb-89	3	0	5	1	3
405	265390	11	1	4	10	94702	14492	27-Mar-89	2	0	2	10	2
406	272554	11	2	1	1	94605	21499	03-Apr-89	2	0	1	1	1
407	312459	7	1	1	2	94609	12354	06-Apr-89	2	0	1	1	2
408	427221	1.333	1	3	9	94560	27215	17-Mar-89	3	14	1	1	3
409	410332	1.250	2	1	9	94621	12992	13-Mar-89	4	6	4	1	1
411	246531	13	1	1	12	94621	12992	17-Mar-89	2	2	5	1	2
412	285252	10	1	3	7	94601	14697	14-Apr-89	3	3	10	1	2
413	393660	14	1	1	5	94601	14697	09-Apr-89	3	4	10	1	1
414	248285	13	1	1	2	94605	21499	26-May-89	2	5	10	1	2
415	312066	8	1	1	14	94621	12992	09-Apr-89	2	23	9	1	2
416	398869	5	2	1	7	94605	21499	07-May-89	2	5	9	1	2
417	374304	3	1	1	2	94612	9985	22-May-89	2	5	19	1	2
418	433297	11	1	1	3	94710	13608	26-Jun-89	2	2	14	1	1
419	432696	9	2	3	12	94606	14308	16-Jun-89	5	0	1	1	2
420	430313	3	1	1	2	94544	20819	08-May-89	2	4	19	1	2
421	434037	0.583	2	1	7	94612	9985	08-Jul-89	2	2	35	6	3
423	32577D	6	1	1	2	94603	14754	07-Jun-89	2	21	26	1	2
424	432545	5	1	1	2	94538	27994	14-Jun-89	1	21	29	1	1
426	391541	6	1	3	14	94501	21455	01-Feb-89	7	0	1	1	3

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427	410401	2	2	3	7	94619	23798	28-Aug-89	2	3	9	1	1
428	348904	5	2	3	7	94607	10931	28-Aug-89	2	0	4	1	2
429	436001	0.167	2	3	7	94546	26142	25-Aug-89	1	0	4	2	2
431	354938	9	2	1	3	94621	12992	24-Aug-89	2	1	5	1	1
432	435692	0.750	2	3	7	94609	12354	20-Aug-89	8	0	1	1	3
433	435091	14	1	3	2	94610	21468	06-Aug-89	2	0	5	1	1
434	435928	8	1	3	12	94607	10931	24-Aug-89	2	0	2	2	3
437	323207	7	1	3	2	94619	23798	22-Aug-89	2	0	0	1	2
438	405134	7	1	1	7	94605	21499	31-Jul-89	2	1	5	1	2
440	372573	5	1	1	2	94605	21499	24-Aug-89	3	0	10	1	3
441	434576	6	2	1	2	94606	14308	23-Jul-89	5	23	9	1	2
442	326380	8	1	1	5	94607	10931	24-Aug-89	2	7	16	1	2
443	435104	6	1	1	3	94501	21455	06-Aug-89	6	23	10	1	1
444	319331	7	1	3	3	94609	12354	01-Aug-89	2	0	1	1	2
445	433802	13	1	1	1	94544	20819	05-Jul-89	1	2	5	1	1
446	434258	14	1	1	14	94621	12992	13-Jul-89	1	1	5	1	3
447	433911	13	1	1	5	94545	23873	06-Jul-89	6	1	5	1	1
448	365094	9	1	1	7	94601	14697	03-Jul-89	5	2	5	1	2
449	432671	13	1	1	2	94536	25928	16-Jun-89	1	0	1	1	1
451	411188	6	1	3	9	94608	14052	05-Jul-89	7	5	2	1	3
452	431673	0.667	1	1	8	94608	14052	31-May-89	2	0	0	4	2
453	285301	12	2	3	6	94501	21455	15-Sep-89	1	0	4	1	3
455	340952	6	1	1	1	94577	21982	12-May-89	2	1	2	1	1
456	364952	4	1	1	7	94606	14308	07-May-89	2	1	5	1	2
457	343457	6	1	3	7	94603	14754	28-May-89	2	1	5	1	2
459	436251	0.500	1	1	9	94545	23873	01-Sep-89	7	7	1	1	2
462	415598	13	1	3	10	94606	14308	11-Sep-89	2	3	6	1	2
463	405143	2	1	3	2	94621	12992	25-Sep-89	3	0	1	1	1
465	413840	14	1	3	10	94608	14052	22-Sep-89	2	0	1	1	2
466	437114	2	1	1	5	94609	12354	20-Sep-89	2	1	4	1	1

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467	305015	9	1	1	2	94621	12992	11-Sep-89	2	1	6	1	3
468	402545	1.917	2	3	5	94601	14697	27-Sep-89	3	2	1	1	3
469	429045	0.500	2	1	2	94621	12992	25-Sep-89	2	2	5	1	2
471	407979	13	2	1	1	94603	14754	03-Sep-89	3	0	1	1	3
473	437263	9	2	1	1	94710	13608	23-Sep-89	2	0	2	1	1
474	437456	3	2	1	1	94612	9985	26-Sep-89	1	0	1	1	3
477	436512	11	1	1	7	94607	10931	07-Sep-89	2	4	10	1	3
478	437464	1.917	1	1	2	94577	21982	26-Sep-89	1	1	9	1	3
480	437674	5	1	3	12	94607	10931	29-Sep-89	2	0	1	1	2
482	422089	0.833	1	3	7	94601	14697	13-Sep-89	3	0	1	1	2
483	368743	4	1	3	7	94606	14308	22-Sep-89	3	0	2	1	2
484	299284	10	2	1	2	94710	13608	25-Sep-89	2	2	5	1	3
485	437668	10	1	1	3	94610	21468	29-Sep-89	1	0	1	1	1
486	436636	10	2	1	2	94602	22939	15-Sep-89	1	0	1	1	3
487	436323	0.083	1	1	1	94621	12992	03-Sep-89	2	1	1	1	3
488	385117	6	1	1	2	94608	14052	13-Sep-89	2	1	0	1	2
489	359087	4	1	3	1	94610	21468	17-Sep-89	3	0	1	1	2
490	357341	6	1	3	1	94610	21468	17-Sep-89	3	0	1	1	2
491	382432	3	1	6	7	94602	22939	07-Sep-89	1	1	1	1	1
492	381543	4	1	1	2	94609	12354	11-Sep-89	2	0	2	1	2
493	436324	10	1	6	3	94609	12354	03-Sep-89	2	6	0	1	3
494	321656	8	2	3	7	94608	14052	04-Sep-89	2	0	1	1	2
495	437240	12	1	1	10	94604	16387	22-Sep-89	5	0	5	1	3
497	436319	8	2	1	1	94621	12992	03-Sep-89	3	0	1	1	3
498	411940	14	1	1	5	94707	32748	29-Sep-89	1	0	1	1	1
499	334248	6	2	1	7	94619	23798	12-Sep-89	2	9	5	1	1
500	435147	6	2	1	2	94621	12992	07-Aug-89	2	37	26	1	2
501	397433	3	2	6	2	94601	14697	22-Jul-89	2	1	4	1	2
502	432637	14	1	1	1	94710	13608	15-Jun-89	2	25	10	2	2
503	313844	8	1	6	12	94601	14697	10-Sep-89	3	36	16	1	2

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504	364624	4	2	3	1	94602	22939	21-Jun-89	2	0	1	1	2
505	264333	11	1	1	3	94601	14697	25-Jun-89	2	0	0	1	2
506	409739	3	1	1	1	94606	14308	08-Jun-89	2	0	1	1	1
507	334307	6	1	1	2	94606	14308	10-Jun-89	2	0	1	1	2
508	307751	8	1	1	2	94601	14697	13-Jun-89	2	1	1	1	3
509	295732	14	1	3	1	94545	23873	16-May-89	2	2	4	1	3
510	432673	14	1	1	2	94536	25928	16-Jun-89	1	0	1	1	1
511	309063	8	1	1	1	94601	14697	06-Jun-89	2	0	1	1	2
512	320790	7	1	1	2	94607	10931	23-Jun-89	2	0	1	1	3
514	438680	11	2	1	1	94587	24923	16-Oct-89	1	0	5	1	3
516	278262	11	1	1	3	94607	10931	04-Oct-89	2	0	1	1	2
517	358813	5	1	1	1	94621	12992	30-Oct-89	2	0	1	1	2
519	432256	7	1	1	1	94621	12992	09-Jun-89	5	0	0	1	3
520	433204	0.833	2	3	7	94606	14308	22-Jun-89	5	0	5	1	2
522	437464	1.917	1	1	2	94577	21982	26-Sep-89	1	1	9	1	3
523	432687	6	1	1	2	94605	21499	16-Jun-89	3	3	14	1	1
525	436751	0.333	1	3	10	94501	21455	19-Sep-89	2	21	16	1	2
526	396464	2	1	1	2	94601	14697	24-May-89	2	20	24	1	2
529	430490	2	2	3	1	94606	14308	22-Oct-89	2	0	1	1	1
530	406727	1.833	1	1	1	94607	10931	02-Oct-89	2	0	1	1	2
531	286915	13	1	1	2	94605	21499	14-Oct-89	2	0	2	1	2
532	438546	11	1	1	3	94606	14308	13-Oct-89	2	0	5	1	2
535	391414	3	1	3	1	94601	14697	01-Oct-89	2	0	1	1	2
537	439157	6	1	6	2	94606	14308	26-Oct-89	3	1	1	1	3
538	339182	6	1	1	1	94606	14308	23-Oct-89	2	0	1	1	2
539	270214	11	1	1	5	94603	14754	06-Oct-89	2	0	1	1	2
541	324046	7	1	1	2	94601	14697	12-Oct-89	2	2	5	1	2
543	355837	5	2	1	1	94611	29731	15-Oct-89	2	0	0	1	3
544	438141	12	2	1	2	94601	14697	06-Oct-89	6	0	9	1	3
545	439409	3	2	1	1	94603	14754	30-Oct-89	2	0	1	1	3

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552	436404	1.750	2	6	2	94539		05-Sep-89	1	1	43	6	1
555	379212	4	2	3	1	94605	21499	16-Nov-89	2	0	2	1	2
557	439932	1.333	2	1	1	94605	21499	08-Nov-89	2	0	1	1	3
558	439739	2	2	1	1	94603	14754	05-Nov-89	2	0	1	1	3
559	394439	12	1	1	5	94607	10931	05-Nov-89	2	0	1	1	2
560	439798	0.083	1	1	1	94605	21499	06-Nov-89	2	0	1	1	2
561	440240	14	2	3	1	94706	19819	13-Nov-89	1	0	5	1	3
562	436466	3	1	1	2	94619	23798	04-Nov-89	1	0	1	1	2
563	439960	13	1	1	2	94606	14308	09-Nov-89	6	0	1	1	3
564	439525	3	2	3	1	94710	13608	01-Nov-89	1	0	2	1	3
565	413754	2	2	1	9	94606	14308	06-Nov-89	5	8	9	1	3
566	433155	0.417	1	3	1	94610	21468	16-Nov-89	2	0	0	1	2
568	252763	14	1	1	5	94607	10931	03-Nov-89	2	0	9	1	2
570	332418	6	1	1	2	94607	10931	03-Nov-89	4	0	1	1	2
571	440307	0.083	1	3	10	94607	10931	14-Nov-89	2	2	1	1	3
573	440017	8	2	3	2	94608	14052	09-Nov-89	2	0	1	1	3
574	436241	7	2	1	2	94621	12992	15-Nov-89	3	0	1	1	3
575	426469	0.750	1	1	1	94601	14697	28-Nov-89	2	0	0	1	2
577	248093	13	1	1	2	94605	21499	11-Nov-89	2	0	0	1	2
578	265336	12	1	1	5	94601	14697	11-Nov-89	2	0	1	1	2
579	439583	12	2	3	7	94607	10931	02-Nov-89	6	0	4	1	3
580	412275	14	1	1	3	94605	21499	24-Nov-89	2	0	5	2	1
581	441018	2	1	3	14	94603	14754	27-Nov-89	3	2	5	1	3
584	404061	2	1	1	1	94601	14697	27-Nov-89	2	1	5	1	2
585	440588	4	2	3	7	94610	21468	19-Nov-89	1	0	0	1	1
586	440217	4	2	1	7	94603	14754	13-Nov-89	3	0	5	1	2
587	440676	0.917	2	1	8	94605	21499	20-Nov-89	2	3	0	1	2
589	331425	6	1	6	2	94607	10931	16-Nov-89	2	1	1	1	2
591	441168	5	2	3	7	94702	14492	29-Nov-89	5	1	1	1	1
592	423518	12	1	3	7	94609	12354	27-Nov-89	3	1	13	1	1

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593	439300	5	1	3	14	94708	35427	28-Oct-89	1	7	10	1	1
594	430097	0.833	1	3	7	94603	14754	17-Nov-89	2	0	10	1	2
595	440669	6	1	6	2	94603	14754	20-Nov-89	2	2	1	1	2
596	368278	6	1	1	2	94601	14697	17-Nov-89	2	7	10	1	3
598	329908	14	2	3	7	94612	9985	18-Nov-89	2	0	0	1	2
601	442559	2	1	1	1	94536	25928	12-Dec-89	1	0	1	1	3
603	330996	10	1	1	7	94608	14052	03-Dec-89	2	17	9	1	1
605	442565	4	1	1	5	94621	12992	22-Dec-89	2	1	2	1	1
606	442635	1	2	3	7	94602	22939	23-Dec-89	1	1	5	1	1
607	442276	6	1	3	2	94609	12354	18-Dec-89	2	0	0	1	3
608	246757	1	2	2	10	94702	14492	04-Dec-89	2	1	5	1	2
609	441998	1.167	2	1	1	94619	23798	13-Dec-89	3	0	0	1	3
610	249724	13	1	3	2	94606	14308	05-Dec-89	2	0	1	1	2
611	303133	9	1	3	1	94601	14697	19-Dec-89	2	0	0	1	2
612	441362	5	2	1	1	94550	25996	02-Dec-89	1	4	5	1	1
613	441374	10	2	1	1	94618	25721	02-Dec-89	6	0	1	1	1
614	378072	5	2	3	1	94608	14052	06-Dec-89	2	0	0	1	2
615	442764	6	1	1	5	94544	20819	26-Dec-89	1	2	5	1	1
616	426846	9	1	1	3	94605	21499	11-Mar-89	2	0	1	1	1
617	441517	12	1	1	7	94544	20819	05-Dec-89	3	0	4	1	1
618	303646	9	2	1	1	94609	12354	30-Dec-89	2	0	1	1	3
619	441476	1.417	1	1	7	94608	14052	04-Dec-89	2	1	5	1	2
620	426534	3	1	6	8	94706	19819	08-Oct-89	1	1	0	6	1
623	383440	3	1	3	9	94501	21455	14-Oct-89	1	4	1	1	2
624	438963	5	1	1	7	94606	14308	22-Oct-89	6	1	10	1	2
625	382783	3	1	1	1	94603	14754	30-Oct-89	2	0	4	1	2
626	439333	9	1	3	7	94546	26142	29-Oct-89	1	0	9	2	3
627	424151	0.833	2	3	7	94608	14052	23-Oct-89	2	1	4	1	2
629	368160	6	1	1	7	94603	14754	12-Oct-89	2	0	0	1	2
631	418961	10	2	3	5	94601	14697	30-Oct-89	3	0	1	1	2

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633	323275	7	1	1	1	94710	13608	19-Oct-89	2	0	0	1	1
634	438806	1.417	1	1	1	94710	13608	19-Oct-89	2	0	1	1	1
635	409099	2	1	3	7	94608	14052	02-Oct-89	2	0	4	1	2
637	378044	3	1	3	1	94609	12354	18-Oct-89	2	0	0	1	2
638	327270	8	1	1	1	94544	20819	15-Oct-89	7	0	1	1	2
640	330374	10	1	1	1	94601	14697	22-Oct-89	2	0	1	1	3
645	388518	5	1	3	7	94621	12992	07-Dec-89	2	2	9	1	1
647	4401243	8	2	1	3	94618	25721	30-Nov-89	1	2	5	1	1
648	277877	11	1	1	2	94608	14052	06-Dec-89	2	0	1	1	2
649	412560	1.833	1	1	7	94703	15551	29-Dec-89	6	1	9	1	2
650	441319	1	2	1	2	94587	24923	01-Dec-89	1	19	10	1	2
651	441249	4	1	6	7	94544	20819	30-Nov-89	1	2	10	1	1
652	141816	8	1	3	7	94611	29731	17-Dec-89	1	1	10	1	1
655	378487	11	2	1	7	94703	15551	12-Dec-89	2	0	0	1	1
656	441361	9	2	1	1	94550	25996	02-Dec-89	1	0	5	1	1
657	414661	1.333	2	3	1	94608	14052	06-Dec-89	2	0	1	1	2
658	311236	10	1	1	1	94601	14697	04-Dec-89	3	0	1	1	2
659	441995	0.917	1	1	7	94560	27215	13-Dec-89	1	0	2	1	3
660	441819	9	2	1	2	94606	14308	10-Dec-89	6	0	1	1	3
661	441937	13	1	1	4	94541	20680	13-Dec-89	1	0	1	1	3
662	244966	14	1	1	5	94607	10931	19-Oct-89	2	0	0	7	3
663	396841	7	1	3	14	94501	21455	01-Feb-89	2	0	4	1	2
666	254910	13	1	1	7	94603	14754	12-Dec-89	2	0	1	1	3
667	442528	0.083	1	6	7	94541	20680	21-Dec-89	1	5	17	1	1
668	437304	0.167	1	3	7	94621	12992	24-Sep-89	7	0	9	1	3
670	436513	1	2	3	9	94603	14754	07-Sep-89	2	3	4	1	2
671	442832	6	2	1	2	94611	29731	27-Dec-89	1	0	1	1	1
672	412893	1.583	1	3	14	94545	23873	06-Dec-89	1	0	4	1	1
673	442630	2	1	1	7	94706	19819	23-Dec-89	5	1	4	1	2
674	419064	3	1	3	2	94605	21499	25-Dec-89	2	0	2	1	2

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675	441318	7	1	1	2	94587	24923	01-Dec-89	8	0	0	1	3
676	441568	11	2	6	2	94619	23798	05-Dec-89	6	1	10	1	1
677	351916	5	1	1	7	94621	12992	04-Dec-89	2	16	9	1	2
679	441328	4	1	1	7	94605	21499	01-Dec-89	3	1	4	1	2
681	434351	8	2	1	2	94609	12354	11-Dec-89	6	0	0	1	2
682	269570	13	1	1	3	94603	14754	15-Dec-89	2	0	1	1	3
683	441862	0.417	2	3	1	94601	14697	11-Dec-89	2	0	1	1	1
687	437178	6	1	1	5	94703	15551	21-Sep-89	2	0	1	1	2
688	346357	12	1	1	5	94621	12992	27-Dec-89	3	0	1	1	2
689	409259	2	2	1	7	94702	14492	09-Dec-89	5	0	0	1	2
690	308243	8	1	3	14	94603	14754	18-Sep-89	2	1	1	1	2
692	422455	0.667	2	3	7	94546	26142	08-Aug-89	3	0	2	1	2
694	433492	3	2	6	9	94550	25996	29-Jun-89	3	2	64	6	3
695	438649	0.250	1	3	7	94608	14052	21-Dec-89	3	5	8	1	2
697	263635	12	2	1	1	94702	14492	02-Jun-89	2	0	0	1	2
698	433345	3	1	1	1	94603	14754	27-Jun-89	3	1	5	1	3
699	427342	0.417	1	3	7	94621	12992	30-May-89	2	2	5	1	2
700	433202	6	1	3	1	94606	14308	25-Jun-89	5	0	5	1	2
702	432450	7	1	1	7	94602	22939	13-Jun-89	3	1	5	1	1
703	338917	7	1	1	7	94601	14697	07-Jun-89	2	1	4	1	1
704	315722	9	1	1	12	94608	14052	25-Jun-89	2	0	1	2	1
705	304442	9	2	1	2	94621	12992	15-Jun-89	2	0	2	1	2
706	432687	6	1	1	2	94605	21499	16-Jun-89	3	3	14	1	1
707	432710	13	1	1	1	94706	19819	17-Jun-89	3	0	1	1	1
709	324046	7	1	1	2	94601	14697	21-Jun-89	2	0	0	1	2
712	428351	0.750	2	3	10	94601	14697	04-Dec-89	1	3	13	9	2
713	439119	0.250	2	3	1	94621	12992	25-Oct-89	3	6	22	9	3
714	313844	8	1	6	12	94601	14697	10-Sep-89	3	36	16	1	2
715	443052	6	1	1	7	94550	25996	31-Dec-89	3	2	5	1	2
716	437863	4	1	6	2	94621	12992	02-Oct-89	5	5	10	1	2

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717	429530	13	1	1	1	94605	21499	30-Dec-89	2	3	10	2	1
718	442583	4	2	1	2	94601	14697	22-Dec-89	2	25	4	1	2
719	319059	7	2	3	1	94601	14697	27-Jun-89	2	0	1	1	2
720	270860	13	1	3	12	94621	12992	27-Dec-89	2	0	4	1	3
721	393536	4	1	3	7	94703	15551	23-Dec-89	2	2	4	1	2
723	267916	12	1	1	2	94603	14754	24-Dec-89	2	1	4	1	2
725	252474	11	1	1	2	94601	14697	25-Nov-89	2	3	5	1	2
727	431904	4	1	3	7	94621	12992	04-Jun-89	2	4	4	1	2
728	432747	3	1	1	2	94601	14697	18-Jun-89	3	0	0	1	3
729	433771	7	1	1	1	94544	20819	04-Jul-89	1	0	2	1	1
730	431910	11	1	3	7	94611	29731	05-Jun-89	1	2	9	1	1
731	432320	2	1	3	9	94603	14754	11-Jun-89	2	3	1	1	3
734	305182	9	2	1	2	94605	21499	23-Jun-89	2	0	1	1	3
735	403307	2.083	1	3	6	94607	10931	07-Jul-89	2	0	1	1	1
736	411888	6	1	3	9	94608	14052	05-Jul-89	7	5	1	1	3
737	370534	4	1	1	2	94601	14697	09-Jul-89	2	0	1	1	3
738	442586	13	2	1	1	94566	29619	22-Dec-89	1	23	10	1	1
742	407455	10	1	1	3	94606	14308	06-Jul-89	5	0	1	1	2
744	433923	0.750	2	3	10	94607	10931	07-Jul-89	2	0	4	1	2
745	275625	14	2	1	1	94501	21455	07-Jun-89	1	1	1	1	3
747	433912	3	1	3	7	94578	20118	06-Jul-89	1	0	4	1	1
748	314174	8	1	1	3	94601	14697	26-Jun-89	2	0	1	1	2