

A photograph of a stone wall sign for the University of California, Irvine. The sign is made of light-colored stone blocks and features the university's name in large, dark, serif lettering. To the left of the main text is a circular seal. In the background, there is a modern, multi-story building with large windows, several green trees, and a tall light pole under a cloudy sky. In the foreground, there is a grassy area with some low-lying shrubs and a row of dark, rectangular markers or benches.

University of California, Irvine

**Pediatric Injury Prevention  
Research Group**

# Epidemiology of Fall Injuries to Children in California

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When you build a new house, make a parapet around your roof so that you may not bring the guilt of bloodshed on your house if someone falls from the roof.

Deuteronomy 22:8



## FALLING OUT OF A WINDOW.

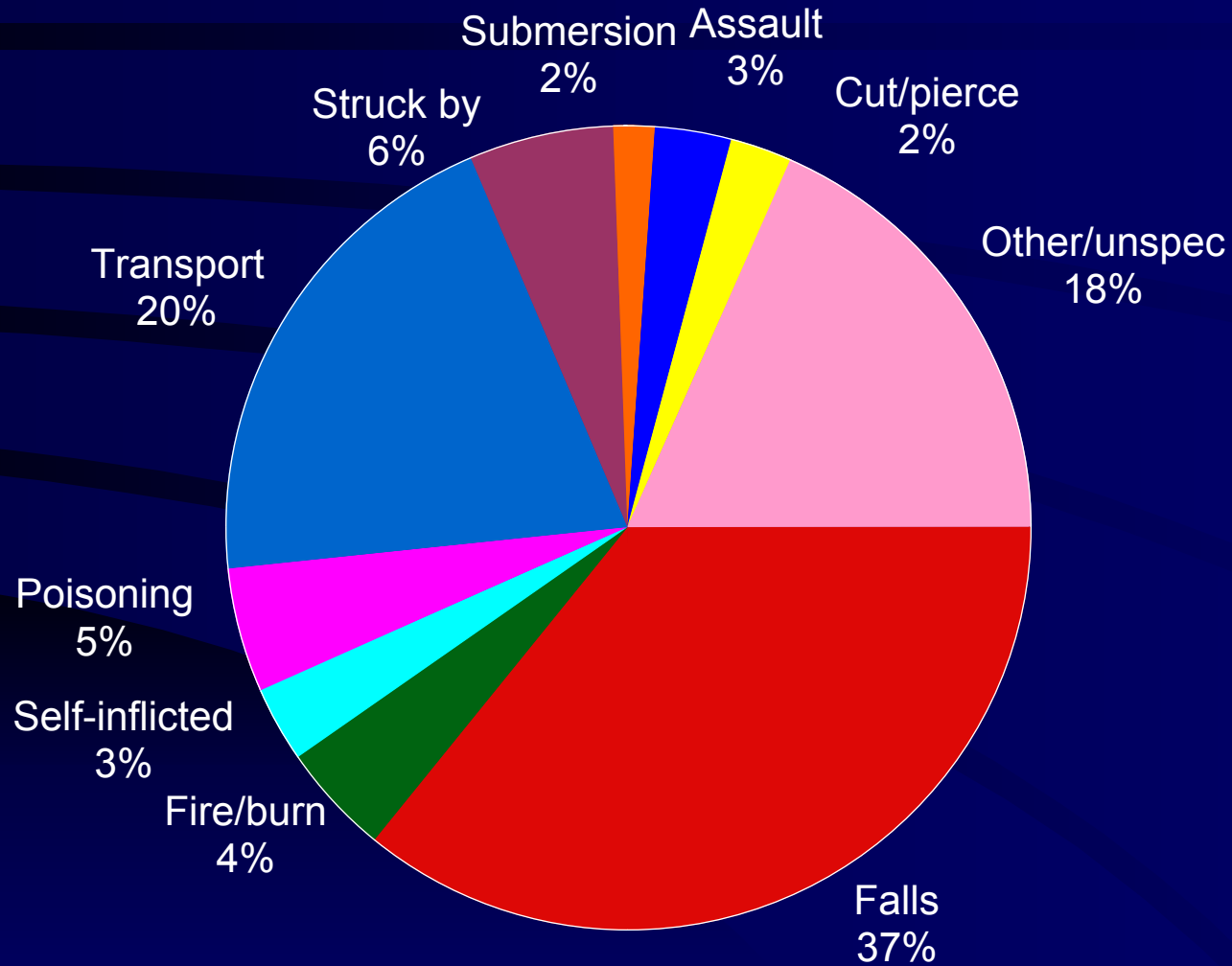
How important that those who have the

# Pediatric Falls in CA

## 0-14 yr olds, 2001

- Leading cause of injury hospitalization
- 7944 children hospitalized
- 9 children died
- > \$65 million in hospital charges (1998)
- Cause of fall codes
  - ICD-9: E 880 - E 888 for all hospitalizations and deaths prior to 1999
  - ICD-10: W00 - W19, used for deaths since 1999

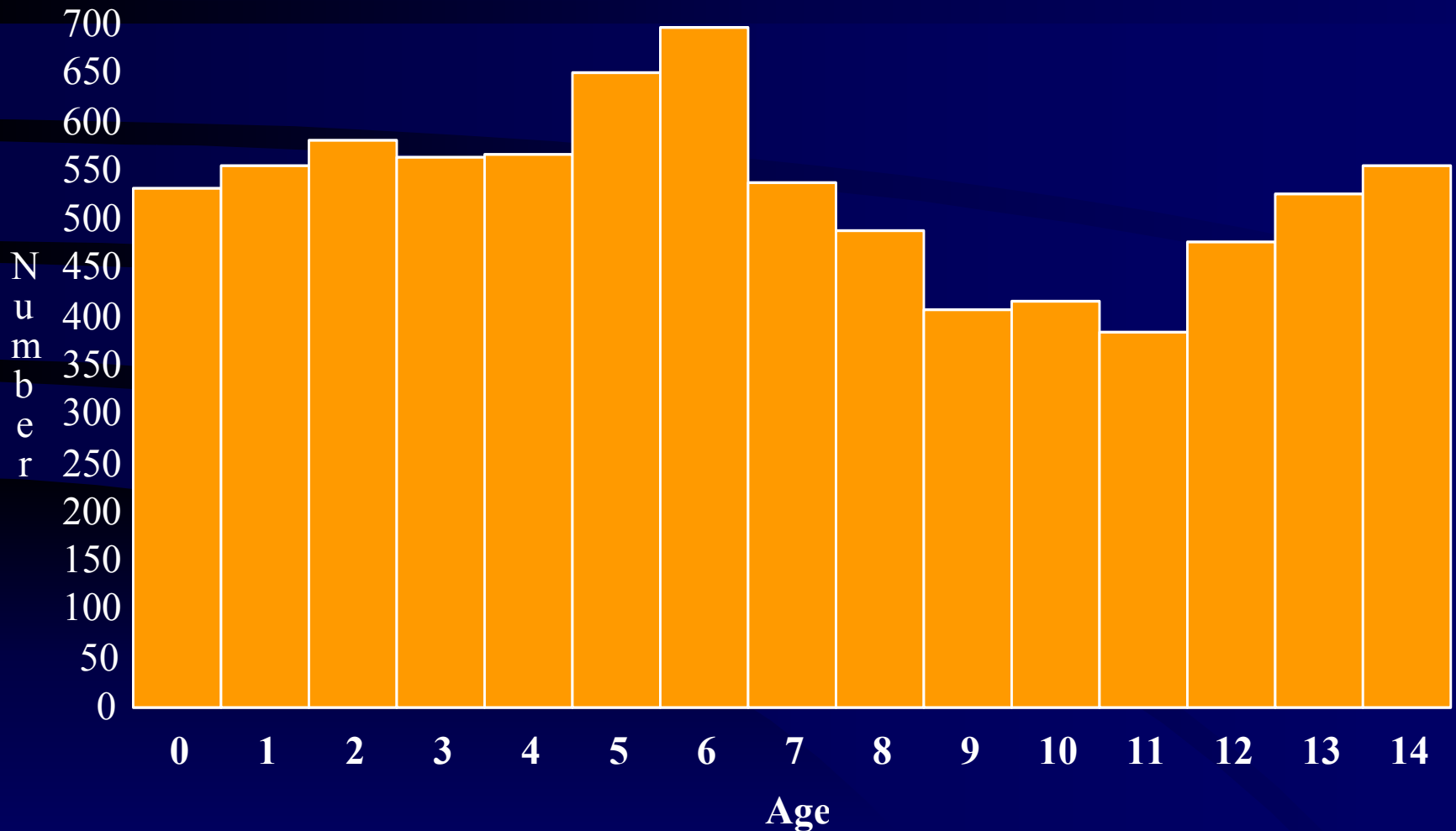
# Pediatric Injury Hospitalizations by Cause CA, 0-14 yr olds, 2001



N=22,115

# Fall Hospitalizations by Age

0-14 years, California, 2001 N=7944

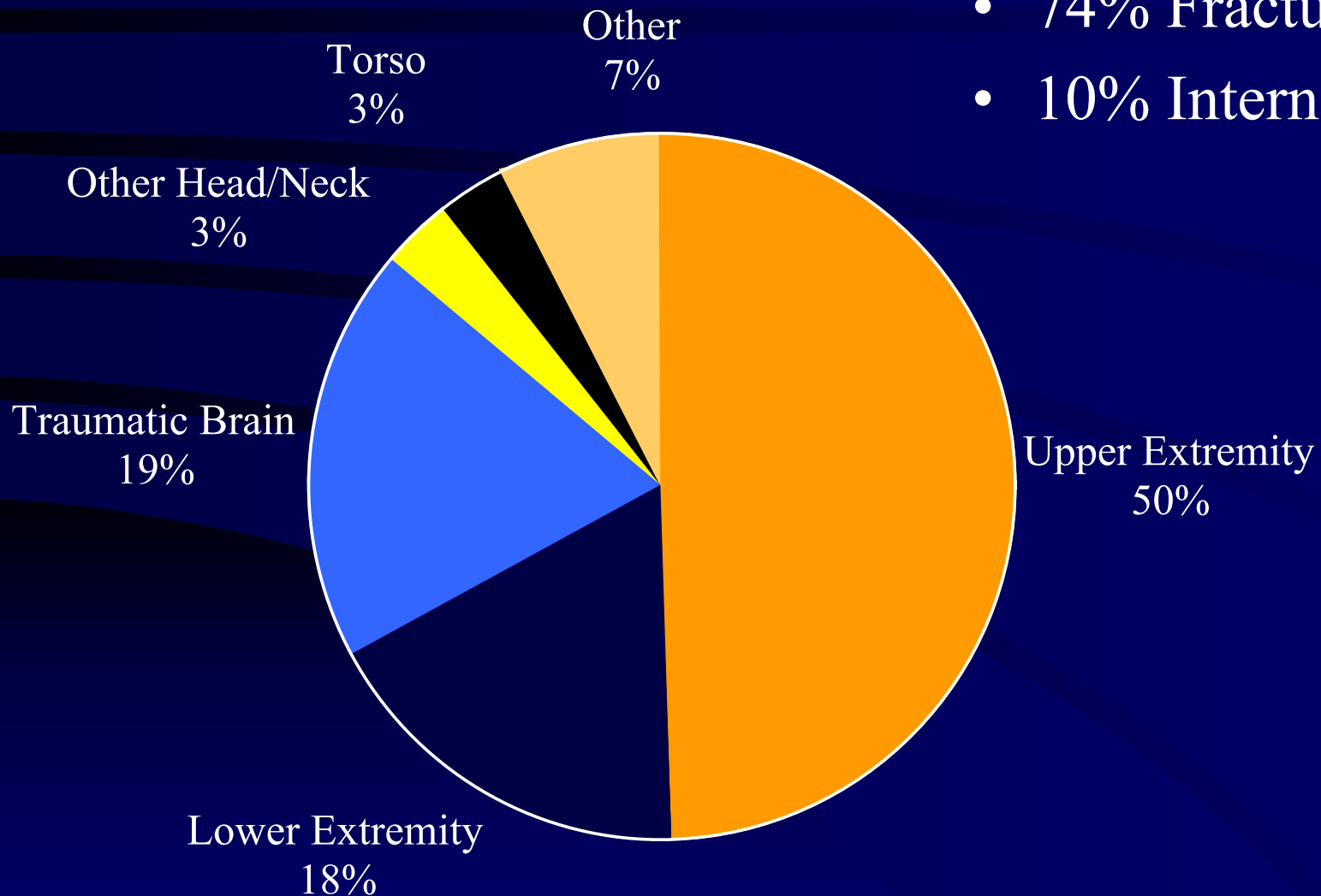


Source: CA Dept of Health Services, EPIC

# Fall Injuries

Children ages 0-14, CA, 2001, N=7944

- 74% Fractures
- 10% Internal



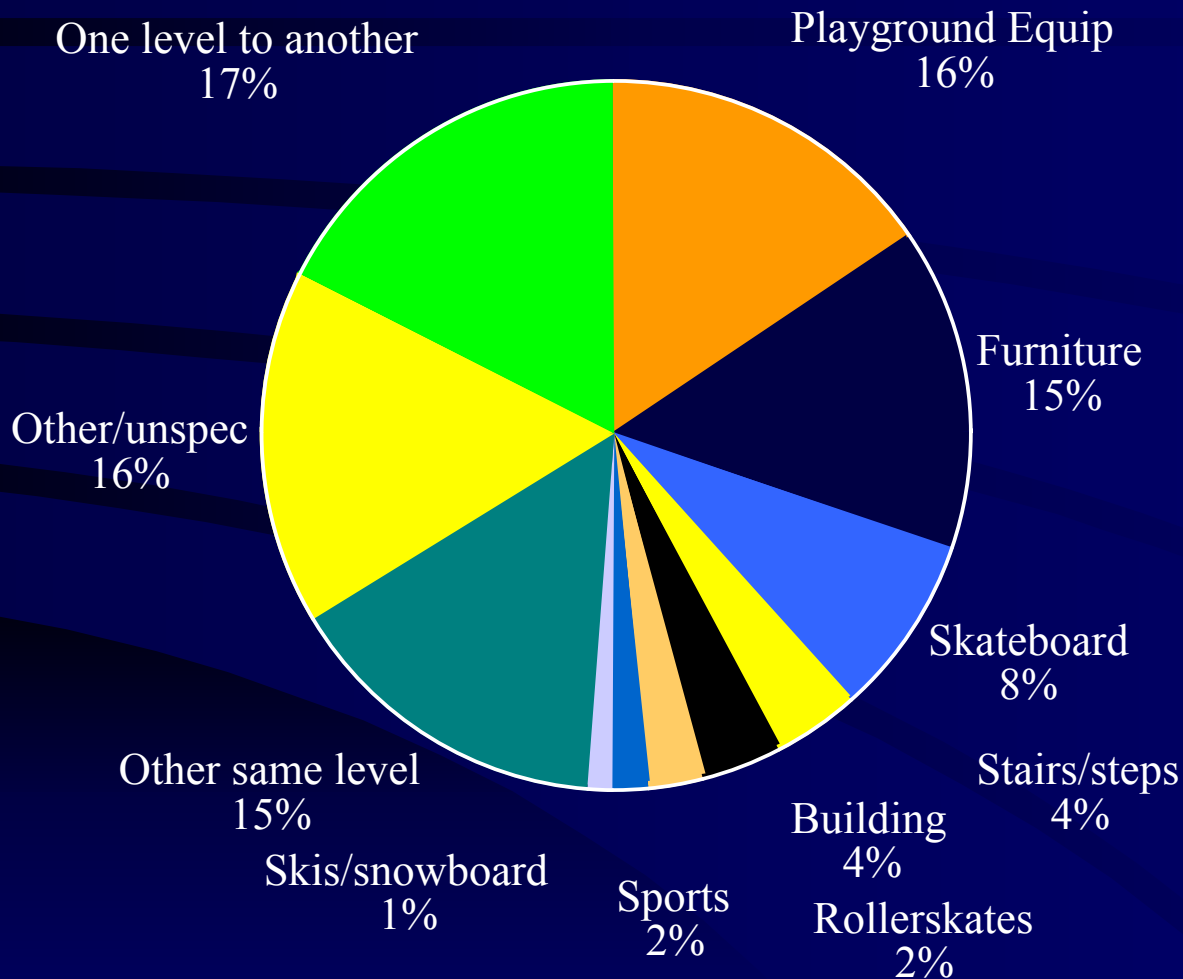


# Falls

- Often presented as single category
- However, diverse types of falls
- Age related differences in types
- Severity varies and is related to
  - Height of fall
  - Impact surface (hardness, shape)
  - Rotation & orientation of body
  - Individual differences

# Fall Hospitalizations by Type

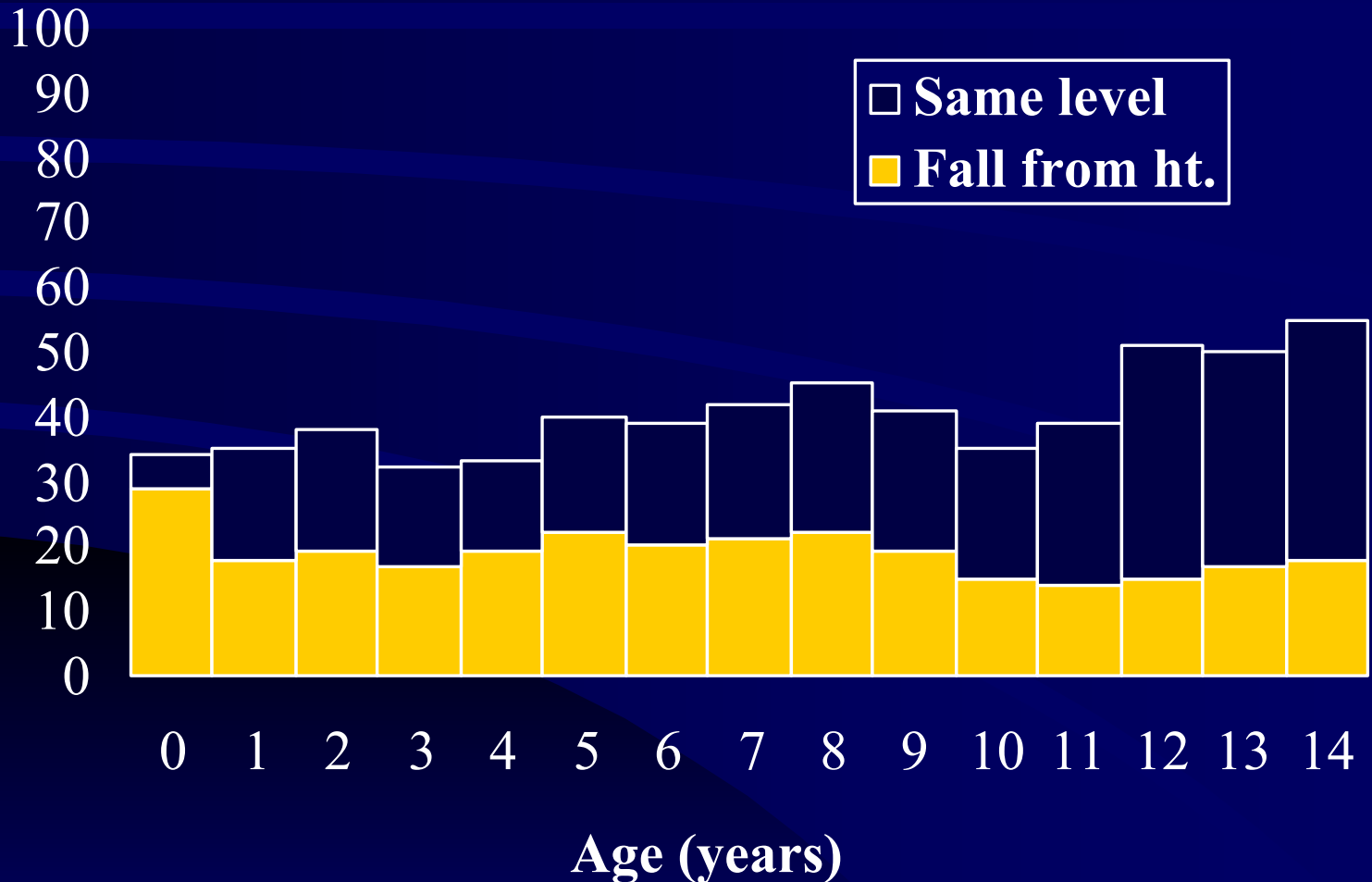
0-14 yr, CA, 2001, N=7944



Nearly 1/2 nonspecific

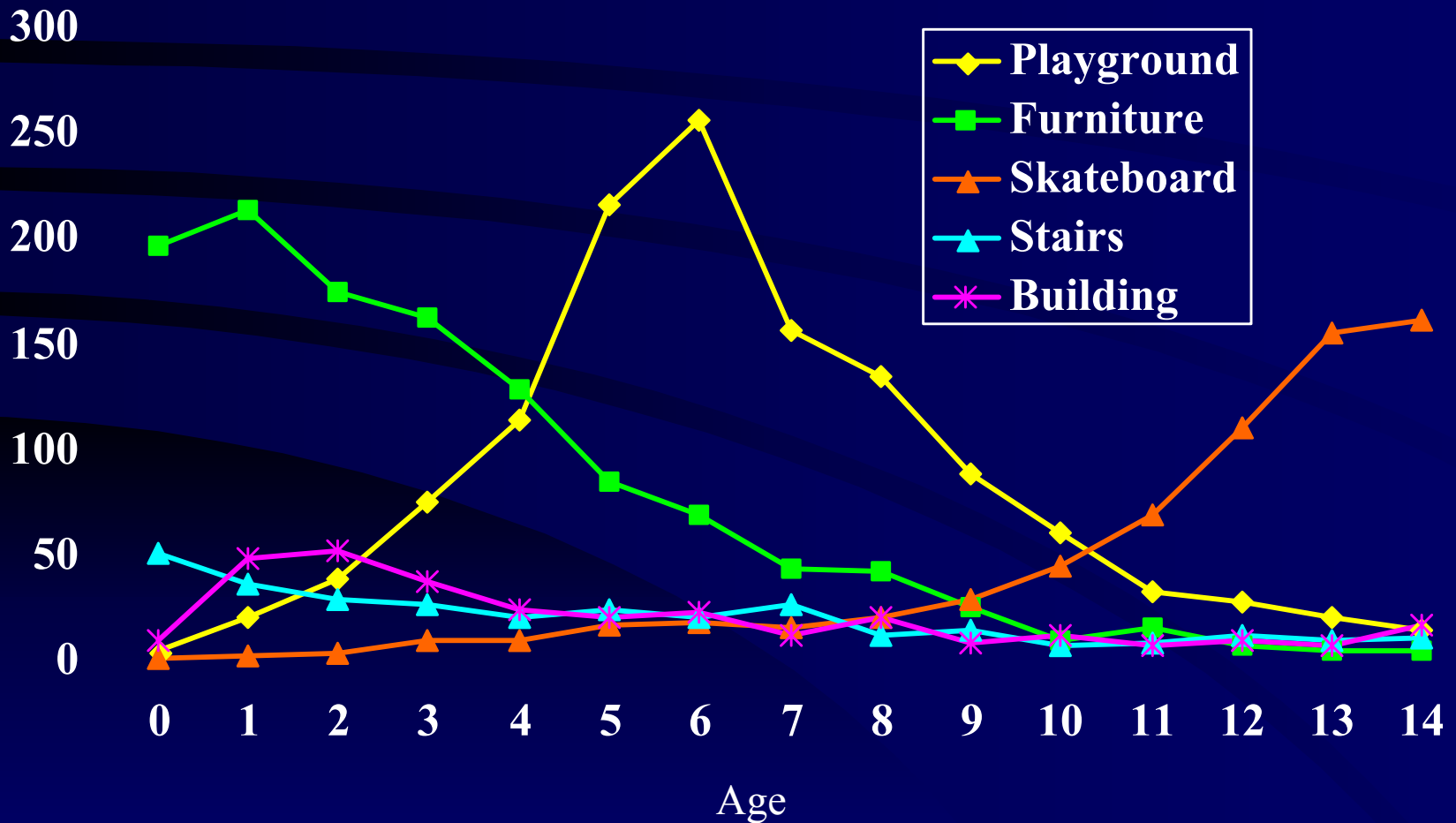
# Other Falls by Age

Annual rate per 100,000



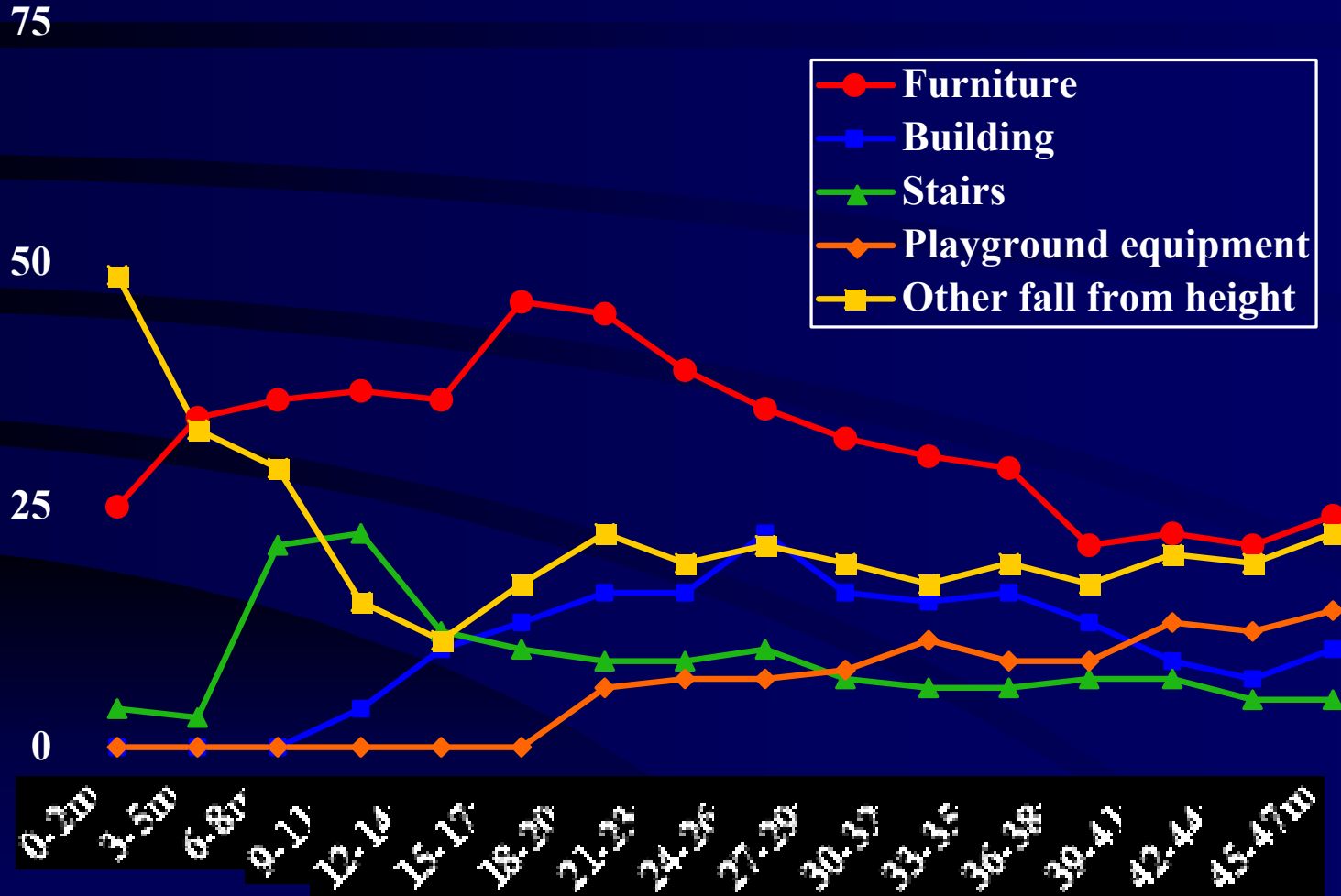
# Types of Falls by Age

0-14 yr, CA, 2001



# Falls

Rates of hospitalization and death per 100,000 by 3 mo intervals 0-4 years, CA 1996-1998 N=6816

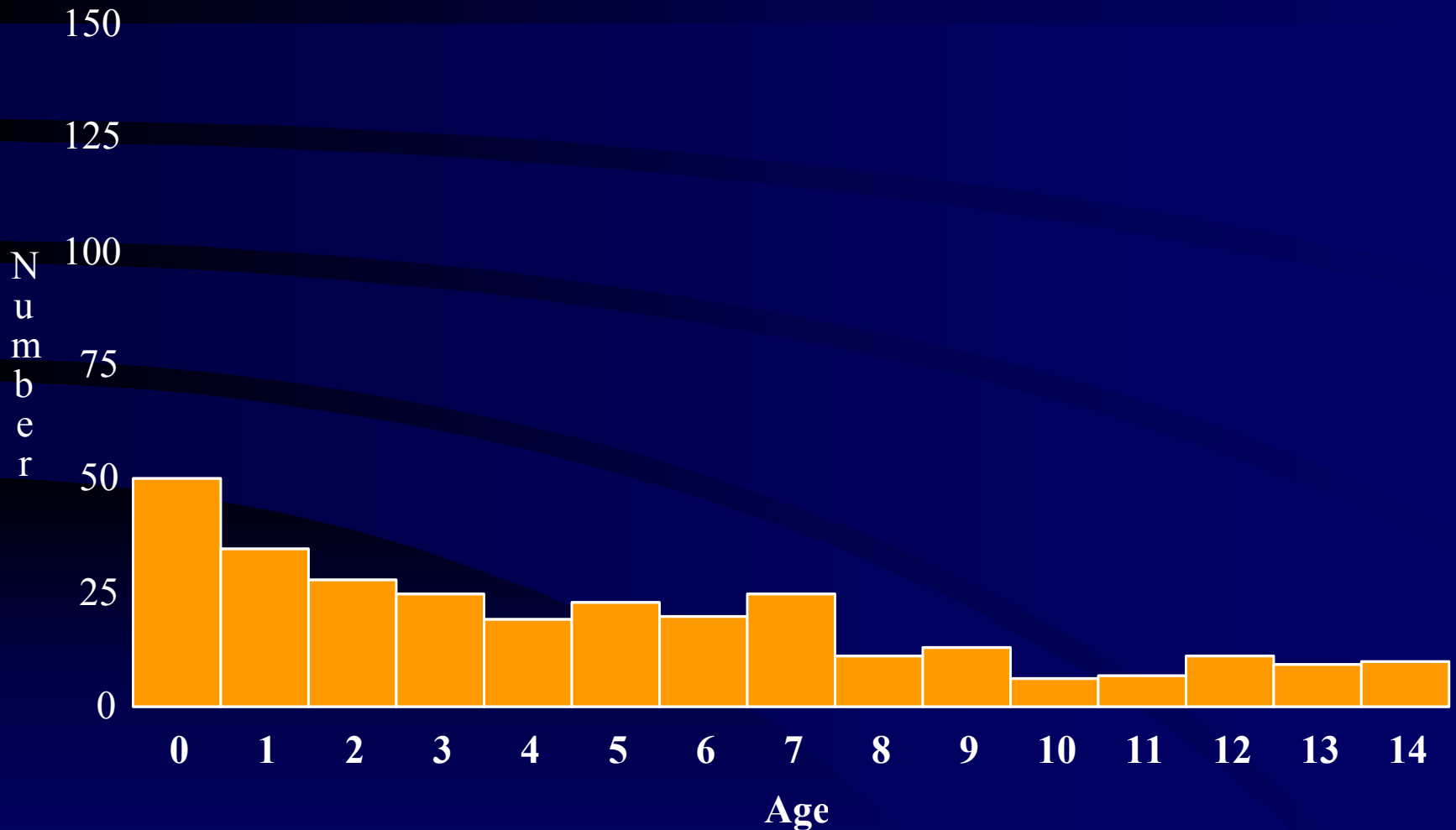


# Limitations of Hospital Discharge Data

- Lack of specificity for large number of falls
  - nearly 1/2 have nonspecific codes
- Some codes are too broad
  - E 882 - falls from buildings includes fall out of window, off balcony and off roof
  - E 886.0 - Falls in sports do not identify type of sport and are probably under-reported
- However, data can still be useful

# Fall on Stairs Hospitalizations

0-14 years, California, 200, N=292



Source: CA Dept of Health Services, EPIC

# Stairs

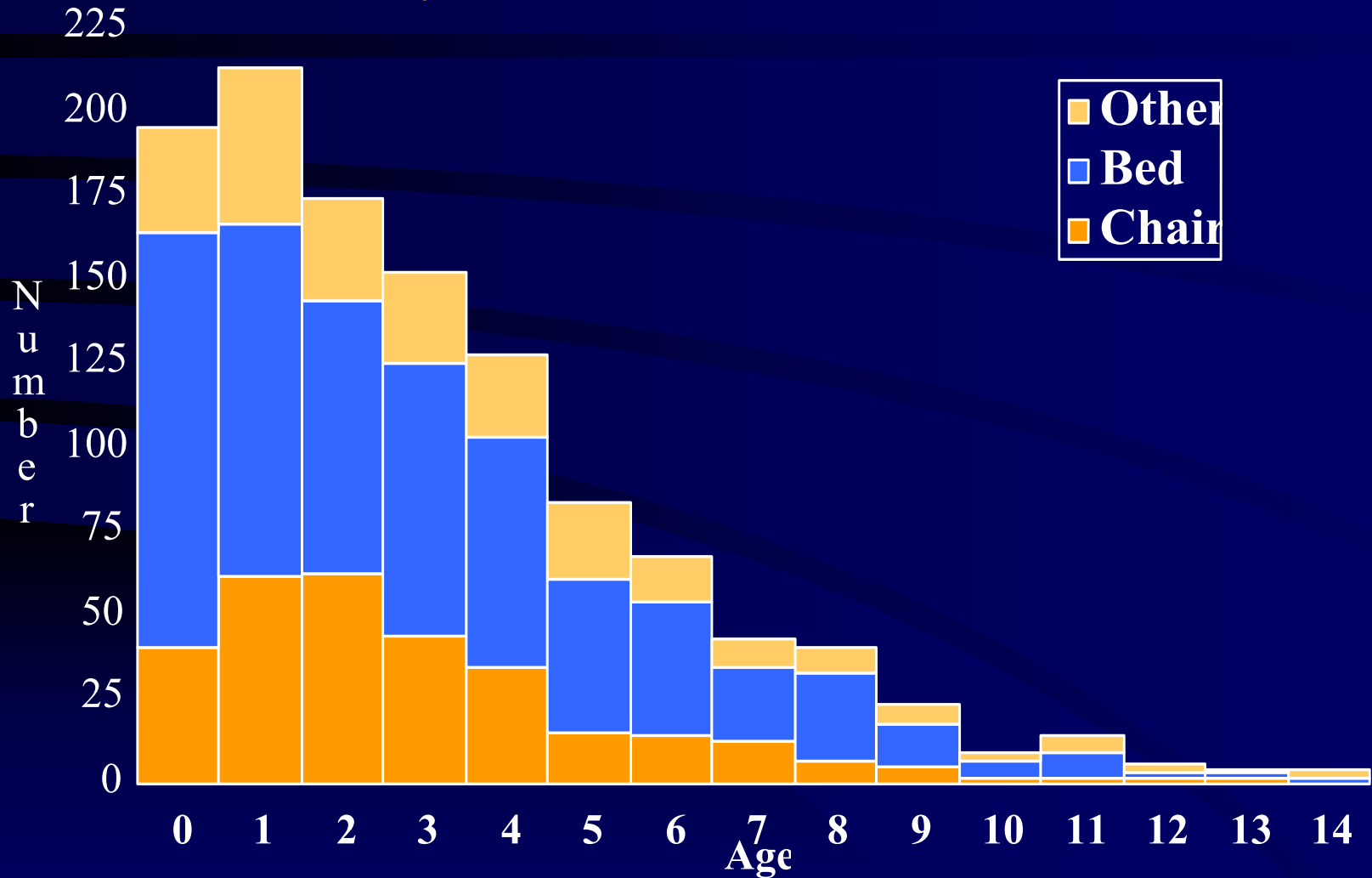
- In arms
- Crawling up/down stairs
- Often associated with infant walkers
  - Earlier study found 70-80% of infants use walkers
  - Increase mobility and allow access to hazardous areas
  - Walkers may actually hinder development for normal walking
- Attracted to objects, people and animals
- By 7 mo. reaches for object out of range





# Fall off Furniture Hospitalizations

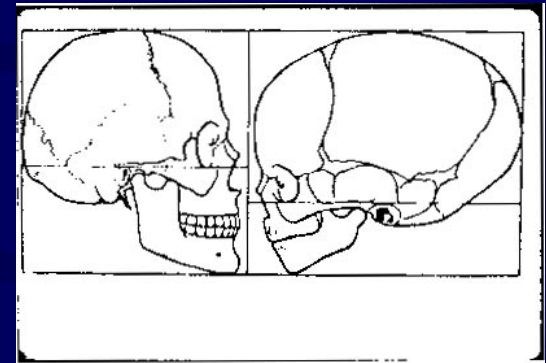
0-14 years, California, 2001, N=1159



Source: CA Dept of Health Services, EPIC

# Furniture (infants)

- Placed at level for caregiver
- Willfully rolls over
  - from abdomen to back at ~5 mo.
  - back to abdomen at ~6 mo.
- Depth perception & crawling
- Large head, fall head first
- Parachute reflex ~ 7 mo.
- Unable to report circumstances



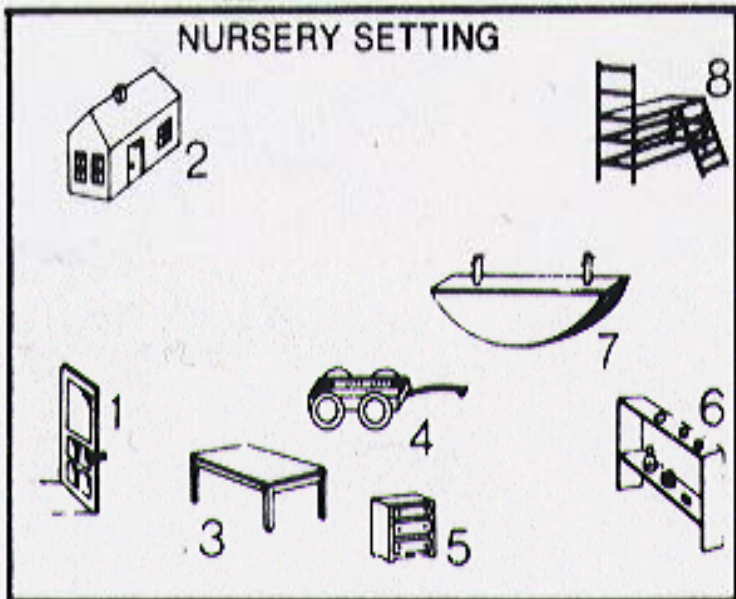
# Furniture (toddlers)

- Able to open drawers, climb
- Active and curious
- Difficulty coordinating hands & feet
- Large head, heavy trunk, protuberant abdomen, short legs
- Balance and cognition of danger immature
- Spatial awareness less than motor abilities

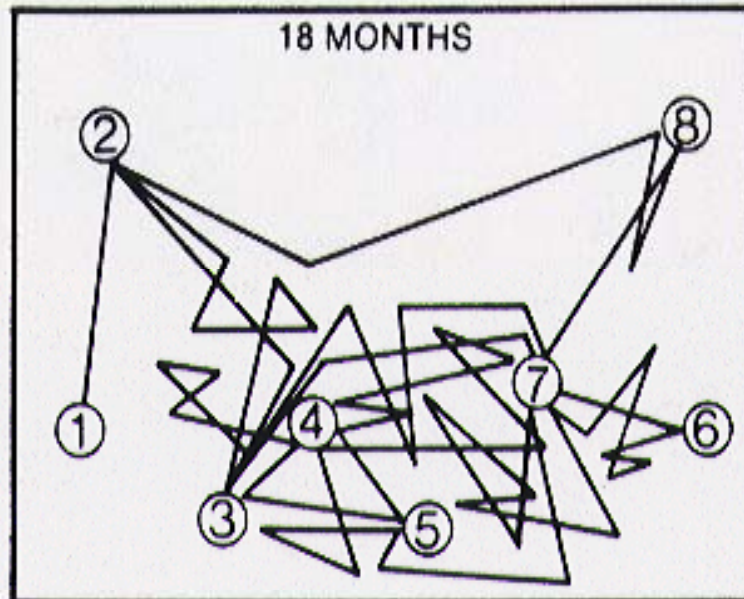


QuickTime™ and a Photo - JPEG decompressor are needed to see this picture.

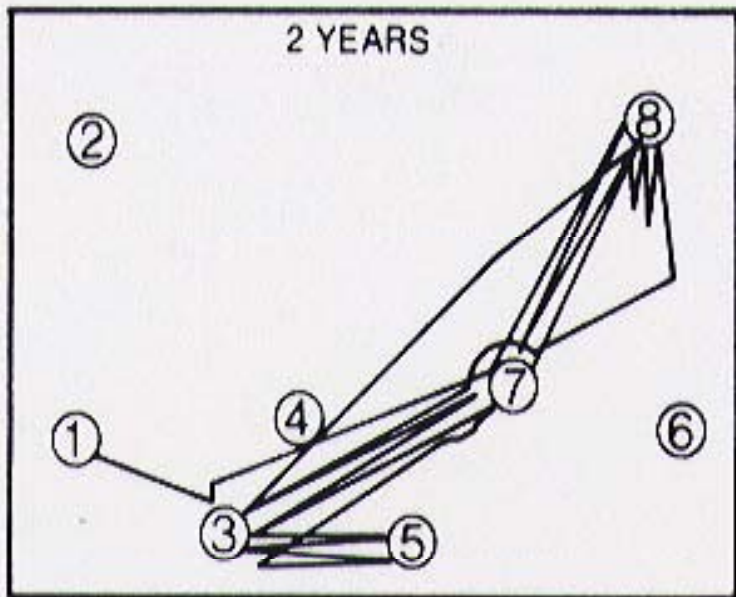
NURSERY SETTING



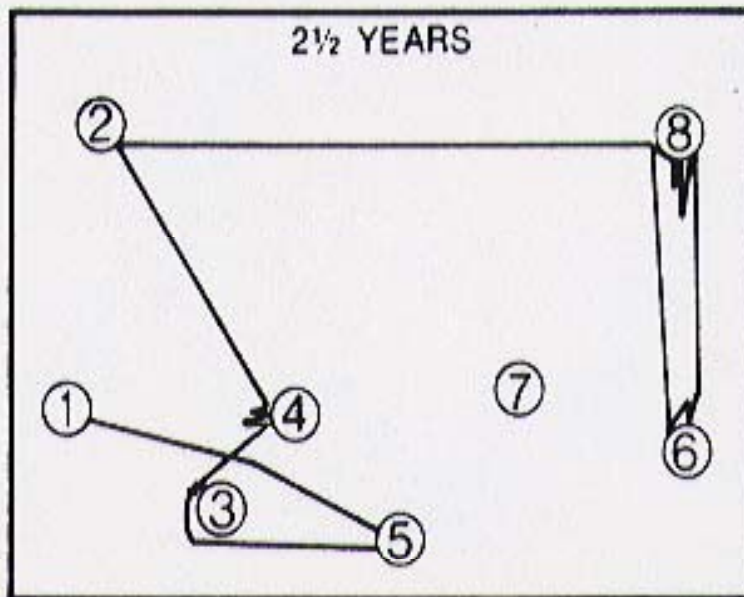
18 MONTHS



2 YEARS

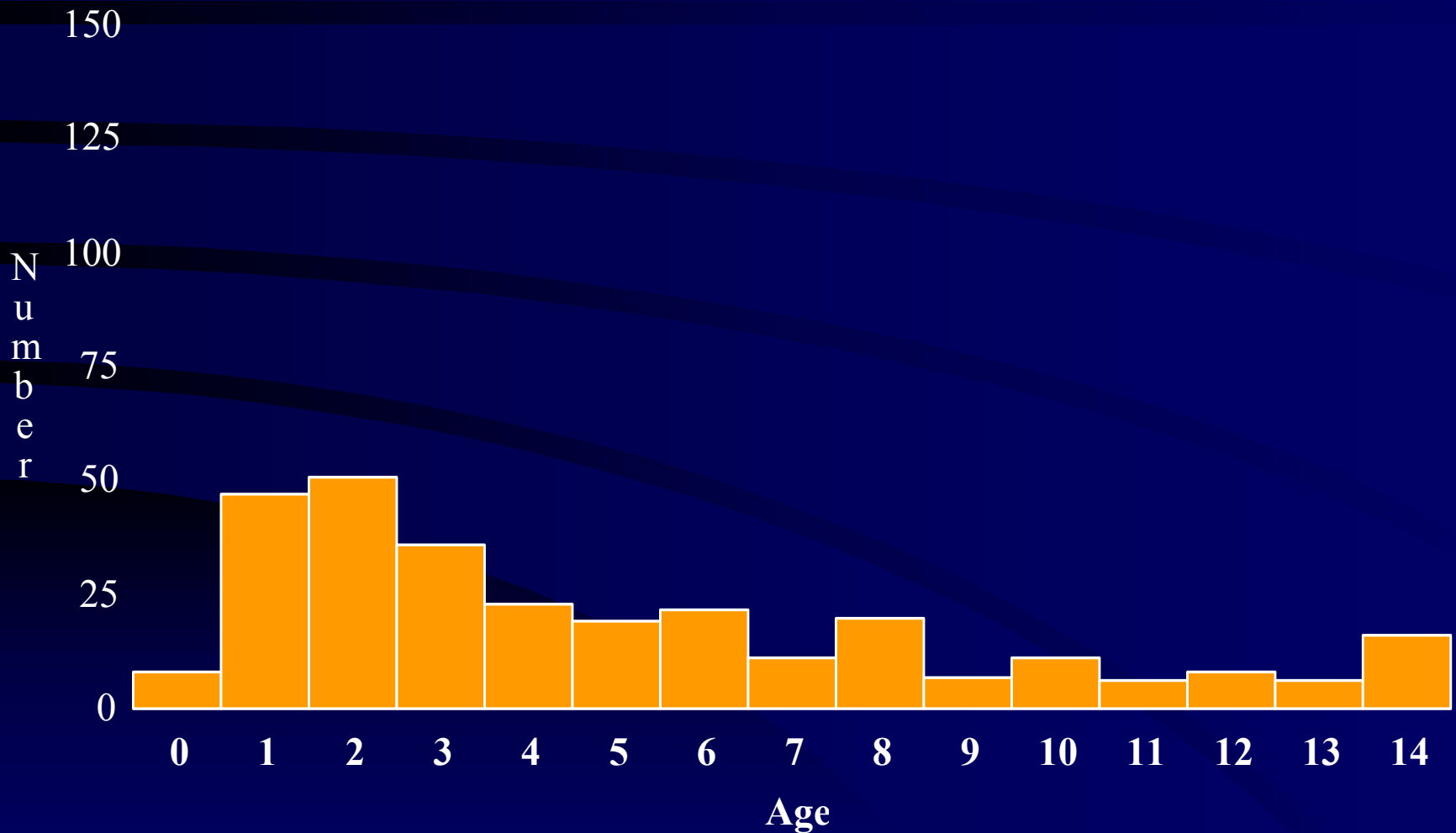


2½ YEARS



# Fall Out of Building Hospitalizations

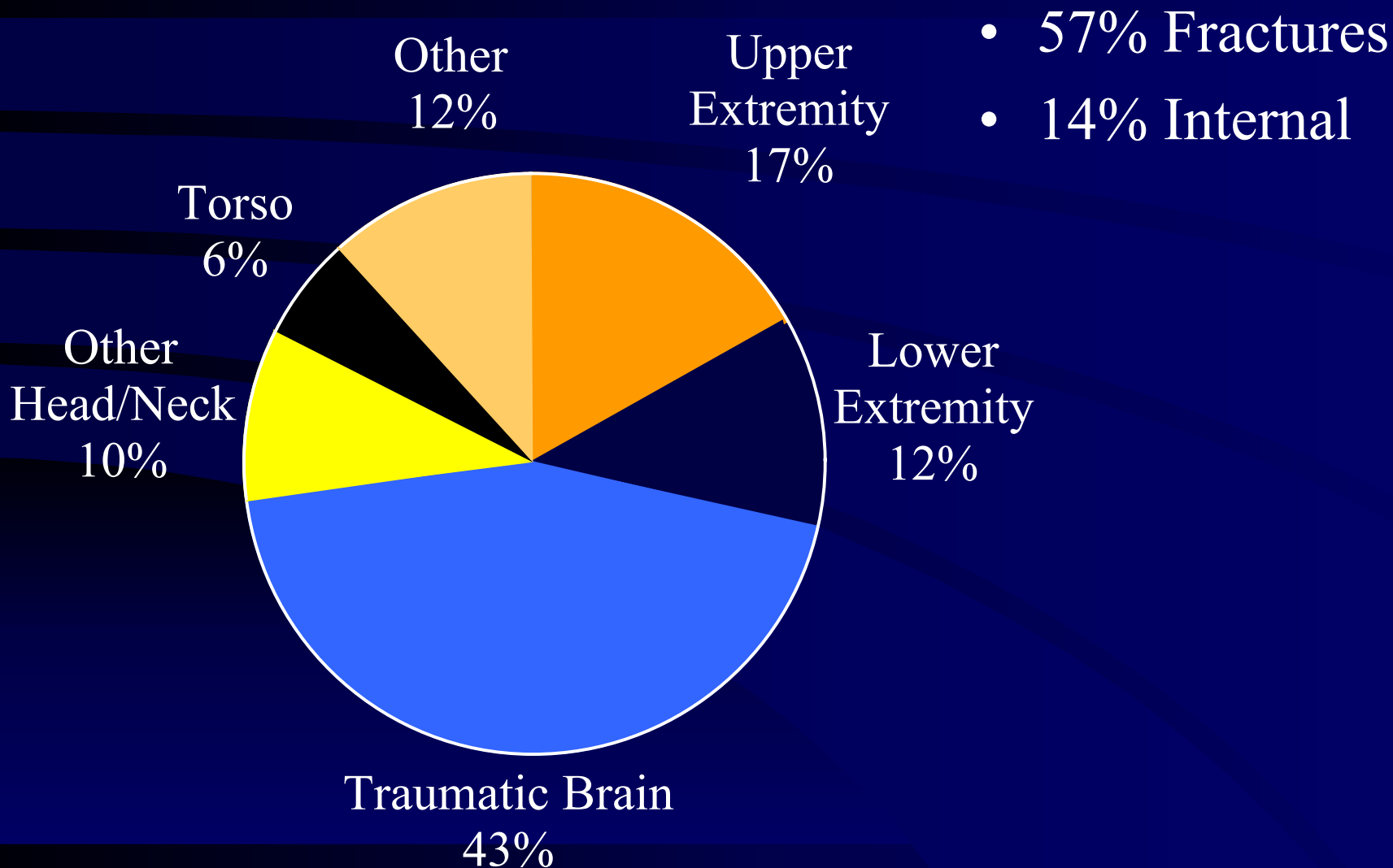
0-14 years, California, 2001, N=291



Source: CA Dept of Health Services, EPIC

# Fall Out of Building Injuries

0-14 yr olds, CA, 2001, N=291



# Buildings (windows)

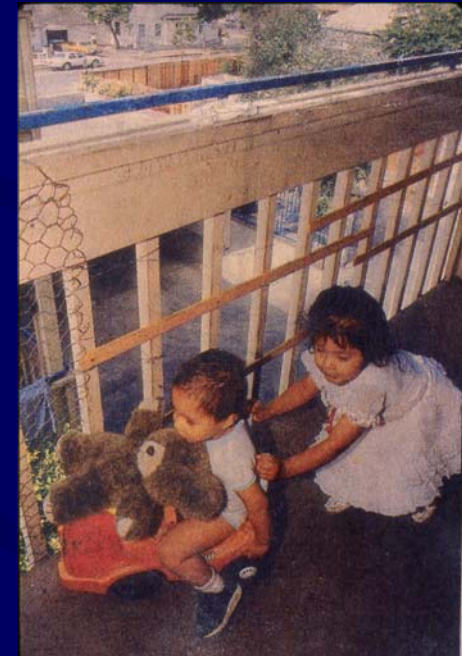
QuickTime™ and a  
Photo - JPEG decompressor  
are needed to see this picture.

- 1/3 falls from buildings (0-4 yr.)
- Window height and openings
- Leaning on/pushing against screen
- Furniture in front of windows
- Climbs, explores, curious
- Perception that screens are protective



# Buildings (balconies)

- 2/3 falls from buildings (< 5 yr.)
- Through and over railings
- Width between vertical guardrails
  - 5 in - 50% 13-18 mo. pass through
  - 6 in - all < 7 yr. pass through
- Horizontal bars and patterns can provide toe holds for climbing
- Codes for 4 in. spacing standard





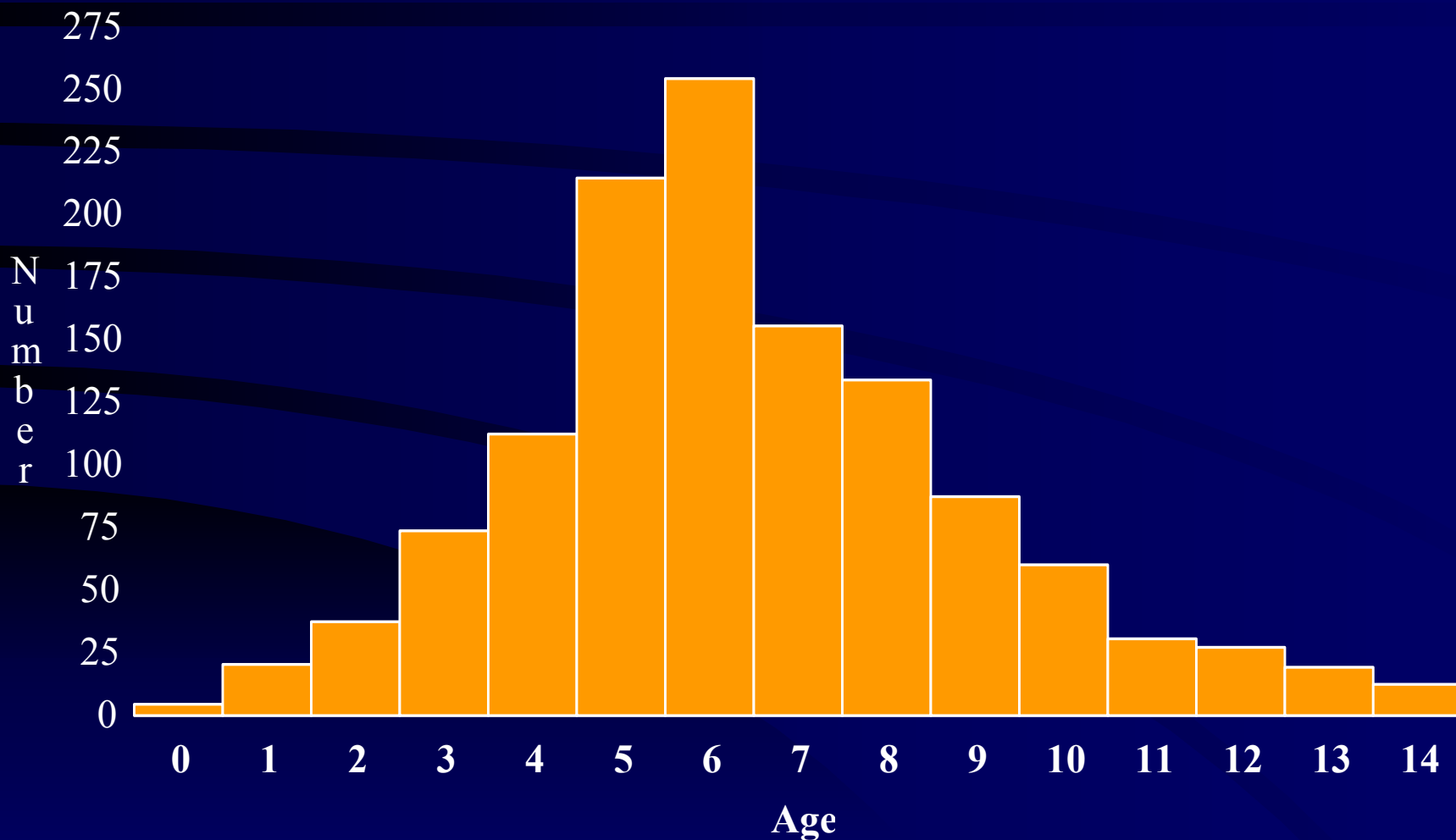
# 18 month old demonstrates how easily she can pass through 5 inch vertical opening

QuickTime™ and a  
Photo - JPEG decompressor  
are needed to see this picture.

4 1/2 in - 5% 1 yr. olds can pass through  
5 in - 50% 13-18 mo. pass through  
6 in - all < 7 yr., 50% 10 yr. olds pass through

# Fall off Playground Equipment Hospitalizations

0-14 years, California, 2001, N=1246



Source: CA Dept of Health Services, EPIC

# Playground (School Age)

QuickTime™ and a  
Photo™ JPEG decompressor  
are needed to see this picture.

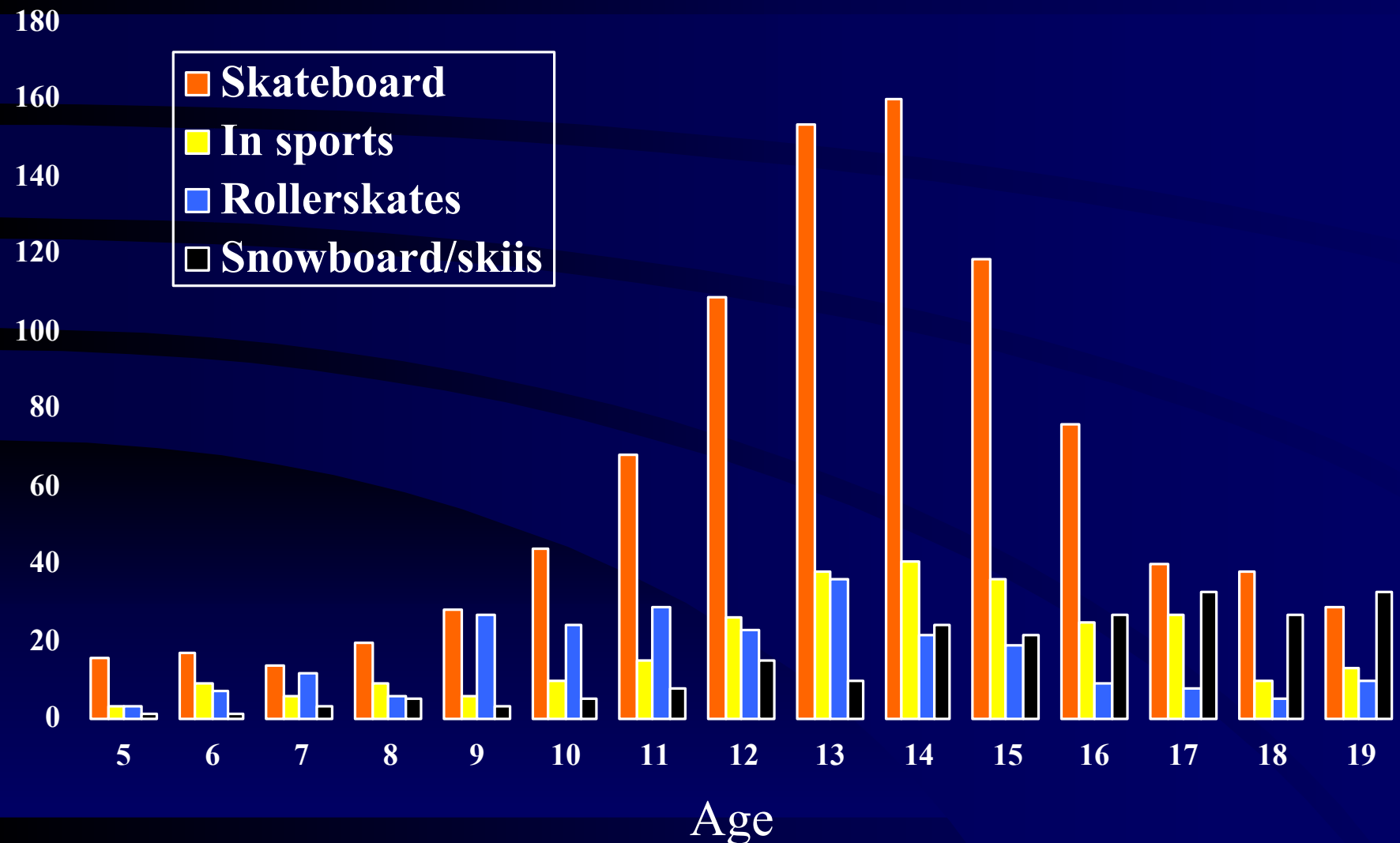
- Increased exposure
- Increased independence
- Improved neuromuscular coordination
- Activities center around play with peers
- Increased daring and adventurous behaviors  
“rough and tumble” play
- Lack experience and judgment
- Standards for equipment and surfaces



# Sports, Sports Equipment and Falls, 0-19 yr, 2001

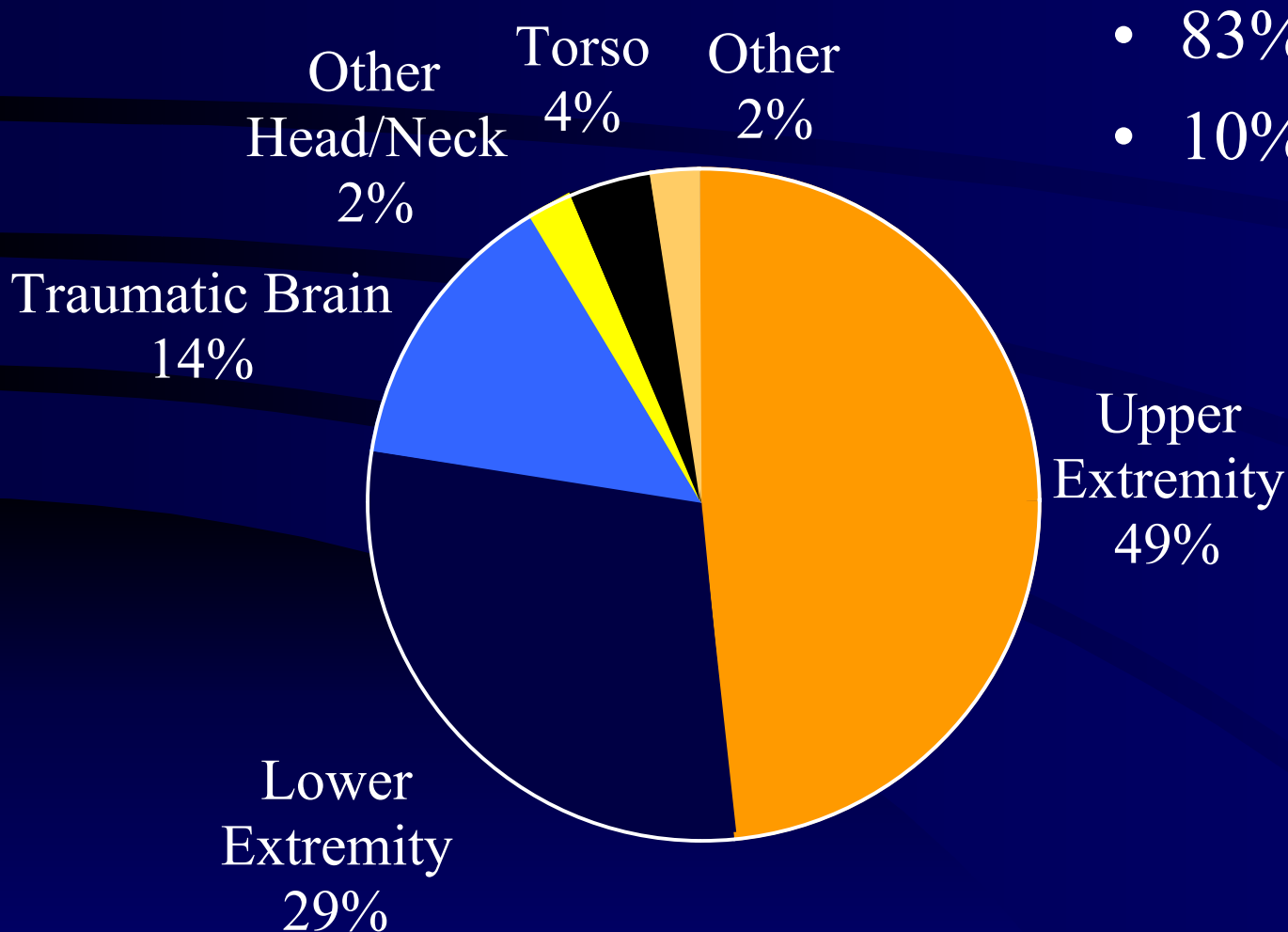
## Hospital Discharge Data, CA

Coders began to use these codes in 2001



# Skateboard Fall Injuries

0-14 yr olds, CA, 2001, N= 649



- 83% Fractures
- 10% Internal

# Sports Related (Pre-teen, Teen)

- Increased independence
- Increased strength and ability leads to increased involvement
- Variations in physical maturity
- Risk taking, aggression, competitiveness
- Growth spurts impact coordination
- Epiphyseal plate weaker than surrounding tissue during periods of rapid growth
- Leading cause of nonfatal injuries to adolescents
- Nonuse of protective equipment



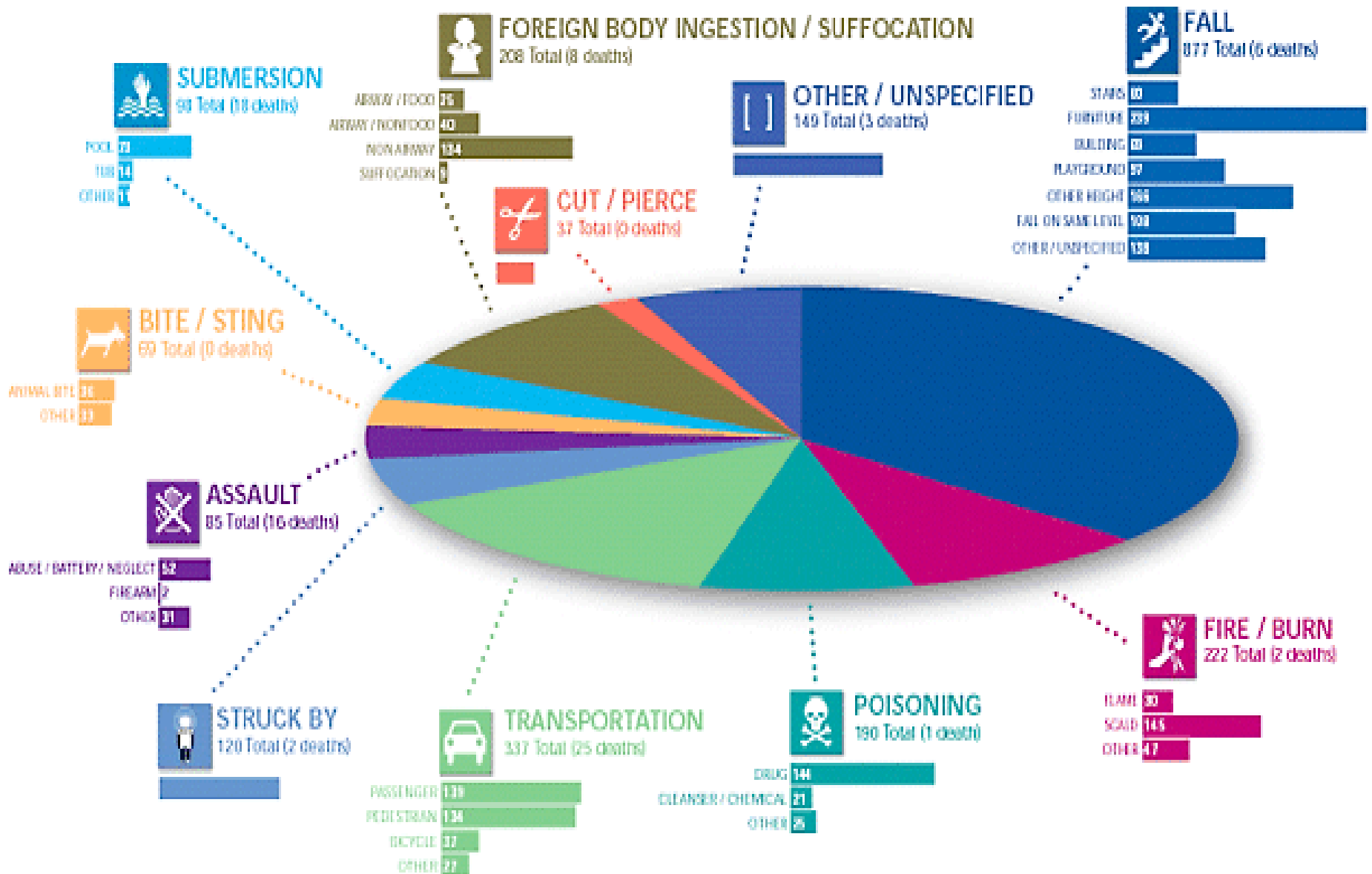
# Falls

- Diversity in types
- Wide range in severity
- Age related differences in types
- Age related differences in injury patterns

# INJURIES RESULTING IN HOSPITALIZATION OR DEATH BY MECHANISM

Orange County Residents 0 - 5 years old, 1998 - 2000

N = 2,398





Refer to Handouts 1 and 2

# Falls San Joaquin County

## 0-14 yr

- 103 hospitalizations in 2001, 0 deaths
- 323 hospitalizations 1999-2001
  - 17% falls from playground equipment
  - 16% falls from furniture
  - 3% falls on stairs
  - 3% fall from building
- 80% of playground fall injuries were extremity injuries