



Pediatric Trauma

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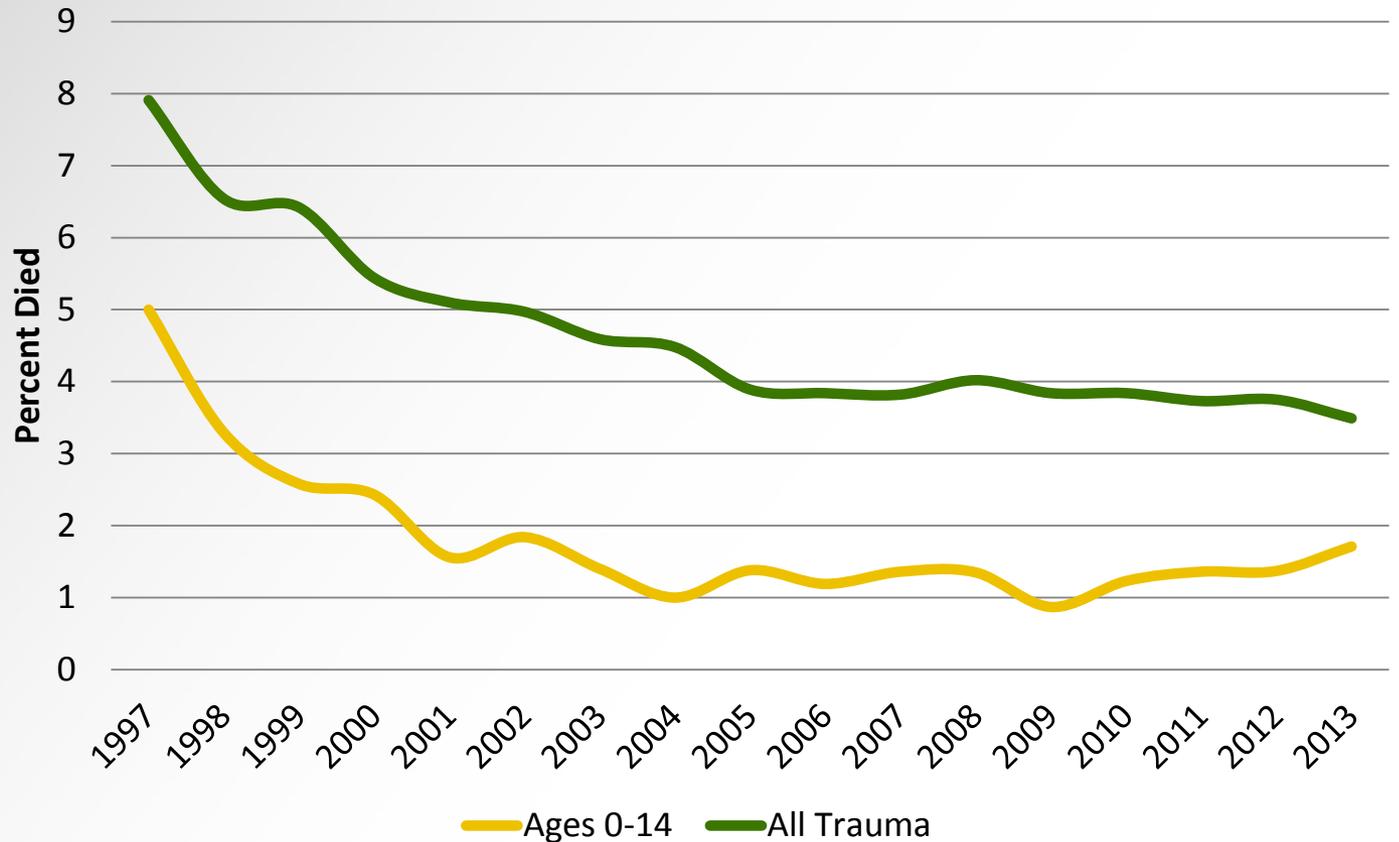
Pediatric (ages 0-14) mortality and volumes



As Washington's Trauma System Matured, Pediatric (Age < 15) Inpatient Trauma Mortality Improved Quickly

(Department of Health Criteria, excluding transfer-outs)

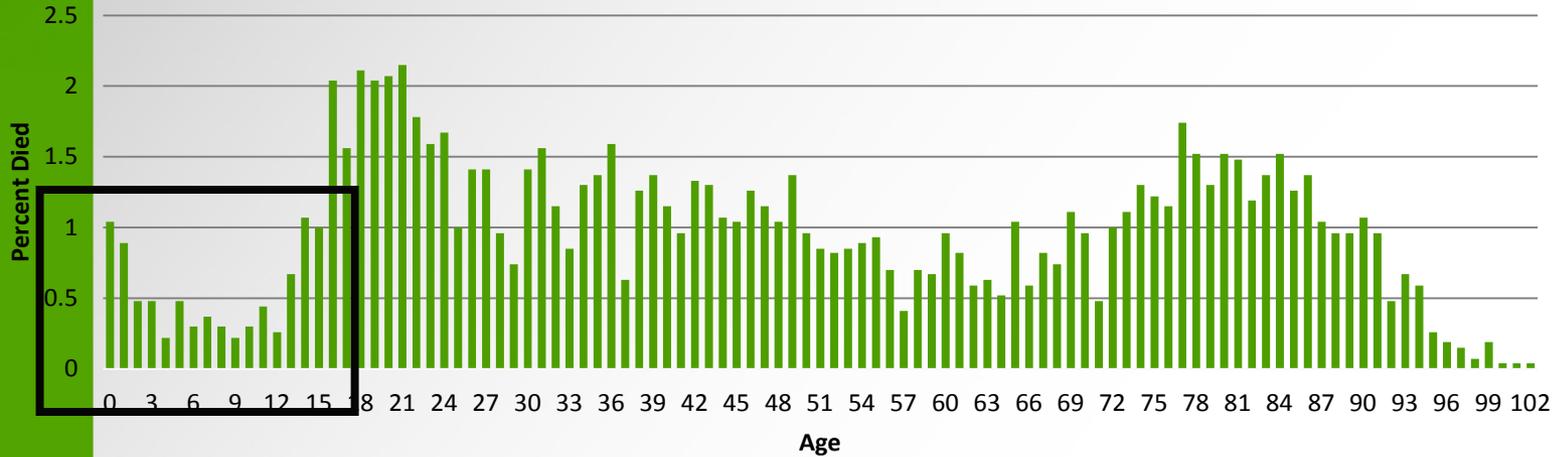
The percentage of hospital deaths, 1997-2013



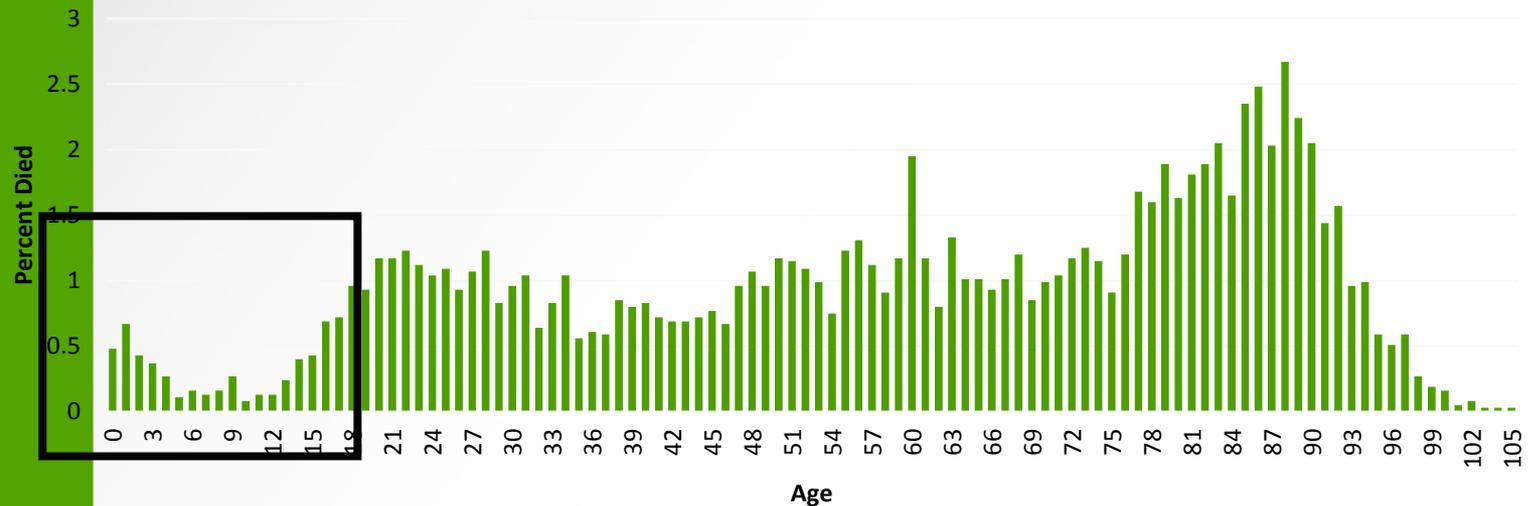


In recent years, we have observed a surge in older adult deaths. Earlier, the youth had most inpatient trauma deaths.

Percent Died by Age, 1995-1999



Percent Died by Age, 2008-2012

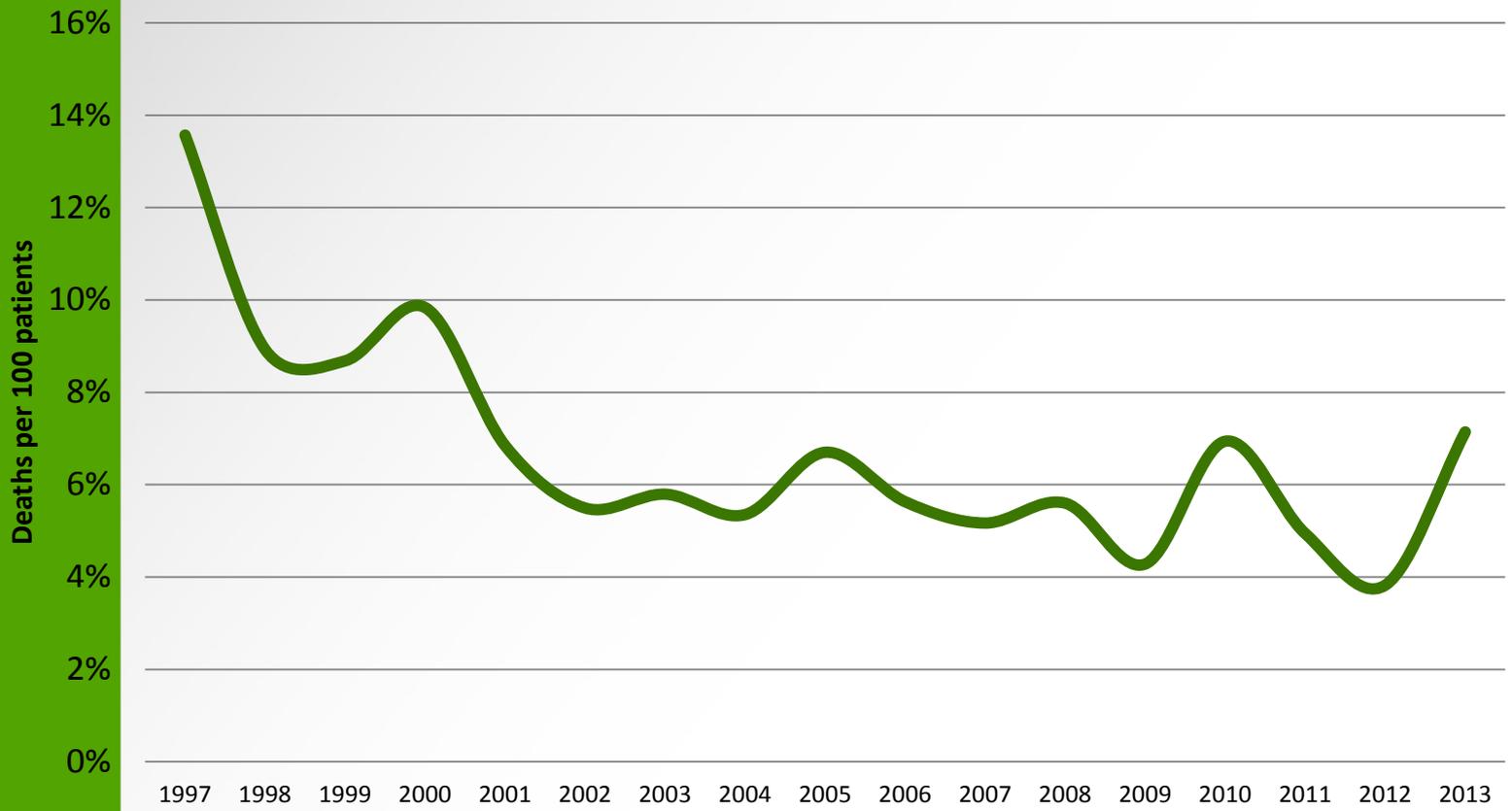




While the Overall Mortality Came Down, Major TBIs are Still the Deadliest of All Pediatric Trauma with 7 percent Case Fatality in 2013

(Department of Health criteria, excluding transfers in)

The Percentage of Major TBI (Max Head AIS \geq 3) Deaths Among Pediatric (Ages $<$ 15) Trauma Patients

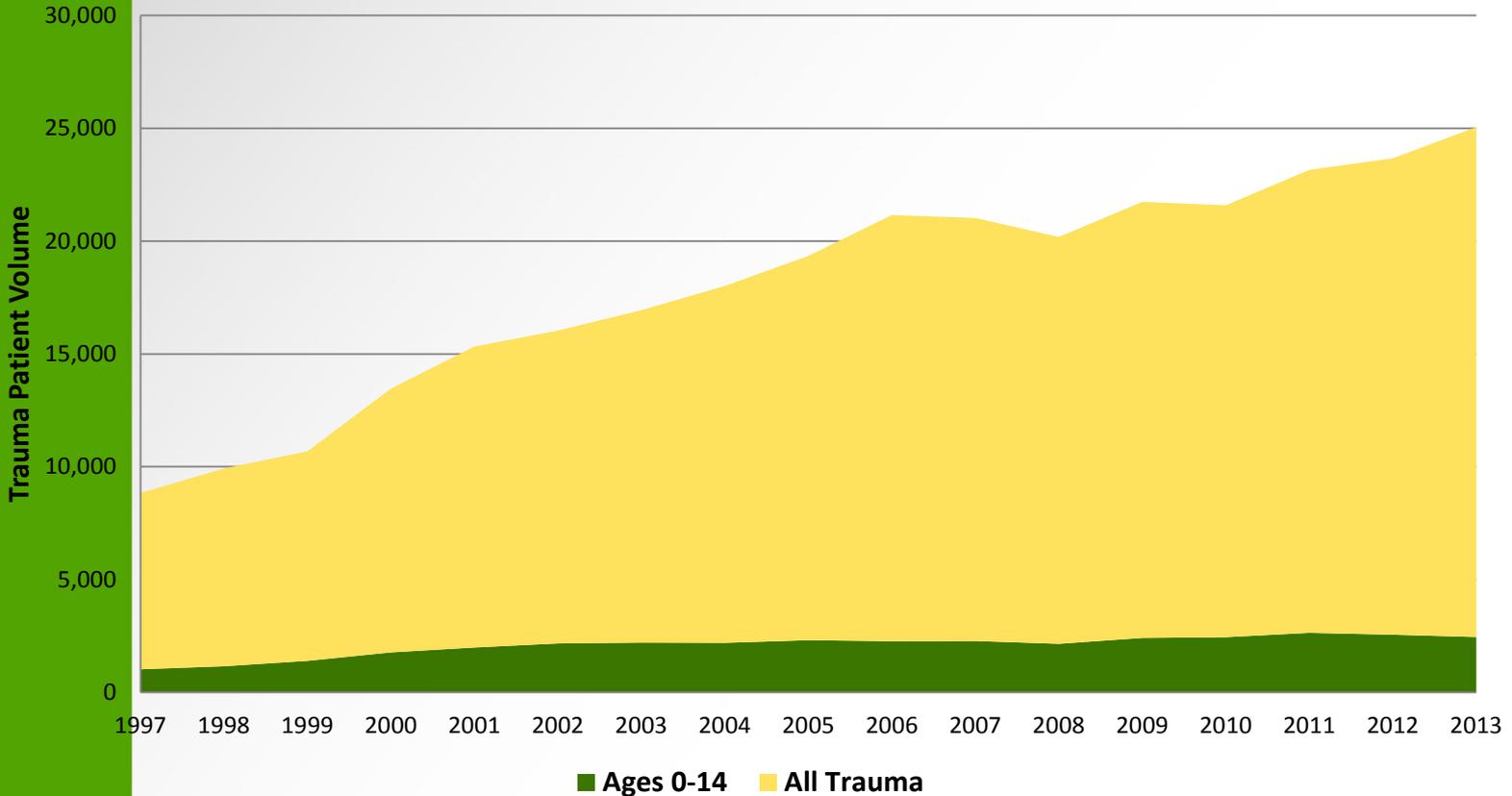




While Washington's Adult Trauma Volume Increased Significantly Over the Years, Since 2001 the Statewide Pediatric Volume Stayed Stable, Around 2,400 to 2,800 Patients

(Department of Health criteria, excluding transfers-out)

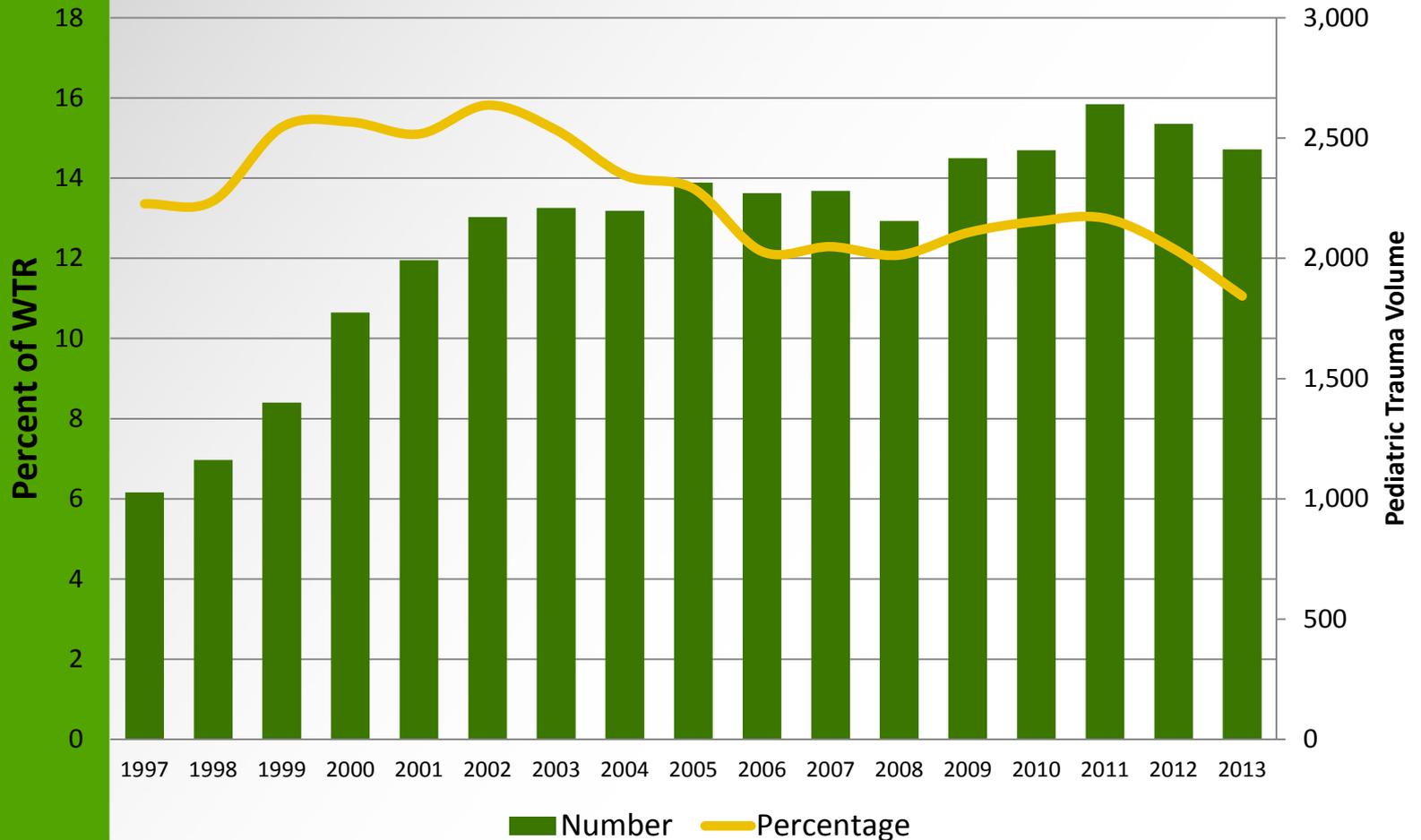
Washington's Trauma Volume





Starting with 2003, The Percentage of Pediatric Trauma in the Trauma Registry Went Down (Department of Health criteria, excluding transfers-out)

Pediatric (ages 0-14) Trauma in WTR, 1997-2013

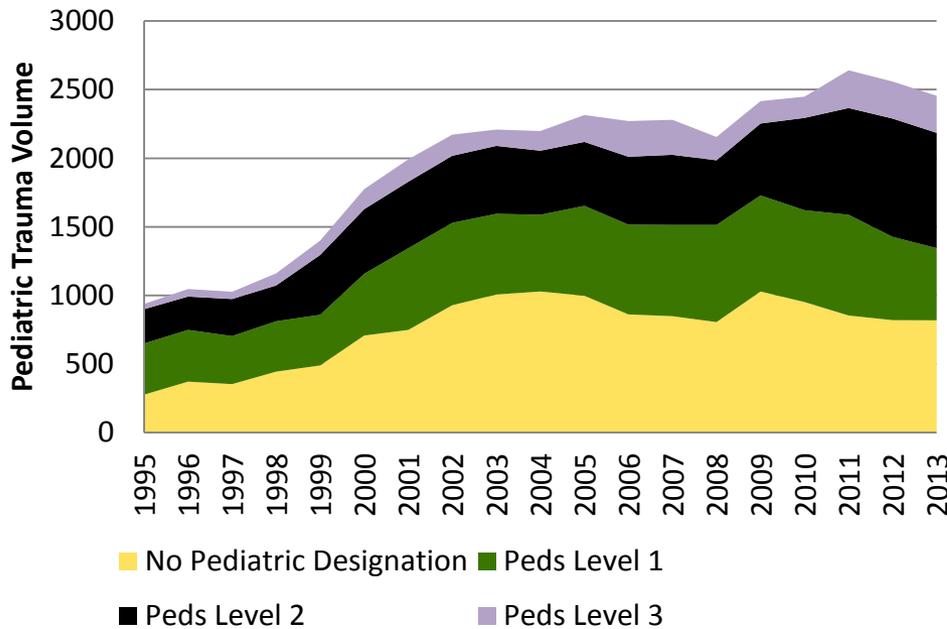




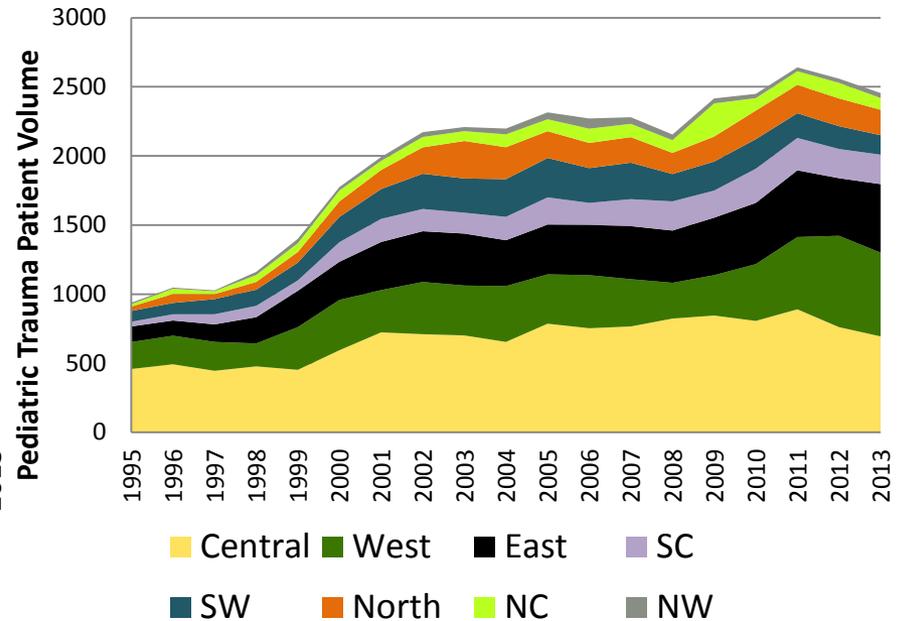
Since 2001, The Statewide Pediatric Trauma Volume Stayed Stable, Around 2,400 to 2,800 Patients, and the Level 2 Pediatric Centers Increased Their Number of Pediatric Patients

(Department of Health criteria, excluding transfers-out)

Washington's Pediatric Trauma Volumes by Pediatric Designation Level



Pediatric Trauma Volumes for Definitive Care by Region

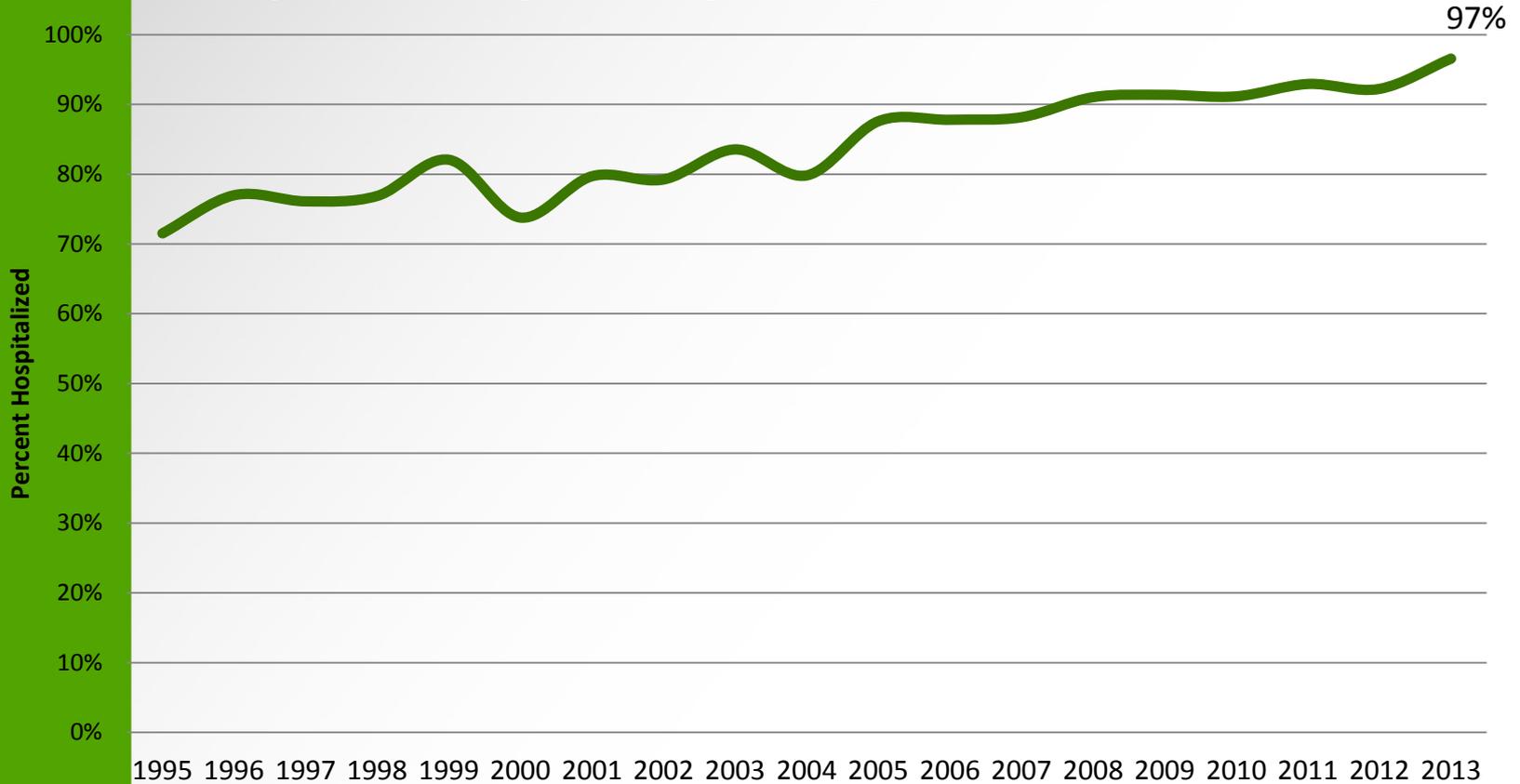




Most major (ISS 16+) pediatric (age <15) trauma patients receive definitive care from level I – II pediatric designated services

(Department of Health Criteria, admitted patients only)

The percentage of pediatric patients with serious injuries (ISS 16+) receiving definitive hospital care by level I-II pediatric designated services





Some of This Decline in Pediatric Patient Volumes as well as the Mortality Could be Attributed to Washington's Injury Prevention Activities

Injury Prevention – Related State Laws

- **Personal Flotation Devices/Life Jackets (1999):** All people on a personal watercraft (PWC) and any person under 12 years of age on a vessel under 19 feet in length must wear a U.S. Coast Guard-approved life jacket that fits the individual.
- **Child Passenger Safety (2005):** A child must be restrained in a child restraint system (rear-facing, forward-facing, or booster seat) until the child is 8 years old, unless the child is four feet nine inches tall or taller. Children under 13 years of age shall be transported in the back seat where it is practical to do so.
- **Zach Lystedt Law (2009):** A youth athlete suspected of sustaining a concussion or head injury in a practice or game shall be removed from play or competition at that time. The youth removed may not return to play until he or she is evaluated by a licensed health care provider who is trained in the evaluation and management of concussion, and receives written clearance to return to play.



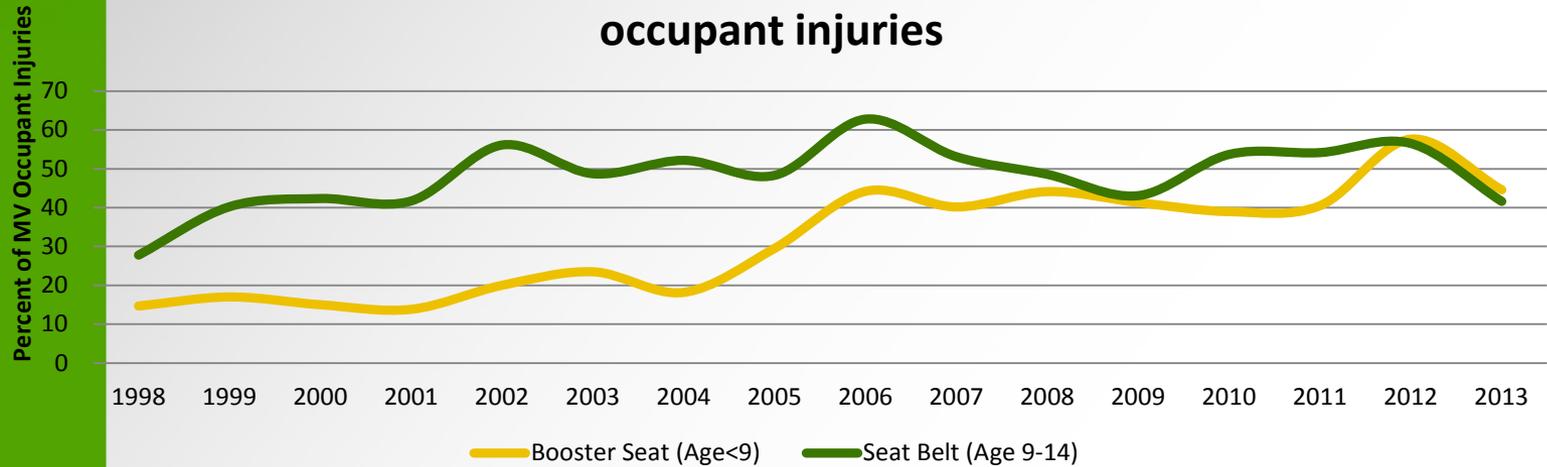
Currently, there is no state law requiring helmet use. However, some cities and counties do require helmet use with bicycles

Location Name	Who is Affected	Effective Date
Aberdeen	All ages	2001
Bainbridge Island	All ages	2001
Bremerton	All ages	2000
DuPont	All ages	2008
Eatonville	All ages	1996
Fircrest	All ages	1995
Gig Harbor	All ages	1996
Kent	All ages	1999
King County	All ages	1993, 2003 updated to include Seattle
Lynnwood	All Ages	2004
Lakewood	All ages	1996
Milton	All ages	1997
Orting	Under 17	1997
Pierce County	All ages	1994
Port Angeles	All ages	1994
Port Orchard	All ages	2004
Poulsbo	Under 18	1995
Puyallup	All ages	1994
Renton	All ages	1999
Spokane	All ages	2004
Steilacoom	All ages	1995
Tacoma	All ages	1994
University Place	All ages	1996
Vancouver	All ages	2008
All Military Installations	All ages	N/A

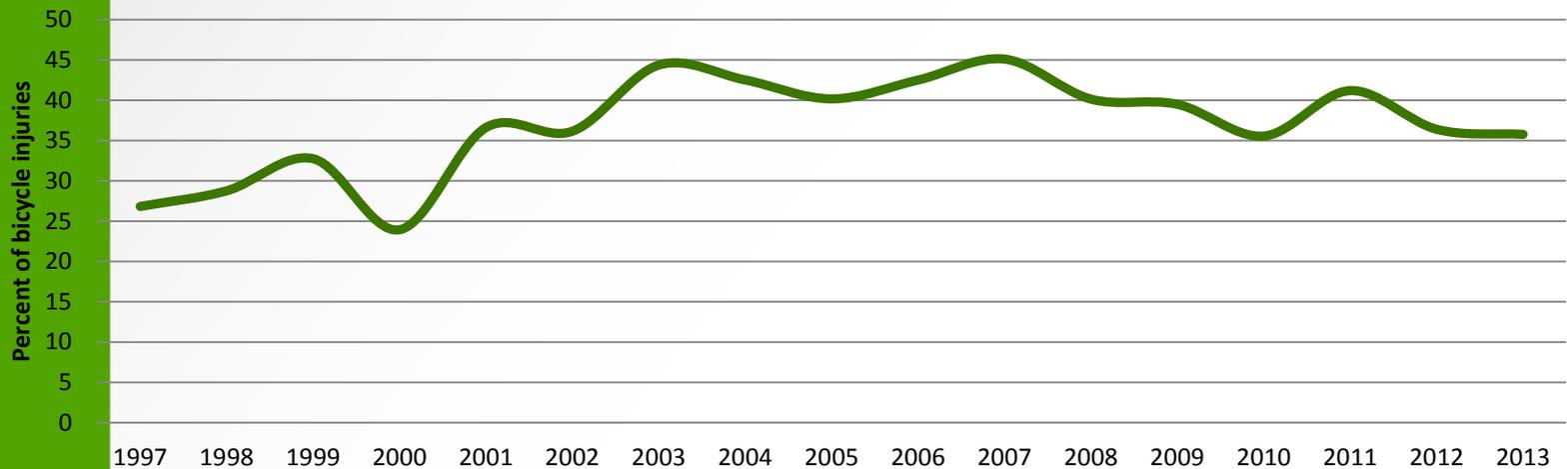


The WTR is more likely to capture those injuries with no injury prevention device use, because they tend to be more life-threatening than those injuries with seat belts or helmets. (Department of Health criteria, excluding transfers in)

Protective device use in Pediatric (ages<15) motor vehicle occupant injuries



Helmet use in pediatric (ages<15) bicycle injuries





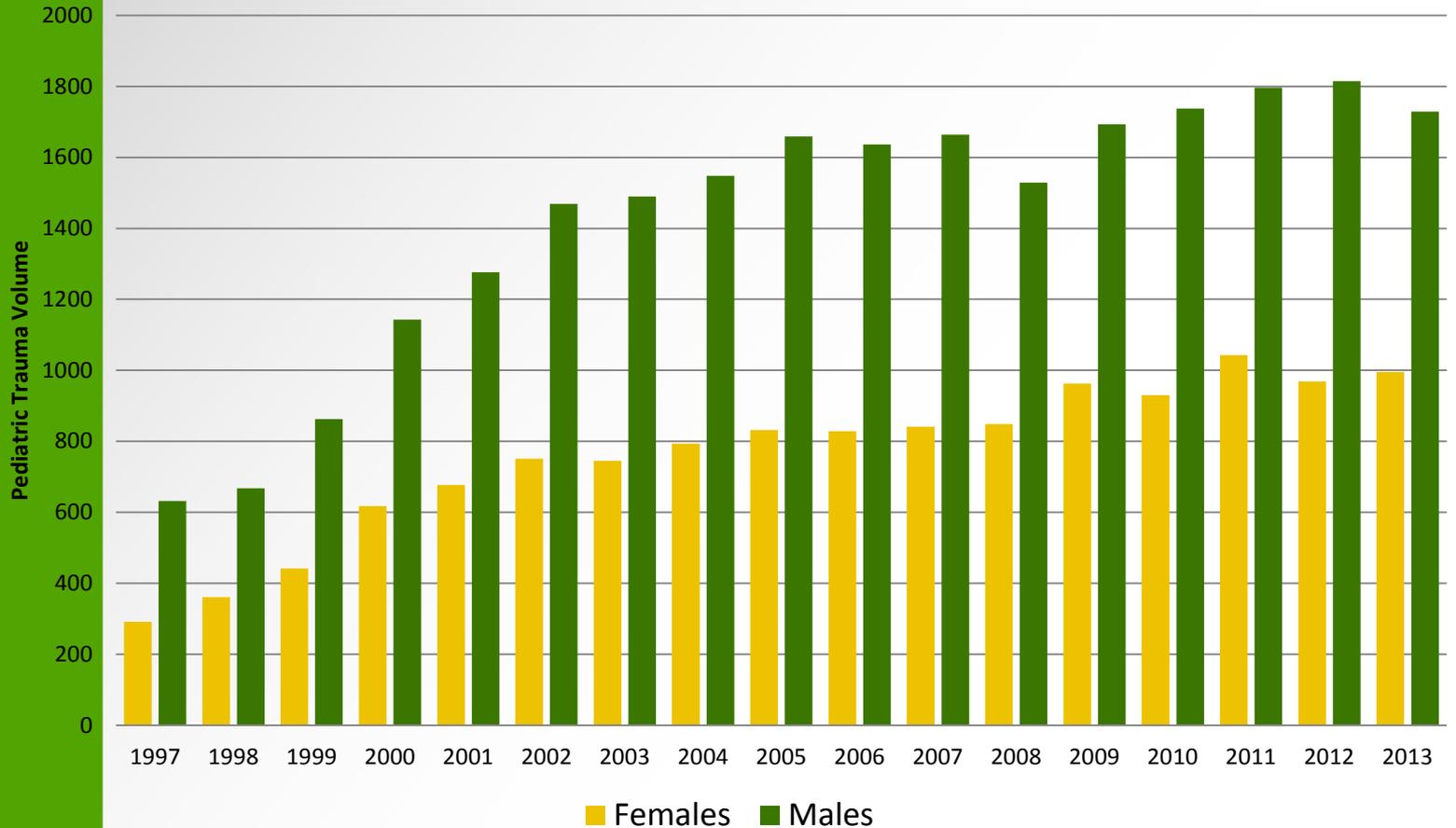
Demographic and injury characteristics



Gender Dynamics

(Department of Health criteria, excluding transfers out)

Pediatric Trauma (Age<15) by Gender

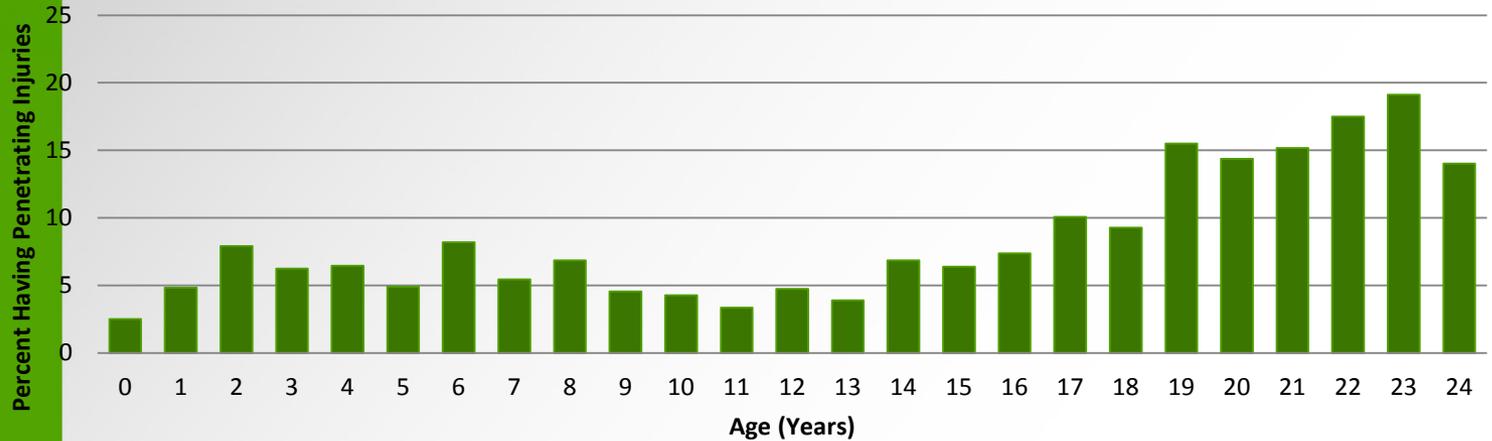




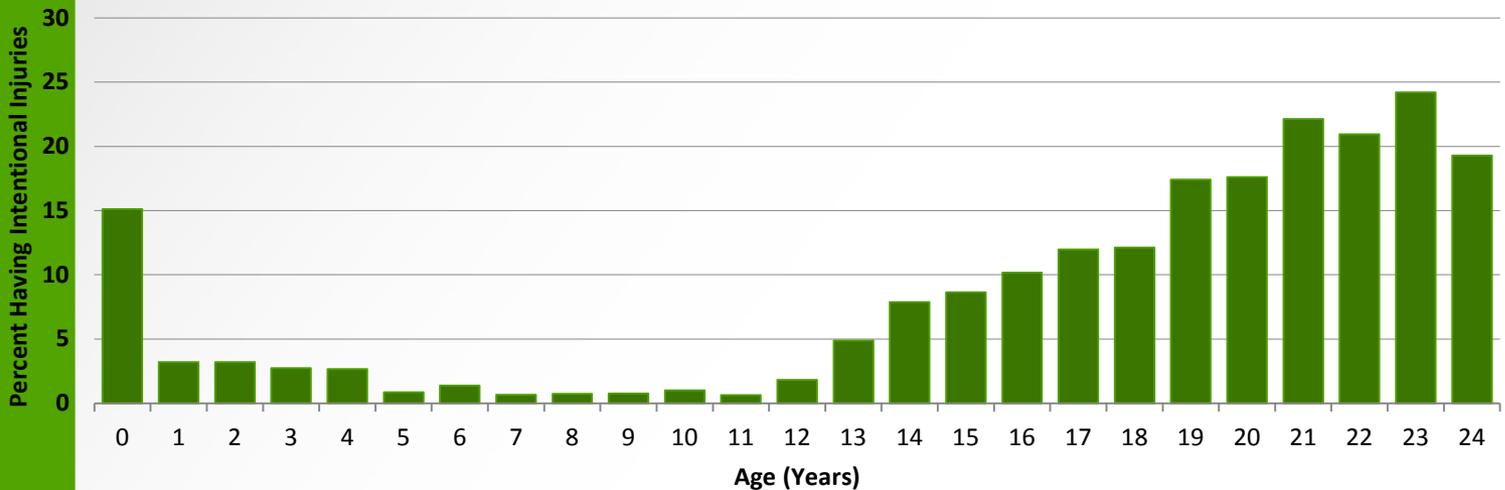
Watch out for those youngsters! After puberty, penetrating and intentional injuries go up!

(Department of Health criteria, excluding transfers in)

The percentage of penetrating injuries by age, 2010-2013

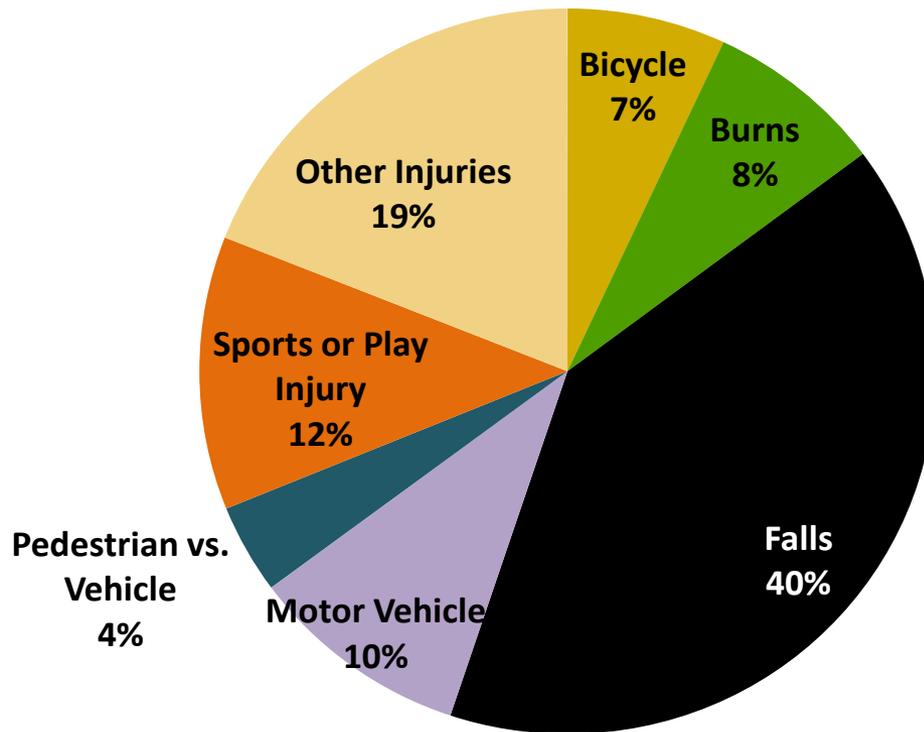


The percentage of intentional injuries by age, 2010-2013



Most Commonly Observed Injury Mechanisms in Pediatric Trauma, 2011-2013

(Department of Health criteria, excluding transfers out)

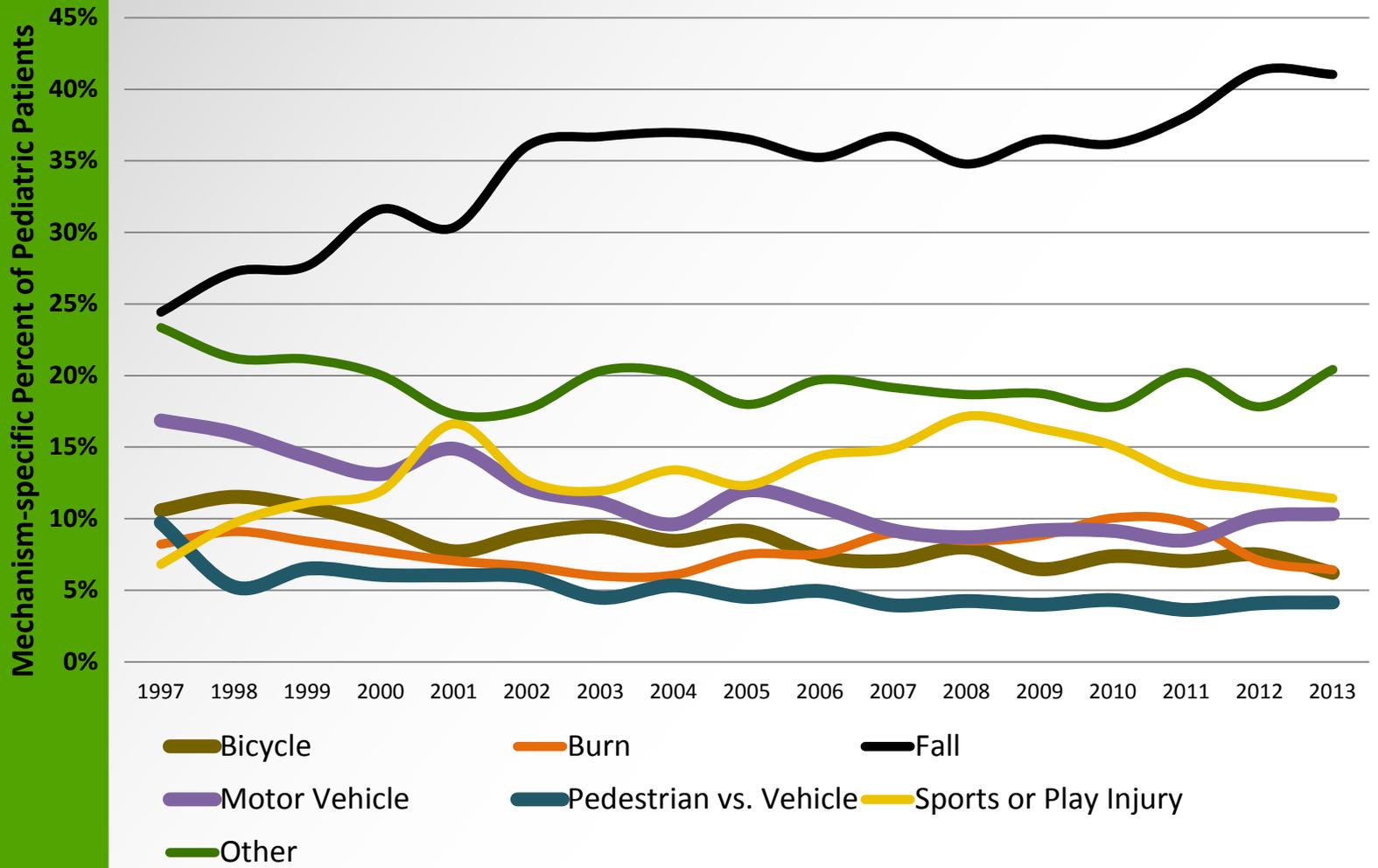




In Recent Years, Falls Show an Upward Trend While Motor Vehicle-Related Injuries are on the Decline

(Department of Health criteria, excluding transfers in)

Trends for Top Pediatric (Age<15) Injury Mechanisms





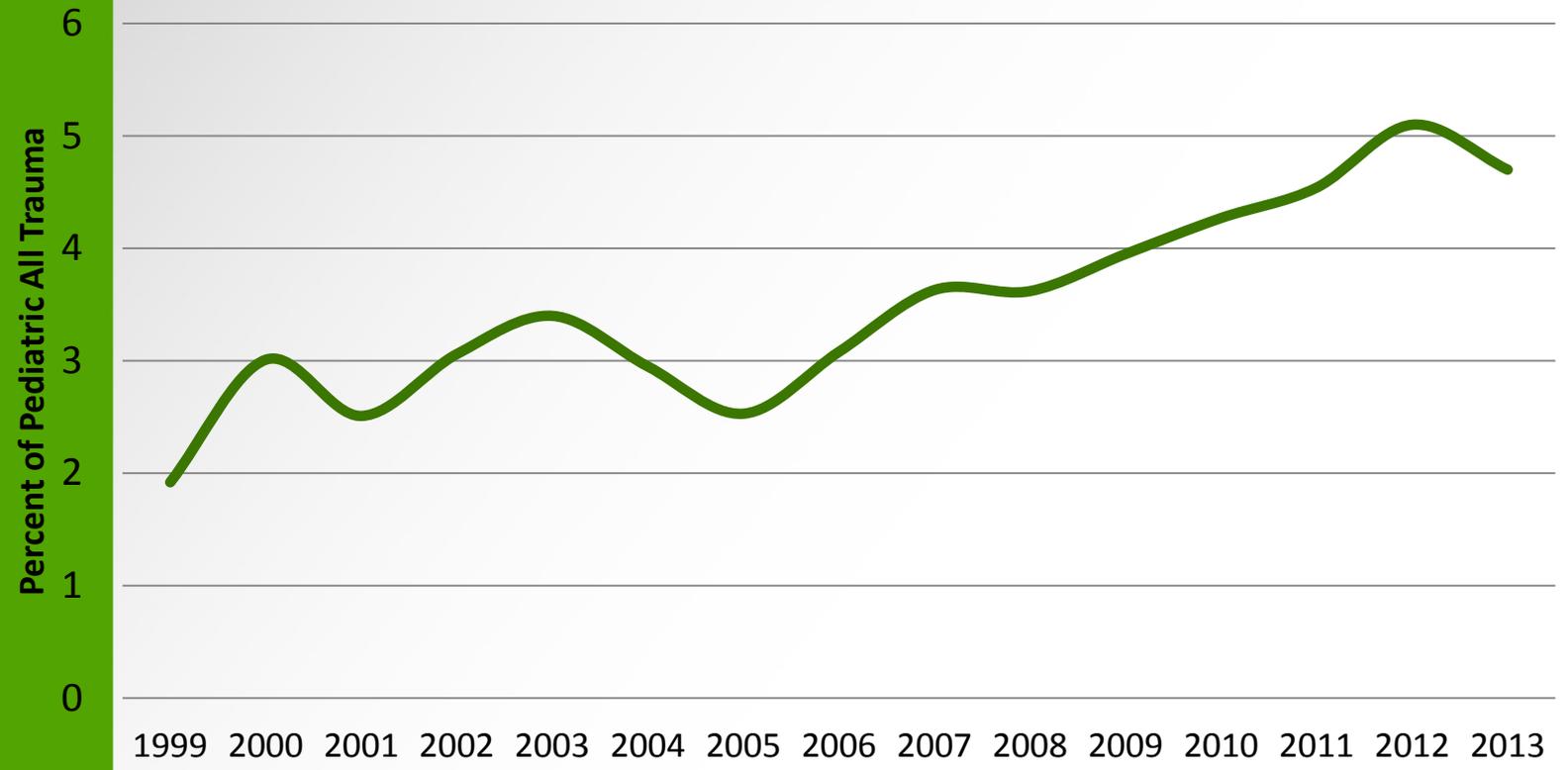
Pediatric (ages 0-14) falls from windows and balconies



We See an Increase in Pediatric (Ages 0-14) Falls From Windows and Balconies

(Department of Health criteria, excluding transfers in)

The Percentage of Building-Related Pediatric (Ages <15) Falls

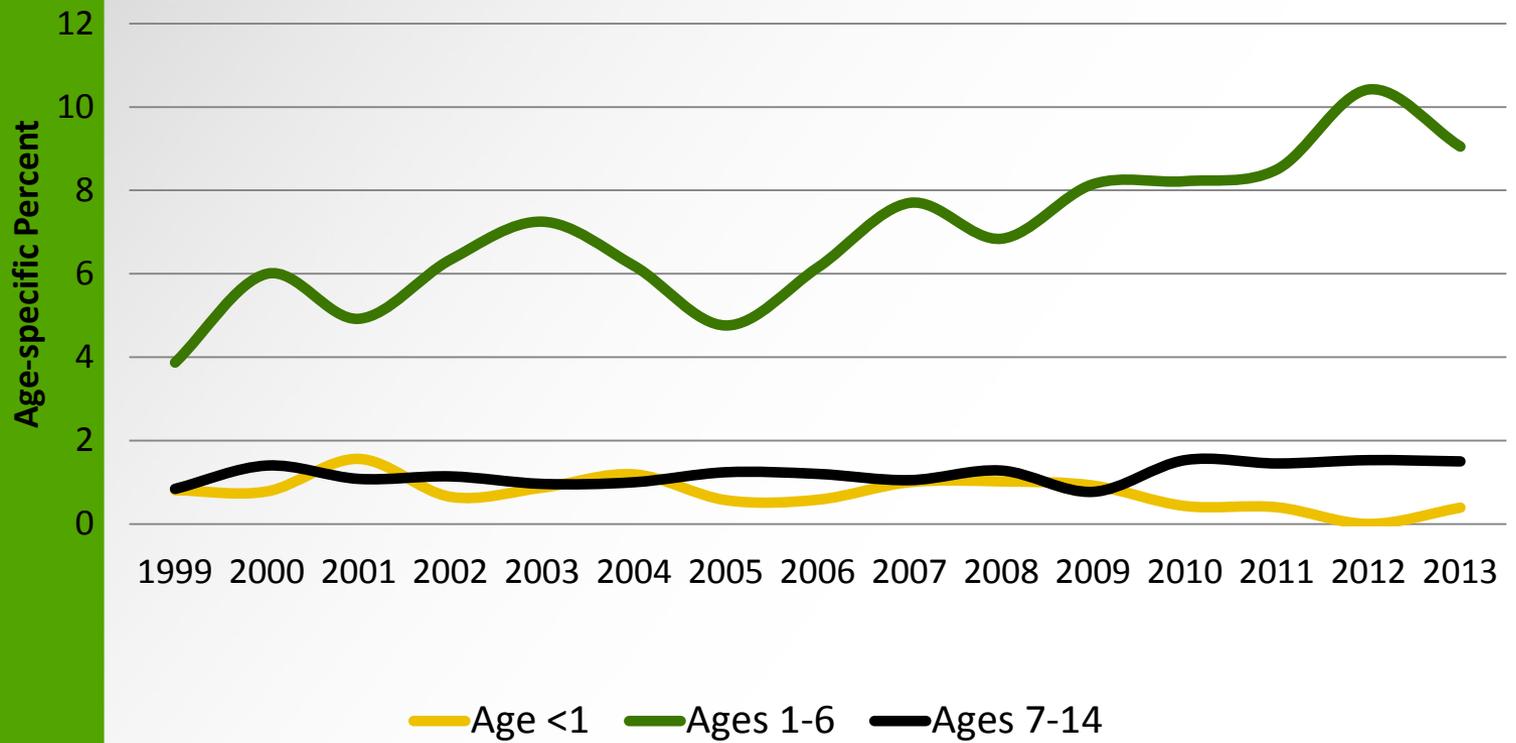




This Increase in Building-Related Falls Mostly Affects Children Ages 1-6

(Department of Health criteria, excluding transfers out)

The Percentage of Building-Related Pediatric Falls by Age Groups

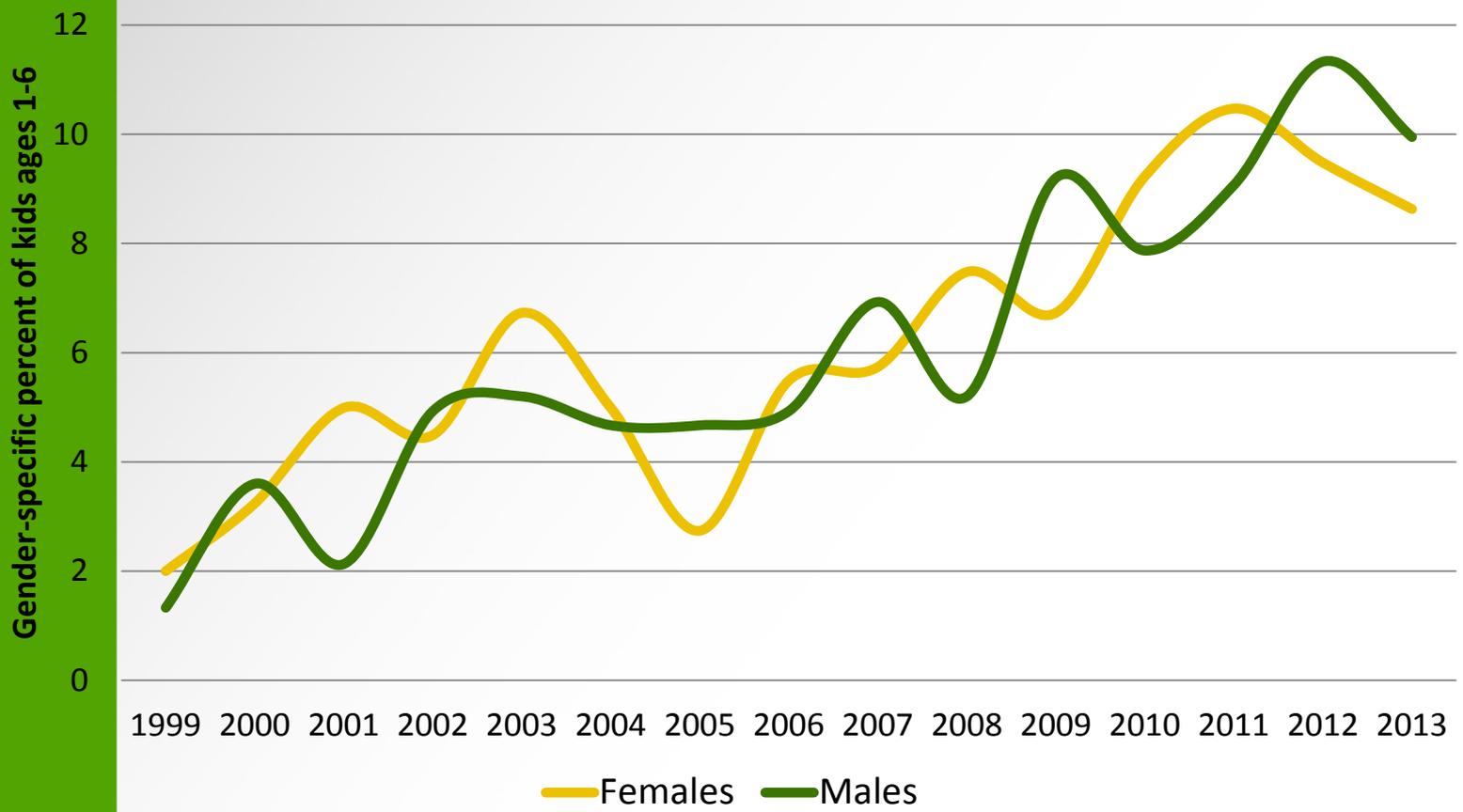




No Gender Differences Among Children Ages 1-6 With Window-Balcony Falls

(Department of Health criteria, excluding transfers out)

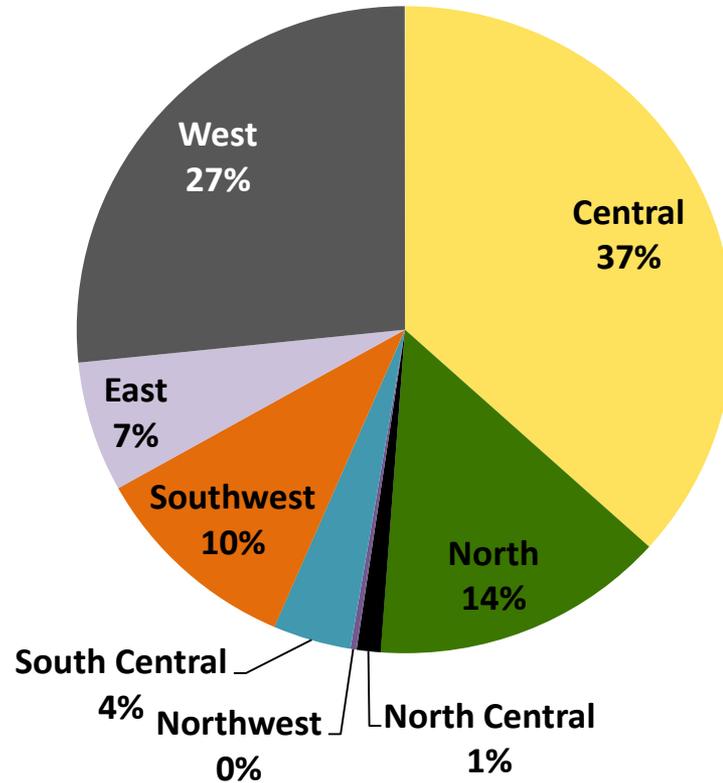
The Percentage of Building-Related Pediatric Falls by Gender



Regional Distribution of Building-Related Falls Among Children Ages 1-6

(Department of Health criteria, excluding transfers out)

Pediatric Window-Balcony Falls by Region, 2011-2013

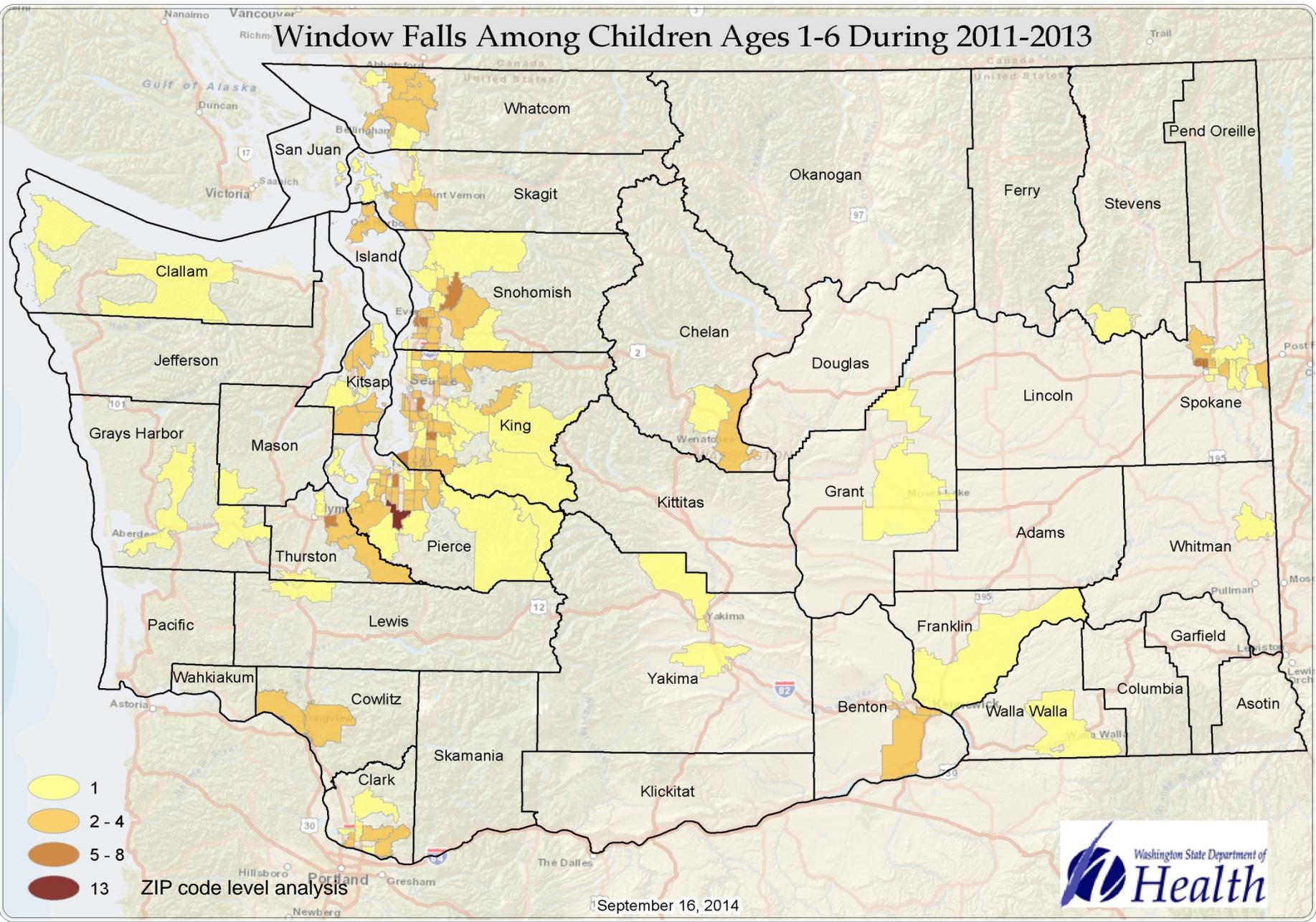


N=333



Washington Trauma Registry Data

Window Falls Among Children Ages 1-6 During 2011-2013



The Outcomes of Building-Related Trauma Among Children Ages 1-6, 2011-2013

(Department of Health criteria, excluding transfers out)

- Out of 333 statewide window/balcony falls:
 - 92 (28 percent) received ICU care
 - 18 (5 percent) had serious (AIS 3+) head injury
 - 2(1 percent) died
 - 321 (96 percent) were discharged home
 - 10 (3 percent) were discharged to a rehab facility or received rehab care at home.

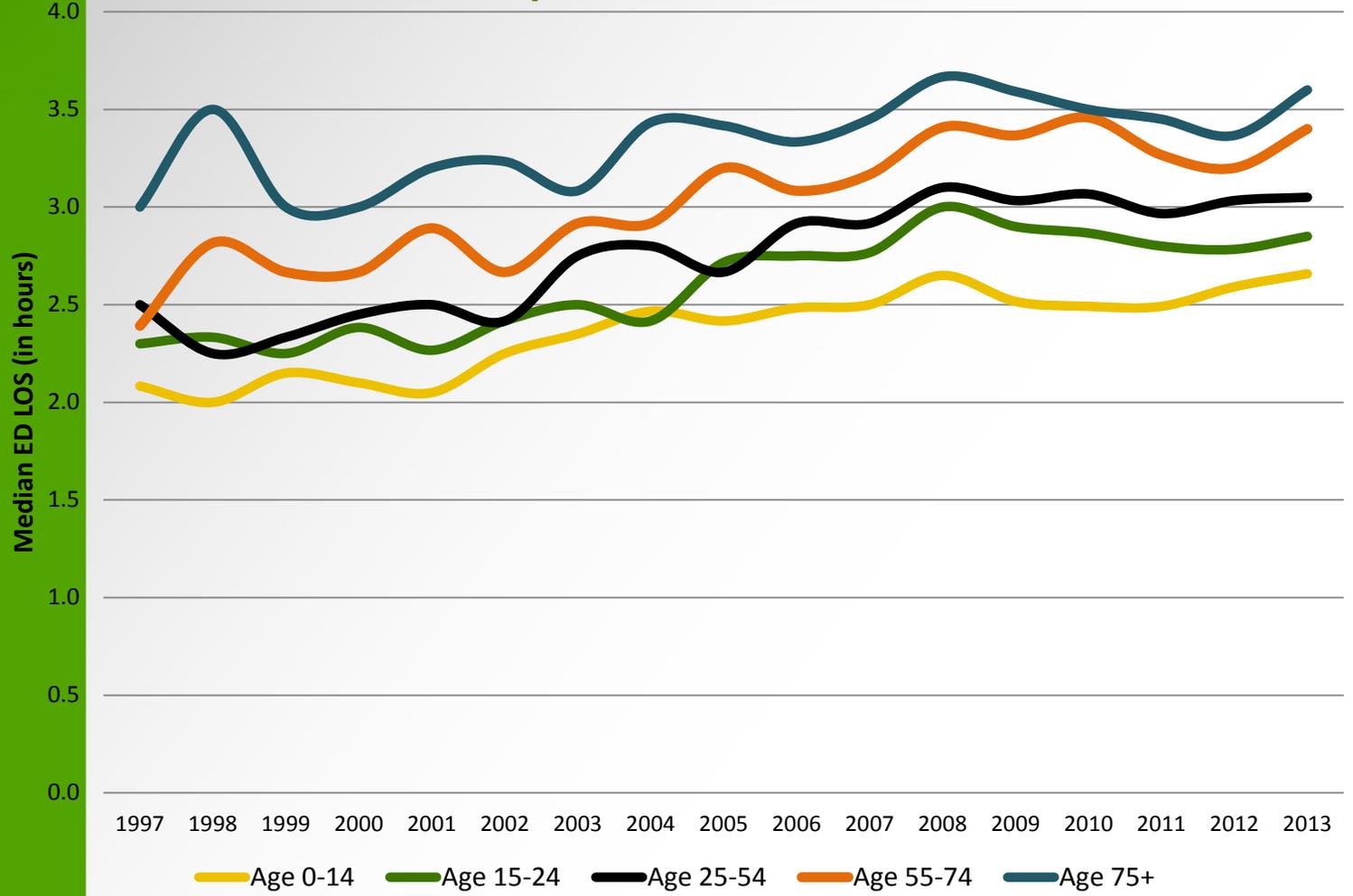




**Other issues related to the management
of pediatric trauma care**



Median emergency department length of stay of transfer out patients (Department of Health criteria)

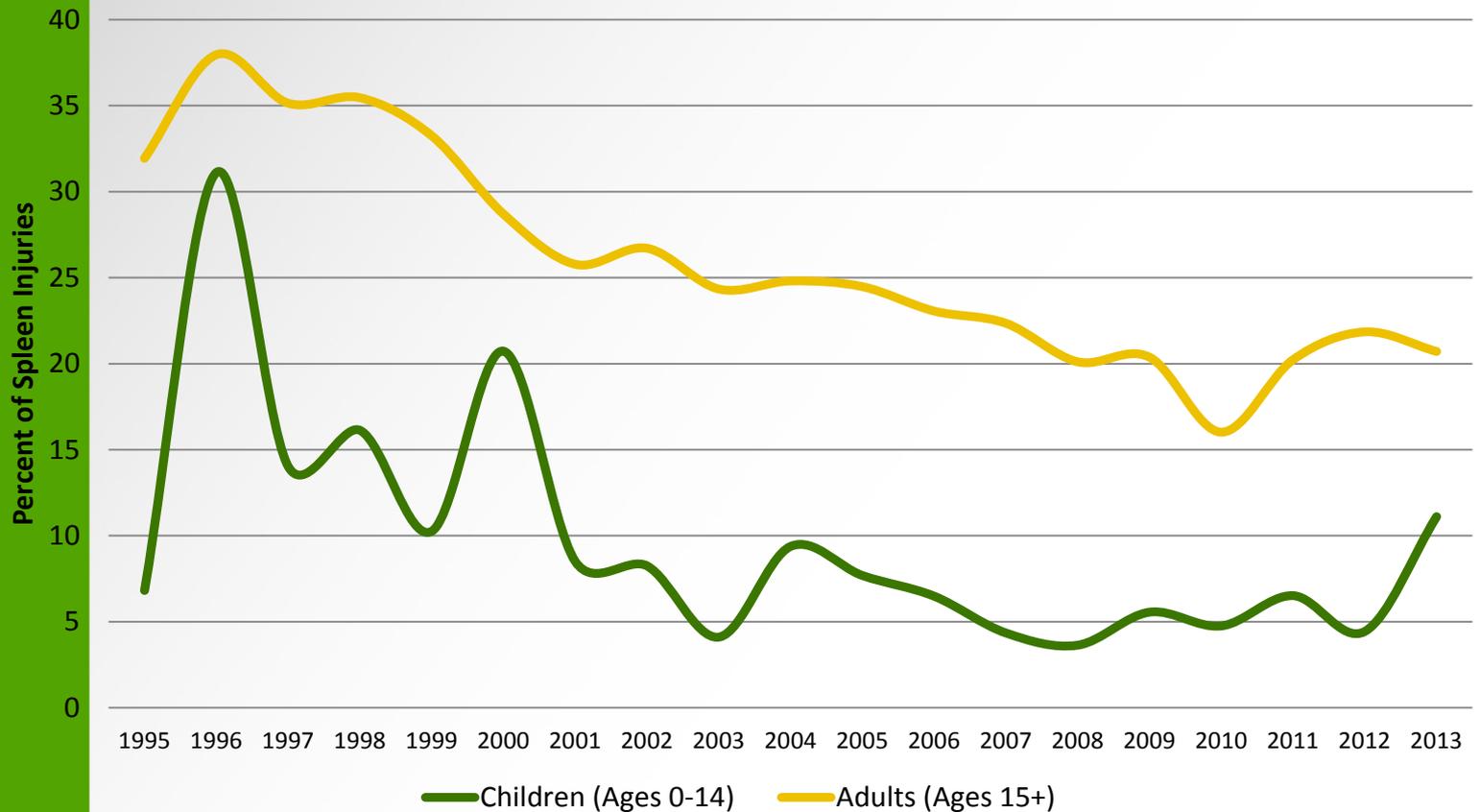




The percentage of spleen injuries managed with splenectomies declined over time

(Department of Health criteria, hospital admissions)

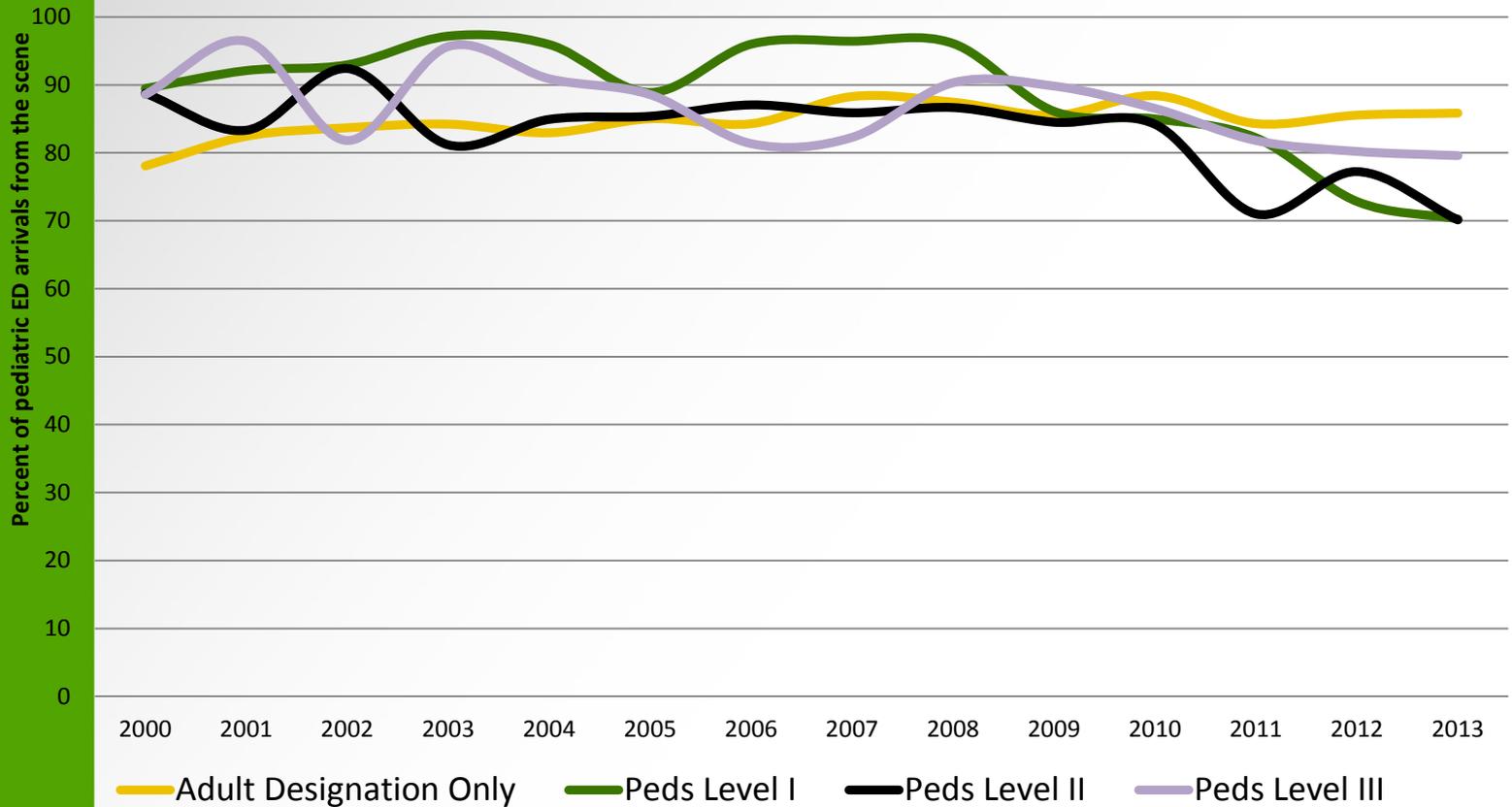
The percentage of splenectomies by age

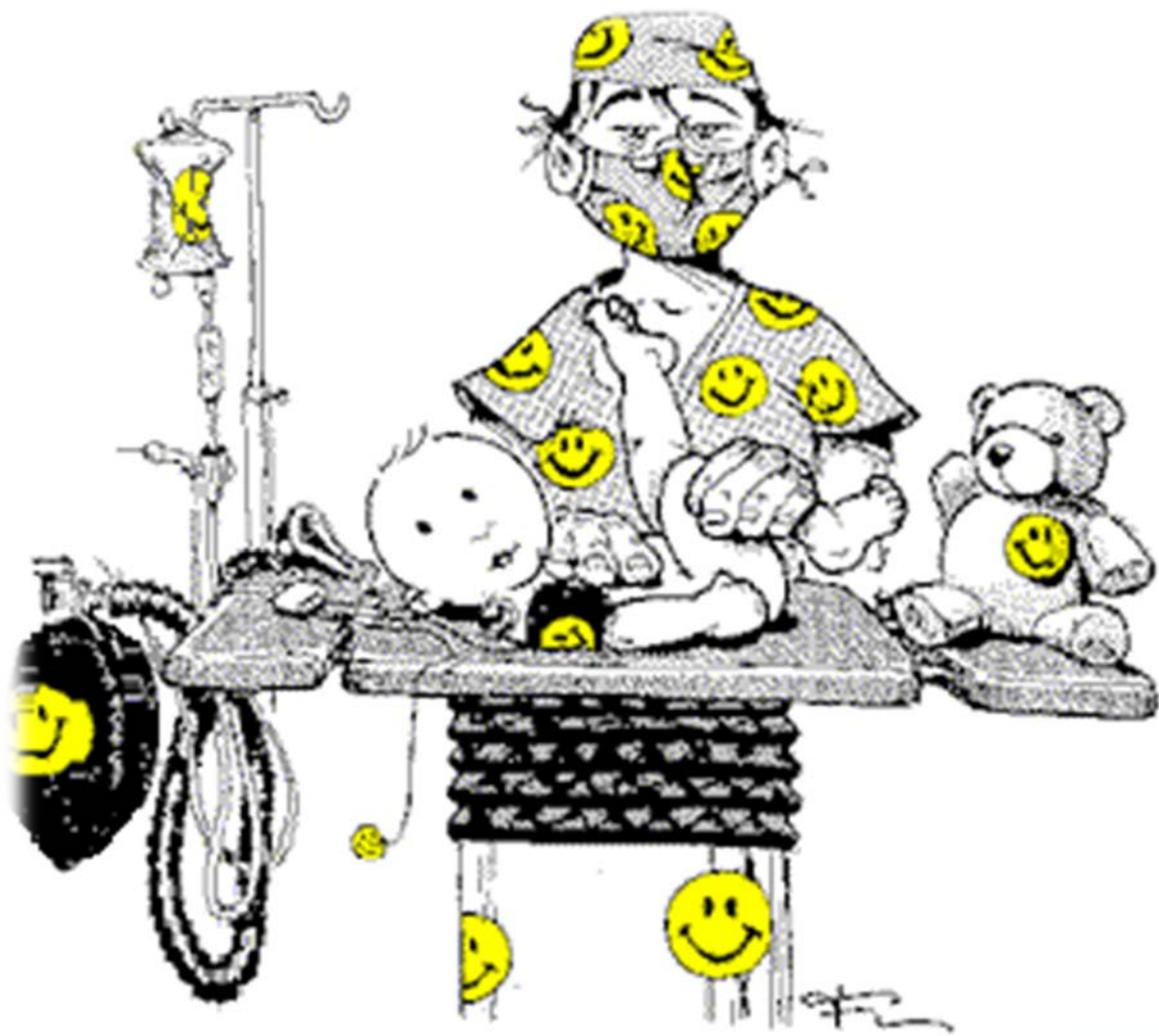




The use of CT scans to diagnose pediatric TBIs is going down in pediatric designated centers

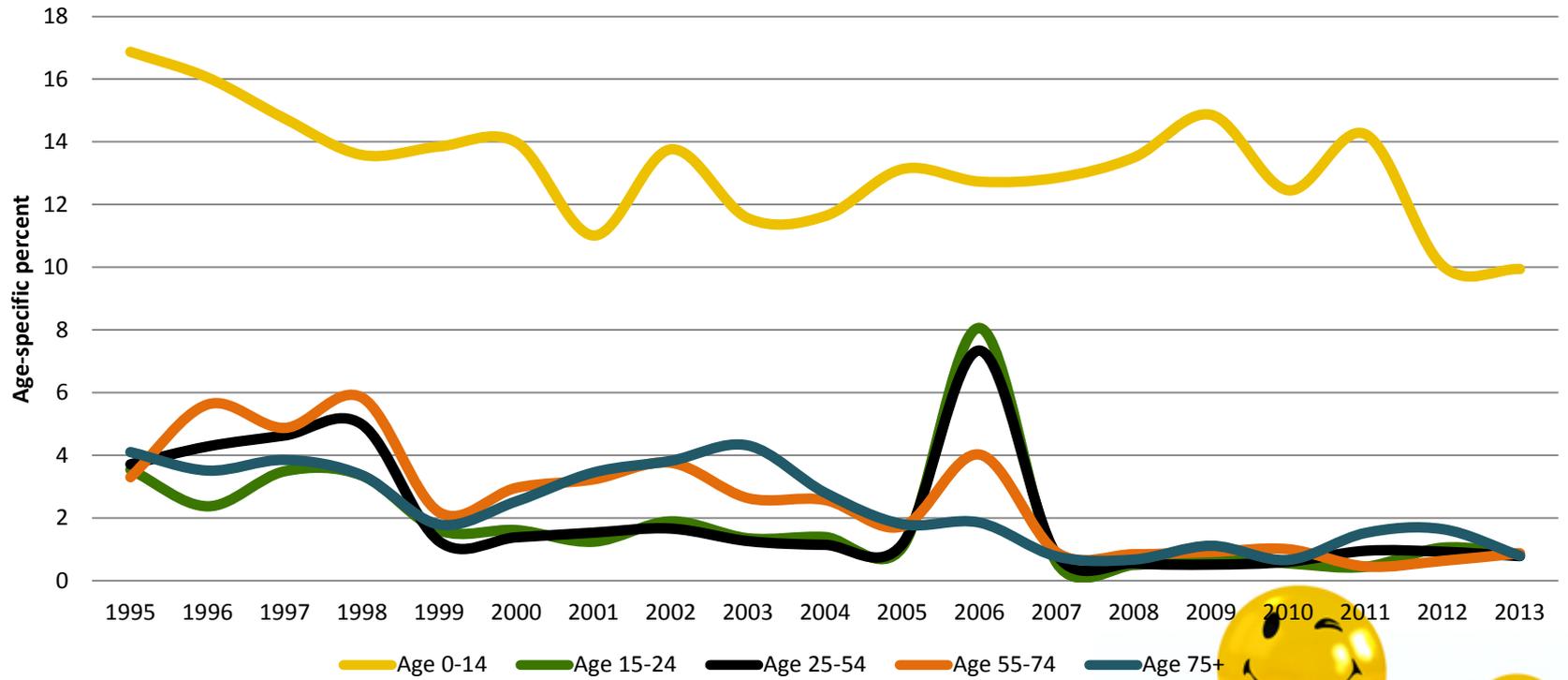
Pediatric (Ages 0-14) Utilization of Head CTs for Minor Head Injuries (AIS <=3) by Pediatric Designation Level





WTR Records with No Emergency Department Systolic Blood Pressure Recorded by Age and Year

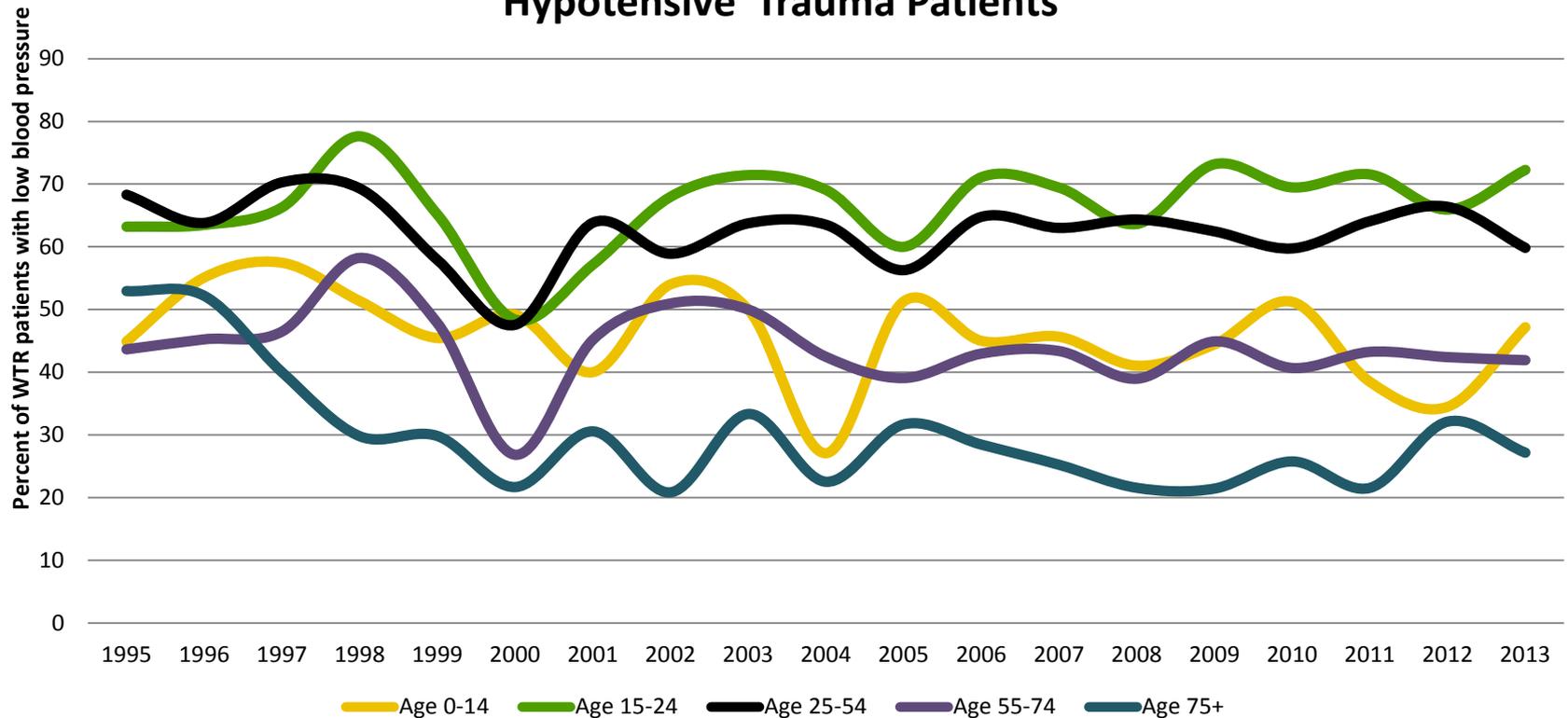
(Department of Health Criteria, excluding transfers-out)



Full Trauma Team Activations (FTTA) for hypotensive pediatric (age 5-14) and older adult (age 55+) trauma patients are lower than other adult age groups

(DOH Criteria, Age-Appropriate Systolic Blood Pressure Thresholds, and Excluding Transfers in)

The Percentage of Full Trauma Team Activations (FTTA) for Hypotensive Trauma Patients





In summary

- After the implementation of Washington's Trauma System, outcomes of pediatric (age <15) trauma improved significantly.
- This suggests effectiveness of coordinated trauma care efforts in this age group.
- Two major coordinated efforts took place.
 - Injury prevention resulted in a relative decline in pediatric volumes in recent years.
 - Better trauma care resulted in a decline in pediatric inpatient mortality.
- Despite all these improvements, TBIs are still the main cause of pediatric deaths, and rising pediatric window-balcony falls in ages 1-6 is a concern.



Thanks!

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