



North America Fixed-Site Amusement Ride Safety Report, 2023 Update, Executive Summary

Prepared for
IAAPA, The Global Association
for the Attractions Industry



July 2024

This is an abridged version. For the full report visit [IAAPA.org/Research](https://iaapa.org/Research).

1. BACKGROUND AND SCOPE

This report presents the results of work done by the National Safety Council (NSC) under contract to IAAPA, the global association for the attractions industry. It includes estimates by NSC for calendar years 2003 through 2023.

Since 2003, NSC has produced the annual North America Fixed-Site Amusement Ride Safety Report for IAAPA, collecting and analyzing ridership, attendance, and patron injury data from facilities that operate fixed-site amusement rides. Beginning with the 2016 data year, Canadian parks were included in the ride safety survey. The survey includes amusement and theme parks, tourist attractions, and family entertainment centers. The results of the survey follow.

1.2 RIDE SAFETY SURVEY RESPONSE

A total of 217 facilities responded to the survey. Of the responses:

- 208 provided some or all the data requested.
- 9 were unable to report either attendance or counts of rides taken.

The number of facilities providing data increased 40% in 2023, from 149 facilities in 2022 to 208 in 2023. The 2023 survey resulted in a total of 194 parks providing attendance-based data and 168 parks providing ridership-based data. Of these, 154 parks provided both attendance and ridership data. Parks participating in the 2023 survey represent approximately 64% of total North America estimated attendance and rides taken. The majority of responding facilities included in this analysis are IAAPA members, with 191 (92%) coming from IAAPA members and 17 (8%) from non-members.

2.0 RESULTS

**Injury rate trends are mixed
in 2023 compared to 2022:**

Injuries per million
attendees were
UP 4%.

Injuries per million
rides taken were
DOWN 3%.

Number of injuries
are **UP IN 2023
FROM 2022
(5%).**

From 2004 to 2023 injury rates have decreased:

Injuries per million
attendees were
DOWN 51%.

Injuries per million
rides taken were
DOWN 22%.

From 2004 to
2023 injuries have
**DECREASED
11%.**

8% of injuries are estimated to be serious:
Serious injuries **DECREASED 54%** from 2022 to 2023.



Most injuries occur on
FAMILY/ADULT RIDES,
followed by **ROLLER
COASTERS.**



Proportion of
injuries occurring
on children's rides
DECREASED
for the second
consecutive year,
DOWN TO 10%.



Roller coasters have the
HIGHEST INJURY RATE
per million rides taken.

**CHILDREN'S RIDES HAVE THE
LOWEST RATES,** with over half of injuries
occurring while getting in or out of the ride.

3.0 RIDE SAFETY REPORT RESULTS

Section 3 is based on the full North America Fixed-Site Amusement Ride Safety Report 2023 sample of responding 208 usable responses. Attendance based estimates reflect the 194 parks providing attendance data, while the ridership estimates reflect 168 parks providing ridership data. Sample results are weighted to reflect the estimated 443 operating parks in North America.

3.1 TOTAL INJURIES

Separate attendance-based and ridership-based injuries analyses were performed. Since not all facilities were capable of reporting both attendance and ridership data, there were variations in the selection of facilities utilized for each analysis.

As in past years, the estimated number of injuries using the two samples resulted in similar counts. In 2023, the estimates using the sample of parks providing attendance data result in 1,376 injuries, while the ridership estimates show 1,461 injuries. Because ridership-based rates are a more appropriate measure of exposure to risk than attendance-based rates, this report will focus primarily on ridership-based estimates. Results based on the attendance-based analysis are clearly labeled.

Similar to past findings, the vast majority of injuries are in the reportable category, not serious. However, the prevalence of serious injuries reported in 2023 is substantially lower than in previous years. In 2023, 8% of injuries were serious compared to 19% in 2022, 11% in 2021, and 16% in 2020. As in past years, family/adult rides were associated with the largest number of injuries followed by roller coasters.

The majority (**71%**) OF INJURIES occur as a result of **RIDE MOTION** versus **29%** while **ENTERING OR EXITING THE RIDE.**

TOTAL INJURY ESTIMATES BASED ON PARKS PROVIDING RIDERSHIP DATA

	North America Estimate (Ridership Providing Sample)									
	2023		2022		2021		2020		2019	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Parks	443		437		431		346		436	
TOTAL INJURIES	1,461	100%	1,390	100%	1,224	100%	341	100%	1,294	100%
Serious	118	8%	259	19%	130	11%	54	16%	82	6%
Reportable	1,343	92%	1,131	81%	1,094	89%	286	84%	1,212	94%
Children's rides	144	10%	148	11%	201	16%	26	8%	157	12%
Family/adult rides	859	59%	739	53%	640	52%	205	60%	688	53%
Roller coasters	458	31%	503	36%	383	31%	110	32%	449	35%
Getting in/out	422	29%	457	33%	406	33%	108	32%	511	40%
Ride motion	1,039	71%	933	67%	818	67%	233	68%	783	60%

For reference to the ridership-based estimates (provided above), estimates using the attendance-based sample of parks are provided below.

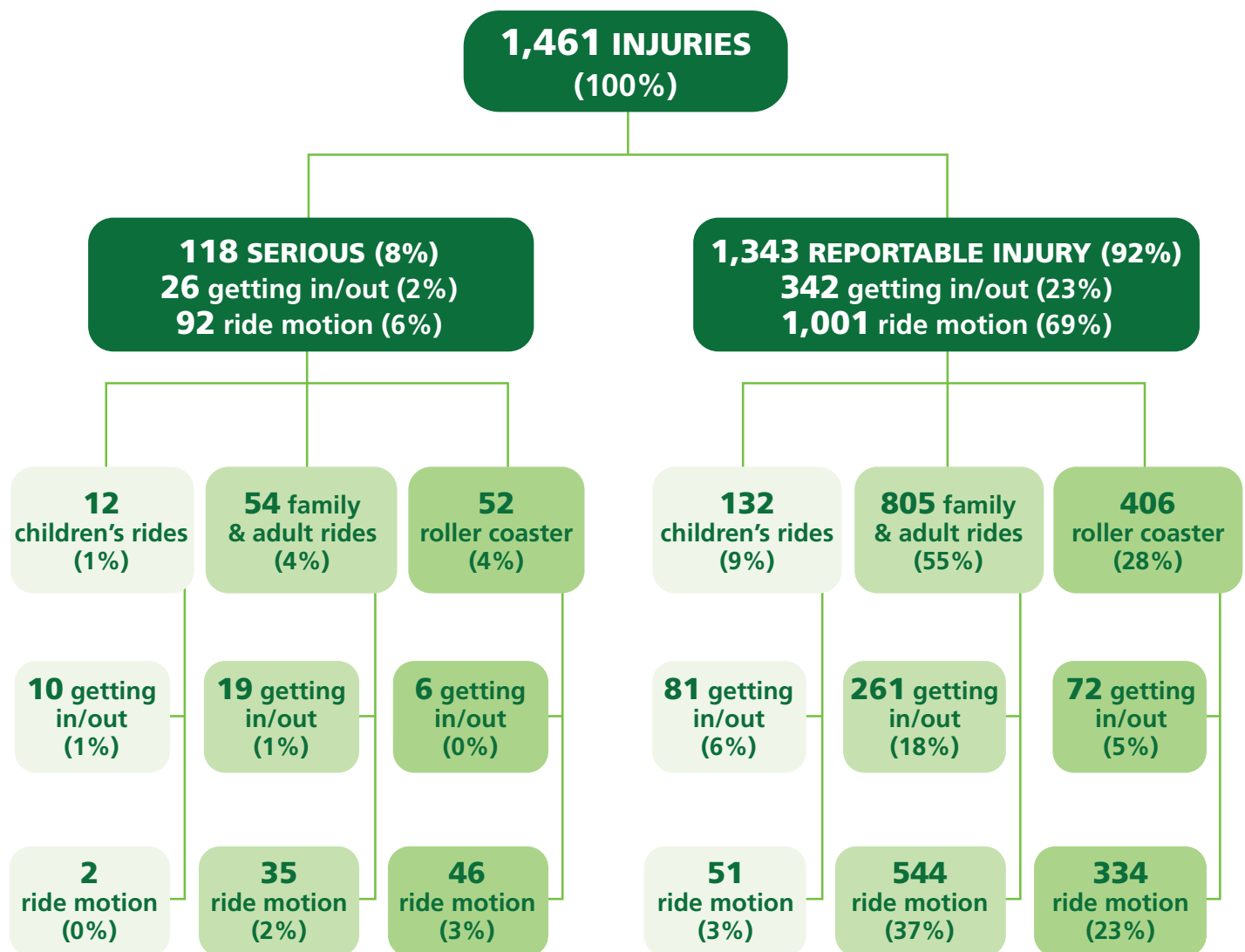
TOTAL INJURY ESTIMATES BASED ON PARKS PROVIDING ATTENDANCE DATA

	North America Estimate (Ridership Providing Sample)									
	2023		2022		2021		2020		2019	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Parks	443		437		431		346		436	
TOTAL INJURIES	1,376	100%	1,349	100%	1,281	100%	314	100%	1,299	100%
Serious	101	7%	192	14%	170	13%	40	13%	78	6%
Reportable	1,275	93%	1,157	86%	1,111	87%	274	87%	1,221	94%
Children's rides	133	10%	106	8%	150	12%	25	8%	118	9%
Family/adult rides	833	60%	793	59%	692	54%	172	55%	727	56%
Roller coasters	410	30%	450	33%	438	34%	116	37%	454	35%
Getting in/out	426	31%	449	33%	410	32%	100	32%	503	39%
Ride motion	950	69%	900	67%	871	68%	214	68%	796	61%

3.2 DISTRIBUTION OF INJURIES

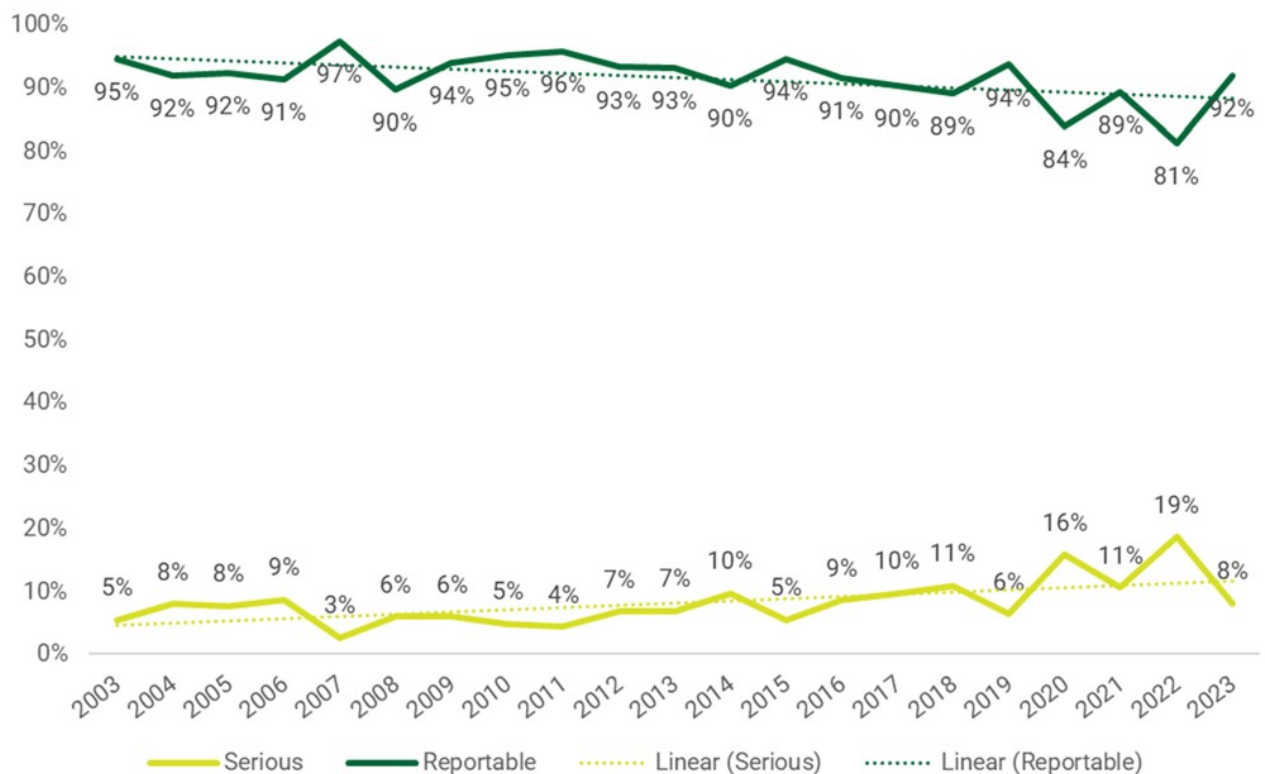
The following tree diagram summarizes the distribution of injuries in terms of severity, type of ride, and location of the injury (some numbers or percentages may not add exactly because of rounding of decimal places).

DISTRIBUTION OF INJURIES (RIDERSHIP SAMPLE OF PARKS)



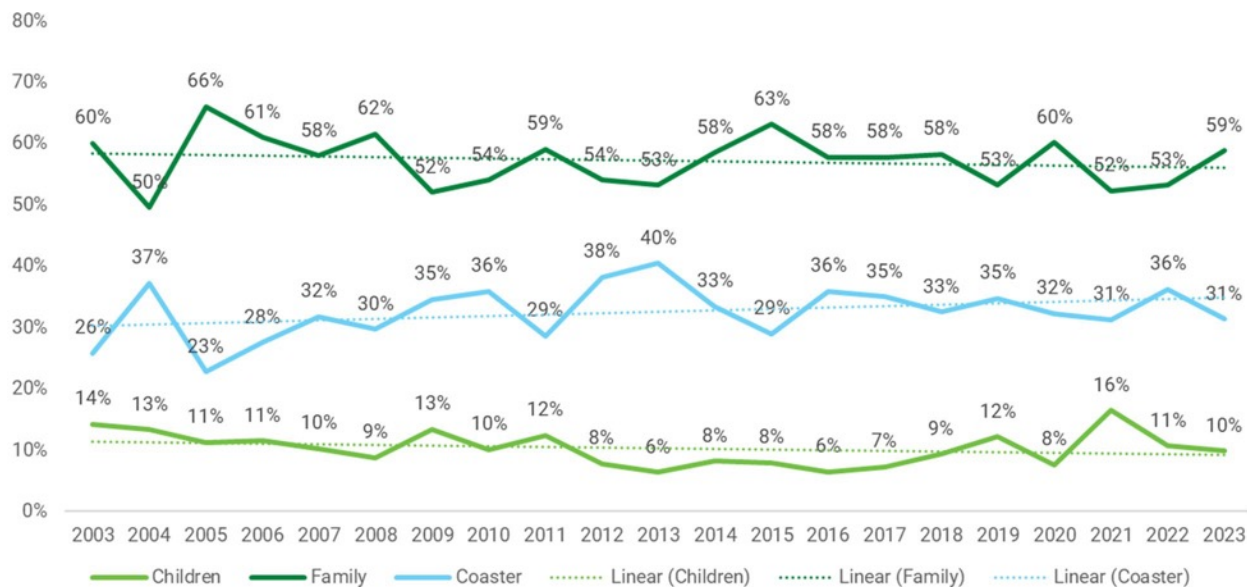
SERIOUS VERSUS REPORTABLE RIDE INJURIES SHARE (RIDERSHIP SAMPLE OF PARKS)

- 8% of injuries are in the serious category.
 - The percent of serious injuries is down from 19% in 2022.
- Over the past 10 years, the average share has been 10% serious and 90% reportable.
 - This is the first year since 2019 that the share of serious injuries is lower than the 10-year average.
- The ratio of severe to reportable injuries varies by ride type.



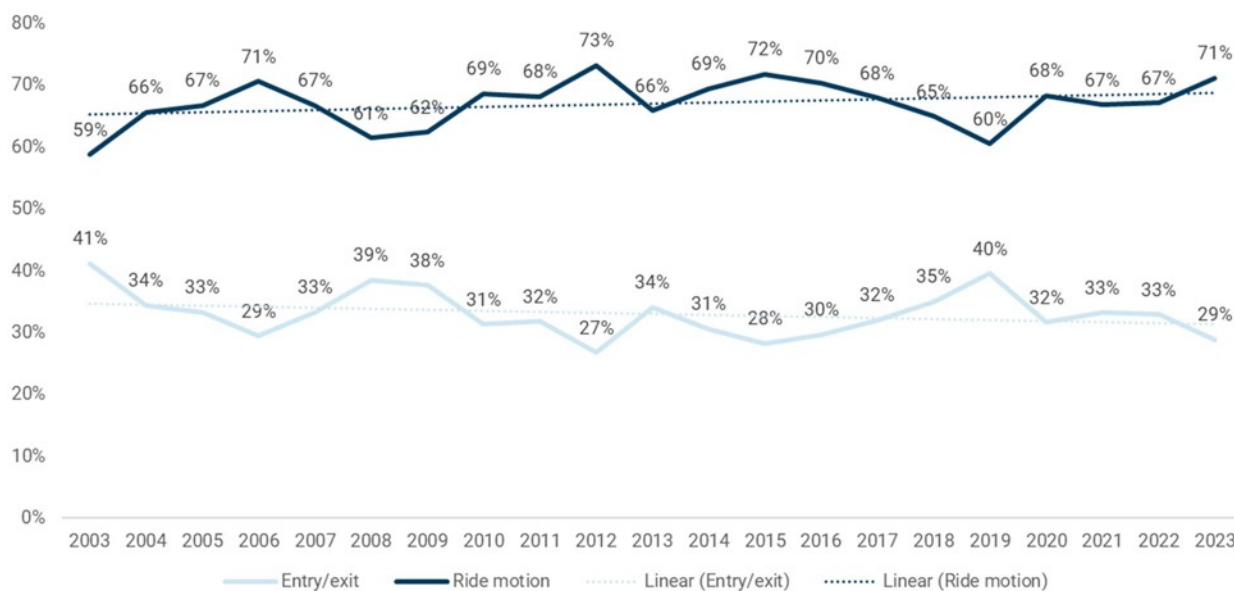
INJURY SHARE BY RIDE TYPE (RIDERSHIP SAMPLE OF PARKS)

- Although the share of roller coaster injuries decreased in 2023, the long-term trend shows that roller coaster share of injuries is slowly increasing.
- Although increasing in 2023 compared to 2022, family/adult rides' share of injuries is nearly stable.
- Children's rides' share of injuries is slowly decreasing.



INJURY SHARE BY LOCATION (RIDERSHIP SAMPLE OF PARKS)

- Over the last 10 years, the ratio of entry/exit to ride motion injuries averages 32:68.
- Although the percent of ride motion related injuries increased in 2023, the long-term trend is consistent over the history of this project.



3.3 INCIDENCE OF INJURIES

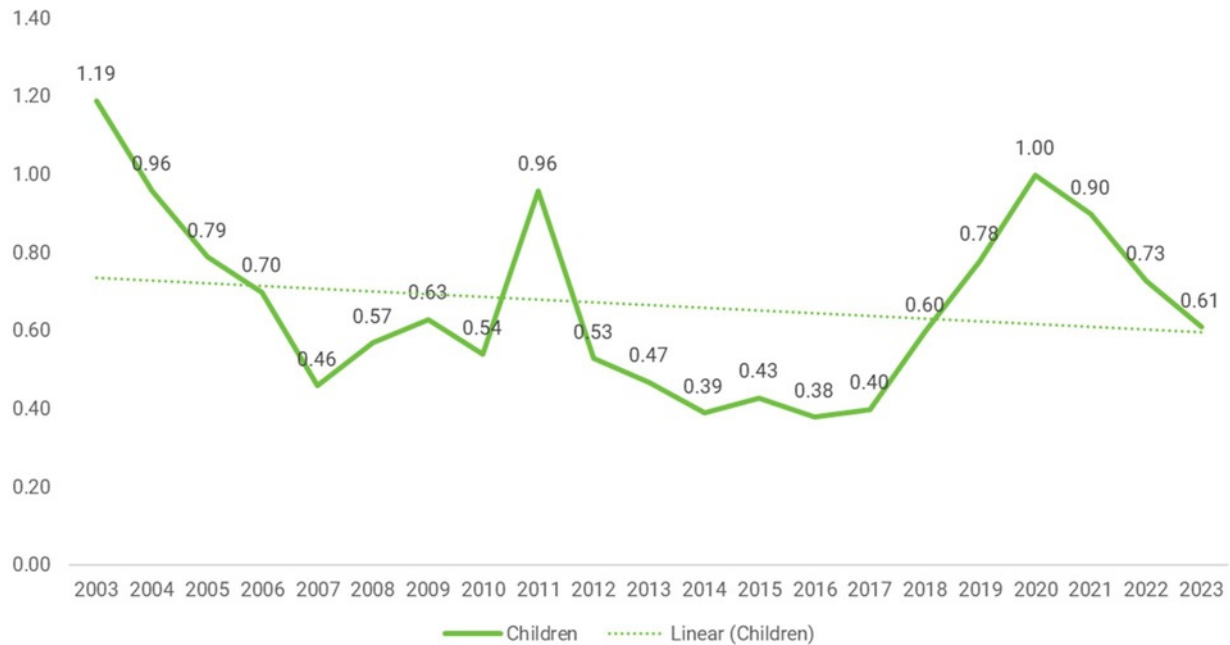
In addition to the absolute number of injuries and their distribution, it is helpful to consider the injury rate trends over time.

- Long-term trends show injuries per million attendees are trending down:
 - In 2023, the rate of 2.56 per million attendees is consistent with the historic trend.
 - In 2023, the rate is slightly higher than 2.46 experienced in 2022 (difference is not statistically significant).
- Long-term trends show injuries per million rides taken have been flat:
 - The 2023 rate of 0.71 per million rides taken aligns with the ongoing trend.
 - The 2023 rate is marginally lower than the 0.73 per million rides recorded in 2022, although the difference is not statistically significant.

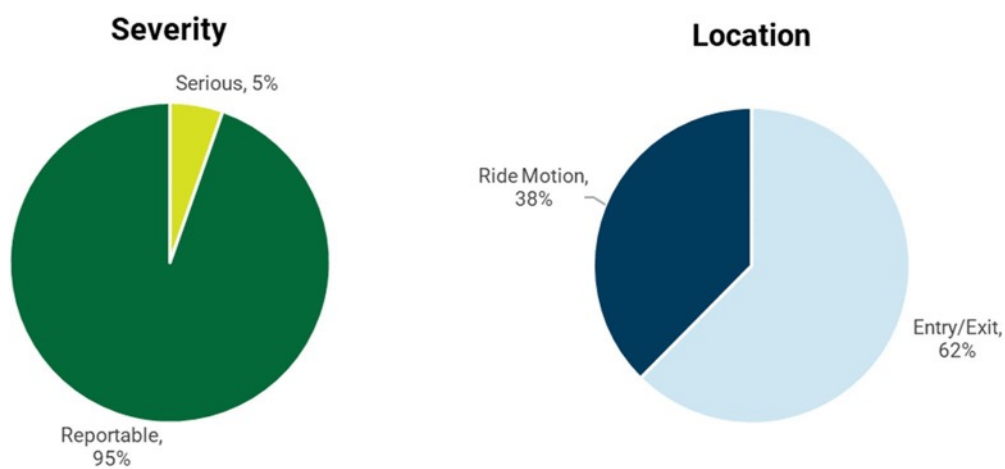


INJURIES PER MILLION CHILDREN'S RIDES TAKEN

- Substantial variation in the injury rate year-to-year.
- Although injury rates have been above trend over the last four years, the overall trend is still down.
- Injury rates have declined for three consecutive years.

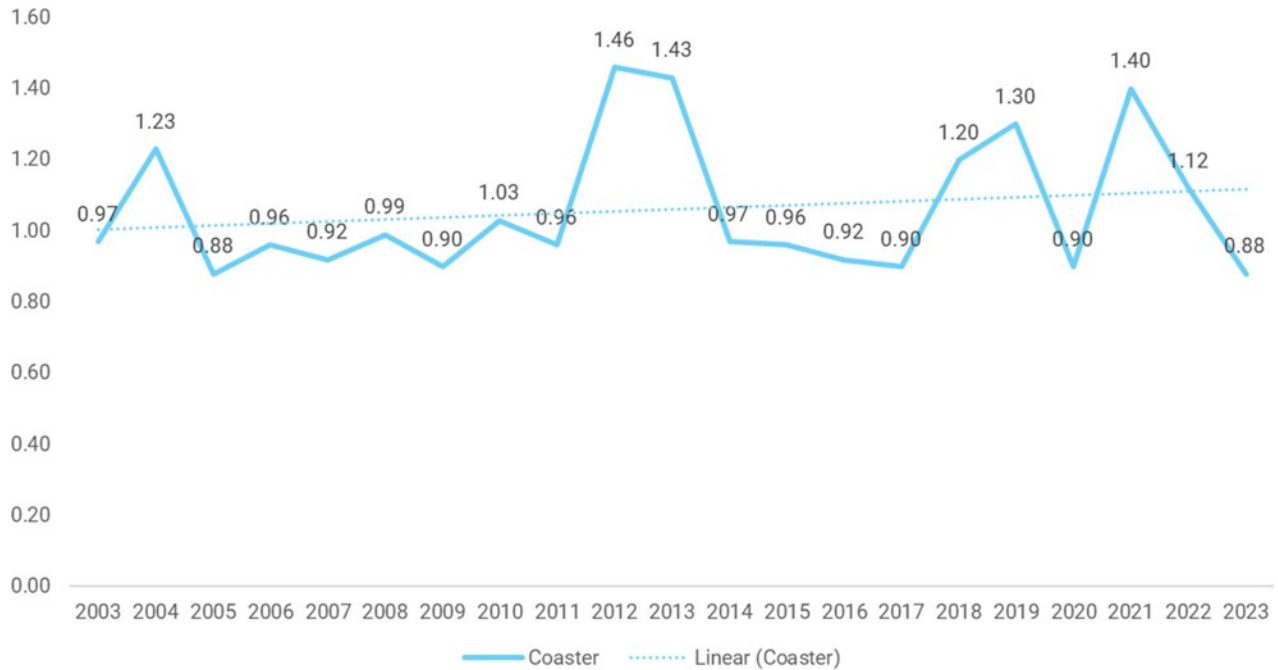


CHILDREN'S RIDE INJURY DISTRIBUTION – 10-YEAR AVERAGE

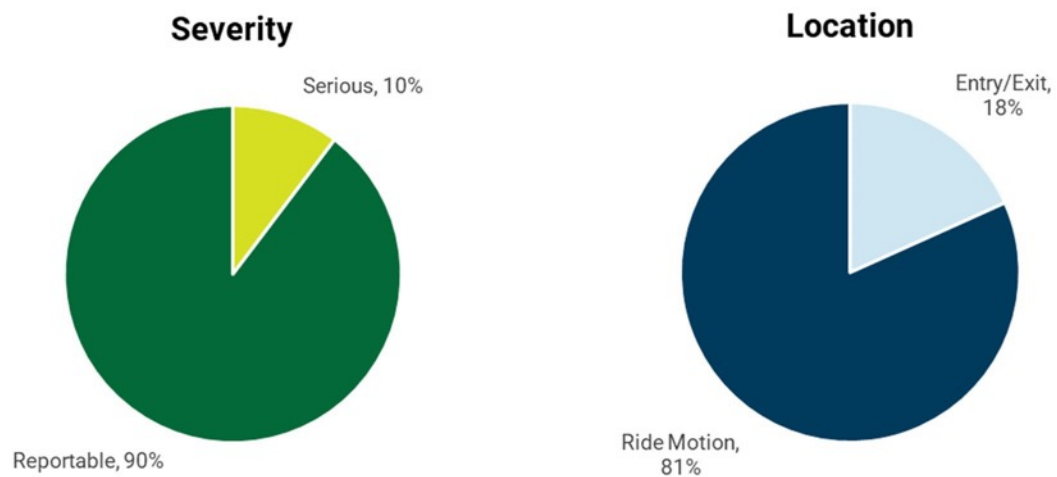


INJURIES PER MILLION ROLLER COASTER RIDES TAKEN

- Substantial variation in the injury rate year-to-year.
- The overall injury rate trend is increasing but have decreased for the last two years.



ROLLER COASTER INJURY DISTRIBUTION – 10-YEAR AVERAGE



FOOTNOTES AND DEFINITIONS

Permanent ride facility: a park, attraction or center operating at a permanent location with at least one fixed-site ride, excluding water parks.

Amusement ride: a device or combination of devices or elements that carries, conveys, or directs a person(s) over or through a fixed or restricted course or within a defined area, for the primary purpose of amusement or entertainment.

Reportable ride: mechanized amusement ride within a permanent ride facility.

Exclusions: air-supported structures (inflatables), concession go-karts, fun houses (walk through), playgrounds and slides, theatrical shows/attractions, mazes and mirror mazes, arcades and coin-operated machinery, ride queue lines, platforms, and exit ramps, midway and other park walkways.

¹Ride Type: The IAAPA Ride Type Classifications are:

- **Children's Ride.** An amusement ride designed primarily for use by children up to 12 years of age. While adults may also be able to ride, the seating will normally be tight for the 95th percentile adult male. Note: A ride should be classified as "children's ride" even if it fits other ride classifications. (Examples: small circular rides for children, miniature roller coaster, miniature swings, and children's carousels.)
- **Family and Adult Ride.** All amusement rides as defined by ASTM F747-97 which are not "Children's Rides" or "Roller Coasters" as defined by IAAPA ride classifications.
- **Roller Coaster.** An amusement ride whose motion is constrained by an elevated, fixed railway where the ride is based on gravity and momentum derived from an initial drop, acceleration, or launch.

²Number of Rides: The total number of rides of each type operated at the listed facilities. (For example, if you have 5 children's rides, 10 family & adult rides, and 3 roller coasters, your total number of rides is 18.)

³Annual Number of Rides Taken: The total number of patron rides given for each ride type at the listed facilities. This would be the actual number, if measured, or estimated by multiplying the average rides taken per visitor by the total attendance of the facility. (For example, if during the year being reported your guests took 3,000 rides on your children's rides, 10,000 rides on your family & adult rides, and 7,000 rides on your roller coasters, then your total annual number of rides taken would be 20,000.)

⁴Reportable Serious Injuries: Injuries to a patron that occur on a ride and result in immediate admission and hospitalization in excess of 24 hours, for purposes other than medical observation, or result in fatality.

⁵Other Reportable Incidents: All other incidents that occur on rides and result in an injury to a patron that requires medical treatment other than ordinary first aid.

⁶Total Reportable Ride Incidents: The sum of Reportable Serious Injuries and Other Reportable Incidents.

⁷Getting In/Out: Incidents occurring while boarding or disembarking a ride vehicle. These would typically be incidents involving stepping into or out of a stopped ride vehicle or a vehicle that is traveling at boarding speed in the station.

⁸Ride Motion: Incidents occurring during the ride experience. These would include all ride incidents except for boarding or disembarking a ride vehicle.