PRODUCT INJURIES

Insights and Trends

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Agenda

Introduction

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Recommendations

Introduction

The Consumer Product Safety Commission maintains a surveillance system (NEISS) to track injury data related to consumer products. The data is collected from a representative sample of emergency rooms in the United States, covering more than 45 years.

This project will explore the NEISS injury data from 2013 through 2022.

Objectives & Scope

Trend Analysis:

Review the injury data published by NEISS and explore trends related to:

- Number of injuries
- Product categories
- Type and severity of injuries
- Patient demographics

Scope:

This project covers injury data from 2013 through 2022.

Based on CRISP-DM Methodology

Project Methodology

Understand Business	Understand Data	Prepare Data	Explore & Analyze	Validate & QA	Visualize & Present

• Define:
  • Objectives
  • Scope of work
  • Deliverables
• Gather background information
	• Collect data
	• Load data
	• Preview data
	• Explore data
		• Verify data integrity
		• Address:
		  • Duplicates
		  • Missing data
		  • Data errors
		  • Outliers
			• Perform Analysis:
			  • Statistical
			  • Descriptive
			  • Correlation
			  • Trend
				• Review Findings
				• Validate:
				  • Data
				  • Process
				• Checkpoint – Are Objectives Met?
					• Finalize:
					  • Documentation
					  • Visualizations
					  • Presentation
					• Next Steps

Data

Data Overview

Source:
US Consumer Product Safety Commission

Description:
Data reported from a representative sample of hospitals for all emergency room visits related to a consumer product

Methodology:
The sample design and implementation documentation is available on the NEISS website.

Data Notes

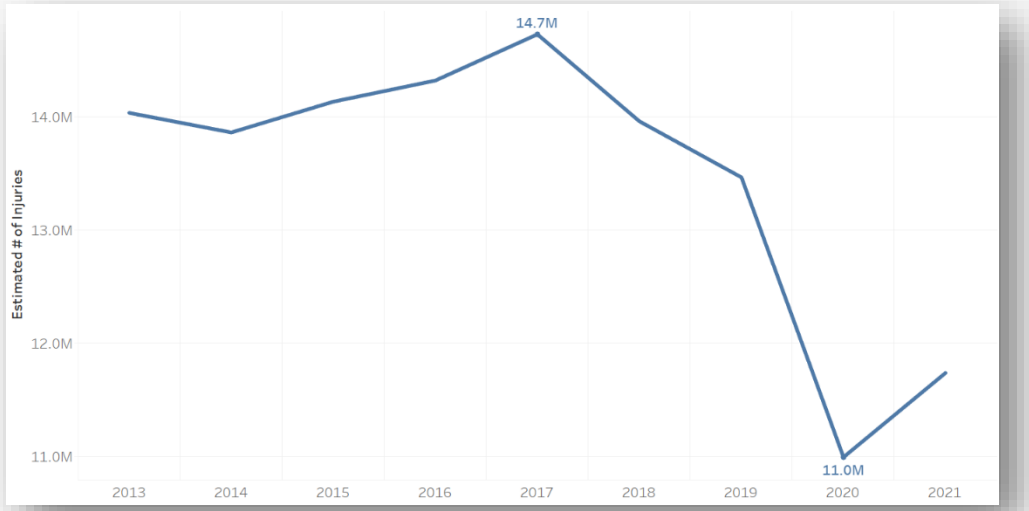
Write-In Values Excluded
Other Race, Other Diagnosis, Other Diagnosis 2, Narrative, and Narrative 1 data were excluded from analysis

Data Set Changes
Hispanic, Body Part 2, and Diagnosis 2 data were added in 2019. For consistency, these data were excluded from analysis

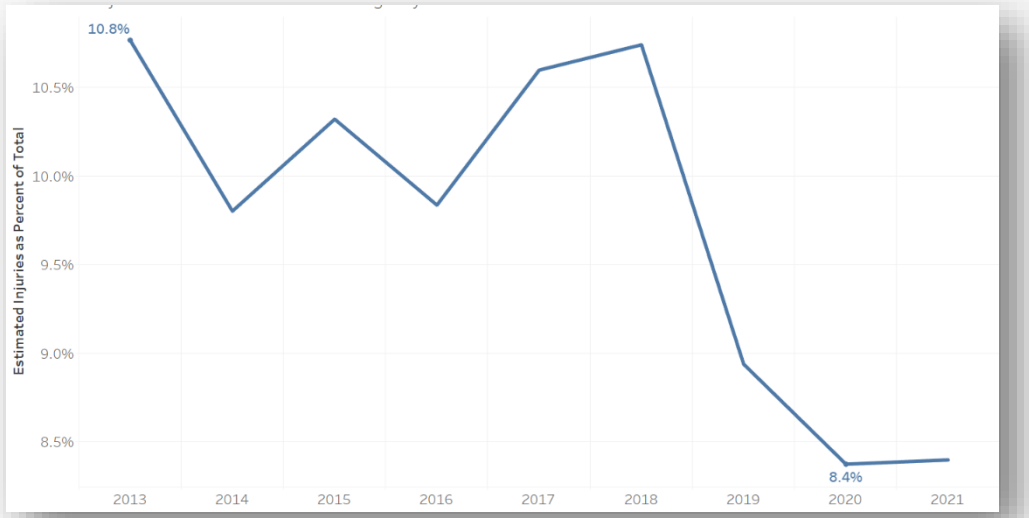
Product Categories
As there are more than 1000 products tracked, product categories were created to simplify analysis

Product Injuries by Year

Estimated Injuries



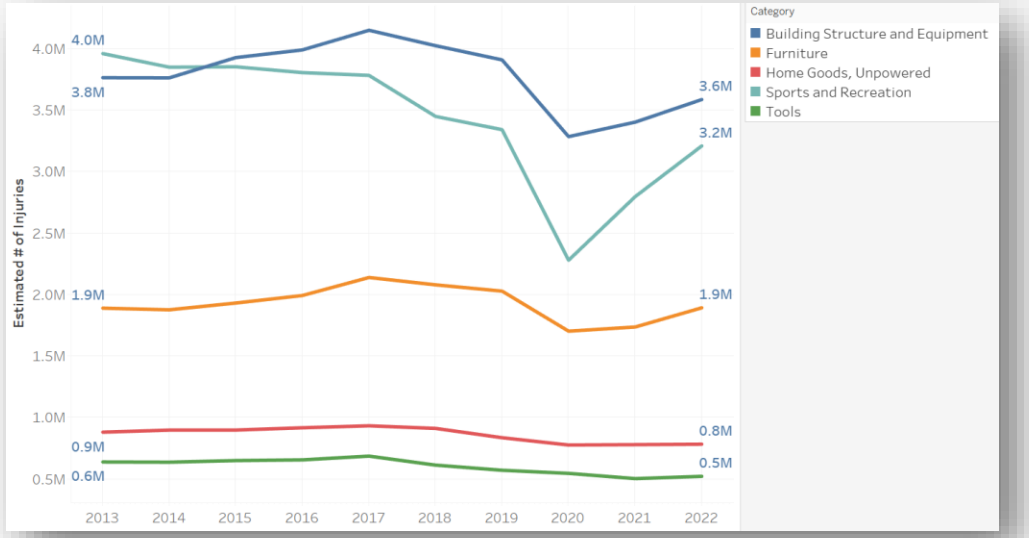
Estimated % of Total ER Visits



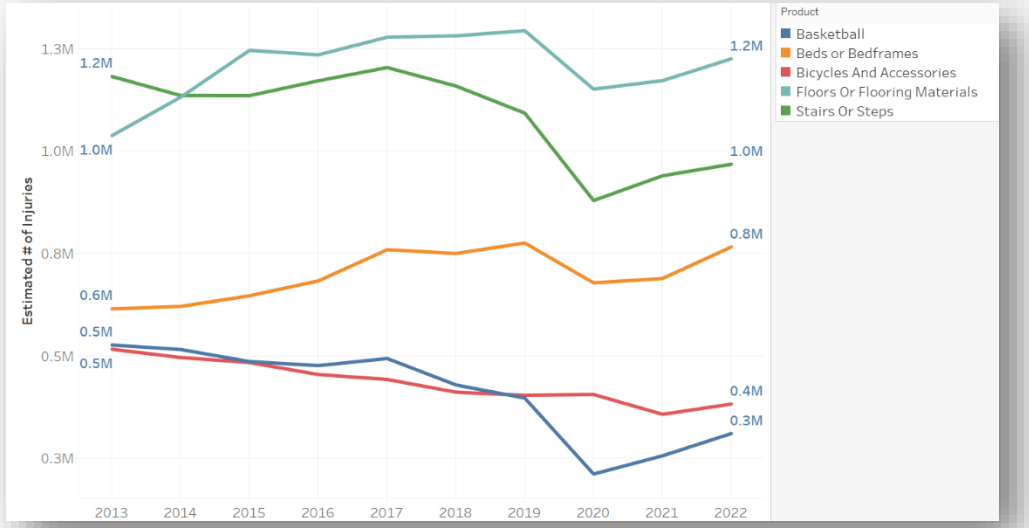
Product-related injuries seen at the emergency room reached a low in 2020 of ~11M. While the estimated number of injuries increased in 2021, the number of product-related injuries as a percent of all visits remained flat.

Products Involved in Injuries

Top 5 Product Categories



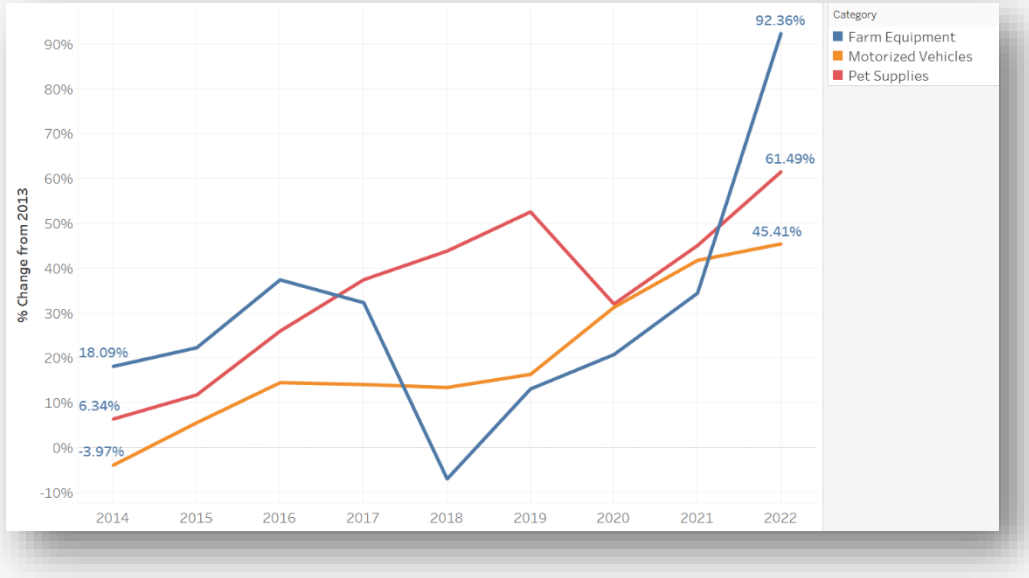
Top 5 Products



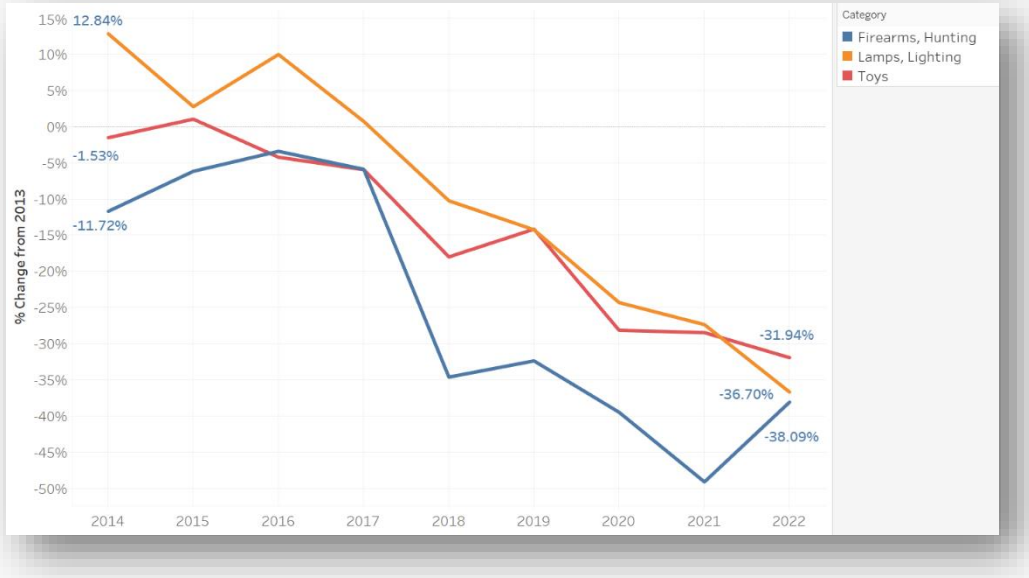
The top five product categories have remained unchanged from 2013 to 2022. Floors and stairs take the top two spots in products, aligning with the top category of Building Structure and Equipment. Beds, Bicycles, and Basketball round out the top 5 products.

Products Involved in Injuries

Largest Increase from 2013



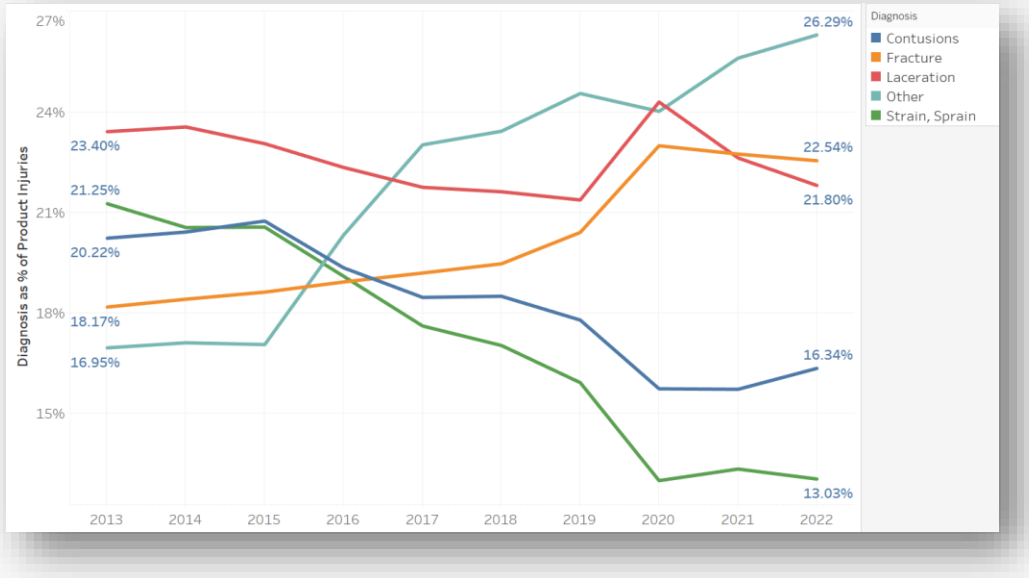
Largest Decrease from 2013



Injuries related to Farm equipment showed the largest increase and toy-related injuries showed the largest decrease.

Diagnosis of Product Injuries

Top 5 Diagnosis



Most product-related injuries are relatively minor – cuts, bruises, sprains, and broken bones.

Despite a total of 29 different pre-defined diagnoses, the most common diagnosis is “Other”.

Disposition of Emergency Room Visits

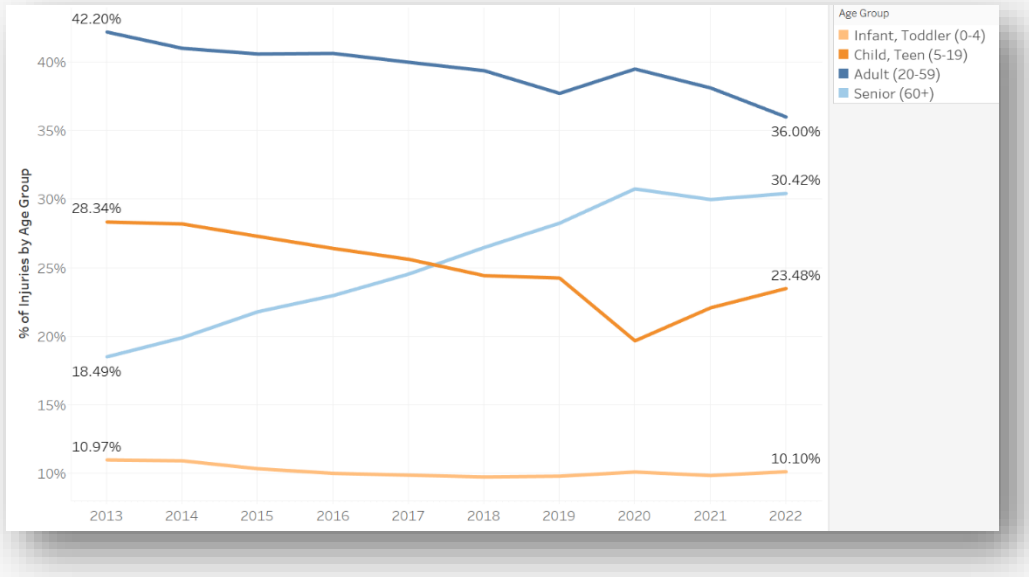
Dispositions as a Percentage of Product-Related Injuries

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Treated/Examined And Released	90.88%	91.13%	90.57%	89.93%	88.57%	87.53%	87.00%	84.29%	84.47%	84.07%
Treated And Admitted/Hospitalized	6.19%	6.27%	6.85%	7.20%	8.11%	9.00%	9.30%	11.84%	11.00%	11.06%
Left Without Being Seen	1.18%	0.96%	0.94%	0.94%	1.22%	1.29%	1.30%	1.23%	1.90%	2.51%
Treated And Transferred	1.13%	1.05%	1.11%	1.19%	1.28%	1.28%	1.39%	1.63%	1.49%	1.40%
Held For Observation	0.57%	0.54%	0.49%	0.69%	0.76%	0.83%	0.94%	0.92%	1.05%	0.85%
Fatality Incl. Doa, Died In Er	0.05%	0.05%	0.05%	0.05%	0.06%	0.07%	0.07%	0.09%	0.09%	0.10%

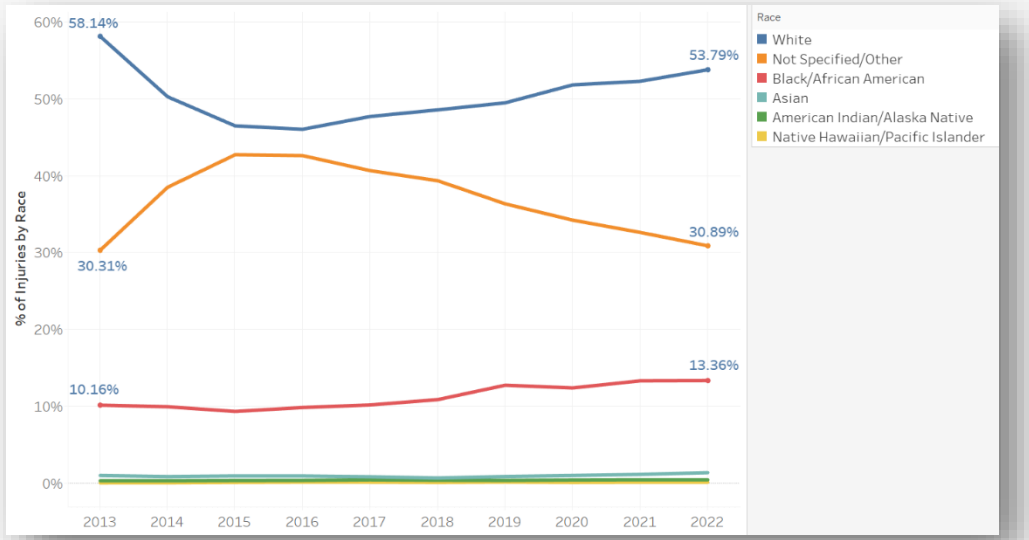
“Treat and release” visits make up the largest portion of product-related emergency room visits, even though they decreased by 6.79% between 2013 and 2022. Increases in hospital admissions and people leaving the emergency room without being seen made up the difference.

Demographics

Age



Race



The percentage of injuries in the senior age group increased by almost 12% from 2013 to 2022. Injuries reported with a race of “Other” or “Not Specified” is the largest group behind white emergency room visitors.

Demographics

Sex

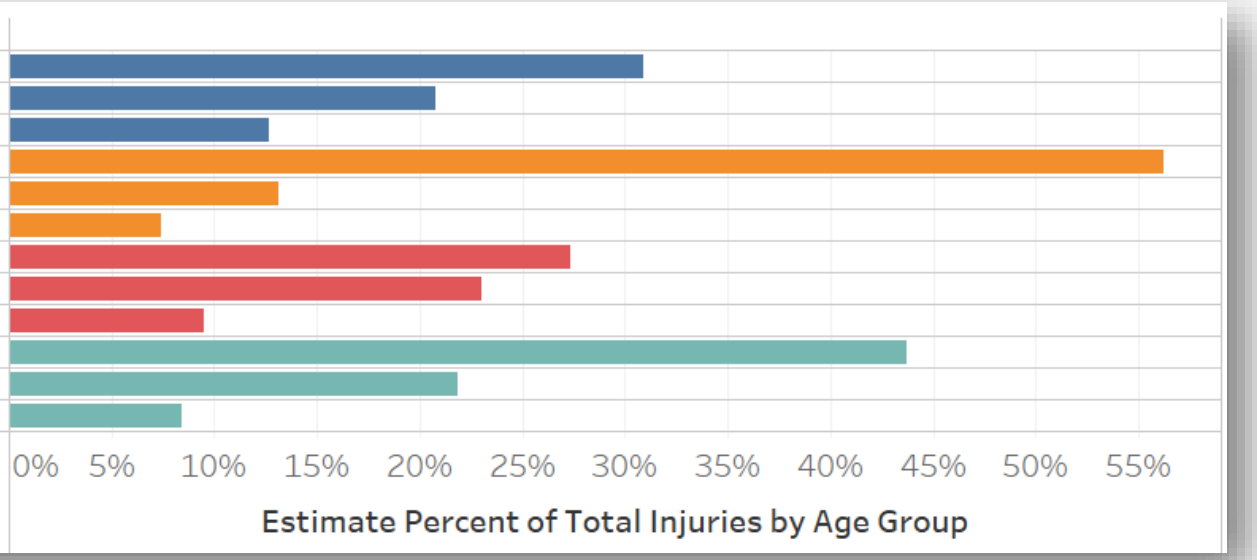
The split between males and females has remained consistent, with men having a slightly higher injury rate.

Note: Before 2019, the options for recording sex were Male, Female, and Not Recorded. Injuries reported for non-binary patients were statistically insignificant at ~ 4,000.

Demographics

Estimated Injuries by Age Group and Category (Top 3, for 2022)

Age Group	Rank	Category
Infant, Toddler (0-4)	1	Furniture
	2	Building Structure and Equipment
	3	Sports and Recreation
Child, Teen (5-19)	1	Sports and Recreation
	2	Building Structure and Equipment
	3	Furniture
Adult (20-59)	1	Building Structure and Equipment
	2	Sports and Recreation
	3	Furniture
Senior (60+)	1	Building Structure and Equipment
	2	Furniture
	3	Sports and Recreation

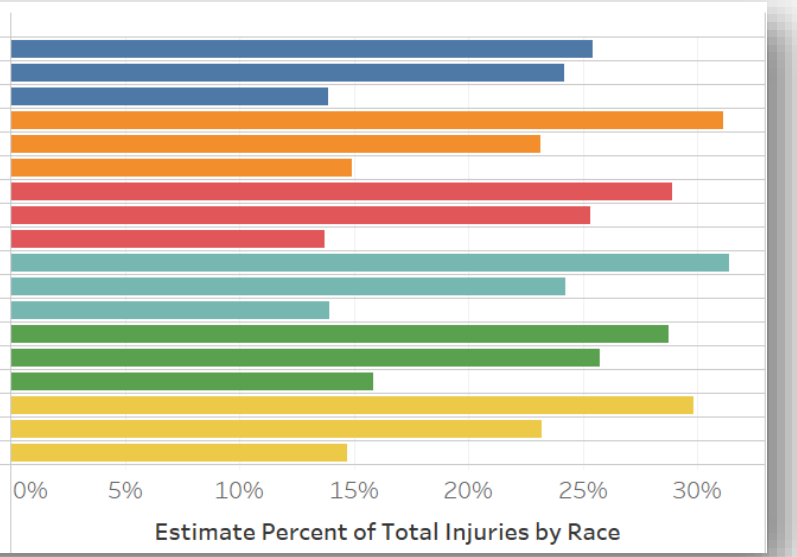


The top injury-producing product category changes for each age group, except Seniors – who have the same top category as Adults. However, the top 3 product categories are the same across all age groups.

Demographics

Estimated Injuries by Race and Category (Top 3, for 2022)

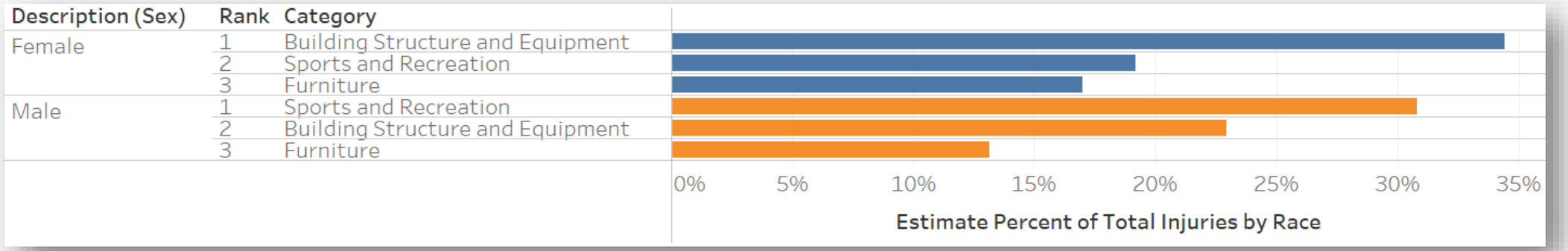
Description (Race)	Rank	Category
American Indian/Alaska Native	1	Sports and Recreation
	2	Building Structure and Equipment
	3	Furniture
Asian	1	Sports and Recreation
	2	Building Structure and Equipment
	3	Furniture
Black/African American	1	Building Structure and Equipment
	2	Sports and Recreation
	3	Furniture
Native Hawaiian/Pacific Islander	1	Sports and Recreation
	2	Building Structure and Equipment
	3	Furniture
Not Specified/Other	1	Sports and Recreation
	2	Building Structure and Equipment
	3	Furniture
White	1	Building Structure and Equipment
	2	Sports and Recreation
	3	Furniture



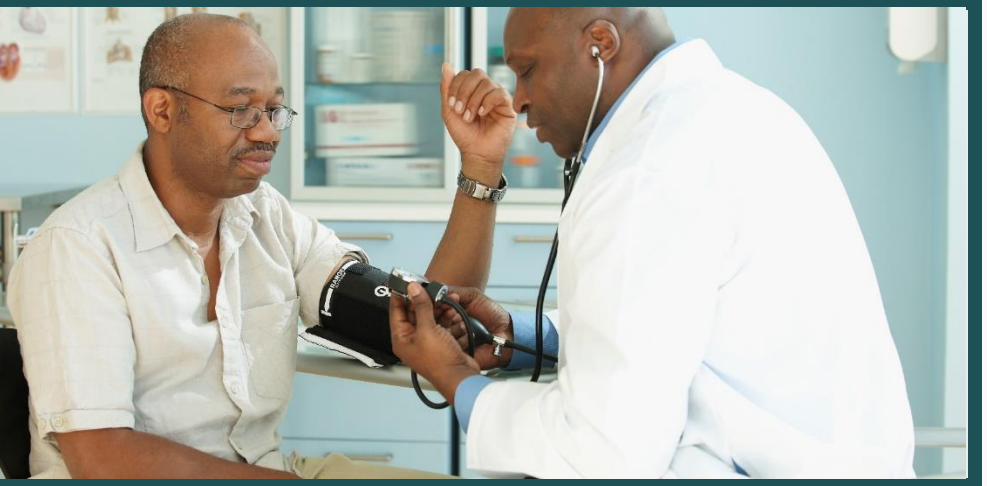
Building Structures and Equipment are the top product categories for White and African American patients, followed by Sports and Recreation. For all other racial groups, the top two product categories are reversed, with Sports and Recreation taking the top spot.

Demographics

Estimated Injuries by Race and Category (Top 3, for 2022)



The top product category for women is Building Structure and Equipment, while Sports and Recreation takes the top spot for men.



Findings

- The number of emergency room visits related to product injuries decreased from ~14.7 million in 2017 to ~11.0 million in 2020.
- The percentage of product-related emergency room visits as compared to all emergency room visits decreased from 10.6% in 2017 to 8.4% in 2020.
- The most common product categories involved in injuries have not changed from 2013 to 2022:
    1. Building Structure and Equipment *(#2 in 2013-4)*
    2. Sports and Recreation *(#1 in 2013-4)*
    3. Furniture
    4. Home Goods, unpowered
    5. Tools

Findings

- Product injuries related to Farm Equipment increased the most, ~92%, between 2013 and 2022.
- Product injuries related to Firearms and Hunting Equipment decreased the most, ~38%, between 2013 and 2022.
- For 5 of the 10 years covered in this analysis, the most common injury type related to products is “Other”.
- Adults (20-59 yo) make up the largest portion of emergency room visits related to product injuries, with Infants and Toddlers (0-4 yo) having the smallest number of visits.
- While the order of the top 3 product categories changed based on sex and race, the categories did not change:
    - Building Structure and Equipment
    - Sports and Recreation
    - Furniture

Next Steps – Future Analysis

Impact of COVID-19 Pandemic
Can the significant drop in ER visits for product injuries be tied to COVID-19?

Product Categories
The assignment of categories was an ad-hoc process. How has this impacted the analysis? Is there a generally accepted way to categorize products?

Other Diagnosis
Given that “Other” is the top diagnosis for 5 of the 10 years examined, analysis of the Other Diagnosis text field may shed light on why so many injuries are not covered by the 29 predefined values

Next Steps – Future Analysis

Demographics
Do the product injuries by age group, sex, and race align with proportions in the general population?

Correlation Analysis
Perform formal correlation analysis on the data set

THANK YOU

Appendix A – Source Data

"Archived Annual NEISS Data." 2013 – 2022, *United States Consumer Product Safety Commission*, [Microsoft Excel], https://www.cpsc.gov/cgibin/NEISSQuery/home.aspx. Accessed Jan 24, 2024.

"NEISS Data Dictionary.", *United States Consumer Product Safety Commission*, [Microsoft Excel], https://www.cpsc.gov/s3fs-public/DataDictionary042022.xlsx?VersionId=ZudA.bM6W3epO1LHUp_XwQjL8q7zIgvD. Access Feb 1, 2024.

National Center for Health Statistics. Emergency Department Visits in the United States, 2016-2021. Generated interactively: April 30, 2024 from https://www.cdc.gov/nchs/dhcs/ed-visits/index.htm

"National Electronic Injury Surveillance System (NEISS)", *United States Consumer Product Safety Commission,* https://www.cpsc.gov/Research--Statistics/NEISS-Injury-Data. Accessed Apr 18, 2024.

Appendix A – Source Data

Rui P, Kang K. National Hospital Ambulatory Medical Care Survey: 2015 Emergency Department Summary Tables. Available from: http://www.cdc.gov/nchs/data/ahcd/nhamcs_emergency/2015_ed_web_tables.pdf

Rui P, Kang K. National Hospital Ambulatory Medical Care Survey: 2014 Emergency Department Summary Tables. Available from: http://www.cdc.gov/nchs/data/ahcd/nhamcs_emergency/2014_ed_web_tables.pdf

Rui P, Kang K, Albert M. National Hospital Ambulatory Medical Care Survey: 2013 Emergency Department Summary Tables. Available from: http://www.cdc.gov/nchs/data/ahcd/nhamcs_emergency/2013_ed_web_tables.pdf

Appendix B - Documentation

"National Electronic Injury Surveillance System (NEISS)." *United States Consumer Product Safety Commission*, https://www.cpsc.gov/Research--Statistics/NEISS-Injury-Data. Accessed Feb 1, 2024.

"NEISS Coding Manual." *United States Consumer Product Safety Commission,* https://www.cpsc.gov/s3fs-public/January-2024-NEISS-CPSC-only-Coding-Manual.pdf?VersionId=bEaz2iKYDAlz8KA60KEKKrLrXZW3kLOj. [PDF]. Accessed Jan 24, 2024.

"NEISS Sample Design 1997-Present." *United States Consumer Product Safety Commission,* https://www.cpsc.gov/s3fs-public/pdfs/blk_media_2001d011-6b6.pdf. [PDF]. Accessed Apr 19, 2004.