



# Sports and Recreation Concussion Surveillance data sources, trends, challenges

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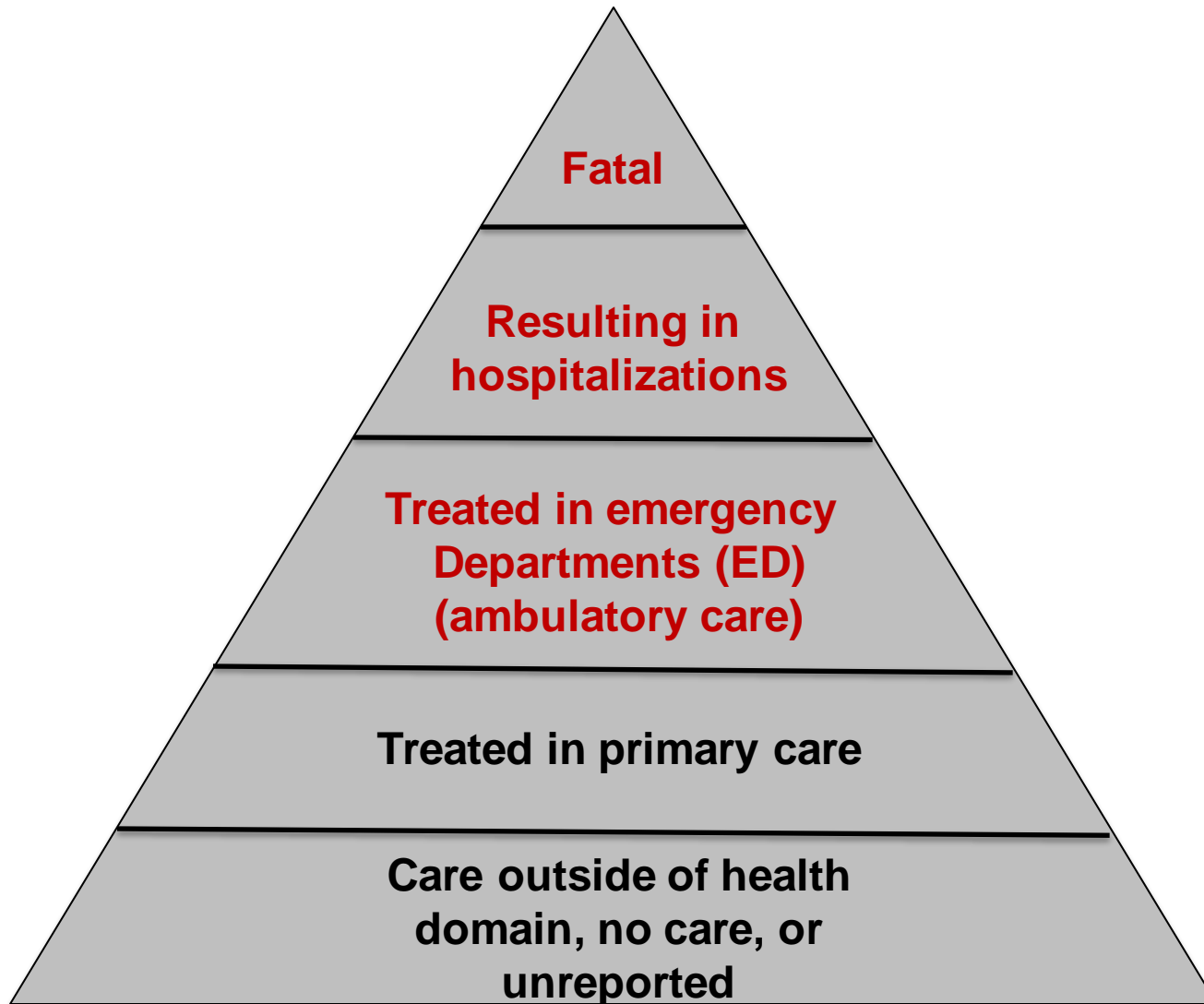
SIRC Concussion in Sport Symposium 2023  
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# Outline

- Data sources - Injury Pyramid
- Emergency Department (ED) Visits
- CCHS Concussion Rapid Response
- Concussion Surveillance – limitations, gaps, challenges
- Overview of all head injuries – ED visits and hospitalizations
- Sports and recreation-related concussion (NACRS)
  - 12-year trend
  - Age groups
  - Sports and Recreation groups
- ED Sentinel Surveillance (CHIRPP)
  - Most frequent sports/activities
  - Sample narratives
- Conclusions

# Injury Pyramid



# Data Sources

<p><b>Deaths:</b></p> <p>CVS:D CCMED</p>
<p><b>Hospitalizations:</b></p> <p>DAD HMDB</p>
<p><b>ED Visits:</b></p> <p>NACRS CHIRPP</p>
<p>CPCSSN Physician billing <b>Some Surveys</b></p>
<p>???</p>

## Data Sources - ED Visits

### National Ambulatory Care Reporting System (NACRS)

- Canadian Institute for Health Information
- All hospital-based and community-based ambulatory care
- Currently only Ontario, Alberta and Yukon have complete coverage
- ICD-10-CA coded

### Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP)

- Sentinel Surveillance, operating since 1990 with about 4 million cases
- Currently 19 ED participate in the program
- Web-based
- Text-based variables
- Expanded Sports and Recreation groupings
  - The system consists of 145 sports/activities arranged into 25 groups (*SPAR Group*).
- Organized vs. informal sports
- Early warning rules

# Canadian Community Health Survey (CCHS) 2020 Concussion Rapid Response

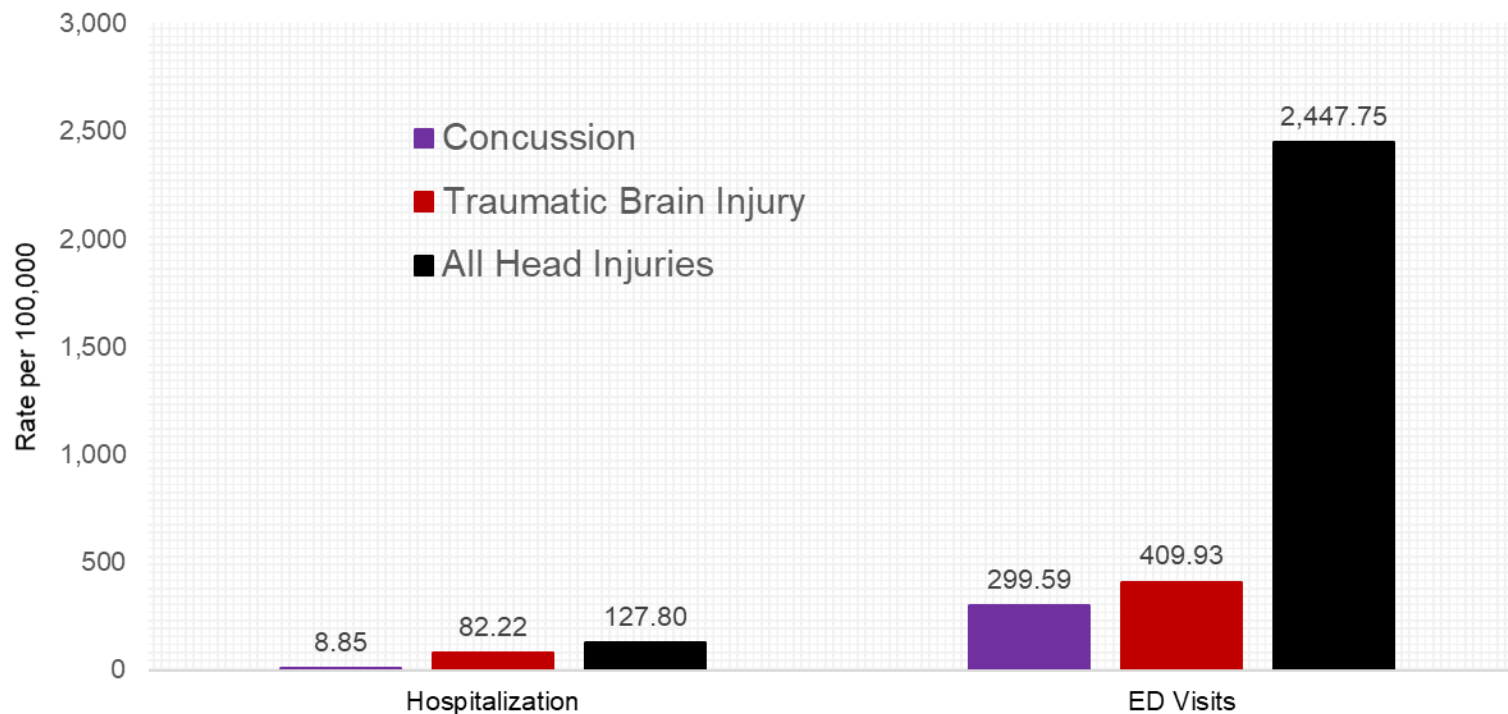
- A collaboration with Statistics Canada
- Main objective: Provide national estimates on the percentage of Canadians aged 12 years or older sustaining one or more concussion in 2019
- Circumstances also examined – i.e. sports and falls
- Findings to be published in July 2023

# Concussion Surveillance

## Limitations, gaps and challenges

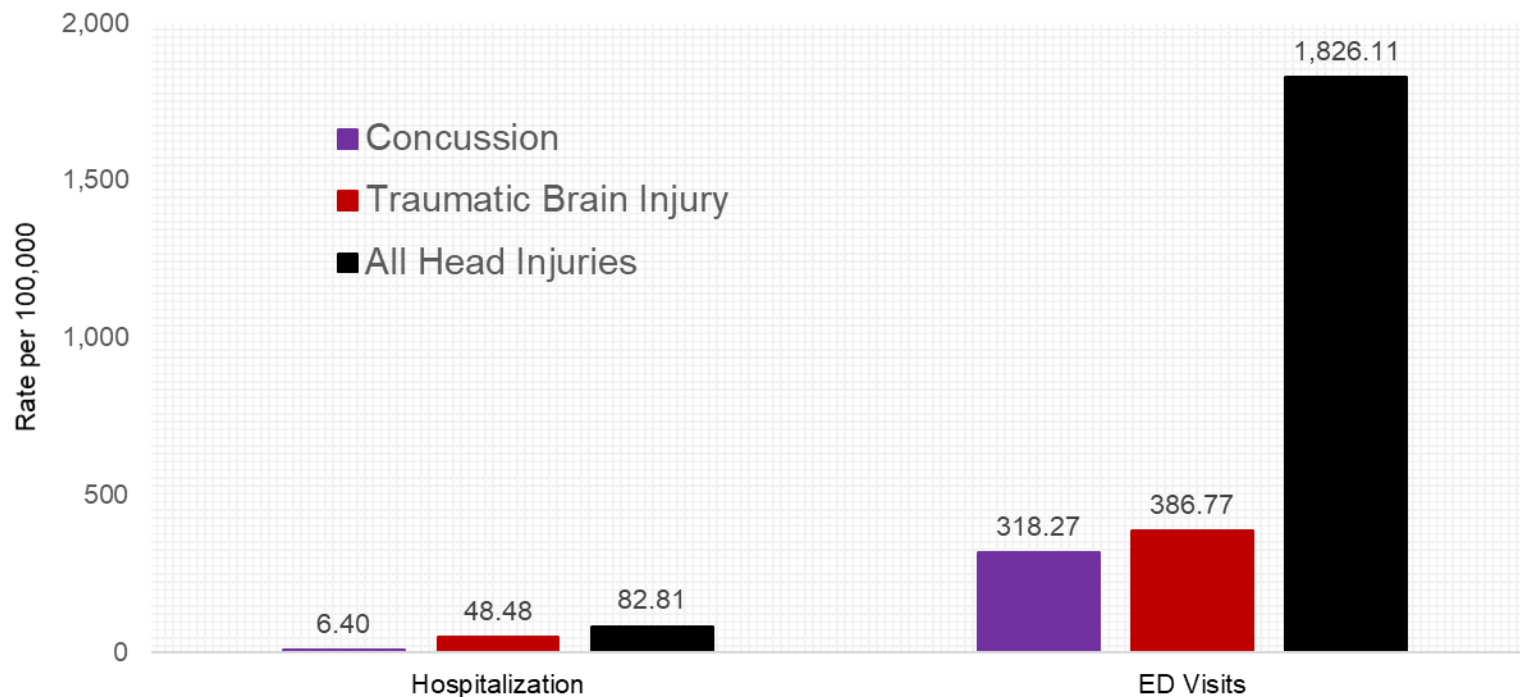
- In Canada, **deaths due to concussion are very rare** and individuals are **not often hospitalized** for a concussion
- Thus, **emergency department (ED) surveillance** (NACRS and CHIRPP) remains the most important data source for concussion surveillance at the moment
- There is recent evidence that individuals are seeking or obtaining treatment at other points of care:
  - *Physician's offices, Physiotherapy/Chiropractic Clinics, Schools*
- Surveys are also another source, but to date the data has not been routinely collected.
- Administrative data (CVS:D, DAD, NACRS) is not complete or timely
- Not all sports and recreational activities are identifiable in NACRS/DAD

# Hospitalization\* and ED Visit\*\* Rates Males, 2019/20, All Mechanisms



\* DAD, Excludes QC; \*\* NACRS, Ontario and Alberta

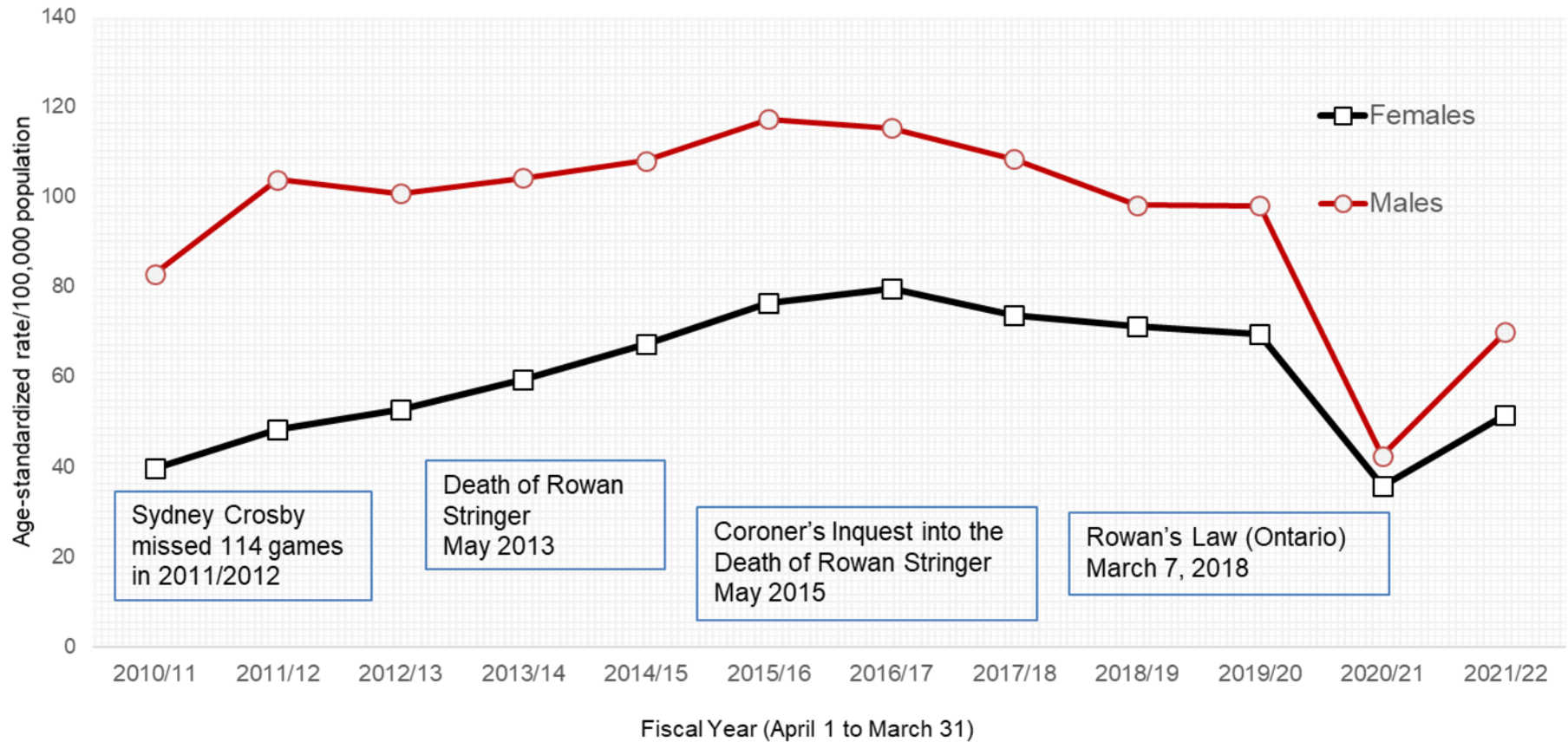
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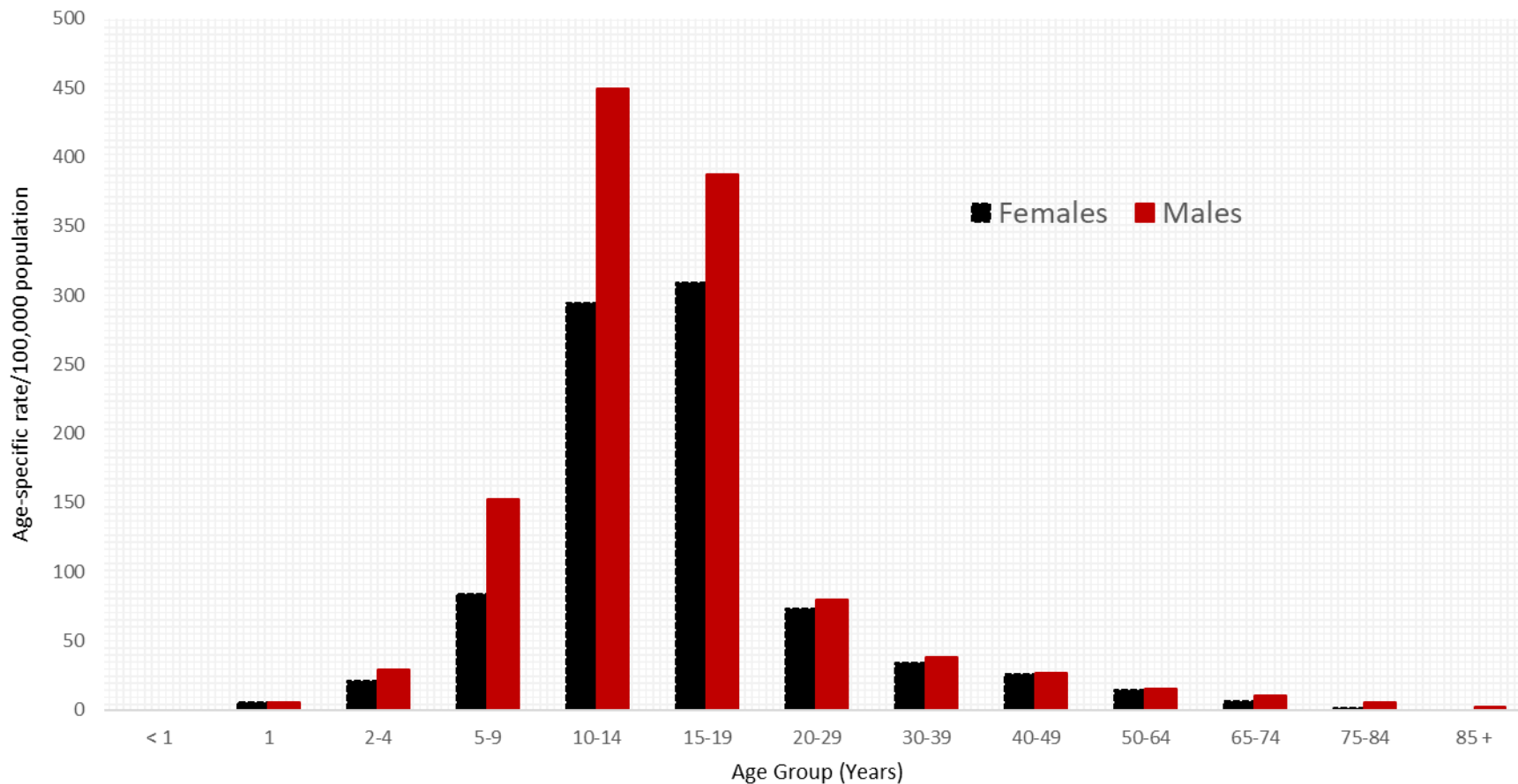
# Sports and Recreation-related Concussions Rates of ED Visits\*, 2010/11 to 2021/22



\* NACRS, Ontario and Alberta; 2011 reference population

# Sports and Recreation-related Concussions

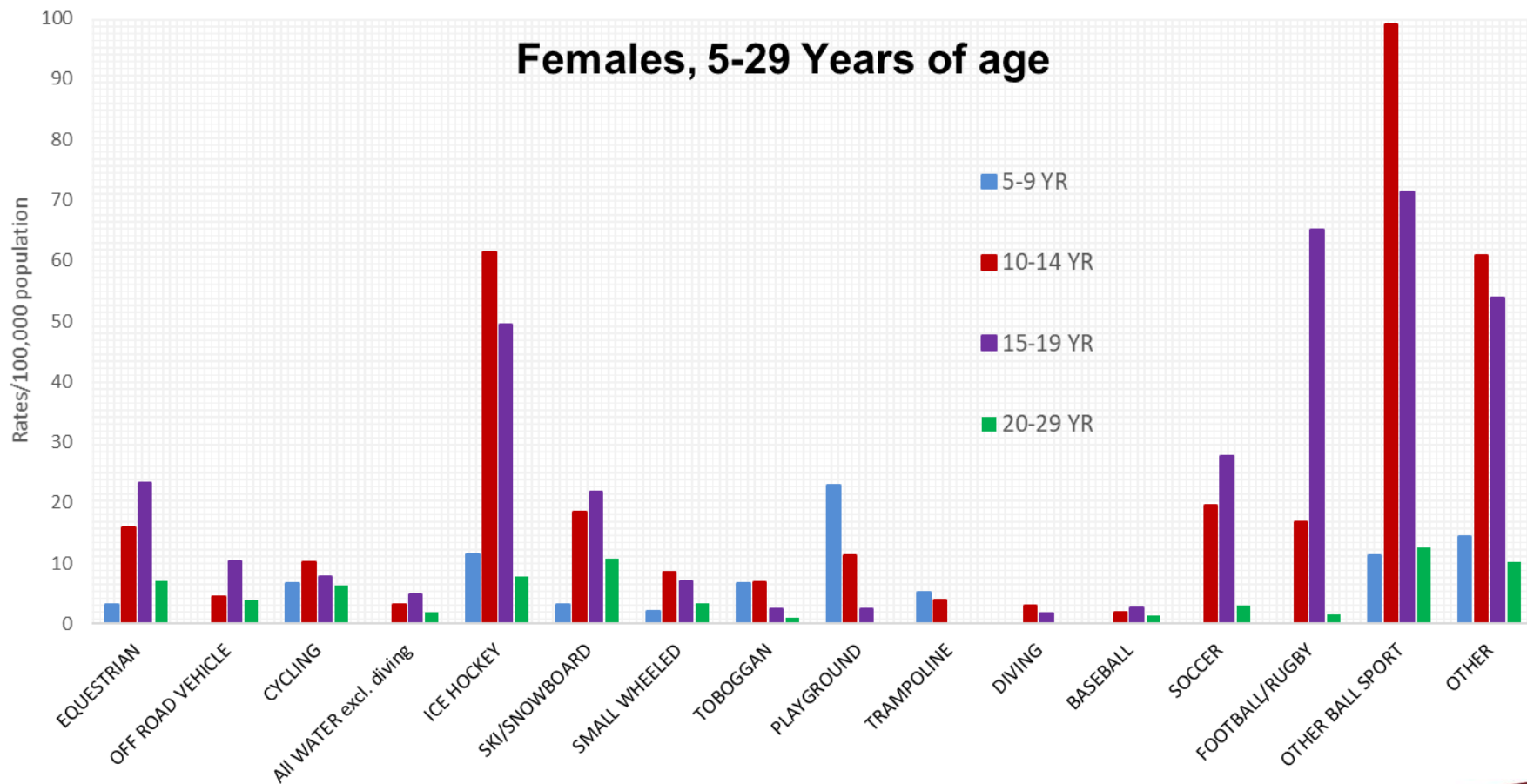
## Age-Specific Rates of ED Visits\*, 2016/17 to 2021/22



\* NACRS, Ontario and Alberta

# Sports and Recreation-related Concussions

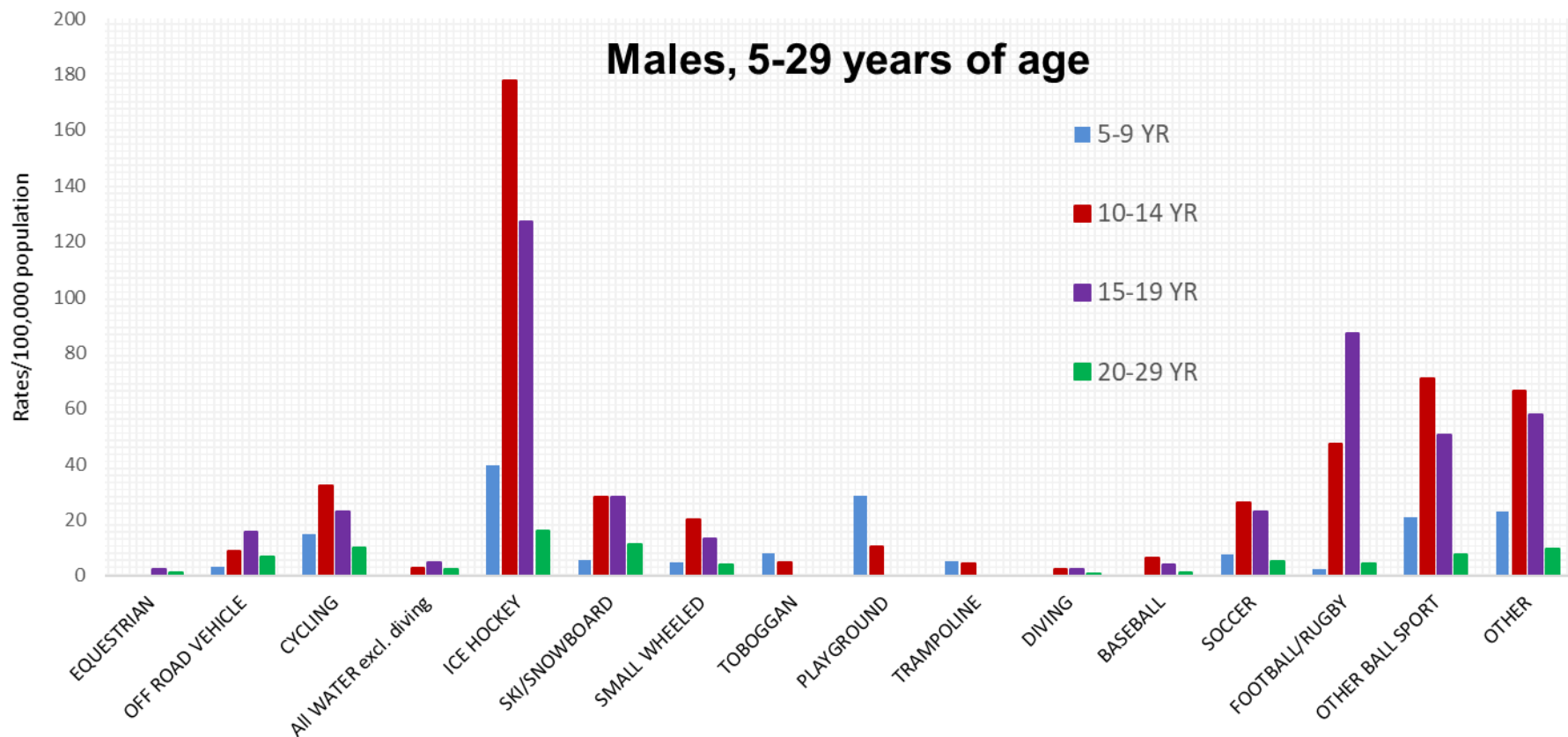
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# Sports and Recreation-related Concussions

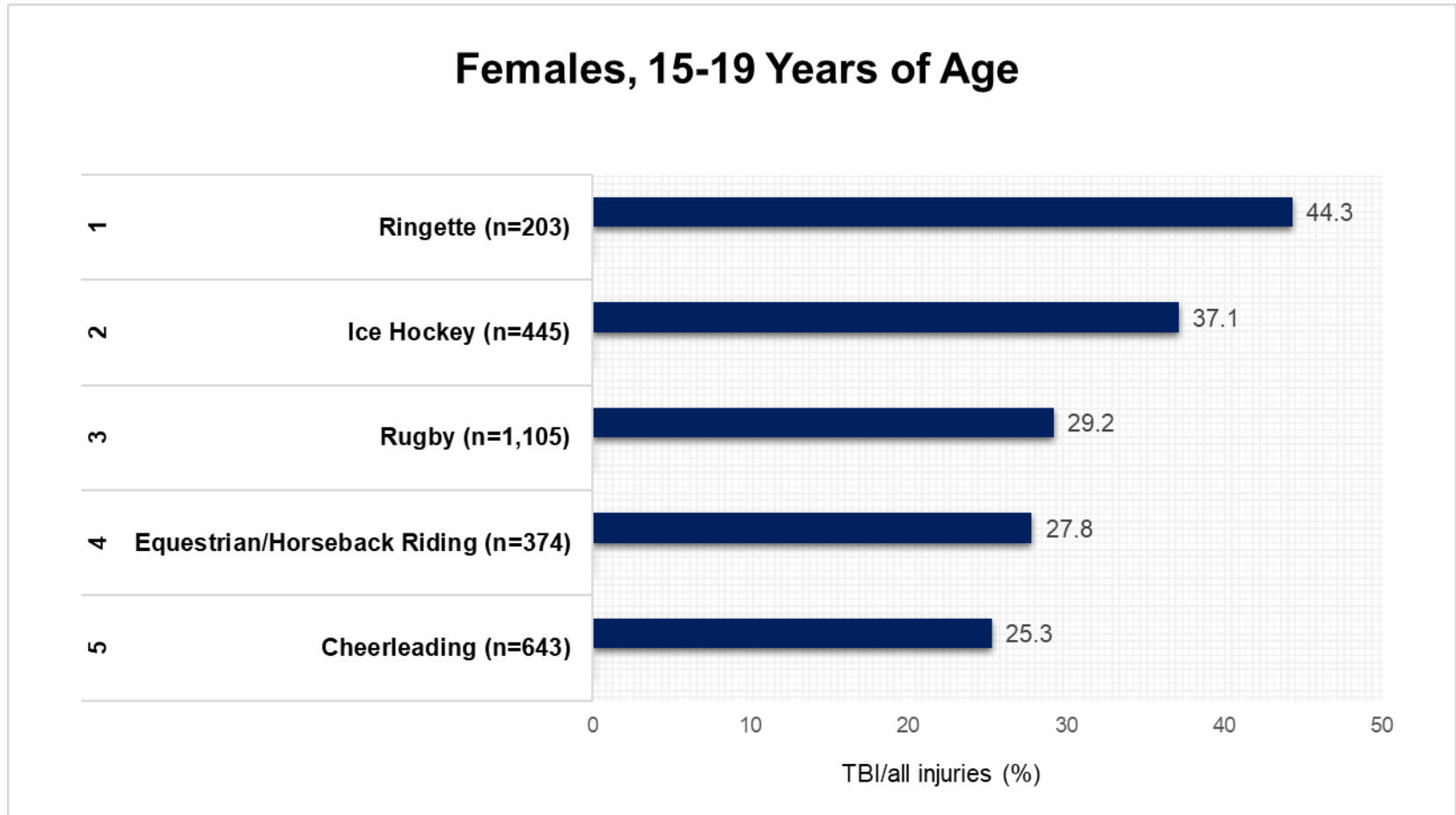
## Age-specific Rate of ED Visits\*, 2019/20



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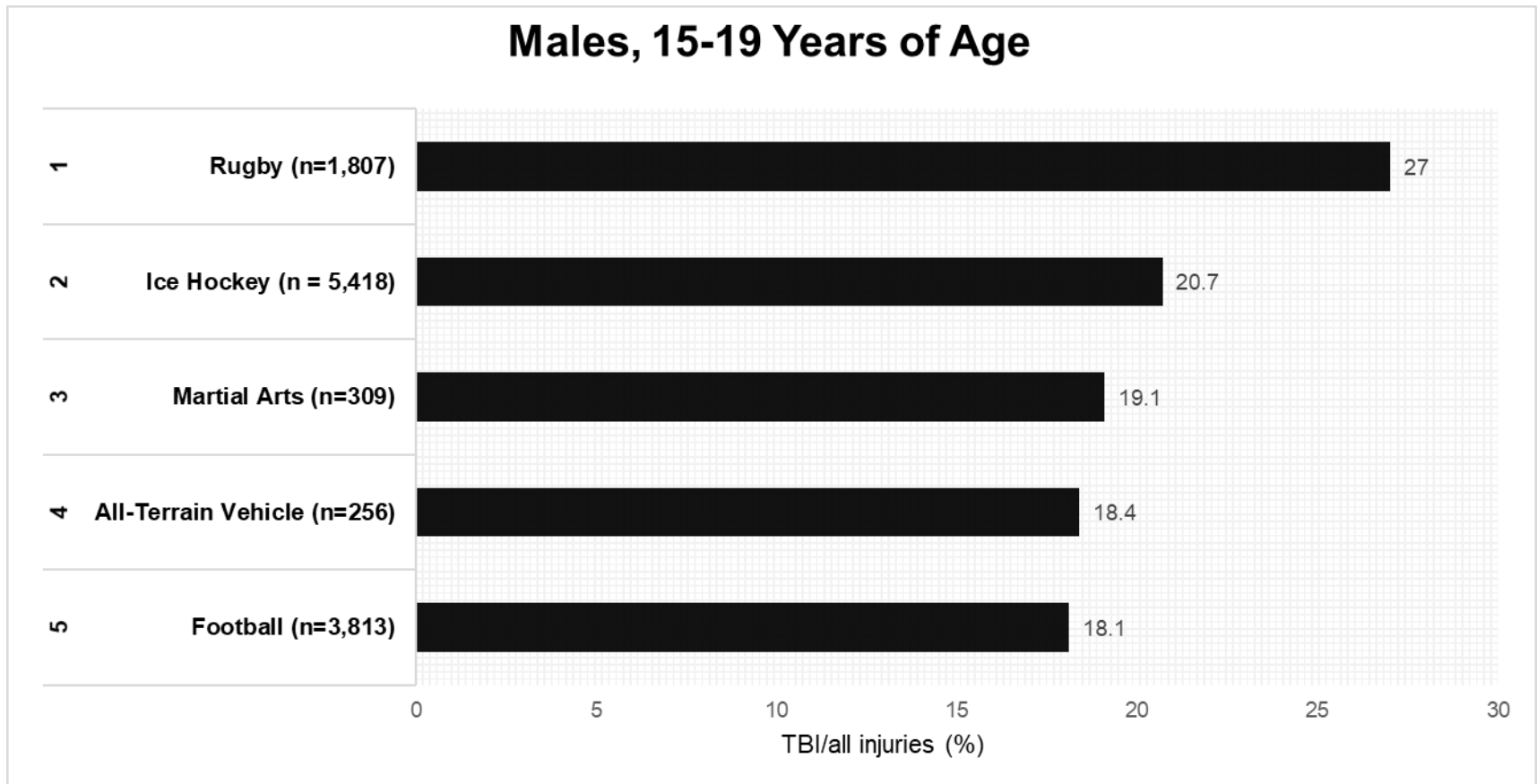
# Most frequent sports and recreational activities with the highest proportion of traumatic brain injuries

CHIRPP, 2011 to 2017.



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CHIRPP, 2011 to 2017



## CHIRPP Sample Narratives

### Concussion Diagnosis

#### Martial Arts:

- *Taekwondo class, patient and another child collided – split lip. Fifteen minutes later ran into another child hitting foreheads – nose bleeding; periodic vomiting throughout the night and nausea and dizziness today*
- *Participating in a Karate competition, kicked in the head*

#### Ice Hockey:

- *Collided with another player, he went into the boards and his neck went back; Fell into boards*
- *Playing hockey, went to get the puck behind the net and was cross-checked in the head*

## CHIRPP Sample Narratives

### Concussion Diagnosis

#### Rugby:

- *Playing rugby, got kneed on the left side of the head*
- *Playing rugby, during a tackle the tackler managed to fall on his head and kicked his head with the heel of his shoe*
- *Playing rugby, was tackled – head-to-head collision*

#### Outdoor Soccer:

- *Fell and hit head on ground; 3 hours later developed headache and vomiting. Family gave patient an ice bath and electrolytes – concerned about heat stroke*
- *Struck to the left side of the face by a kicked soccer ball*
- *Playing soccer, was elbowed in the temple by opposing player*



## Conclusions

- Concussions associated with sports and recreation are common among those aged 5-29
- ED surveillance (NACRS) allows the assessment of the burden of concussions
- ED Sentinel surveillance (CHIRPP) allows more specificity and the identification of circumstances which can inform injury prevention initiatives

## Contact information

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