SHRED CONCUSSIONS

Community Report 2023

Surveillance in High Schools and Community Sport to Reduce Concussions and their Consequences in Youth

UNIVERSITY OF CALGARY
FACULTY OF KINESIOLOGY
Sport Injury Prevention Research Centre

PLAY SMART
PLAY SAFE
NFL

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Introduction

The Sport Injury Prevention Research Centre (SIPRC) is proud to reside and work on the campus of the University of Calgary, in the Faculty of Kinesiology, in Calgary, Alberta, Canada.

We acknowledge the traditional territories of the people of the Treaty 7 region in Southern Alberta, which includes the Blackfoot Confederacy (comprising the Siksika, Piikani, and Kainai First Nations), as well as the Tsuut'ina First Nation, and the Stoney Nakoda (including the Chiniki, Bearspaw, and Goodstoney First Nations). The city of Calgary is also home to Métis Nation of Alberta (Districts 5 and 6).

Sports are a natural and beneficial part of childhood and adolescence. For many of us, sports help create some of the most lasting memories of childhood: friends we have made, the successes, the near successes, and the multitude of experiences that build personal character.

Every day youth are at risk of injury and concussion through participation in sport and recreational acitivites often without being aware they are at risk, or of the things that could protect them from injury.

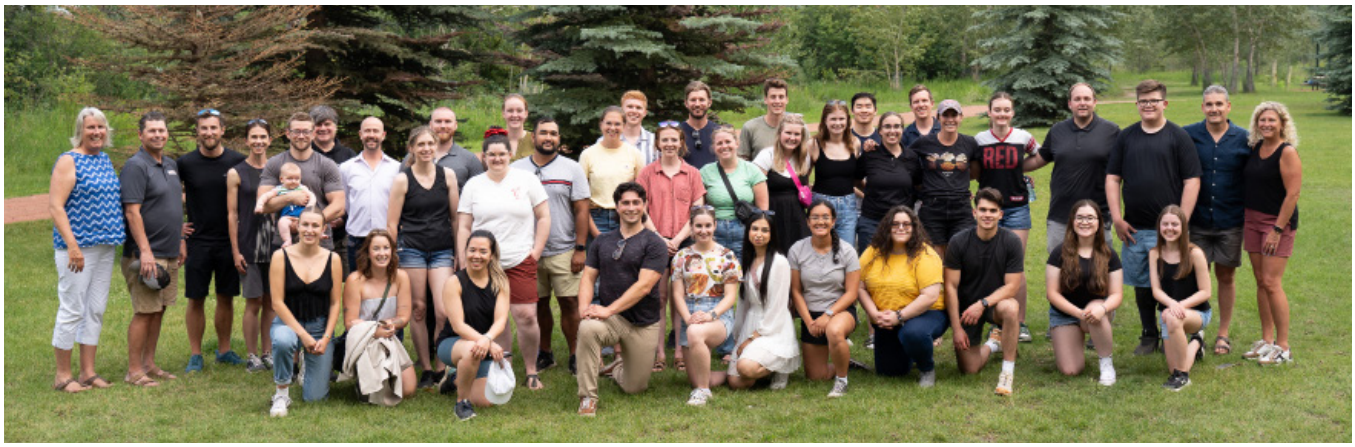
Concussions are common in youth and can have devastating impacts on individuals and families. It is estimated that 1 in 10 youth between the ages of 10-19 will sustain a concussion each year.

We believe our research through SHRed Concussions can have a significant impact in reducing sport related concussions and their consequences in youth.

We are grateful to our school and community sport partners, clincians, collaborators, teachers, coaches, and adolescents that make this possible.

Sincerely,

Dr. Carolyn Emery
Chair, Sport Injury Prevention Research Centre
Canada Research Chair (Tier 1) in Concussion
Professor, University of Calgary



SHRed Concussions Overview

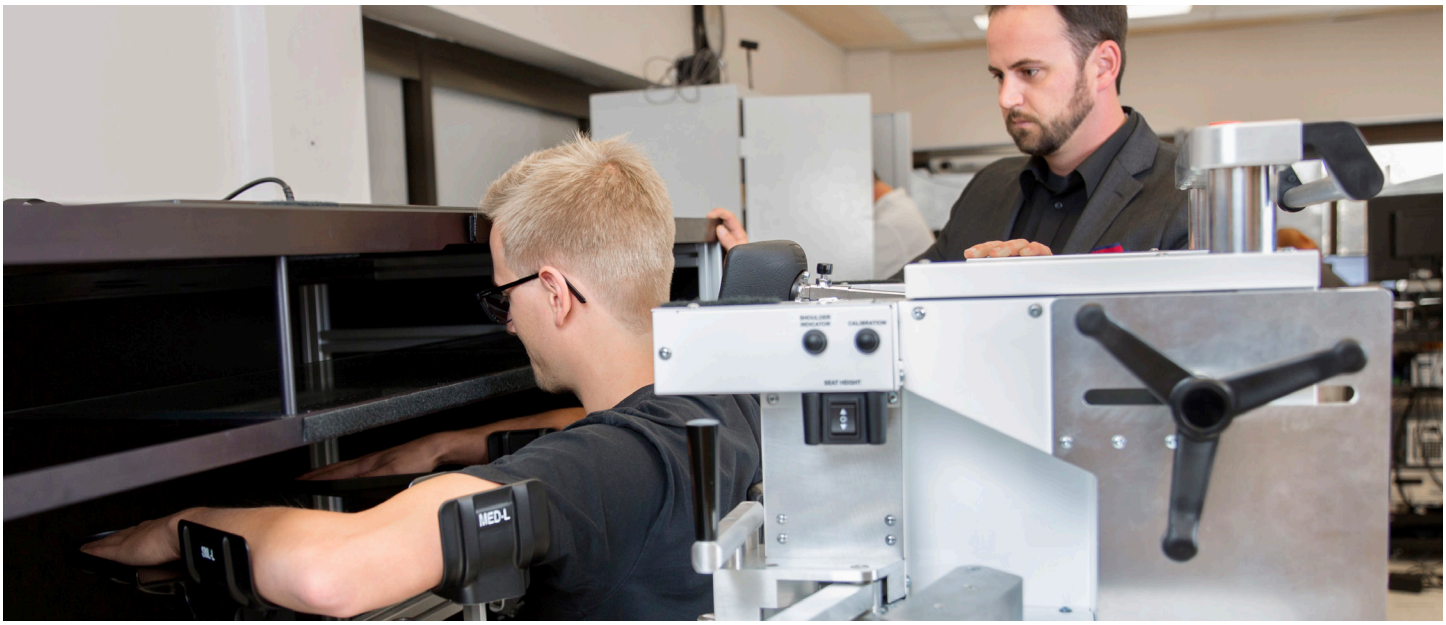
The Surveillance in High Schools and Community Sport to Reduce Concussions and their Consequences in Youth (SHRed Concussions) research program is a multi-year study designed to help us learn more about concussion in Canadian youth participating in sport.

SHRed Concussions will help us prevent concussions from happening, take care of concussions if they do happen, develop new tools to help us know when someone has a concussion, and better determine who will recover well and who will not.

Youth account for over 50% of the 3 million concussions that happen in North Amercia annually. SHRed Concussions will help to reduce the number and impact on daily life of concussion across all youth sport populations. Our goal is in alignment with the National Football League's (NFL) Play Smart Play Safe program goal to translate original research into clear clinical end-points that advantage patients and advance understanding of short and long-term effects of concussion.

The SHRed Concussions study population will include over 10,000 adolescents (ages 11-19) who participate in one or more high risk concussion sports. SHRed Concussions research sites are located in Vancouver, Calgary, Edmonton, Winnipeg, and Quebec City.

Participants will be followed for five years using our custom web-based SHRed Concussions injury surveillance system. This web-based system supports the collection of preseason measures, hours at risk of concussion, and details of any sport injuries and concussions, including recovery following concussion.



KINARM robotic testing in the lab

Our Research Goals

1) To create a national concussion surveillance program in high schools and community sport to evaluate predictors of recovery from concussion in a sample of over 6000 first year high school students who play high risk concussion sports.

2) To use a variety of tools for sport related concussions in high school-aged athletes [e.g., magnetic resonance imaging (MRI), fluid biomarkers, robotic neuromotor control, and measures of physiological, cognitive, psychosocial, cervical, vestibular, visual, and balance functions] to detect concussions and predict recovery.

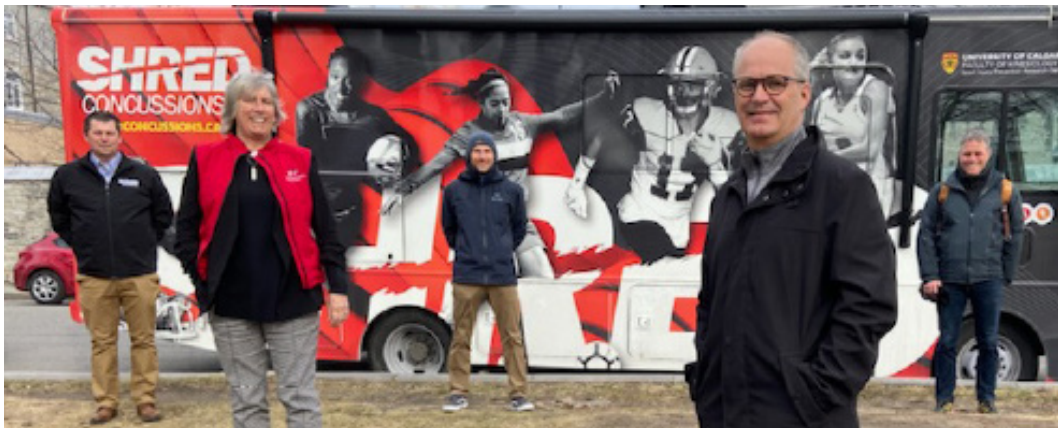
3) To evaluate novel sport-specific and school-based prevention strategies, including: a) policy and rule changes (e.g., contact policy, management protocols); b) training interventions (e.g., neuromuscular training warm-ups, contact training, head contact load modification); and c) equipment recommendations/development (e.g., helmet fit, mouth guards, wearable technologies).

4) To recruit injured athletes for treatment studies (e.g., physiotherapy, exercise prescription, cognitive-behavioural therapy) aimed to prevent long-term consequences of sport related concussions (e.g., reduced physical activity, recurrent concussion, mental health consequences, impaired school performance, economic costs).

Investigative Team

Research teams across the country coordinate concussion follow-ups, conduct assessments by study physicians, and engage participants in a variety of important measures including evaluation of magenetic resonance imaging (MRI) and concussion related blood biomarkers.

Members of the SHRed Concussions research team are recognized as some of the top sport related injury and concussion researchers and educators in Canada and around the world.



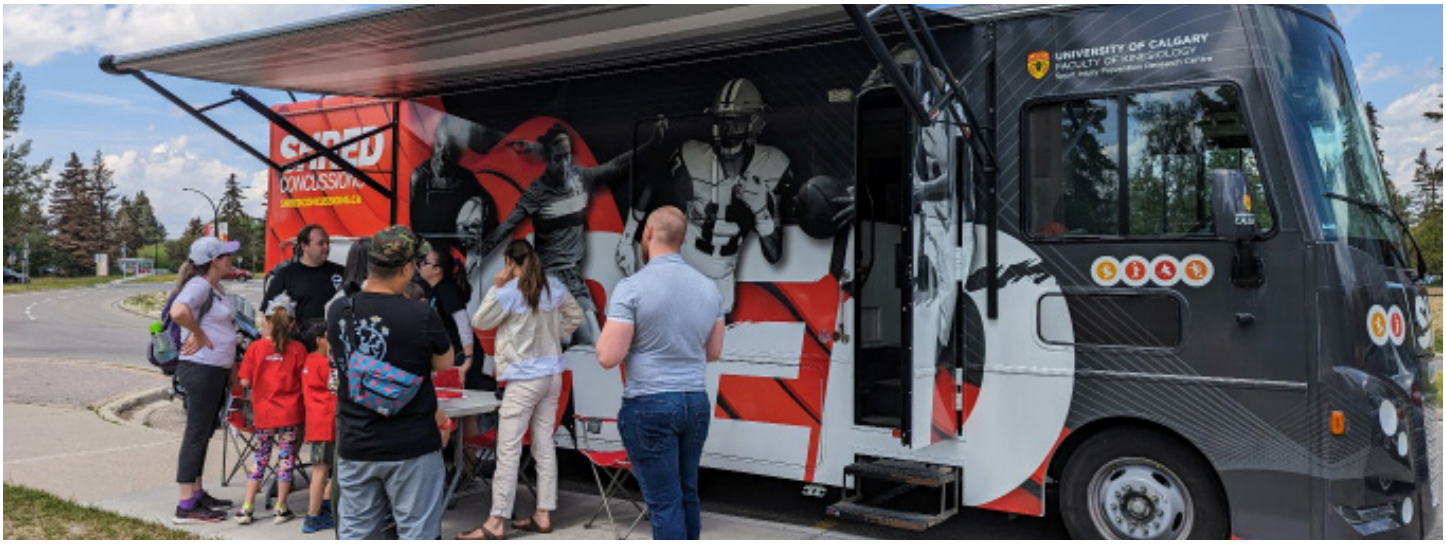
(L-R) Shane Esau, Dr. Carolyn Emery, David Laperriere, Dr. Pierre Fremont, Dr. Claude Goulet at the Institut National du Sport du Quebec in Montreal, PQ

University of Calgary: Carolyn Emery (lead-principal investigator), Brian Brooks, Tyler Cluff, Meghan Critchley, Chantel Debert, Sean Dukelow, Paul Eliason, Reed Ferber, Kenzie Friesen, Jean-Michel Galarneau, Bradley Goodyear, Brent Hagel, Sarah Kenny, Deborah Marshall, Kati Pasanen, Kathryn Schneider, Jon Smirl, Darren Stefanyshyn, Stephen West, Keith Yeates
Université Laval: Patrice Brassard, Pierre Frémont, Claude Goulet, Catherine Mercier, Brad McFayden
University of British Columbia: Shelina Babul, Ian Pike, Cheryl Wellington, Paul vanDonkelaar, Jackie Whitaker
University of Alberta: Kathy Belton, Constance Lebrun, Martin Mrazik
University of Ottawa: Roger Zemek
University of Manitoba: Mike Ellis, Kelly Russell
Western University: Doug Fraser
McGill University: Isabelle Gagnon, Ian Shrier
University of Victoria: Chris Dennison
York University: Alison Macpherson
University of Toronto: Nick Reed
University of Montreal: Jeff Caron
University of Moncton: Vicki Plourde
Parachute: Pamela Fuselli

Knowledge Translation

Sharing research outcomes from the SHRed Concussions program that inform best practices and policies in schools and communities is of critical importance for us. Putting knowledge into the hands of individuals, organizations, policy makers, health care professionals, and others, is going to help us achieve our goal of reducing the burden of sport related concussions.

Knowledge translation (KT) needs to be adapted to the needs of the communities and individuals that we work with and beyond. We successfully developed and shared multiple resources including guidelines for neuromuscular training, web-based concussion education tools, an online course, and concussion education sessions in schools and communities.



SHRed Mobile on location at a community event

The SHRed Mobile (pictured above) is a customized recreation vehicle, funded through the Canada Foundation for Innovation, Alberta Government, and the University of Calgary. The SHRed Mobile houses mobile research equipment and Sport Injury Prevention Research Centre staff to facilitate concussion and injury prevention education, knowledge translation, and implementation activities across Alberta and Canada.

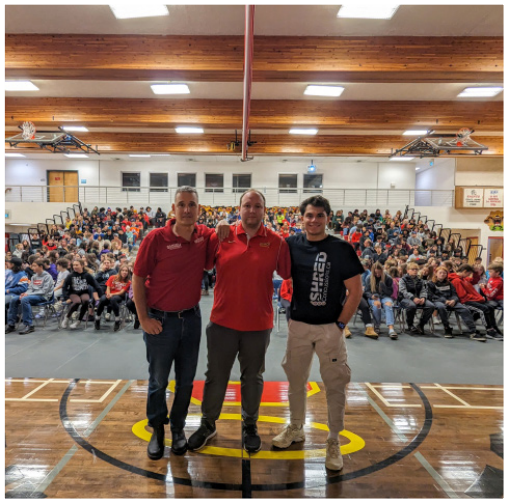
In 2023, the SHRed Mobile was busy doing preseason evalutions, data collection, and injury follow up with young athletes from across the province. The SHRed Mobile was on the road for approximately 125 days in 2023, roughly every 1 in 3 days, travelling to communities like Brooks in southern Alberta, and to communities like High Level and Peace River in northern Alberta. We are thankful and honoured to have had the opportunity to visit these places.

An ongoing priority is to extend the reach of our concussion research and KT activities with rural and Indigenous community partners. We were honoured to work with a number of Indigenous communities including the Siksika First Nation, the Blood Tribe, and the Samson Cree First Nation over the past year. We hope to continue our work with these and many other Indigenous communities in the future.

HLPS Bears Athletics
1d ·

We had very special guests at HLPS this week. The Shred concussion bus with presenters Mark, Ash and Joseph, were at our school presenting to all students to develop a greater understanding of concussions and their consequences among high school students. It was a great experience for students and staff loaded with important information! Thanks to the Shred team, U of C and the NFL for developing such a great and important program!

A testimonial from one of our participating schools



2023 also saw SHRed Concussions develop more neuromuscular resources and scale up training workshops for coaches, athletes and trainers. SHRed Concussions did a total of 36 different sessions in 2023, engaging with over 166 coaches and trainers across 6 different sports: rugby, football, field hockey, ice hockey, ringette, and soccer.

SHRed neuromuscular training session in Cranbrook, BC

SHRed Concussions is committed to meeting and exceeding our KT goals in the future:

1. To develop and sustain relationships among researchers, sport and community associations. medical associations, educational institutions, and policy makers.
2. To showcase examples of concussion and evidence informed prevention research in Alberta, Canada, and internationally.
3. To engage community and government stakeholders in discussions on concussion prevention to support their efforts in developing concussion prevention management strategies.
4. To facilitate further collaboration and networking between the research, government, clinical, and sport and recreation communities.
5. To engage knowledge users in informing, supporting, and participating in the research and knowledge translation process in concussion prevention and management.

2023 Program Highlights

2023 was another fruitful year for SHRed Concussions in terms of recruiting youth sport participants to the study and increasing the number of baselines we were able to complete. Below are some of our participant recuitment numbers, including the different sports in which we have been successful in recruiting participants.

Unique Participant Baselines/Year of Study

Year of Study	Unique Baseline Records
2019-2020	776
2020-2021	1694
2021-2022	5302
2022-2023	5077
2023-2024	2544
Total	**15393**

Unique Participant Baselines by First Year in Study

First Year in Study		Unique Participants	%
Year 1	2019-2020	776	6.91
Year 2	2020-2021	1463	13.03
Year 3	2021-2022	4473	39.85
Year 4	2022-2023	3228	28.75
Year 5	2023-2024	1286	11.46
Total		**11226**	

SHRed Concussions has had 15,393 participants since the first year of the program, with some youth participating in multiple years.

Participants Recruited By Athlete Sport-Seasons

	2019-2020	2020-2021	2021-2022	2022-2023	Total
Football	80	686	1660	1771	**4197**
Rugby	80	686	1010	1425	**2697**
Soccer	56	288	956	682	**1982**
Hockey	80	178	715	732	**1705**
Volleyball	67	249	568	540	**1424**
Basketball	113	112	647	549	**1421**
Ringette	19	81	134	384	**618**
Alpine Skiing	0	49	269	292	**610**
Wrestling	32	21	82	205	**340**
Lacrosse	13	31	77	53	**174**
Field Hockey	6	11	89	206	**312**
Acrobatic Dance	0	0	45	25	**70**
Cheerleading	5	25	16	17	**63**
Sledge Hockey	0	10	29	22	**61**
Artistic Swimming	0	0	0	30	**30**

*some participate in more than one sport

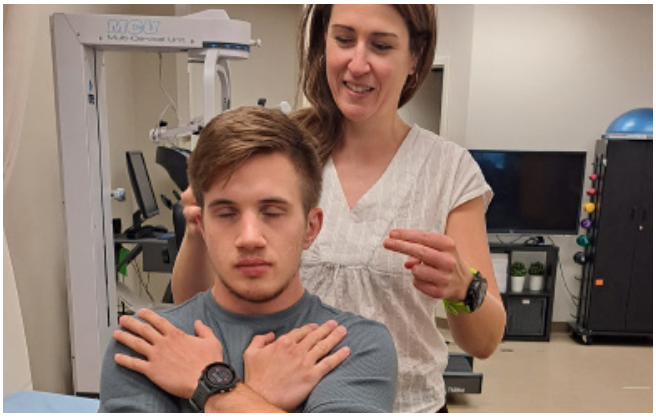
From the data that we have collected from our baseline studies, our research has shown that **concussions account for almost 30% of all injuries**. This highlights the importance of concussion prevention strategies to protect athletes from getting concussions in the first place.

SHRed Concussions research is helping to prevent concussions across multiple youth sport contexts. Some examples of our research that are making a difference include:

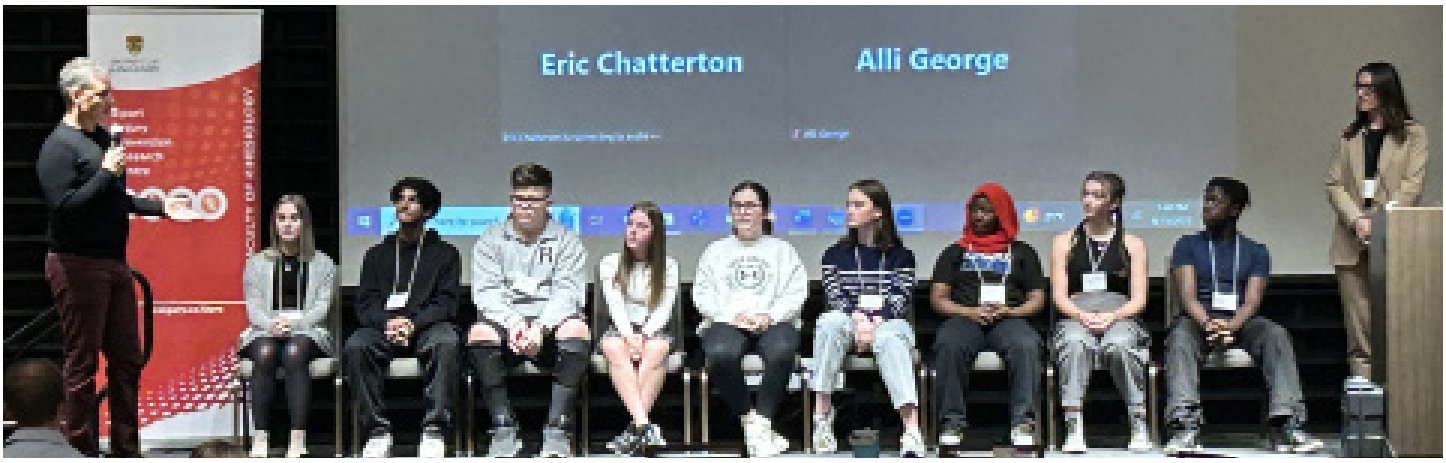
- Working with Rugby Canada, World Rugby, Ringette Canada, Hockey Canada, School Sport Canada, and others, we are evaluating neuromuscular training methods, personal protective equipment, contact training, referee training, rule changes, and concussion management strat-egies to improve player safety.
- Instrumented mouthguards are being used to measure head impact biomechanics in youth collision sports.
- Video analysis has been used to evaluate player-to-player physical contacts, head impacts, mechanisms of injury, and suspected concussions which inform prevention strategy evaluation across multiple youth sports.
- The collection of over 2164 blood samples will help scientists identify potential concussion biomarkers that will inform concussion detection, diagnosis and prognisis which may help identify those at risk of a concussion, or further concussions.

Injury Type	n	% of 15,393 Unique Baselines	% of 11,226 Unique Individuals
Concussion	1661	10.79	14.80
Musculoskeletal Injury	3955	25.69	35.23
Total	**5616**	**36.48**	**50.03**

Concussions account for 29.6% of all injuries



Youth Advisory Committee



Youth Advisory Committee at the 2023 Community and Research Engagement Symposium

2023 also marked the scale up of the Sport Injury Prevention Research Centre Youth Advisory Committee. Comprised of 9 youth members representing students and youth from high schools and universities in the Calgary area, the committee has been tasked with providing a youth perspective on topics ranging from broad sport injury prevention areas to specific SHRed Concussions research. Committee members also engage in specific sub-project activities throughout the year.

Having an opportunity for youth to provide their perspectives about concussion research has been incredibly valuable for the SHRed Concussions research team. Input from the Youth Advisory Committee has helped shape research questions, informed effective ways to engage youth in research, and also improved our means of communicating SHRed Concussions research to youth.

The Youth Advisory Committee meets approximately 6 times per year, and is comprised of high school students who are all active in sports such as football, para ice hockey, volleyball, rugby, basketball, ringette and others. Advisory committee members are asked to stay on for a term of one-year at a minimum, and new members will be sought as needed after an annual review of whether members want to continue.

Interested in becoming a member of the Youth Advisory Committee?

Email us at siprc@ucalgary.ca with your name and a brief description of why you would like to join the commitee, and a short biography of yourself including any sports or recreational activites you have particiapted in.

2023 Facts and Figures

SHRed recruitment of participants to date
15,393

2023 conference presentations
71

Kilometers the SHRed Mobile travelled in 2023
10,000+

# of coaches trained in neuromuscular training
166

2023 invited research talks
51

SIPRC Twitter followers
1649

Research trainees in program
53

Researchers across Canada
45

Research partners and collaborators
67

2023 extenal funding to SHRed trainees
>$552,210

SHRed Concussions sub-projects
41

2023 SHRed Concussions publications
32

Fluid biomarker samples collected to date
2164

Psychosocial questionnaires completed to date
8042

Participants taken the online concussion course
14,000

Contact Us:

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SHRed Concussions Program

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ucalgary.ca/sport-injury-prevention-research-centre