

Toward a Minnesota Model for Brain Health in Youth Sports

University of Minnesota Grand Challenges Research Initiative

FINAL REPORT

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To: University of Minnesota Provost's Office

From: Francis Shen, Lead PI for GC Research Project, *Toward a Minnesota Model for Brain Health in Youth Sports*

Re: Final Report / Annual Report for 2018-2019

Date: October 19, 2018

This memo presents our Annual Report for the period August 2017- September 2018. Because this marks the end of our 2-year Grand Challenges grant, this also serves as our final report. The past year has been very productive, and our project successes include:

- Producing eight scholarly publications (4 published or forthcoming; 4 in prep or under review), with multiple UMN student lead- and co-authors from different disciplines;
- Launching a statewide survey, the first of its kind in the nation, to assess the implementation of the state's youth sports concussion law;
- Collecting nearly 1,500 unique responses from leaders, administrators, coaches, referees, parents, and athletes involved in youth sports through our statewide survey, making this the most extensive survey of its kind nationally;
- Establishing successful partnerships with Minnesota Hockey, Minnesota Swimming, Minnesota Youth Athletic Services and Trusted Coaches, and Minnesota State High School League, and Project Brain Safe, all of whom assisted in developing and disseminating our statewide law survey;
- Successfully completing a new seminar on sports concussions and the law (the first of its kind in the nation) in spring 2018;
- Enabling a UMN Public Health School graduate to obtain a full time position with the National Sports Center (Blaine, MN);
- Enabling a UMN Law student to obtain a highly competitive internship with the National Football League's Management Council;
- Conducting focus groups and interviews with stakeholders from across the state, including Bemidji, St. Cloud, Rochester, and the Twin Cities; and
- Making multiple presentations to the Minnesota youth sports community.

The following documentation of these accomplishments are submitted with this report:

1. Syllabus for Sports Concussions and the Law seminar (spring 2018 term)
2. A copy of our youth and high school statewide concussion law implementation survey instrument
3. Publication: Rasmussen, Carly, Sydney Diekmann, Christine Egan, Tyler Johnson, and Francis X. Shen. "How Dangerous are Youth Sports for the Brain? A Review of the Evidence." *Berkeley Journal of Entertainment and Sports Law* 67 (2018): 7
4. Publication: Shen, Francis X. "Are Youth Sports Concussion Statutes Working." *Duq. L. Rev.* 56 (2018): 7.
5. Forthcoming Publication: Diekmann, Sydney, Christine Egan, Carly Rasmussen, and Francis X. Shen. "The Failure of Youth Sports Concussion Laws and the Limits of Legislating Health Education." *Yale Journal of Public Health, Law, and Ethics* (2018)


Summary of Project and Research Team

Summary of Research Project: This Grand Challenges project was a new collaboration between six researchers across five different units, all focused on various aspects of traumatic brain injury.¹ In 2011, Governor Dayton signed into law a new set of protocols to govern the treatment of concussions experienced by youth athletes in Minnesota. This project was pursued because we know little about the effectiveness of concussion care for student-athletes, including potential disparities of treatment across ages, sports, or regions. Nor do we know if students are receiving the care they need to succeed in the classroom (i.e., “Return to Learn”) after concussion incidents. This Grand Challenge project pursued an interdisciplinary response to fill these research gaps, inform policy, and improve the health of Minnesota’s youth athletes. The project had four interrelated objectives: (1) to establish a campus-wide working group on traumatic brain injury (TBI); (2) to conduct a pilot study on the implementation of Minnesota’s 2011 sports concussion law and on current practices in the identification, evaluation, and treatment of youth sports concussions; (3) to host a statewide summit, in partnership with community partners, to disseminate best practices and identify statewide needs; and (4) to develop grant proposals to secure funding in order to create a Minnesota Model for addressing the challenge of youth sports TBI.

1. Accomplishments to date, described in terms of project benchmarks

We identified ten benchmarks and report on each below. For ease of reading, we have **progress updates are in boldface**.

A. Research Project Benchmarks

- i.  *Study Design:* In partnership with multiple stakeholders, has the research team prepared a feasible study design that will—within resource constraints—provide a meaningful assessment of the current state of youth sports brain injury incidence and response in Minnesota? **Yes: We developed and disseminated a statewide survey with meetings and input from many stakeholders including: MN Dept. of Health, Minnesota Amateur Sports Commission/National Sports Center, Minnesota Youth Athletic Services (MYAS), the Minnesota Athletic Trainers Association, and the Minnesota State High School League (MSHSL). We launched the survey in July 2018. To generate a high response rate, we sent over 2,500 emails, made over 200 phone calls, and sent nearly 150 letters to youth sport organization leaders, referees, and coaches across the state of Minnesota requesting their participation. We interacted with over 500 youth athletes and parents who participated in our survey at the State Fair and hundreds of parents at the USA Cup at the National Sports Center. After various partnering organizations disseminated our survey, we collected nearly 1,500 unique responses that provide a statewide representative sample of Minnesotans. We are scheduled to**

¹ Over the course of the grant period, two PIs (Jessica Brown and Moira Novak) left the University of Minnesota for positions elsewhere.

launch a high school version of the survey, in partnership with the MSHSL, in Fall 2018.

- ii. ✓ *Researcher access:* Has the research team gained access for a study of TBI incidence and case studies in a purposeful sample of Minnesota schools and youth sports organizations? **Yes: We included in our statewide survey, as well as our State Fair surveys, questions related to concussion incidence rates. We also conducted focus groups in St. Cloud with our Project Brain Safe and Sanford Health and Sports Medicine. In addition, we conducted interviews with stakeholders from around the state.**

- iii. ✓ *Best practices:* Through literature reviews and qualitative research, has the research team identified promising best practices in assessment, prevention, treatment, Return-to-Play, and Return-to-Learn? **Yes: We have conducted extensive literature reviews on best practices. Two of these pieces are now published and another has recently been accepted for publication. Within the next six months, we will publish at least two more literature review pieces, one focused on the benefits of participating in sports for youth and a second focusing on the legal standard of care. We have also finished writing, and aim to submit for publication, two scientific pieces focused on Minnesota parent and athlete concussion law knowledge, attitudes, perceptions, and management of sport-related concussions, delineated from the results of our State Fair survey conducted in 2017.**

- iv. ✓ *Parent survey data:* Has the research team produced survey data related to concussion knowledge and areas of concern amongst Minnesota parents? **Yes: Our data from the 2017 and 2018 MN State Fair produced the state's first data on student-athlete and parent knowledge of the MN concussion law. Our statewide assessment survey has expanded these findings by producing a statewide-representative pool of athlete, parent, coach, referee, administrator, and youth sport leader experiences regarding various dimensions of youth sport concussion, including concussion knowledge, concussion education and training, return-to-play protocols, confidence in identifying concussion, resource availability to implement the concussion law, oversight and assistance provided by governing organizations or sport advisory committees, knowledge of the concussion law, and management of concussion. The data is being analyzed and articles will be submitted in the coming months.**

B. Institutional Transformation Benchmarks

Context: Our research project aimed to transform the University by bringing together new collaborators on campus, as well as building new collaborations with partners outside the University. The following benchmarks reflect those goals:

- i. ✓ *UMN working group on traumatic brain injury*: Has the research team established a new campus-wide, interdisciplinary working group on traumatic brain injury? **Yes: Our campus-wide and statewide working group met in person in May 2017, and then participated in the 2018 Sports Concussion and Law Seminar in spring 2018. Individuals from many disciplines and institutions participated in these meetings / seminar, and the partnerships we developed helped us disseminate our statewide survey instrument. Most of the individuals in this group had not previously worked together.**

- ii. ✓ *New student research with interdisciplinary mentors*: Have students engaged in new TBI research with the mentorship of mentors from multiple disciplines? **Yes: We have employed over 13 different student research assistants, and almost all of them co-authored a scholarly publication. Student research assistant duties included engaging in scholarly writing and data analysis and participating in the design, development, and dissemination of our statewide survey instrument. Two undergraduate students have lead-authored research articles that were accepted for publication in well-respected legal journals.**

- iii. ✓ *Hosting interdisciplinary event on brain injury*: Has the research team hosted an interdisciplinary event on campus to educate community members and foster dialogue about best practices and challenges in the prevention, assessment, and treatment of youth brain injuries? **Yes: We held our first stakeholder meeting in 2017 and, in 2018, we hosted multiple focus groups with youth sports community members, high school athletic departments, and healthcare professionals in central and southeastern Minnesota to discuss regional best practices and challenges associated with the implementation of Minnesota's concussion law. In April 2018, student research assistants had the opportunity to develop an interactive display and present preliminary findings of the project to faculty and community members at the Grand Challenges Research Expo. We also presented to multiple audiences each 100+ in Rochester, MN (Hockey Summit in fall 2017); Blaine, MN (Players Health Football Summit in winter 2018); and Moundsview, MN (Football Summit in summer 2018).**

- iv. ✓ *Public awareness*: Has the research team made relevant constituencies, such as school districts and youth sports leagues, aware of this research initiative and invited their participation with the University of Minnesota? **Yes: Our partners now include the MSHSL, Trusted Coaches, MYAS, and others with direct contact in youth and school sports. We aim to extend awareness of our efforts to the high school sports community when we launch our high school survey in fall 2018 in conjunction with the MSHSL. Additionally, following the completion of the project, the entirety of our research findings will be made freely available and easily-accessible to all Minnesotans on the web.**

- v. ✓ *Greater Minnesota*: Has the research team established a partnership with stakeholders outside the Twin Cities metropolitan area? **Yes: Our partners include groups in St. Cloud, Rochester, Mankato, and Bemidji. Our survey responses come from a wide cross-section of the state's population.**

2. Student involvement, both graduate and undergraduate students

We have had extensive student involvement, including 13 undergraduate research assistants (from multiple disciplines including neuroscience, mathematics, psychology, linguistics, biology, and English) and three law students over the course of the project. These students all worked at the State Fair Driven to Discover research building and are all lead- and/or co-authoring scholarly publications. The students have directly and indirectly collaborated with one another and area professionals on a number of projects including organizing and conducting focus groups, developing and disseminating our statewide assessment survey instrument, lead- and co-authoring publications with their colleagues, presenting research findings at the Grand Challenges Research Expo in April 2018, and engaging in scholarly writing and data analysis.

In addition, a new seminar—*Sports Concussions and the Law: Neuroscience and Liability*—was approved for and taught by Professor Shen in Spring 2018 (syllabus attached). This was the nation's first seminar dedicated to sports concussion and the law. It involved a series of over ten guest speakers from amongst the Grand Challenges team and industry professionals and could possibly pave the way for a future Grand Challenges course on a similar topic.

3. Collaborations with external partners

We have built an extensive set of collaborators. As noted above, our survey instrument was the product of input from over 15 stakeholders, and over ten participants in our May 2017 summit served as guest speakers for Dr. Shen's sports concussion seminar. None of these collaborations were functional before we began our Grand Challenges work.

In addition, we have partnered with Minnesota Youth Athletic Services, Trusted Coaches, Minnesota Hockey and Minnesota Swimming, and the Minnesota State High School League, who have greatly assisted with the development and dissemination of our statewide survey. In Summer 2018, we partnered with Project Brain Safe in St. Cloud, Minnesota and Sanford Health in Bemidji, Minnesota to host regional focus groups with youth sports leaders and high school athletic departments. These groups focused on identifying regional trends and challenges regarding concussions.

4. Public events or outreach activities

In 2018, Professor Shen presented the work of this Grand Challenges project both locally and nationally. As previously mentioned, we hosted a series of community events (in partnership with other stakeholders) to raise concussion awareness and discuss important challenges and issues in the youth sports community. Locally, Professor Shen met with stakeholders around the state and presented at the 2018 Minnesota Youth Football Summit hosted by Minnesota Youth Athletic Services. Research assistants in the lab presented preliminary research findings at the Grand Challenges Research Expo in April 2018. In 2018-2019, we aim to compile findings from our statewide assessment survey and qualitative focus groups, in combination with knowledge obtained from our literature reviews, to develop a comprehensive report to the state legislature. A summary of this report will be widely disseminated via our many partners.

5. Developments to date that especially highlight your international efforts.

Our efforts to date have been focused domestically and especially focused on Minnesota.

6. Personnel updates

A. Lessons Learned: Interdisciplinary team integration.

We identified potential members of our team through our professional networks and through web searches to identify individuals with relevant expertise. This was our first opportunity to work together and it was a productive relationship. Substantively, we learned that there is a lot of distance (understandably so) between the basic neuroscience of traumatic brain injury and the on-the-sidelines reality of caring for youth sports concussions. It will not be soon that we will add brain scanning as a routine part of concussion sideline assessment. This was a challenge to certain types of collaboration and scholarly production. For instance, the gap between the basic science and the applied policy limited the ways in which some members of the team (the basic scientists) could make meaningful policy recommendations.

But that said, our work did lay important groundwork for technological development to come in the future. Moreover, it became clear that additional types of expertise (e.g. in communication risk, in economic analysis of costs and benefits) would have been useful for our project. If we are able to identify sources for continued support, we may add those components.

It should also be noted that we learned *a lot* from each other. We had regular email chains, conversations, and exchanges about the challenges of implementing youth sports concussion laws. We also established ourselves within the state as *the* place to go for analysis on these issues. The Grand Challenges grant gave us the head start we needed.

B. *Unanticipated outcomes: Community support*

We entered this project as a group of academics aimed primarily at policy analysis. An unanticipated outcome was the outpouring of support and interest we received from stakeholders and the public. This was most evident when we went to the legislature in 2017. As can be seen from the attached slide, we had support from academics, clinicians, professional athletes, and many more. I had not anticipated working with state legislators so early in the process, but there too (on a bipartisan basis) we were well received. There is momentum in the state to keep improving youth sports concussion policy, and this Grand Challenges project allowed us to tap into that energy.

Summary

In sum, we collected important qualitative and quantitative data in 2018, using a network of support and collaborations developed in the previous year that has never been seen before in the sports concussion sector. We have synthesized information and data across a broad and diverse range of Minnesotan communities to identify trends and challenges in concussion management and recommendations to improve Minnesota's concussion policy. We remain confident that our research will be nationally recognized for its innovation and breadth.