

RESEARCH ARTICLE

Strategies to Address Unmet Needs and Facilitate Return to Learn Guideline Adoption Following Concussion

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ABSTRACT

BACKGROUND: Many students do not receive return to learn (RTL) services upon return to academics following a concussion.

METHODS: Using a mixed-methods approach, we conducted a survey of RTL practices and experiences in Washington State schools between January 2015 and June 2015. We then held a statewide summit of RTL stakeholders and used a modified Delphi process to develop a consensus-based RTL implementation model and process.

RESULTS: Survey participants included 83 educators, 57 school nurses, 14 administrators, and 30 parents, representing 144 schools in rural and urban areas. Unmet need domains and recommendations identified were (1) a current lack of school policies; (2) barriers to providing or receiving accommodations; (3) wide variability in communication patterns; and (4) recommendations shared by all stakeholder groups (including desire for readily available best practices, development of a formal school RTL policy for easy adoption and more training). Using stakeholder input from RTL summit participants and survey responses, we developed an RTL implementation model and checklist for RTL guideline adoption.

CONCLUSIONS: Washington State children have unmet needs upon returning to public schools after concussion. The student-centered RTL model and checklist for implementing RTL guidelines can help schools provide timely RTL services following concussion.

Keywords: concussion; academic accommodations; traumatic brain injury (TBI); return to learn (RTL) services.

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There are between 1.1 and 1.9 million sports- and recreation-related concussions that occur annually among children aged 0-18 years in the United States,¹ with many young athletes returning to play prior to getting cleared by a medical professional.²⁻⁶ The cost of traumatic brain injury (TBI) and concussion care is high, with care management estimated to be \$76.5 billion in 2000 in the United States alone. However, this estimate does not capture the emotional, physical, or school impacts that often accompany concussion and TBI.⁷ Studies show that many students with more severe concussions and special education needs resulting from TBI do not receive adequate services in school.^{8,9} Whereas it is recognized that

providing appropriate academic accommodations and school services to children with concussion is critical for supporting their recovery and development, and for increasing their capacity for higher education and work productivity,¹⁰⁻¹⁴ barriers to accessing school services such as lack of medical documentation and poor communication between medical professionals and schools are reported to hinder implementation of return to learn (RTL) services.¹⁵

Accommodations for students with recognized educational and medical needs, including concussion, may include either formally defined and temporary individualized health care plans, 504 plans, and individualized education plans, or informal academic accommoda-

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tions provided by individual educators.¹⁶⁻¹⁸ Current guidelines for accommodating students returning to school after concussion do not consider how school policies or teacher education on RTL practices might affect RTL guideline implementation or fidelity. The current guidelines also have not been evaluated.¹⁶⁻¹⁹ In addition, the development of these guidelines does not consistently include feedback or input from all key stakeholder groups about how policies and procedures might be implemented in schools or about how school policies might affect overall guideline implementation.^{15,17,19,20,21} Washington State was the first US state to pass a return to play law, known as the Zachary-Lystedt law, but has no RTL law or public school RTL policy. There is also little known about statewide RTL school policies or RTL needs in any of the states. To bridge this gap in knowledge, we examined RTL practices and experiences in Washington State public schools. We aimed to use this information to develop strategies that redress these needs and facilitate best practice guideline adoption for schools serving students with concussion.

METHODS

General Study Design

We used a mixed-methods approach to determine RTL needs. We conducted a statewide needs assessment using a survey of public school nurses, administrators, and teachers, as well as a survey of parents of children with concussion. The recruitment period for all survey data was February to May 2015. State needs assessment results were shared with the Washington State TBI council. We held a 1-day RTL summit in Seattle on January 22, 2016. Needs assessment results were used to guide development of summit contents and a RTL implementation model and checklist. The RTL model and RTL checklist were refined further using consensus from a modified Delphi process facilitated during the summit as well as from post-summit

attendee feedback.²² The final model and checklist were agreed upon by stakeholders and attendees.

Statewide Needs Assessment

Schools. Schools were selected for participation using a random sample of all public schools in Washington State; the Office of the Superintendent of Public Instruction for Washington State provided the list of schools. We excluded college programs and schools serving a special population such as inpatient facilities and schools for the deaf and hard of hearing. Because many cognitive symptoms do not become recognizable until a child with TBI reaches middle school and accommodations are more likely to be deemed necessary in grades 6-12 than in grades 5 and below, we surveyed schools that included students in grade 6 or higher; however, schools were not excluded if they also included students in grades K-5.²⁰

The 1333 eligible public schools were divided into the following 8 groups based on their school-type designation: vocational schools, reengagement schools, tribal schools, alternative schools, K-12, elementary schools, middle schools, and high schools. They were labeled as either rural or urban within each school-type using the Washington State Department of Health designations of each school's county. We randomly sampled schools in blocks of 10 from each school-type and rural/urban category, replacing those who declined to participate with the next school in that block, contacting a total of 254 schools by the end of the recruitment period. Using publicly available contact information, we contacted schools between February and May 2015, 208 of which were confirmed as eligible.

Administrators, teachers, and nurses. Once a school agreed to participate, individual survey links were sent via e-mail to a school administrator, as well as to the school nurses and teachers. Due to a low survey response rate, we additionally disseminated

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the nurse and teacher surveys to registered school nurses and teachers statewide using the Washington State Office of the Superintendent of Public Instruction listserv. Teachers were asked demographic questions, but not asked to specify their school. School nurses and administrators were not asked demographic questions to protect respondent privacy.

Parents. Parents of students in Washington State public schools who had experienced a concussion were recruited through the Brain Injury Alliance of Washington (BIAWA). Parents were sent an anonymous survey link through BIAWA's Facebook page and listserv. Since the study focused on children who attended school (grades 6-12) following their concussion, we included only parents of children who were diagnosed with concussion prior to age 18 years.

Study Materials and Survey Content

Surveys were developed based on questions included in prior studies of TBI in school aged children^{9,15,17,23-25} and based on input from interviews with 2 former teachers, a school nurse, and a district administrator in Washington State. Surveys asked questions aimed at assessing respondent knowledge, attitudes and beliefs as well as current practices and experience regarding students with concussion reentering school and any relevant policies in their corresponding public schools or districts.

Instrumentation

We used the National Institutes of Health funded online surveying platform designed for Health Insurance Portability and Accountability Act (HIPAA) compliant, institutional research called REDCap (Research Electronic Data Capture)²⁶ to survey Washington State teachers, school nurses, school administrators, and parents of children with concussion. Databases were maintained at the Harborview Injury Prevention and Research Center and Seattle Children's Research Institute.

Data Analysis

We used a mixed-methods approach to analyze survey data and assess the landscape of RTL guideline implementation practices and experiences in Washington State. Categorical and demographic survey questions were analyzed quantitatively while open-ended survey questions were analyzed using a qualitative content analysis. Two study coders independently reviewed the survey responses and identified thematic codes using an inductive approach.¹⁹ After coding was completed, investigators employed an iterative consensus-based process for theme development to facilitate interpretation of findings and model development.²⁰ We identified 4 major domains and

attributed themes within each domain to describe responses. Analysis was completed with Stata 13 and Dedoose software packages.^{27,28}

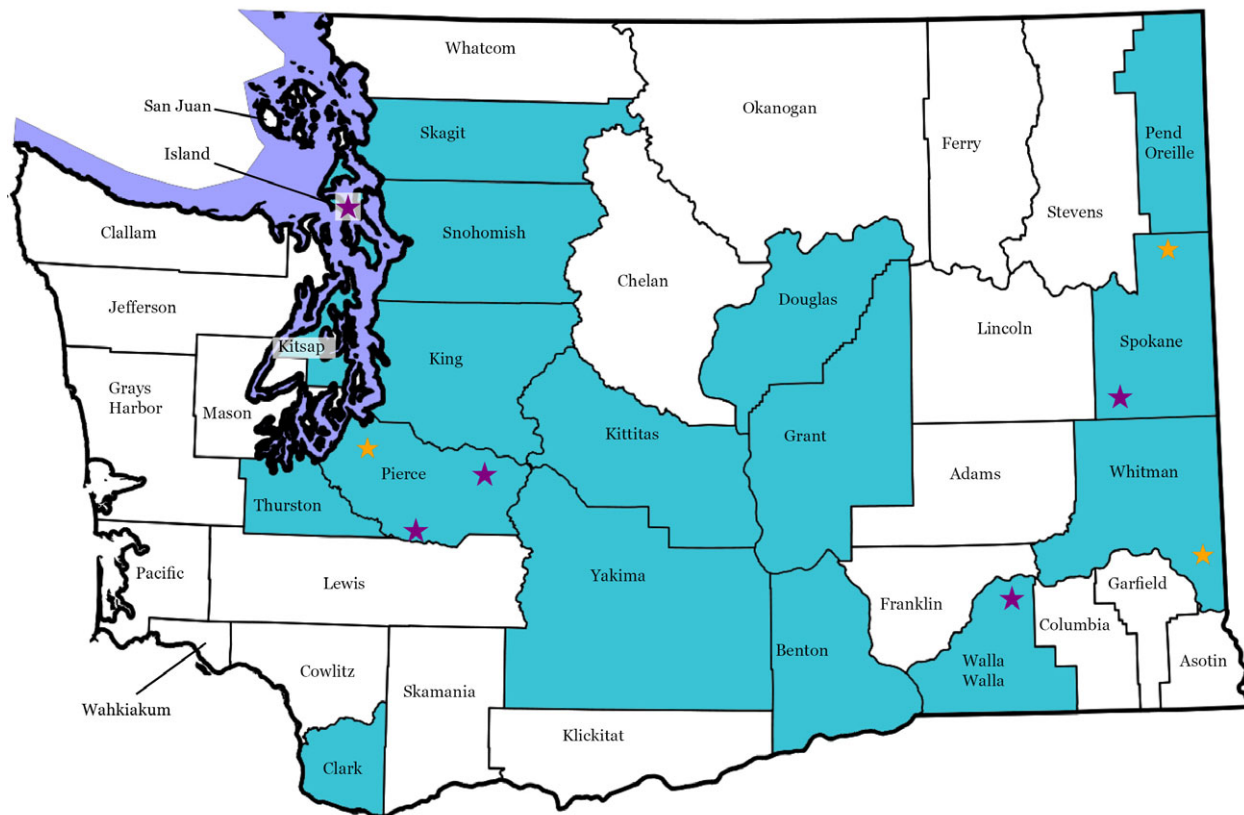
RTL Summit

Participants. The needs assessment results identified 6 major stakeholder groups with formal state and public school responsibilities for children with concussion and whose engagement would be critical for RTL guideline implementation in schools. Accordingly, invited stakeholder groups were parents, educators, state level policymakers, medical providers, social workers, and community organizations. We also contacted individuals who could represent multiple stakeholder groups (eg, a teacher who was also a parent of a child with concussion), with attention paid to representation from underserved populations (ie, Native American, Hispanics, and other disabilities). We invited a total of 59 individuals from the identified 6 major stakeholder groups. The summit was attended by 35 invitees with at least 1 person from each stakeholder group.

Summit agenda and process. Before the summit, investigators reviewed and summarized existing RTL literature and results of the Washington State needs assessment. We sent participants the summary, as well as the Washington State Superintendents Association sample policy on student sports concussion and head injury, the Revised Code of Washington pertaining to student sports concussion, and an executive summary of the statewide RTL needs assessment. We asked participants to respond with questions and comments that were used to guide the summit agenda. Summit presenters reviewed and discussed the strengths and weaknesses of the RTL literature, discussed the completed Washington statewide needs assessment results, reviewed the neighboring Oregon RTL processes, and identified gaps in statute and formal policy pertaining to RTL.

Participants were then divided into 6 workgroups with at least 4 stakeholder groups represented in each workgroup where discussion was facilitated by a summit participant who was briefed on the process and goals prior to the discussion. By group, participants developed and ranked key components of RTL domains and implementation processes in order of relevance to implementation using a Delphi process.²² These domains were derived from the shared components of 2 of the most widely used RTL models, the REAP (Reduce Educate Accommodate Pace) Project²⁹ and Brain 101,¹⁶ and included the prepared system, the coordinated care team, RTL protocols and program evaluation. Alongside each domain were pertinent questions raised by stakeholders and facilitators with respect to the RTL process during the pre-summit assessment.

Figure 1. Geographic Distribution of Study Participation and School- and District-Level Return to Learn (RTL) Policies.



Note. The 17 Washington State counties with at least 1 participating school or school district are highlighted in blue. Orange stars indicate school districts with formal RTL policy and purple stars indicate schools with formal RTL policy to guide return to learn following a concussion.

Theme development. At the end of the summit, facilitated workgroups developed group level consensus on ideal RTL guideline domains and preferred implementation components. Themes were identified by consensus among study investigators for use in the development of the RTL implementation model and checklist, as described below.

RTL Implementation Model Development

Using results from the needs assessment and summit findings, we adapted the Consolidated Model for Implementation Research (CFIR) developed by Damschroder et al³⁰ to describe RTL specific external, guideline, school and communication contexts relevant to the development of an optimal RTL context. Following the Damschroder model, the external context refers to the state level policies, the school context refers to school capacity, the communication context refers to the systems of communication between interdisciplinary groups required to support RTL accommodations, and the guideline context refers to available RTL guidelines available for implementation.

We then developed a 3-phase checklist that considers the optimal RTL context and could be used by schools to implement formal RTL policy. The checklist

does not require full development of the external context because this aspect may lag behind school and guideline readiness. The model and checklist were further refined based on consensus from the core research group and summit participants at the summit and via e-mail after the summit. All stakeholders iteratively achieved final consensus regarding the final RTL implementation model and checklist.

RESULTS

Statewide RTL Needs Assessment

Participants. Survey participants included 83 educators, 57 school nurses, 14 administrators, and 30 parents from 17 (43.5%) counties, from 144 schools in rural and urban areas (Figure 1). Administrator and school nurses responded from 6 school-types: high schools, middle schools, elementary schools, vocational schools, reengagement schools, and tribal schools (Table 1).

Domains

Responses from the open-ended needs assessment were categorized into 4 domains: (1) accommodation practices; (2) barriers to accommodation;

Table 1. Study Participant Demographics

Respondents by School-Type	Administrator (N = 11) N (%)	Teacher (N = 83) N (%)	School Nurse (N = 57) N (%)
High school	2 (14.3)	11 (13.3)	13 (22.8)
Middle school	1 (7.1)	7 (8.4)	13 (22.8)
Elementary school	2 (14.3)	27 (32.5)	9 (15.8)
Tribal school	1 (7.1)	4 (4.8)	1 (1.8)
Reengagement schools	2 (14.3)	12 (14.5)	4 (7.0)
Vocational school	3 (2.1)	9 (10.8)	0 (0)
Office of the Superintendent of Public Instruction	0 (0.0)	13 (15.7)	0 (0.0)
District level	0 (0.0)	0 (0.0)	17 (29.8)

Demographics of Children Among Participating Parents (N = 21)		Children N (%)
White		15 (71.4)
Private insurance at time of injury		18 (85.7)
TBI sustained		
Prior to starting school		1 (4.8)
K-5th grade		7 (33.3)
6th-8th grade		1 (4.8)
9th-12th grade		12 (57.1)
Average household income		
Below the Federal Poverty Level (FPL)		2 (9.5)
FPL-2xFPL		2 (9.5)
2xFPL or more		17 (81.0)
Academic accommodations provided to support return to learn		
No special services		9 (42.9)
Informal Services		6 (28.6)
504		6 (28.6)
IEP		0 (0.0)

Demographics of Teachers (N = 83)	Teachers N (%)
Highest level of education received	
Bachelors	28 (33.7)
Masters	54 (65.1)
PhD	1 (1.2)
Years teaching	
Less than 5	20 (24.1)
5-10	11 (13.3)
10-20	17 (20.5)
20 or more	35 (42.2)
Race	
White	76 (91.6)
American Indian	1 (1.2)
Multiple races	6 (7.2)
Had formal TBI training	25 (30.1)

IEP, individualized education plans; TBI, traumatic brain injury.

(3) communication patterns; and (4) recommendations for improvement. Table 2 provides illustrative quotes representing themes within each domain.

Domain 1: school policies on accommodations. Only 12% of schools reported a formal RTL policy. Most participating schools (67%) and districts (59%) had no formal RTL policy but described an informal process to support students transitioning back to school after concussion. Schools with formal policies were more likely to provide more formal accommodations specific

to concussion (including extra time on tests even prior to student assessment and formal accommodations, extending homework deadlines, providing a note-taker and requiring written clearance from a doctor prior to full RTL) if they had older students. Administrators at schools with no policy expressed “We don’t know what to do” (Table 2). Compared to schools with no RTL policies, schools with RTL policies were more likely to report providing an Individualized Health care Plan (0.0% and 26.7%, respectively), Individualized Education Program (0.0% and 20.0%, respectively) or 504 Plan (13.3% and 33.3%, respectively). Schools with a formal RTL policy were also more likely than schools without to report requiring written clearance from a physician before returning a student to their full academic load (6.7% and 40.0%, respectively), more likely to base accommodations on physician recommendation (33.3% and 66.7%, respectively), and more likely to hold a meeting between coordinated care team to discuss the student’s accommodations (0.0% and 46.7%, respectively).

Domain 2: barriers to accommodations. Only 30% of teachers reported receiving concussion training and approximately half (N=42) reported having had a child with concussion in their classroom at some point in their career. Major thematic barriers to providing accommodation and recovery across stakeholder groups were: (1) invisibility of concussion as an injury; (2) time constraints; (3) lack of awareness, resources, and support for educators; and (4) lack of concussion knowledge. Invisibility of injury refers to the fact that in most cases, a child with concussion cannot be identified based on outward appearance; many parents indicated their child’s teacher “thought the child was faking it” because the injury could not be seen. Teachers and administrators both agreed that teachers did not have enough time to provide necessary 1-on-1 instruction with students recovering from a TBI. Teachers reported feeling unprepared to modify their curriculum to accommodate students with TBIs, due to a lack of knowledge of how TBI affects the individuals learning needs, school policy and lack of available curriculum adjustment tools.

Domain 3: communication patterns. Across all groups represented in the needs assessment, there was a desire for more frequent meetings between individuals supporting the child’s return to school as well as more frequent communication with the child’s physician. Parents reported feeling responsible for the majority of the communication between the school and health care providers. Parents also reported not feeling listened to by school personnel when requesting or developing accommodation plans.

Domain 4: shared recommendations. All surveyed groups agreed on the need for readily available best

Table 2. Illustrative Quotes From the Needs Assessment Surveys

Surveyed Group	Domain 1: Accommodations and School Policies	Domain 2: Barriers to Accommodations	Domain 3: Communication Patterns	Domain 4: Shared Recommendations
Parents	<p>1) "[The school should have] had a better process in place to know what to do and how to handle reentry."</p> <p>2) "The school at first was amazing, it's now that we are 4 years into this I think they forget and her care is lessened."</p>	<p>1) "They had no clue how to handle my son since he didn't have a 'visual' impairment, like a cast or crutches. They thought he should be back to normal in 2 weeks."</p> <p>2) "The school refused to create an IEP [Individualized Health care Plan] at that time for my son because they said he needs to wait his turn on the IEP evaluation wait list."</p> <p>3) "Teachers thought [my child] was faking it." "First, the teachers would have to know that we had TBI students in class. That kind of information gets socked away in the counselor's office. Secondly, teachers would need to be informed on what we can do to better serve this group of children."</p>	<p>"[The school should have] coordination and communication between school nurse, attendance office, counseling office and teachers."</p>	<p>1) "[Schools need] a flow chart with step by step guide."</p> <p>2) "My son was weeks behind in school and had to drop 3 of his 6 classes while waiting for the accommodation plan to be put in place."</p> <p>3) "[Schools should] offer services immediately."</p>
Teachers	<p>1) "It would be nice to have a protocol for return to full classroom. I know in sports we have a gradual plan for returning kids back to practice then competition but there is no such plan for school."</p> <p>2) "State law needs to allow for flexible support for students with TBIs."</p>	<p>1) "[I would] request permission to speak with the doctor in order to be more attuned to expectations/possibilities and ideas for work-arounds where challenges."</p> <p>2) "More communication with family about how things are going at home, ie sleep and eating habits and mood swings as well as general overall well-being."</p>	<p>1) "Wouldn't it be cool if the educational system had a consultant available?"</p> <p>2) "Teachers don't just need information, we need training. Someone needs to come in and coordinate the education of the teachers with what to expect, how to plan for & implement a classroom environment appropriate for a TBI student, as well as provide informational resources for future problems/concerns/situations that may arise."</p>	<p>1) "Have training for all teachers so that they all know the procedures and would have universal knowledge of the policy."</p> <p>2) "We require training and resources."</p>
School nurses	<p>1) "An easy-to-follow protocol for teachers. Coaches' return-to-play protocol is understandable. Teachers don't have guidance for cognitive 'return to play'."</p> <p>2) "I would like to see a universal return to school policy/protocol that educators and health staff are trained on."</p>	<p>1) "The idea of resting and going slow is very difficult for staff to accept."</p> <p>2) "Concussions become opportunities for kids and sometimes, parents to brag. They don't get the danger. Today a student told me, oh it is minor and implied that there was nothing to be concerned about although she had restrictions on activities. Her PCP didn't write a note."</p>	<p>"Many times if the injury is not severe we as school nurses receive little information from the care provider. Many time we receive notes that say the student was seen in the ER, urgent care or clinic and that they may return to school on a specified date. The note may say that the student is not to participate in PE or sports for a specified period of time and that is it."</p>	<p>"A standard evaluation/tool/scoresheet to monitor and document progress when a student returns to school. This would be a tool that could be used to communicate with classroom teachers, and let them know at what level they can expect the student to perform on a given day."</p>
Administrators	<p>1) "We need access to doctors and current research on how to best meet the needs of students with TBIs."</p> <p>2) "[We need] uniform policy about how to service students with TBI, and training regarding the policy."</p> <p>3) "We don't know what to do."</p>	<p>1) "I would appreciate clearer direction from physicians regarding student 'limitations.'"</p> <p>2) "[Students] need a structured plan that is well communicated with an environment that supports their progressive recovery process."</p>	<p>1) "Have training for all teachers so that they all know the procedures and would have universal knowledge of the policy."</p> <p>2) "We require training and resources."</p>	

Table 3. Shared Recommendations Between Surveyed Stakeholder Groups

Recommendations	Parents (N = 21) N (%)	Teachers (N = 83) N (%)	Nurses (N = 57) N (%)	Administrators (N = 11) N (%)
More training	7 (33.3)	55 (66.3)	16 (28.1)	7 (50.0)
Have RTL school policy	4 (19.0)	8 (9.6)	18 (31.6)	5 (35.7)
More communication between transition team members	10 (47.6)	27 (32.5)	15 (26.3)	3 (21.4)
Have best practices available	2 (9.5)	26 (31.3)	9 (15.8)	2 (14.3)
Provide more staff time for 1-on-1	—	19 (22.9)	—	1 (7.1)
Must have fast and flexible accommodations	3 (14.3)	6 (7.2)	—	—

RTL, return to learn.

practices, development of an RTL policy for easy adoption and more training both for parents and for teachers (Table 3). Other recommendations included (1) need flexible accommodations immediately following concussion; (2) more staff time to support students with concussion; (3) expert resources to provide guidance for accommodations; and (4) providing environmental accommodations. The majority of participants agreed that implementing RTL policies and services was important and would provide additional support to all stakeholder groups involved in supporting a child with a concussion.

RTL Summit Participants

Of the 59 invited, 35 (58.3%) stakeholders attended, representing all targeted stakeholder groups and a total of 28 organizations. Participants included study investigators, pediatricians, rehabilitation medicine physicians, neuropsychologists, a representative of the School Nurses of Washington, the head of school nurses for Office of the Superintendent of Public Instruction, the Lead for the Disabilities Task Force on the Washington Student Achievement Council as well as many others (Appendix 1). All summit participants wanted to stay engaged in future efforts to address RTL needs for concussion, and to examine development of school policy for RTL after concussion.

RTL Implementation Model for Concussion

Following the development of the RTL model and implementation checklist, study investigators received input on the model and checklist from all RTL stakeholders who attended the summit plus an additional 10 newly recruited stakeholders from the Puget Sound Nurses Association. On the first round, 56 (80%) approved the model and checklist while 14 stakeholders recommended changes and or requested clarifications which were incorporated in the final products. The adapted and refined model highlights the optimal RTL context and the structural components needed to support RTL needs (Figure 2) while the checklist outlines specific steps for schools to expediently implement RTL guidelines (Figure 3)

should a student with concussion be identified. The diagnosis of concussion would activate the chosen RTL guidelines.

Model Based Process for Implementing RTL Guidelines

Phase I: readiness. Phase I starts with engaging major stakeholder groups and developing a plan and timeline for implementation and includes the current landscape and infrastructure that would support RTL guideline implementation using the above model as a guide. Identification of the RTL guidelines for adoption also occurs in this phase. The key RTL champion ensures that there is a positive culture for change in the schools, 1 key person is identified at the district or school, RTL costs are accounted for, and that a RTL guideline has been identified for implementation. Formalized concussion documentation, training plan, and communication metrics are developed. Schools identify local resources for students with concussion.

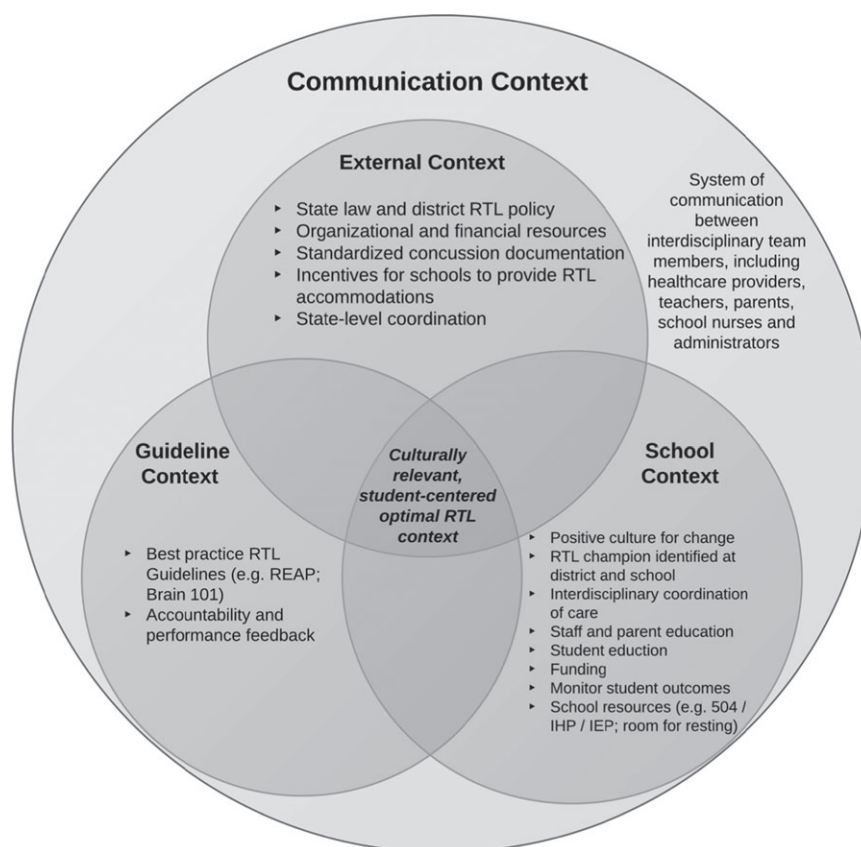
Phase II: RTL implementation process. Adaptations of the RTL guidelines for the local environment should be considered. This process includes staff training, formalizing the multidisciplinary team, implementing RTL guidelines, and assessing guideline implementation fidelity. Barriers to implementation are identified and addressed. Students with concussion are identified. Individualized accommodations are initiated and periodically evaluated. Student achievement is periodically evaluated and need for discontinuation of RTL accommodations should be considered.

Phase III: continuous quality improvement. New RTL evidence and new RTL guidelines should be examined annually by the school to determine need for revision of the checklist. Schools should measure student outcomes and share performance with their district.

DISCUSSION

The main findings of this study are that (1) few Washington State public schools have formal RTL policies for concussion; (2) there are numerous barriers to RTL implementation; and (3) there is uniform

Figure 2. Return to Learn Model for Concussion



stakeholder support for the development and adoption of an RTL school policy and RTL state law. The student-centered RTL model and implementation checklist that resulted from this study support implementation of existing RTL guidelines, and provide a new school process for adopting these guidelines so that RTL accommodations for concussion can be activated and provided in a timely and structured manner.

In this report, we provide new information on the many barriers to RTL implementation in the Washington State public school system. Specifically, school personnel and parents both agreed that lack of multidisciplinary teams, lack of school capacity or a formal transition plan, lack of teacher training in concussion and lack of parent preparedness for advocating for their child with concussion were major barriers to RTL guideline implementation. While these findings align with previously described gaps by individual stakeholder groups, this study is the first to identify high priority barriers faced by all stakeholder groups attempting to implement RTL in Washington State public schools.^{4-6,10,15,27}

We developed a conceptual model for RTL because conceptual models serve an important role in understanding complex issues influenced

by multiple domains and in the development of recommendations.^{30,35} Thus, we were able to identify the optimal RTL context and developed a new model for RTL after concussion which contains the critical components of existing RTL guidelines and their relation to the factors affecting RTL guideline implementation. We considered multiple models for adaptation and selected the Damschroder model to adapt for RTL primarily because it allowed us to include and connect the contexts that are specifically relevant to the reintegration of the student into school after concussion.³² Stakeholders voiced lack of communication as a barrier to implementing RTL guidelines within each context; hence, this is shown as an overarching aspect of providing optimal RTL services.

The adapted RTL model allows schools to understand and evaluate their existing strengths prior to proceeding with implementation efforts. However, conceptual models, including the one we developed, do not uniformly translate to process improvement or successful implementation. This is evidenced by the fact that failure to implement evidence-based health services guidelines is a common and multifaceted problem. Within the educational system, RTL guideline adoption may be impacted by lack of

Figure 3. School Checklist for Implementation of Return to Learn Guidelines for Students Following Concussion

Phase I: Readiness

- ☐ Engage stakeholder groups
- ☐ Identify local champions
- ☐ Plan and structure implementation process using elements of Phase II below
- ☐ Establish timeline
- ☐ Assess existing infrastructure in place at policy, district and local levels
- ☐ Develop external context, school context and guideline context
- ☐ Choose RTL guidelines for adoption (e.g. REAP or Brain 101)
- ☐ Professional development
- ☐ Standardized concussion documentation
- ☐ Define communication metrics
- ☐ Identify school resources
- ☐ Core components that must be in place prior to Phase II:
 - ☐ School context components:
 - ☐ Positive culture for change
 - ☐ Communication system
 - ☐ Care coordination system
 - ☐ One key person (champion) identified at district or school
 - ☐ Funding needed
 - ☐ Guideline context components:
 - ☐ Existence of RTL Guidelines
- ☐ School administration approval if process was initiated as school level

Phase II: Implementation

School Processes

- ☐ Adaptation of RTL guidelines for the local environment
- ☐ Formalize interdisciplinary care team members and school contact; team members should include as many as possible of:
 - ☐ parents
 - ☐ healthcare providers
 - ☐ athletic director
 - ☐ school nurse
 - ☐ school psychologist
 - ☐ teacher
 - ☐ administrator
 - ☐ student (if applicable)
- ☐ Implement RTL guidelines
- ☐ Measure implementation fidelity outcomes
- ☐ Analyze fidelity outcomes
- ☐ Assess additional local barriers to guideline adherence
- ☐ Address any newly identified barriers
- ☐ Conduct necessary trainings for staff and parents to increase guideline adherence
- ☐ Create RTL Sustainability Plan

Implement Selected Return to Learn Guidelines

- ☐ Confirm concussion diagnosis
- ☐ Identify process and referrals for students in need of accommodations
- ☐ Use adopted RTL guidelines
- ☐ Provide individualized, student-centered accommodation, with attention to child's language, culture and home support

Phase III: Evaluation

- ☐ Continuing opportunity for reflection and improvement of RTL guidelines and process by revisiting phases I - II above
- ☐ School staff annual review of RTL evidence and guidelines in case of additional need for checklist review or evidence-based guidelines for adoption
- ☐ Track student progress at regular intervals
- ☐ Measure and analyze student outcomes
- ☐ Collect common data elements
- ☐ Share performance with district
- ☐ Utilize RTL Sustainability Plan

formal school board policy, competing demands within the school system and/or a lack of awareness of best RTL practices.³¹⁻³⁴ Consequently, we operationalized the model into a process and created a checklist that schools can use to demonstrate readiness, implement RTL guidelines, and evaluate RTL accommodations. The consensus-based RTL checklist has some distinct advantages. First, as recommended by the stakeholder group, the checklist leaves the choice of specific RTL guideline to the school. Second, the checklist accommodates the variability in school context by not specifying the cost coverage method, the key personnel position within the school structure, the individuals

required on the coordinated care team, the method used to evaluate student progress or process of communication with health care providers and parents. The flexible checklist also allows schools to incorporate culturally relevant factors, and allows schools to develop local solutions to meet their specific RTL needs while providing all necessary elements of the RTL best practice checklist. Use of the model and checklist may allow schools to adopt structures and processes that facilitate successfully RTL guideline adoption even in the absence of district or state level policy.

There are currently 3 main RTL guidelines that have been developed and used: REAP, Brain 101, and Brain Steps.^{16,29,31} All of these are primarily consensus-based recommendations because data on the most effective RTL guidelines for concussion are scant. Despite this limitation, existing research suggests the importance of a designated and coordinated team to guide school transition and reintegration of students with concussion back to school and to ease the burden placed on school staff members, who may not have the time for coordinating these efforts.^{9,17,20} This recommendation is included in both the new RTL model and RTL checklist. The RTL model and checklist provide a systems-based approach for schools to facilitate implementation of the RTL guidelines.

We used a mixed-methods approach to examine RTL needs and to develop an RTL implementation process that schools can use to support children with concussion. Mixed-methods approaches are appealing because they maximize the strengths of qualitative and quantitative methods to address multifaceted, complex research questions that cannot be answered using only 1 method.³³⁻³⁵ In our study, the use of both qualitative and quantitative survey questions and the model development process involving multiple stakeholders allowed us to elicit both breadth and depth of perspectives and offer a holistic view of the barriers and facilitators of RTL services in Washington State as well as strategies for next steps. Had we only used a quantitative survey approach, we would have been able to quantify the magnitude of RTL needs, but would not have captured the rich detail about specific RTL concerns and recommendations that we obtained using open-ended survey questions and the consensus-driven, iterative model development process. Another strength of our methodology was that we could initiate stakeholder engagement to support RTL guideline adoption in Washington State; a key step in the implementation process (Figure 3: phase 1).

Limitations

This study has some limitations. First, this was a study in Washington State only and focused on the public school system. Hence, it is possible that there are some unique and specific RTL needs that we missed

among students with concussion who attend private schools, and that the optimal RTL model may need to be adapted for private schools. We had a limited number of non-English speaking families which may have affected identification of themes, our understanding of their RTL barriers and, consequently, the development of the RTL model. We also did not examine specific school level RTL policies or student achievement, and are not able to determine the effect presence of school level policies on student outcomes. Despite these limitations, this study provides new information on unmet RTL needs and presents a new road map for schools to implement RTL services after concussion.

IMPLICATIONS FOR SCHOOL HEALTH

This study highlights the unmet needs of students with concussion upon returning to school and suggests potential strategies for improvement that have shared stakeholder support. We found that:

- Many parents felt unsupported by school personnel when navigating their child's return to academics post-concussion.
- Most schools do not have formalized RTL guidelines in place.
- All surveyed stakeholder groups (parents, teachers, administrators, and school nurses) requested more training, school RTL guidelines, increased communication between team members and availability of best practices to support RTL transitions post-concussion.

Students and families are often unprepared to initiate RTL transitions and unaware of RTL best practices. This places the school in a unique position to offer the structure and support to families and students that will encourage successful RTL transition post-concussion. Schools can:

- Adopt student-centered, culturally relevant RTL guidelines to proactively prepare for student concussion recovery.
- Ensure students should not return to play prior to completed return to academics.
- Utilize the model and implementation process developed to improve RTL transitions and outcomes for students with concussion.
- Actively provide support for teachers when a student is transitioning back to academics post-concussion.
- Engage parents actively when designing RTL accommodations for their child.

Human Subjects Approval Statement

Institutional Review Board exempt status #49218 was obtained from the University of Washington Human Subjects Division.

Appendix 1.

Complete List of Summit Participant Organizations

- Brain Injury Alliance of Washington
- Center for Child Health
- Center for Clinical and Translational Research
- Center for Child Health, Behavior, and Development
- Harborview Injury Prevention & Research Center
- Issaquah School District
- Kent-Meridian High School
- Latino Center for Health
- Lake Washington School Districts
- Office of the Superintendent of Public Instruction
- Renton School District
- Safe Kids Washington
- Shoreline School District
- Steilacoom School District
- Seattle Children's Hospital Departments of Rehabilitation Psychology, Neuropsychology, Psychiatry, and Behavioral Health
- School Nurses Association of Washington
- Traumatic Brain Injury Model System
- The Center on Brain Injury Research and Training
- University of Oregon
- University of Washington Sports Concussion Program
- University of Washington School of Social Work and Departments of Pediatrics, Epidemiology, Anesthesiology, Psychiatry, and Behavioral Sciences, Adolescent Medicine, Rehabilitation Medicine, Developmental Pediatrics, Neurological Surgery, and Radiology
- Vashon Partners in Education
- Vashon Island School District
- Virginia Mason Medical Center
- Washington State Commission on Hispanic Affairs
- Washington State Department of Health
- Washington Student Achievement Council
- Washington Traumatic Brain Injury Strategic Partnership Advisory Council

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