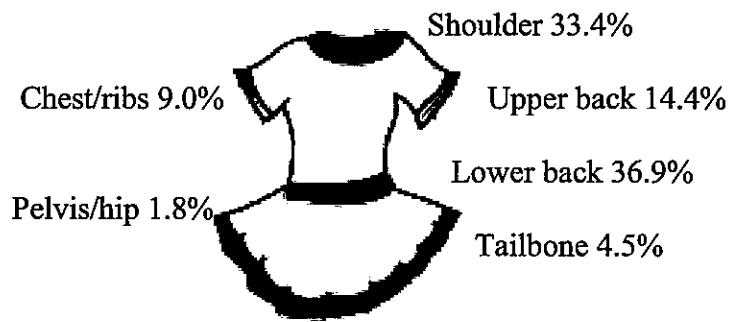
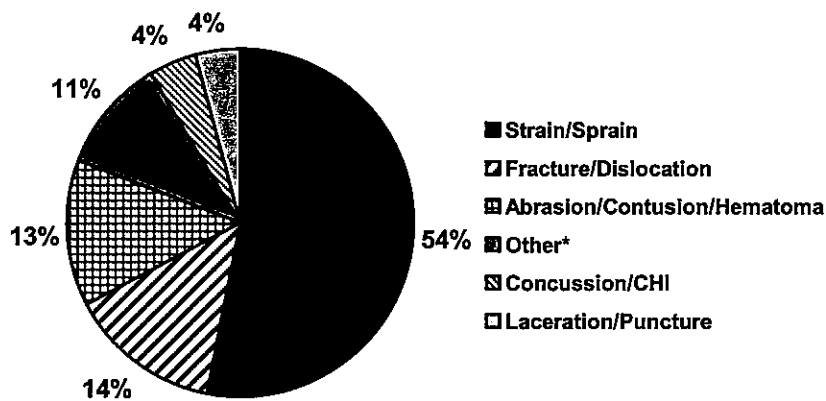


**Figure 3.6 Part of trunk injured**



**Figure 3.7 Type of injury sustained**



\* Other: epistaxis (nose bleed), crush/pinch, avulsion, friction burn, foreign body, dental injury, nerve damage, ligament/tendon/cartilage tear, overuse injury, and comorbidity

### 3.4 Injury Event Description

**Table 3.3 Surface injured cheerleader was performing on at the time of injury**

<b>Surface</b>	<b>n</b>	<b>%</b>	<b>Surface</b>	<b>n</b>	<b>%</b>
<b>Accordion mat</b>	12	2.1	<b>Mat, not specified</b>	3	0.5
<b>Artificial turf</b>	19	3.3	<b>Rubber gym floor</b>	4	0.7
<b>Asphalt</b>	2	0.3	<b>Rubberized track</b>	19	3.3
<b>Bleachers</b>	1	0.2	<b>Spring floor</b>	180	31.0
<b>Carpet</b>	1	0.2	<b>Tile/linoleum</b>	4	0.7
<b>Cheer mat</b>	2	0.3	<b>Traditional foam floor</b>	192	33.0
<b>Cheese wedge mat</b>	3	0.5	<b>Tumble Trak</b>	5	0.9
<b>Concrete</b>	2	0.3	<b>Wood</b>	32	5.5
<b>Grass</b>	55	9.5	<b>Wrestling mat</b>	42	7.2
<b>Gravel</b>	1	0.2	<b>Total</b>	<b>581</b>	<b>100.0</b>
<b>Gymnastics mat</b>	2	0.3			

**Table 3.4 Top 3 mechanisms of injury**

<b>Mechanism</b>	<b>n</b>	<b>% of all injuries*</b>
<b>1 While tumbling</b>	83	14.3
<b>2 Fell</b>	81	13.9
<b>3 Catching another cheerleader</b>	76	13.1

\* Denominator = 581

## **IV. Conclusions**

Cheerleading RIO™ is the first study to prospectively collect data on cheerleading-related exposures and data on injuries sustained during those exposures. This allowed us to be the first to calculate injury rates based on actual exposure data. In addition, data collected by Cheerleading RIO™ allowed us to be the first to be able to directly compare injury rates among six types of cheerleading teams for practices, pep rallies, games, and competitions.

If this study were to continue and the study findings were used to develop and implement evidence-based injury prevention strategies, cheerleading could be made safer. Using the Cheerleading RIO™ system to collect exposure and injury data on an ongoing basis would allow us to evaluate the effectiveness of the evidence-based injury prevention strategies, and develop and monitor new and better strategies, based on the most current data.

This study has several limitations. There were a large number of study participants who never logged into the system to report data, or withdrew from the study before completing the entire year. Comparisons among the six team types were difficult due to the small number of cheerleading teams in some of the team type groups. Attempts to further stratify the groups of cheerleading teams resulted in subgroups that were too small to allow statistical analyses to be performed. In the future, recruiting a larger number of teams that are equally divided among the six team types would allow us to explore the circumstances surrounding injury events in much greater detail, thereby giving us greater insight into possible ways to decrease the number of cheerleading-related injuries.

## **V. End of Study Survey**

## 5. End of Study Survey

At the conclusion of the one-year study, reporters were asked to complete an anonymous, on-line survey that collected data on the ease of use of the reporting system, problems encountered while using the reporting system, and suggestions to improve the reporting system (Appendix I). This survey was completed by 131 reporters. Most reporters found the system easy to use: very easy (66%); somewhat easy (25%); neither difficult nor easy (6%); and somewhat difficult (3%). An online training tool for using the reporting system was available and reporters were strongly encouraged to use it prior to beginning to report their data. Of the 87% of reporters who completed the training program, 68% found it helpful. Although reporters using a dial-up internet connection experienced slow page-loading, 96% of the reporters had high speed internet access.

### Top problems identified

- Internet browser compatibility issues

The system was designed to be used with Internet Explorer. Some of the reporters used Firefox (9%). These reporters experienced page-loading problems and difficulty navigating through the report pages. After updating to the most recent version of Firefox, or switching to Internet Explorer, these problems were resolved.

- Power Point accessibility

Power Point was required to use the online tutorial for Cheerleading RIO™. Some of the reporters (19%) did not have access to Power Point. These reporters were sent a PDF file containing the screen prints from the tutorial.

- Reporter ID

- A large number of reporters repeatedly forgot their assigned reporter ID. Many of the reporters who were reporting for more than one team got the team IDs mixed up. To solve this problem, the team's name was added to each page of the report forms.
- Some reporters logged in using the wrong reporter ID, and the reporter ID they used turned out to belong to someone else. To solve this problem, an emergency fix was implemented in which the reporter's last name was appended to the end of the reporter ID and was used as the Login ID. All incorrectly entered data was able to be identified and corrected.
- Many survey completers suggested allowing the reporters to select their own reporter ID, so that it would be something easy to remember. This poses a problem for two reasons: (1) the reporting system will not allow alphabetic characters in the reporter ID field; (2) we must ensure that there are no duplicate reporter IDs, and it would be very time-consuming for us to do this if every reporter chose their own. We use a random number generator program to generate the unique reporter ID numbers that we assign to the reporters.

- Unique Cheerleader ID

Many of the reporters, even at the end of the study, could not grasp the concept of assigning a unique cheerleader ID to each of the cheerleaders on their team. For confidentiality reasons, we cannot collect data using the cheerleader's name. We asked each reporter to select a unique identifier for each cheerleader on their team. On the injury report forms, reporters entered everything from the cheerleader's full name, to the

Reporter ID in the blank for "Unique Cheerleader ID". None of the respondents to the survey were able to agree on a system to assign these numbers. For future studies, this ID will be the cheerleader's first and last initials. If more than one cheerleader on the team has the same initials, a number will be appended to the initials to specify the cheerleader.

- Weekly versus Monthly Reporting

Many reporters suggested that the exposure and injury reports be completed on a monthly, rather than weekly basis. We prefer that the data be broken down by week, however the reporting system allows the reporter to login at any time and complete or update reports from previous weeks. Therefore, the reporters always had the ability to report on a monthly basis. We prefer that the reports be completed on a weekly basis so that the data is fresh in the reporter's memory and is as accurate as possible.

- Weekly Reminder E-mails

Although 97% of the reporters found the weekly reminder e-mails helpful, many requested that the reminder be sent on Friday instead of Monday. The weekly reminder was sent on Monday to remind the reporters to complete their reports for the previous week, not the current week. Most reporters did not understand this. In future versions of Cheerleading RIO™, the wording of the weekly reminder will be changed so that reporters understand that it is reminding them to complete reports for the previous week. They will continue to be sent on Monday.

- Calculating Exposure Data

The most serious problem encountered during the entire study was teaching the reporters how to calculate and enter the exposure data correctly. Although there was an example of how to calculate each exposure number directly under the blank for entering the number,

reporters were still confused about how to calculate these numbers. Based on suggestions from the reporters completing the survey, the exposure report form will be drastically changed in future versions of Cheerleading RIO™.

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