2015 Trauma Program Report
Transforming Trauma Care
2015 Trauma Program Report

Summary

- In 2015, the Trauma Service at OHSU treated 2757 patients.
- 1807 patients (66 percent) were brought to OHSU directly from the scene of injury, and 952 (34 percent) were transferred from another hospital.
- The mean injury severity score of admitted patients was 15.3.
- The number of patients age 25-74 increased, while the number of patients older than 74 decreased.
- Injury Prevention: ThinkFirst and Matter of Balance Fall Prevention had another successful year, serving more than 36,000 community members.
- The Trauma Laboratory had another productive year, publishing 33 research papers and receiving more than $2.3 million in new funding.
Trauma Statistics

In 2015, the OHSU Trauma Program total patient volume increased by 277 patients from 2014, an 11 percent increase.

Figure 1. Patient Volume 2013 - 2015

![Bar chart showing patient volume from 2013 to 2015 with scene/ED and transfers categories.]

Figure 2. Gender Distribution of Patients Treated by the OHSU Trauma Program

![Pie chart showing gender distribution with 67% male and 33% female.]
Figure 3. Patients Treated by the OHSU Trauma Program: Blunt versus Penetrating Injuries

Figure 4. Age Distribution of Patients Treated by the OHSU Trauma Program
Month, Day and Time

Figure 5. Distribution of Patients by Month

Figure 6. Distribution of Patients by Day of Week

Figure 7. Distribution of Patients by Time of Arrival
Tranforming Trauma Care

Length of Stay

Figure 9. Total Hospital Length of Stay of Admitted Patients

![Bar chart showing total hospital length of stay for admitted patients from 2013 to 2015.]

Trauma Team Response

The OHSU Trauma Program uses a three-tiered system to evaluate injured patients. The level of activation is based on information provided by pre-hospital personnel. In the Portland metropolitan area, paramedics evaluate patients at the scene of injury and enter them into the trauma system if they meet established triage criteria for serious injury. Our analyses indicate patients can be safely and efficiently treated with a limited team response, saving our full trauma team activations for those truly critically injured.

Figure 10. OHSU Trauma Team Response by Level of Activation

![Pie chart showing trauma team response by level of activation for 2013.]

- No Activation: 65.9%
- Level 1: 10.7%
- Level 2: 7.9%
- Level 3: 15.4%
Mechanism of Injury

Although motor vehicle crashes remain the most common mechanism of injury overall, falls continue to be a significant source of trauma. Falls continue to be the leading mechanism of injury for both children and older adults, and the leading cause of death.

Figure 11. Causes of Injury for Patients Seen by the OHSU Trauma Team

Injury Severity Score is an estimate of the overall severity of the patient's injuries. Scores can range from one to 75. An ISS of 15 or more denotes a serious injury.
Figure 13. Mean Injury Severity Score of Patients Admitted to OHSU Hospital

Patients transferred in from other hospitals are more injured on average than those admitted directly from the scene.

Disposition and Outcome for Patients Treated by OHSU Trauma Team

Emergency Observation Unit

Faculty from the Department of Emergency Medicine are responsible for managing patients with minor injuries admitted to the Observation Unit in the Emergency Department. Of the hundreds of trauma patients sent to ED OBS in 2015, seven percent required subsequent hospital admission (Figure 14). The decrease in OBS unit usage for trauma patients is likely due to the increase in the elderly trauma population, who require more intensive service and care. The ED OBS unit continues to be an effective way to assure efficient use of inpatient beds while providing quality medical care for injured patients.

Figure 14. Number of Patients Sent to Emergency Observation Unit
Hospital Admissions via OHSU Trauma Program

In 2015, we admitted 2053 patients (74 percent) to OHSU Hospital (Figure 15). Patients at the extremes of age were more likely to require hospital admission. Most of these patients were able to return home after admission (Figure 16).

Figure 15. Patients Requiring Hospitalization after Trauma Team Care

Figure 16. Disposition of Admitted Patients after Hospital Discharge
Mortality

In 2015, 102 patients (3.7 percent) expired. Eleven patients expired in the Emergency Department and 91 after hospital admission.

Figure 17. Total Deaths by Arrival Status

Figure 18. Cause of Death

Deaths from falls continued to surpass those from vehicle collisions this year.
Care for Patients Older than 64

In 2015, the OHSU Trauma Team treated 637 patients older than 64 in 2014, a 10% increase. Of these, 278 (44 percent) were transferred to OHSU from another hospital or clinic. Most of the transfer patients were injured in falls. Of the 637 injured patients, 573 (90 percent) required hospital admission.

Figures 19-22 provide additional information regarding Trauma Team care for patients older than 64 at OHSU.

Figure 19. Patient Volume, Age 65 and Older

![Graph showing patient volume for ages 65 and older from 2013 to 2015.]

Figure 20. Disposition from the Emergency Department, Patients 65 and Older

![Bar chart showing disposition from the emergency department for ages 65 and older, with categories including Ward, ICU, Home/Discharge, and others.]

10
Figure 21. Mechanism of Injury, Patients 65 and Older

- Vehicle Collisions: 23%
- Falls: 72%
- Suicide & Self-Inflicted Injury: 1%
- Homicide & Injury Purposely Inflicted by Others: 1%
- Other: 2%

Figure 22. Injury Severity Scores for Patients 65 and Older
Trauma Quality Improvement Program

The American College of Surgeons Trauma Quality Improvement Program (TQIP) collects data from more than 350 participating trauma centers across the United States. The program uses risk-adjusted benchmarking to compare OHSU with other participating facilities. As patient characteristics and injury severity differ across trauma centers, the American College of Surgeons developed statistical models to estimate the outcomes for each hospital, adjusting for patient characteristics.

The chart below shows the risk of major complications and death of OHSU trauma patients for each injury category. The chart expresses the odds of complication and death in deciles. If the odds ratio is in the first decile, the risk of complications and death is lower than 90% of other hospitals. The 1st decile, 10th percentile, and median are noted for the chart below. As you can see, OHSU outperforms the majority of participating facilities in the risk of major complication and death in trauma patients.
Patients 14 Years and Younger

In 2015, the OHSU Trauma Team evaluated 268 patients aged 14 and younger. Of these, 188 (70 percent) were transferred to OHSU from hospitals around the Pacific Northwest. Patient disposition included 215 (80 percent) admitted to OHSU Doernbecher Children’s Hospital: 110 (41 percent) to the ICU, 80 (30 percent) to the ward, 20 (8 percent) to the OR, and 3 (1 percent) as direct admissions. Two children (0.7 percent) died as a result of their injuries.

Figure 23. Patient Volume, Age 14 and Younger

![Bar chart showing patient volume from 2013 to 2015, with 266 in 2013, 252 in 2014, and 268 in 2015.]

Figure 24. Disposition from the Emergency Department, Patients 14 and Younger

![Bar chart showing patient disposition: 110 in ICU, 80 in Ward, 42 in Home/DC, 20 in OR, 3 in Direct Admit, and 1 in Expired.]

The “other” category includes patients with sports-related injuries, those struck by a falling object and those with injuries accidentally inflicted by others.

Figure 25. Mechanism of Injury, Patients 14 and Younger

Figure 26. Injury Severity Scores for Patients 14 and Younger
2015 Injury Prevention Activities

ThinkFirst Oregon

ThinkFirst is an organization dedicated to reducing the incidence of brain, spinal cord and other traumatic injuries and fatalities by educating youth, parents and community members throughout Oregon. Table IV describes the activity of the OHSU ThinkFirst Oregon team and its injury prevention efforts.

In 2015 OHSU ThinkFirst Oregon staff were selected by the ThinkFirst National Injury Prevention Foundation to receive the 2015 Outstanding Community Involvement Award. This competitive award was designed to recognize a chapter for conducting creative ThinkFirst injury prevention initiatives at the community level. In addition, Dr. Ed Neuwelt received the Distinguished Service Award for his contributions to injury prevention. Dr. Neuwelt has served as sponsoring physician for ThinkFirst Oregon for 29 consecutive years.

Table IV. 2015 ThinkFirst Oregon Activity Summary

<table>
<thead>
<tr>
<th>Activity</th>
<th>Quantity</th>
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</thead>
<tbody>
<tr>
<td>Community events</td>
<td>33</td>
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<tr>
<td>Number of students addressed at seminars</td>
<td>17,140</td>
</tr>
<tr>
<td>Number of community members served</td>
<td>19,441</td>
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<tr>
<td>Number of teachers provided</td>
<td>200</td>
</tr>
<tr>
<td>Community members reached</td>
<td>36,781</td>
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Matter of Balance

Matter of Balance is a program designed to reduce the fear of falling and increase activity levels among older adults. The course includes eight two-hour sessions for a small group led by a trained facilitator. This nationally recognized program was developed at Boston University following a randomized, single-blind controlled trial that was conducted to test the efficacy of a community-based group intervention to reduce fear of falling and associated restrictions in activity levels among older adults.

Table V. 2015 Matter of Balance Activity Summary

<table>
<thead>
<tr>
<th>Activity</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of people attending seminar</td>
<td>104</td>
</tr>
<tr>
<td>Number of people attending class</td>
<td>84</td>
</tr>
<tr>
<td>Number of people trained to teach</td>
<td>28</td>
</tr>
<tr>
<td>Community members reached</td>
<td>216</td>
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</table>
Research

In 2015, under the directorship of Dr. Martin Schreiber, the Trauma Research Laboratory received $2,389,856 in new funding from the Federal government and private industry. Newly funded areas of research include evaluation of pharmacokinetics and biomarkers in patients with a traumatic brain injury. Ongoing research includes evaluation of the use of tranexamic acid for traumatic brain injury, evaluation of biomarkers to predict the development of PTSD, transfusions in trauma patients, and anti-thrombin III levels and thromboembolic events in trauma patients.

Drs. Schreiber and Susan Rowell continue to study Pre-hospital Tranexamic (TXA) Acid Use for Traumatic Brain Injury through the Resuscitation Outcomes Consortium which began enrolling subjects in May of 2015. Dr. Rowell was also awarded her first NIH R01 grant as supplemental funding to the larger study. Dr. Rowell and her co-investigators will evaluate the pharmacokinetics of TXA after infusion and attempt to identify biomarkers that may be used to predict the severity of injury to the brain or outcomes after a TBI.

Dr. Karen Brasel received funding from PCORI through the University of Wisconsin. The project is designed to strengthen the doctor-patient communication centered on the potential outcomes following high risk surgery. Dr. Brasel will begin enrolling surgeons in the spring of 2016 with patient enrollment to follow in June 2016.

Dr. Christopher Connelly received an Early Clinical Investigator award from the Medical Research Foundation of Oregon to assess changes in the endothelium following hemorrhagic shock in obese and non-obese rats. His study is designed to help explain differences in obese patients where endothelial function is impaired following trauma.

James D. Ross, PhD, joined the Division of Trauma, Critical Care & Acute Care Surgery in August as Associate Professor. He will continue the research he was previously working on at the 59th Medical Wing at the Wilford Hall Ambulatory Surgical Center and the Battlefield Health and Trauma Research Institute in San Antonio, Texas. For his first year, he brings $1,426,686 of funding with him to OHSU. His research focuses on pre-hospital hemorrhage control and resuscitation, identification of therapeutic targets for modulation of the trauma-induced immune and inflammatory response, and multi-functional blood substitutes for use in austere medicine.

Every year surgical residents who are completing a research fellowship in the Trauma Research Lab receive awards for the excellent work they have completed or collaborated on. This last year, Dr. Christopher Connelly won the North Pacific Surgical Association
Resident Competition and the Portland Surgical Society Basic Science Award while Dr. Justin Watson won the American College of Surgeons Region X Committee on Trauma Resident Paper Competition.

These publications represent the culmination of the many studies and reviews conducted by our trauma faculty and surgical residents:


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