

>> Oregon Trauma Registry Report

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Executive summary

Thirty to forty percent of all trauma deaths occur within hours of the injury. Many trauma deaths are preventable. Oregon's trauma care system provides emergency medical response, patient triage, patient transport, hospital transfers and trauma team activation to assure that patients have access to the care that they need. These services save lives and Oregonians expect a well-managed system of care.

By law, the Oregon Trauma Registry is mandated to collect data from 44 trauma hospitals to: 1) identify the causes of traumatic injury and recommend prevention activities; and 2) assure timely, quality treatment, education and research. Data collected meet these goals by: a) identifying patients who receive care in the system; b) assessing the level of care received; and c) tracking outcomes of patients in order to ensure high-quality trauma care throughout the state.

The purpose of this report is to provide information from the Oregon Trauma Registry from 2013–2014 to the state program system and stakeholders. This information increases understanding of the importance of the Trauma System, improves the Trauma Registry and targets injury prevention efforts.

A. Trauma Registry findings

In 2013–2014, 19,757 patients entered into the Oregon Trauma System. The number of patients in the Trauma System has increased by 17.5% from 8,410 per year (2003–2012) to 9,878 per year (2013–2014).

1. Mechanism of injury

In 2013–2014, motor vehicle traffic incidents were the leading mechanism of injury among trauma patients, representing 37% (7,370) of all trauma cases. Among the 7,370 trauma cases, 5,056 were injured as motor vehicle occupants, 1,022 were injured while riding motorcycles or as passengers on motorcycles, 751 were injured on a roadway as a pedestrian, and 362 were injured while riding on a bicycle on a roadway.

2. Mortality

In 2013–2014, 3% of trauma patients died. This is the same rate as for deaths among trauma patients in 2012. Asian patients were more likely to die than patients of another race or ethnicity.

3. Alcohol and drug use associated with motor vehicle traffic injury cases

In 2013–2014, alcohol tests were performed in 69% of trauma cases involved in motor vehicle traffic crashes. The results were positive in 37% of cases. Drug tests were performed in 28% of trauma cases involved in motor vehicle traffic crashes. The results were positive in 57% of cases.

4. Fall injuries

In 2013–2014, there were 6,534 trauma patients injured due to falls. Twenty-four percent of them had major trauma. Patients 65 years of age and older were three times more likely to die from a fall than patients who were less than 65 years of age.

B. Recommendations

1. Trauma System

The medical director of the EMS and Trauma Systems Programs should convene a meeting of the State Trauma Advisory Board Data Subcommittee and users of the Oregon Trauma Registry data to plan how to support and improve data quality.

2. Injury prevention

- 1) Increase the number of clinicians in primary care who screen patients aged 55 years and older for falls, document the falls reported, and refer patients to community-based exercise and, if needed, home safety assessments, medication assessments, physical assessments, and physical therapy.
- 2) A substantial number of motor vehicle crash injuries occur when the vehicle operators drive under the influence of alcohol and other drugs. The State Trauma Advisory Board should partner with the state Injury Community Planning Group to support broad efforts to reduce injuries due to falls and motor vehicle crashes through community and statewide planning, research and policy development.

II. Introduction

Trauma is a leading cause of death and non-fatal injury among Oregonians. Receiving care for a severe injury at a designated trauma center can lower the risk of death by 25 percent. The Oregon Legislature established the Oregon Trauma System in 1985 (ORS 431.607—431.633). Oregon has been recognized as a leader in trauma systems development, trauma research and trauma care. Oregon was the second state to develop a statewide trauma system (Maryland was the first). Oregon was the first state to develop a system that included both small rural hospitals and large urban facilities, formally integrating hospitals across the state into the Trauma System. Today, all Oregonians have access to trauma care through a system of 44 trauma centers that participate in Oregon’s Trauma System Program.

A. Trauma System services in Oregon

The primary goal of the Trauma System in Oregon is to deliver the right care at the right time for every trauma patient. The Trauma System coordinates care for varying types and complexities of injuries. Trauma centers deliver this care. Oregon’s seven regional area trauma advisory boards (ATABs) develop a regional trauma plan that coordinates care across the region. ATABs meet to continuously evaluate quality and develop quality improvement measures and other aspects of trauma care in the region. The state designates trauma centers to provide trauma care. There are two Level 1 trauma centers in Oregon, both located in Portland (ATAB 1). Oregon has four Level 2 trauma centers (two in ATAB 2, one in ATAB 3 and one in ATAB 7). There are 11 Level 3 trauma centers and 27 Level 4 trauma centers. Many Level 3 and Level 4 hospitals serve rural and frontier regions of Oregon. The two Level 1 centers provide specialty pediatric services and one is a verified burn center.

B. Emergency medical services and the Trauma System

Emergency medical services (EMS) play a critical role in the Oregon Trauma System. EMS includes dispatch centers (the initial 911 call point of contact), emergency medical response, field triage, treatment and stabilization, and transport by ground or air ambulance to a hospital. EMS provides inter-hospital transfers, providing transport by ground ambulance, helicopter or fixed-wing aircraft between hospitals. Inter-hospital transport (IHT) can span hundreds of miles and is an integral aspect of a functional trauma system for moving complex patients to higher levels of care. There are standardized protocols for the field triage of injured persons and for selecting transport destinations for trauma patients.

C. Oregon Trauma Registry

Injured patients are identified as trauma patients in one of four ways: 1) field (EMS) identification of patients meeting statewide field trauma triage criteria; 2) emergency department identification of patients with injuries warranting entry to the Trauma System; 3) retrospective identification following admission; and 4) trauma transfers. The report below is for the entire state and by ATAB region. Grouping of patients by county of injury in the individual ATAB reports allows geographic representation of trauma across the different regions of Oregon.

The Trauma System tracks, measures and quantifies trauma care through systematic data reporting to the Oregon Trauma Registry. All trauma centers submit standardized data to the State EMS and Trauma Systems Office for all trauma patients. These data are used in quality assurance, continuous quality improvement, disaster and mass casualty event planning and response, trauma research, public health prevention, tracking patient outcomes, and ensuring high-quality trauma care throughout the state.

III. Methods

In 2013–2014, 44 hospitals submitted regular data to the Oregon Trauma Registry. To generate this report, the Oregon Emergency Medical Services and Trauma Program processed and analyzed these data. An analyst matched and compiled records of patients who transferred between hospitals to provide a comprehensive patient-level representation of trauma care.

Oregon statute requires the 44 trauma hospitals to collect and submit data to the Oregon Trauma Registry. The system collects information including demographics of trauma patients, diagnostic codes, information about the injury (date, location, mechanism, severity and outcome of injury), and how the patient was injured.

The cases in this report include patients injured in Oregon, patients injured in Oregon and treated by a hospital in another state that participates in the Oregon Trauma System, and patients who were injured in another state and transported to trauma hospitals in Oregon for care.

IV. Results

A. Patient demographics by age, race and ethnicity

The highest rate of death was observed among trauma patients aged 65 years and older (Figure 1) and among Asian patients (Figure 2).

Figure 1. Mortality rate by age in years, Oregon Trauma Registry, all patients, 2013–2014

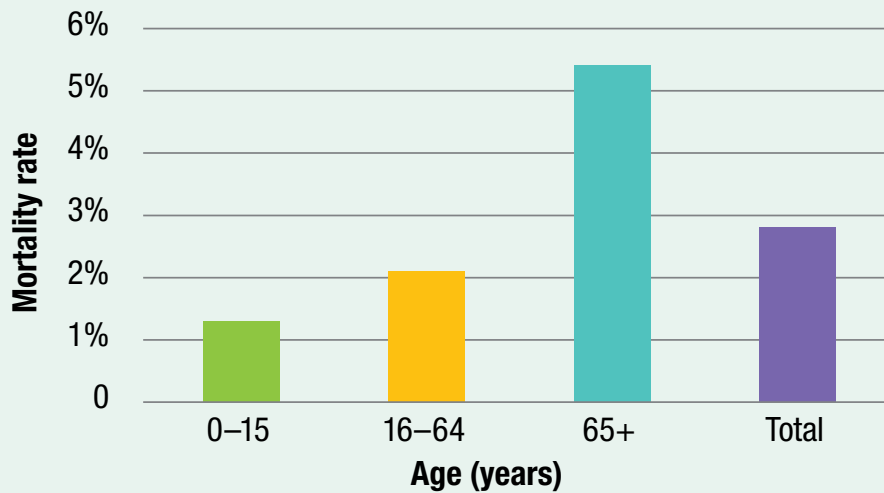
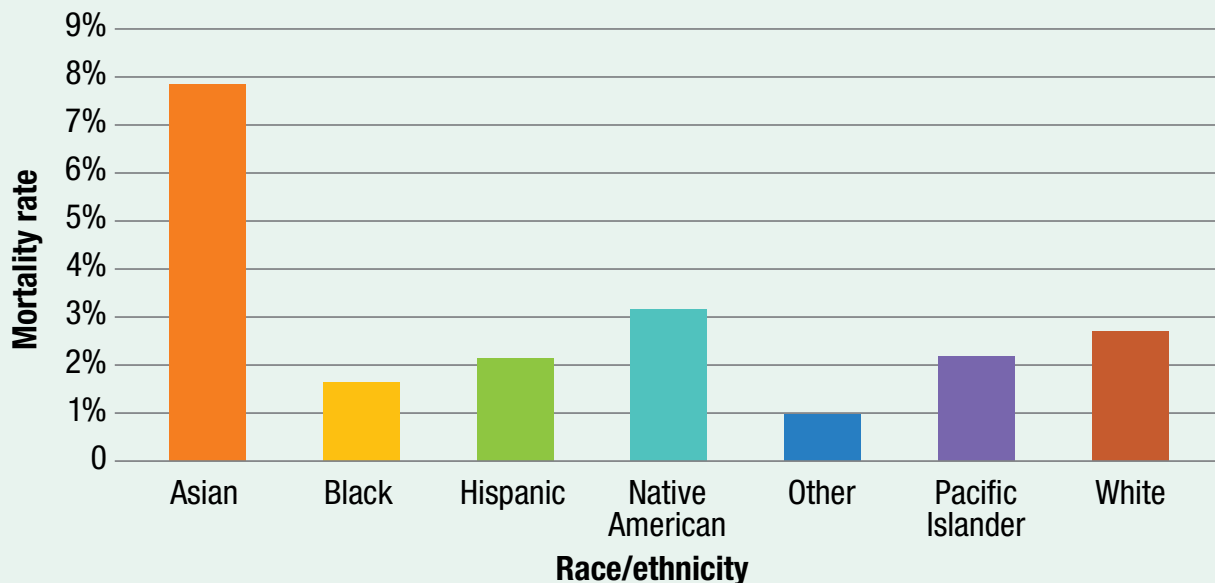


Figure 2. Mortality rate per 100,000 population by race/ethnicity, Oregon Trauma Registry, all patients, 2013–2014



B. Motor vehicle traffic injury

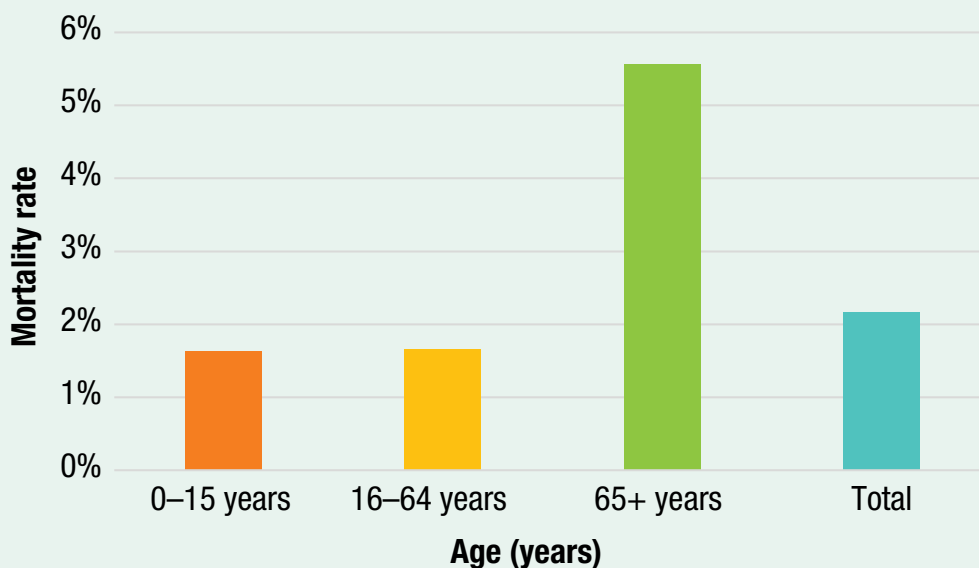
Seventy-seven percent of trauma patients injured in motor vehicle crash events had an ISS≤15.

Table 1. Number and percentage of patients injured due to motor vehicle traffic crashes by Injury Severity Scores and age group in years, Oregon Trauma Registry, 2013–2014

Injury Severity Score (ISS)	Age group in years						Total Number
	0–15		16–64		65+		
	Number	Percent	Number	Percent	Number	Percent	
ISS ≤ 15	379	7.0%	4,342	80.2%	692	12.8%	5,413
ISS ≥16	80	4.9%	1,259	77.2%	292	17.9%	1,631
Missing							326
Total	459		5,601		984		7,370

Mortality due to motor vehicle crash was highest among trauma patients aged 65 years and older (Figure 3).

Figure 3. Mortality rate among motor vehicle crash patients by age in years, Oregon Trauma Registry, 2013–2014



C. Alcohol and drug involved motor vehicle traffic injury

Tests for alcohol were done on almost 69% (5,053) of trauma patients involved in motor vehicle traffic crashes (7,370). Almost 37 percent (1,848) of those tested received a positive result.

There were tests for drugs on 28% (2,065) of trauma patients involved in motor vehicle traffic crashes (7,370). Almost 57 percent (1,171) of those tested received a positive result.

D. Fall injury

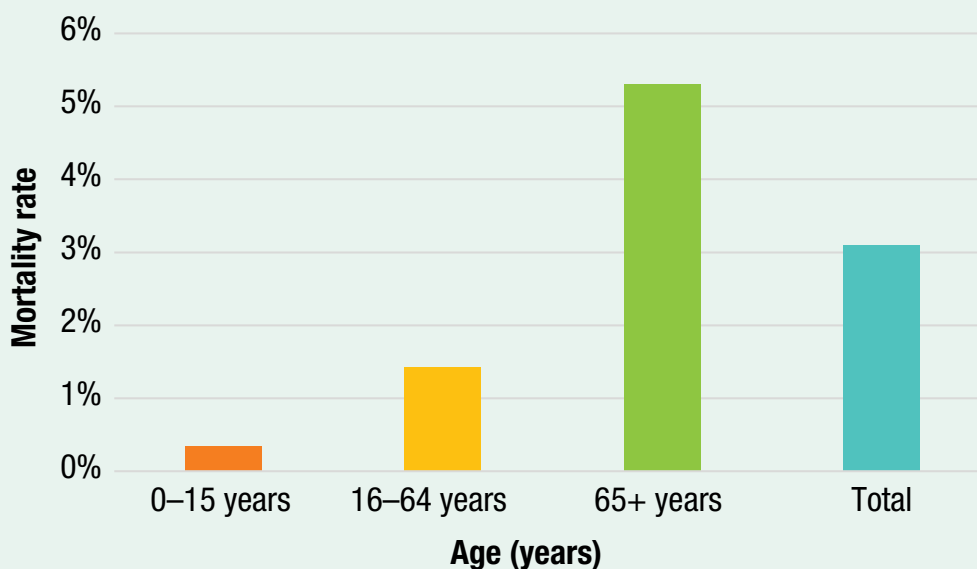
There were 6,534 trauma patients injured due to falls in 2013–2014. Among patients 65 years of age and older, 158 (5.3%) died.

Table 2. Number and percentage of patients injured due to falls by Injury Severity Scores (ISS) and age group in years, Oregon Trauma Registry, 2013–2014

Age group in years	ISS ≤ 15		ISS ≥ 16		Total Number
	Number	Percent	Number	Percent	
0–15	470	84.2%	88	15.8%	558
16–64	2,146	76.5%	658	23.5%	2,804
65+	2,087	71.3%	840	28.7%	2,927
Missing					245*
Total	4,703		1,586		6,534

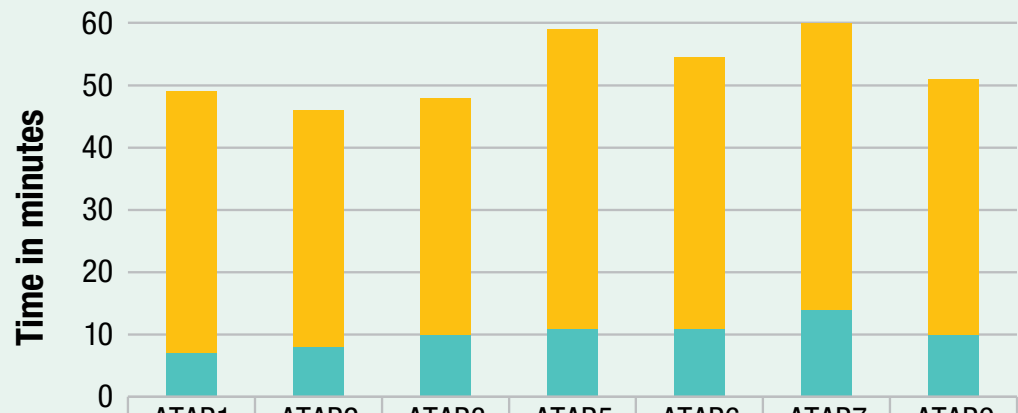
* There were 6,534 trauma patients due to falls in 2013–2014 with 245 patients that had missing values in age and Injury Severity Scores' cross-tabulation.

Figure 4. Mortality rate among trauma patients injured due to falls by age group in years, Oregon Trauma Registry, 2013–2014



E. Emergency medical services response and patient transfers between area trauma advisory boards

Figure 5. Emergency medical services median response time and total time (notification to arrival at hospital) by area trauma advisory board region, Oregon Trauma Registry, 2013–2014

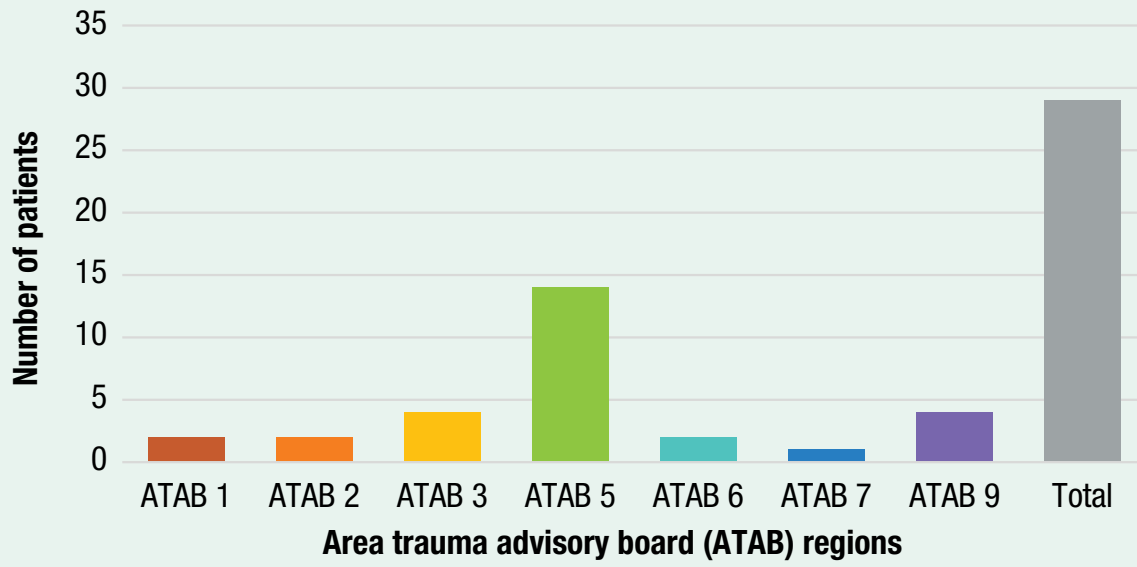


■ Total EMS time in minutes	42	38	38	48	43.5	46	41
■ Median response time in minutes	7	8	10	11	11	14	10

Area trauma advisory board regions

One reason the Trauma System is in place is to monitor patient transfers. Figure 6 shows that there were very few transfers between hospitals of the same level of care. Most of those same-level transfers were in ATAB5.

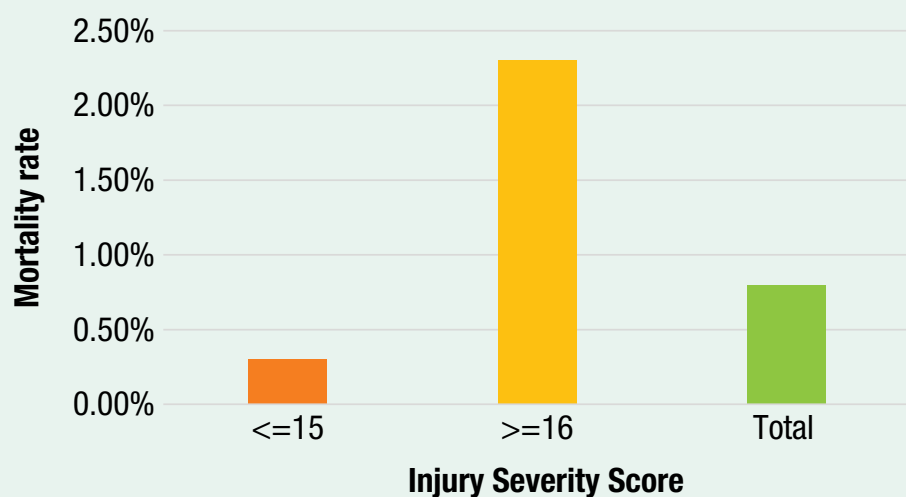
Figure 6. Number of trauma patients transferred to same level of trauma centers by area trauma advisory board region, Oregon Trauma Registry, 2013–2014



F. Patient injury severity and outcomes

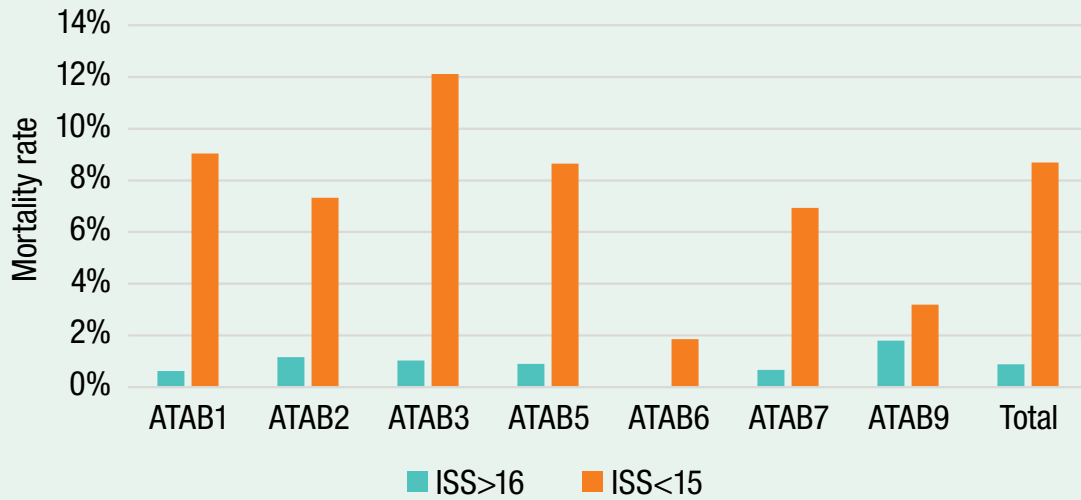
The mortality rate among trauma patients who died on arrival or in the emergency department was 0.8%. Not surprisingly, people with an Injury Severity Score ≥ 16 were eight times more likely to die in transit or in the emergency department than people with an Injury Severity Score ≤ 15 .

Figure 7. Mortality rate (among patients who died in the emergency department or were dead on arrival) by Injury Severity Score greater than or equal to 16 and less than or equal to 15, Oregon Trauma Registry, 2013–2014



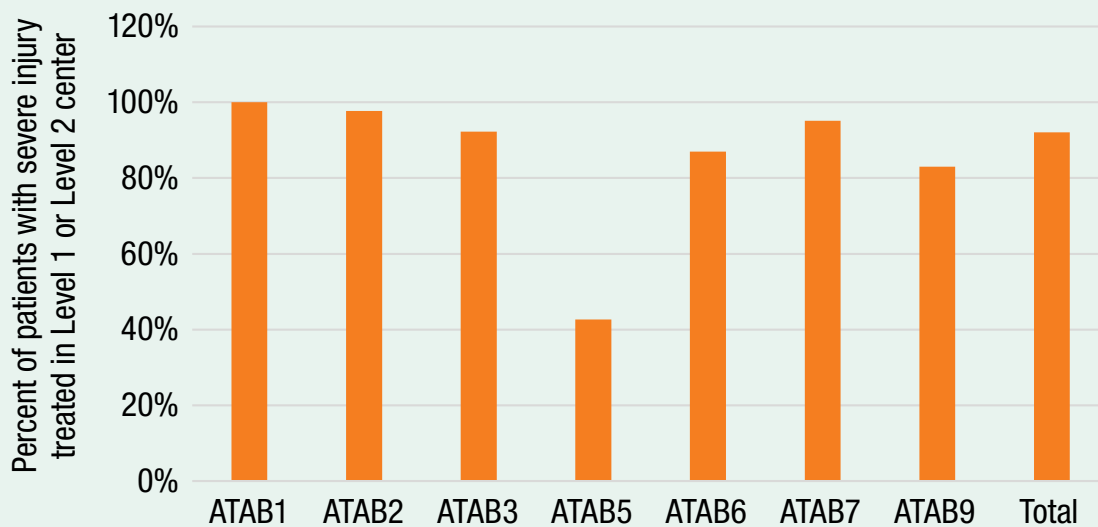
Looking at all Injury Severity Scores ≥ 16 or ≤ 15 , there was some variation in mortality rate among the ATAB regions.

Figure 8. Mortality rates by Injury Severity Score by ATAB, Oregon Trauma Registry, 2013–2015



G. Trauma response and outcomes

Figure 9. Percent of patients with ISS \geq 16 who received care in a Level 1 or Level 2 trauma center by area trauma advisory board region, Oregon Trauma Registry, 2013–2014



H. Data reporting

Oregon administrative rule requires timely data entry of patient care data. Patient record completion varies by region. Figure 10 illustrates the median number of days for patient record completion by ATAB region.

Figure 10. Median number of days for patient record completion by ATAB region, Oregon Trauma Registry, 2013–2014

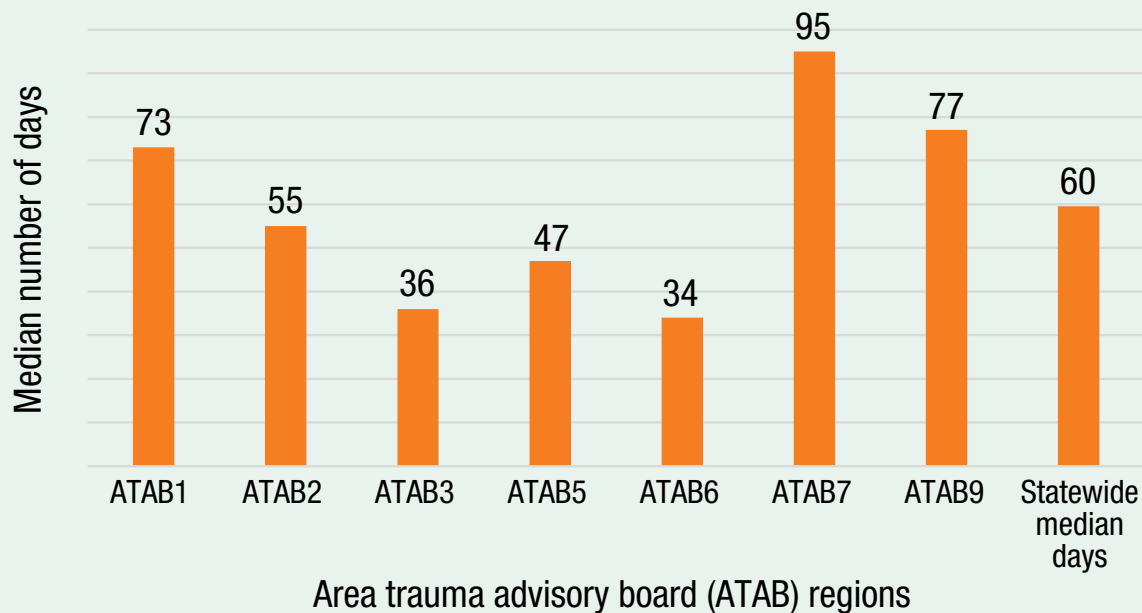
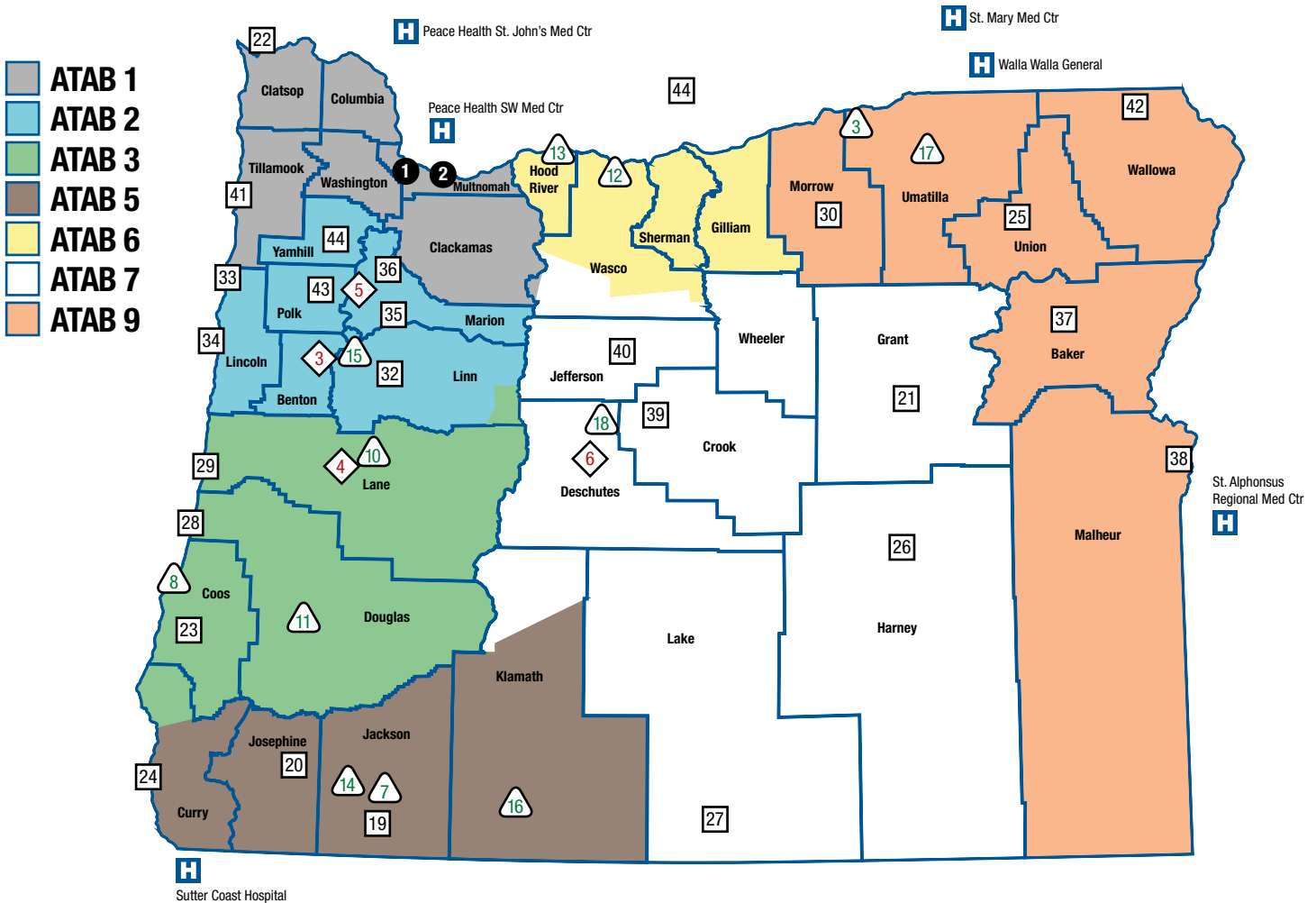


Figure 11. Oregon Trauma System regions, 2016



Legend

Level I (circles on map)

1. Legacy Emanuel Medical Center, Portland
2. Oregon Health & Science University Hospital, Portland

Level II (diamonds on map)

3. Good Samaritan Regional Medical Center, Corvallis
4. Sacred Heart Medical Center — Riverbend, Eugene
5. Salem Hospital, Salem
6. St. Charles Medical Center, Bend

Level III (triangles on map)

7. Asante Rogue Regional Medical Center, Medford
8. Bay Area Hospital, Coos Bay
9. Good Shepherd Medical Center, Hermiston
10. McKenzie Willamette Medical Center, Springfield
11. Mercy Medical Center, Roseburg
12. Mid-Columbia Medical Center, The Dalles
13. Providence Hood River Memorial Hospital, Hood River

Level IV (squares on map)

14. Providence Medford Medical Center, Medford
15. Samaritan Albany General Hospital, Albany
16. Sky Lakes Medical Center, Klamath Falls
17. St. Anthony Hospital, Pendleton
18. St. Charles Medical Center, Redmond
19. Asante Ashland Community Hospital, Ashland
20. Asante Three Rivers Medical Center, Grants Pass
21. Blue Mountain Hospital, John Day
22. Columbia Memorial Hospital, Ashton
23. Coquille Valley Hospital, Gold Beach
24. Curry General Hospital, Gold Beach
25. Grande Ronde Hospital, La Grande
26. Harney District Hospital, Burns
27. Lake District Hospital, Lakeview
28. Lower Umpqua Hospital, Reedsport
29. Peace Harbor Medical Center, Florence
30. Pioneer Memorial Hospital, Heppner
32. Samaritan Lebanon Community Hospital, Lebanon
33. Samaritan North Lincoln Hospital, Lincoln City
34. Samaritan Pacific Communities Hospital, Newport

35. Santiam Memorial Hospital, Stayton
36. Silverton Hospital, Silverton
37. St. Alphonsus Medical Center, Baker City
38. St. Alphonsus Medical Center, Ontario
39. St. Charles Medical Center, Prineville
40. St. Charles Medical Center, Madras
41. Tillamook Regional Medical Center, Tillamook
42. Wallowa Memorial Hospital, Enterprise
43. West Valley Hospital, Dallas
44. Willamette Valley Medical Center, McMinnville

H Out of state resources:

- Peace Health St. John's Medical Center, Longview, WA, Level III
- Peace Health St. John's Medical Center, Vancouver, WA, Level II
- St. Mary Medical Center, Walla Walla, WA, Level III
- Walla Walla General Hospital, Walla Walla, WA, Level III
- St. Alphonsus Regional Medical Center, Boise, ID, Level II
- Sutter Coast Hospital, Crescent City, CA, Level IV

Source: Oregon EMS and Trauma Systems Program.

V. Recommendations

A. Trauma System

The medical director of the EMS and Trauma Systems Program should convene a meeting of the State Trauma Advisory Board Data Subcommittee and users of the Oregon Trauma Registry data. This meeting is to initiate the development of strategies to improve data quality and increase the use of data.

B. Injury prevention

Increase the number of clinicians in primary care who screen patients aged 55 years and older for falls. These clinicians should document the falls reported and refer patients with a fall history to community-based exercise, home safety assessments, medication assessments, physical assessments and physical therapy.

A substantial number of motor vehicle crash injuries occur when the vehicle operators drive under the influence of alcohol and other drugs. The State Trauma Advisory Board should partner with the state Injury Community Planning Group. This partnership should support broad efforts to reduce injuries due to falls and motor vehicle crashes through community and statewide planning, research and policy development.



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