

TRAUMA CARE SYSTEM DEVELOPMENT



HISTORY AND RESOURCES

In 1982, Daniel K. Lowe, M.D. and his colleagues conducted a non-autopsy, retrospective analysis of 762 severely injured patients admitted to 23 hospitals in a six county area, including Portland and the surrounding rural areas. The patients had been transported from the injury scene to the nearest hospital without regard to the hospital's special capabilities. At that time, hospitals had not been designated or categorized as trauma centers. Outcomes for 16% of all injured patients, including 25% of the fatalities, were considered "inappropriate" for the severity of injury that had been incurred by the patient. Furthermore, the study demonstrated that the average time required for a surgeon to respond and attend to an injured patient was greater than one hour.¹

In 1983, Senate Joint Resolution 23 was introduced by Senator Starkovitch and then-Senator John Kitzhaber that would authorize the Department of Human Services to develop a plan for a statewide trauma system.

In 1984, the Oregon Trauma Plan, which included preset standards for prehospital trauma care, trauma center triage criteria, trauma center designation, system-wide quality assurance, research, and injury prevention, was completed.

The Oregon Legislature passed Senate Bill 147 in 1985 that authorized the creation of a statewide trauma system. In September of 1985, Governor Victor Atiyeh signed this bill, making Oregon one of the few states in the nation to approach trauma care in a systematic manner. The original legislation has been amended over the years, and is presently codified as Oregon Revised Statutes (ORS) 431.607 *et seq.* The administrative rules that implement the legislation, first promulgated by the Department of Human Services on September 20, 1985 are

¹Lowe, Daniel K., M.D., Gately, Hugh L., M.D., et al: Patterns of Death, Complication, and Error in the Management of Motor Vehicle Accident Victims: Implications for a Regional System of Trauma Care. *Journal of Trauma* 23(6):503-509, 1983.

set forth as Oregon Administrative Rules (OAR) Chapter 333, Division 200.

In summary, the statutes and rules:

- create the Oregon Trauma System (OTS) and the Oregon Trauma Registry (OTR);
- provide for a State Trauma Advisory Board (STAB) and seven Area Trauma Advisory Boards (ATABs) to advise the Department of Human Services with respect to the Oregon Trauma System and the Oregon Trauma Registry;
- require the development of a state trauma plan and area trauma plans; provide authority for the designation² of trauma centers in ATAB 1 (the Portland metropolitan area) and for the categorization³ of trauma facilities in all other areas;
- provide for the Division to collect and analyze data regarding all aspects of trauma care;
- require a performance monitoring process and provide for the confidentiality of all information involved in this process;
- require periodic reports to the Legislature; and
- provide financing for the Oregon Trauma System Program.

The Department of Human Services' EMS & Trauma Systems Section, STAB, and seven ATABs collaborate to fulfill the mandates of the trauma system legislation.

²Designation means a competitive process for identifying the level of hospitals' trauma care capability and commitment. This process selects a limited number of hospitals which meet criteria to receive trauma system patients.

³Categorization means a process for determining the level of hospitals' trauma care capability and commitment. Any hospital that meets criteria to receive trauma system patients may be categorized.

WHAT IS A TRAUMA CARE SYSTEM?

A *Trauma Care System* is more than availability of ambulance services and hospital emergency departments. In its 1988 report, the National Highway Traffic Safety Administration defines a *Trauma Care System* as “a system of health care delivery that combines prehospital Emergency Medical Services (EMS) resources and hospital resources to optimize the care, and therefore, the outcome of traumatically injured patients”⁴. A *Trauma Care System* is a continuum of care from the time of injury detection through acute care in a trauma hospital and rehabilitation if necessary. This system provides a comprehensive approach to the triage, treatment, transport, and ultimate care of major trauma victims. The American College of Surgeons Resources for the Optimal Care of the Injured Patient: 1999⁵ defines a *Trauma Care System* as being composed of four primary patient components: **access to care, prehospital care, trauma hospital care, and rehabilitation.**

- 1) **Access to care** implies that all users of the system, including the patient, know how to access the system. The most notable form of access is the 9-1-1 universal access emergency telephone number.
- 2) **Prehospital care** focuses on ambulances, emergency personnel, and emergency equipment and transport to acute care hospitals. Oregon prehospital agencies respond to out-of-hospital emergencies, including trauma, in a timely fashion. Out-of-hospital equipment and training of the responders are supplemented by equipment grants and education provided by the EMS and Trauma Systems Section Mobile Training Unit. Advanced care in the out-of-hospital

phase in rural Oregon has increased significantly during the past ten years.

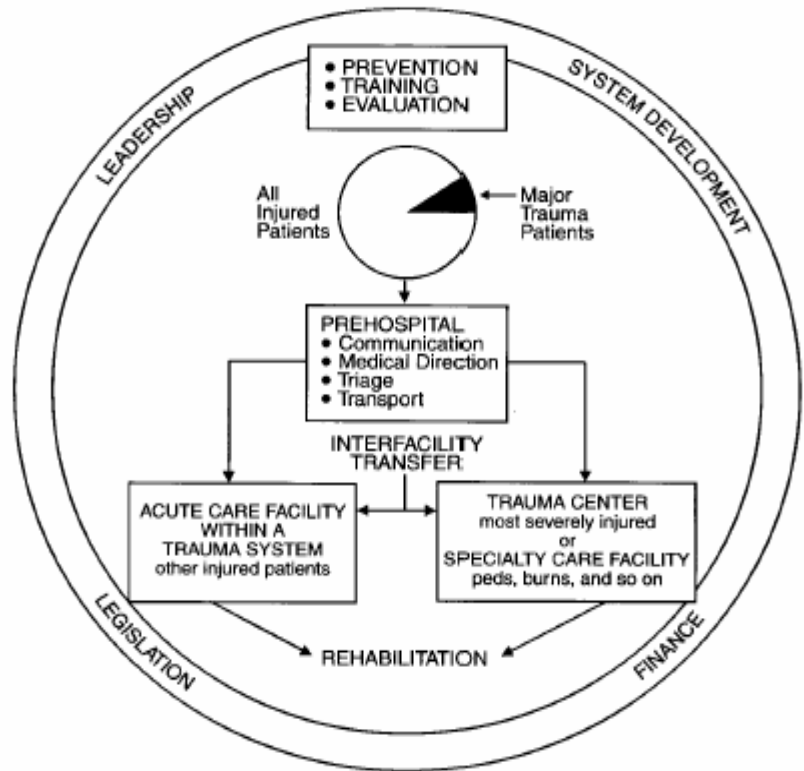
- 3) **Trauma hospital care** implies that those facilities providing care for trauma patients have been evaluated with regard to its ability to care for major trauma patients to assure a system that enables getting the right patient to the right hospital in the right amount of time. Additionally, optimal hospital care requires commitment from each of the designated and accredited facilities, the medical staff and all support personnel.
- 4) **Rehabilitation** for surviving victims of trauma must be provided. It is not efficient or cost effective to develop sophisticated out-of-hospital and hospital care to treat severely injured patients only to transfer the patients to custodial facilities without adequate rehabilitation.

⁴ National Highway Traffic Safety Administration. (1990) NHTSA assessment of emergency medical services in Oregon.

⁵ American College of Surgeons Committee on Trauma. (1998). Resources For The Optimal Care of the Injured Patient: 1999. Chicago, IL.

THE MODEL TRAUMA CARE SYSTEM MODEL

The ideal trauma system is designed to care for all injured patients with specific attention to the victims of major trauma. **The Model Trauma Care System Plan (1992)**⁶ recognizes that optimal trauma care is based upon a continuum of care that is ideally provided in an integrated system. This system depends upon close cooperation among providers throughout each phase of treatment. An inclusive system is one in which every health care provider and health care facility participates. Input from each of these participants is essential in establishing a functional system. An inclusive system recognizes not only severely injured patients, and the facilities that care for them, but also recognizes the significance of other hospitals within the system that care for the majority of injured patients. The Model Trauma Care System Plan (1992) defines the goal of an inclusive trauma system as one that matches the resources of each trauma care facility to the needs of injured patients. A trauma care system acknowledges the continuum of care for each trauma patient and is able to reduce mortality and morbidity, while improving the quality of care that each patient receives.



Adapted from Bureau of Health Services Resources, Division of Trauma and Emergency Medical Services: Model Trauma Care System Plan. Health Resources and Services, 1992.

⁶ U. S. Department of Health and Human Services Public Health Resources and Services Administration. (1992). Model trauma care system plan. Rockville, MD.

OREGON'S IMPLEMENTATION OF THE MODEL TRAUMA CARE SYSTEM

The Emergency Medical Services and Trauma Systems Section implements the components of the Model Trauma Care System Plan in the following manner:

The Emergency Medical Services and Trauma Systems Section of the Department of Human Services is responsible for the adoption, amendment and repeal of rules governing ambulance services, vehicles, and equipment; emergency medical technician (EMT) education, certification and discipline; trauma system development; programs to address the care of ill and injured children; and the integration of the state's EMS system. The EMS office is comprised of a section chief, eight program staff, and six support staff. The Trauma Program is supported by 4 full-time positions: a trauma and tertiary care manager, a trauma coordinator, a research analyst, and an administrative specialist.

The State Trauma Advisory Board (STAB), a twenty-one member advisory board, has statutory responsibility to assist the Division in the development and monitoring of the trauma care system and to comment on all new rules, policies, or procedures proposed by the Division.

The STAB consists of representatives from the American College of Surgeons, American College of Emergency Physicians, Oregon Society of Anesthesiologists, Oregon Association of Orthopaedists, American Academy of Pediatrics, Oregon Neurosurgical Society, Oregon Association of Hospitals, Oregon Emergency Medical Technicians Association, Oregon Emergency Nurses Association, Oregon Association of Critical Care Nurses, Oregon Ambulance Association, Oregon Volunteer Ambulance Association, the Fire Medical Administrators Association, and the citizens of Oregon at large.

The seven Area Trauma Advisory Boards (ATABs) are responsible for the development and implementation of regional trauma plans, each of which is geographically specific and contains

all of the elements of the state trauma plan. These ATABs are similar in composition to the STAB.

The statute and rules define the administrative, clinical and operational components of the trauma care system. The administrative components of the trauma care system consist of Leadership, System Development, Legislation, and Finances. The operational and clinical components fall into five major categories: Public Information and Prevention, Human Resources, Prehospital Care, Definitive Care, and Evaluation. Below are brief descriptions of each of these components:

Leadership for the development and implementation of the Oregon Trauma System is provided by the state EMS and Trauma Systems Section, assisted by the State Trauma Advisory Board (STAB), the State Emergency Medical Services Committee (SEMSC), the State EMS for Children Committee (SEMS-C), seven Area Trauma Advisory Boards (ATABs), and many other health care organizations.

System Development began with the analysis of data obtained from the Department of Human Services' Center for Disease Prevention and Epidemiology, Health Statistics Section, and from the Oregon Association of Hospitals to determine the resource needs of the trauma system. This data included information about the percentage of the population involved in minor, major, and fatal injury incidents, pattern of injury sites, and the number of emergency department visits. In addition, as mentioned above, a non-autopsy, retrospective analysis of 762 severely injured patients admitted to 23 hospitals was completed by Lowe, et al, to determine trauma care practice patterns.

Legislation enabling the Oregon Trauma System contains the necessary language for the Division to promulgate administrative rules (code) for the implementation of the trauma system. Operational policies are set forth both in Oregon Administrative Rules, Chapter 333, Division 200 and in the plan documents themselves (the State Trauma System Care Plan

and the seven Area Trauma Care System Plans). These plans are operational and have the force of law within the state.

Funding of the trauma system is provided through the Department of Human Services as general fund appropriations, currently augmented by a HRSA Trauma/EMS grant.

Public Information and Prevention programs reduce the actual incidence or severity of injury and remain the most cost effective means of decreasing the impact of trauma both within the system and for society. In Oregon, injury prevention is achieved through public education, legislation, and environment modification. Educational programs promote the use of restraint and protective devices (seatbelts, car seats, motorcycle and bicycle helmets, etc.), and curtail the combination of alcohol consumption and motor vehicle operation. The Department of Human Services' Injury Prevention Program coordinates public information and prevention activities with other public agencies, hospitals, and ATABs, and provides outreach to health departments, rural, community, and migrant health care clinics, child care resource referral centers, and groups that have been targeted because of the high incidence or risk for injury.

Human Resources issues addressed in the Oregon Trauma System Plan include prehospital workforce resources, the education and training of health care providers, standards for hospital and health care personnel, continuing medical education, and trauma education and preparation. Because a large portion of Oregon is rural and remote from large urban centers, assuring that physicians, nurses, and emergency medical technicians receive the necessary education in the delivery of trauma care has been a significant challenge.

The mechanisms for providing prehospital, nursing and medical trauma education are varied. Local entities are largely responsible for assuring that prehospital and hospital providers receive trauma education. All trauma centers routinely provide opportunities for initial and continuing education in trauma. The

Department of Human Services, using grant funding, has provided trauma specific education to EMTs, nurses, physicians, and ancillary staff throughout the state. The passage of Senate Bill 911 in 1999 provided increased funding for education and training of emergency medical services personnel and nursing staff in rural communities. An annual conference sponsored by the EMS for Children Program provides education specific to the care of pediatric trauma patients.

Prehospital Care includes communication systems, EMS medical direction, patient care protocols, triage, and transport. The statewide 9-1-1 service is probably the most widely recognized component of the EMS and trauma communications. At present, the state enjoys 100% coverage by basic 9-1-1 systems, and enhanced coverage is available in several urban, suburban, and rural areas. State legislation levies a tax on telephone access to support this system.

Triage and Transport of seriously injured patients is one of the most significant aspects of trauma care. Injured patients who require trauma system care are transported to the highest level trauma center nearest the injury scene. The decision to triage a patient to a trauma center is based on the presence of physiologic, anatomic, mechanism of injury data, pre-morbid conditions, and prehospital provider judgment. Patients identified for trauma system care often sustain life-threatening injuries.

Definitive Care consists of an integrated plan that addresses standards for trauma care facilities, designation and categorization, interfacility transfer, and medical rehabilitation. The trauma care facility distinguishes itself from other hospitals by providing dedicated trauma-related services, including physician services, nurses, ancillary services, and resuscitation life-support equipment on a 24-hour-a-day basis. Trauma care facilities are designated or categorized as Level I, Level II, Level III, or Level IV. Level I and Level II centers offer the highest level of trauma care. Oregon has adopted, with few modifications, the American College of

Surgeons' Optimal Standards of Care of the Trauma Patient as the *minimal* acceptable standards for Level I, Level II and Level III trauma hospitals. In recognition of the special needs of the very small, very remote hospitals, and in order to optimize their participation in the trauma system, Oregon also created standards for Level IV trauma facilities.

The Oregon Trauma Care System ensures coordination between all levels of trauma centers and facilities so that efficient and prompt inter-facility communication and transfer can take place according to patient need. Access to rehabilitation services, initially in the acute care hospital and subsequently in more specialized facilities is of paramount importance for the patient's total recovery and return as a productive member of his/her family and community.

Evaluation includes data collection and system assessment. A trauma system must have the ability to monitor system performance, continuously re-evaluate system needs, and assess system impact on trauma morbidity and mortality. The Oregon Trauma Registry (OTR) collects data about the causes of injury, emergency response, cost, and outcome of all injured patients who receive trauma system care. Other databases that monitor trauma prevention and utilization of trauma resources include the Oregon Department of Human Services, Office of Health Policy (Hospital Discharge Index); Center for Disease Prevention and Epidemiology, Health Statistics Section; the Oregon Department of Transportation, Transportation Safety Division; the Oregon Criminal Justice Commission; and the State Medical Examiner's Office. The passage of Senate Bill 911 in 1999 appropriated funds to support a statewide EMS data collection system. The implementation of an EMS data system will greatly enhance Oregon's capacity to collect prehospital data and analyze the EMS system. Statewide trauma system quality assessment and improvement activities enhance the quality management programs of the ATABS, individual EMS agencies and trauma hospitals. Each ATAB and the STAB have implemented a trauma system quality

improvement plan to ensure continuous assessment of system operations and system performance. Audit criteria (based on system standards) that measure the quality of medical care and system performance have been established statewide.

These administrative, operational, and clinical components, implemented together as a statewide system, result in the delivery of optimal levels of care to the most seriously injured patients in our state.