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Patterns of Death, Complication, and Error in the Management of Motor Vehicle Accident Victims: Implications for a Regional System of Trauma Care

DANIEL K. LOWE, M.D., F.A.C.S., HUGH L. GATELY, M.D., J. RICHARD GOSS, CECILIA L. FREY, R.N., AND CLARE G. PETERSON, M.D., F.A.C.S

A nonautopsy, retrospective analysis of severe motor-vehicle accident trauma can provide valuable information in regard to volume of trauma and quality of care. In a 6-county region surrounding a large metropolitan area trauma care, as reviewed by this method, had deficiencies at all levels of delivery. Patients were taken to the nearest hospital. Hospitals then had not been classified or designated according to capability. Twenty-five per cent of the fatalities and 16% of all outcomes were considered inappropriate for the severity of injury incurred. A regional trauma system with categorization and designation of hospitals providing trauma care would have eliminated or improved these deficiencies, resulting in improved outcomes for a significant percentage of these patients.

In 1980 there were approximately 10 million trauma victims in the U.S.A., 100,000 trauma-related fatalities, and 380,000 persons left permanently disabled (4). Trauma remains the leading cause of death for the age group from 2 to 40 years, and in the older population is exceeded only by cardiovascular disease and cancer. Since 1898 when the first U.S. traffic fatality occurred, motor-vehicle accidents (MVA's) have increased to now represent more than 50% of all trauma related deaths.

Retrospective autopsy and nonautopsy analyses of MVA fatalities and injuries have concluded that from 5 to 73% of all MVA-related fatalities were secondary to inadequate prehospital, emergency department, or inhospital care (18–21, 25–27, 29–31, 34, 35). Several states and local regions have since developed graded-echelon trauma care systems as described by Boyd (9, 10), Cowley (15, 16), and the ACS Committee on Trauma (1–3). The major elements of a graded-echelon trauma care system include: 1) a central emergency telephone number; 2) centralized dispatch of ambulances; 3) rapid field stabilization and resuscitation; 4) paramedic triage with field-hospital communication; 5) rapid transport with ongoing resuscitation to an appropriate hospital; 6) the designation of specified receiving hospitals (Levels I-III, ACS); and 7) ongoing training programs for medical personnel and the public (1, 2, 3A).

Data from several trauma centers suggest that a substantial percentage of trauma fatalities can be prevented by implementation of such a system (9, 16, 22, 23, 34). Most striking were the decreases in death rates reported by Waters (33) and Boyd (9, 10) after implementation of regional emergency medical systems (REMS). West and Trunkey, in an important comparison study of a REMS versus a nonorganized system, revealed one preventable death in the REMS series and 73% of the non-CNS and 28% of the CNS-related fatalities as preventable in the nonorganized system (34). Pressure to implement such a system of care in this region provided the impetus for a retrospective regional autopsy analysis of trauma care as described by West (35). An autopsy study in our region was limited, however, by the relative scarcity of autopsies obtained for MVA fatalities. Therefore, a nonautopsy method was devised to analyze severe MVA trauma and to show the volume and quality of care in this area.

METHODS

The region studied was the six-county area of Northwest Oregon including metropolitan Portland. This area of 5,724 square miles has a population of 1,127,450. The region is served by 29 hospitals. Twenty-three hospitals have emergency rooms staffed by physicians 24 hours/day and receive trauma patients without classification or designation according to trauma care capability. Several hospitals basically qualified as ACS Level II and provided in-depth trauma care, but no hospital met the criteria

From the Section on Trauma, Department of Surgery, Oregon Health Sciences University, Portland.

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Address for reprints: Daniel K. Lowe, M.D., Head, Section on Trauma, 3181 S.W. Sam Jackson Park Road, Portland, OR 97201.

for an ACS Level I classification (1, 2, 3A). One of the 23 hospitals refused a review of their medical records. Trauma victims, in general, were transported without triage protocol to the closest available receiving facility regardless of the severity of injury or the receiving hospital's resources. Twelve independent ambulance companies with varying levels of trauma care capabilities service the region.

All patients sustaining severe MVA injuries requiring direct admission to an intensive care unit (ICU) or an operating room (OR) are included in this study. All MVA victims pronounced dead at the scene of the accident or in transit to hospital were excluded from the study, while all patients receiving resuscitative measures on hospital arrival were included. The clinical records of all patients meeting our criteria were reviewed by the authors.

Information for evaluation was obtained from ambulance, hospital, and emergency department records and autopsy reports. To discern frequency patterns of accident occurrence the location of each accident was recorded as well as the distance from each accident scene to the metropolitan geographic center. These distances were used to calculate ambulance driving times in 15-minute intervals (4 miles, 8 miles, 15 miles from the metropolitan geographic center). Data were collected regarding the role of the patient (driver, passenger, pedestrian, etc.), use of protective devices and prehospital health care measures (basic or advanced life support). Time intervals from the ambulance or hospital record were recorded when available for: 1) injury; 2) ambulance arrival; 3) transport; 4) hospital arrival; 5) consultant arrival; 6) blood administration; 7) initiation of surgery; or 8) death.

Emergency department diagnoses and physical examinations were used to categorize the severity of the injury by the ACS Hospital Trauma Index (HTI) (3E). Emergency department treatment was also recorded regarding measures for resuscitation, evaluation, and treatment, including: 1) airway management; 2) IV's and fluid resuscitation; 3) laboratory and radiologic studies; 4) vital sign monitoring; 5) procedures (chest tube placement, pericardiocentesis, peritoneal lavage, etc.); and 6) consultation requests, general surgery, neurosurgery, and others.

Each patient's hospital admission was summarized by computer to contain all of the collected information from the data sources. This computer summary was reviewed by a panel of six physicians. This Trauma Review Panel (TRP) consisted of: three general surgeons, one neurosurgeon, one emergency room physician, and one anesthesiologist, chosen from nearby geographic areas not in the study region. Each panel member is a board member of his specialty and was selected because of interest in trauma care delivery and geographic location. The level of expertise in trauma care varied from fellowship and staff experience at a major trauma center to essentially very little experience with multiple system trauma. Each panel member made decisions and reached conclusions independently of the other TRP members. A consensus of the TRP's evaluations was obtained by computer analysis, with a consensus requiring agreement of two or more panel members.

Panel members were questioned regarding the severity of injury (major vs. minor) and all patients with minor injuries were excluded from further statistical analysis. The trauma review panel evaluated individually whether the outcome seemed appropriate for the severity of injury. The panel members also critiqued the management of trauma in various areas including the prehospital, emergency department, times of treatments, operations, and critical care. The TRP members were also asked to judge whether Trauma Center capabilities would have made a difference in outcome, either as a primary or secondary care facility.

RESULTS

Oregon Department of Transportation Statistics document 278 MVA fatalities in the region during the 12-month study period. One hundred forty-three (51%) were dead at the scene or died in transit and were excluded from our study. The remaining 135 fatalities had ongoing resuscitative attempts and were evaluated by this study (Table I). The medical records of 628 MVA survivors were also reviewed for a total of 880 admissions and transfers to the 22 area hospitals.

The population as defined (severe MVA injuries requiring emergency operation or ICU admission) totalled 763 patients and 880 admissions (Table II). The TRP described 104 patients as having minor injuries and these patients were excluded, leaving 659 patients and 767 admissions for evaluation. The minor injuries were primarily in those patients sustaining facial lacerations or isolated orthopedic injuries where surgery was done on an urgent basis.

TABLE I
Deaths

Site	Number (%)
Scene	143 (51.4)
ER (<1 hr)	45 (16.2)
ER (>1 hr)	27 (9.7)
Admit (OR, ICU)	63 (22.7)
Totals	278 (100.0)

TABLE II
Dispositions

Site	Number (%)
ICU admitted	273 (41.5)
OR	223 (33.8)
ER (<1 hr)	45 (6.8)
ER (>1 hr)	25 (3.8)
Transfer	93 (14.1)
Totals	659 (100.0)

The geographic distribution of the study population revealed that 80% of the MVA's occurred within 12 miles of the metropolitan center and an additional 10% occurred within 24 miles.

Prehospital transport times were infrequently included with medical records. Only 76 (12%) of our study population had transport and in-field times recorded, of which 96% had transport times less than 30 minutes. The average recorded in-field plus transport ambulance time was 37.0 minutes.

The demographic data of our study population revealed: 70% (464) were male, 78% (517) were less than 40 years of age, and 46% (300) were drivers. Of the fatalities, 62% (84) were less than 40 years old. Alcohol use was confirmed (ETOH Level > 0.10 mg%) in 129 (19%) of the accidents with 462 (70%) not having serum levels drawn (Table III). The use or nonuse of protective devices (seatbelts or helmets) was recorded in 291 medical records, with 262 (90%) of these accident victims not employing them (Table IV). Four hundred seventy-seven operative procedures were performed on 338 patients, representing 40 fatalities (Table V). Sixty-nine (14%) of the operations were performed at secondary hospitals after transfer, representing seven fatalities.

The 22 hospitals involved in the study were categorized by size and included 14 with less than 200 beds and eight with more than 200 beds. This arbitrary divison of hospitals was used to allow for the comparison of trauma care delivery at 'large' and 'small' hospitals. The level of injury (HTI or ISS) as well as the interval time for surgeon arrival, blood availability, operation, and length of stay were not statistically different for the two groups of hospitals (Table VI).

There were 135 hospital deaths for an overall mortality rate of 20.5%. *The mortality rate in small hospitals with less than 200 beds was 26% compared to 17% for large hospitals with over 200 beds* ($p < 0.01$). A description of the hospital deaths showed 45 (33%) occurred within 1 hour of emergency department arrival, 25 (20%) later

TABLE III
Ethanol

ETOH Level	Number (%)	Deaths (%)
Not meas.	462 (70)	108 (23)
Drunk (>.10 mg%)	129 (20)	17 (13)
None	27 (4)	8 (30)
On breath	41 (6)	2 (7)
Totals	659 (100)	135 (100)

TABLE IV
Protective devices

Device	Number (%)	Deaths (%)
Unknown	368 (56)	75 (20)
None	262 (40)	57 (22)
Seatbelt	17 (3)	2 (12)
Helmet	12 (2)	1 (8)
Totals	659	135

TABLE V
Operative procedures

Operations	Number	Operations	Number
Orthopedic	135	Tracheostomy	16
Neurosurgery	36	Thoracotomy	5
Debride/repair lacerations	84	Exploratory laparotomy	19
Plastic	44	Cholecystectomy	3
Splenectomy	45	Colectomy	3
Splenorrhaphy	3	Small bowel repair	7
Urologic procedures	11	Retroperitoneal exploration	4
Vascular	15	Appendectomy	1
Ophthalmologic procedures	5	Laryngoscopy	1
Hepatic lobe/repair	20	Chest tube	8
Diaphragm repair	5	Peritoneal lavage	2
Nephrectomy	1	Fasciotomy	6
Bronchoscopy	1		

TABLE VI
Trauma results compared to hospital size

	Small Hospitals (<200 beds)	Large Hospitals (>200 beds)
Admissions	268 (41%)	391 (59%)
Severity of injury		
HTI (Av)	10.8	11.2
ISS (Av)	34.5	31.7
Time after hospital arrival (hours)		
Consultant	1.1	1.0
Blood	3.3	3.1
Operation	4.6	4.0
Deaths	69 (26%)	66 (17%)*
Site of dying (135 patients)		
ER (<1 hr)	39	6
ER (>1 hr)	13	14
OR or ICU	17	46

* ($p < 0.01$).

TABLE VII

A) Trauma Review Panel Management Critique: Inappropriate Outcomes (105 Patients)

Deficiency	Patients (%)	Deficiency	Patients (%)
Delayed consult	57 (54)	ED therapy	36 (34)
Delayed operation	56 (53)	ED resuscitation	23 (22)
ED diagnosis	55 (52)	Operation	18 (17)
Prehospital care	48 (46)	Critical care	8 (8)
		Others	34 (32)

B) Trauma Review Panel Management Critique: Appropriate Outcomes (521 Patients)

Deficiency	Patients (%)	Deficiency	Patients (%)
Prehospital care	141 (27)	ED resuscitation	40 (8)
ED diagnosis	115 (22)	Operation	19 (4)
Delayed consult	67 (13)	Critical care	5 (1)
Delayed operation	64 (12)	Others	40 (8)
ED therapy	44 (8)		

(302 patients [58%], no critique.)

than 1 hour in the emergency department, and 63 (46%) in the intensive care unit or operating room (see Table VI). The majority of deaths in the small hospitals occurred in less than 1 hour in the emergency department. The majority of the deaths in the large hospitals occurred later than 24 hours after admission. Late mortality rates did not differ between large and small hospitals.

Trauma review panel (TRP) consensus required agreement by two or more TRP members. Of the 135 fatalities, 34 (25%) were judged to be inappropriate. Nineteen (14%) were judged to have indeterminate outcomes due to lack of autopsy or other information. Of the 34 inappropriate deaths, 19 were non-CNS related and 15 were CNS-related (Table VIII).

The trauma review panel (TRP) considered 105 of the 659 (16%) patients to have inappropriate outcomes. The areas of care considered by the TRP to have led to the unnecessary morbidity or mortality are: delays in consultation or operation, emergency diagnosis, and prehospital care. The summary of the deficiencies in care for these 105 patients is listed (see Table VII).

In the opinion of the TRP, outcome might have been improved for 74 patients (10%) if primary care had been at a Level I Trauma Center. No outcome would have been worse with transfer to a Trauma Center after initial stabilization. A large number of outcomes (28%) could not be evaluated by this method because of insufficient data.

DISCUSSION

An autopsy method of trauma care evaluation was not possible in our region because of an 18.6% autopsy rate for MVA fatalities. Ten years would be required to accumulate the 500 autopsy studies suggested by West (35) as needed for analysis. Our regional study was based, therefore, on severe cases of MVA trauma with panel review for evaluation of care. As in previous studies, fatalities occurring at the scene (143) were excluded as an unknown quantity in trauma management. In a retrospective autopsy study Frey (20) estimated that with prompt and effective emergency medical care, approximately 18% of MVA victims who were DOA might have been salvaged. Numerous authors have published retrospective autopsy or nonautopsy trauma analyses with varying levels of inadequacy of trauma care and inappropriate fatalities reported (Table VIII). All indicate significant inadequacies in trauma care without a regional graded-echelon trauma care system. In a recent study, Waters has reported a 24% drop in the mortality rate of those injured in Jacksonville, Florida, when comparing similar time intervals before and after implementation of an emergency medical care system (33). Similarly, Boyd has shown a decline in MVA mortality rates in spite of an associated increase in the number of MVA's with an organized emergency medical care system (10).

Our data analysis shows that trauma care in the Portland region for 1979 could have been improved at all levels of delivery: prehospital, E.R., O.R., and in-hospital care. A 20% mortality rate (135/659) for trauma patients reaching hospitals seemed excessive, particularly after excluding the 51% (143/278) of MVA fatalities occurring at the scene.

Of the fatalities, 25% (34/135) were considered inappropriate and another 14% (19) were considered indeterminate due to lack of autopsy data.

The resuscitation and initial E.R. management of these trauma patients was inadequate in the small hospitals as seen by the number of early E.R. deaths (39 patients). These early deaths account for the significant difference in mortality between the small hospitals (26%) and large hospitals (17%). When these early E.R. deaths are excluded, the late mortality rates are not different (13% vs. 16%) and show comparable trauma care outcomes. This fits with the data which showed no significant differences in consultation, blood arrival, and O.R. times between large and small hospitals (Table VI). The trauma care in the region as seen by the morbidity and mortality and other parameters measured in the study indicate the need for improvements in all areas of trauma care delivery in both small and large hospitals. Further improvements beyond current capabilities would require categorization and designation of a regional trauma system.

TABLE VIII

Study Group	Study Method	Totals	Total Inapprop.	Inapprop. Fatalities	Non-CNS Fatalities	CNS Fatalities
Moylan et al. (Wisconsin '72–'73)	Retrospective, nonautopsy	823	16%	33%		
Detmer et al. (Wisconsin '72–'73)	Retrospective, nonautopsy	556		36%		
Frey (Michigan '62–'67)	Retrospective, autopsy	159		18%		
Gertner (Baltimore '64–'69)	Retrospective, autopsy	33		50%		
Perry et al. (Minneapolis '57–'63)	Retrospective, autopsy	127		50%		
Root (Oakland)	Retrospective, nonautopsy	1,988	16%			
van Wagoner ('57–'59)	Retrospective, nonautopsy	606				
West & Trunkey (San Francisco '72)	Retrospective, autopsy				73%	28%
Trunkey (San Francisco '72)	Retrospective, autopsy	425		5.1%		
Lowe, et al. (Oregon '79) (present study)	Retrospective, nonautopsy	659	14%	25%	41%	17%

The trauma review panel indicated that the major areas where inadequacies occurred in the 105 patients with inappropriate outcomes were prehospital care, E.R. diagnosis and therapy, and delays in consult and operation (Table VII,A). These inadequacies were seen at both small and large hospitals and are inherently improved within an organized regional graded-echelon trauma care system. The results of management critique are described for the 521 patients whose outcome was considered appropriate for the level of injury (Table VII,B). The deficiencies most frequent in this group were prehospital care (27%) and ED diagnosis (22%). In this group of patients 302 patients (58%) had no deficiencies in management critique as reviewed by the trauma review panel.

The trauma care evaluation critique indicated that 10% (74) of the patients would have improved outcomes with the availability of a Level I facility. This is recognizably an extremely subjective decision that emphasizes one of the inadequacies of our study, i.e., retrospective analysis by panel review. Although the panel members had variable experience with trauma care, their analysis was an accurate assessment of the inadequacies present in the current system and a definite indication of the need for more aggressive trauma management available at a Level I facility.

Public education in regard to safety measures appears to be an obvious need to improve survival from trauma. The life-saving benefits of protective devices (i.e., seatbelts and helmets) are well known; however, 98% of these fatalities occurred without their use. Oregon medical examiners' reports have shown a greater than 80% elevated alcohol level in MVA fatalities, yet our study showed a 13% alcohol-related fatality rate (ETOH >0.10 mg%). This reflects a lack of awareness in hospitals for the need of such documentation, with 462 (70%) patients not having blood alcohol levels drawn.

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   Appendix A: Qualifications of Trauma Care Personnel
   Appendix C-1: Interhospital Transfer of Patients
   Appendix C-2: Air Ambulance Operations
   Appendix D: Treatment Protocol for Prehospital Management of the Trauma Patients
   Appendix E: Field Categorization of Trauma Patients and Hospital Trauma Index
   Appendix F: Quality Assurance and Education in the Emergency Department
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DISCUSSION

DR. GEORGE H. RODMAN, JR. (Phoenix, Arizona): Thank you, President Freeark. First, I'd like to congratulate Doctor Lowe and his colleagues for taking what I am sure has been and what in the future will turn out be a very painful and time

consuming but, nevertheless, obligatory first step toward developing an effective regional trauma system. His review of vehicular fatalities in the Portland area not only documents how lethal a community's disorganized approach to trauma care really can be, but, in addition, Doctor Lowe uses an interesting method to identify specific areas of deficiency; hopefully, to be the foundation for designing a relevant system.

His deficiency list is quite broad, and implicates trauma care providers at all levels. Even though mistakes in diagnosis and inadequate emergency department resuscitation seem to lead the way as most frequent sins, it is equally apparent that surgeons don't escape blame either, based on their surprisingly prolonged ER response times, that is, '15 minutes' lip service' is in fact a one-hour response time. In addition, there were inappropriately delayed surgical procedures, and an excessive number of intraoperative mistakes.

Doctor Lowe, I can't imagine these study observations and conclusions have won you very many friends in the Portland area and I expect your survey method using a multidisciplinary trauma review panel with their admitted subjective judgments is going to undergo very careful scrutiny, if perhaps not here, certainly in your home town by all the local special interest groups.

Allow me, if you will, to anticipate some of this skepticism by asking you the following questions.

First, did all six panelists judge each clinical summary?

Second, if a consensus of the panel was defined by two panelists in agreement, how did you resolve the phenomenon of paired disagreement, that being two yeses and two noes in answer to the question, "Was the clinical outcome appropriate?"

Third, how consistent was the panelist's judgment? In other words, is there some test that you did in terms of rater reliability? When given the same case the second time, would he come up with the same subjective evaluation?

Fourth, when comparing outcome in small versus large hospitals, was the patient population really the same? You have noted that injury severity scores seem to be the same, but were severe head injuries also equally distributed between small and large hospitals?

Finally, an observation. I am quite surprised, indeed, that you found no difference in late mortality between small and large hospitals after the early deaths in the small hospitals had been deleted from further evaluation. In fact, I would have expected the results to have shown that small hospitals then had an exceedingly low mortality for postoperative care or critical care compared to large hospitals unless, of course, critical care is also deficient in small hospitals.

Mr. Chairman, thank you very much for the opportunity to discuss what I think is a very important paper, and for the privilege of membership in the Association. [Applause]

DR. NORMAN E. MCSWAIN (New Orleans, Louisiana): We were awfully severe in our criticism of the EMT's this morning when we were talking about 10, 15 minutes' response time and even a 38-minute response time. Doctor Rodman has already pointed out an hour response time for the surgeons and a 4-hour response time to the operating room. I wonder if, in light of this, Doctor Lowe has looked at the prehospital response time in terms of minutes either from the time of arrival of the EMT's or how much time was spent on the scene or if, in some way, we could get a handle on what the prehospital care was. Can we compare physician response to EMT response?

DR. LAWRENCE H. PITTS (San Francisco, California): I am fascinated by your ability to gather this information and refer it to a group of disinterested reviewers, and I would love to know how you convinced one set of hospitals to give their data for review by an outside group. This is a significant and important piece of work and must be widely applied to a variety of specialties including neurosurgery and general surgery. We now generally don't know how effective and timely is our trauma response. Your study demonstrates just how long response times can be, despite protestations by many physicians that they 'do better at their hospitals.'

DR. HENRY C. CLEVELAND (Denver, Colorado): In defense of surgeons, we were asked to evaluate in Orange County a system once they designated the trauma centers 2 years ago and it is interesting, even in small hospitals in the southern part of their system that are designated, the response times by surgeons. In more than 60% of the time, the surgeons were in-house at the time the patient arrived and, in the majority of the others, the surgeons were there within 15 minutes.

So that once you have a designated system, I think you will see a difference in response times.

DR. C. GENE CAYTEN (Philadelphia, Pennsylvania): It was interesting to me that there was relatively little difference between the small and large hospitals in preventable deaths related to critical care. Much of the rationale for regional trauma systems has been suggested to be the sophisticated critical care capabilities or regional trauma centers. Certainly the Maryland example comes to mind. Doctor Lowe, was this lack of difference attributable to critical care between the large and small hospitals in your area an artifact or was it a valid finding?

DR. DANIEL K. LOWE (Closing): Doctor Rodman, I don't know how many friends I have in the Portland area. Hopefully, I have at least as many as Doctors West and Trunkey have in Orange County.

In answer to question one, each of the six panelists individually judged each clinical summary. It took each reviewer about 80 hours and this length of time precluded a further review.

The problem with the 'consensus' of the panel as being defined by only two does raise a question and it has to do with this whole methodology. It is a problem that I chose to resolve this way and which may not be as scientific as it could be. I chose this method because of the inexperience and broad range of responses by the panel members. Remember that an anesthesiologist, even though this one was trained at a trauma center, really did not understand what a trauma center is. The neurosurgeon, for example, primarily considered 'inappropriate' those patients with inappropriate management of neurosurgical injuries and seemed to frequently conclude on the general surgery problems, that he didn't know.

So I had to rely mostly on the general surgeons and, in fact, if I had to do this methodology over again, I would suggest that you use only general surgeons.

In regard to question number three, there appeared to be a fairly consistent panelist response, although I did not report the results of this.

There were several questions about the critical care in small hospitals. One has to remember that in the system that we had, the major injuries, particularly head injuries, were sent to the large hospitals, and the only patients who remained in the small hospitals for critique were those with very minor injuries. The critical care actually in the small hospitals was okay. The population was much less severely injured.

The prehospital response in this group of patients was only recorded in the medical records in 76 patients. Of those 76 patients, the average time of response to hospital arrival was 37 minutes, 15 minutes in the field and 15-minute transport time.

How did I get the information? That was the reason that it is 1982 and I am just presenting a study from 1979. The hospital administrators were the ones who were interested in deciding whether they wanted a regional system of trauma, and they decided that there was no impetus for the regional trauma system unless somebody showed them that trauma care wasn't

really as good as they thought it was. Oregon has several misconceptions about trauma in the area. One is that the trauma in Oregon is out in the boondocks, and this study showed that it was primarily in the metropolitan area. The mechanism for obtaining data involved going to the state attorney general for legal opinions and to allow the medical school to agreement that I would not identify the hospital, the patient, nor the surgeon. Getting access to data this way was difficult and potentially would be very difficult for me to repeat.

Thank you. [Applause]

ORGAN DONOR LINE AVAILABLE TO HEALTH PROFESSIONALS

The nation's first toll-free telephone number for physicians, nurses, and other health professionals with questions about a potential organ donor has been based at the University of Pittsburg. The number will assist health professionals by providing urgently needed information for a donor and referring the caller to his local procurement organization.

The phone number, restricted to doctors, nurses, and other health professionals is 800-24-DONOR. The number operates 24 hours-a-day, 365 days-a-year. It is a service of the North American Transplant Coordinators Organization (NATCO) and part of its attempts to expand efforts to match available organs with those people waiting for a transplant. NATCO is the professional association of individuals responsible for organ procurement in hospitals.

According to Donald W. Denny, director of organ procurement for the University of Pittsburg, there are 110 organ procurement centers in this country, but often doctors and health professionals do not know whom to contact locally when a donor is identified. The new number provides information on the organ needs of the major transplant institutions in this country and Canada. It includes information on kidneys, hearts, livers, lungs, pancreases, and heart/lungs.

The general public can make inquires about organ donations through DONORS-7 (366-6777).