Idaho Trauma Registry

Annual Report
to the
Idaho Legislature

Injury in Idaho

Trauma Registry Pilot Project

January 2007

Idaho Hospital Association

IDAHO DEPARTMENT OF HEALTH & WELFARE

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Acknowledgements

The Idaho Hospital Association contracts with, and receives funding from, the Idaho Department of Health and Welfare, Bureau of Emergency Medical Services for piloting and implementing a statewide trauma registry.

The Idaho Transportation Department, Office of Highway Safety (OHS) and the Idaho Department of Health and Welfare, Bureau of Emergency Medical Services (EMS) partnered with the Idaho Trauma Registry (ITR) in providing data on motor vehicle traffic collision injuries and pre-hospital care. Data from these sources was essential for developing and testing record linkage procedures.

ITR partnered with Digital Innovation, Inc. to develop the software and systems needed to collect, validate, and transfer data from hospitals.

The following hospitals worked with ITR to report trauma cases and refine systems during the first year of the project. It is because of their time and effort that the project has evolved.

Pilot Hospitals:

- Eastern Idaho Regional Medical Center (Idaho Falls)
- Franklin County Medical Center (Preston)
- Gooding County Memorial Hospital (Gooding)
- McCall Memorial Hospital (McCall)
- Mercy Medical Center (Nampa)
- Portneuf Medical Center (Pocatello)
- Saint Alphonsus Regional Medical Center (Boise)
- St. Joseph's Regional Medical Center (Lewiston)
- St. Luke's Magic Valley Regional Medical Center (Twin Falls)
- St. Luke's Regional Medical Center (Boise)
- St. Luke's Regional Medical Center (Meridian)
- St. Luke's Wood River Medical Center (Sun Valley)

Executive Summary

The Idaho Trauma Registry (ITR) was established by Idaho Code §57-2003 to collect data needed to analyze the incidence, severity, causes, costs, and outcomes of trauma in Idaho. The Idaho Hospital Association (IHA) contracts with, and receives funding from, the Idaho Department of Health and Welfare, Bureau of Emergency Medical Services, to operate ITR.

The ITR database contains more than 12,000 legacy records exported from Eastern Idaho Regional Medical Center, Portneuf Medical Center, Saint Alphonsus Regional Medical Center and St. Joseph Regional Medical Center hospital registries.

ITR is currently in the pilot phase of operating the trauma registry. There were 1,879 cases reported to ITR by 12 Idaho hospitals for injuries occurring between May 8 and December 31, 2006. The analyses provided in this report are based on the 1,879 injuries occurring between May 8 and December 31, 2006. Cases reported by multiple hospitals were not consolidated into one record for this report. These analyses should not be interpreted as applying to Idaho overall, but rather are intended to provide information on basic types of analysis of hospital data that will be available for injuries meeting trauma registry inclusion criteria.

Sample analyses revealed the following for injuries reported by the 12 pilot hospitals:

- A greater number of injuries were reported for males than females for every cause of injury and for all age groups except 65 years and older.
- Females aged 65 years and older had greater numbers of fall and motor vehicle traffic injuries than males aged 65 years and older.
- More transport related injuries (motor vehicle traffic collision and other types of transport) were reported than injuries from any other cause, although almost equal numbers of fall and motor vehicle traffic collision injuries were reported.
- One in three (33%) of injuries reported occurred on a public street or highway. One in four (25%) injuries reported occurred in a private home.
- Reflecting national trends, a greater number of minor injuries (Injury Severity Score (ISS) <16) were reported than major injuries (ISS $\geq$16).
- Almost eight of 10 (78%) patients whose hospital discharge site was known were discharged home.
- For patients whose discharge site was known, almost one in six (17.5%) was discharged to another hospital, a skilled nursing facility or an intermediate care facility.

Future analyses will not be limited to hospital data, but will include analysis of linked files of hospital and, where applicable, pre-hospital, motor vehicle traffic collision and death reports. Analysis of linked records will enhance information for: 1) performance improvement (e.g. outcomes by field procedure tracked); 2) distribution of injuries (e.g. by geographic area); 3) injury severity (e.g. versus outcome); 4) cause of injury (e.g. motor vehicle injury severity versus length of hospital stay); 5) cost of injuries (e.g. hospital charges by safety equipment use status); and 6) trends (e.g. injury rates by geographic area over time).

Section I
Trauma Registry Fundamentals

Legislation

The Idaho Trauma Registry (ITR) was established by Idaho Code §57-2003 to collect data needed to analyze incidence, severity, causes, costs and outcomes of trauma in Idaho.

Purpose

A statewide trauma registry provides ongoing and systematic collection, analysis, interpretation and dissemination of information related to severe injuries in order to guide systems improvement, prevention and research activities. Elements in the registry describe the nature and scope of traumatic injury, severity of injury, performance of out-of-hospital and hospital emergency medical systems, patient outcomes and the impact of trauma on the health care system and the citizens of Idaho. Injuries are the leading cause of death for Idahoans aged one to 44 years, and among the leading causes of death for Idahoans overall.

Infrastructure

The Idaho Hospital Association (IHA) contracts with, and receives funding from, the Idaho Department of Health and Welfare, Bureau of Emergency Medical Services (EMS Bureau) to develop and implement ITR. IHA is a nonprofit association established in 1933 to bring hospitals and health care leaders together to identify and address issues that ensure quality health care for Idahoans.

Inclusion Criteria

ITR inclusion criteria were developed by the Trauma Registry Advisory Committee (TRAC) to capture information on patients with the most serious injuries. This minimizes the reporting burden for hospitals, while still providing statewide information on injury in Idaho. Death records are collected for injury related deaths including those in which the victim was not hospitalized or died after being released from the hospital.

Inclusion criteria include injuries resulting in:
- dislocations, sprains, strains and fractures;
- internal injuries;
- open wounds;
- burns;
- head injuries;
- crushing injuries;
- drowning and nonfatal submersions;
- suffocation and strangulation;
- injuries caused by electric current.

Additionally, at least one of the following must be met: 1) admission as an in-patient; 2) death after receiving any evaluation or treatment; 3) dead on arrival; or, 4) transferred into or out of the hospital by ambulance.

Minor injuries, poisonings, late effects of injuries, some fall injuries, and complications of surgical and medical care are among injuries that are excluded from ITR.

Hospital Reporting Options

Three mechanisms are available for hospital reporting:

- Hospitals with hospital based trauma registry software export data to the central site server. These hospitals are: Eastern Idaho Regional Medical Center, Portneuf Medical Center, Saint Alphonsus Regional Medical Center, and St. Joseph Regional Medical Center.

- Hospitals without hospital based trauma registry software report cases to the central site server using a secure, web-based reporting tool called Collector™.

- Hospitals with 20 or fewer trauma cases per month are eligible for on-site data abstraction by an ITR registrar on a quarterly or bi-annual basis.

Data Sources

ITR data are received from four sources: 1) hospitals; 2) Idaho Transportation Department, Office of Highway Safety (OHS); 3) EMS Bureau, and; 4) Idaho Bureau of Health Policy and Vital Statistics.

Hospital trauma case records are linked, when applicable, with EMS Bureau patient care reports, OHS motor vehicle traffic collision reports, and Vital Statistics death certificates to provide a complete record

of an injury incident. Aggregated, de-identified, linked records are used for analysis, research, report generation and submission to the National Trauma Data Bank (NTDB) of the American College of Surgeon's Committee on Trauma. Appendix A provides an overview of the data submission, linking, and report generation process.

Data Submission Timeline

Eligible trauma cases are reported to ITR within 60 days of discharge. Cases in which the patient is readmitted within 30 days of initial discharge, for any reason related to the injury, must also be entered/updated within 60 days of discharge for the readmission. Reimbursement information is collected up to 365 days after discharge unless charges are paid in full or no further reimbursement is expected within the 365 day period.

EMS agencies have no deadline to submit patient care reports to the EMS Bureau, but a new system currently being piloted will prompt timely submission.

OHS estimates 99 percent of motor vehicle traffic collision reports are electronically entered directly into the OHS data collection system.

Death data are available approximately 10 months after the end of the calendar year in which the death occurred.

Section II
Trauma Data Report

The following analyses are based on 1,879 injuries occurring between May 8 and December 31, 2006 that were reported by 12 Idaho hospitals participating in the ITR pilot project. Cases reported by multiple hospitals are not consolidated into one record for this report. The four pilot hospitals with hospital based registries provided cases that met hospital trauma registry inclusion criteria that varied slightly from ITR inclusion criteria[1]. At the conclusion of the pilot project, all Idaho hospitals will submit cases that meet ITR minimum inclusion criteria, although the need for further discussions on realistic, cost effective inclusion criteria was identified during pilot data collection.

Hospitals providing data for this report are:

Eastern Idaho Regional Medical Center	Saint Alphonsus Regional Medical Center
Franklin County Medical Center	St. Joseph's Regional Medical Center
Gooding County Memorial Hospital	St. Luke's Magic Valley Regional Medical Center
McCall Memorial Hospital	St. Luke's Regional Medical Center, Boise
Mercy Medical Center	St. Luke's Regional Medical Center, Meridian
Portneuf Medical Center	St. Luke's Wood River Medical Center

These analyses should not be interpreted as applying to Idaho overall, but rather are intended to provide information on basic types of analysis of hospital data that will be available for injuries meeting trauma registry inclusion criteria. Future analyses will not be limited to hospital data, but will also include analysis of linked files, where applicable, of pre-hospital, hospital, death and motor vehicle traffic collision reports.

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[1] Eastern Idaho Regional Medical Center inclusion criteria does not include patients whose injuries occurred more than three days prior to being treated at the hospital, ground levels falls with isolated orthopedic injuries (including hip fractures), as well as patients with no trauma code. For other than pediatric patients, ground level fall related injuries meeting Saint Alphonsus Regional Medical Center inclusion criteria are limited to those with head, neck, rib and spine injuries. St. Joseph Regional Medical Center requires a 48 hour stay to meet in-patient inclusion criteria. These three inclusion criteria scenarios result in fewer cases reported than if the ITR minimum inclusion criteria were used.

CAUSE OF INJURY BY AGE AND GENDER

A total of 1,879 injuries were submitted for analysis, with a greater number reported for males than females for every cause of injury and for all age groups except 65 years and older. The number of reported injuries was higher among females aged 65 years and older than males.

All Injuries

Count of Cases Submitted by ITR Pilot Hospitals
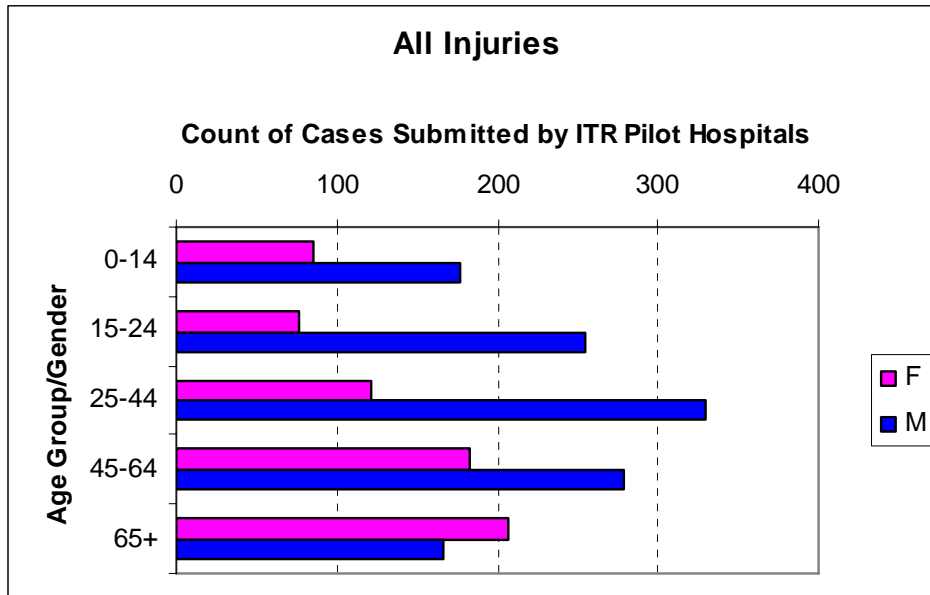
Numbers of reported injuries increased for males aged 0-14, 15-24 and 25- 44, then decreased.

With the exception of ages 15-24, reported injury counts for females increased with age.

The greatest number of injuries reported were transport related; both motor vehicle traffic and other types of transport.

Almost equal numbers of fall related and motor vehicle traffic collision injuries were reported.

Cause of Injury by Gender

Count of Cases Submitted by ITR Pilot Hospitals
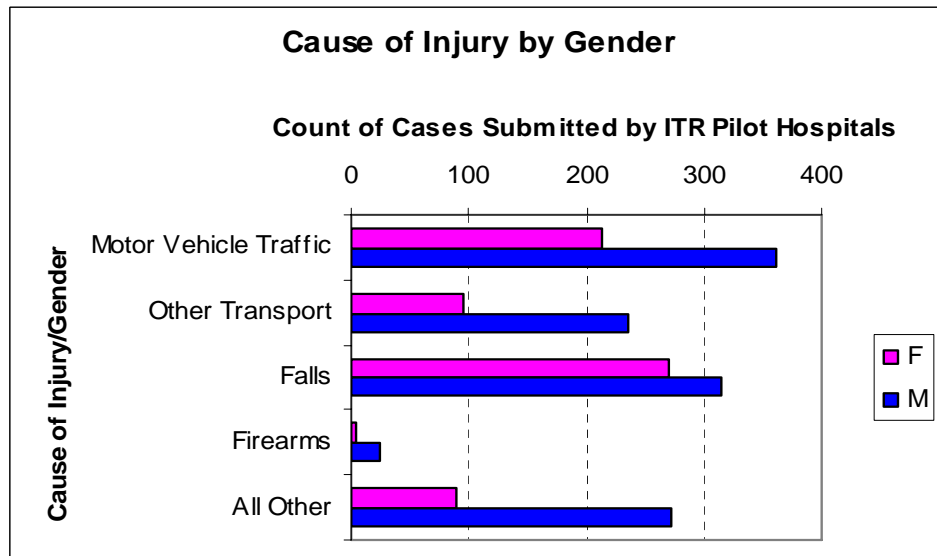
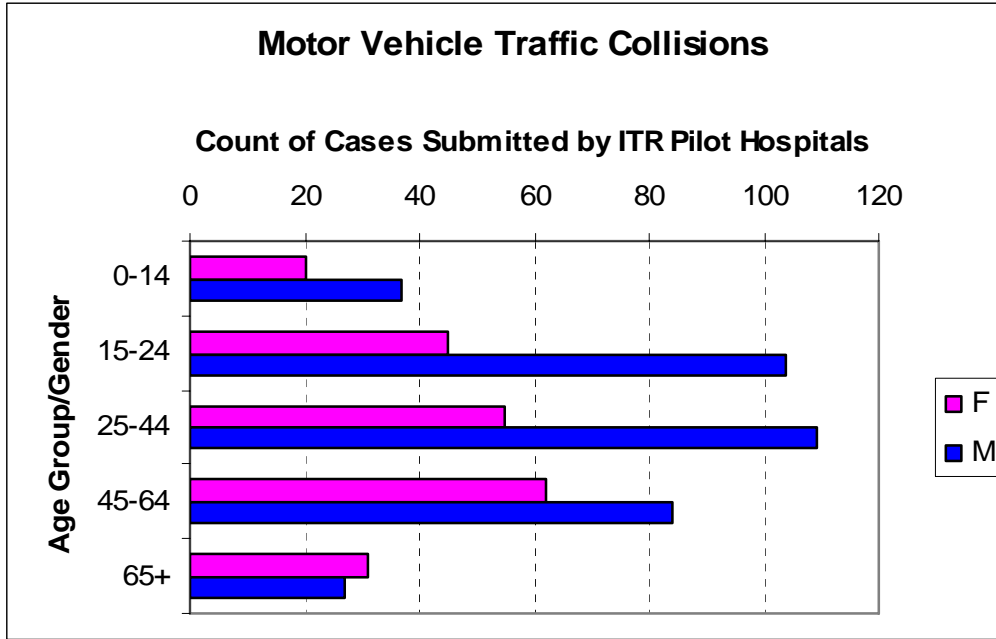# TRANSPORT RELATED INJURIES

Motor vehicle traffic collision injuries were reported more often for males than females. For persons aged 65 and older, there were more motor vehicle traffic injuries reported among females than males.

Motor Vehicle Traffic Collisions

Count of Cases Submitted by ITR Pilot Hospitals

The greatest number of motor vehicle traffic collision injuries was reported for males aged 25-44, followed by males aged 15-24.

Motor vehicle traffic collision injury counts increased by age group for females aged 0-64, then decreased for those aged 65 and older.

Other transport includes injuries from off road vehicles in recreational or sporting activities (not on state roads or highways), bicycles (other than from collisions with motor vehicles), animals being ridden, and water and air transport.

Other Transport

Count of Cases Submitted by ITR Pilot Hospitals
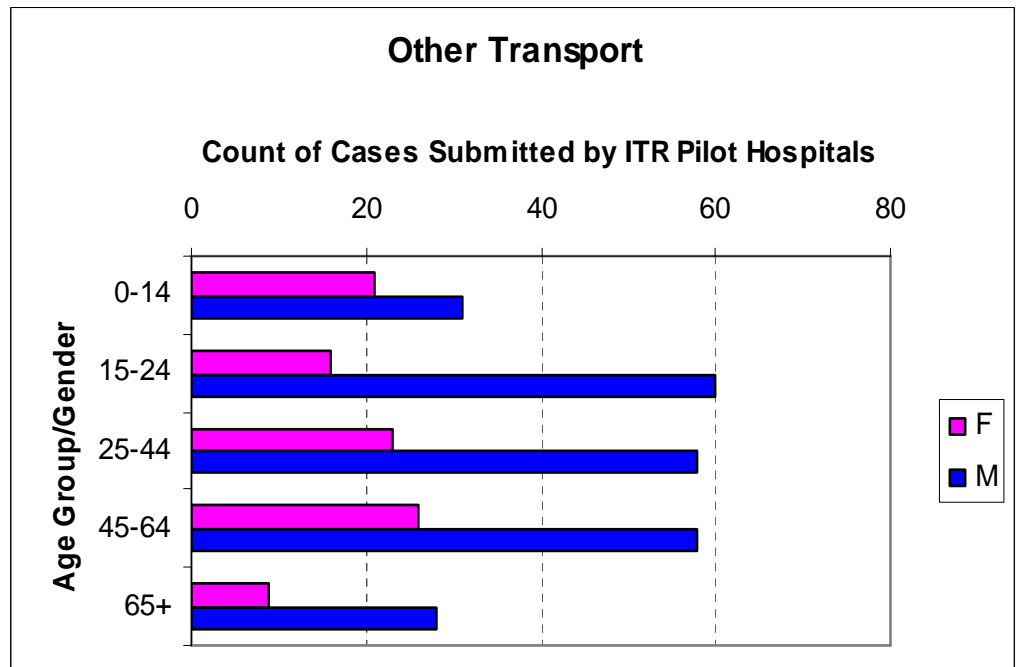
FALL INJURIES

Overall, a greater number of fall injuries were reported for males than females, although one in four falls were reported for females aged 65 years and older.

Falls

Count of Cases Submitted by ITR Pilot Hospitals
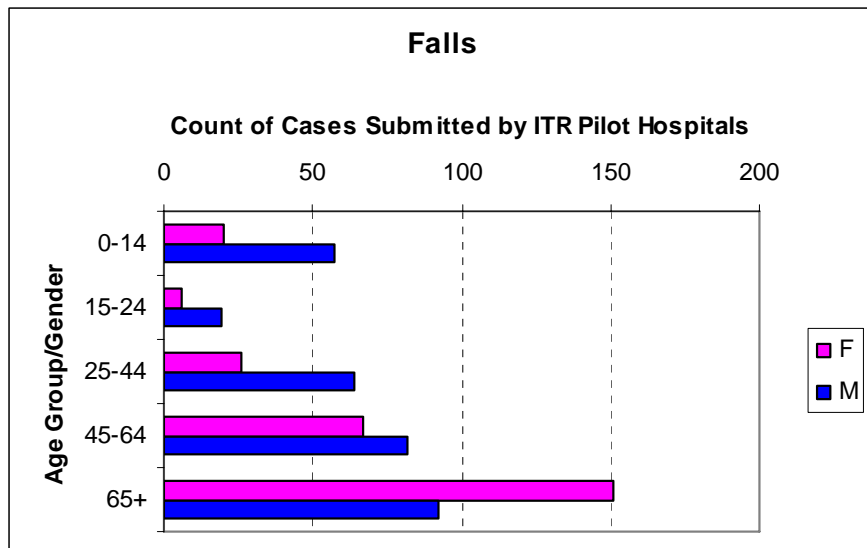
With the exception of persons aged 15-24, the number of reported fall injuries increased with age.

Increased numbers of reported fall injuries by age was more pronounced among females.

FIREARMS INJURIES

Most firearms related injuries were reported for males.

The greatest number of firearms injuries was reported for males aged 25-44, followed by males aged 15-24.

Firearms

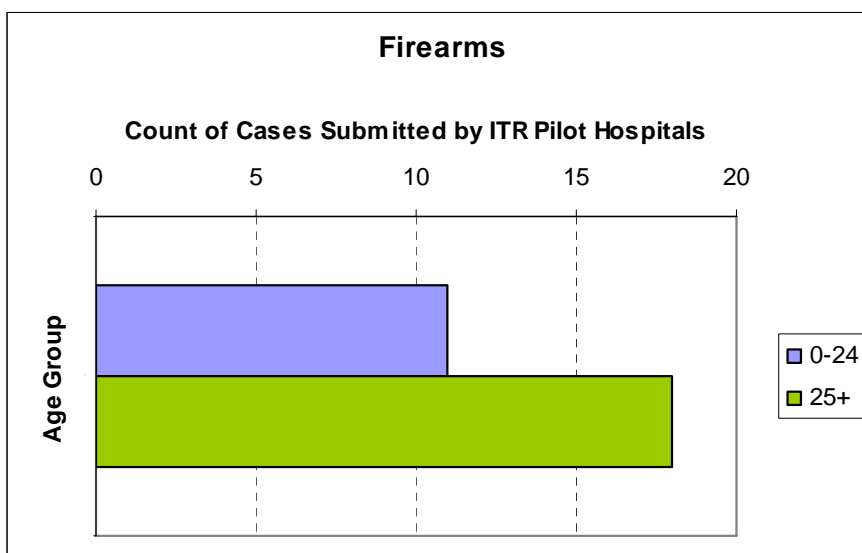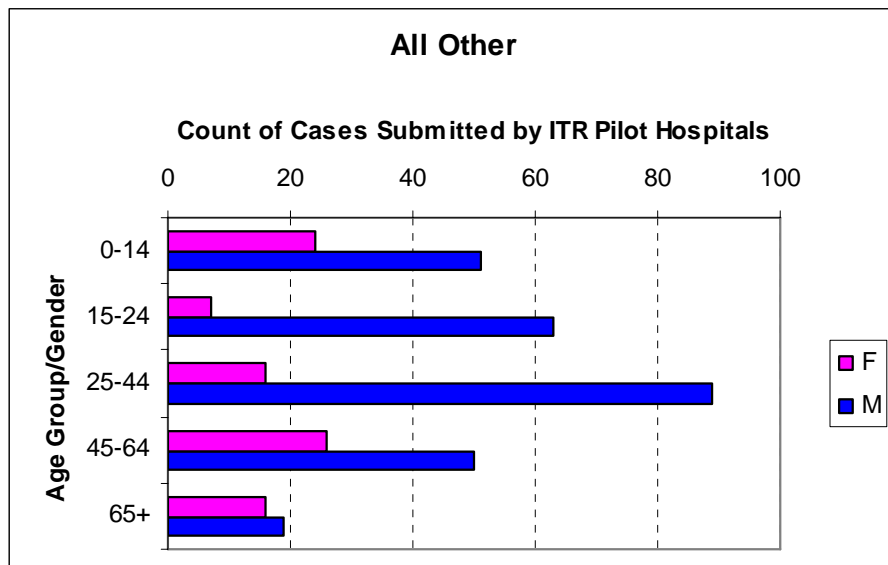### Count of Cases Submitted by ITR Pilot Hospitals

ALL OTHER INJURIES

All other injuries include all reported injuries other than those from motor vehicle traffic collisions, other types of transport, falls, and firearms. Examples of other types of injuries are burns, drowning, assaults, being struck by or striking an object, and being injured by machinery.

All Other

Count of Cases Submitted by ITR Pilot Hospitals

Age Group/Gender: 0-14, 15-24, 25-44, 45-64, 65+

Legend: F, M

Numbers of other injuries reported among females were fairly consistent across age groups, with the lowest number reported for those aged 15-24.

Other injuries reported among males peaked for those aged 25-44, then declined.

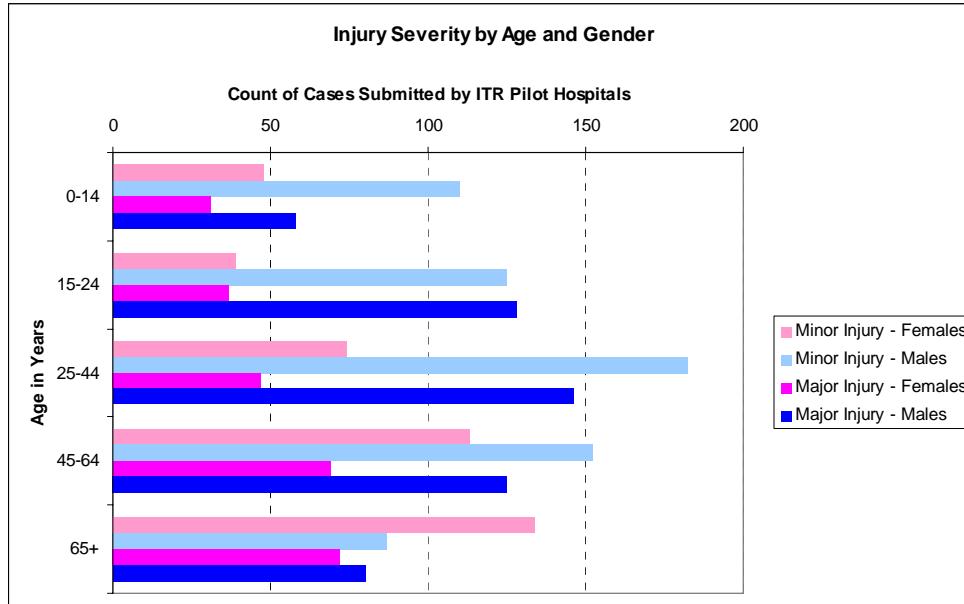## CAUSE OF INJURY BY AGE AND GENDER

Cause of Injury by Age and Gender

ITR Pilot Hospitals*

Dates of Injury: May 8, 2006 - December 31, 2006

Age (Years)	Motor Vehicle Traffic		Other Transport		Falls		Firearms		All Other			
	F	M	F	M	F	M	F	M	F	M	U	Total
0-14	20	37	21	31	20	57		1	24	51		262
15-24	45	104	16	60	6	19	2	8	7	63		330
25-44	55	109	23	58	26	64	1	10	16	89	1	452
45-64	62	84	26	58	67	82	2	4	26	50		461
65+	31	27	9	28	151	92		1	16	19		374
Unknown												
Total	213	361	95	235	270	314	5	24	89	272	1	1,879

*Eastern Idaho Regional Medical Center, Franklin County Medical Center, Gooding County Memorial Hospital, St. Luke's Magic Valley Regional Medical Center, McCall Memorial Hospital, Mercy Medical Center, Portneuf Medical Center, Saint Alphonsus Regional Medical Center, St. Joseph Regional Medical Center, St. Luke's Regional Medical Center, St. Luke's Regional Medical Center Meridian, St. Luke's Wood River Medical Center

INJURY SEVERITY

Injury severity scores are useful for characterizing injuries as well as for predicting survival and evaluating patient outcomes. Mortality predictions and patient outcome measures are important for emergency medical systems performance improvement. Greater numbers of minor injuries were reported than were major injuries, as is also reported by the NTDB. (*National Trauma Data Bank Report 2006, Version 6.0.* Clark, DE and Fantus, R, Editors. American College of Surgeons Committee on Trauma, 2006.)

Injury Severity by Age and Gender

Count of Cases Submitted by ITR Pilot Hospitals

Both minor and major injuries reported for males increased through age 25-44, then declined.

Minor injuries reported among females increased by age, with the exception of those aged 15-24; major injuries increased to age 45-64 then remained constant.

# INJURY SEVERITY SCORE (ISS) BY AGE AND GENDER

Injury Severity Score by Age and Gender
ITR Pilot Hospitals*
Dates of Injury: May 8, 2006 - December 31, 2006

Age (Years)	Minor Injury (ISS <16)		Major Injury (ISS >=16)			Unknown		Total
	F	M	F	M	U	F	M	
0-14	48	110	31	58	.	6	9	262
15-24	39	125	37	128	.	.	1	330
25-44	74	182	47	146	1	.	2	452
45-64	113	152	69	125	.	1	1	461
65+	134	87	72	80	.	1	.	374
Unknown								
Total	408	656	256	537	1	8	13	1,879

*Eastern Idaho Regional Medical Center, Franklin County Medical Center, Gooding County Memorial Hospital, St. Luke's Magic Valley Regional Medical Center, McCall Memorial Hospital, Mercy Medical Center, Portneuf Medical Center, Saint Alphonsus Regional Medical Center, St. Joseph Regional Medical Center, St. Luke's Regional Medical Center, St. Luke's Regional Medical Center Meridian, St. Luke's Wood River Medical Center

PLACE OF INJURY

Knowing where injuries occur is important for developing injury prevention activities that more closely meet prevention needs.

Place of Injury by Gender

Count of Cases Submitted by ITR Pilot Hospitals
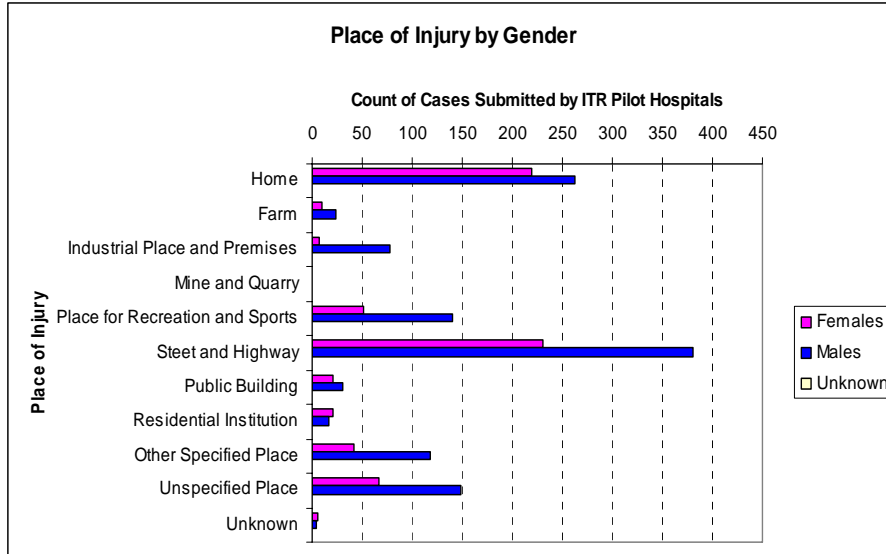
Almost one in three injuries reported occurred on public streets and roadways.

One in four injuries reported occurred in a private residence.

One in 16 injuries reported occurred on a farm or in an industrial place or premises.
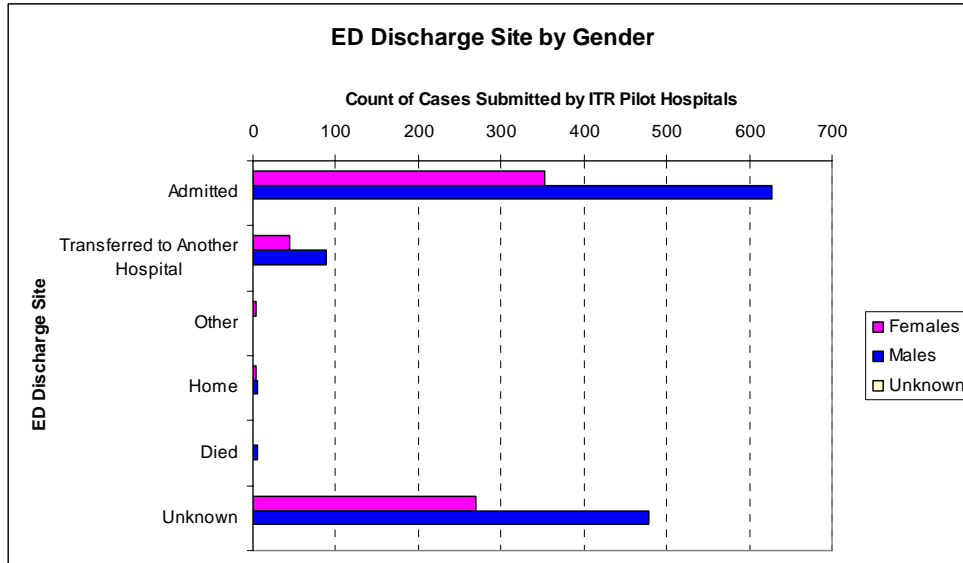
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PLACE OF INJURY BY GENDER

Place of Injury by Gender
ITR Pilot Hospitals*
Dates of Injury: May 8, 2006 - December 31, 2006

Place of Injury	Gender			Total
	Females	Males	Unknown	
Home	219	262	.	481
Farm	10	24	.	34
Industrial Place and Premises	7	78	.	85
Mine and Quarry	.	2	.	2
Place for Recreation and Sports	51	140	.	191
Steet and Highway	231	381	.	612
Public Building	21	31	1	53
Residential Institution	21	17	.	38
Other Specified Place	41	118	.	159
Unspecified Place	66	149	.	215
Unknown	5	4	.	9
Total	672	1,206	1	1,879

*Eastern Idaho Regional Medical Center, Franklin County Medical Center, Gooding County Memorial Hospital, St. Luke's Magic Valley Regional Medical Center, McCall Memorial Hospital, Mercy Medical Center, Portneuf Medical Center, Saint Alphonsus Regional Medical Center, St. Joseph Regional Medical Center, St. Luke's Regional Medical Center, St. Luke's Regional Medical Center Meridian, St. Luke's Wood River Medical Center

EMERGENCY ROOM DISCHARGE SITE

Discharge status was not reported for 40 percent of cases that were submitted to ITR. For patients with a known discharge site, almost all were either admitted as in-patients or transferred to another general hospital.

ED Discharge Site by Gender

Count of Cases Submitted by ITR Pilot Hospitals

Although more males than females were admitted as in-patients, the percent of patients for each gender who were admitted was equal.

Although more males than females were transferred to another hospital, the percent of patients for each gender who were transferred was almost equal.

EMERGENCY ROOM DISCHARGE SITE BY GENDER

ED Discharge Site by Gender
ITR Pilot Hospitals*
Dates of Injury: May 8, 2006 - December 31, 2006

Discharged to:	Gender			Total
	Females	Males	Unknown	
Admitted	352	627	1	980
Transferred to Another Hospital	44	88	.	132
Other	3	2	.	5
Home	4	5	.	9
Died	.	6	.	6
Unknown	269	478	.	747
Total	672	1,206	1	1,879

*Eastern Idaho Regional Medical Center, Franklin County Medical Center, Gooding County Memorial Hospital, St. Luke's Magic Valley Regional Medical Center, McCall Memorial Hospital, Mercy Medical Center, Portneuf Medical Center, Saint Alphonsus Regional Medical Center, St. Joseph Regional Medical Center, St. Luke's Regional Medical Center, St. Luke's Regional Medical Center Meridian, St. Luke's Wood River Medical Center

HOSPITAL DISCHARGE SITE

Hospital discharge site is a useful proxy for injury outcome since long term follow up studies of trauma patients are not conducted in Idaho. Hospital discharge site was not reported for 16 percent of patients.

Hospital Discharge Site by Gender

Count of Cases Submitted by ITR Pilot Hospitals

For patients whose discharge site was known, 82 percent of males and 72 percent of females were discharged home.

For patients whose discharge site was known, almost one in six was discharged to another hospital, a skilled nursing facility or an intermediate care facility.

HOSPITAL DISCHARGE SITE BY GENDER

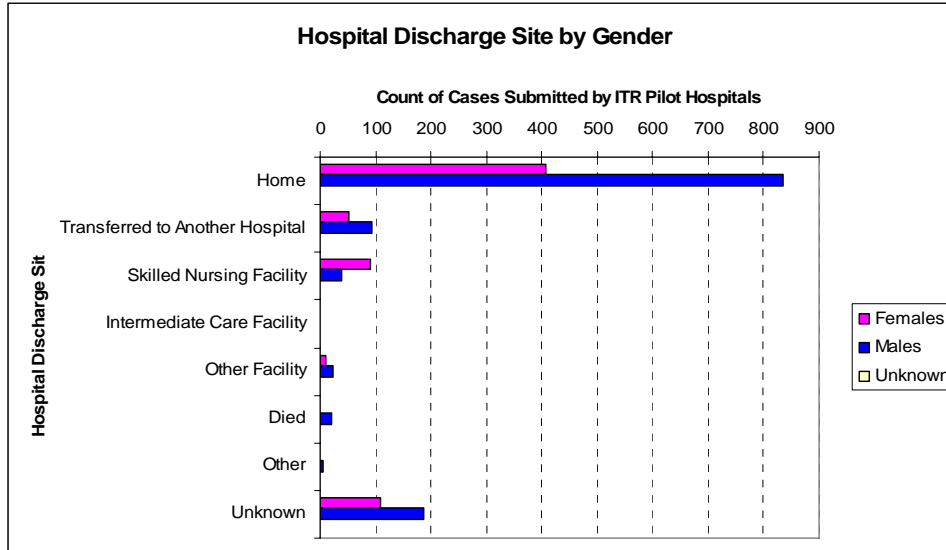Hospital Discharge Site by Gender
ITR Pilot Hospitals*
Dates of Injury: May 8, 2006 - December 31, 2006

Discharged to:	Gender			Total
	Females	Males	Unknown	
Home	406	835	1	1242
Transferred to Another Hospital	51	94	.	145
Skilled Nursing Facility	90	39	.	129
Intermediate Care Facility	1	2	.	3
Other Facility	11	23	.	34
Died	3	22	.	25
Other	2	4	.	6
Unknown	108	187	.	295
Total	672	1,206	1	1,879

*Eastern Idaho Regional Medical Center, Franklin County Medical Center, Gooding County Memorial Hospital, St. Luke's Magic Valley Regional Medical Center, McCall Memorial Hospital, Mercy Medical Center, Portneuf Medical Center, Saint Alphonsus Regional Medical Center, St. Joseph Regional Medical Center, St. Luke's Regional Medical Center, St. Luke's Regional Medical Center Meridian, St. Luke's Wood River Medical Center

Section III
Systems Development

Data Dictionary

The ITR data dictionary contains 147 data items that are collected from hospitals or made available to ITR from EMS Bureau patient care reports, traffic collision reports and death certificates. The TRAC developed an initial list of data items with the philosophy that a minimum number of data items would be collected and that each organization or agency would be responsible for providing the data related to what occurred under their purview. A small number of data items are collected across one or more organizations or agencies for use in linking all records for a given patient and incident.

Definitions for hospital data items also collected by the National Trauma Data Bank (NTDB) are consistent with the NTDB Data Dictionary Version 2.1, the first national standards for data definitions. Idaho was the first state to collect trauma data using the new definitions. Other Idaho variables were defined by EMS, OHS, or Vital Statistics.

Data items collected include: 1) patient demographics; 2) injury cause, geographic location, and time; 3) EMS and emergency room times, assessment, and care; 4) hospital diagnosis and procedures; 6) patient outcomes; and, 7) cost and reimbursement information. The data dictionary is available on-line at: http://www.idahotrauma.org/ReportingSta ndards/Documents/ITRDataDictionary.pdf

Software Vendor Partner

Both the Collector™ and NTRACS software systems used by ITR and hospital based registries are products of Digital Innovation, Inc. (DI). DI has 18 years of experience designing, developing, and supporting medical registry, case management and related database applications used world wide. In 2005, DI was chosen by the American College of Surgeon's Committee on Trauma to provide data management and support services for NTDB.

ITR partnered with DI to: 1) develop a web-based reporting tool (Collector™) compliant with ITR minimum dataset and reporting standards; 2) update hospital based trauma registry software (Collector™ and NTRACS) to comply with ITR minimum dataset and reporting standards; 3) update hospital based software platforms and write data conversion programs to allow exporting of data to ITR and, 3) to develop customized management reports.

Data Quality Improvement

Several systems are in place for quality assurance of data. These include: 1) Collector™ menus with defined reporting options; 2) searchable menus of ICD-9 and E-codes for use when reporting cause of injury, injury diagnosis, and hospital procedures; 3) automatically calculated injury scores; 4) edit checks which flag out-of-range entries; 5) mechanism for automatically coding injuries from text abstracted from patient charts; and, 6) hospitals will be sent a quarterly report that provides feedback on data entry timeliness, completeness, quality, and missing cases from hospitals.

ITR SQL Server

The ITR SQL server hosts the analysis database, data storage and, in the near future, will host a data analysis web application. The SQL server has emergency recovery safeguards and data and network security including firewalls, password protected user access, and protection against viruses and malware.

Technical Assistance

ITR provides initial on-site trauma registrar training to hospital staff. Technical assistance, software manuals, and reporting guidelines are also available by telephone, e-mail, and at www.idahotrauma.org.

Confidentiality

ITR adheres to specific obligations and activities to protect confidential information in accord with HIPAA privacy and security requirements in compliance with 45 CFR § 164.504(e) as well as Idaho Code §57-2006 and §57-2007.

ITR staff sign confidentiality agreements, follow procedures for protecting patient confidentiality, and are subject to penalty if they, through negligence or willful misconduct, disclose confidential data. Trauma data are de-identified and aggregated when used for reports and analysis. Idaho law provides reporting entities protection from damages for disclosing confidential information required for reporting information to the trauma registry. The law does not protect these entities from disclosure of confidential information due to gross negligence or willful misconduct.

Data Linkage

Reported trauma cases will be linked across hospital, pre-hospital patient care reports, traffic collision records, and death certificates to provide a complete record for each case. Data linkage trials were conducted during the pilot project using 2004 data from four Idaho hospitals with hospital based trauma registries, EMS Bureau patient care reports and OHS vehicle collision reports. The trials allowed for the development of linking methodology to include records containing misspellings, transpositions, and missing data when matching records. Matched records are reviewed manually for a final determination of probable matches. Probabilistic linking allows records to be matched across databases containing thousands of records in which data are not always collected using the same data definitions (e.g. injury date mm/dd/yyyy versus collision date mm/dd/yy).

Website

ITR's website (www.idahotrauma.org) has been developed and contains up-to-date information related to reporting guidelines. In the future, standard report generating capabilities and query tools for aggregated de-identified data, and other reports from ITR, will be available.

Pilot Phase

Twelve Idaho hospitals participated in the first year of the ITR pilot project by providing data for cases meeting inclusion criteria. The pilot project allows for testing and refining data definitions, software development, registrar training, and technical assistance systems. At the conclusion of the pilot project, ITR intends to implement statewide reporting of trauma cases meeting inclusion criteria.

IDAHO TRAUMA REGISTRY DATA FLOW

Web Based Data Entry

Export Files in Standard Format

ITR Abstractor

Collect Hospital Trauma Cases

Data Entered in Application Server

Errors Corrected

Automated Edits for Data Validity and Integrity

Data Contains Errors

Data Meets Standards

Linkage Detects Existing Case

Linkage Results in No Match

Consolidate New and Existing Records

New Record Created in Database

QI Feedback Reports

Analysis Database SQL Server

Probabilistic Linking

Office of Highway Safety

EMS Bureau

Vital Statistics

Linkage Detects Existing Hospital Case

Hospital Case Not Reported by EMS, OHS, VS

Record Updated with Additional Data Elements

Analysis Database SQL Server

QI Feedback Reports

Data Useable for Analysis and Research

Aggregate Data on Searchable Web-Based Query System

Aggregate Data in Standard Report Form

Aggregate Data in Ad Hoc Report Format

De-Identified Data to NTDB

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APPENDIX A