New York State Trauma Registry

Statistical Summary Report 2010-2013

New York State Department of Health
Office of Primary Care and Health System Management

September, 2015

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Executive Summary

Introduction

The purpose of this report is to present summary statistics of trauma-related injuries and outcomes of the care provided in the 40 trauma centers designated in New York State for the years 2010-2013. Trauma clinicians, administrators and policy makers may use this report to identify important areas and issues for enhancing systems development and clinical quality improvement; the public may use this report to learn more about the trauma system in New York. As trauma centers in New York State transition to the standards of the American College of Surgeons Committee on Trauma, and additional levels of trauma center are added to the State system, this report will serve as a baseline for measuring improvements in outcome and injury prevention.

Data Sources

The New York State Trauma Registry serves as the data source. Trauma patients identified as being moderately to severely injured (Inclusion Criteria in Appendix 84) and discharged from the New York State designated trauma centers during 2010-2013 were included.

Summary of Results

For the discharge years 2010-2013, the New York State Trauma Registry received a total of 69,657 trauma cases submitted by the 40 trauma centers across the state. The key findings are:

- Annually, there were an average of 17,414 trauma incidents with a 6.63% case fatality rate. The trauma incidence and case fatality rate increased with patient's age.
- Males had statistically significant higher trauma incidence and case fatality rate than females, particularly for patients aged 17-55; black people aged 17-35 years had statistically significant higher trauma incidence and case fatality rate compared to white people.
- Private health insurance was the primary payer for 49.6% of all trauma incidents and for 80.0% of injuries due to motor vehicle accidents. Medicare was the primary payer for 50.0% of injuries due to fall; Worker's Compensation was the primary payer for 54.0% of the machinery injuries.

- The leading causes of trauma were falls (45.0%) and motor vehicle accidents (30.5%), these were also the leading causes of trauma death, followed by firearm trauma. Fire, suffocation, and firearm trauma had the highest case fatality rates, 23.1%, 21.4%, and 14.0% respectively.
- 61% of trauma patients had emergency medical services (EMS) response time within 8 minutes; 94% had response time within 30 minutes; and 98% had response time within 60 minutes. The median transport time to trauma and non-trauma centers were 16 minutes and 19 minutes, respectively.
- Adult trauma patients were taken directly to an appropriate trauma center in 82% of cases, approaching 95% for very severe trauma. Pediatric trauma patients however where taken to an appropriate trauma center in only 51% of reported cases.
- The risk adjusted case fatality rate among trauma patients residing in Central New York region (7.3%) was statistically significantly higher than the statewide rate (6.5%); while trauma patients residing in Northern and Western New York regions had statistically significantly lower adjusted fatality rates (5.6% for Northern, 5.8% for Western New York).
- Trauma centers with an adult only designation had a significantly higher risk adjusted case fatality rate than trauma centers with a pediatric or dual desigantion.
- Compared to the national estimates (National Trauma Data Bank), the 2013 trauma case fatality rate in New York was significantly higher among trauma patients 75 year of age or older with an injury severity score greater than 24.

Acknowledgement

The State Health Department would like to thank: the New York Trauma Center program staff and the Bureau of Emergency Medical Services and Trauma Systems program manager of the Office of Primary Care and Health System Management (OPCHSM) who have worked diligently to provide the data utilized in this report, the NYSDOH Bureau of Occupational Health and Injury Prevention for the injury statistics (Appendix), and the Data Management, Analysis and Research Group of the OPCHSM who created the trauma registy and performed the descriptive and predictive statistical analyses to generate the tables and figures presented in this report.

Facility Information

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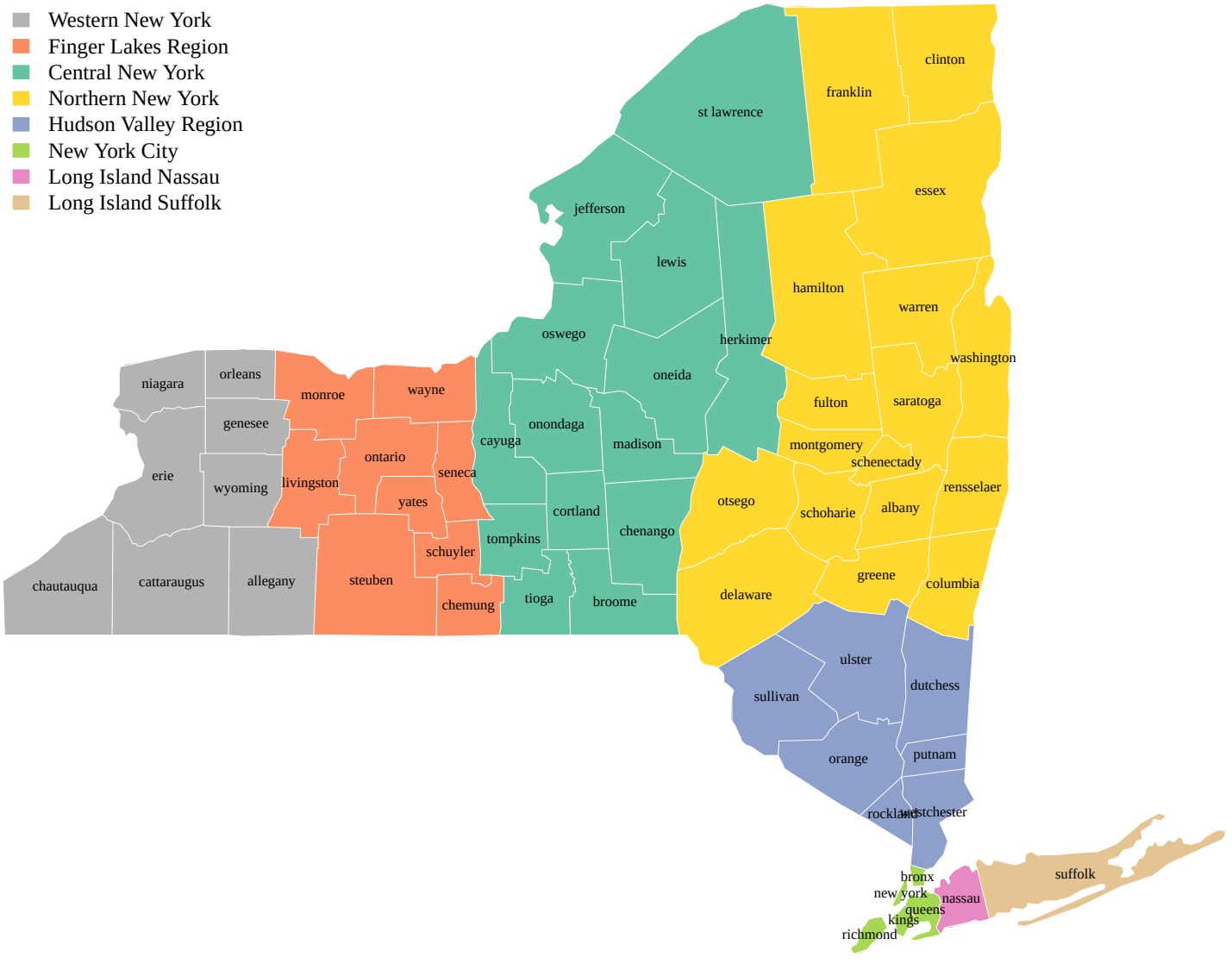
New York Trauma Regions



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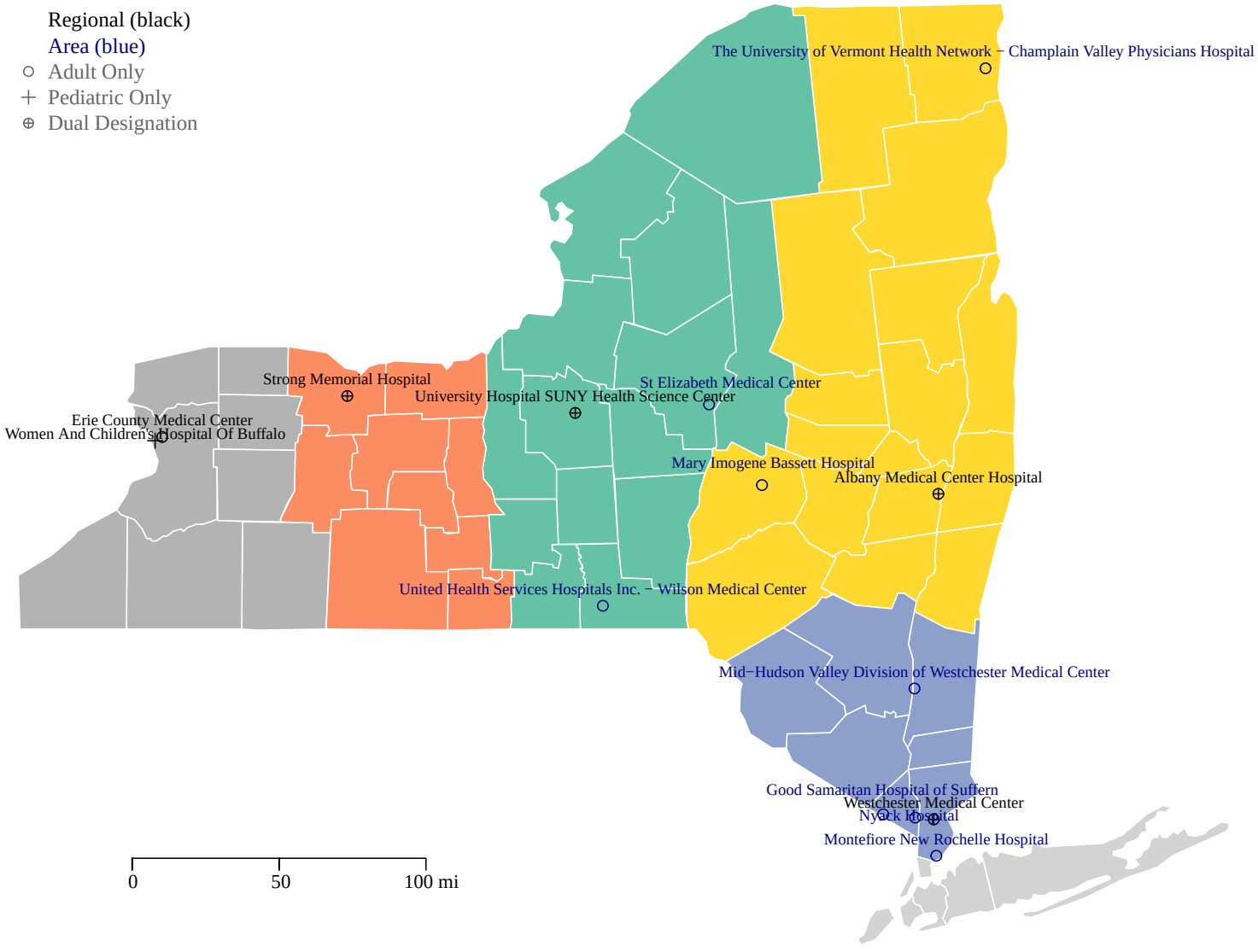
Geographic Distribution of Upstate New York Trauma Centers



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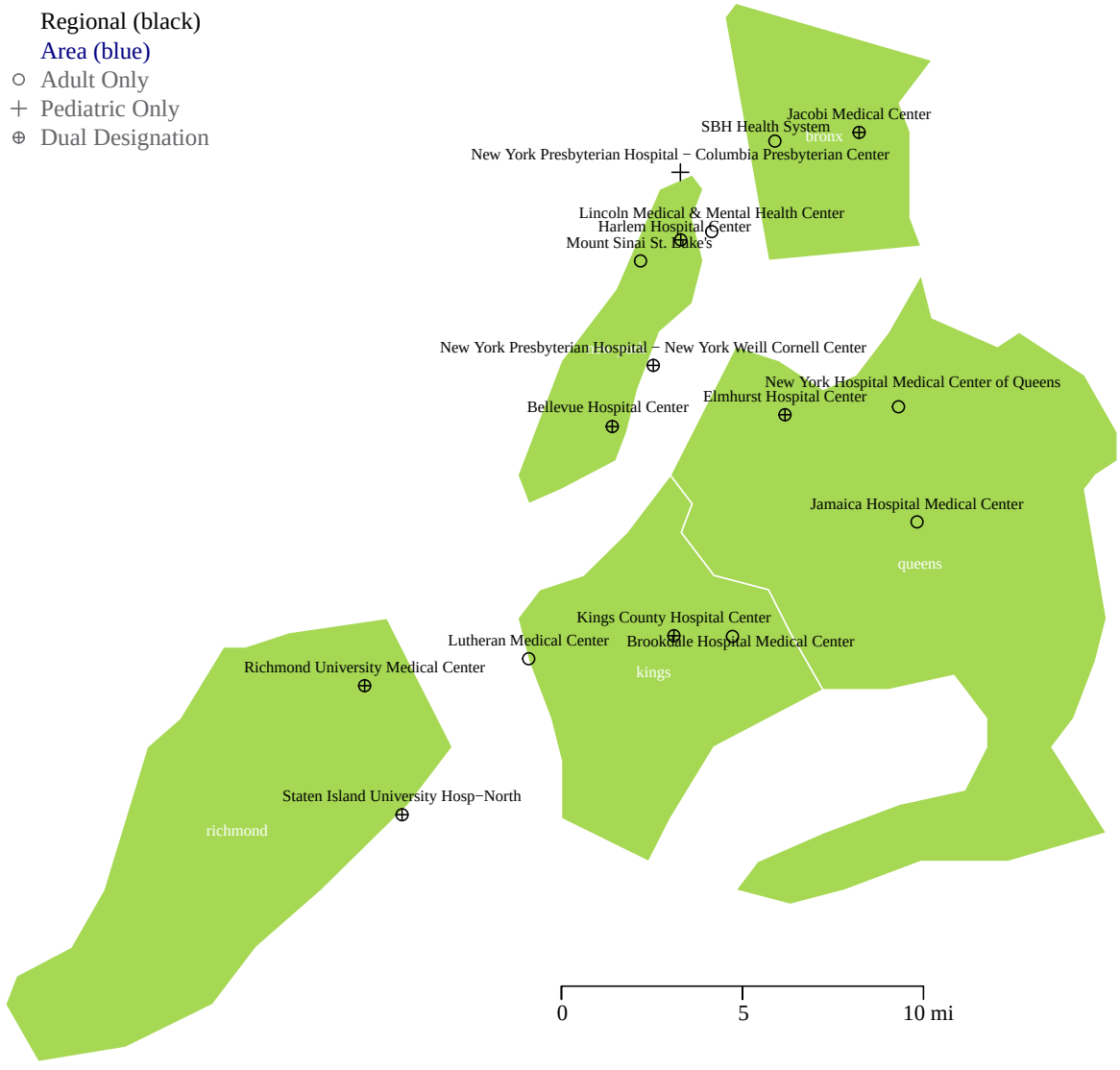
Geographic Distribution of New York City Trauma Centers



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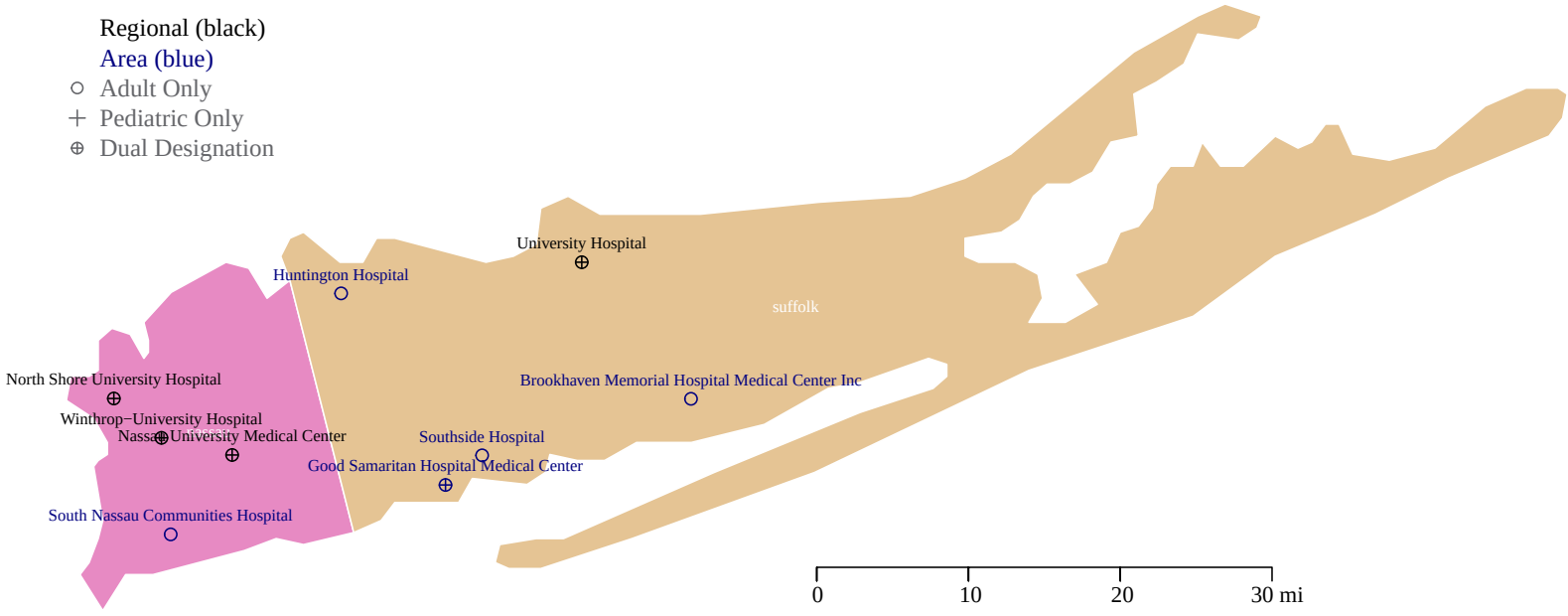
Geographic Distribution of Long Island Trauma Centers



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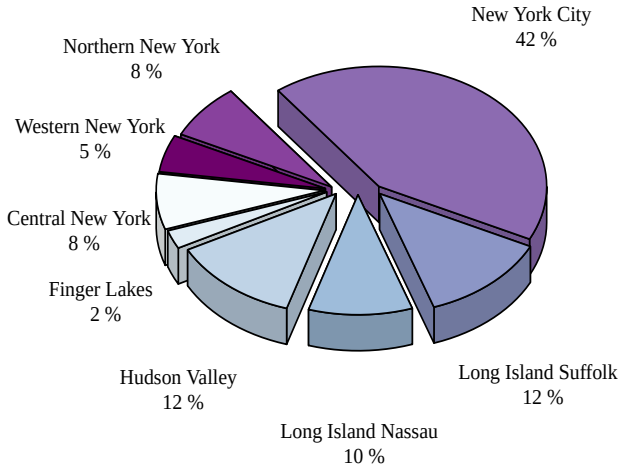
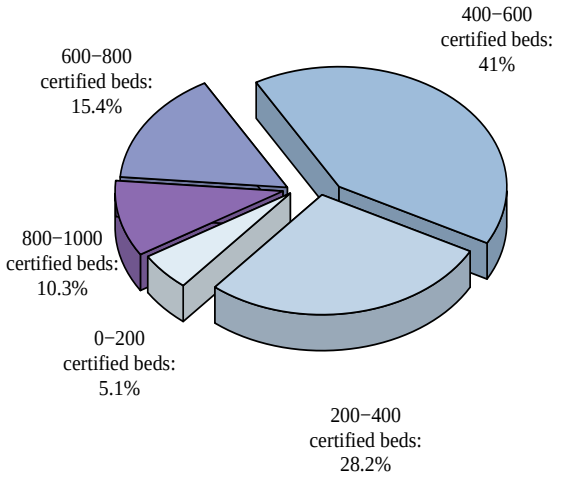
Types of Trauma Centers By Region

Trauma Region	Total Trauma Centers	Area Trauma Centers	Regional Trauma Centers	Dual Designation Trauma Centers	Adult Only Trauma Centers	Pediatric Only Trauma Centers
Central New York	3 (8%)	2	1	1	2	0
Finger Lakes	1 (2%)	0	1	1	0	0
Hudson Valley	5 (12%)	4	1	1	4	0
Long Island Nassau	4 (10%)	1	3	3	1	0
Long Island Suffolk	5 (12%)	4	1	2	3	0
New York City	17 (42%)	0	17	8	7	2
Northern New York	3 (8%)	2	1	1	2	0
Western New York	2 (5%)	0	2	0	1	1
All Regions	40 (100%)	13	27	17	20	3

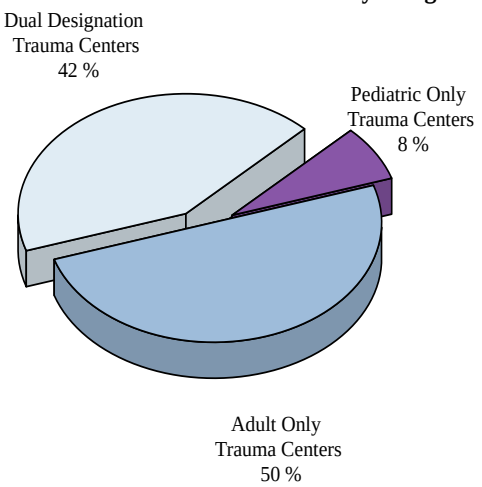
Distribution of New York Trauma Centers by Region



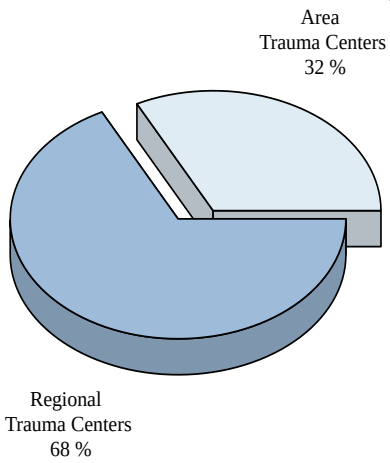
Distribution of New York Trauma Centers by Number of Certified Beds



Distribution of New York Trauma Centers by Designation



Distribution of New York Trauma Centers by Type



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New York City Trauma Center Case Loads

Facility	Adult Trauma Cases 2010	Adult Trauma Cases 2011	Adult Trauma Cases 2012	Adult Trauma Cases 2013	Pediatric Trauma Cases 2010	Pediatric Trauma Cases 2011	Pediatric Trauma Cases 2012	Pediatric Trauma Cases 2013	Type	Designation
Bellevue Hospital Center	460	521	394	53	29	26	10	5	Regional	DualDesig
Brookdale Hospital Medical Center	373	327	316	208	44	33	27	11	Regional	AdultOnly
Elmhurst Hospital Center	570	529	526	396	44	53	33	28	Regional	DualDesig
Harlem Hospital Center	199	216	198	144	19	9	7	9	Regional	DualDesig
Jacobi Medical Center	535	446	524	405	47	41	43	35	Regional	DualDesig
Jamaica Hospital Medical Center	363	312	206	344	16	2	0	0	Regional	AdultOnly
Kings County Hospital Center	486	484	497	493	34	24	14	19	Regional	DualDesig
Lincoln Medical & Mental Health Center	378	366	303	138	9	20	21	12	Regional	AdultOnly
Lutheran Medical Center	493	439	473	576	12	5	7	6	Regional	AdultOnly
New York Hospital Medical Center of Queens	475	431	427	446	17	8	5	11	Regional	AdultOnly
New York Presbyterian Hospital Columbia Presbyterian Center	9	10	7	8	66	66	52	42	Regional	Pediatric
New York Presbyterian Hospital New York Weill Cornell Center	420	361	272	284	90	48	28	33	Regional	DualDesig
Richmond University Medical Center	174	161	104	138	17	20	10	11	Regional	DualDesig
St Barnabas Hospital	373	265	300	244	8	8	4	4	Regional	AdultOnly
St Lukes Roosevelt Hospital St Lukes Hospital Division	218	151	196	182	7	6	1	1	Regional	AdultOnly
Staten Island University Hosp North	321	335	389	498	20	16	24	21	Regional	DualDesig
Steven & Alexandra Cohen Children's Medical Center	39	32	41	16	152	178	203	163	Regional	Pediatric

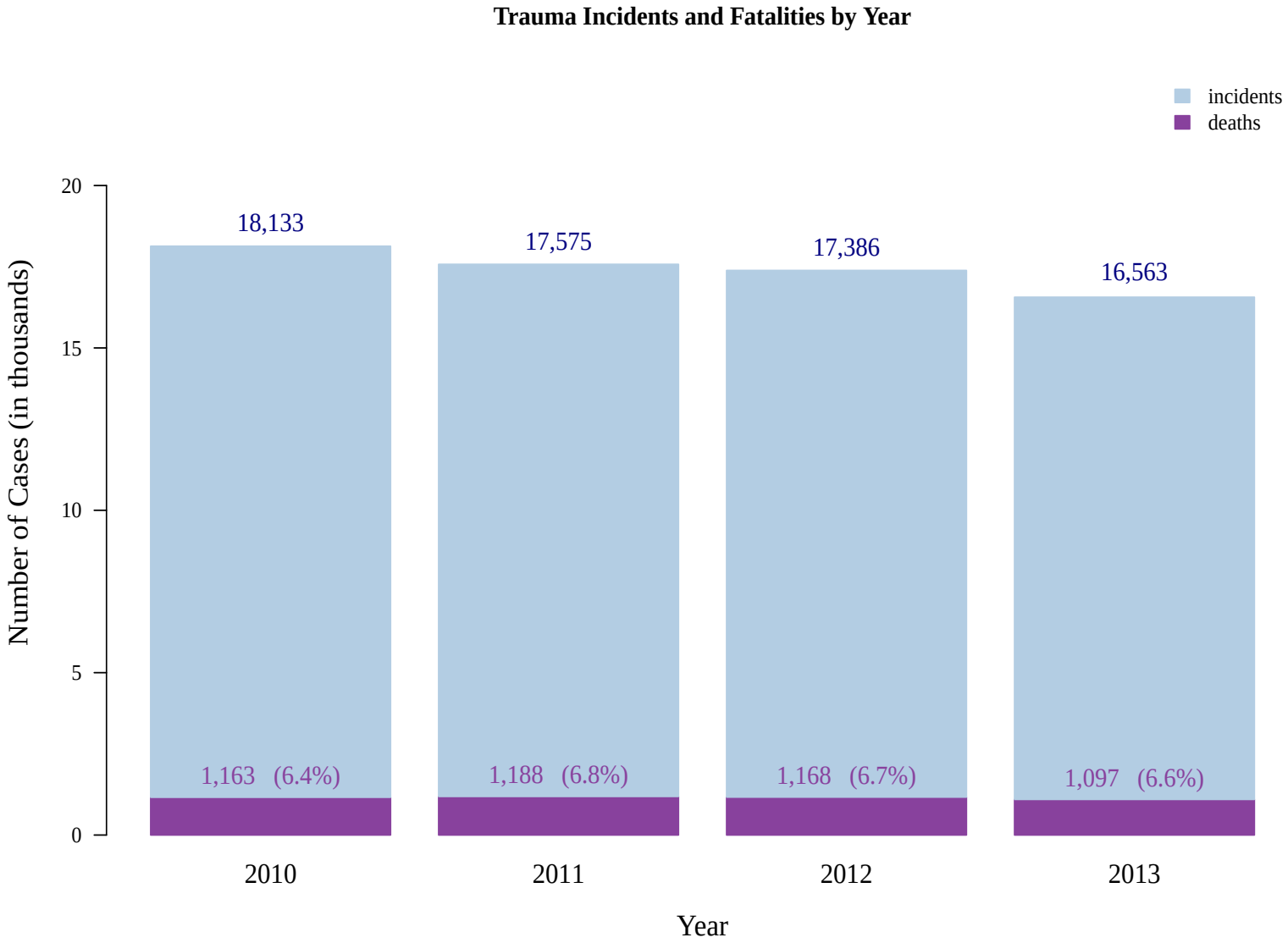
Long Island Trauma Center Case Loads

Facility	Adult Trauma Cases 2010	Adult Trauma Cases 2011	Adult Trauma Cases 2012	Adult Trauma Cases 2013	Pediatric Trauma Cases 2010	Pediatric Trauma Cases 2011	Pediatric Trauma Cases 2012	Pediatric Trauma Cases 2013	Type	Designation
Brookhaven Memorial Hospital Medical Center Inc	308	280	263	271	2	5	0	0	Area	AdultOnly
Good Samaritan Hospital Medical Center	303	351	309	330	34	29	36	18	Area	DualDesig
Huntington Hospital	286	280	222	274	2	2	3	0	Area	AdultOnly
Nassau University Medical Center	486	336	440	306	19	11	10	12	Regional	DualDesig
North Shore University Hospital	795	813	706	823	7	9	8	5	Regional	DualDesig
South Nassau Communities Hospital	276	239	193	297	0	4	3	4	Area	AdultOnly
Southside Hospital	262	273	243	292	2	2	1	8	Area	AdultOnly
University Hospital	781	732	727	715	74	82	74	60	Regional	DualDesig
Winthrop University Hospital	471	429	432	421	43	30	36	31	Regional	DualDesig

Upstate Trauma Center Case Loads

Facility	Adult Trauma Cases 2010	Adult Trauma Cases 2011	Adult Trauma Cases 2012	Adult Trauma Cases 2013	Pediatric Trauma Cases 2010	Pediatric Trauma Cases 2011	Pediatric Trauma Cases 2012	Pediatric Trauma Cases 2013	Type	Designation
Albany Medical Center Hospital	1241	1201	1253	1393	108	128	148	155	Regional	DualDesig
Champlain Valley Physicians Hospital Medical Center	75	41	122	91	4	0	3	4	Area	AdultOnly
Erie County Medical Center	874	996	1142	1140	2	3	4	2	Regional	AdultOnly
Good Samaritan Hospital of Suffern	88	91	134	80	0	0	1	0	Area	AdultOnly
Mary Imogene Bassett Hospital	154	138	124	95	6	7	6	3	Area	AdultOnly
Nyack Hospital	143	225	258	245	7	21	26	24	Area	AdultOnly
Sound Shore Medical Center of Westchester	33	23	36	33	1	0	1	0	Area	AdultOnly
St Elizabeth Medical Center	196	225	153	96	5	9	1	2	Area	AdultOnly
St Francis Hospital Poughkeepsie	389	409	331	347	14	6	4	12	Area	AdultOnly
Strong Memorial Hospital	1090	1123	1143	1017	122	122	92	93	Regional	DualDesig
United Health Services Hospitals Inc Wilson Hospital Division	358	445	369	333	18	24	21	12	Area	AdultOnly
University Hospital SUNY Health Science Center	976	980	1042	1059	158	124	144	139	Regional	DualDesig
Westchester Medical Center	973	958	1060	990	210	196	162	156	Regional	DualDesig
Women And Children's Hospital Of Buffalo	26	27	23	27	190	191	212	163	Regional	Pediatric

Patient Characteristics



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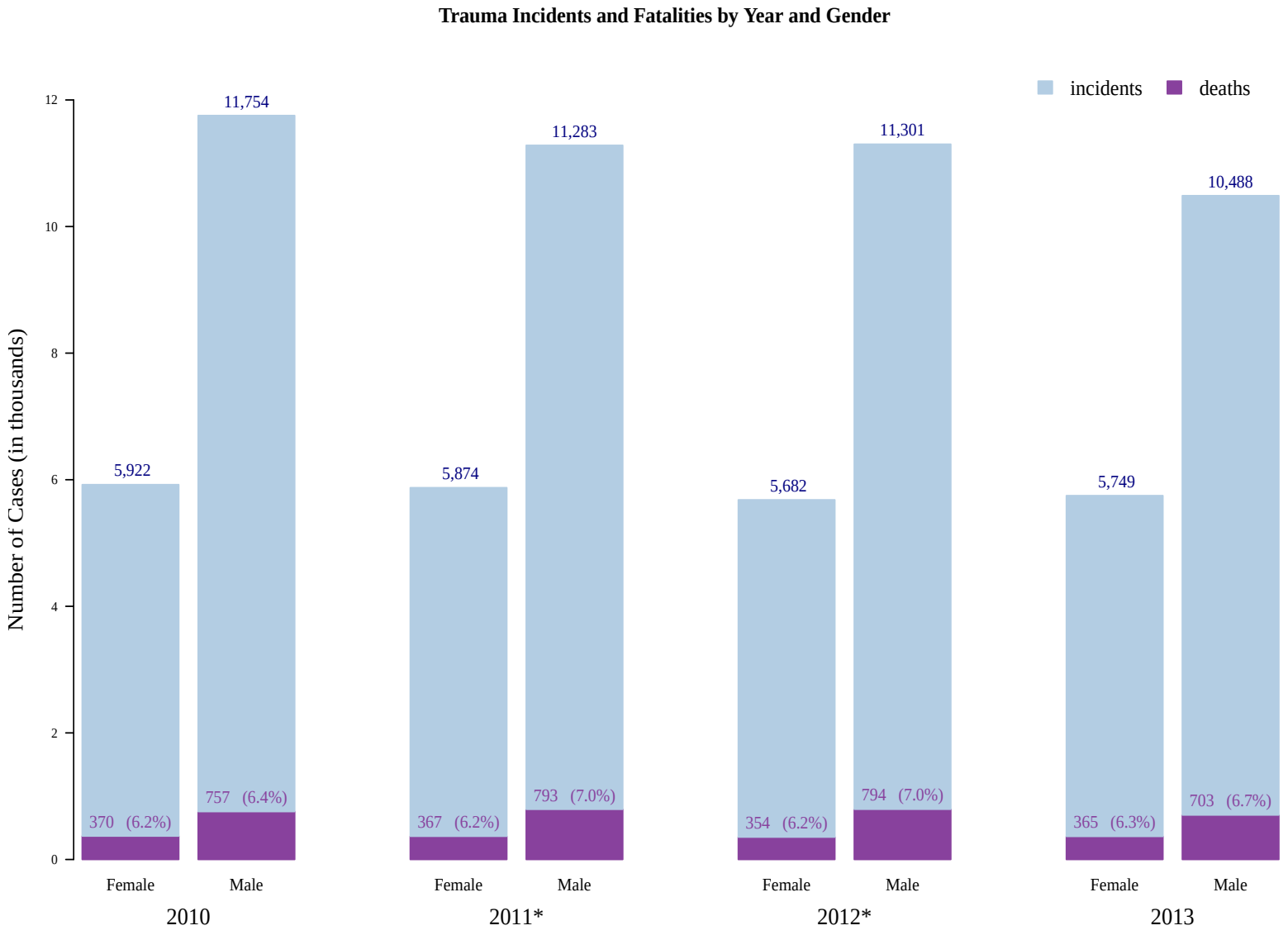

Astrix (*) indicates a statistically significant difference in case falalities between males and females with 95% confidence.For the combined four year period there was a statistically significant difference in case fatality rates of males and females (6.8% and 6.2% respectively) with 99% confidence.

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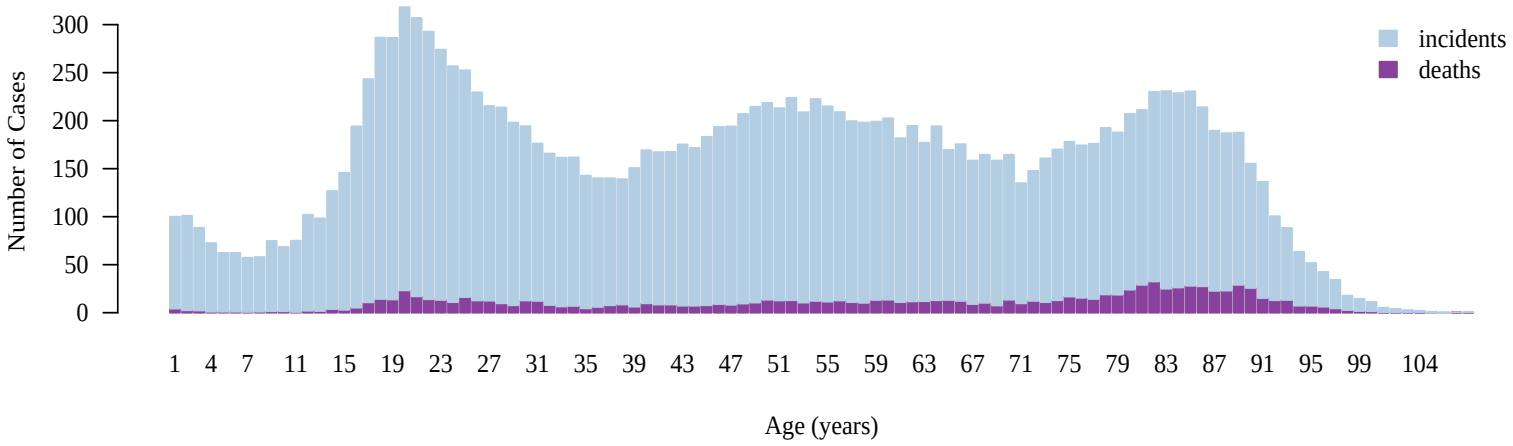
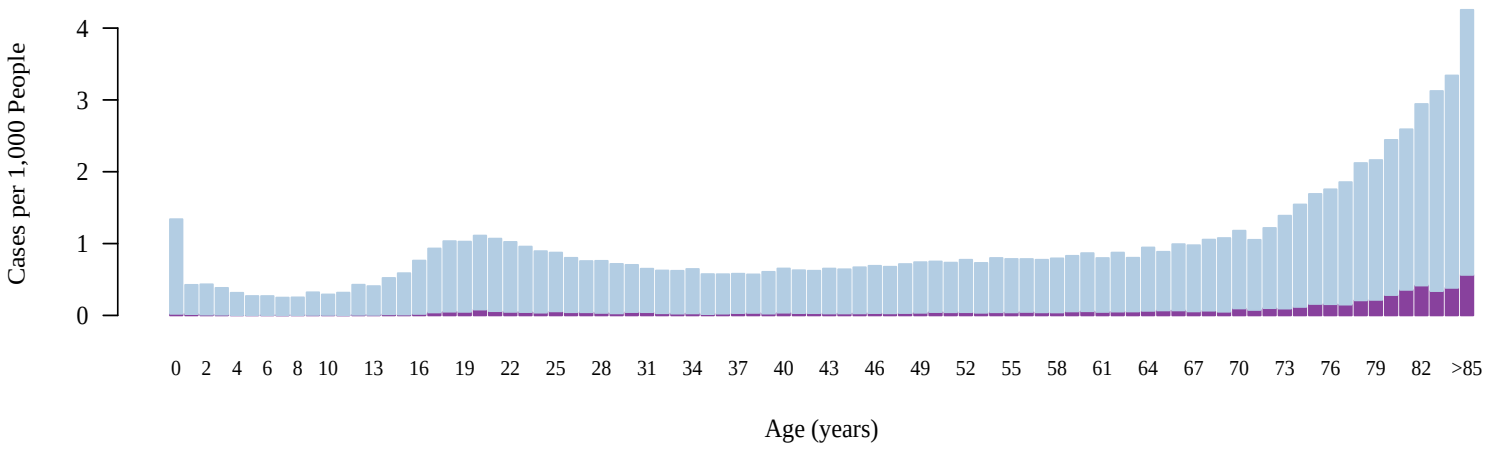
Average Annual Trauma Incidents and Fatalities by Age



Average Annual Trauma Incidence and Mortality by Age



Population data source: Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute.

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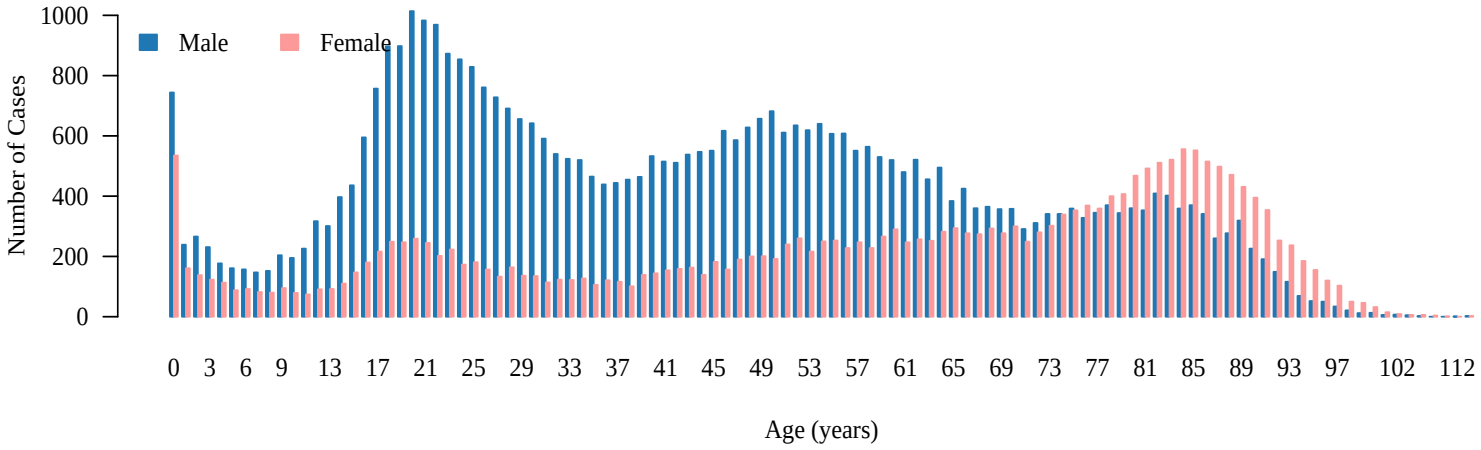
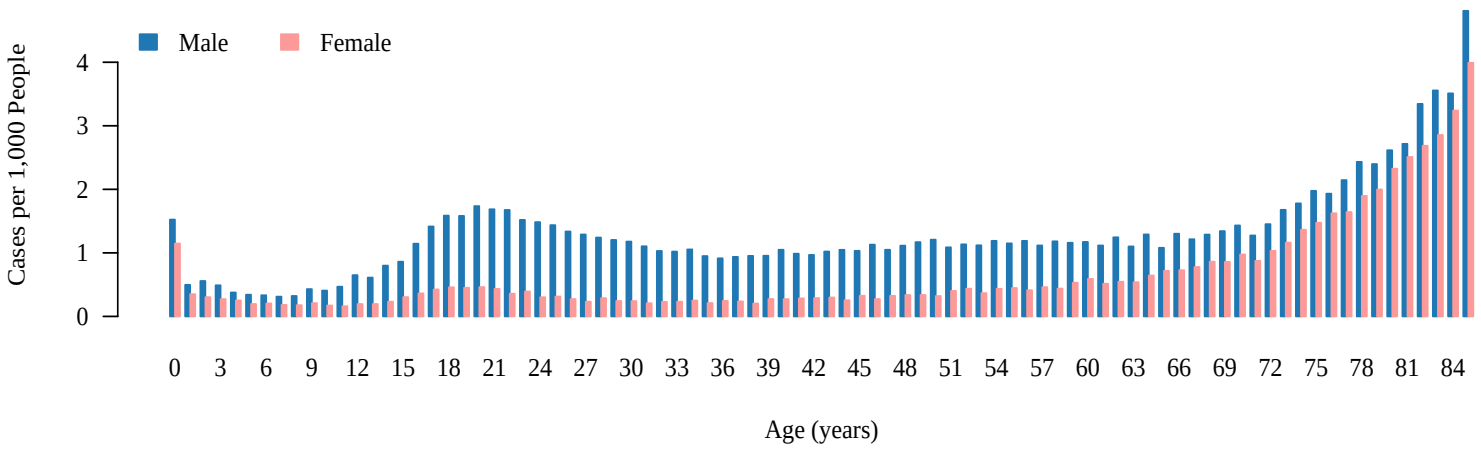
Average Annual Trauma Incidents by Gender and Age



Average Annual Trauma Incidence by Gender and Age



Population data source: Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute.

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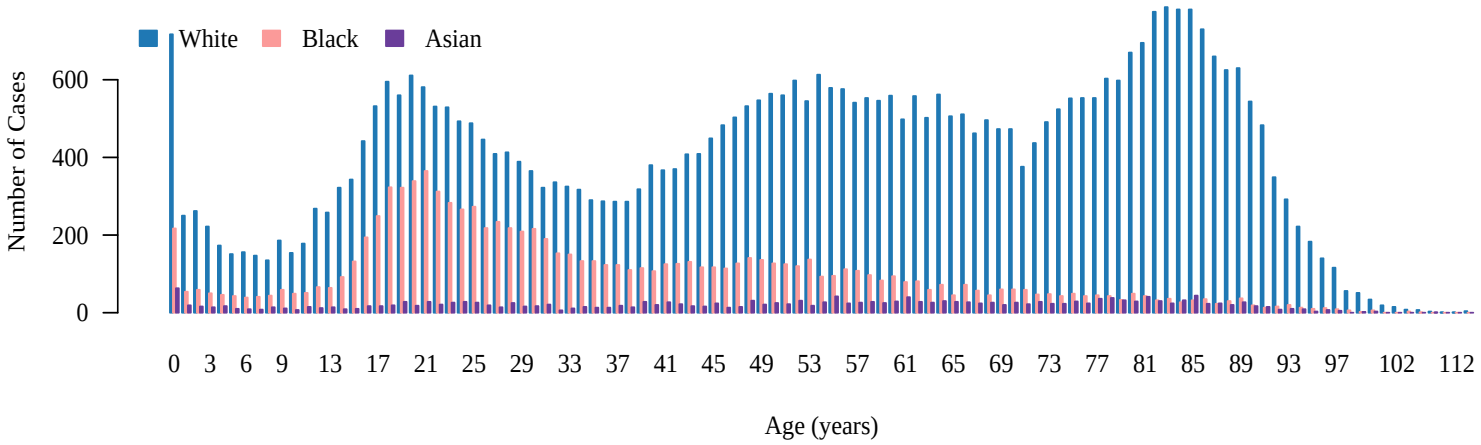
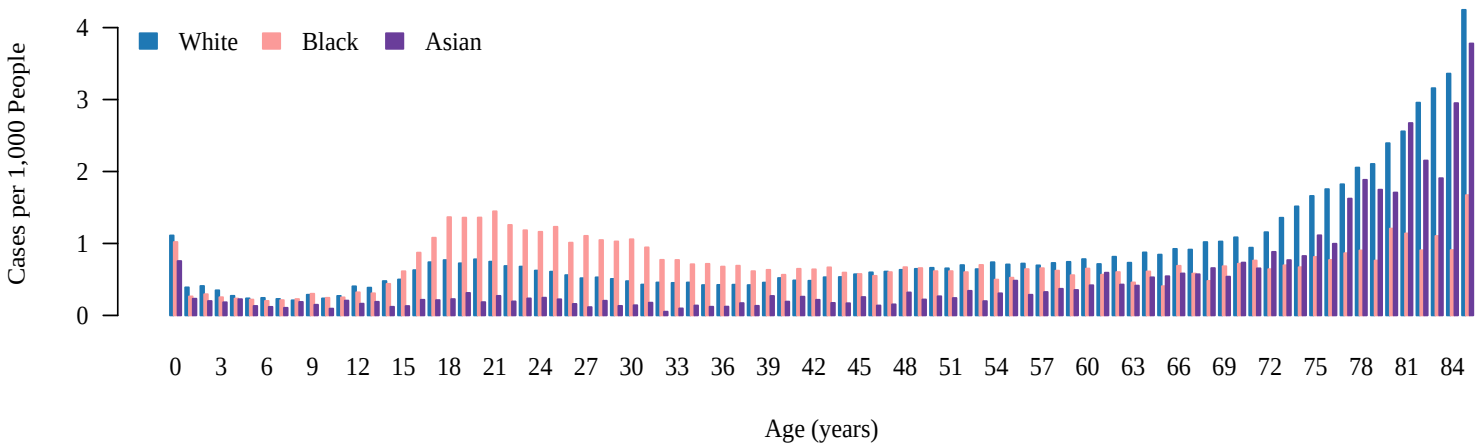
Average Annual Trauma Incidents by Race and Age



Average Annual Trauma Incidence by Race and Age



Population data source: Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute.

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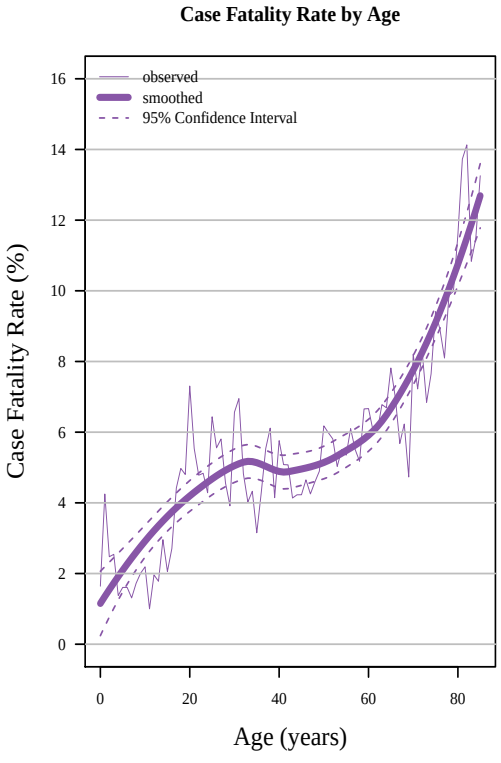

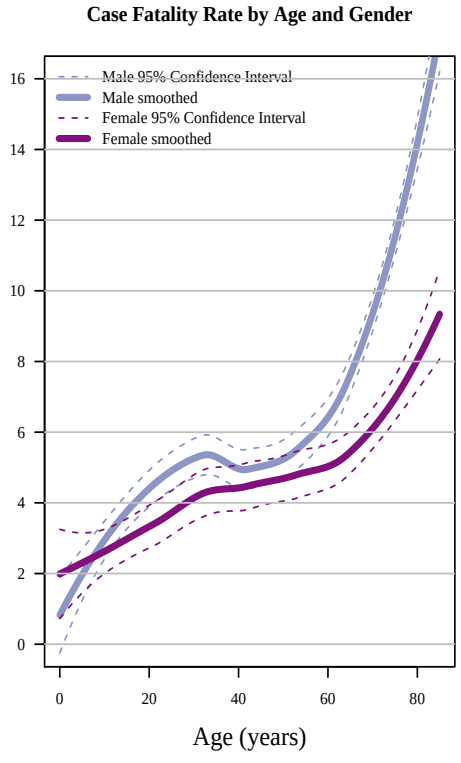

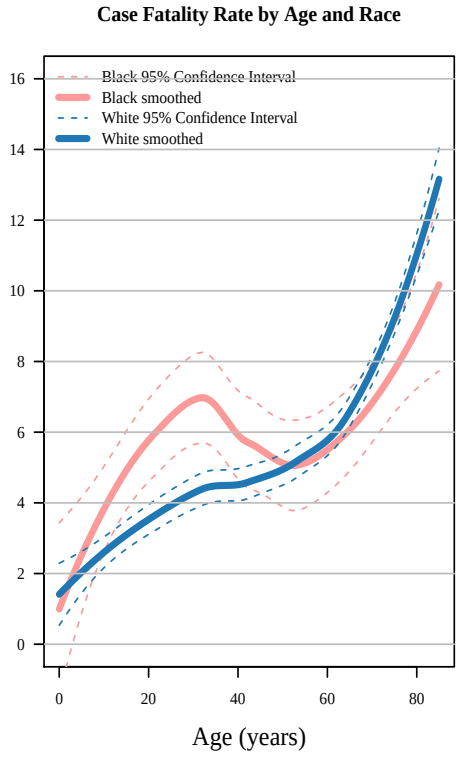

Smoothed using a local regression algorithm (LOESS) weighting each point by number of incidents.

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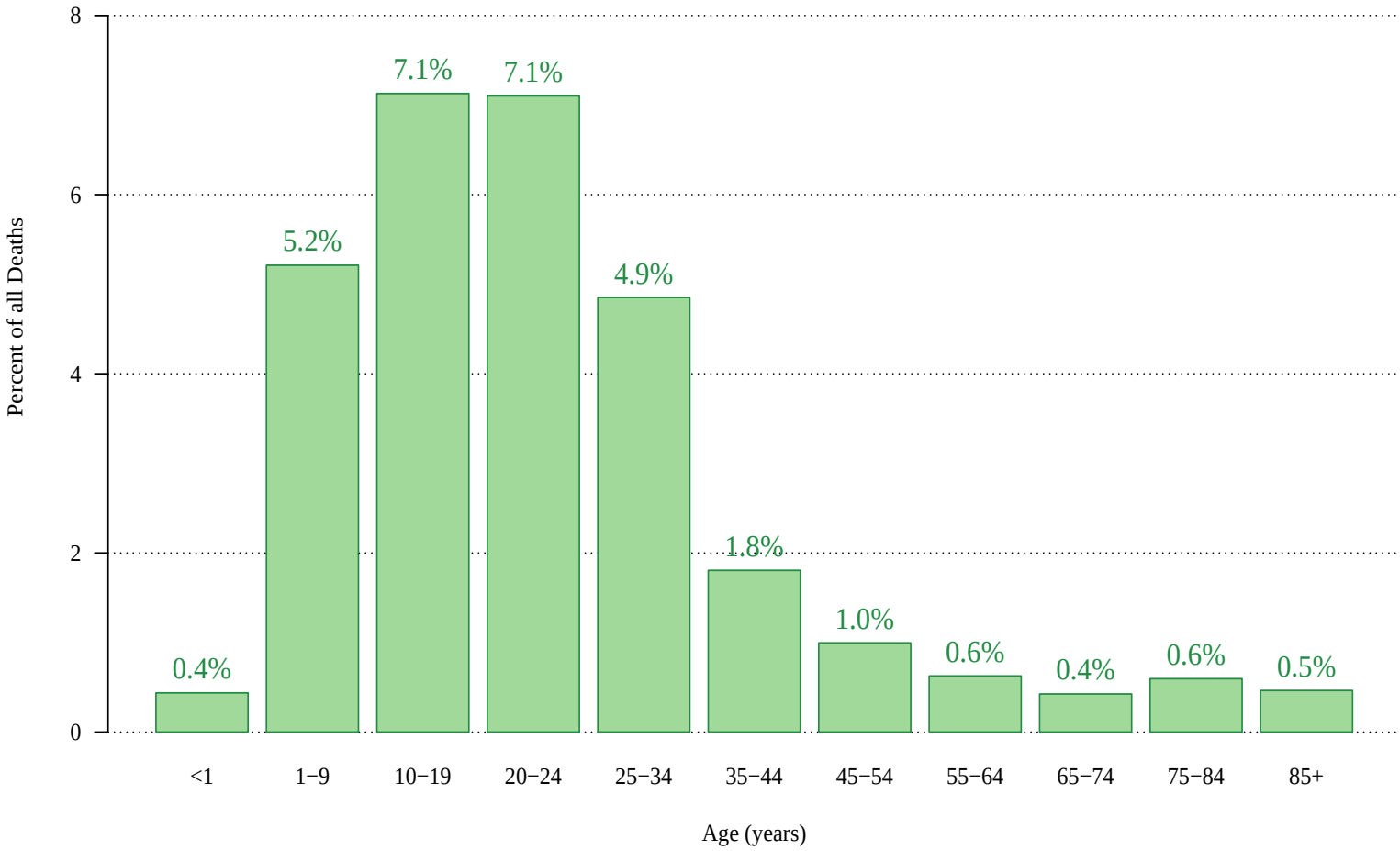
Trauma Registry Deaths as a Percent of All New York State Deaths in 2013 by Age
(NYS residents only)



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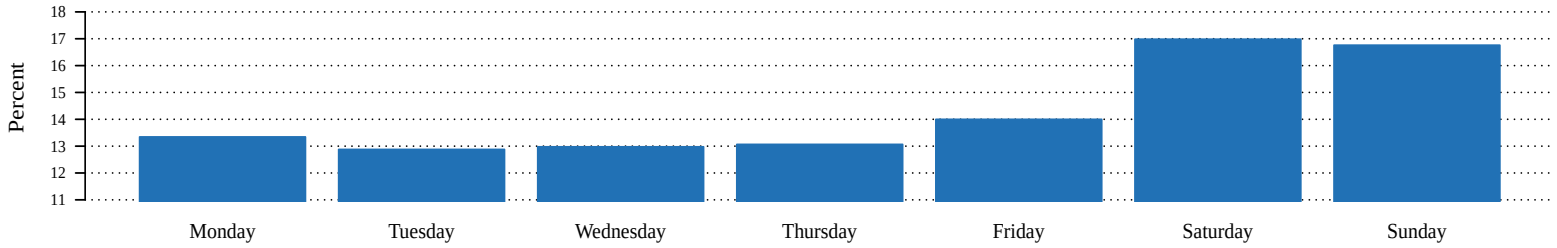
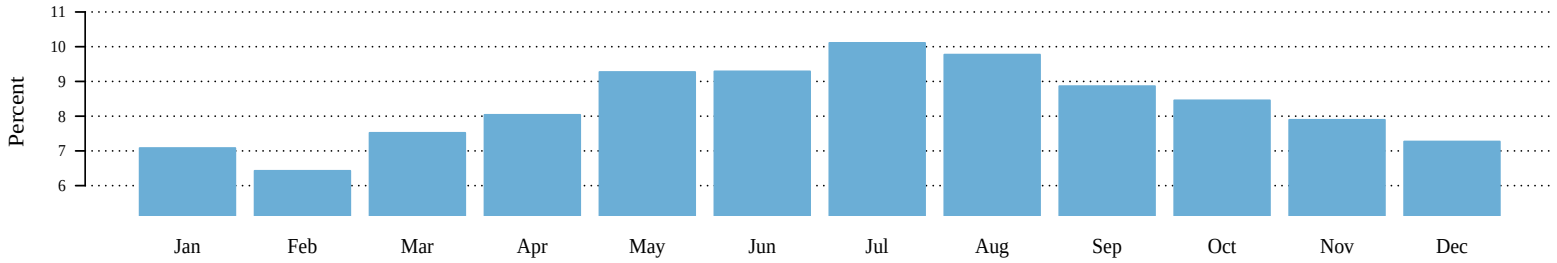
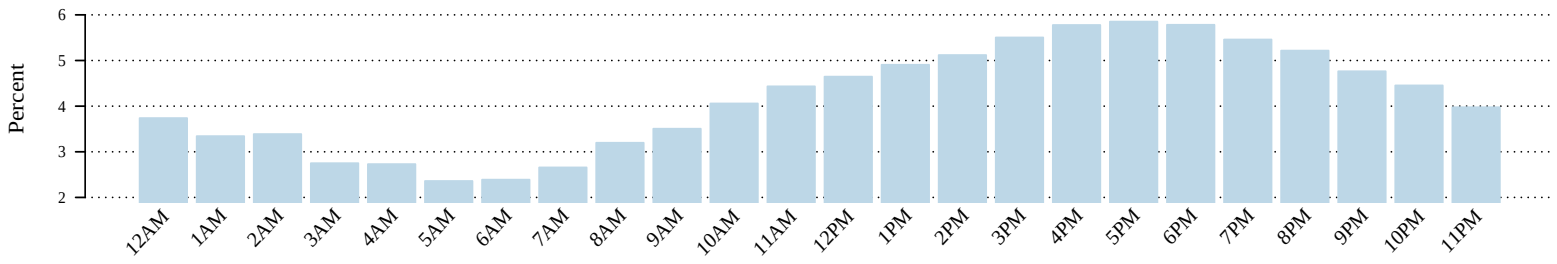
Percent of Trauma Occurrences by Day of the Week



Percent of Trauma Occurrences by Month of the Year



Percent of Trauma Occurrences by Time of the Day



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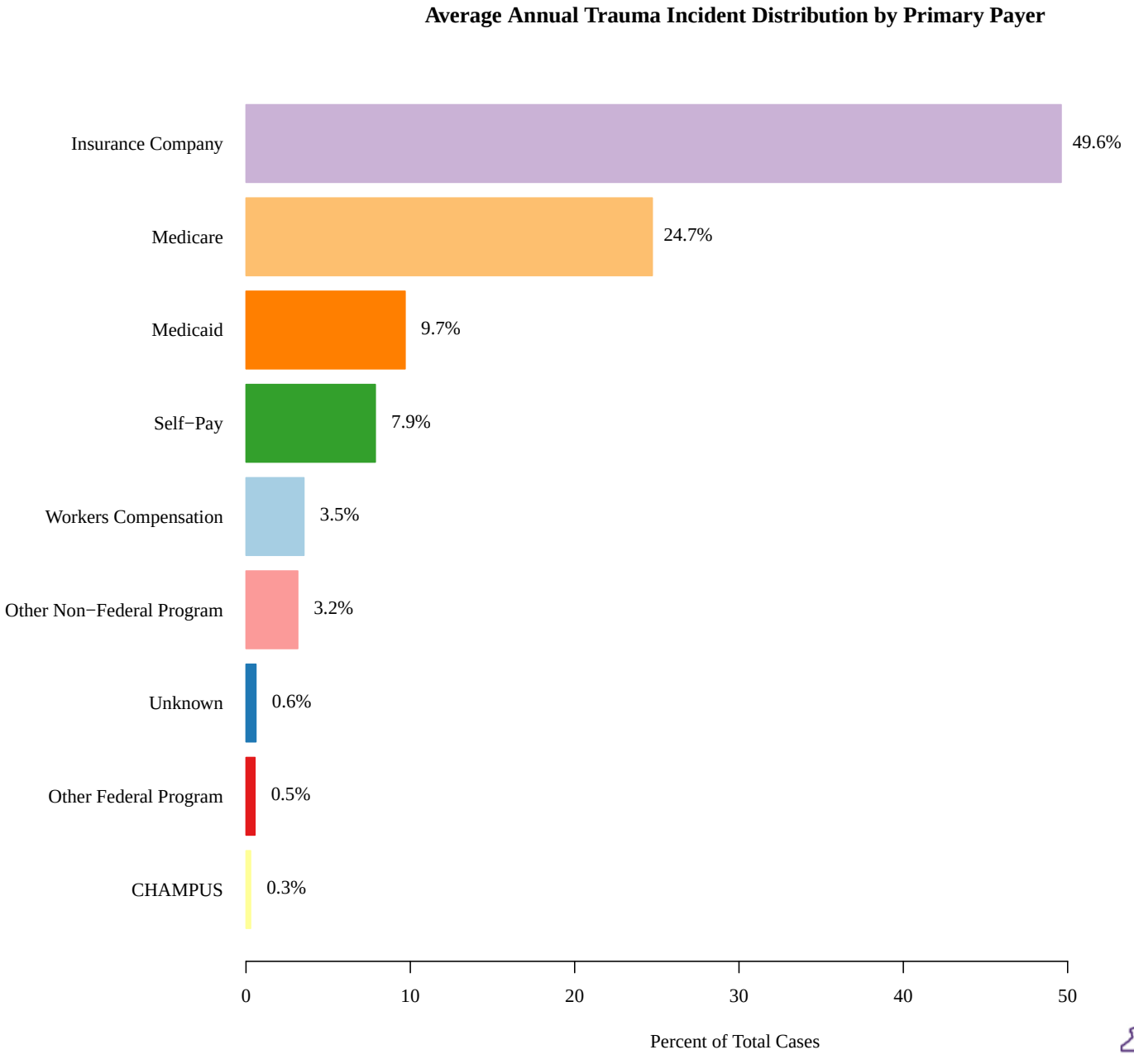

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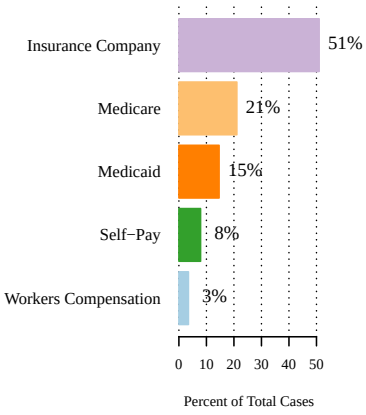
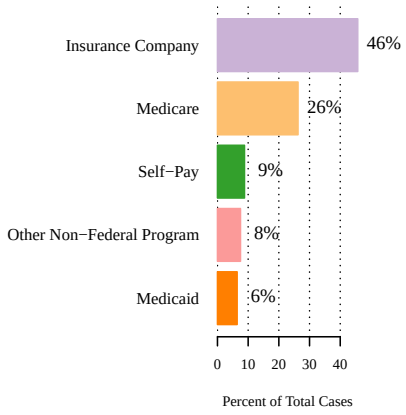
Payer Types by Region

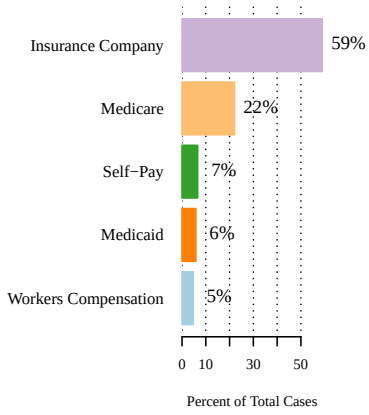
Finger Lakes Region



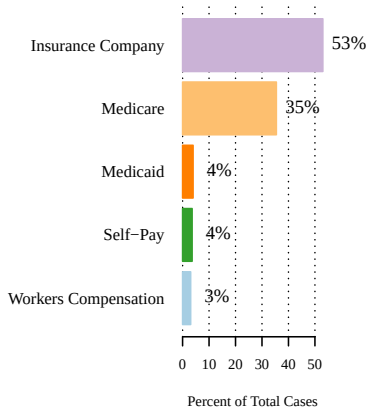
Central New York



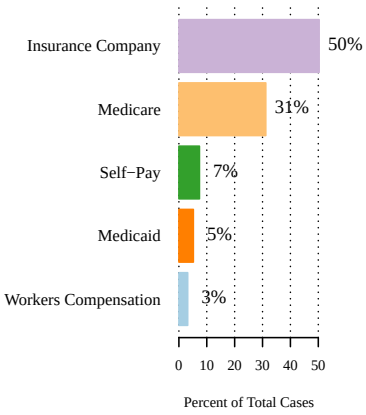
Hudson Valley Region



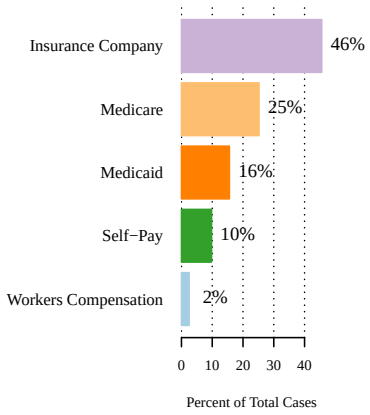
Long Island Nassau



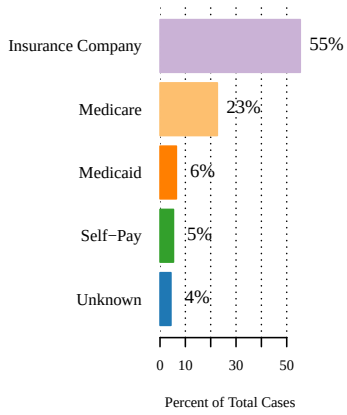
Long Island Suffolk



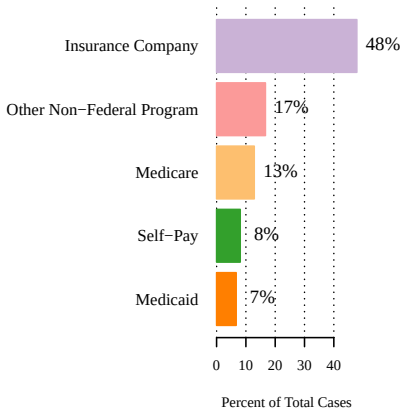
New York City



Northern New York



Western New York



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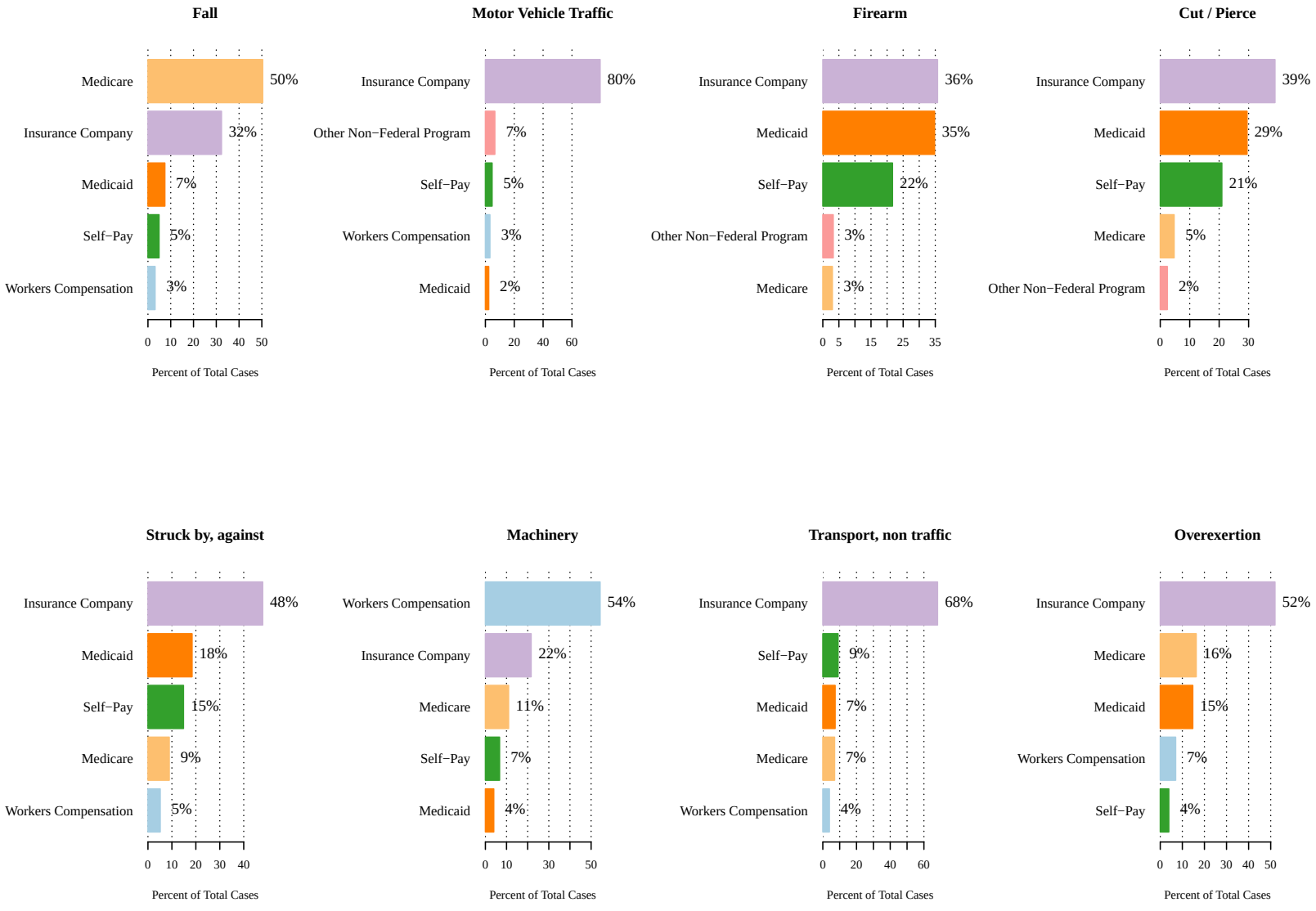
Payer Types by Mechanism of Trauma



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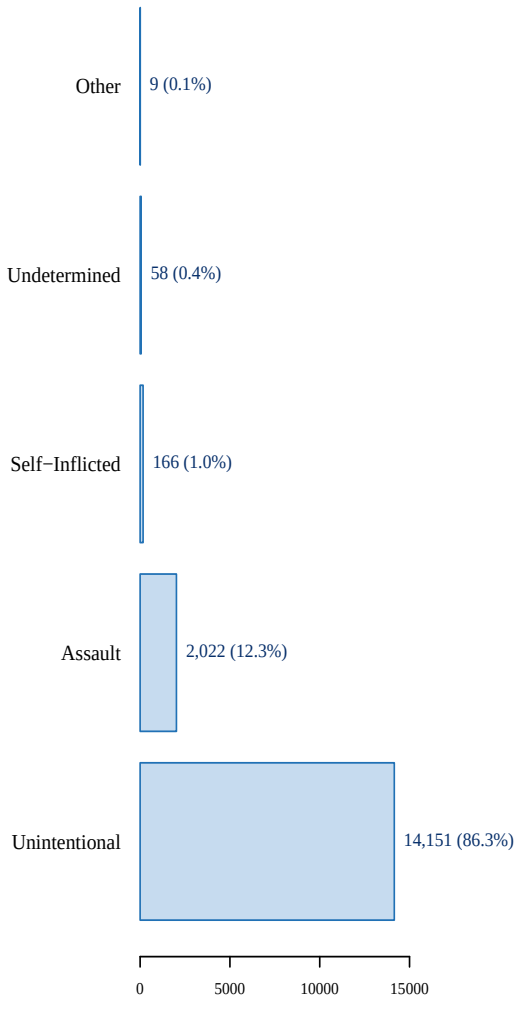
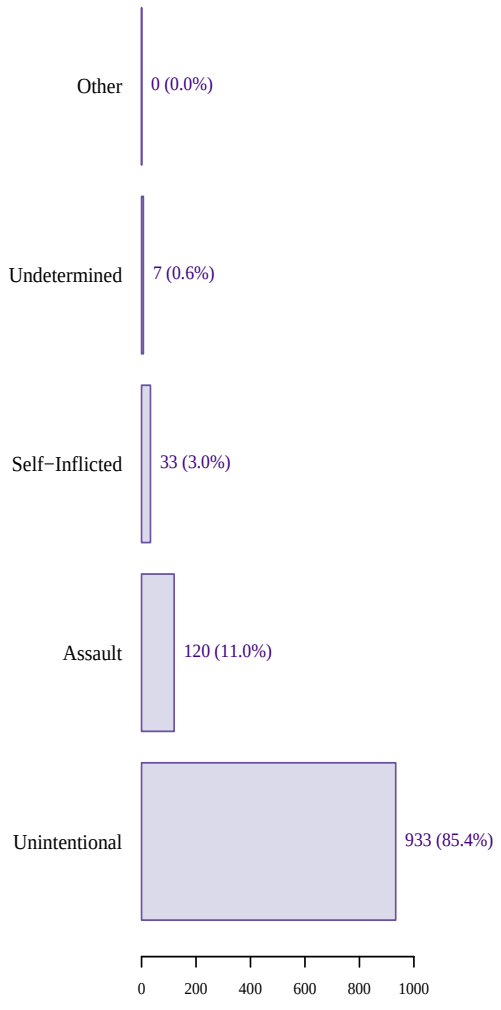
Injury Characteristics

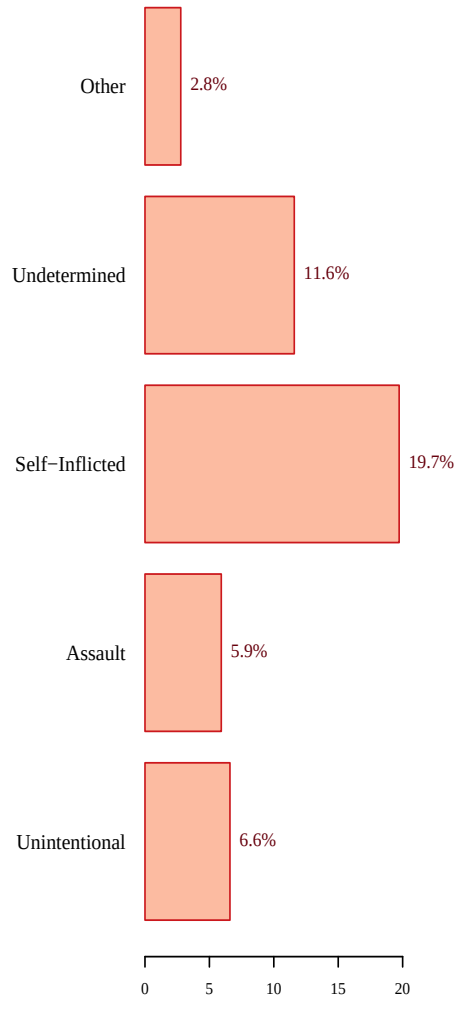
Average Annual Trauma Incidents by Intention of Injury



Average Annual Trauma Fatalities by Intention of Injury



Case Fatality Rate by Intention of Injury



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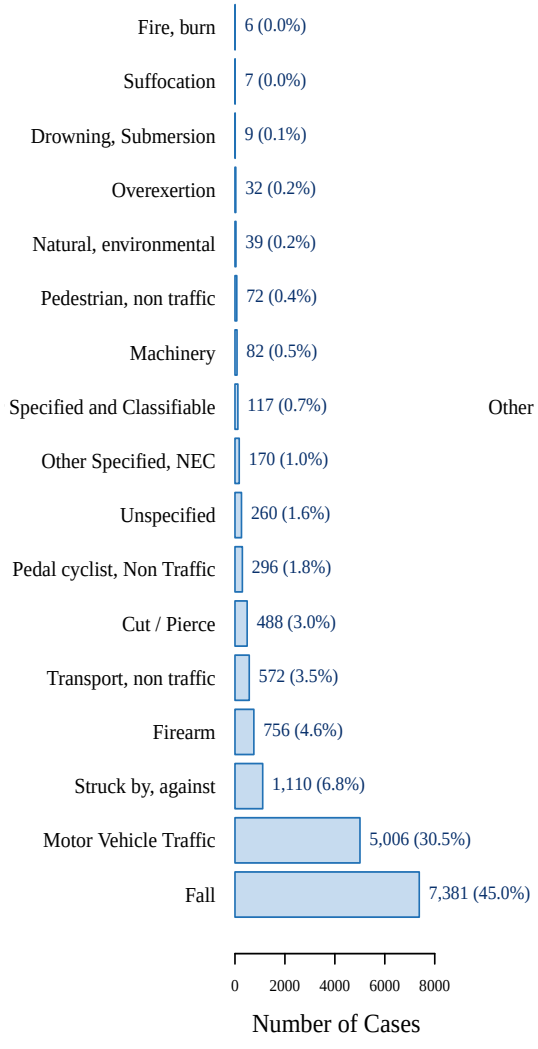
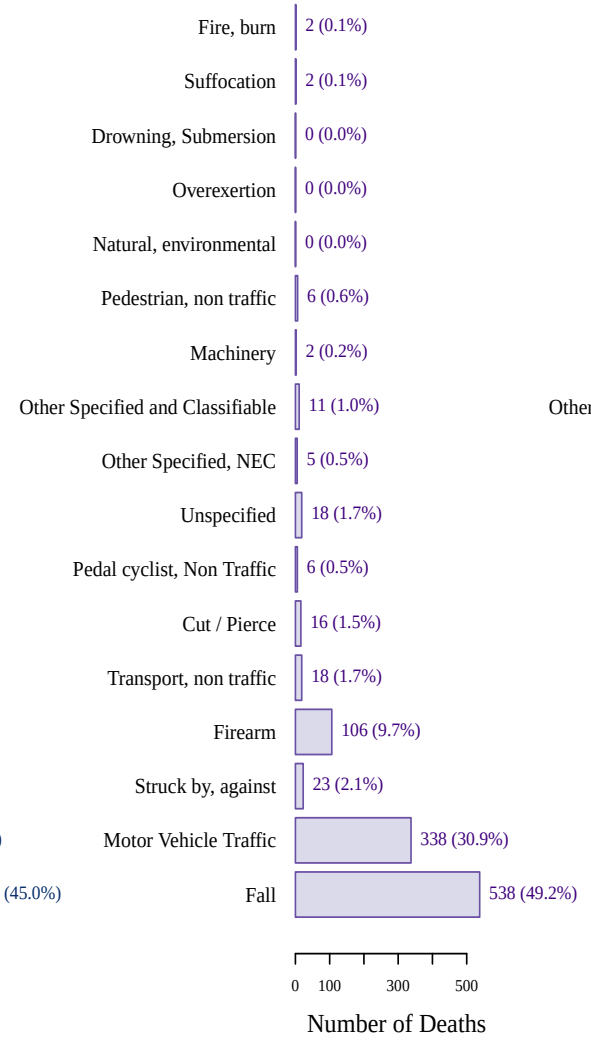
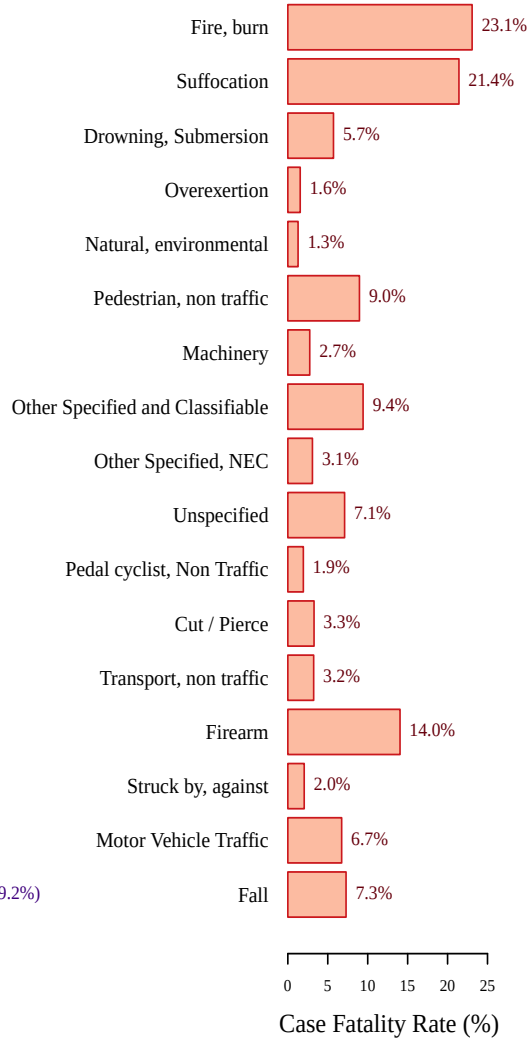
Average Annual Trauma Incidents by Injury Category



Average Annual Trauma Fatalities by Injury Category

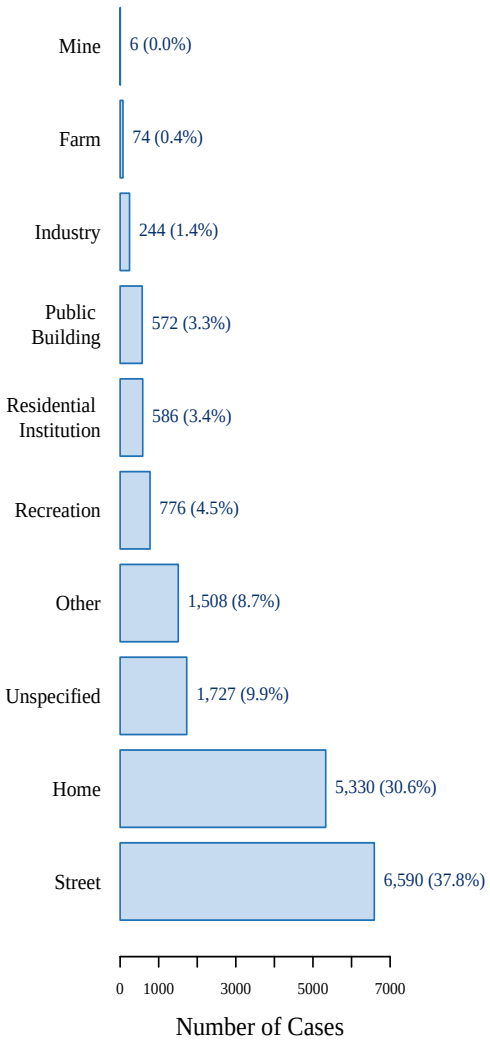


Case Fatality Rate by Injury Category

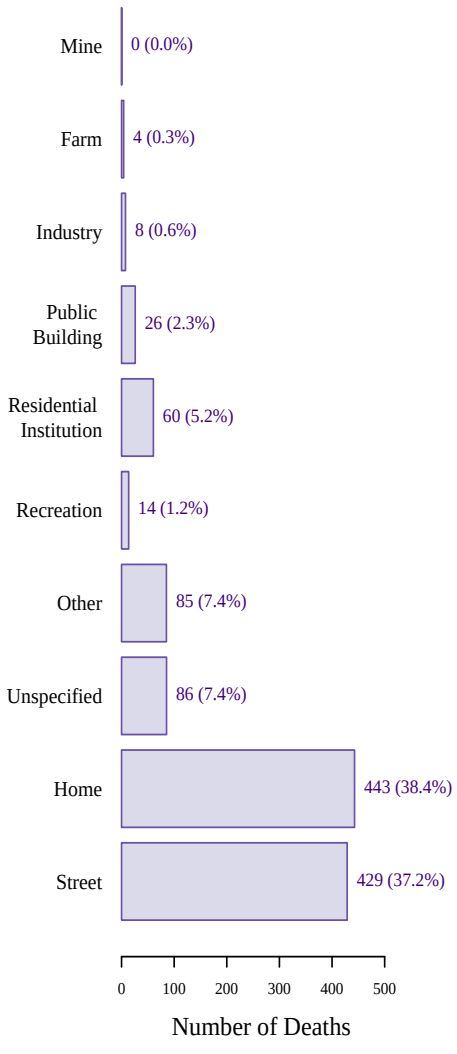


NEW YORK STATE OF OPPORTUNITY. Department of Health

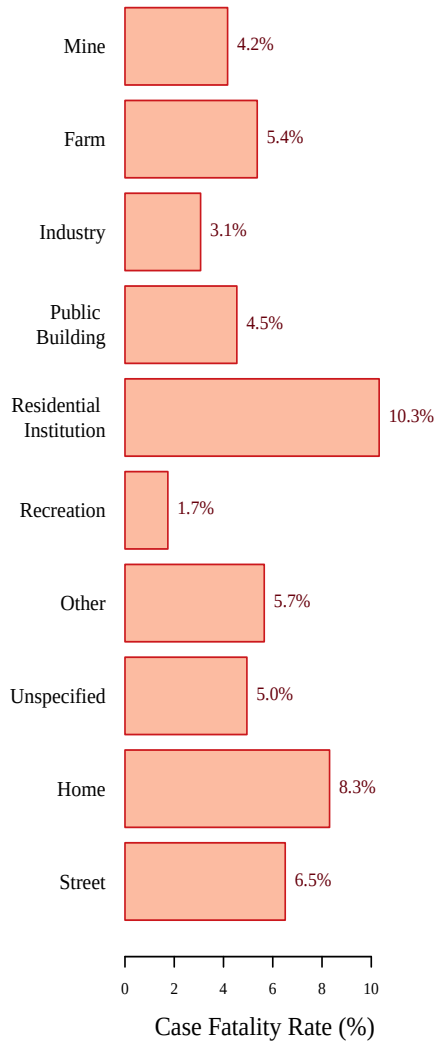
Average Annual Trauma Incidents by Place of Injury



Average Annual Trauma Fatalities by Place of Injury

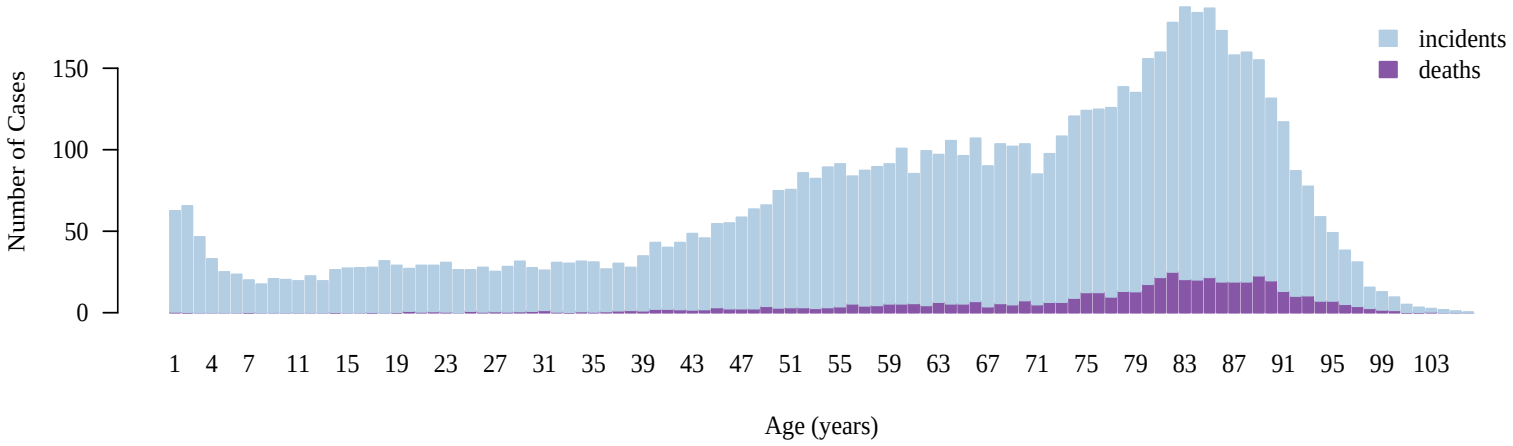


Case Fatality Rate by Place of Injury

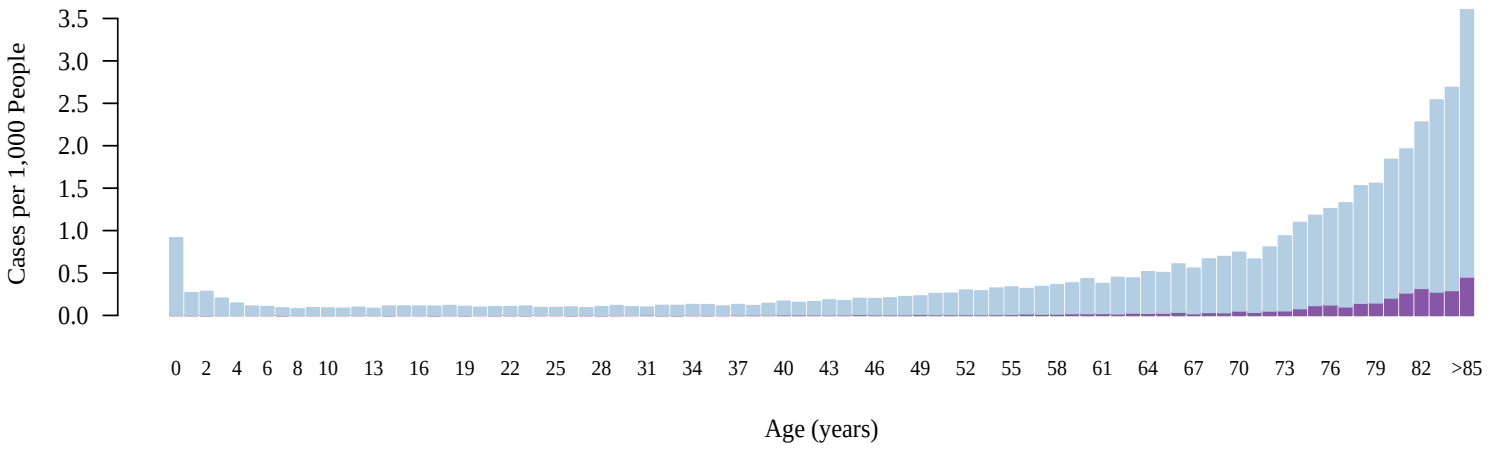


NEW YORK STATE OF OPPORTUNITY. Department of Health

Fall Trauma: Average Annual Incidents and Fatalities by Age



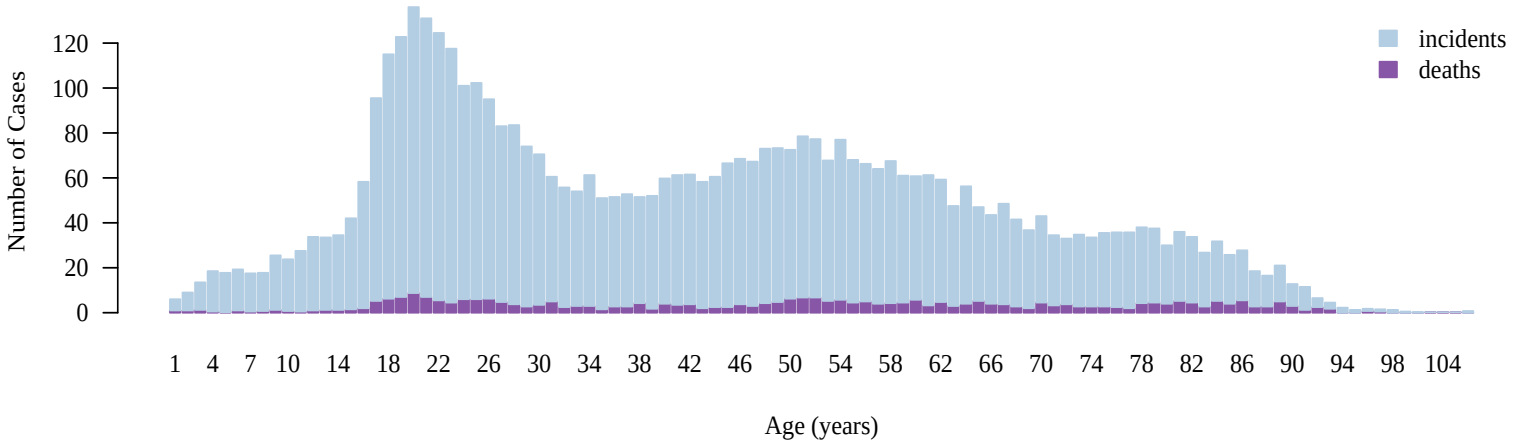
Fall Trauma: Average Annual Incidence and Mortality by Age



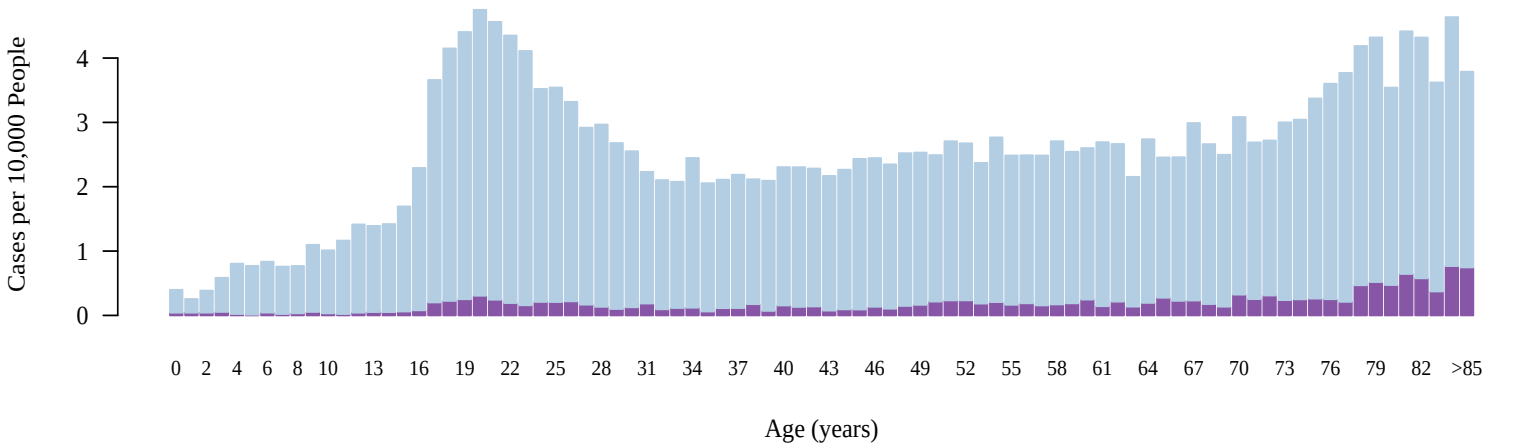
Population data source: Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute.

NEW YORK STATE OF OPPORTUNITY. Department of Health

Motor Vehicle Traffic Trauma: Average Annual Incidents and Fatalities by Age



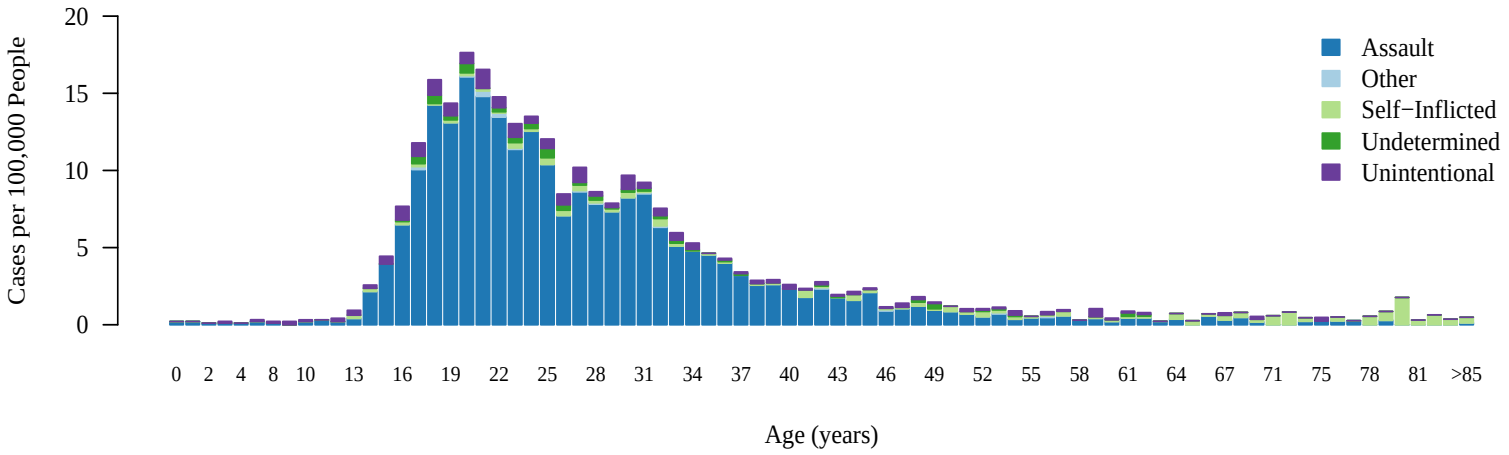
Motor Vehicle Traffic Trauma: Average Annual Incidence and Mortality by Age



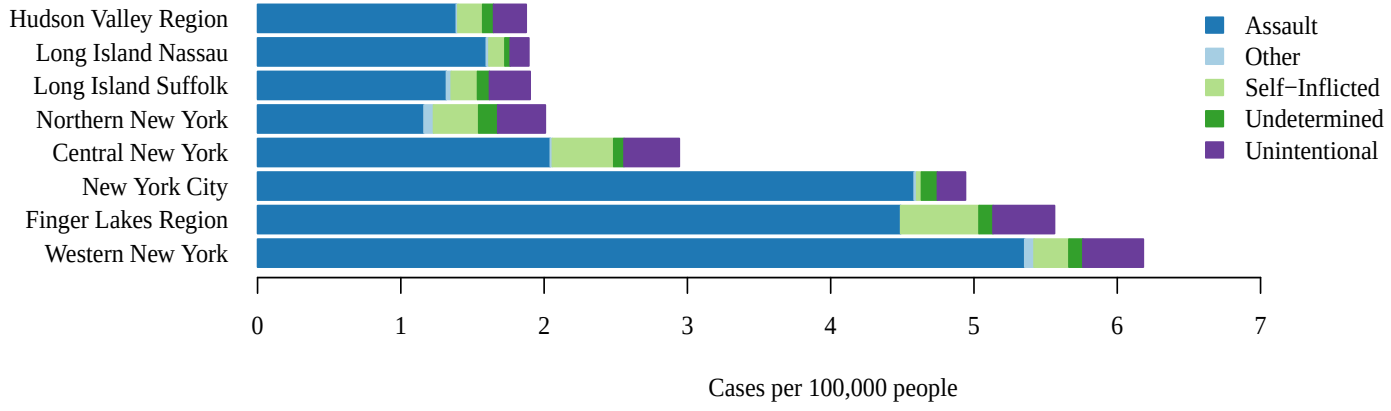
Population data source: Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute.

NEW YORK STATE OF OPPORTUNITY. Department of Health

Firearm Trauma: Average Annual Incidence by Age and Intention



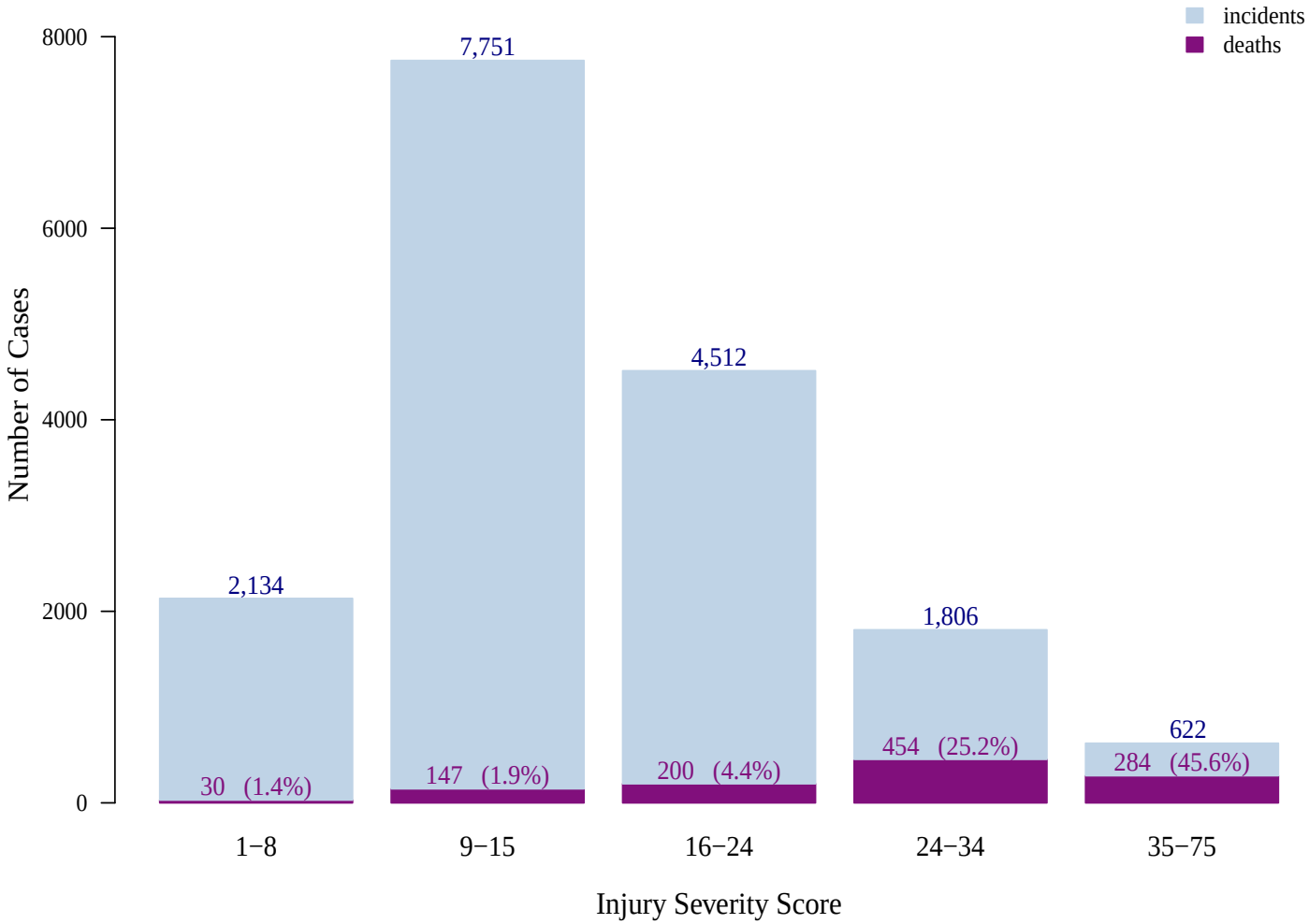
Firearm Trauma: Average Annual Incidence by Region and Intention



Population data source: Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute.

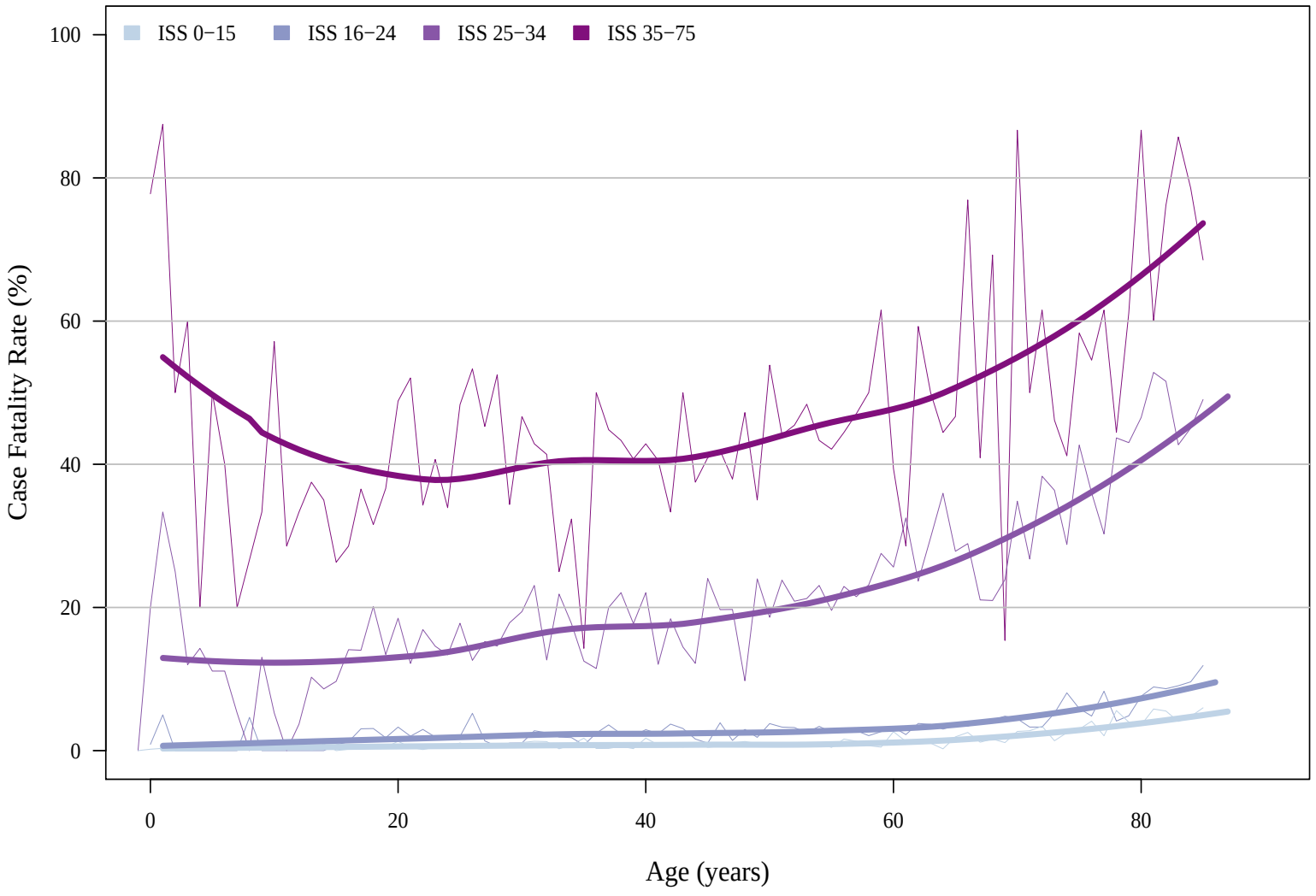
NEW YORK STATE OF OPPORTUNITY. Department of Health

Average Annual Incidents of Trauma and Fatalities by Injury Severity Score



NEW YORK STATE OF OPPORTUNITY. Department of Health

Average Annual Trauma Case Fatality Rate by Age and Injury Severity Score (ISS)

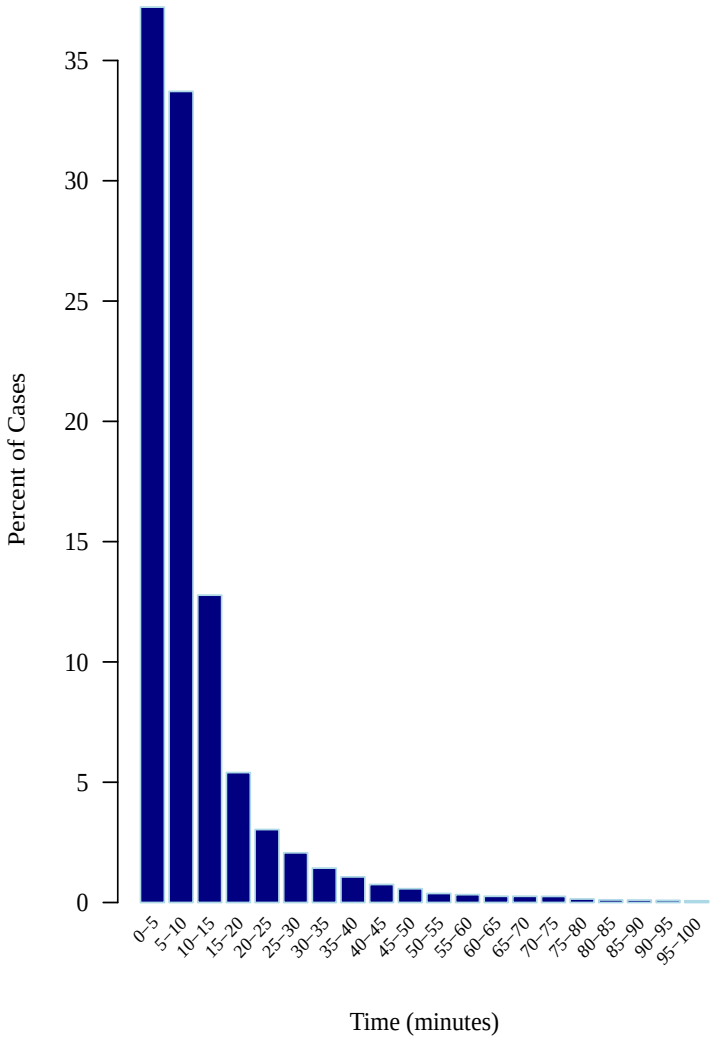


NEW YORK STATE OF OPPORTUNITY. Department of Health

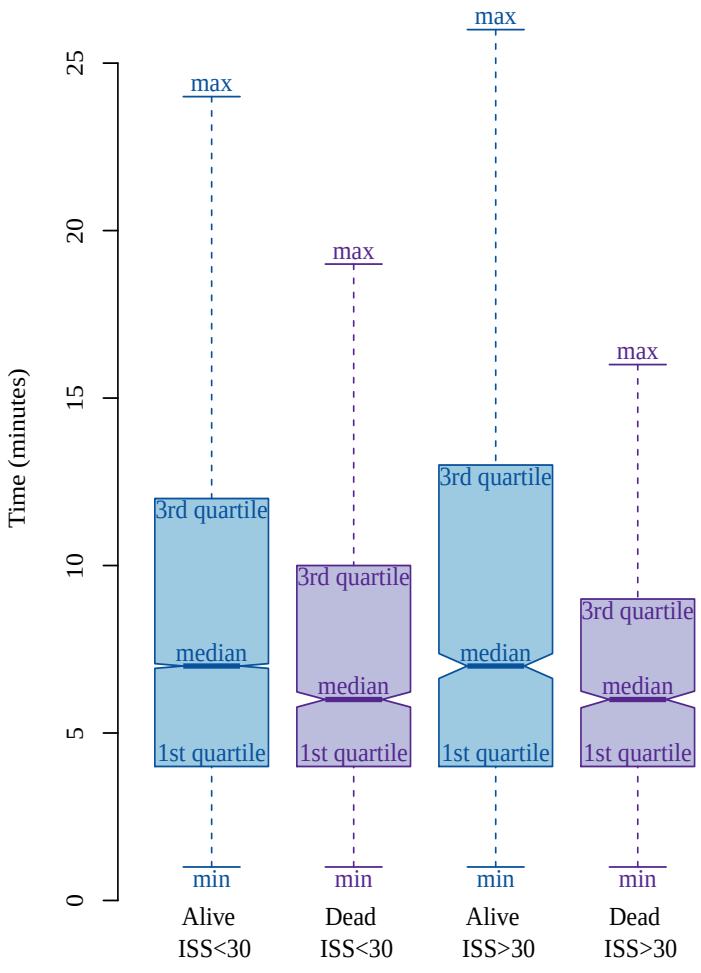
Emergency Medical Services

NEW YORK STATE OF OPPORTUNITY. Department of Health

Distribution of Emergency Medical Services (EMS) Response Times



Distribution of Emergency Medical Services Response Times by Injury Severity Score and Outcome



Response time is calculated as the time from emergency phone call to medical service's arrival at scene. Statistical outliers are omitted from boxplots. Notches represent a 95% confidence interval around the medians. Nonoverlapping notches sugest a meaningfull difference in group medians.

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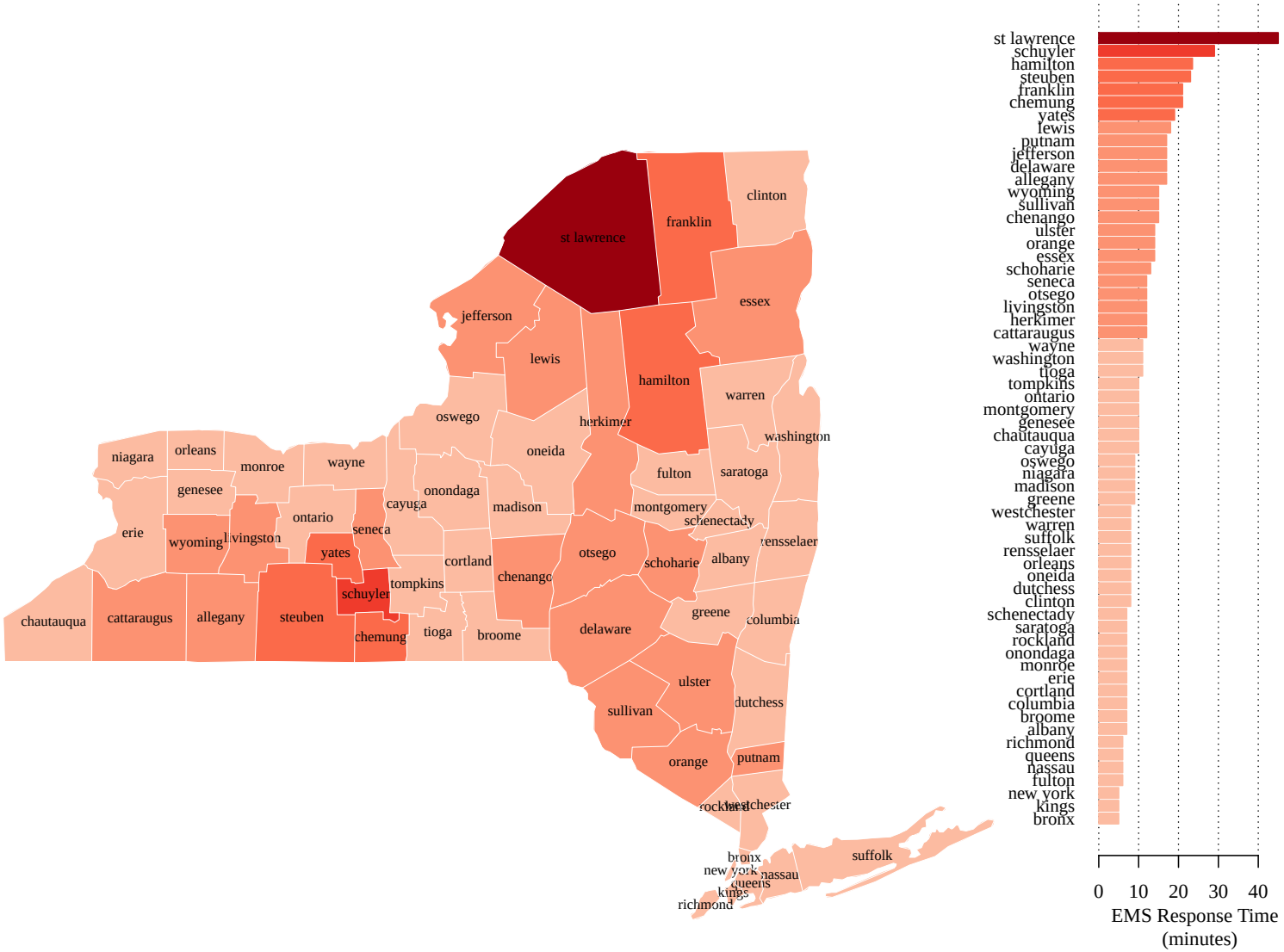
New York State Median EMS Response Time by County of Residence



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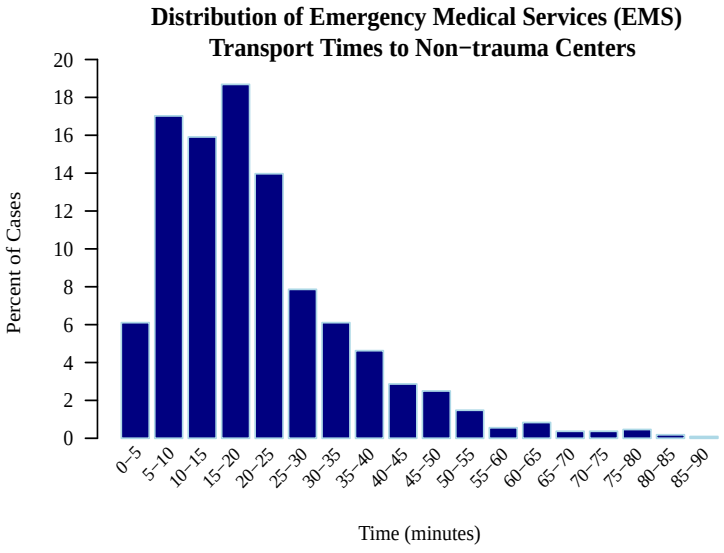
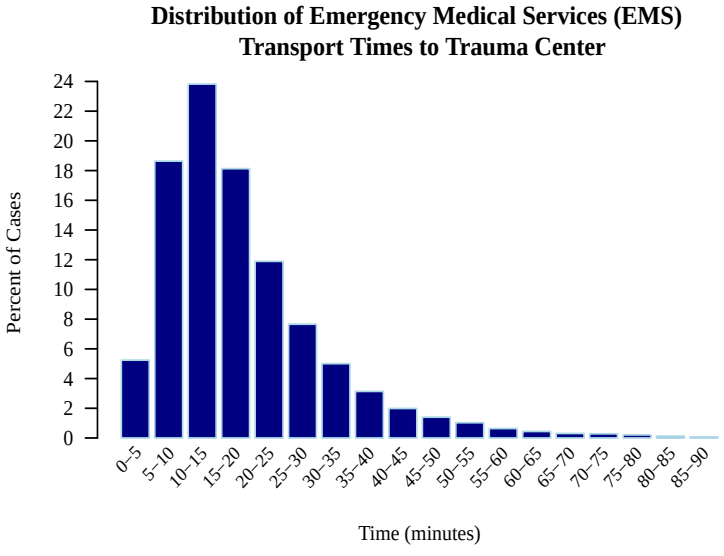
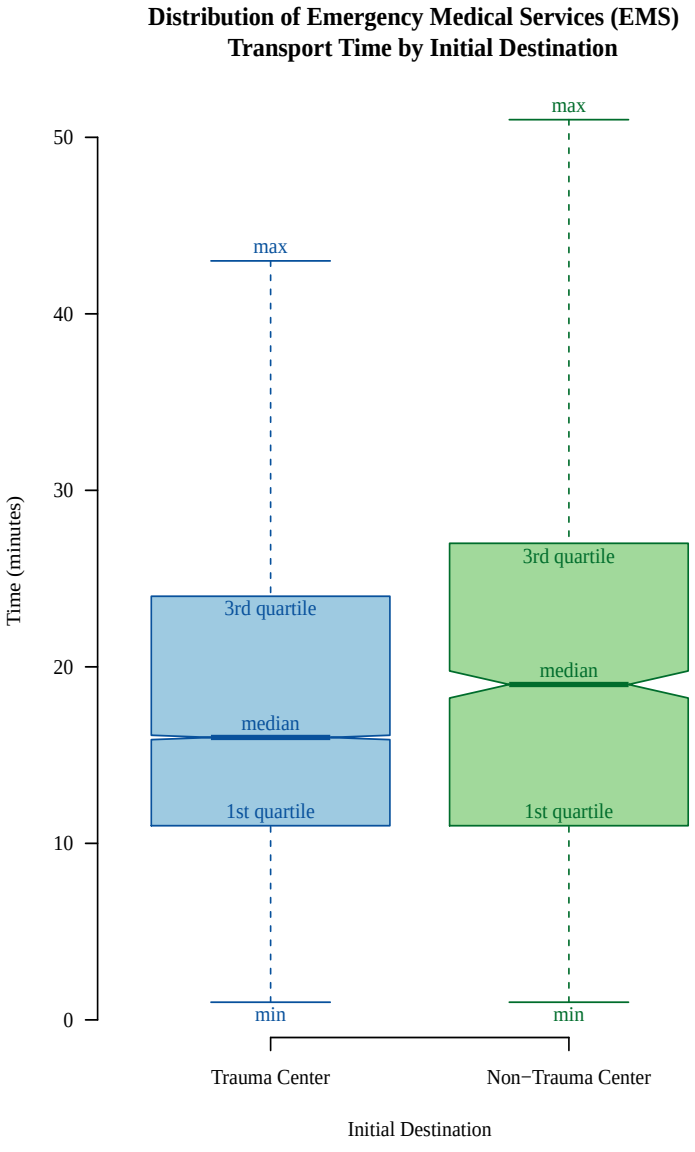


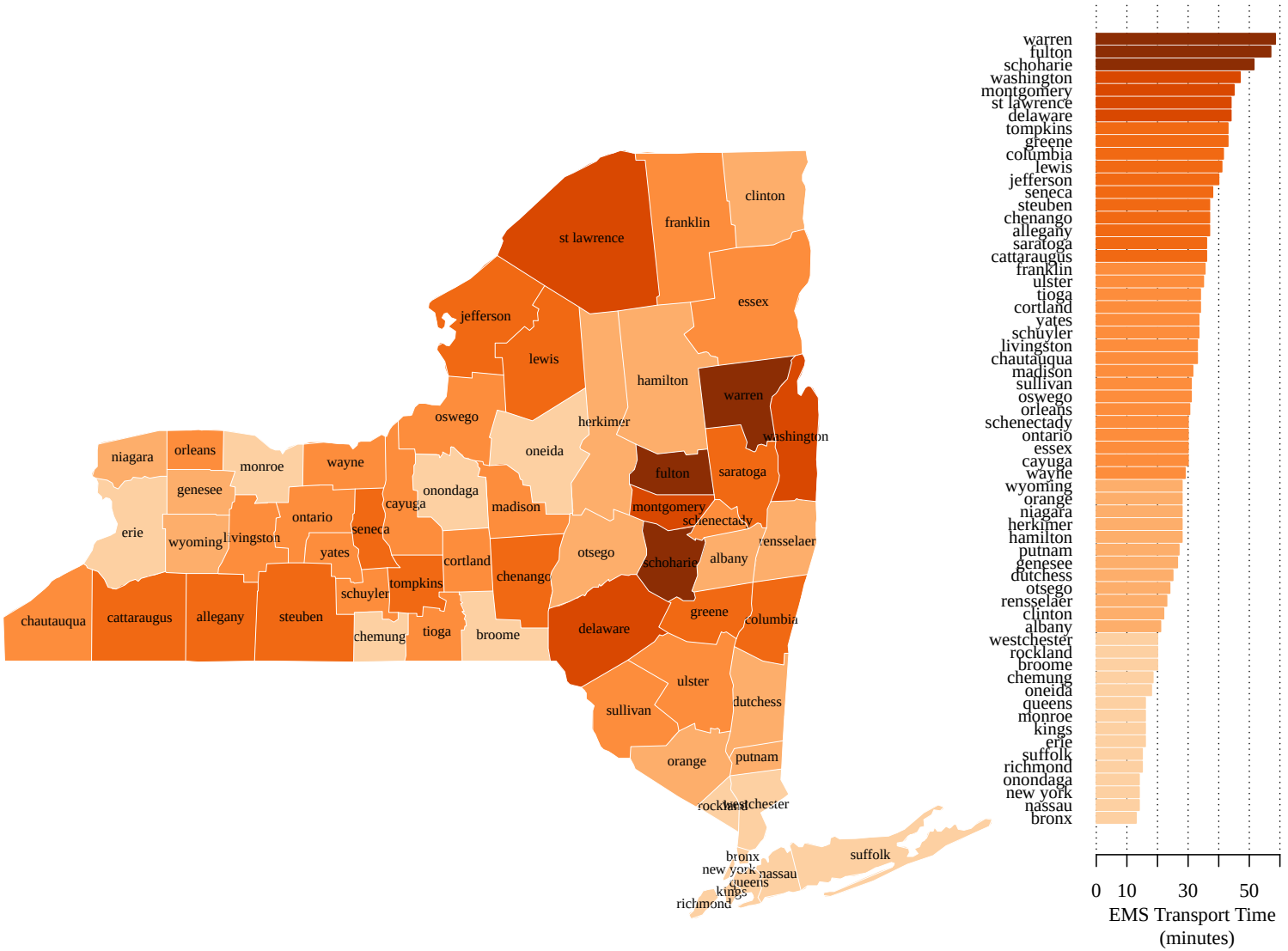




Transport time is calculated as time from emergency medical service's departure from the scene of injury to arrival at hospital. Statistical outliers are omitted from boxplots. Notches represent a 95% confidence interval around the medians. Nonoverlapping notches sugest a meaningfull difference in group medians.

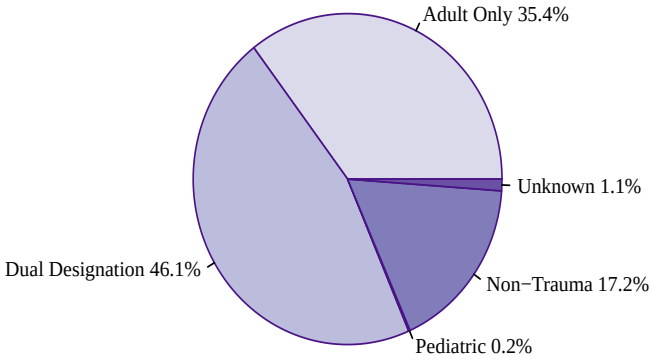
NEW YORK STATE OF OPPORTUNITY. Department of Health

Median EMS Transport Time To Appropriate Trauma Center by County of Residence

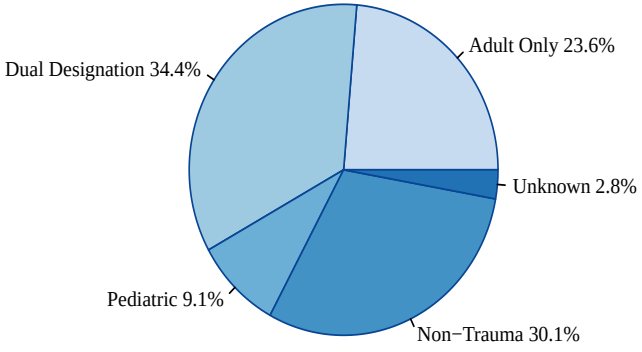


NEW YORK STATE OF OPPORTUNITY. Department of Health

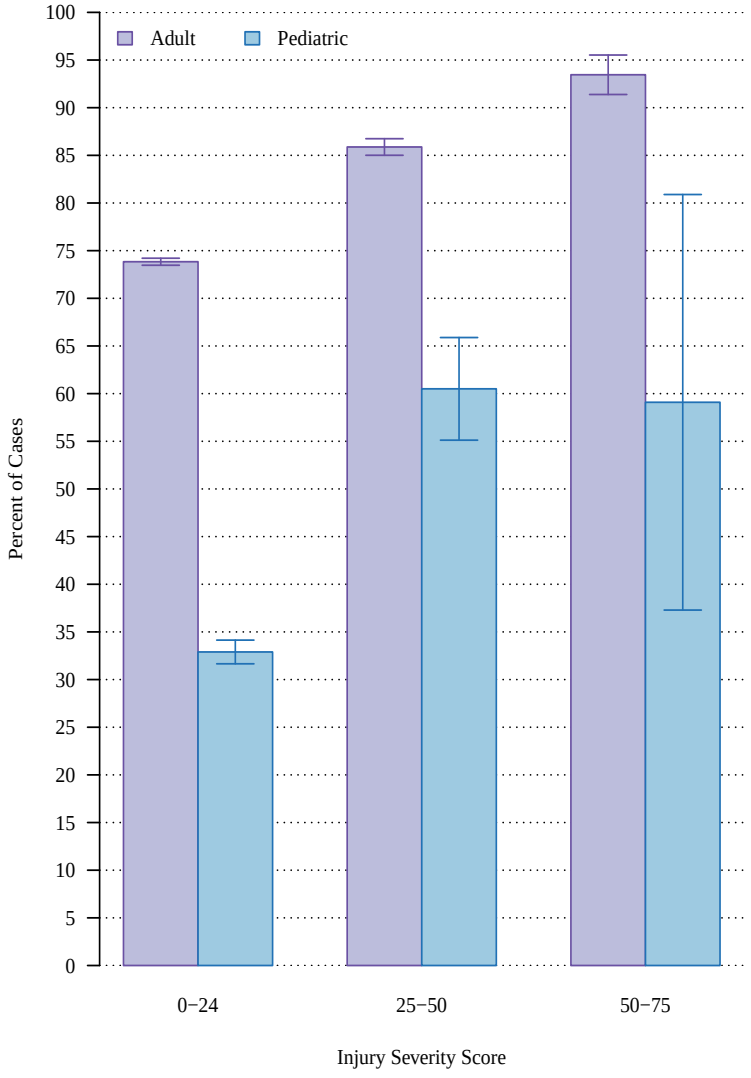
Distribution of Adult Trauma Cases by Inital Destination



Distribution of Pediatric Trauma Cases by Inital Destination



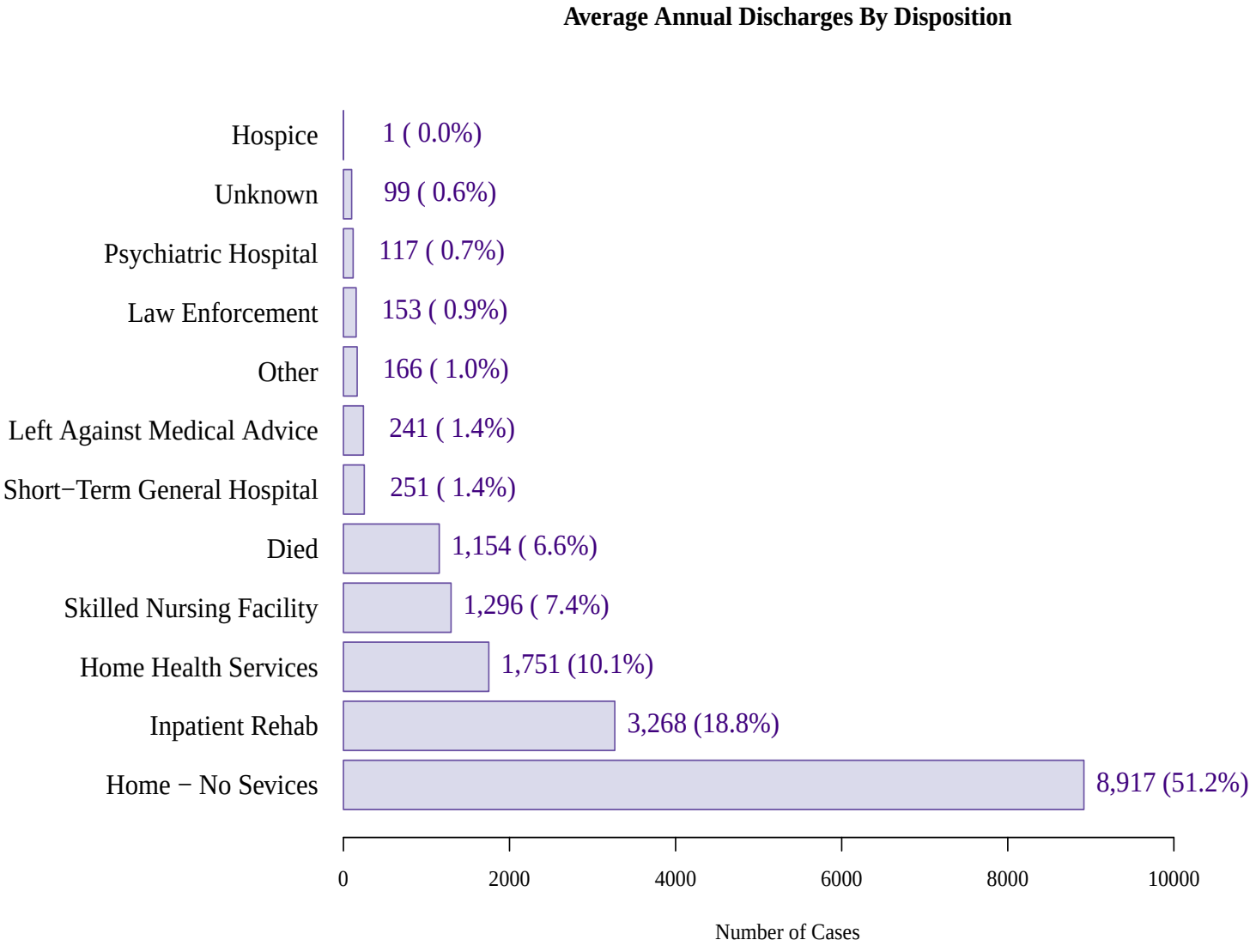
Transport to Appropriate Trauma Center by Age and Injury Severity Score



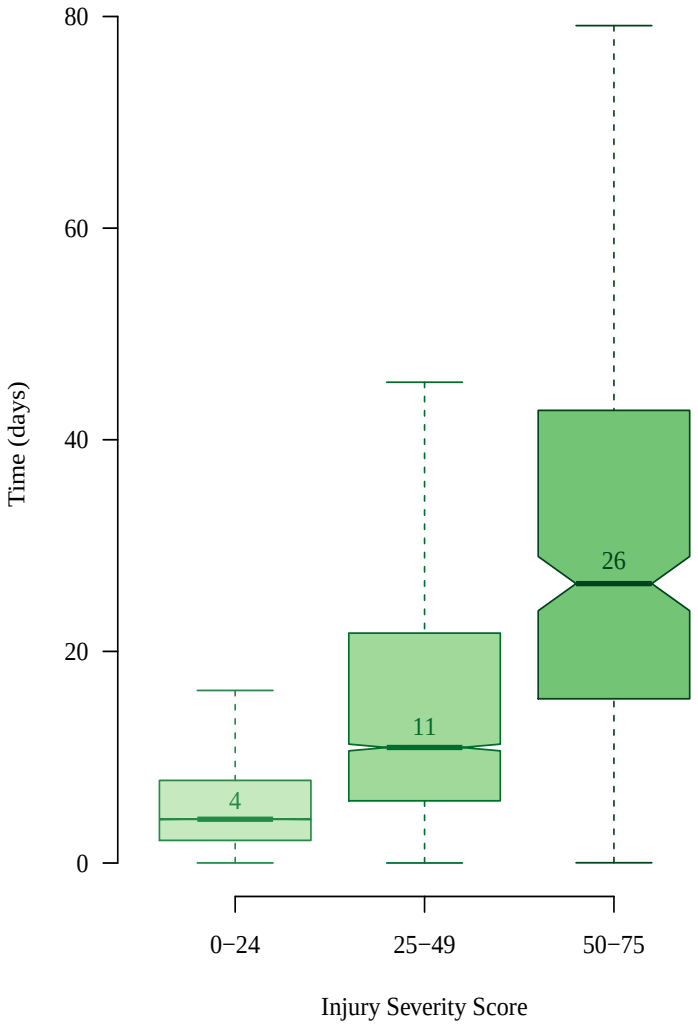
Registry data does not include data from patients that never made it to a Trauma Center. 95% confidence intervals are shown around sample means in the barchart. Walk-ins excluded.

NEW YORK STATE OF OPPORTUNITY. Department of Health

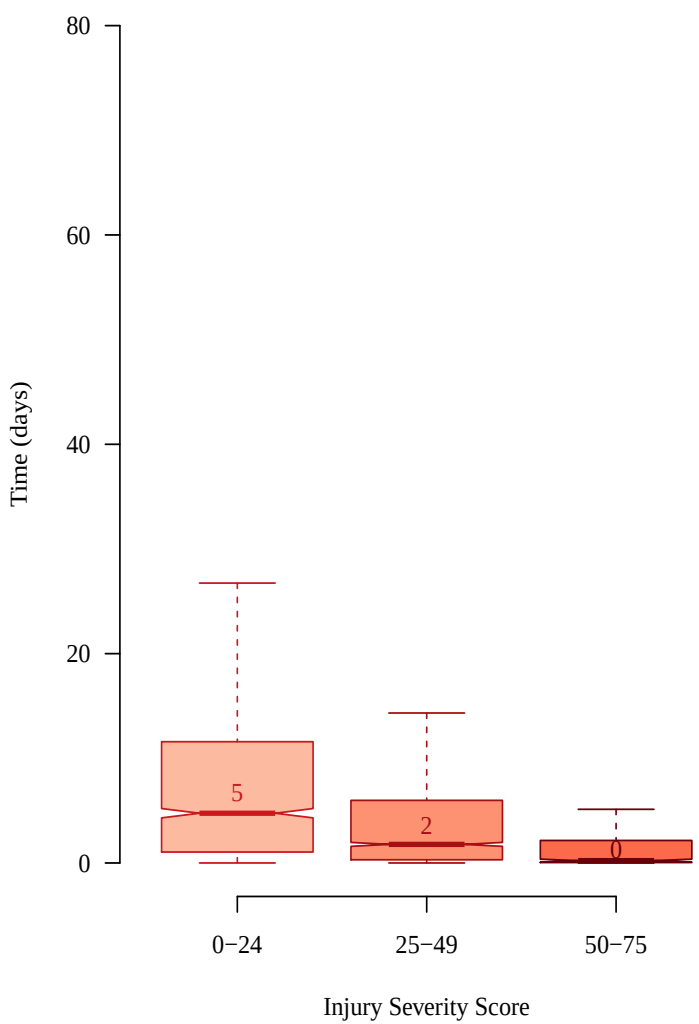
Outcome Statistics


Average Annual Discharges By Disposition
Hospice
1 (0.0%)
Unknown
99 (0.6%)
Psychiatric Hospital
117 (0.7%)
Law Enforcement
153 (0.9%)
Other
166 (1.0%)
Left Against Medical Advice
241 (1.4%)
Short−Term General Hospital
251 (1.4%)
Died
1,154 (6.6%)
Skilled Nursing Facility
1,296 (7.4%)
Home Health Services
1,751 (10.1%)
Inpatient Rehab
3,268 (18.8%)
Home − No Sevices
8,917 (51.2%)
0
2000
4000
6000
8000
10000
Number of Cases

Length of Stay by Injury Severity Score for Patients Who Lived

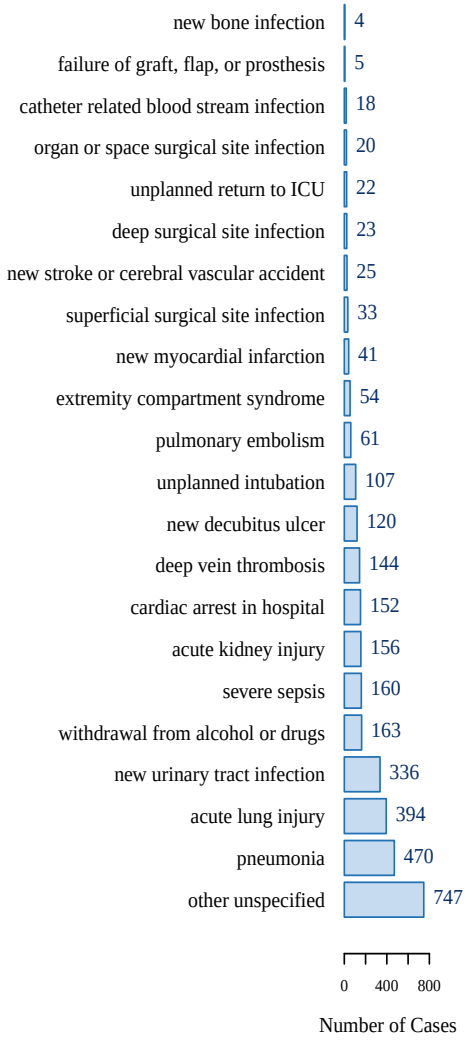


Length of Stay by Injury Severity Score for Patients Who Died

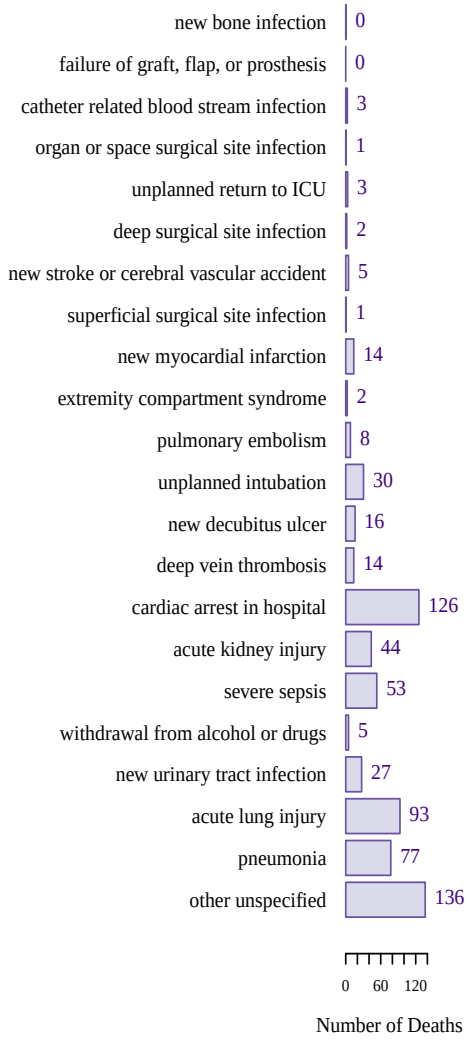


NEW YORK STATE OF OPPORTUNITY. Department of Health

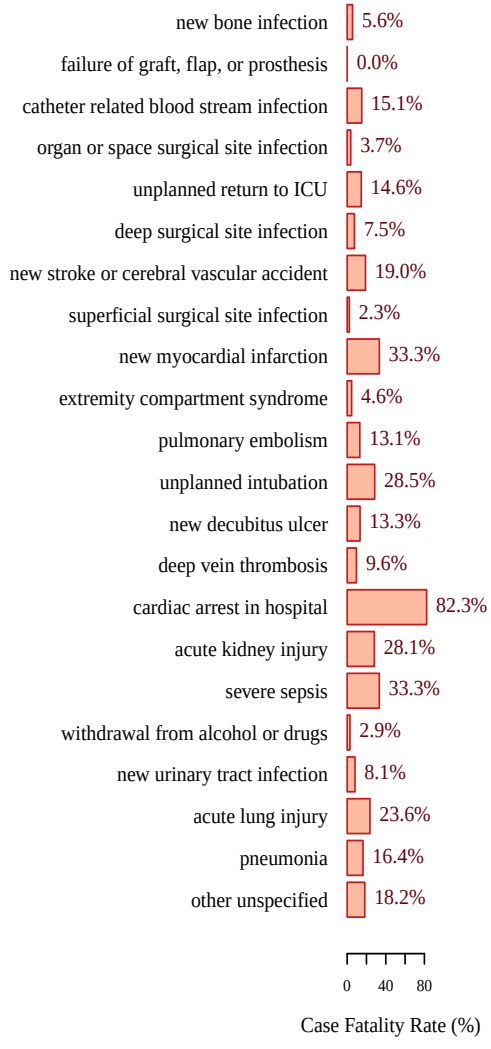
Average Annual Trauma Incidents by Complication



Average Annual Trauma Fatalities by Complication

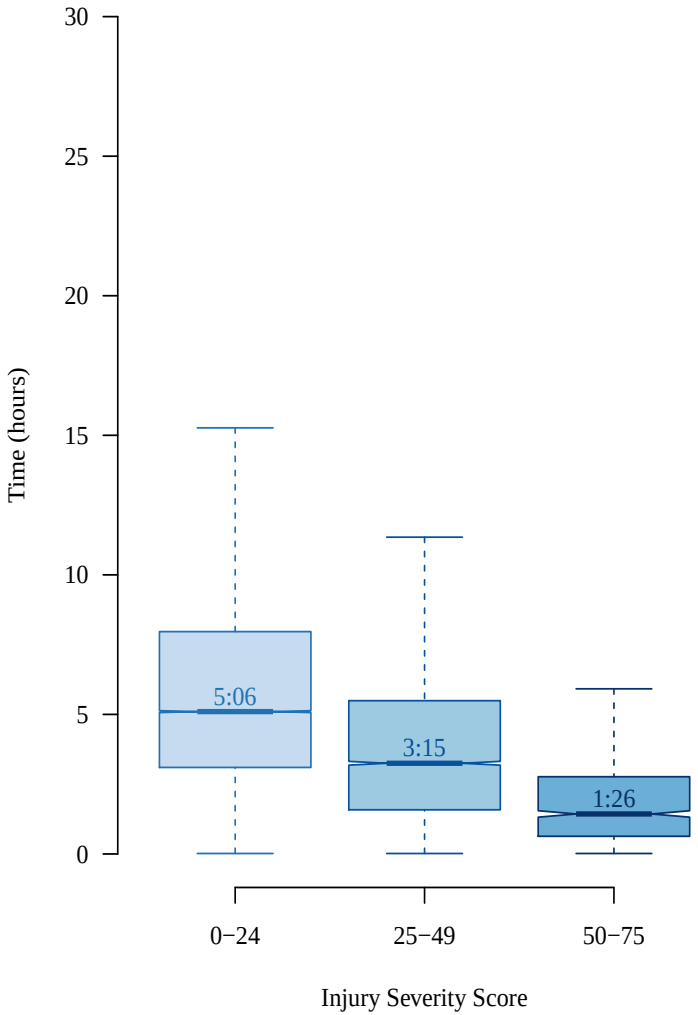


Average Annual Case Fatality Rate by Complication

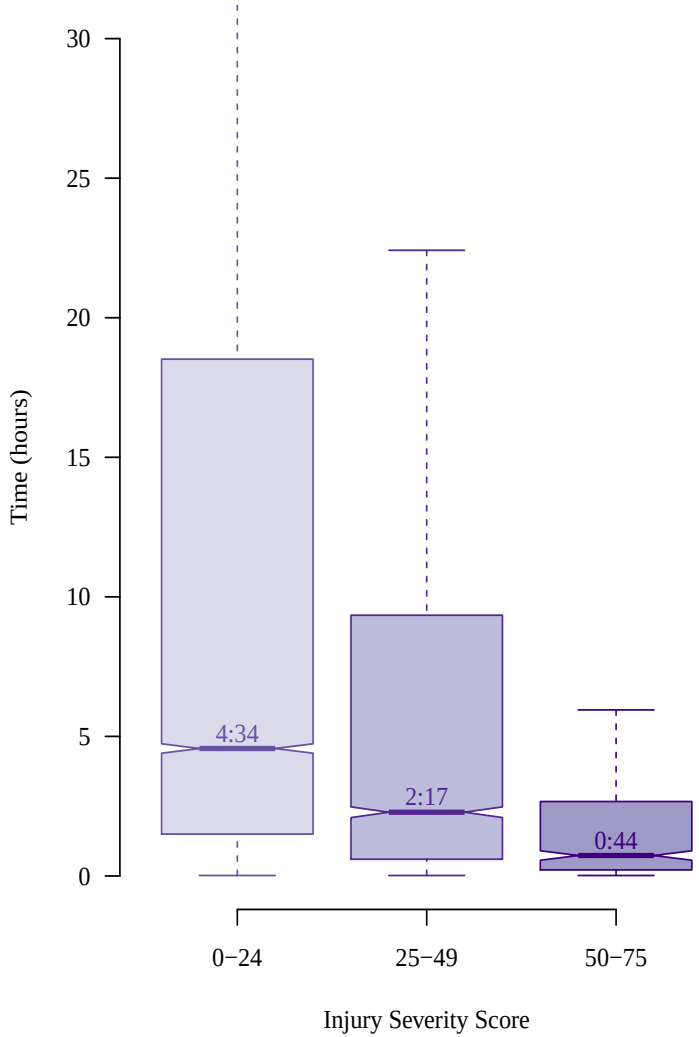


NEW YORK STATE OF OPPORTUNITY. Department of Health

Distribution of Time In Emergency Department

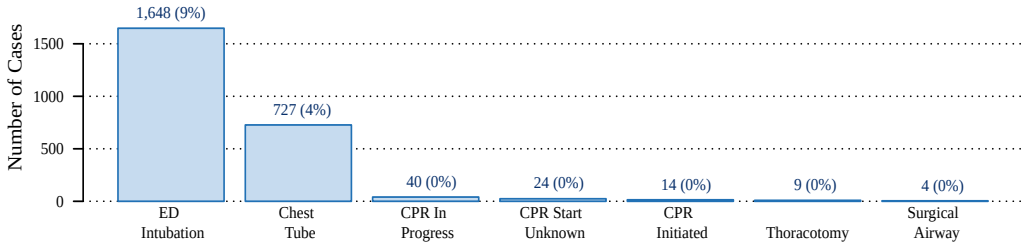


Distribution of Time Until First Procedure

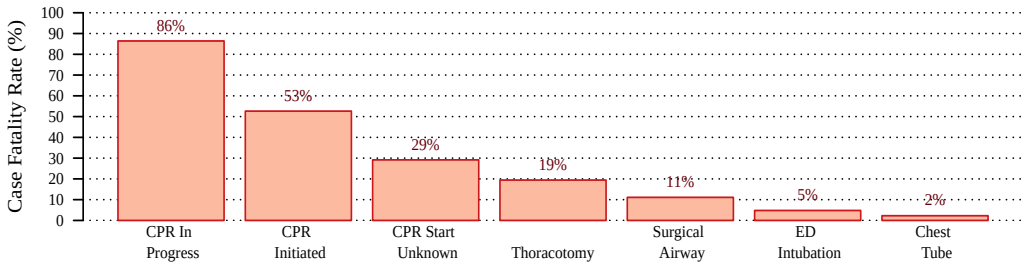


NEW YORK STATE OF OPPORTUNITY. Department of Health

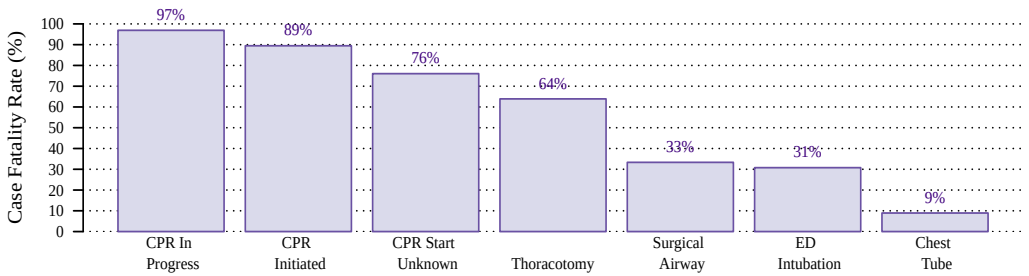
Average Annual Incidents of Required Emergency Department Procedures



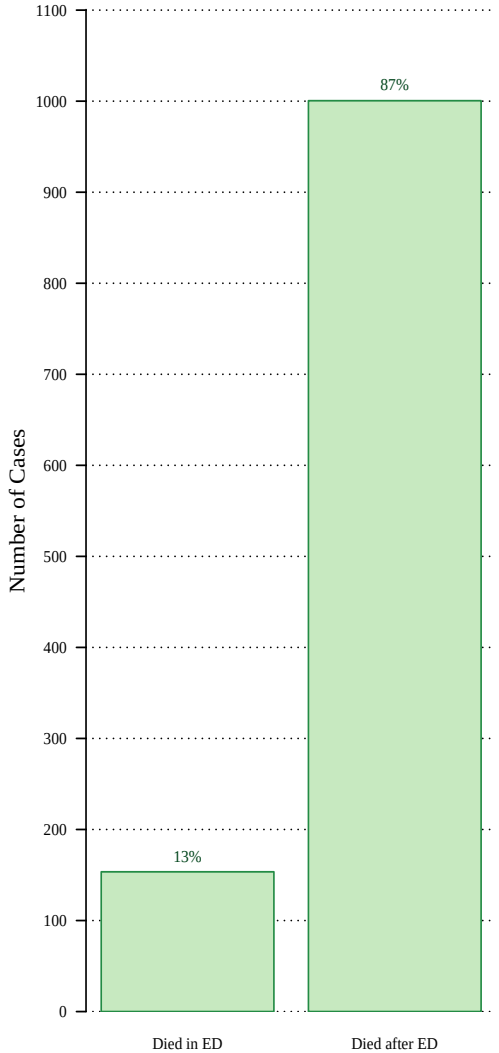
Emergency Department Case Fatality Rates by Required Emergency Department Procedure



Inpatient Case Fatality Rates by Required Emergency Department Procedure

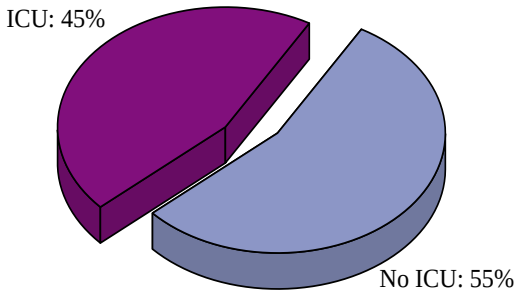


Average Annual Trauma Fatalities by Location of Patient Deaths

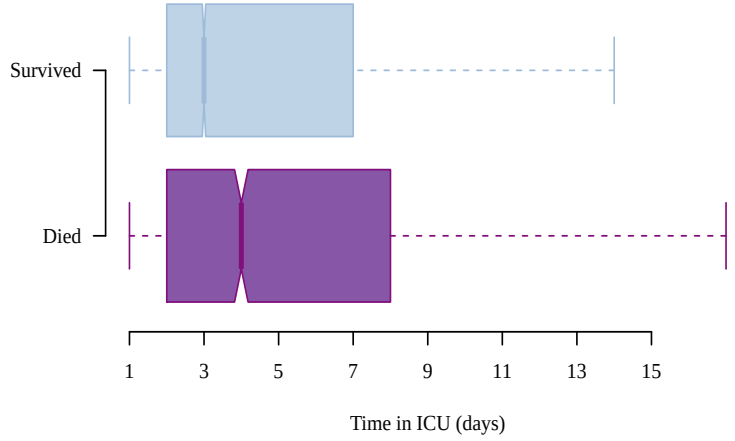


NEW YORK STATE OF OPPORTUNITY. Department of Health

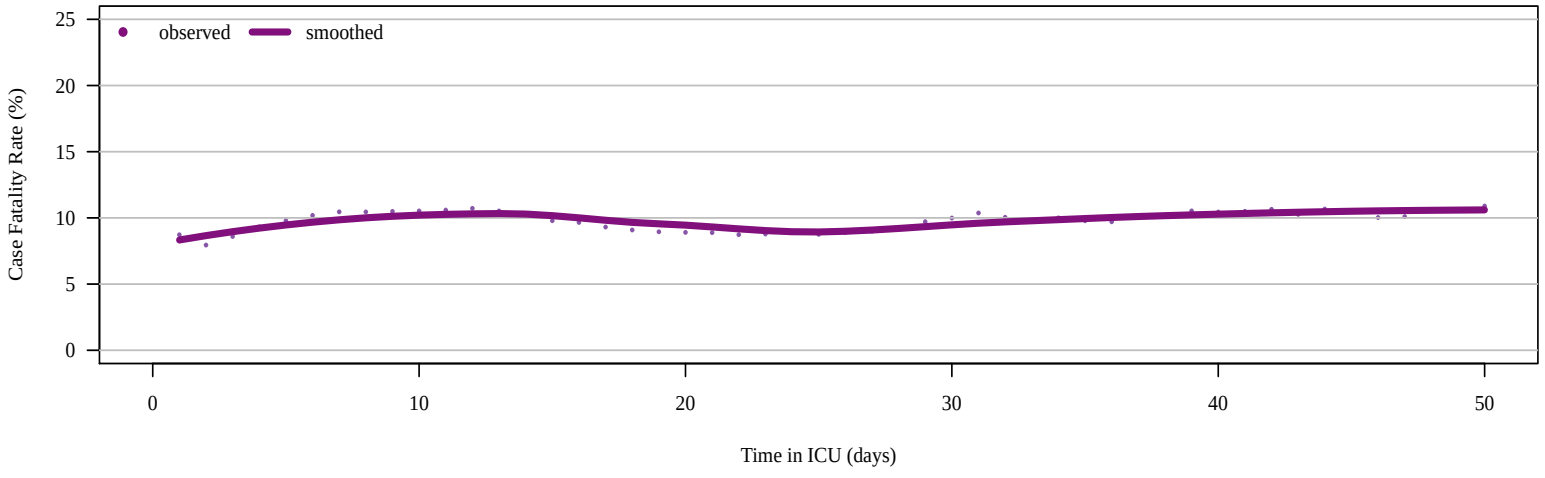
Trauma Patients Admitted to the Intensive Care Unit (ICU)



Days in the Intensive Care Unit (ICU)



Case Fatalities in the Intensive Care Unit (ICU) as a Function of Time



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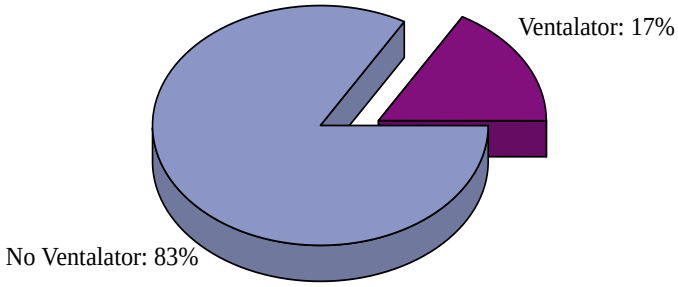
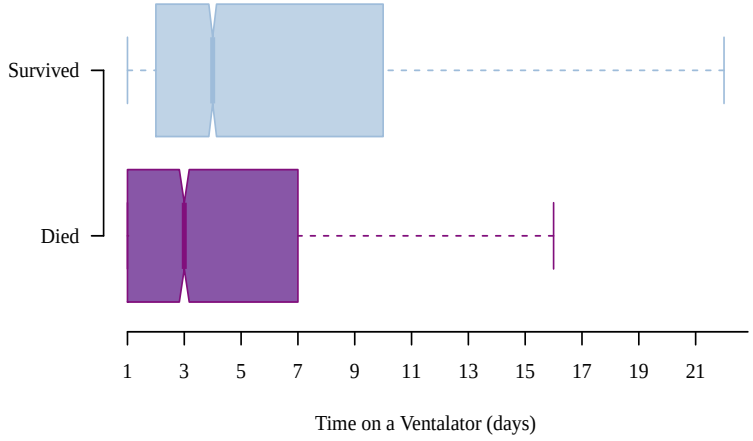
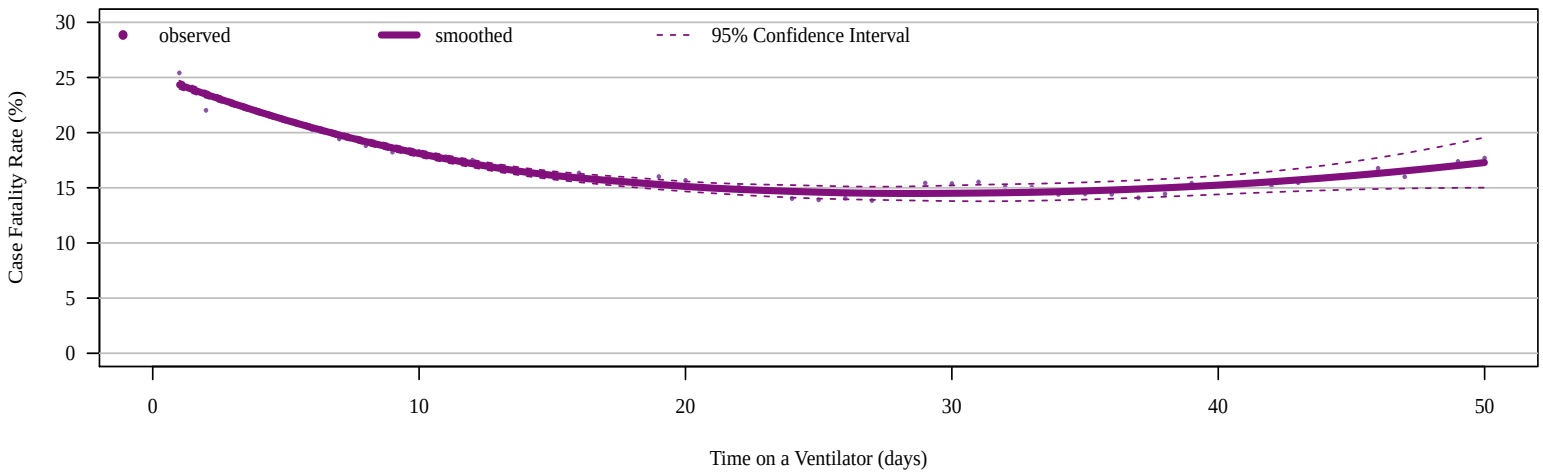
Trauma Patients Requiring a Ventalator



Days on a Ventalator

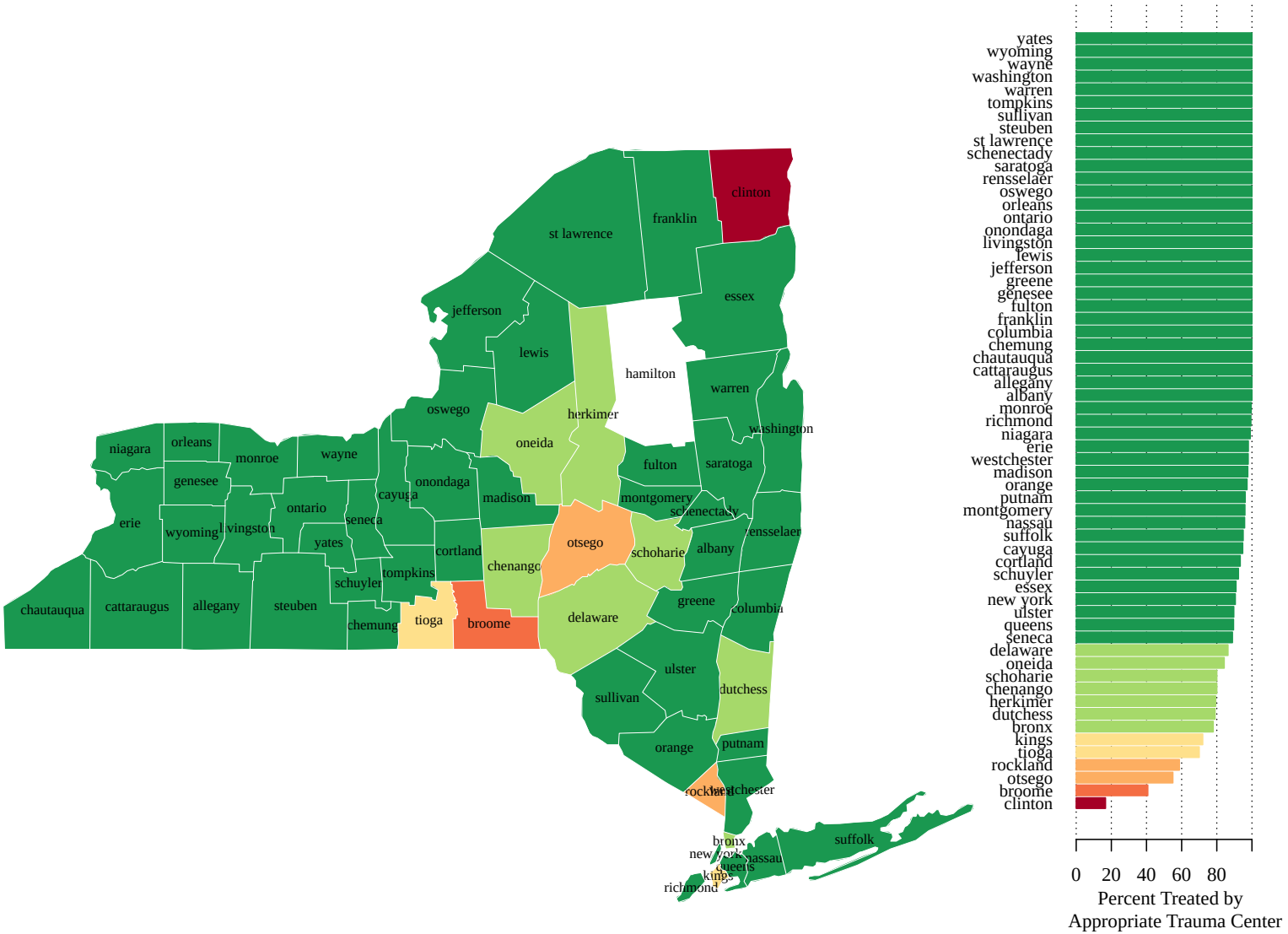


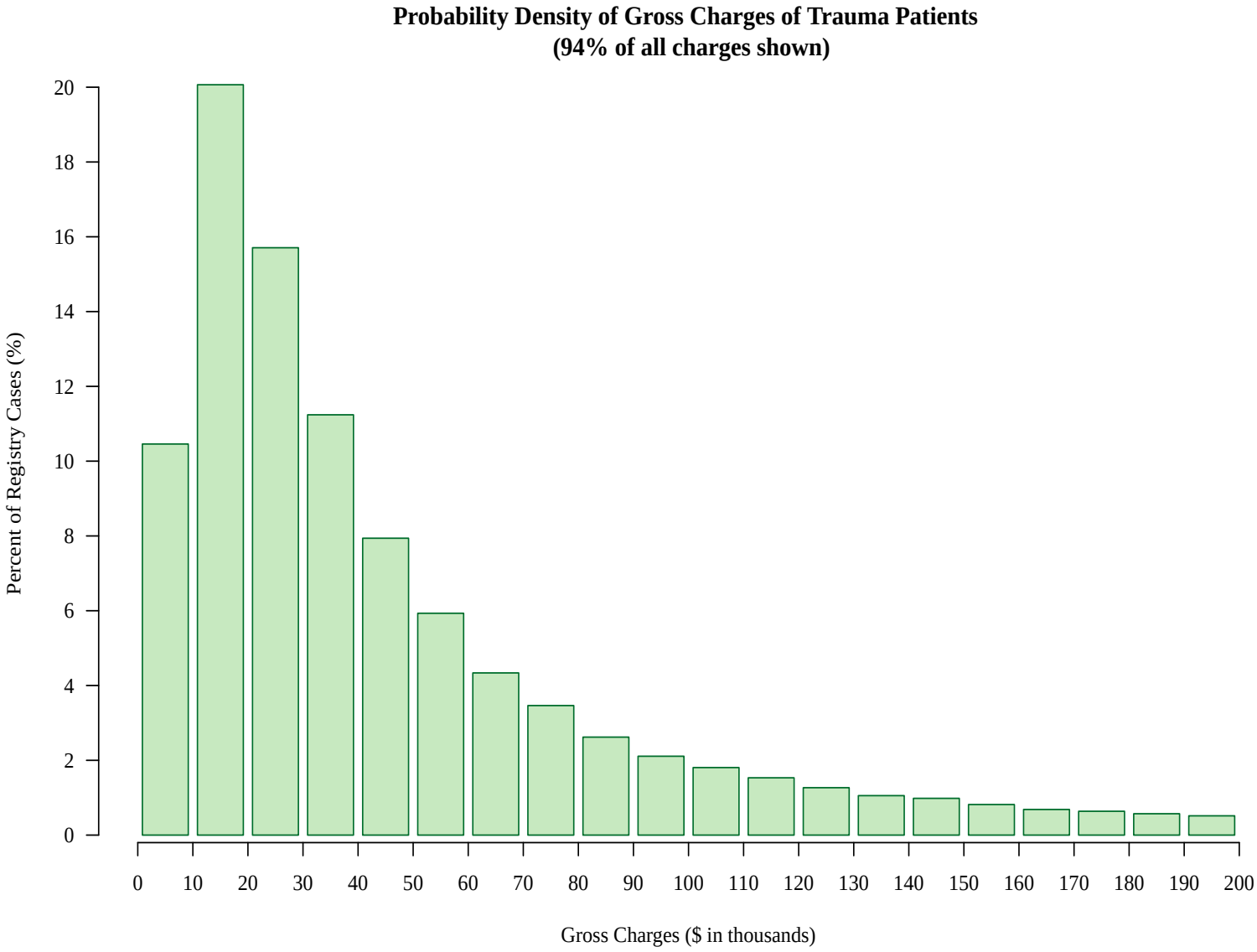
Case Fatality Rate of Patients on a Ventilator as a Function of Time



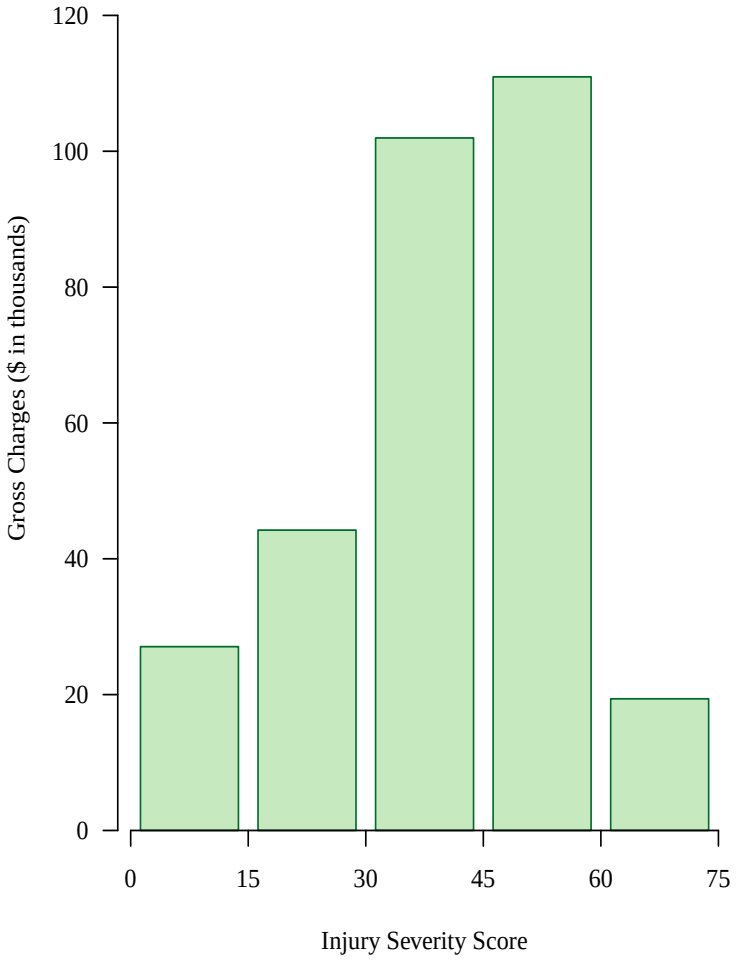
NEW YORK STATE OF OPPORTUNITY. Department of Health

Percent of Pediatric Patients Treated at an Appropriate Final Destination by County of Residence

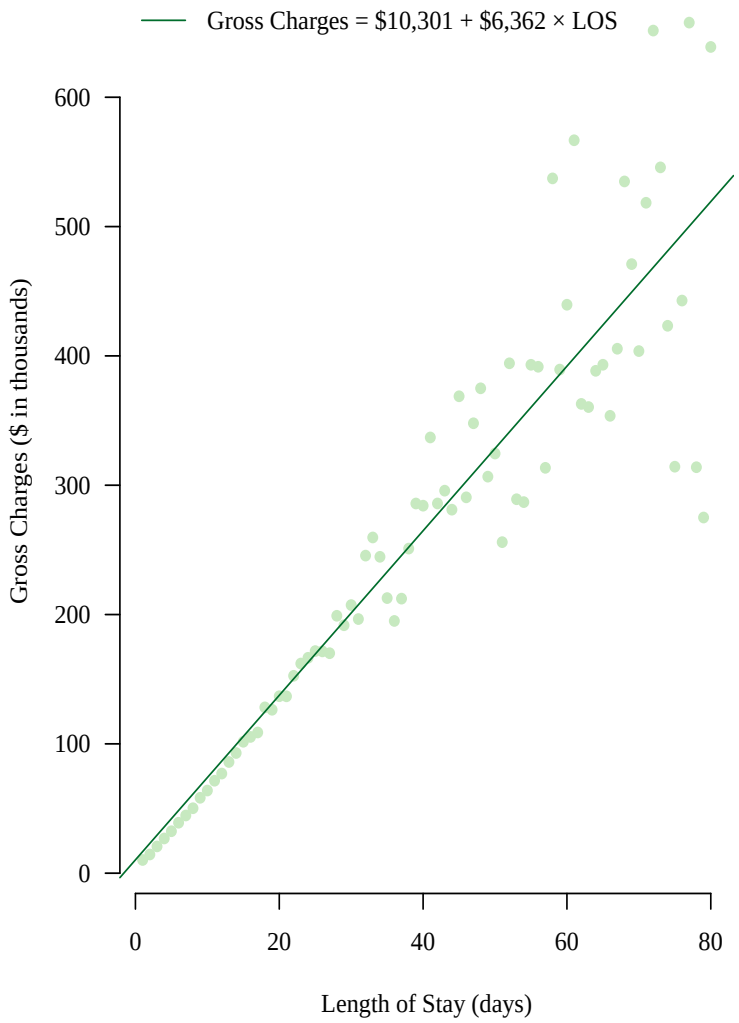



Probability Density of Gross Charges of Trauma Patients
(94% of all charges shown)
Percent of Registry Cases (%)
0
2
4
6
8
10
12
14
16
18
20
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Gross Charges ($ in thousands)

Median Gross Charges by Injury Severity Score



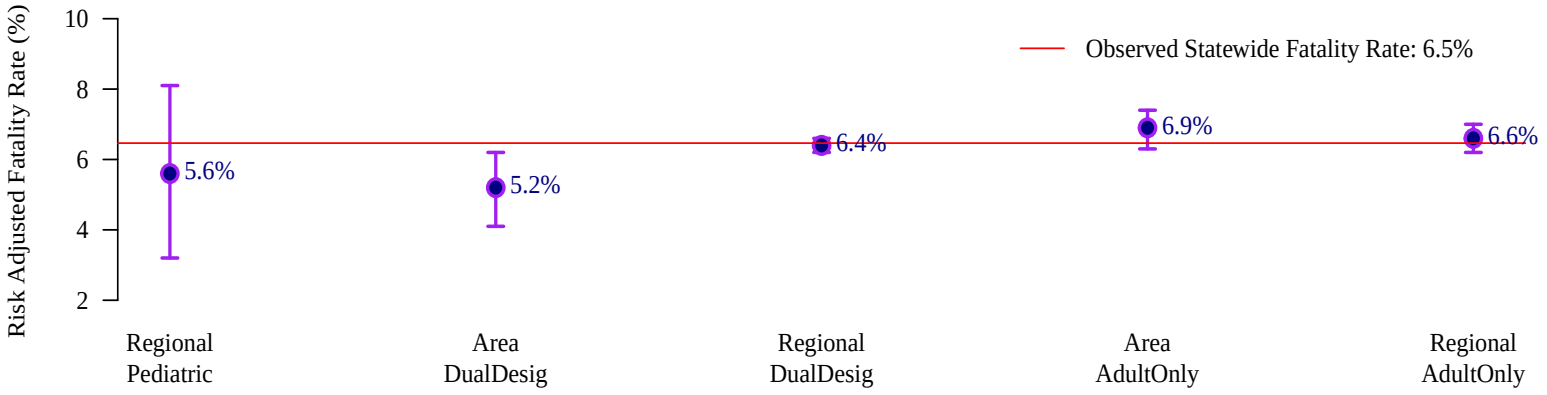
Median Gross Charges by Length of Stay (LOS)



NEW YORK STATE OF OPPORTUNITY. Department of Health

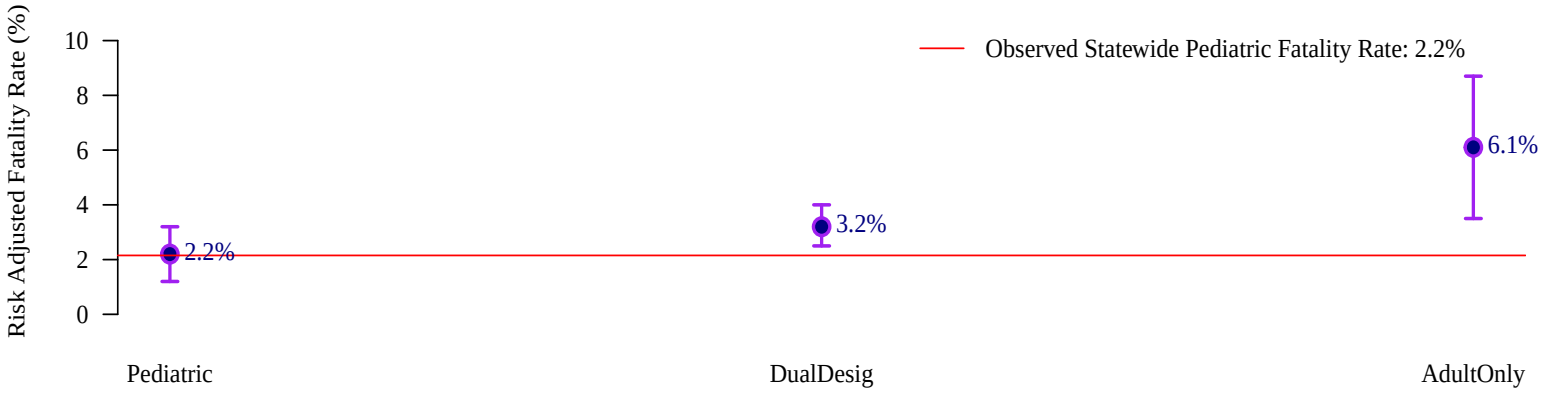
Risk Adjusted Comparisons

Risk Adjusted Case Fatality Rates by Trauma Center Type and Designation



Facility Type	Facility Designation	Number of Patients	Observed Fatality Rate	Expected Fatality Rate	Risk Ratio	Risk Adjusted Fatality Rate
Regional	Pediatric	1,735	1.2%	1.3%	0.92 ± 0.38	5.6% ± 2.5
Area	DualDesig	1,384	6.1%	7.6%	0.80 ± 0.17	5.2% ± 1.1
Regional	DualDesig	40,132	6.6%	6.7%	0.99 ± 0.04	6.4% ± 0.2
Area	AdultOnly	9,819	6.5%	6.1%	1.07 ± 0.08	6.9% ± 0.5
Regional	AdultOnly	13,428	6.7%	6.6%	1.02 ± 0.06	6.6% ± 0.4

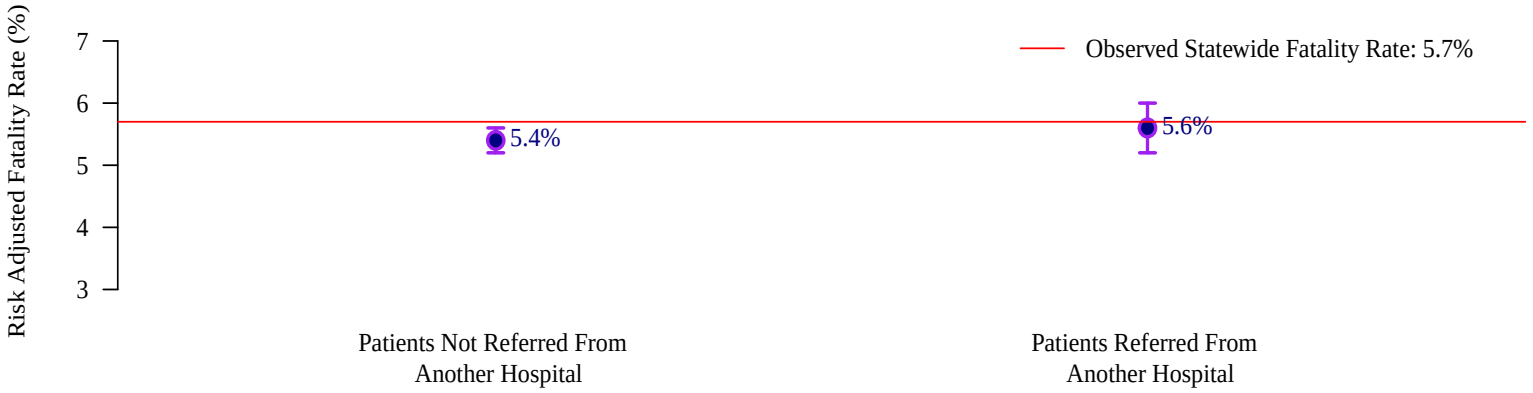
Pediatric Risk Adjusted Case Fatality Rates by Trauma Center Designation



Facility Designation	Number of Patients	Observed Fatality Rate	Expected Fatality Rate	Risk Ratio	Risk Adjusted Fatality Rate
Pediatric	1,489	1.3%	1.2%	1.06 ± 0.46	2.2% ± 1.0
DualDesig	3,174	2.2%	1.5%	1.49 ± 0.35	3.2% ± 0.7
AdultOnly	449	4.5%	1.6%	2.78 ± 1.21	6.1% ± 2.6

Pediatric patients are defined here as less than 15 years of age.

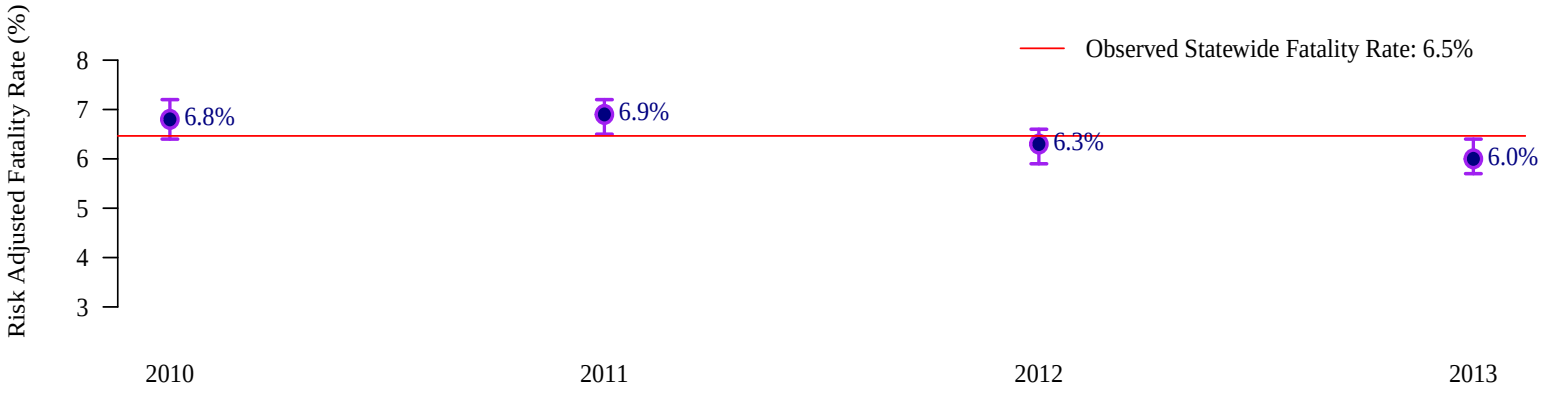
Risk Adjusted Case Fatality Rates by Patients' Referral Status
(excluding patients who died in the ED to reduce possible bais in the comparison)



Referal Status	Number of Patients	Observed Fatality Rate	Expected Fatality Rate	Risk Ratio	Risk Adjusted Fatality Rate
Not Referred	52,402	5.7%	6.0%	0.95 ± 0.03	5.4% ± 0.2
Referred	13,550	5.6%	5.7%	0.98 ± 0.07	5.6% ± 0.4

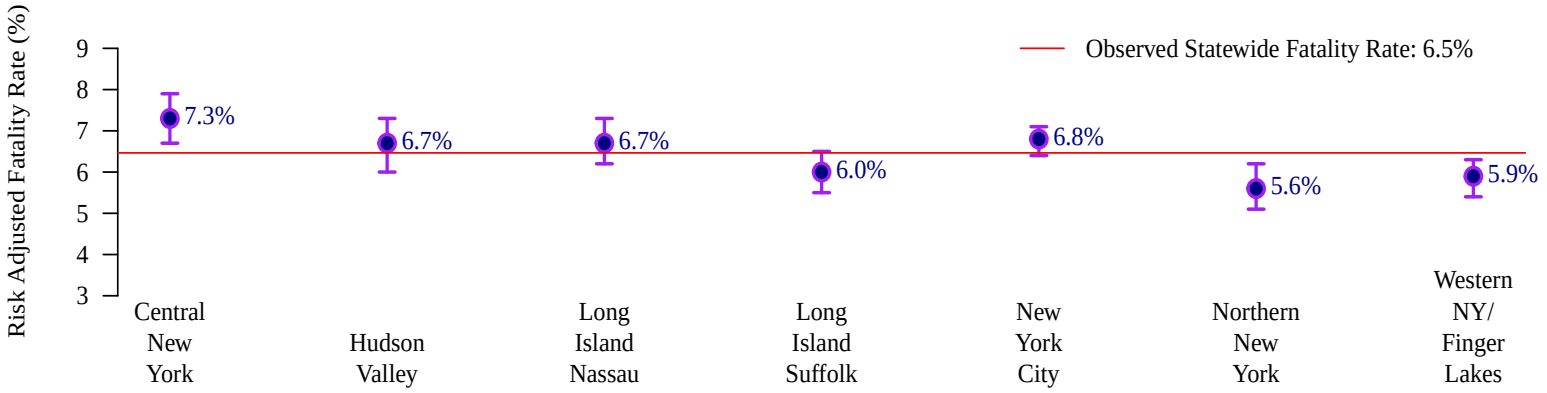
NEW YORK STATE OF OPPORTUNITY. Department of Health

Risk Adjusted Case Fatality Rates by Discharge Year



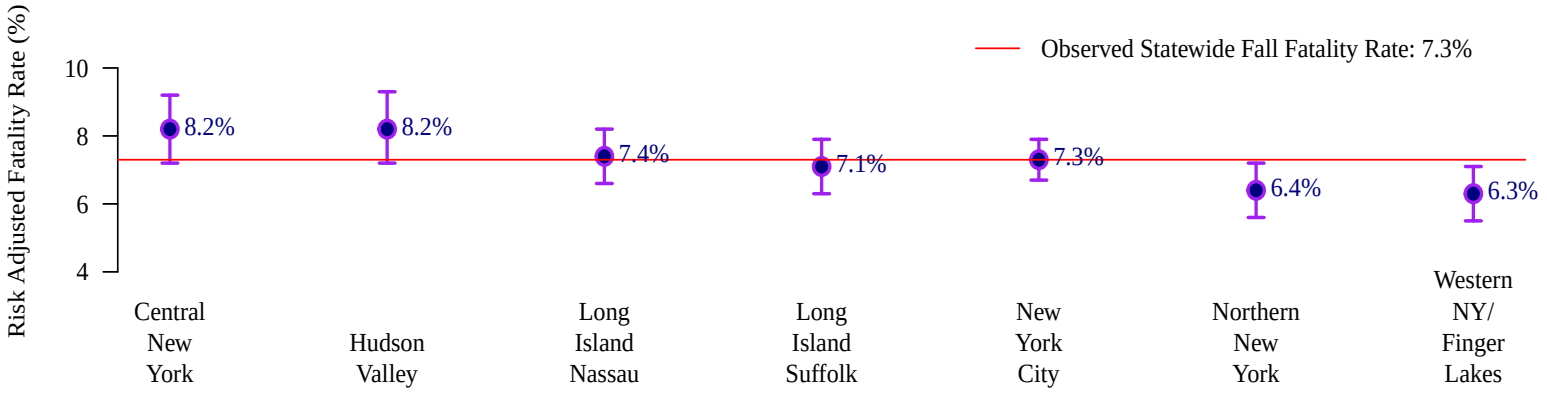
Year	Number of Patients	Observed Fatality Rate	Expected Fatality Rate	Risk Ratio	Risk Adjusted Fatality Rate
2010	17,226	6.2%	5.9%	1.05 ± 0.06	6.8% ± 0.4
2011	16,751	6.6%	6.2%	1.06 ± 0.06	6.9% ± 0.4
2012	16,686	6.6%	6.8%	0.97 ± 0.06	6.3% ± 0.4
2013	15,835	6.5%	7.0%	0.93 ± 0.06	6.0% ± 0.4

Risk Adjusted Case Fatality Rates by Region



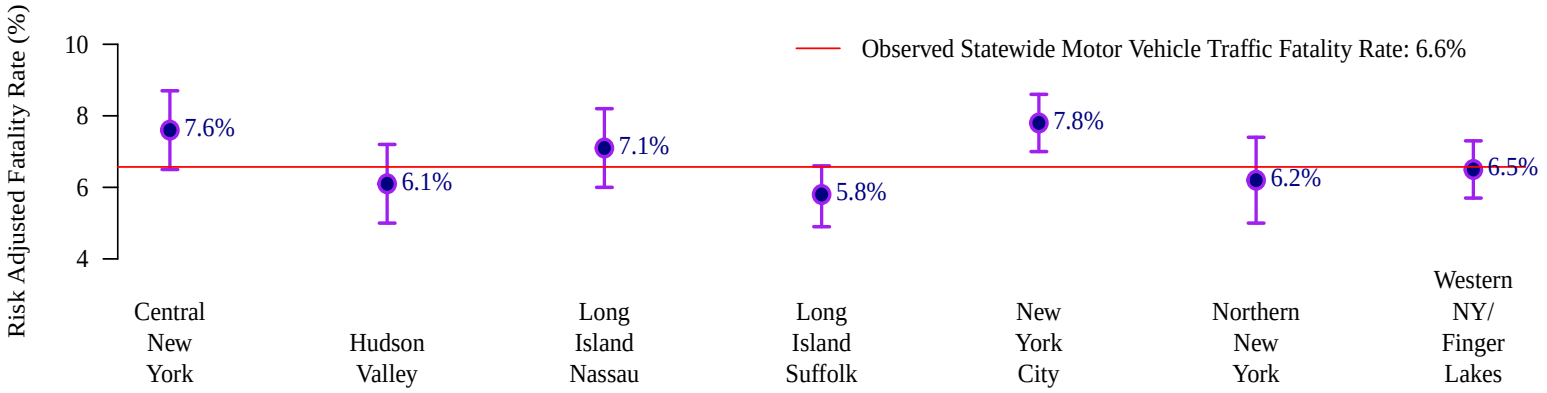
Region	Number of Patients	Observed Fatality Rate	Expected Fatality Rate	Risk Ratio	Risk Adjusted Fatality Rate
Central New York	6,724	8.3%	7.4%	1.12 ± 0.09	7.3% ± 0.6
Hudson Valley	7,301	5.5%	5.4%	1.02 ± 0.10	6.7% ± 0.6
Long Island Nassau	7,271	7.3%	7.1%	1.03 ± 0.08	6.7% ± 0.5
Long Island Suffolk	7,790	6.8%	7.3%	0.93 ± 0.08	6.0% ± 0.5
New York City	21,754	6.0%	5.7%	1.05 ± 0.06	6.8% ± 0.4
Northern New York	6,222	5.7%	6.6%	0.86 ± 0.09	5.6% ± 0.6
Western NY/ Finger Lakes	9,436	6.6%	7.2%	0.92 ± 0.07	5.9% ± 0.4

Fall Trauma: Risk Adjusted Case Fatality Rates by Region



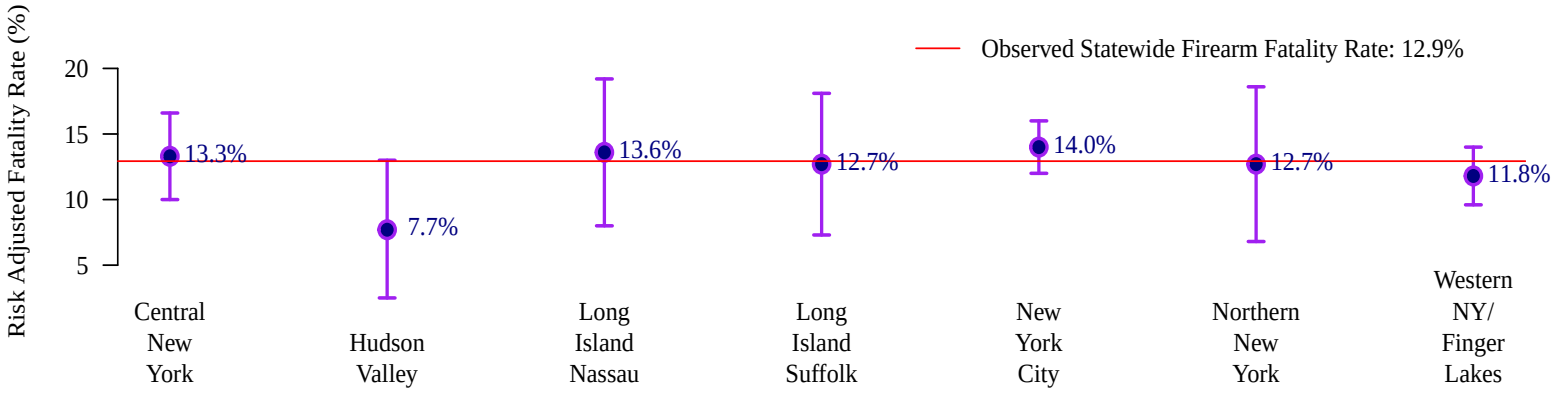
Region	Number of Patients	Observed Fatality Rate	Expected Fatality Rate	Risk Ratio	Risk Adjusted Fatality Rate
Central New York	2,541	9.2%	8.2%	1.12 ± 0.14	8.2% ± 1.0
Hudson Valley	2,917	7.8%	6.9%	1.13 ± 0.14	8.2% ± 1.0
Long Island Nassau	4,249	7.7%	7.6%	1.01 ± 0.10	7.4% ± 0.8
Long Island Suffolk	3,905	7.5%	7.7%	0.97 ± 0.11	7.1% ± 0.8
New York City	8,331	6.4%	6.3%	1.02 ± 0.08	7.3% ± 0.6
Northern New York	2,700	7.6%	8.7%	0.87 ± 0.12	6.4% ± 0.8
Western NY/ Finger Lakes	3,332	6.8%	7.8%	0.87 ± 0.11	6.3% ± 0.8

Motor Vehicle Traffic Trauma: Risk Adjusted Case Fatality Rates by Region



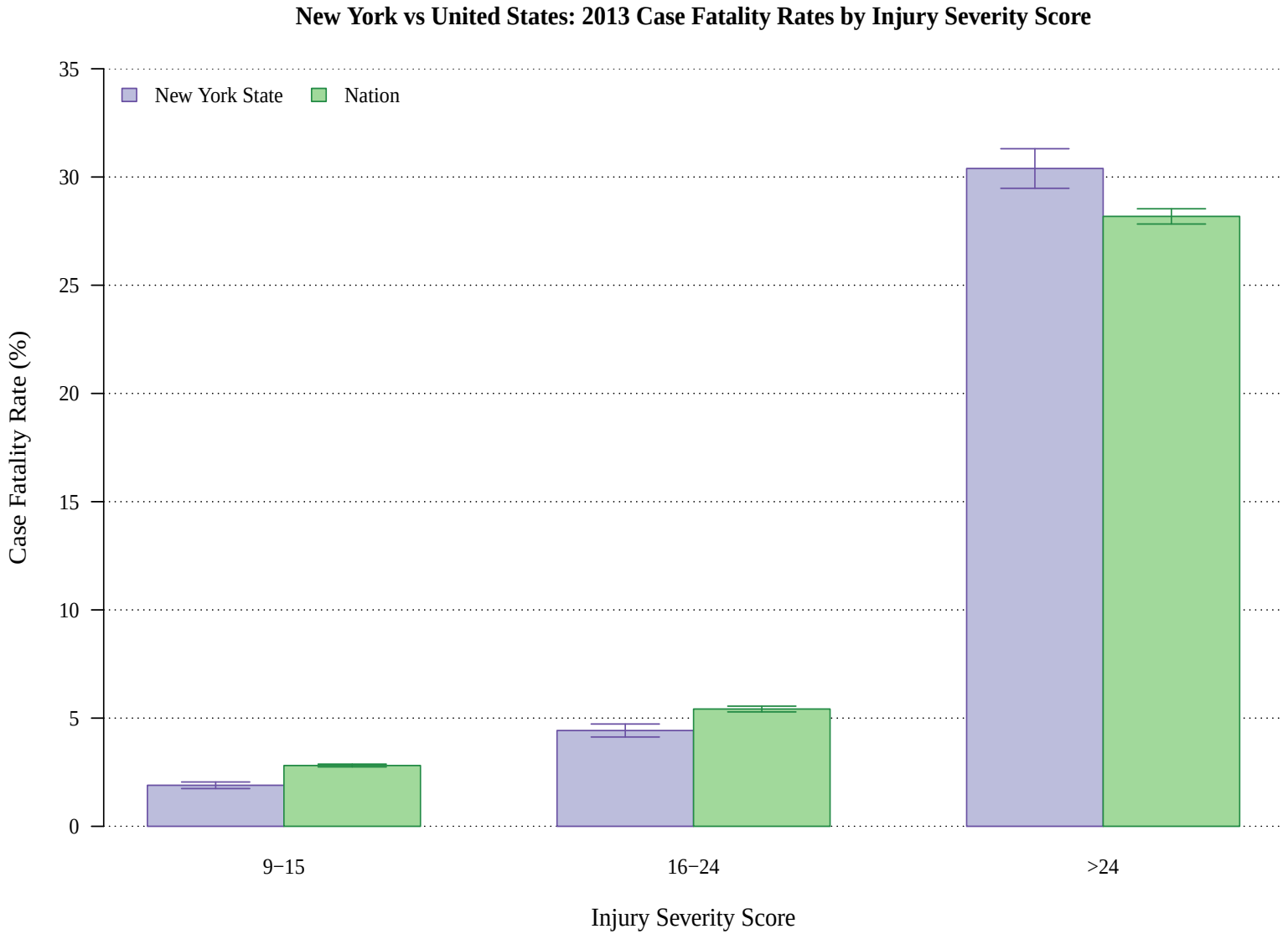
Region	Number of Patients	Observed Fatality Rate	Expected Fatality Rate	Risk Ratio	Risk Adjusted Fatality Rate
Central New York	2,128	8.4%	7.2%	1.17 ± 0.16	7.6% ± 1.1
Hudson Valley	2,565	4.4%	4.8%	0.92 ± 0.17	6.1% ± 1.1
Long Island Nassau	2,023	7.4%	6.8%	1.09 ± 0.17	7.1% ± 1.1
Long Island Suffolk	2,500	6.6%	7.5%	0.88 ± 0.13	5.8% ± 0.8
New York City	5,127	6.8%	5.7%	1.19 ± 0.12	7.8% ± 0.8
Northern New York	1,918	5.1%	5.3%	0.96 ± 0.18	6.2% ± 1.2
Western NY/ Finger Lakes	3,142	7.2%	7.3%	0.99 ± 0.12	6.5% ± 0.8

Firearm Trauma: Risk Adjusted Case Fatality Rates by Region



Region	Number of Patients	Observed Fatality Rate	Expected Fatality Rate	Risk Ratio	Risk Adjusted Fatality Rate
Central New York	207	23.7%	23.0%	1.03 ± 0.25	13.3% ± 3.3
Hudson Valley	127	6.3%	10.5%	0.60 ± 0.40	7.7% ± 5.2
Long Island Nassau	112	17.0%	16.1%	1.06 ± 0.43	13.6% ± 5.6
Long Island Suffolk	104	17.3%	17.6%	0.98 ± 0.42	12.7% ± 5.4
New York City	1,628	10.4%	9.7%	1.07 ± 0.15	14.0% ± 2.0
Northern New York	133	12.0%	12.3%	0.98 ± 0.45	12.7% ± 5.9
Western NY/ Finger Lakes	605	16.0%	17.6%	0.91 ± 0.17	11.8% ± 2.2

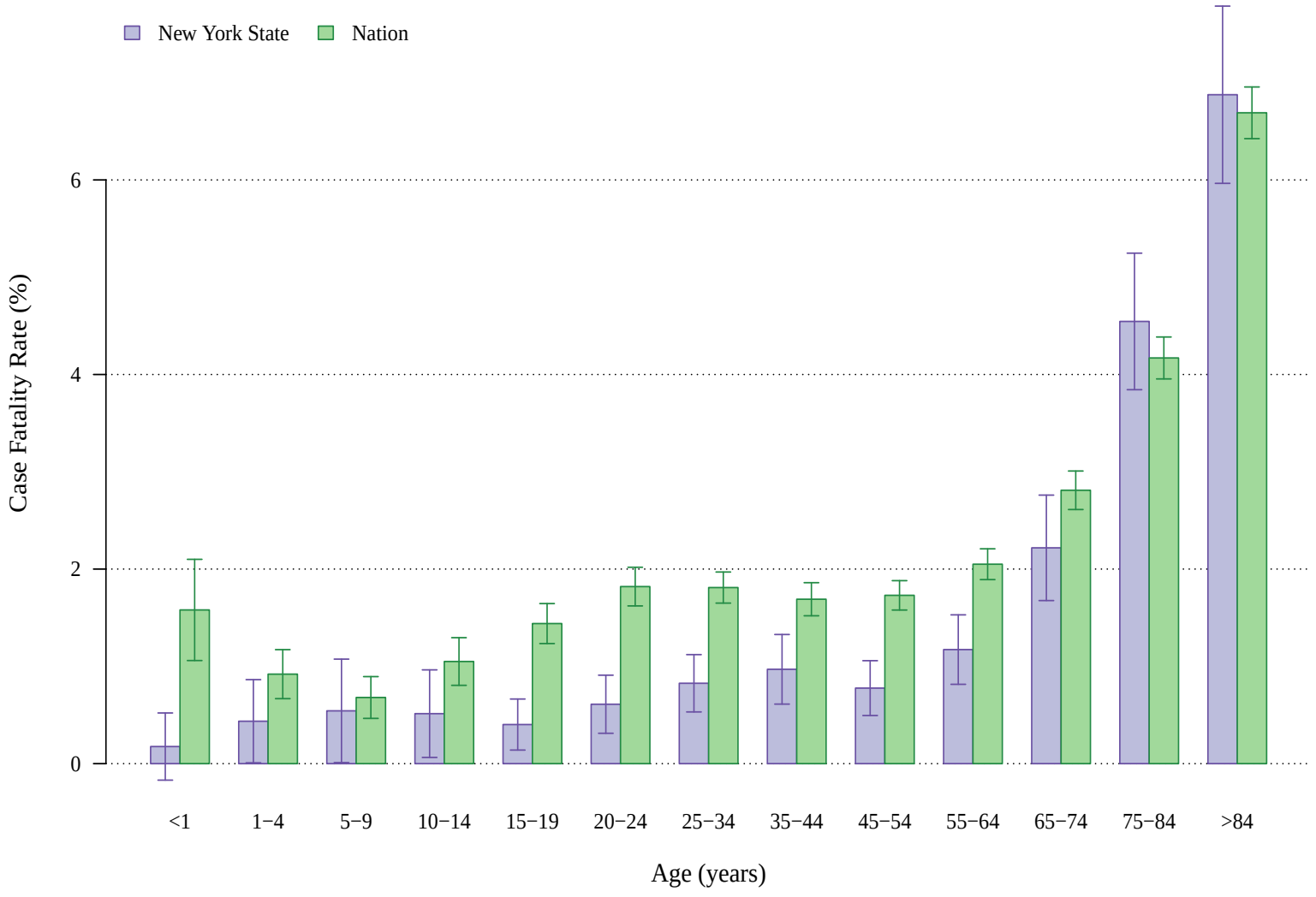
Comparison to National Trauma Data Bank



For this section, since different inclusion criteria is used by the NYSTR and NTBD, to reduce bias in the comparison only trauma with an injury severity score of greater than or equal to 9 was considered.

NEW YORK STATE OF OPPORTUNITY. Department of Health

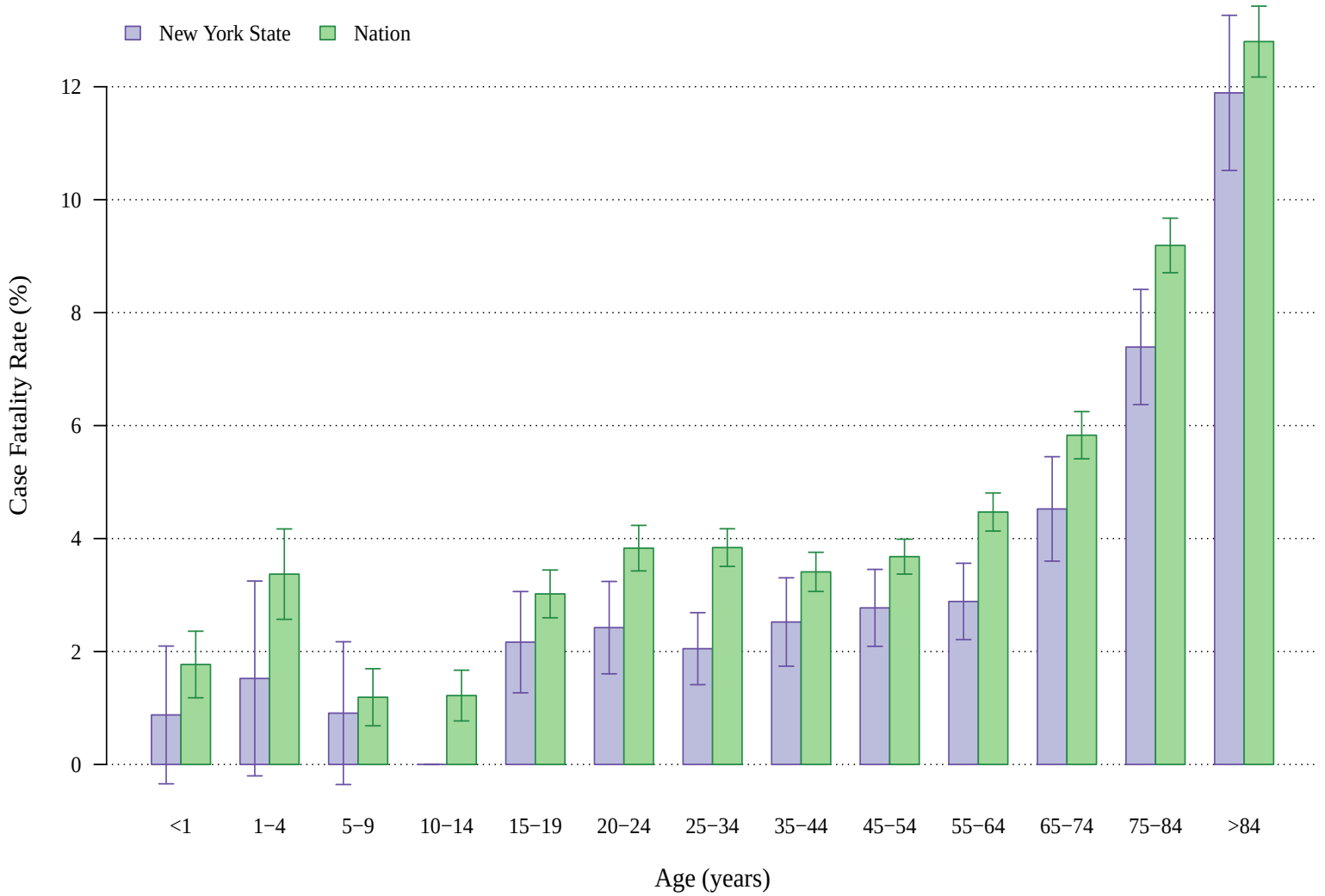
New York vs United States: 2013 Case Fatality Rates by Age Group for Trauma with Injury Severity Score 9−15



For this section, since different inclusion criteria is used by the NYSTR and NTBD, to reduce bias in the comparison only trauma with an injury severity score of greater than or equal to 9 was considered.

NEW YORK STATE OF OPPORTUNITY. Department of Health

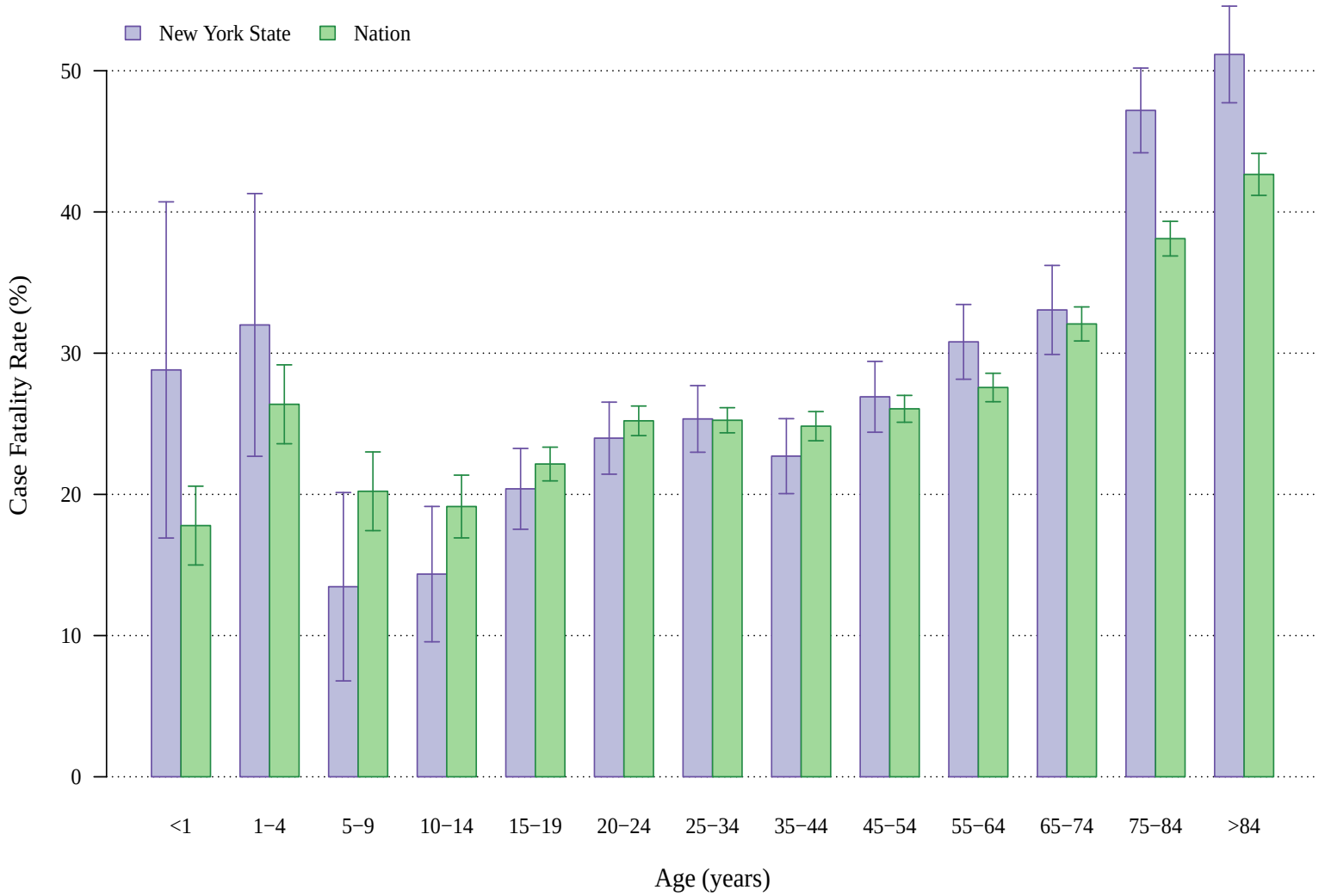
New York vs United States: 2013 Case Fatality Rates by Age Group for Trauma with Injury Severity Score 16−24



For this section, since different inclusion criteria is used by the NYSTR and NTBD, to reduce bias in the comparison only trauma with an injury severity score of greater than or equal to 9 was considered.

NEW YORK STATE OF OPPORTUNITY. Department of Health

New York vs United States: 2013 Case Fatality Rates by Age Group for Trauma with Injury Severity Score 25−75

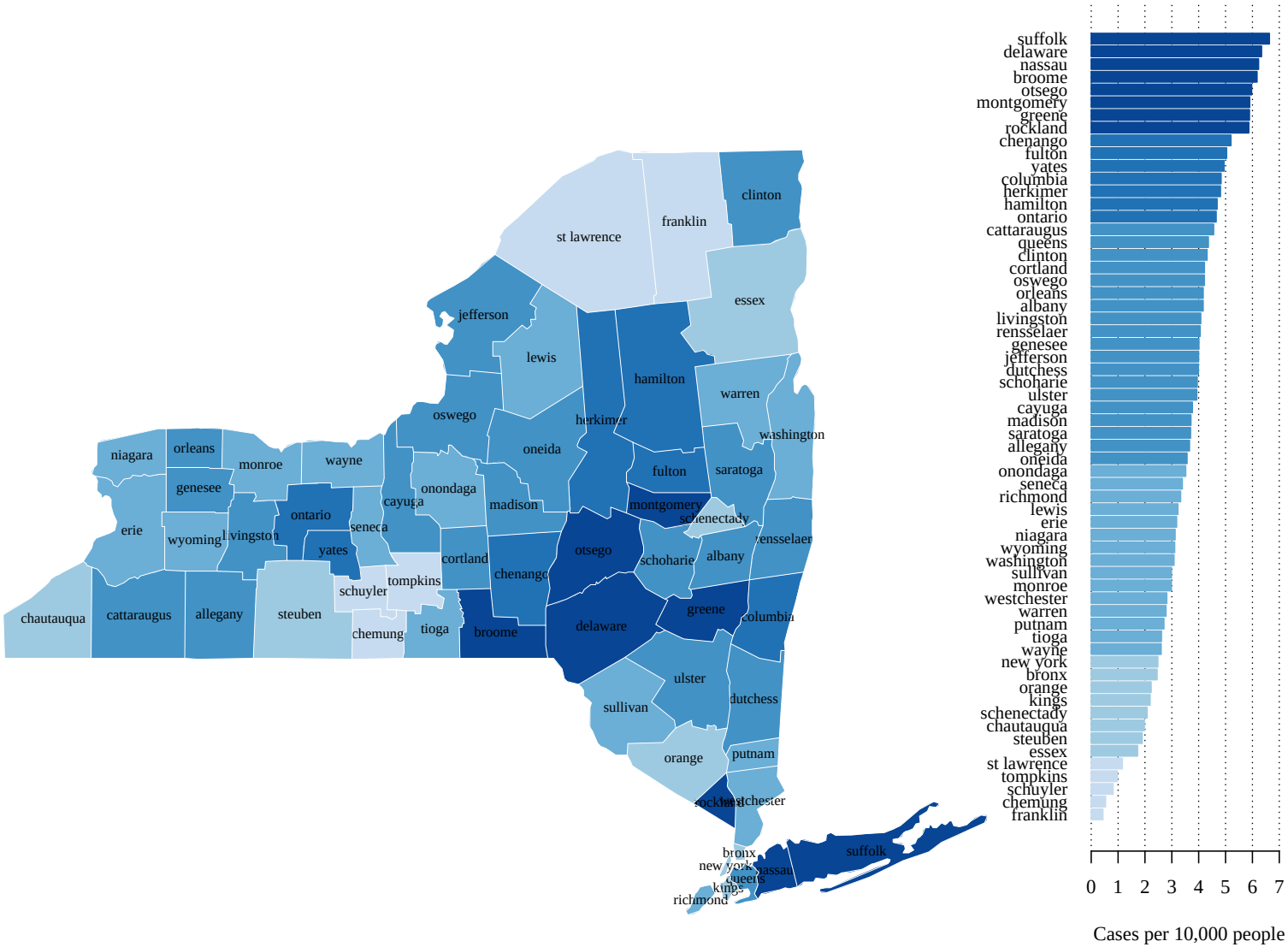


For this section, since different inclusion criteria is used by the NYSTR and NTBD, to reduce bias in the comparison only trauma with an injury severity score of greater than or equal to 9 was considered.

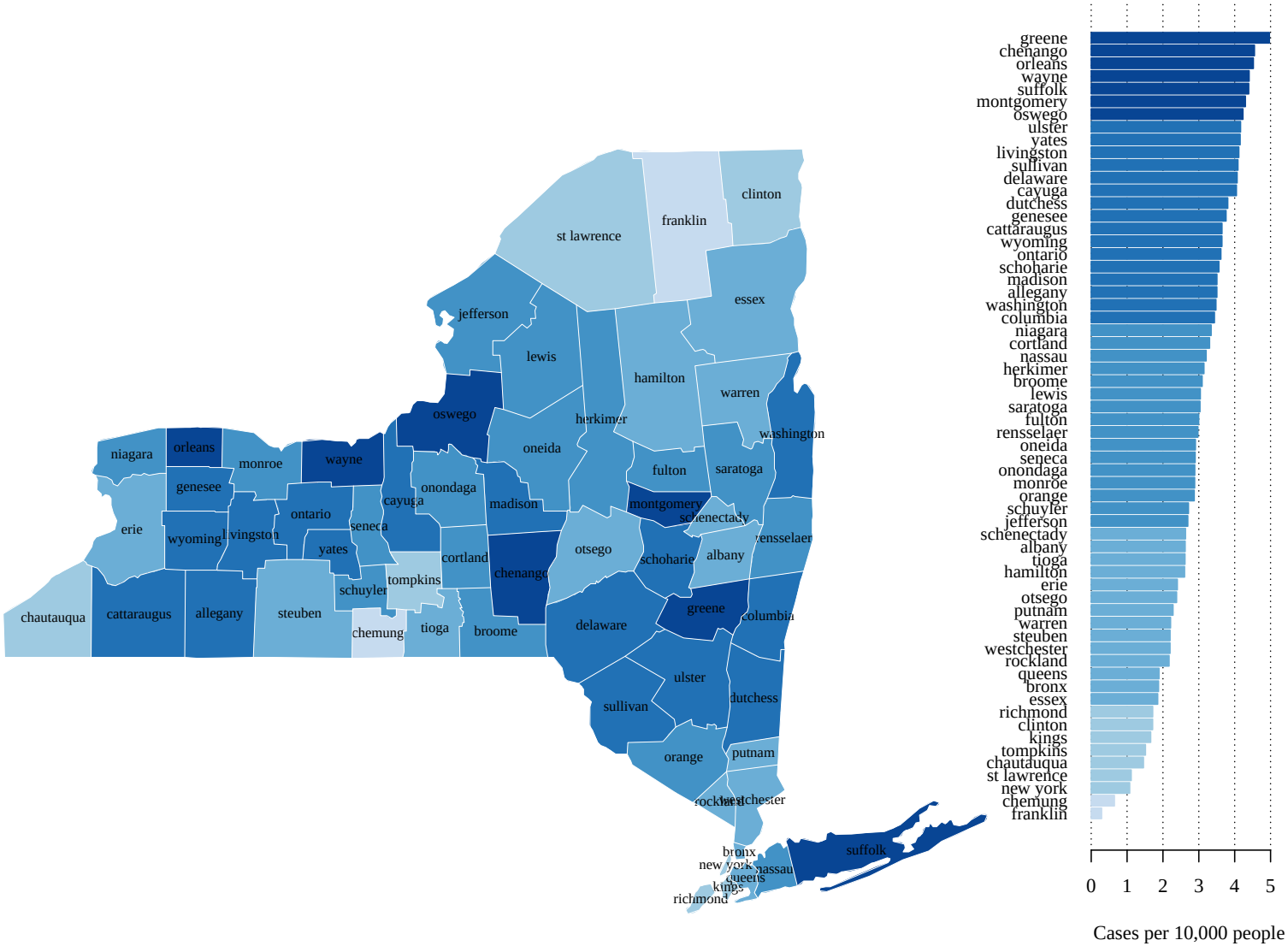
NEW YORK STATE OF OPPORTUNITY. Department of Health

Appendix

Fall Trauma: Average Annual Incidence by County of Residence

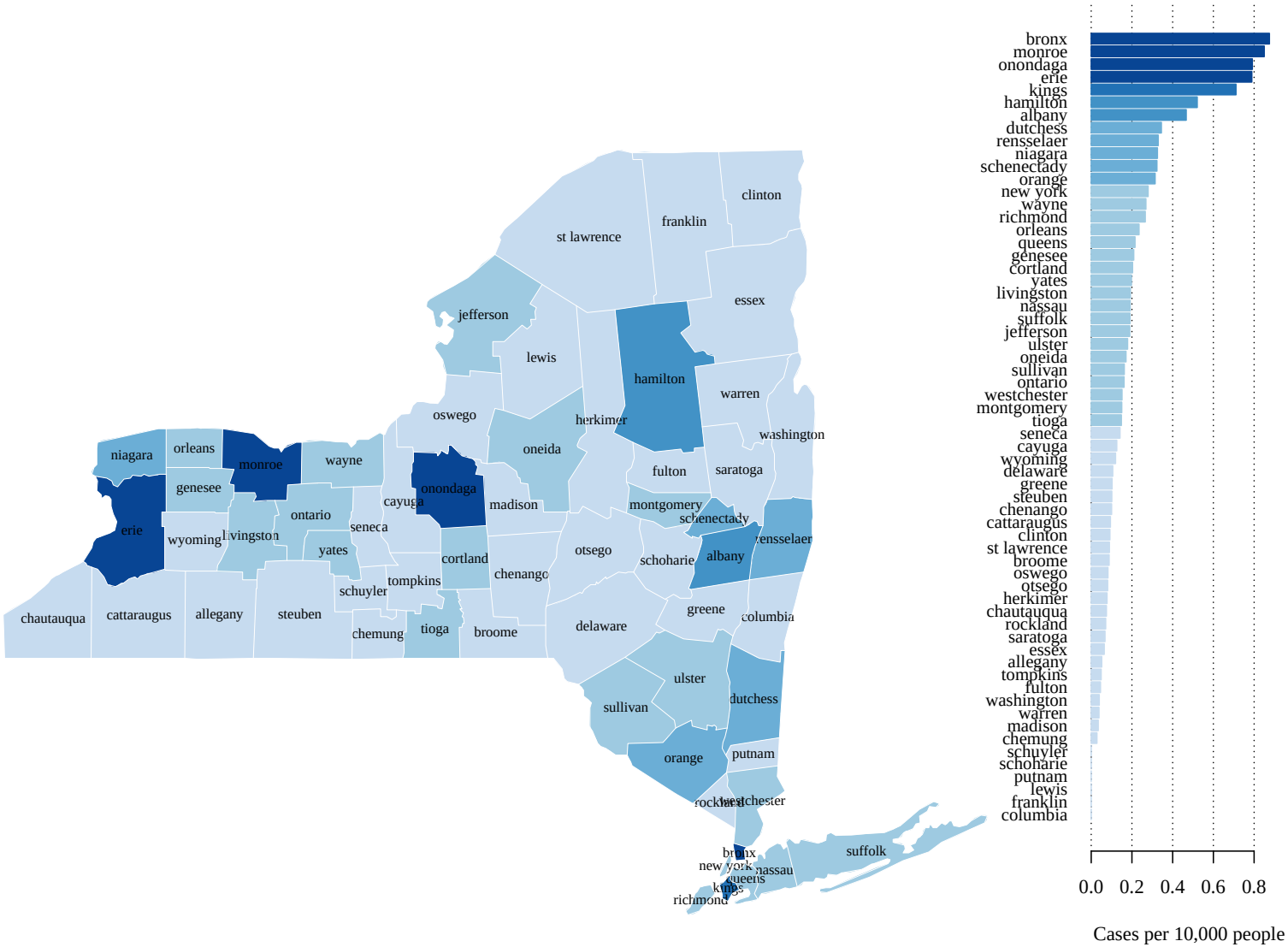


Motor Vehicle Traffic Trauma: Average Annual Incidence by County of Residence

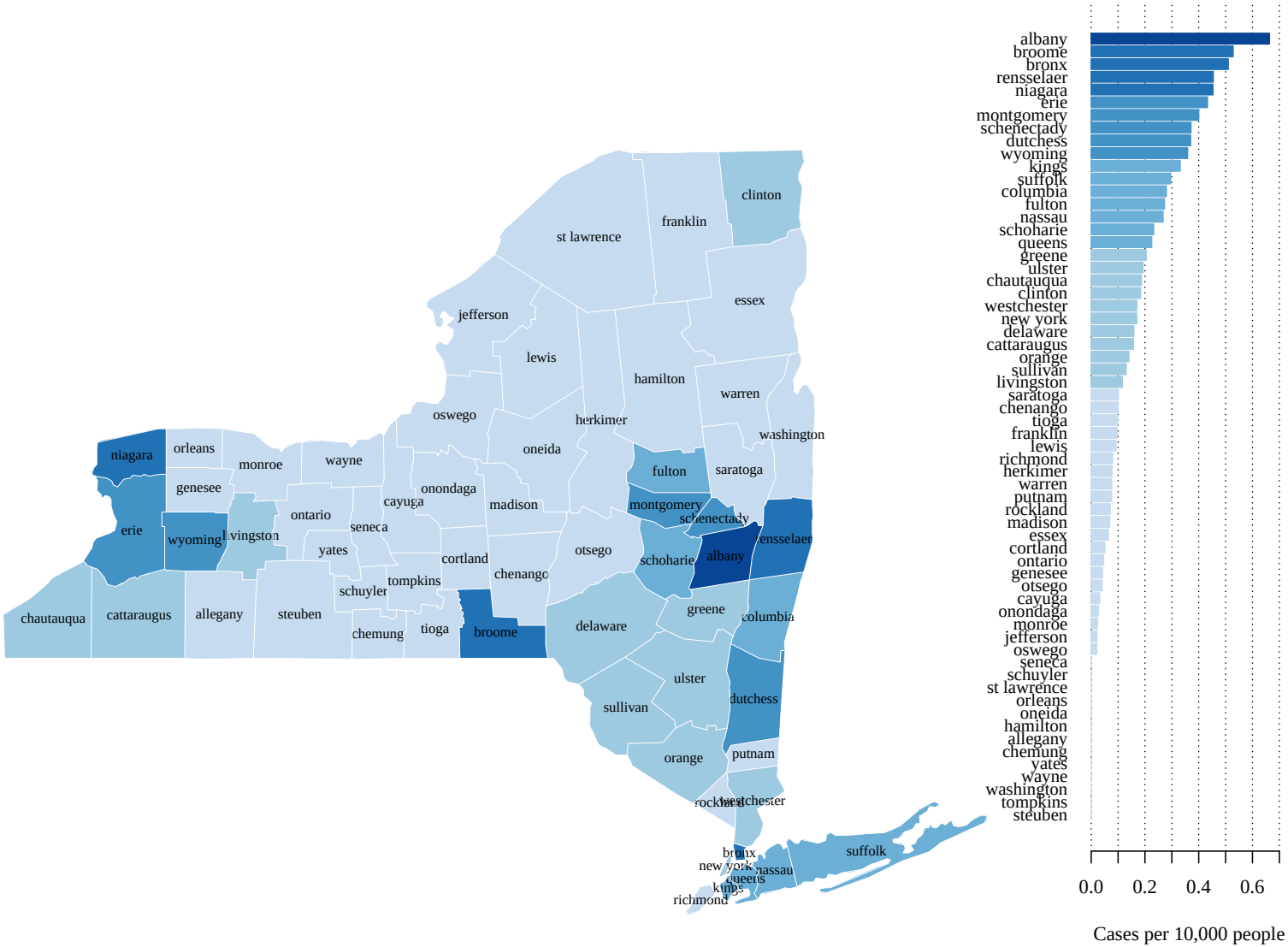


NEW YORK STATE OF OPPORTUNITY. Department of Health

Firearm Trauma: Average Annual Incidence by County of Residence

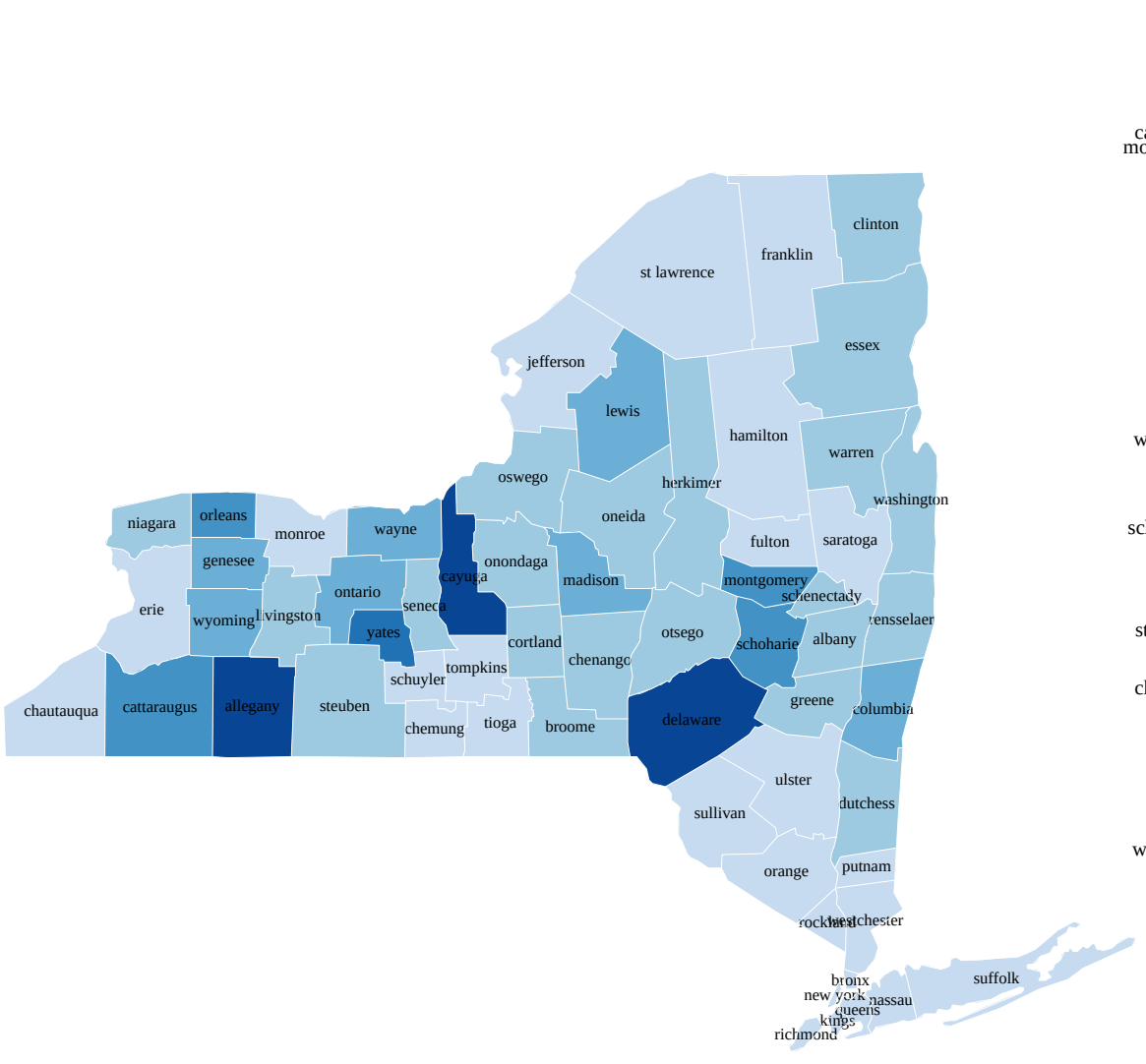


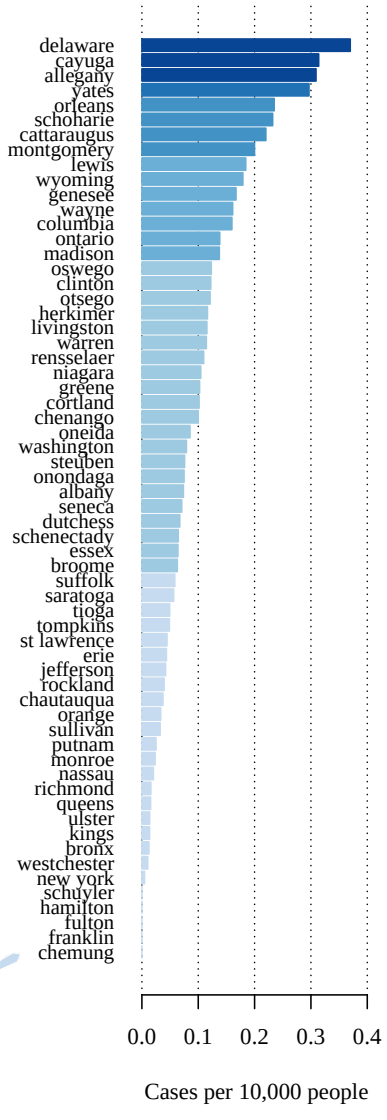
Cut / Pierce Trauma: Average Annual Incidence by County of Residence



NEW YORK STATE OF OPPORTUNITY. Department of Health

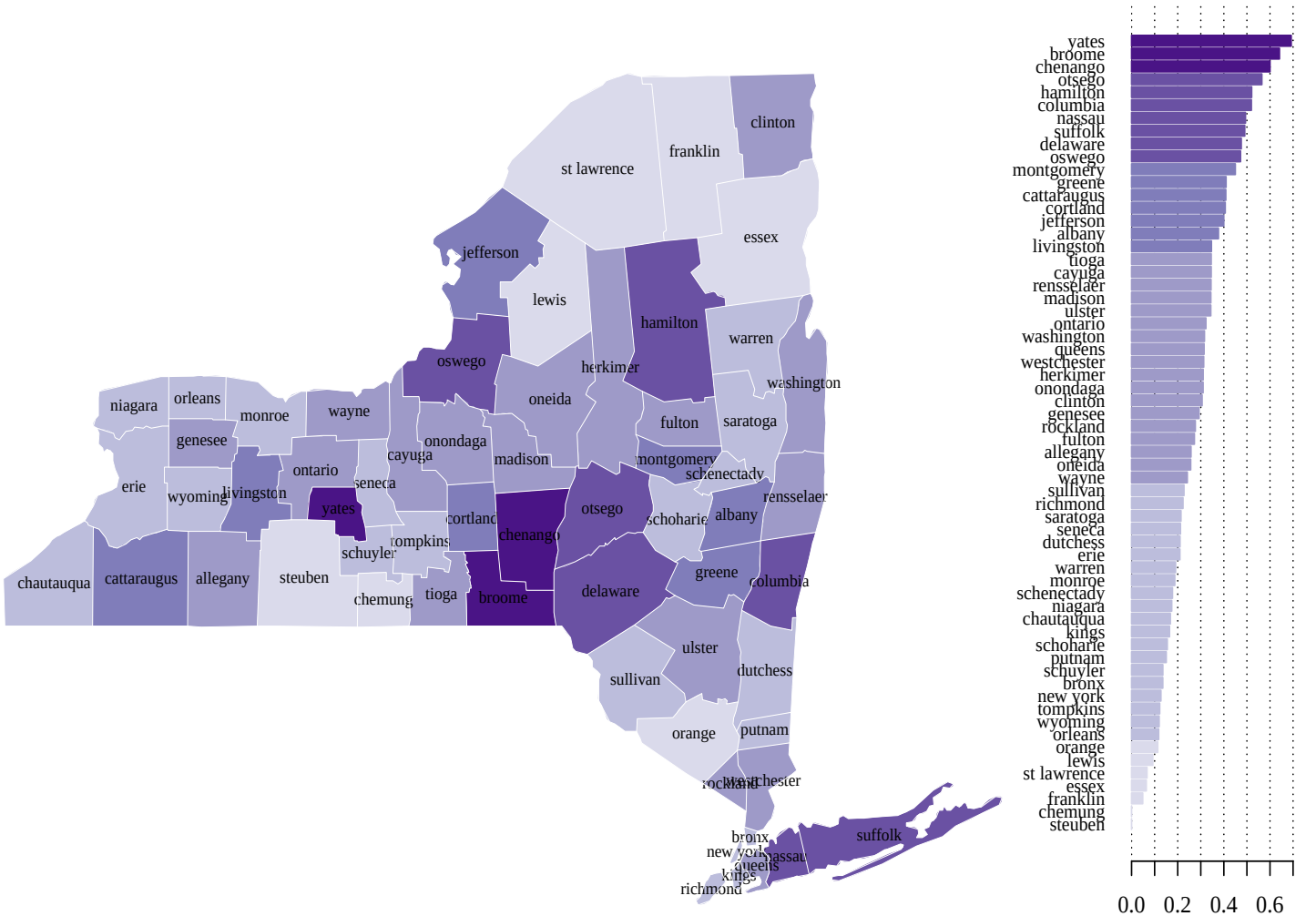
Machinery Trauma: Average Annual Incidence by County of Residence



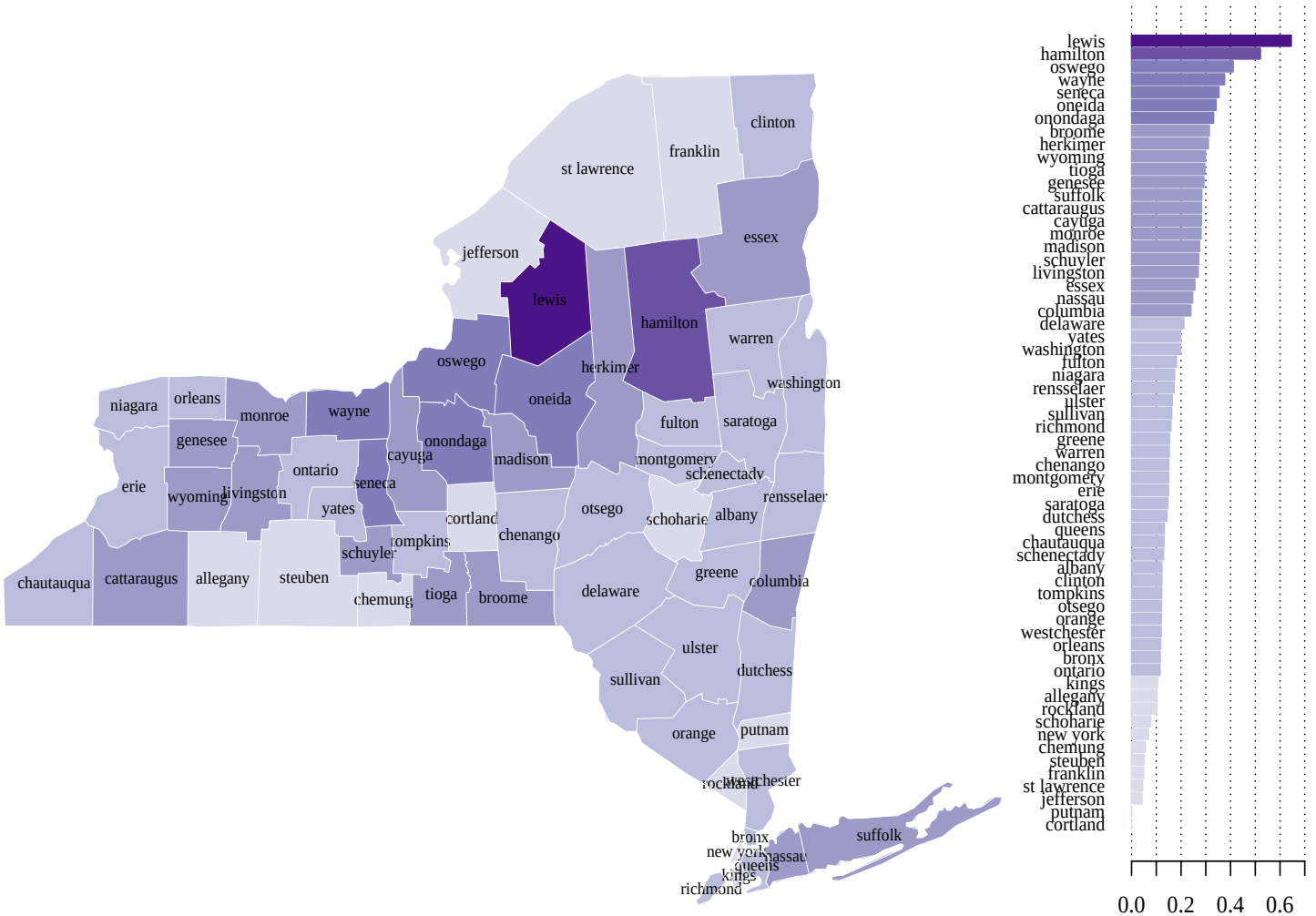


NEW YORK STATE OF OPPORTUNITY. Department of Health

Fall Trauma: Average Annual Mortality by County of Residence

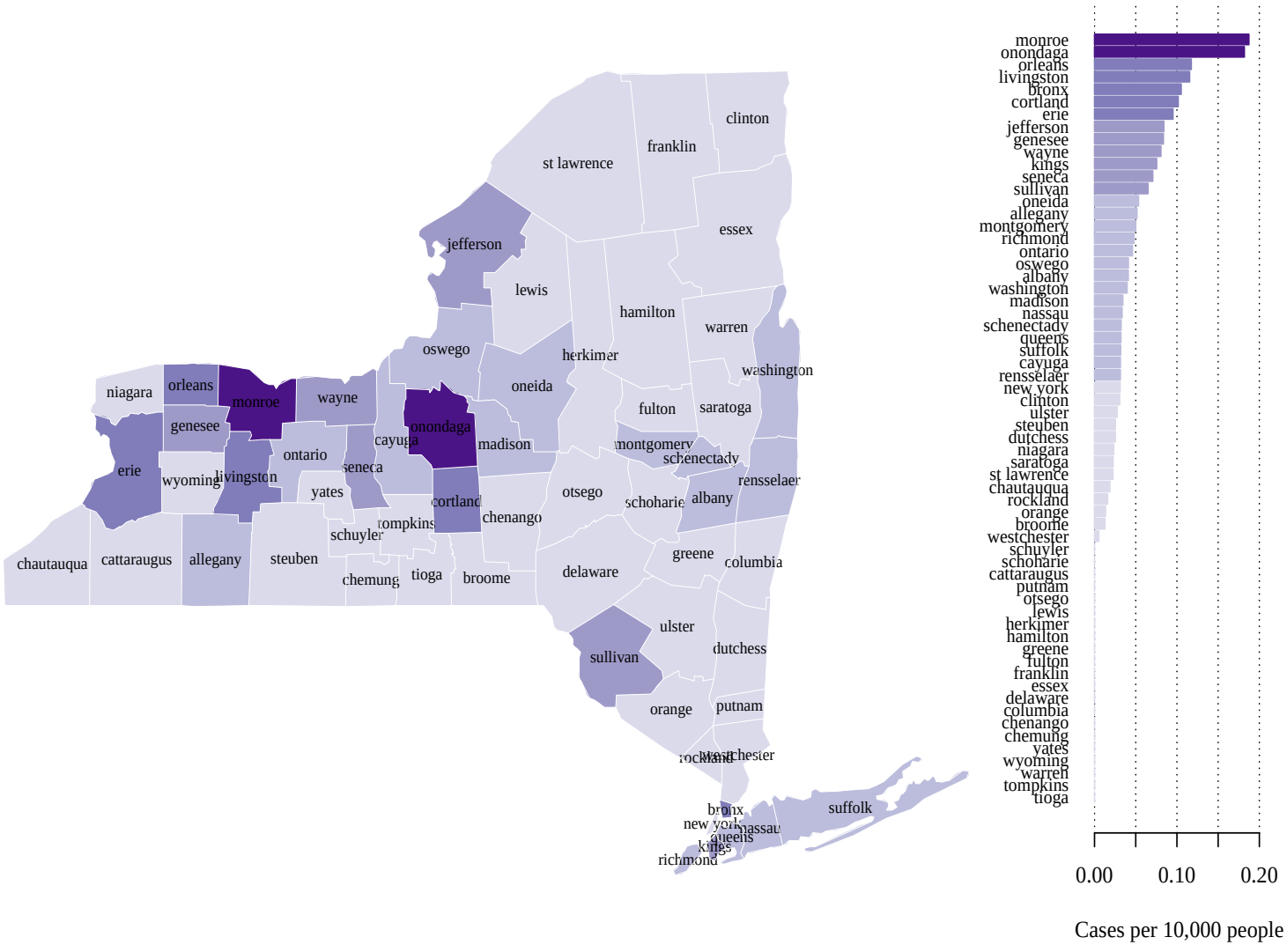


Motor Vehicle Traffic Trauma: Average Annual Mortality by County of Residence



NEW YORK STATE OF OPPORTUNITY. Department of Health

Firearm Trauma: Average Annual Mortality by County of Residence



NEW YORK STATE OF OPPORTUNITY. Department of Health

Deaths Due to Injury
Leading Causes by Age Group
New York State Residents, 2010-2012

	Age Group									
Rank	0<1	1-4	5-9	10-14	15-19	20-24	25-44	45-64	65+	Total
1	Suffocation 27 (32%)	Homicide 16 (28%)	Homicide 6 (23%)	Suicide 10 (19%)	Homicide 96 (31%)	Homicide 159 (26%)	Poisoning 613 (30%)	Poisoning 684 (29%)	Fall 1,013 (45%)	Suicide 1,581 (20%)
2	Homicide 14 (17%)	Suffocation 7 (12%)	MVT^, Unspecified 5 (20%)	MVT^, Pedestrian 8 (16%)	Suicide 73 (23%)	Poisoning 123 (20%)	Suicide 492 (24%)	Suicide 633 (27%)	Suicide 254 (11%)	Poisoning 1,518 (20%)
3	*	MVT^, Pedestrian 5 (9%)	Fire / Flame 4 (14%)	Homicide 7 (14%)	MVT^, Occupant 30 (10%)	Suicide 118 (19%)	Homicide 326 (16%)	Fall 180 (8%)	Unspecified 196 (9%)	Fall 1,257 (16%)
4	*	Fire / Flame 4 (7%)	MVT^, Pedestrian 4 (14%)	MVT^, Unspecified 4 (8%)	MVT^, Unspecified 29 (9%)	MVT^, Unspecified 52 (8%)	MVT^, Unspecified 82 (4%)	Homicide 126 (5%)	Suffocation 136 (6%)	Homicide 790 (10%)
5	*	MVT^, Unspecified 3 (5%)	*	Fire / Flame 3 (6%)	Poisoning 23 (8%)	MVT^, Occupant 43 (7%)	MVT^, Motorcyclist 76 (4%)	MVT^, Pedestrian 93 (4%)	MVT^, Pedestrian 102 (5%)	MVT^, Unspecified 354 (5%)
6	*	*	*	Transport, Non-Traffic 3 (6%)	MVT^, Pedestrian 13 (4%)	MVT^, Motorcyclist 21 (3%)	MVT^, Occupant 76 (4%)	MVT^, Unspecified 85 (4%)	MVT^, Occupant 94 (4%)	MVT^, Occupant 313 (4%)
7	*	*	*	MVT^, Pedal Cyclist 2 (4%)	MVT^, Motorcyclist 7 (2%)	MVT^, Pedestrian 19 (3%)	MVT^, Pedestrian 67 (3%)	MVT^, Occupant 65 (3%)	MVT^, Unspecified 92 (4%)	MVT^, Pedestrian 311 (4%)
8	*	*	*	*	MVT^, Pedal Cyclist 4 (1%)	Fall 8 (1%)	Fall 49 (2%)	Suffocation 51 (2%)	Poisoning 70 (3%)	Unspecified 265 (3%)
9	*	*	*	*	Fall 4 (1%)	Pedestrian, Non-Traffic 6 (1%)	Suffocation 21 (1%)	MVT^, Motorcyclist 45 (2%)	Fire / Flame 55 (2%)	Suffocation 249 (3%)
10		*	*	*	Pedestrian, Non-Traffic 4 (1%)	MVT^, Pedal Cyclist 5 (1%)	Unspecified 18 (1%)	Unspecified 42 (2%)	Homicide 36 (2%)	MVT^, Motorcyclist 155 (2%)
Yearly Average (percent of age group)										

MVT^ = Motor Vehicle Traffic

*Data based on three year total frequencies of less than six are not reportable

Intentional Injury

Unintentional Injury

Source: NYSDOH, Bureau of Occupational Health and Injury Prevention

www.health.ny.gov/prevention/injury_prevention/

NEW YORK STATE OF OPPORTUNITY. Department of Health

Emergency Department (ED)† Visits Due to Injury
Leading Causes by Age Group
New York State Residents, 2010-2012

	Age Group									
Rank	0<1	1-4	5-9	10-14	15-19	20-24	25-44	45-64	65+	Total
1	Fall 7,283 (52%)	Fall 43,695 (42%)	Fall 30,735 (35%)	Fall 29,891 (27%)	Struck By, Against 26,336 (20%)	Fall 21,135 (15%)	Fall 73,014 (18%)	Fall 86,482 (29%)	Fall 88,930 (57%)	Fall 403,647 (28%)
2	Struck By, Against 1,265 (9%)	Struck By, Against 15,555 (15%)	Struck By, Against 17,734 (20%)	Struck By, Against 27,152 (24%)	Fall 22,481 (17%)	Struck By, Against 16,882 (12%)	Overexertion 45,004 (11%)	Overexertion 27,973 (9%)	Unspecified 11,674 (7%)	Struck By, Against 184771 (13%)
3	Unspecified 864 (6%)	Natural / Environmental 8,784 (8%)	Natural / Environmental 6,500 (7%)	Overexertion 10,826 (10%)	Overexertion 14,196 (11%)	Assault 15,436 (11%)	Struck By, Against 44,109 (11%)	Cut / Pierce 27,445 (9%)	Struck By, Against 8,864 (6%)	Overexertion 124504 (9%)
4	Natural / Environmental 691 (5%)	Unspecified 5,376 (5%)	Cut / Pierce 5,287 (6%)	Cut / Pierce 6,296 (6%)	Assault 12,829 (10%)	MVT^, Occupant 15,270 (11%)	Cut / Pierce 41,710 (10%)	Struck By, Against 26,875 (9%)	Cut / Pierce 7,773 (5%)	Cut / Pierce 116751 (8%)
5	MVT^, Occupant 484 (3%)	Cut / Pierce 4,276 (4%)	Unspecified 4,110 (5%)	Unspecified 5,756 (5%)	MVT^, Occupant 10,491 (8%)	Cut / Pierce 14,042 (10%)	MVT^, Occupant 38,715 (10%)	Unspecified 24,990 (8%)	MVT^, Occupant 7,405 (5%)	MVT^, Occupant 104768 (7%)
6	Hot Object / Scald 421 (3%)	Overexertion 3,361 (3%)	Overexertion 3,424 (4%)	Assault 4,720 (4%)	Cut / Pierce 9,592 (7%)	Overexertion 13,014 (9%)	Unspecified 33,618 (8%)	MVT^, Occupant 24,778 (8%)	Overexertion 6,469 (4%)	Unspecified 104289 (7%)
7	Poisoning 365 (3%)	Poisoning 3,123 (3%)	MVT^, Occupant 2,705 (3%)	Natural / Environmental 4,149 (4%)	Unspecified 7,910 (6%)	Unspecified 9,990 (7%)	Assault 32,793 (8%)	Natural / Environmental 13,420 (5%)	Natural / Environmental 5,220 (3%)	Assault 81,464 (6%)
8	Cut / Pierce 329 (2%)	Hot Object / Scald 2,062 (2%)	Pedal Cyclist, Non-Traffic 2,231 (3%)	Pedal Cyclist, Non-Traffic 3,165 (3%)	Natural / Environmental 4,272 (3%)	Natural / Environmental 5,461 (4%)	Natural / Environmental 15,453 (4%)	Assault 12,733 (4%)	Poisoning 1,366 (1%)	Poisoning 15,844 (1%)
9	Overexertion 237 (2%)	MVT^, Occupant 1,976 (2%)	Assault 1,136 (1%)	MVT^, Occupant 2,943 (3%)	Self-Inflicted 2,117 (2%)	Self-Inflicted 1,614 (1%)	Hot Object / Scald 3,995 (1%)	Poisoning 3,007 (1%)	Assault 1,204 (1%)	Pedal Cyclist, Non-Traffic 14,578 (1%)
10	Suffocation 185 (1%)	Suffocation 700 (1%)	Hot Object / Scald 835 (1%)	Transport, Non-Traffic 1,011 (1%)	Pedal Cyclist, Non-Traffic 1,828 (1%)	Hot Object / Scald 1,459 (1%)	Poisoning 3,970 (1%)	MVT^, Pedestrian 2,920 (1%)	MVT^, Pedestrian 1,100 (1%)	Hot Object / Scald 13,769 (1%)
	Yearly Average (percent of age group)									

†The incidence of ED visits does not include those that were subsequently admitted into the hospital

MVT^ = Motor Vehicle Traffic

Intentional Injury

Unintentional Injury

Source: NYSDOH, Bureau of Occupational Health and Injury Prevention

www.health.ny.gov/prevention/injury_prevention/

SPARCS December 2013

NEW YORK STATE OF OPPORTUNITY. Department of Health

Hospitalizations Due to Injury
Leading Causes by Age Group
New York State Residents, 2010-2012

	Age Group									
Rank	0<1	1-4	5-9	10-14	15-19	20-24	25-44	45-64	65+	Total
1	Fall 406 (39%)	Fall 938 (31%)	Fall 881 (42%)	Fall 764 (27%)	Self-Inflicted 1,422 (22%)	Assault 1,627 (20%)	Fall 5,076 (19%)	Fall 14,397 (38%)	Fall 52,640 (73%)	Fall 76,790 (48%)
2	Hot Object / Scald 117 (11%)	Poisoning 434 (14%)	Natural / Environmental 153 (7%)	Self-Inflicted 296 (11%)	Assault 1,204 (18%)	Self-Inflicted 1,454 (18%)	Self-Inflicted 4,208 (16%)	Poisoning 3,893 (10%)	Unspecified 4,659 (6%)	Self-Inflicted 10,896 (7%)
3	Assault 87 (8%)	Hot Object / Scald 426 (14%)	MVT^, Pedestrian 137 (7%)	Struck By, Against 271 (10%)	Fall 783 (12%)	Fall 904 (11%)	Assault 3,403 (13%)	Self-Inflicted 2,907 (8%)	Poisoning 2,069 (3%)	Poisoning 9,987 (6%)
4	Unspecified 77 (7%)	Natural / Environmental 258 (8%)	Struck By, Against 133 (6%)	MVT^, Pedestrian 200 (7%)	MVT^, Occupant 636 (10%)	MVT^, Occupant 884 (11%)	Poisoning 2,503 (9%)	Unspecified 2,543 (7%)	MVT^, Occupant 1,566 (2%)	Unspecified 9,075 (6%)
5	Suffocation 56 (5%)	Struck By, Against 127 (4%)	Hot Object / Scald 87 (4%)	Assault 178 (6%)	Struck By, Against 364 (6%)	Poisoning 545 (7%)	MVT^, Occupant 1,861 (7%)	MVT^, Occupant 1,774 (5%)	Natural / Environmental 1,132 (2%)	Assault 8,482 (5%)
6	Poisoning 56 (5%)	Unspecified 83 (3%)	Poisoning 74 (4%)	Pedal Cyclist, Non-Traffic 134 (5%)	Poisoning 329 (5%)	MVT^, Motorcyclist 246 (3%)	Unspecified 1,221 (5%)	Assault 1,604 (4%)	Struck By, Against 971 (1%)	MVT^, Occupant 6,917 (4%)
7	Natural / Environmental 42 (4%)	MVT^, Pedestrian 65 (2%)	Pedal Cyclist, Non-Traffic 73 (3%)	Natural / Environmental 114 (4%)	MVT^, Pedestrian 215 (3%)	MVT^, Pedestrian 224 (3%)	Natural / Environmental 843 (3%)	Natural / Environmental 1,271 (3%)	Suffocation 742 (1%)	Struck By, Against 3,668 (2%)
8	Struck By, Against 26 (3%)	Assault 63 (2%)	MVT^, Occupant 64 (3%)	Transport, Non-Traffic 87 (3%)	Natural / Environmental 147 (2%)	Struck By, Against 221 (3%)	Struck By, Against 742 (3%)	MVT^, Pedestrian 907 (2%)	MVT^, Pedestrian 642 (1%)	MVT^, Pedestrian 3,088 (2%)
9	MVT^, Occupant 10 (1%)	Suffocation 61 (2%)	Cut / Pierce 61 (3%)	Poisoning 84 (3%)	Unspecified 143 (2%)	Unspecified 214 (3%)	MVT^, Pedestrian 696 (3%)	Struck By, Against 813 (2%)	Self-Inflicted 598 (1%)	Cut / Pierce 1,955 (1%)
10	Drowning / Submersion 7 (1%)	MVT^, Occupant 45 (1%)	Unspecified 53 (3%)	Unspecified 83 (3%)	Transport, Non-Traffic 138 (2%)	Natural / Environmental 195 (2%)	MVT^, Motorcyclist 649 (2%)	Cut / Pierce 596 (2%)	Overexertion 543 (1%)	Hot Object / Scald 1,806 (1%)
Yearly Average (percent of age group)										

MVT^ = Motor Vehicle Traffic

Intentional Injury

Unintentional Injury

Source: NYSDOH, Bureau of Occupational Health and Injury Prevention

www.health.ny.gov/prevention/injury_prevention/

SPARCS December 2013

NEW YORK STATE OF OPPORTUNITY. Department of Health

Characteristics of Injury Incidence
Deaths, Hospitalizations, and Emergency Department† (ED) Visits
New York State Residents, 2010-2012

		Deaths		Hospitalizations		ED Visits	
		Mean Annual Frequency	Rate per 100,000 Residents	Mean Annual Frequency	Rate per 100,000 Residents	Mean Annual Frequency	Rate per 100,000 Residents
Total		7,784	39.8	161,270	825.4	1,447,251	7,407.5
Age Group	0<1	84	34.9	1,038	431.8	13,998	5,820.7
	1-4	55	5.8	3,035	320.8	104,854	11,082.9
	5-9	27	2.3	2,089	178.4	87,310	7,454.2
	10-14	53	4.4	2,810	235.6	111,210	9,323.1
	15-19	311	23.4	6,531	492.5	133,457	10,062.8
	20-24	619	43.6	8,013	564.7	139,113	9,803.3
	25-44	2,048	38.7	26,946	509.6	402,900	7,620.1
	45-64	2,344	44.6	38,242	726.9	298,196	5,668.2
	65+	2,236	83	72,565	2693.9	156,213	5,799.4
Gender	Male	5,372	56.6	79,928	841.2	764,718	8,061.6
	Female	2,412	24	81,340	810.3	682,502	6,789.9
	Unknown	*	n/a	*	n/a	31	n/a
Percent Traumatic Brain Injury		29%		12%		8%	
Mean Charge per Hospitalization or ED Visit		n/a		$37,142		$1,587	
Mean One Year Total Hospitalization or ED Visit Charges		n/a		$5,989,883,314		$2,296,544,396	
Three Year Total Hospitalization or ED Visit Charges		n/a		$17,969,649,941		$6,889,633,188	
Average Length of Hospital Stay (Days)		n/a		6		n/a	

†The incidence of ED visits does not include patients who were subsequently admitted into the hospital
Rate = Frequency / Population * 100,000
*Data based on frequencies less than six not reported

Source: NYSDOH, Bureau of Occupational Health and Injury Prevention
www.health.ny.gov/prevention/injury_prevention
SPARCS December 2013
Vital Statistics Death File February 2014

NEW YORK STATE OF OPPORTUNITY. Department of Health

Materials and Methods

1. Data Sources

Trauma Registry - Established in 1993, the New York State Trauma Registry (NYSTR) receives reports from designated trauma centers on patients identified and treated as being moderately to severely traumatically injured (Inclusion Criteria in Appendix Inclusion Criteria in Appendix). The reports contains variables specified by the New York State Trauma Registry including patients' demographic information, diagnoses and treatments. A very small portion of the trauma reports in the NYSTR were submitted from several non-trauma centers/hospitals.

Statewide Planning and Research Cooperative System (SPARCS) - Implemented by the New York State Department of Health (NYSDOH) in 1979, SPARCS is a comprehensive, integrated information system available to assist hospitals and organizations in the health care industry with healthcare resource planning, financial analysis, decision making, and surveillance of New York State. SPARCS receives, processes, stores, and analyzes the inpatient and emergency department from data from all hospitals in New York. Each health care provider submits its SPARCS data, as mandated, in the uniform, computer-readable format described in the Universal Data Set.

Surveillance, Epidemiology, and End Results Program (SEER) - The population estimates used to calculate trauma incidence and mortality were from Surveillance, Epidemiology, and End Results Program (SEER) of the National Cancer Institute. These data were produced by the US Census Bureau's Population Estimates Program, in collaboration with the National Center for Health Statistics and with support from the National Cancer Institute.[3]

National Trauma Data Bank (NTDB) - NTDB collects trauma registry data from participating trauma centers across the U.S. on an annual basis. The case fatality rates calculated using NYSTR 2013 data were compared with that published on NTDB 2014 Annual Report.[4]

2. The Cohort

A cohort used for generating the NYSTR Summary Report was constructed with NYSTR data from 2010 through 2013 submitted from the certified trauma centers. Trauma records submitted by non-trauma centers were excluded in the data analyses.

3. Data Matching

A dataset containing all patients diagnosed with traumatic injuries and were treated in New York State trauma centers for discharge years 2010 - 2013 was created from SPARCS hospital inpatients and emergency department (ED) discharge files. This data file was matched to Trauma Registry records for the same discharge year period by using identifying variables such as hospital's Permanent Facility Identifier, admission dates, discharge dates, hospital's medical record numbers, Patients' date of birth, etc. The matches were conducted without using patient's name and address, because SPARCS does not contain patient name and SAPRCS ED data do not have patient's address information. The records found in the SPARCS hospital data files or ED data files but not in the Trauma Registry database were defined as unmatched/missed reports and were sent to hospitals for audits. After checking their own unmatched/missed reports, hospitals resubmit the missing trauma cases and corrected trauma cases to Trauma Registry.

4. Statistical Analysis

Descriptive Analysis. Standard linear and weighted loess regression techniques were used. All confidence intervals shown represent a 95% confidence interval of the sample population. Box plots omits outliers, defened as 1.5 times the interquartile range.

Predictive Analysis. Predictive analysis of risk of mortality was performed to develop a risk adjusted model that provides unbiased estimates of trauma case fatality rates. The detailed description of the risk adjustment methodology was provided in the Risk Adjustment Methodology section in Appendix.

5. Specific Notes

EMS Time Variables. Many omissions were present in the EMS time variables, approximately 47% of the cohort. Therefore, when time variables were quoted, a subset excluding the records with missing values was used.

E-codes. In the cohort, about 3.5% of patients have more than one E Code for cause. In this analysis, only the primary E code cause was used, in the Mechanism of Injury section, page 28

Payer and total charges. Primary payer and total charges used for the Payer Types section, page 24 and the Cost of Trauma section, page 51 were obtained from SPARCS data.

Pediatric patents. In this report, the pediatric patients were defined as those aged 14 years or younger.

Comparison to the Nation. Since different inclusion criteria is used by the NYSTR and NTBD, only trauma with an injury severity score of greater than or equal to 9 was considered.

6. Software

All figures, tables, maps, and calculations were created with R statistical software[5]. This document was typeset with LaTeX. The two scripts were combined into a single program with Sweave[7].

Risk Adjustment Methodology

1. Introduction

This section describes the risk adjustment methodology developed by the New York State Trauma Registry. The goal of the risk adjustment was to provide unbiased estimates of trauma fatality rate after controlling contributing risk factors. The risk adjustment model was developed using the New York Trauma Registry data submitted by the trauma centers across the state.

2. Trauma data

Trauma case reports submitted by the New York State certified trauma centers for patients discharged in 2010 through 2013 were included. About 5% of the patients were excluded from the analysis due to the missing values in the variables used for risk-adjustment model development.

3. Selection of factors

The contributing fatality risk factors among trauma patients include the following categories:

- Patient demographic variables: age, gender, race, ethnicity, health insurance/payer, body mass index, and comorbidities;
- Patient condition upon arrival: Glasgow coma score, systolic blood pressure, pulse, respiratory rate, and oxygen saturation level;
- Required pre-hospital and emergency room treatments: CPR, intubation, and ventilation
- Mechanism of injury;
- Transferring/referring; and
- Severity of injury: Abbreviated Injury Scale (AIS).

4. Risk-adjustment model

We choose to use a logistic regression to model trauma patient fatality risk with trauma death as the dependent variable and the potential risks factors (listed in 3, Selection of factors) as the independent variables. The final risk adjustment model contains 25 variables, all of which are highly significant with greater than 95% confidence (Table 1).

5. Calculation of the risk-adjusted fatality rate and confidence intervals

- Expected fatality rate: calculated using the developed risk adjustment model adjusting for the differences among groups.
- Observed fatality rate: calculated using the number of patient deaths observed in the group divided by the number of patients in the group.
- Rate ratio: calculated using the observed fatality rate divided by the expected fatality rate. If the ratio is larger than one, the group has a higher fatality rate than expected on the basis of its patient mix.
- Risk-adjusted fatality rate: calculated using the fatality rate ratio multiplied by the overall statewide observed fatality rate.
- Confidence intervals: The 95% confidence intervals for the risk-adjusted fatality rate were calculated using the standard error of the observed fatality rate[1]. A confidence interval is above the statewide rate indicating a statistically significantly higher than expected fatality rate after adjusting for risk.

Category	Independent variable	Coefficient	Std. Error	z value	Pr(>|z|)
	(Intercept)	-4.274	0.117	-36.634	0.000
Demographics					
	Age	0.040	0.001	29.525	0.000
	Male	0.117	0.048	2.441	0.015
	White	0.120	0.051	2.341	0.019
Comorbidity					
	Bleeding disorder	0.347	0.073	4.777	0.000
	Advanced directive	1.792	0.086	20.871	0.000
	Disseminated cancer	0.717	0.204	3.510	0.000
	Prior renal failure	0.961	0.136	7.045	0.000
	Prehospital cardiac arrest	1.608	0.435	3.697	0.000
Patient condition on arrival					
	Glasgow Comma Score Motor	-0.344	0.012	-29.781	0.000
	Systolic Blood Pressure	-0.008	0.001	-15.058	0.000
Required treatment					
	CPR administered in field or ED	3.588	0.236	15.233	0.000
	Ventilator required	1.472	0.053	27.727	0.000
	Intubation occurred in the ED	0.854	0.056	15.359	0.000
Severe injuries (AIS = 5 or 6)					
	Severe head or neck trauma	2.253	0.052	43.454	0.000
	Severe face trauma	2.345	0.641	3.659	0.000
	Severe chest trauma	1.849	0.107	17.215	0.000
	Severe abdomen trauma	1.415	0.136	10.401	0.000
	Severe extremities trauma	1.942	0.272	7.151	0.000
	Severe external trauma	4.816	0.673	7.156	0.000
Mechanism of Injury					
	Pedestrian hit by car	0.438	0.083	5.301	0.000
	Firearm trauma	1.316	0.097	13.598	0.000
	Low fall	0.169	0.060	2.794	0.005
Insurance/payer					
	Self Pay	1.040	0.079	13.170	0.000
	Medicare	0.378	0.065	5.864	0.000
Transfer status					
	Referring Hospital	-0.267	0.057	-4.664	0.000

Table 1: Summary of risk adjusted mortality rate model

ICD-9 Codes for Inclusion in Registry

800 .00-.06 .09-.16 .19-.26 .29-.36 .39-.46 .49-.56 .59-.66 .69-.76 .79-.86 .89-.96 .99
801 .00-.06 .09-.16 .19-.26 .29-.36 .39-.46 .49-.56 .59-.66 .69-.76 .79-.86 .89-.96 .99
802 .7
803 .00-.01 .03-.05 .12-.15 .20-.25 .33-.35 .43-.45 .52-.55 .62-.65 .72-.75 .82-.85 .92-.95
804 .03-.05 .10-.16 .19-.26 .29-.36 .39-.46 .49-.56 .59-.66 .69-.76 .79-.86 .89-.96 .99
805 .01-.08 .10-.18 .3 .5 .6 .7 .8
806 .00-.39 .4 .5 . 60-.62 .69-.72 .79 .8 .9
807 .04-.19 .4 .5 .6
808 .1 .3 .43 .51-.53 .59 .9
819 .0 .1
821 .00-.01 .10-.11 .20-.23 .29-.33 .39
823 .10 .12 .30 .32 .90 .92
824 .1 .3 .5 .7 .9
828 .0 .1
836 .51-.52 .61-.64 .69
839 .01-.08 .11-.18 .20-.21 .30-.31 .40-.42 .51-.52 .59 .8
850 .2 .3 .4
851 .00-.06 .09-.16 .19-.26 .29-.36 .39-.46 .49-.56 .59-.66 .69-.76 .79-.86 .89-.96 .99
852 .00-.06 .09-.16 .19-.26 .29-.36 .39-.46 .49-.56 .59
853 .00-.06 .09-.16 .19
854 .03-.05 .10-.16 .19
860 .0 .1 .2 .3 .4 .5
861 .00-.03 .10-.13 .20-.22 .30-.32
862 .0 .1 .21-.22 .29 .31-.32 .39 .8 .9
863 .0 .1 .20-.21 .29-.31 .39-.46 .49-.56 .59 .80-.85 .89-.95 .99
864 .02-.05 .10-.15 .19
865 .01-.04 .09 .11-.14 .19
866 .02-.03 .11-.13
867 .1 .2 .3 .4 .5
868 .01-.04 .09-.14 .19
874 .00-.02 .10-.12 .4 .5
887 .0 .1 .2 .3 .4 .5 .6 .7
896 .0 .1 .2 .3
897 .0 .1 . 2.3 .4 .5 .6 .7
900 .00-.03 .1 .81-.82 .89 .9
901 .0 .1 .2 .3. 40-.42 .81-.83 .89 .9
902 .0 .10-.11 .19-.27 .29 .31-.34 .39-.42 .49-.56 .59 .81-.82 .87 .89 .9
903 .01-.02
904 .0 .1
925 .1 .2
927 .00-.03 .09-.11 .21 .8 .9
928 .00-.01 .10-.11 .20-.21 .8 .9
950 .0 .1 .2 .3 .9
952 .00-.19 .2 .3 .4 .8 .9
953 .0 .1 .2 .4
954 .8 .9
955 .8
956 .0. 8
958 .4 .9 .91 .92 .93 .99

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