

Morbidity and Mortality Associated with Unintentional Falls Through the Ice in Alaska

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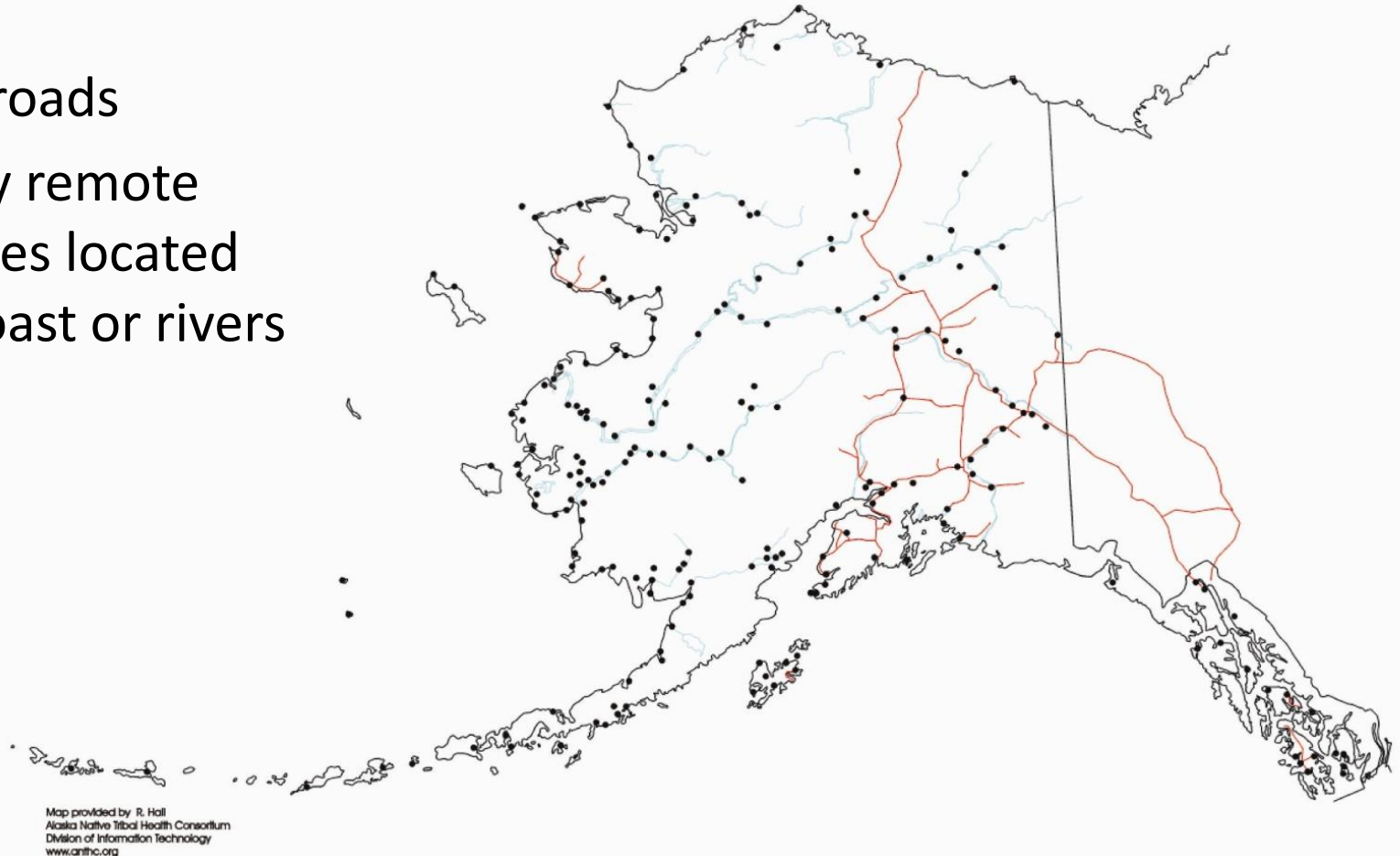
Centers for Disease Control and Prevention

Alaska Native Tribal Health Consortium



Alaska

- Vast
- Few roads
- Many remote villages located on coast or rivers





Background

- Many Alaskans in remote areas live traditional lifestyle, subsisting on fishing, hunting, gathering
- Travel between villages or for subsistence is often by boat in summer and by snowmachine, All Terrain Vehicle (ATV) or car over frozen lakes, rivers or sea in winter.



Background

- Over past 50 years Alaska has warmed at twice rate for rest of United States
 - Average annual temperature has increased 3.0°F
 - Winters have warmed by 5.0 °F

Consequences of warming

- Earlier snowmelts and changing quality, cover and thickness of ice
 - Resulting in shorter ice travel season
 - Anecdotal reports of increased falls through ice events
- Detrimental to health, economy and subsistence culture of AN communities

Objectives

- Conduct comprehensive assessment of falls through ice events 1990-2010
 - Describe morbidity and mortality
 - Examine spatial and temporal trends

Methods

Event definition:

Report of at least one person unintentionally breaking through or falling through ice on a body of water; including in a vehicle. Also included driving into body of water if ice was expected.



Utility truck breaks through ice, Dec. 21, 2008, on the Chena River near Pike's Landing, Fairbanks, Alaska. The vehicle's multiple occupants escaped unharmed

Methods

- Excluded events:
 - Falls from a height into frozen body of water, e.g. plane crash
 - Falls on glaciers
 - Falls into man-made holes in ice
 - Events south of latitude of King Salmon 58° 45' N due to climatic differences in Aleutian chain and Southeast Panhandle

Data sources

- Alaskan newspaper reports
 - Electronic search in major newspapers through online archives: Nexis, Google News
 - Manual search of microfiche or hard copy of small weekly publications available at libraries in Anchorage
- Alaska Trauma Registry
 - Limited to hospitalized cases
- Alaska Occupational Injury Surveillance System
 - Maintained by National Institute for Occupational Injury and Health, Alaska Field Office
- Alaska State Troopers
 - If event investigated and outside of municipal police jurisdiction
 - Includes Village Public Safety Officer Reports
- Alaska Bureau of Vital statistics

Skier
Fairbanks Daily
News Miner
15/Mar/1993

Weak ice plunges man, baby into frigid river

By KELLY BOSTIAN
Staff Writer

The Chena River offered no warning as Dan Anderson skied home with his 7-month-old daughter, Emily, in a backpack just more than a week ago. The ice simply gave way beneath them.

evidence of overflow or a depression or anything," he said. "This was fast. There was no time to react."

Neighbor Phil Jones was walking his dog on the river at the time. He had stopped to watch curiously to see how the skier would climb the steep bank

Recent snowmachine deaths alarm state troopers

Fairbanks Daily News-Miner
6/Dec/1999
Troopers recommended that anyone who is considering using a snow machine should be advised to use caution. The state troopers said that the snow machines are not safe for use in the mountains and that they should be used only in the mountains.

Through the ice

A young hero rescues gunner

By James Wilson
Arctic Science

KOTZEBUE - On the night of Nov. 23, Alex Kotzebue was 600 yards from shore when he saw a 10-year-old boy and his mother in a small boat. The boy was alone with his mother and a dog. Alex's boat was nearby and he was the only one who could help.

Snow Machine
Kotzebue

The
Arctic Sounder
12/Dec/2002

ATV
Bristol Bay Times Feb/1998

Two men drown in Newhalen River

Attempting to cross
on ATVs, ice breaks,
third man escapes

Two Nondalton men are dead after their all-terrain vehicles broke through the ice as they were attempting to cross the Newhalen River on a late Saturday night. A third man fell into the river but managed to climb out and run for help. Alaska State Troopers reported on Feb. 5, around 10 p.m., Abram "Bean" Wilson Jr., 24, Nick "Steve" Carlakoff, 22, and Sean Alexie, 22, all of Nondalton, were riding their all-terrain vehicles near the Newhalen River.

Wilson attempted to cross the river on his ATV despite protests from Carlakoff and Alexie. He quickly fell through the ice and disappeared with the ATV. In an attempt to rescue Wilson, Carlakoff then mounted another ATV and went to the spot where Wilson broke through the ice. Carlakoff also fell through the ice with his ATV and disappeared. Alexie ran out onto the ice on foot and also fell through the ice, but was able to bust through and work his way back to shore, where he ran back to the village to get help. Local responders launched a recovery effort for Wilson and Carlakoff, whose bodies were recovered late the following afternoon.

of troopers...
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Data abstracted

- Date/time
- Location
- Number of people involved
- Type of activity
- Transportation type
- Search and rescue
- Alcohol use
- Individual: demographic characteristics, outcome, use of safety equipment

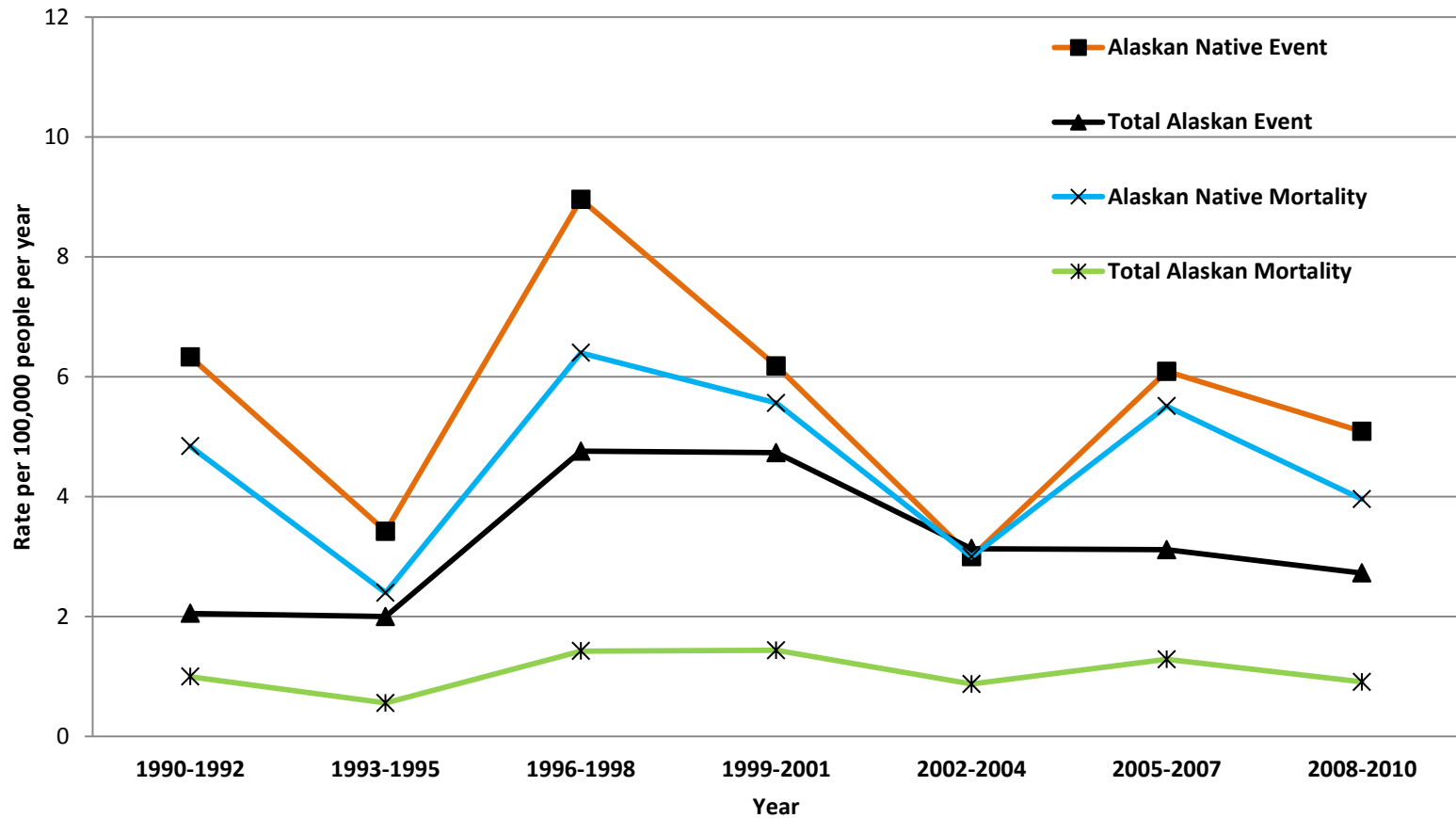
Analyses

- Annual fall through ice rates calculated using population denominator estimates from Alaska Department of Labor and Workforce Development
 - Rates smoothed over 3 three year period to compensate for small numbers
- Descriptive analyses conducted using Stata version 11
- Events geocoded; >50 within 1-mile confidence radius, >70% within 5-mile radius

Results – Falls through ice events 1990-2010

		N	%
Total events		307	
Total number of individuals		449	
People per event median (range)		1 (1-6)	
Event involved fatality	Yes	112	36.5
	No	171	55.7
	Unreported/Unknown	24	7.8
Alcohol involved	Yes	22	7.1
	No	31	10.1
	Unreported/Unknown	254	82.7

Annual Rates of Falling Through the Ice, Alaska 1990–2010



- Month:
 - Events occurred between September and June
 - 81% occurred between November and April
- Day:
 - Lowest frequency: Wed 8.5%, Tue 10.4%
 - Highest frequency: Sunday 18.6%, Saturday 16.0%
- Time:
 - No report for 41.1% of event
 - Most frequent period: afternoon (12pm-6pm) 23%

Falls through ice; 1990-2010

Mode of travel

	N	%
Snowmachine	157	51.1
Foot	43	14
Car/Truck/Vehicle	27	8.8
All Terrain Vehicle (ATV)	17	5.5
Heavy Equipment	13	4.2
Dog mushing	13	4.2
Airplane	10	3.3
Ski/Ice skate	9	3.0
Bicycle	3	1.0
Sled	2	0.7
Other	3	1
Unreported/Unknown	10	3.3

Falls through ice; 1990-2010

Primary activity

	N	%
Traveling	132	43.0
Subsistence activity (hunting, fishing)	35	11.4
Working	22	7.2
Adventure sports	19	6.2
Play	15	4.9
Search and Rescue	4	1.3
Other	7	2.3
Unreported/Unknown	73	23.8

Falls through ice; 1990-2010

Location

		N	%
River/Creek/Slough		165	53.7
Lake/Lagoon/Pond		78	15.4
Bay/Harbor/Port/Sound/Sea Ice		25	7.5
Other		11	3.6
Unknown		30	9.8
Involved overflow	Yes	35	11.4
	No	14	4.9
	Unreported/Unknown	257	83.7

Falls through ice; 1990-2010

Characteristics of individuals

		N	%
Total number of individuals		449	
Mean age (range) (years)		33.7 (1-86)	
Sex	Female	62	13.8
	Male	317	70.6
	Unreported/Unknown	70	15.6
Race/ethnicity	Alaska Native	124	27.6
	Caucasian	40	8.9
	Unreported/Unknown	285	63.5

Falls through ice; 1990-2010

Individual Outcome of Event

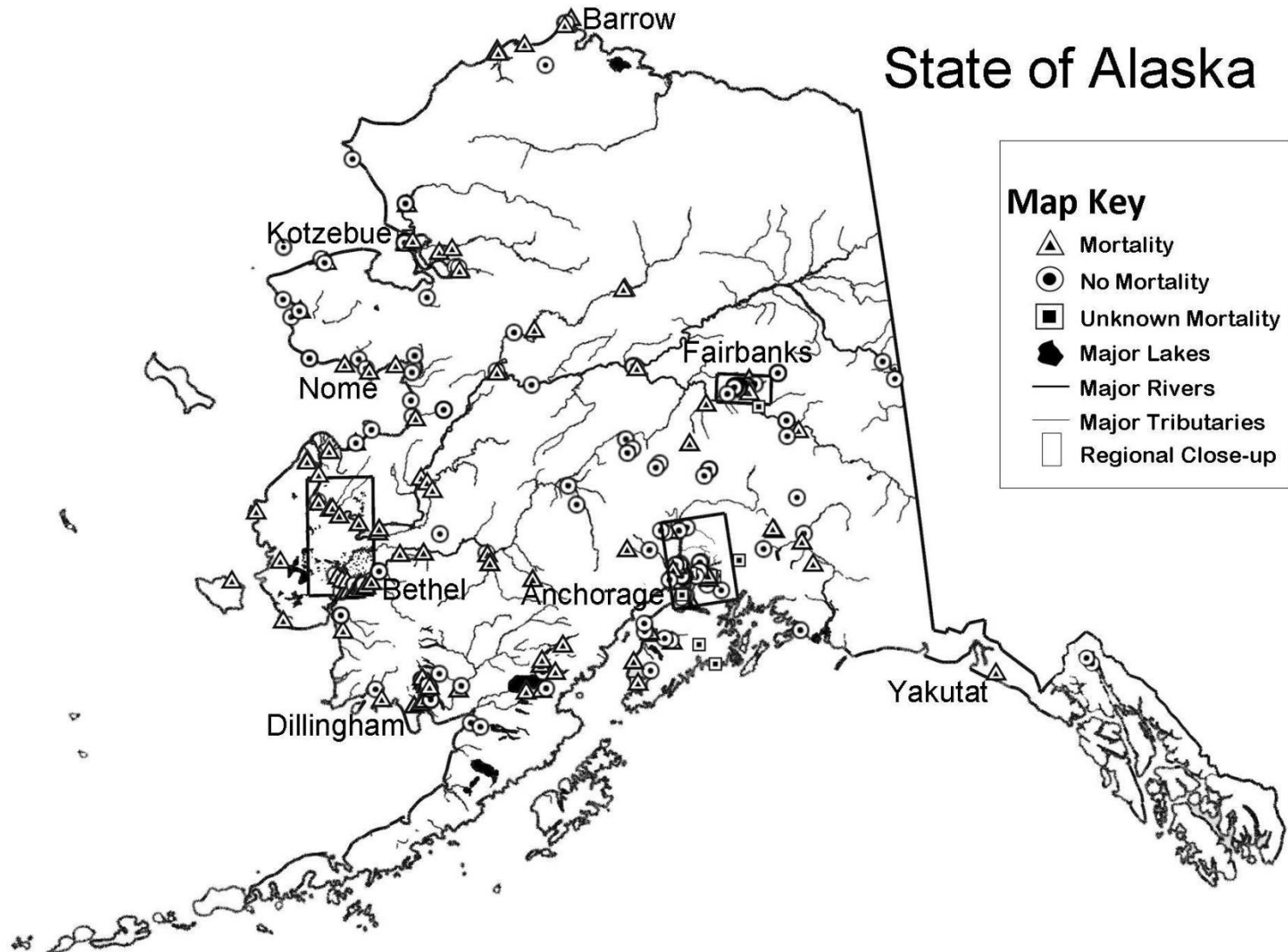
		N	%
Survived		295	65.7
	No adverse outcome	219	48.8
	Frostbite	17	3.8
	Hypothermia/Exposure	21	4.7
	Other/not specified	38	8.5
Died or presumed dead		143	31.9
	Drowning	64	14.3
	Hypothermia/Exposure	11	2.4
	Not specified	48	10.7
No report/unknown		11	2.4

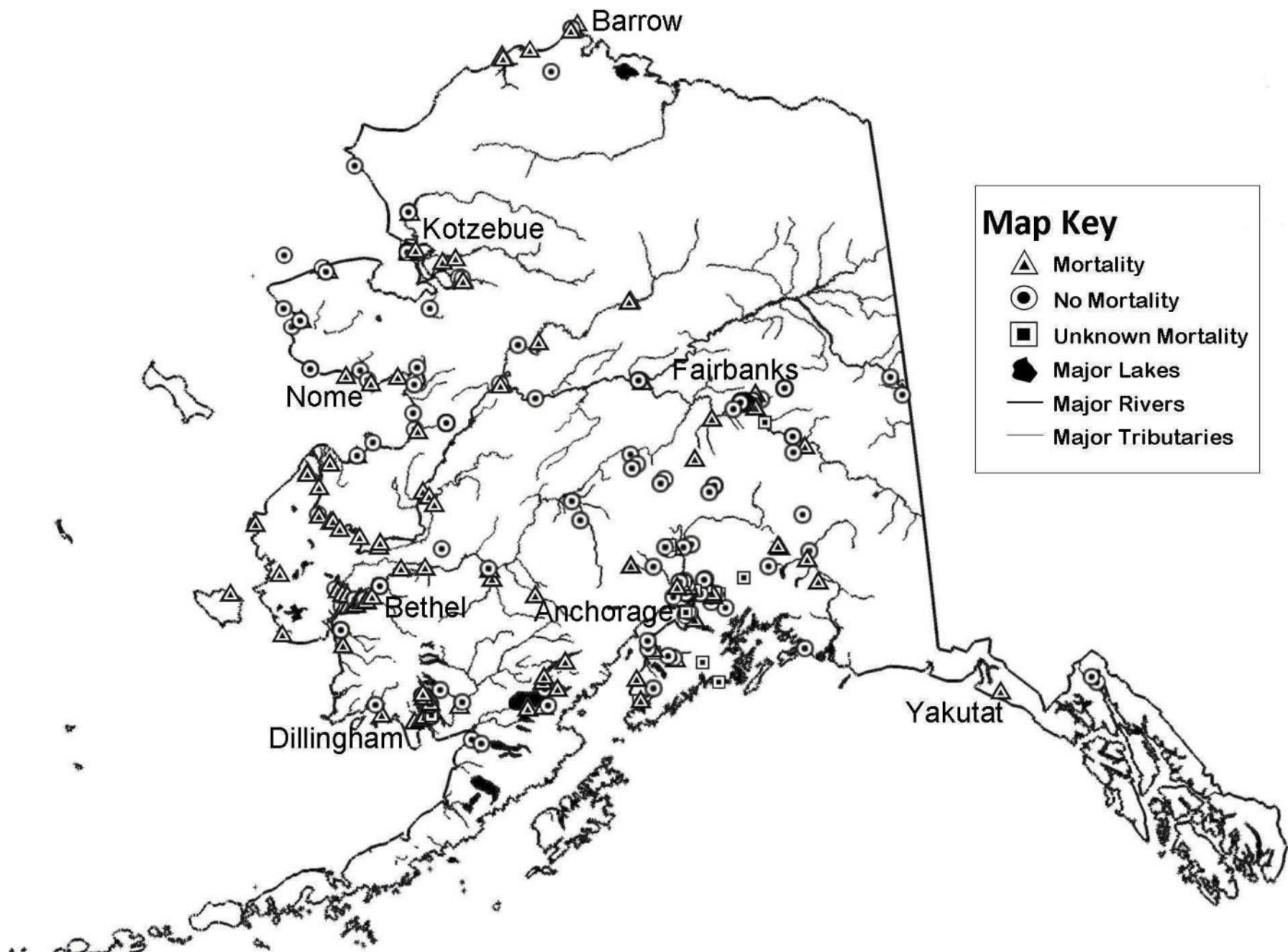
Falls through ice; 1990-2010

Rescue

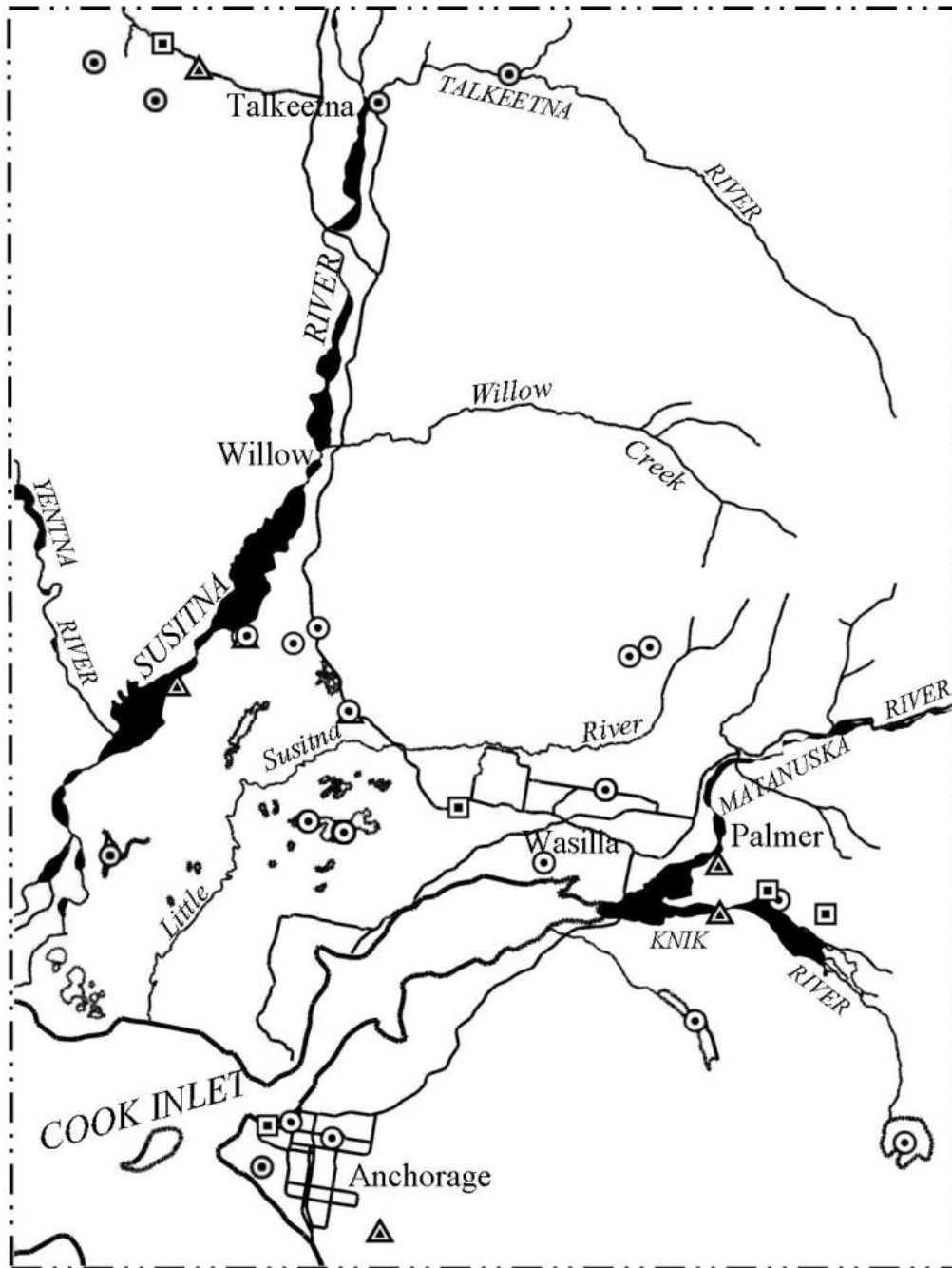
		N	%
Notification	Reported missing	75	24.4
	Person part of event	73	23.8
	Bystander	67	21.8
	Unreported/Unknown	92	30.0
Search and Rescue	Yes	210	68.4
	No	67	21.8
	Unreported/Unknown	42	13.7
Law enforcement involved	Yes	171	55.7
	No	67	21.8
	Unreported/Unknown	69	22.5

Map of Morbidity and Mortality of Unintentional Falls Through the Ice, Alaska 1990–2010



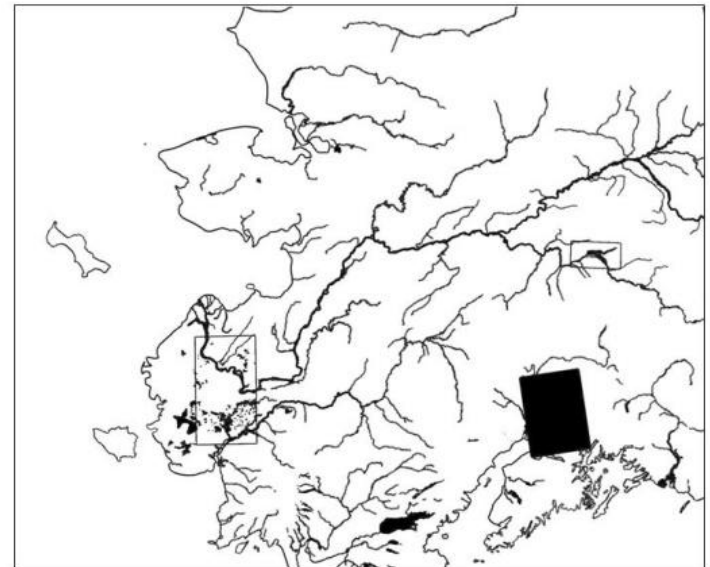


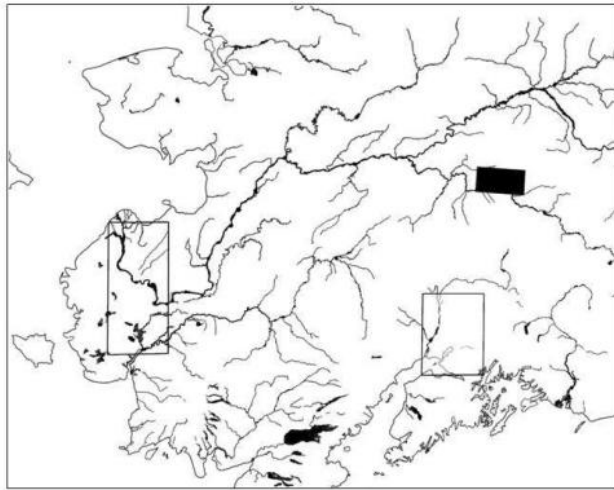
Anchorage Area



Map Key

- ▲ Mortality
- No Mortality
- Unknown Mortality
- Major Lakes
- Coastal Zone
- Major Rivers
- Major Tributaries
- Highway / Roads

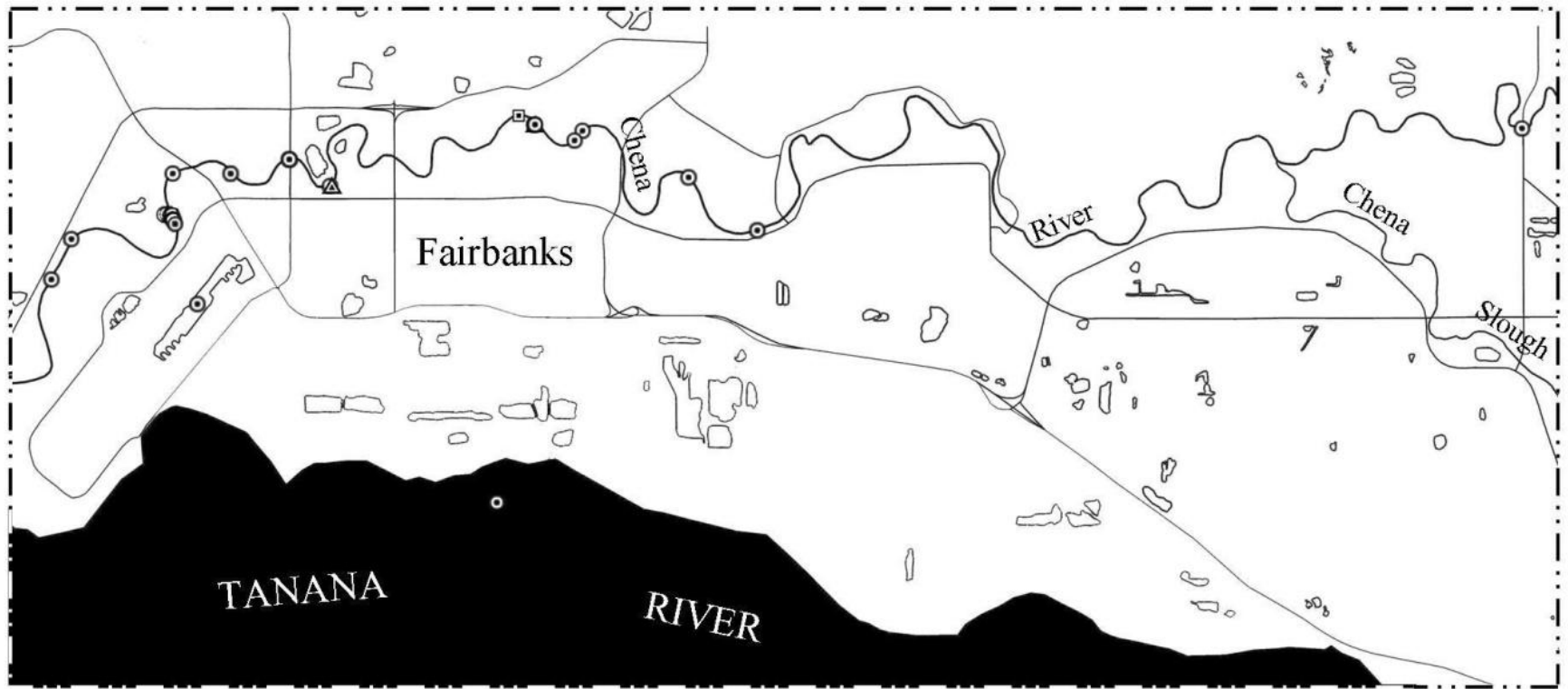




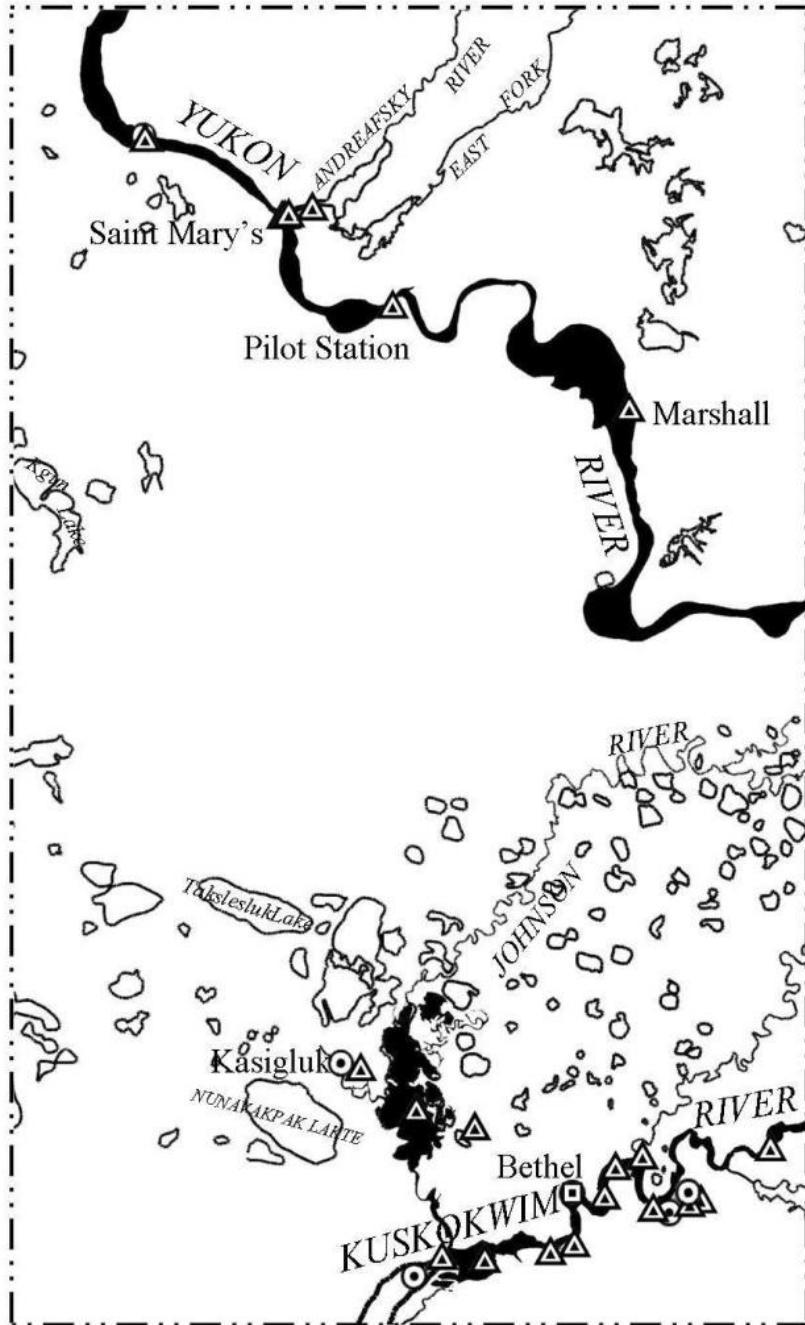
Map Key

- ▲ Mortality
- No Mortality
- Unknown Mortality
- ◊ Major Lakes
- Major River
- Slough
- Highway / Roads

Fairbanks Area

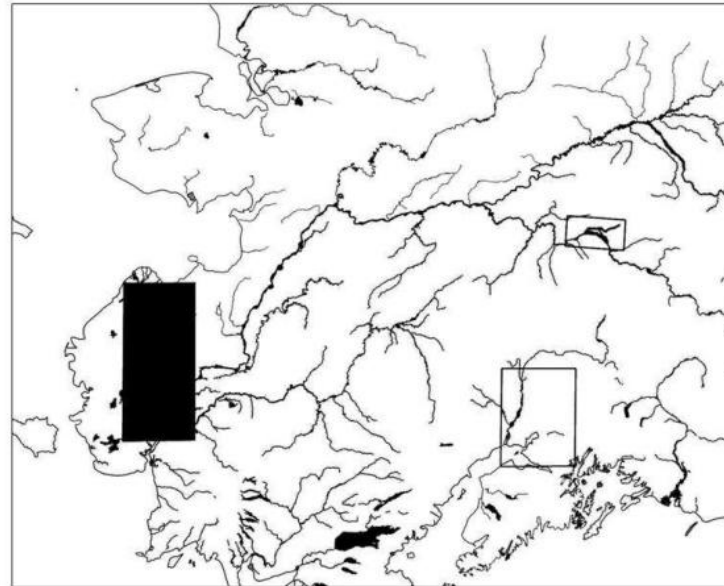


Southwest Area



Map Key

- △ Mortality
- No Mortality
- Unknown Mortality
- Major Lakes
- Coastal Zone
- Major Rivers
- Major Tributaries



Summary

- First systematic characterization of unintentional falls through ice in Alaska
- 307 events in 21 years affecting 449 individuals
- Over 35% of events resulted in ≥ 1 fatality
- Men account for 70% of people involved
 - Hunting/fishing activities
 - Increased risk-taking behavior
- Over 50% involved snowmachine
- Alaska Native people at increased risk of event and for dying from an event
 - Increased exposure to travel on ice
 - More remote areas for search and rescue and medical care
- No obvious increase in events over time

Interventions

- Increased monitoring of waterways used for travel for ice thickness and marking of areas with thin ice
- Travelling with others
- Avoidance of alcohol
- Use of safety equipment
 - Float coats (winter weight)
- Safer snow machine use
- Continued systematic monitoring of these events

LEO observations: Falls Through Ice

- Date/time
- Location
- Number of people involved
- Type of activity
- Transportation type
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- Alcohol use
- Individual: demographic characteristics, outcome, use of safety equipment

Limitations

- Use of newspaper reports may underestimate number of events
 - Less severe events may not be reported
- News reports often lacked information on:
 - Race/ethnicity
 - Drug/alcohol use
- No link to climate data

Acknowledgements

- Newspaper archive search
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- LexisNexis Group is a corporation that provides computer-assisted legal research services. During the 1970s, LexisNexis pioneered the electronic accessibility of legal and journalistic documents. As of 2006, the company has the world's largest electronic database for legal and public-records related information.
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