

Occupational Injuries & Fatalities

BACKGROUND

National Occupational Fatalities

This nation lost approximately 2,800 persons in the terrorist attacks on the World Trade Center on September 11, 2001.¹ It was a terrible loss for the U.S. Each year, however, an even greater number of persons (approximately 6,000) will die from traumatic occupational injuries in the U.S. Most of these deaths are preventable.²

The two primary surveillance systems for occupational fatalities in the United States are the National Traumatic Occupational Fatalities (NTOF) system and the Census of Fatal Occupational Injuries (CFOI).³ The NTOF surveillance system uses the "injury at work" variable on death certificates as the source of case identification. Several reports have shown that underreporting of occupational fatalities occurs when the death certificate alone is used as a source of data.⁴⁻⁷ The CFOI system utilizes multiple data sources. There is a need for universal standards for defining, reporting, and recording occupational injuries and fatalities in the United States.^{8,9}

According to national data for 1980 through 1997, the rate of occupational deaths in the U.S. declined by 45%, from 7.4 per 100,000 workers in 1980 to 4.1 in 1997.¹⁰ There were 5,915 occupational deaths in the U.S. in 2000 (4.3 deaths per 100,000 workers).¹¹ The leading causes of occupational fatalities

are transportation incidents, assaults and violent acts, contact with objects and equipment, and falls. The highest rates of occupational fatalities occur among workers in the mining, agriculture, construction, and transportation industries.¹¹ Each year, an average of 70 youth under 18 years of age are fatally injured.¹²

National Agricultural Fatalities

Agriculture-related activities have consistently had one of the highest fatality rates, ranging from 17 to 42 deaths per 100,000 workers.¹³⁻¹⁷ The agriculture/forestry/fishing industry had the second highest fatality rate (approximately 20 deaths per 100,000 workers), behind mining (30 deaths per 100,000 workers).^{11,18} Identifying agriculture-related deaths and collecting information on them can be challenging. A key factor in agricultural data collection is the accurate coding of the "injury at work" variable on death certificates. Designating work-relatedness in fatal farming incidents is not as straightforward as in other types of work. Farmers generally do not have a fixed retirement age, and farming is commonly a part-time occupation in addition to another full-time job.^{13,15,19} For example, an older person with an occupation of mechanic who is fatally injured while working on a farm on a weekend could easily be overlooked as a work-related case. Despite the difficulties in ascertaining cases, the agriculture/forestry/fishing industry continues to be among the most hazardous industries in the nation.^{20,21}

According to the National Institute for Occupational Safety and Health (NIOSH), approximately 85% of hired agricultural crop workers in the United States are foreign-born, and 90% of this group are from Latin America (Hispanic populations).²² Hispanics are at higher risk than the general population for injuries, illnesses and environmental hazards due to lack of education, health care and English proficiency. Limited English proficiency may have contributed directly to work-related injuries and fatalities.²³

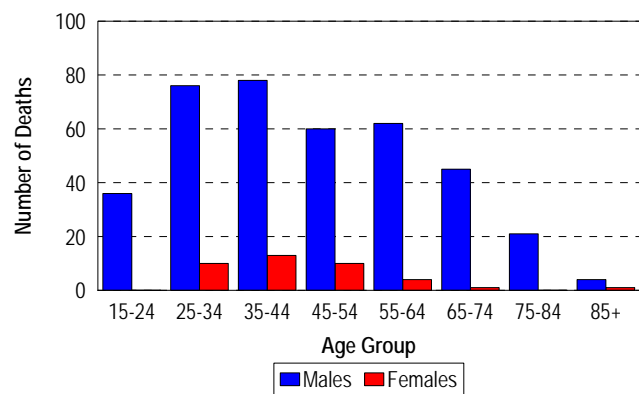
Oklahoma Occupational Fatalities

In July 1997, the Commissioner of Health declared occupational fatalities a reportable condition for special study. Since that time, the Injury Prevention Service has collected data from multiple reporting sources including the Office of the Chief Medical Examiner, Oklahoma State Department of Health Division of Vital Records, Occupational Safety and Health Administration, Oklahoma Department of Labor, Workers' Compensation Court, statewide hospital injury surveillance system, and a newspaper clipping service. Supplemental information has also been obtained from the Department of Public Safety, the Oklahoma Department of Mines, the Oklahoma Lake Patrol, fire departments, police and sheriff departments, and emergency medical services.

Although data collection began July 1, 1997, the following analysis includes persons injured during the four-year period from January 1, 1998 through December 31, 2001 in order to reflect seasonal trends. A total of 432 work-related deaths were identified in Oklahoma (average of 108 deaths per

year; annual work-related death rate: 6.7 deaths per 100,000 workers). Ages of persons who died ranged from 13 to 90 years of age, with a mean age of 46 years (Figure 1). Males outnumbered females 9 to 1, with males accounting for 91% (392/432) of the work-related deaths.

Figure 1. Work-Related Fatalities by Gender and Age,* Oklahoma, 1998-2001



*A 13-year old male worker also died.

Table 1. Causes of Work-Related Fatalities, Oklahoma, 1998-2001

Type of Incidents	Deaths	Percent
Motor Vehicle Crashes		
Traffic Crashes: 139	144	33%
Non-Traffic Crashes: 5		
Machine-Related	74	17%
Falls from Elevation	49	11%
Homicide	42	10%
Electrocution	33	8%
Struck and/or Crushed by Object	26	6%
Suicide at Work	10	2%
Airplane Crashes	10	2%
Explosion	9	2%
Animal-Related	8	2%
Thermal Burn	7	2%
Accidental Drug Overdose	5	1%
Drowning	5	1%
Suffocation	5	1%
Others	5	1%
TOTAL	432	100%

The leading causes of work-related deaths were motor vehicle crashes (33%), followed by machinery (17%), and falls from elevation (11%). Other common causes included homicide, electrocution, being struck and/or crushed by an object, suicide at work, airplane crashes, and explosions (Table 1).

The agriculture, forestry, and fishing industry (SIC 0111-0971) had the highest death rate (35.8 per 100,000 workers), followed by mining (29.8/100,000), construction (19.3/100,000), and transportation and public utilities (16.0/100,000) (Figure 2). Overall, work-related deaths occurred most frequently in July and August (Figure 3).

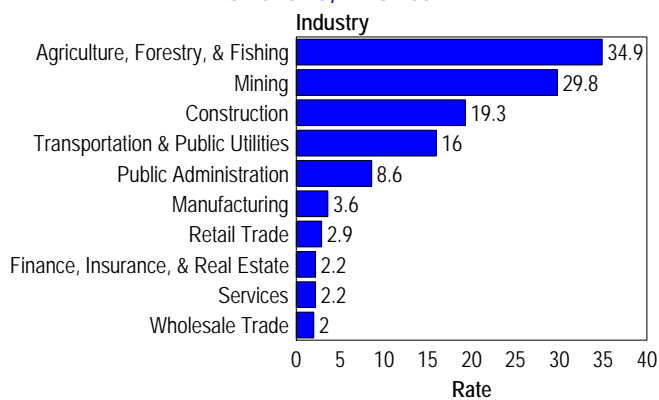
Oklahoma Agricultural Fatalities

From January 1998 through December 2001, there were 88 deaths identified in the agriculture, forestry, and fishing industry (SIC 0111-0971). The forestry, and fishing industry accounted for only one death, and 99% (87/88) of deaths were contributed by crop and livestock farming or ranching (SIC 0111-0783). Further analyses will include only agriculture deaths related to crop and livestock farming or ranching. The average annual farming death rate was 35.9 deaths per 100,000 workers. While farmers and farm workers accounted for 4% of the work force, they accounted for 20% of all work-related deaths in Oklahoma. The ages of farmers who died ranged from 17 to 89 years, with an average age of 56 years (median 61 years). Males accounted for 92% of deaths; only seven females died in agriculture-related incidents. Forty-seven percent of deaths occurred among males over 64 years of age. Over half (52%, 45/87) of agriculture-related deaths were related to crop production, including planting and harvesting, whereas

39% (34/87) were associated with livestock farming or ranching, and 9% (8/87) were others, such as landscape/horticultural services and farm labor services.

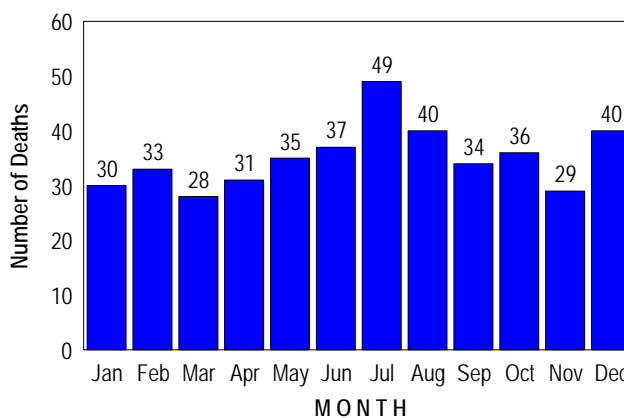
The leading causes of fatal agriculture-related events were machinery, followed by traffic crashes, animal-related incidents, electrocution, and being struck and/or crushed by an object, (Table 2).

Figure 2. Annual Rate of Work-Related Fatalities by Industry,* Oklahoma, 1998-2001



*According to the Standard Industrial Classification Manual (1987, Office of Management and Budget)

Figure 3. Work-Related Deaths by Month of Incident, Oklahoma, 1998-2001



Of the fatal farming machinery cases, tractors were the most frequently used piece of farming machinery, accounting for 87% (41/47) of the machinery-related deaths. Almost half of the tractor-related fatalities (44%, 18/41) occurred when the victim fell or was thrown from a moving tractor and run

over either by an attached implement or the tractor. Other common causes of tractor-related fatalities were tractor rollovers (34%, 14/41) and being crushed or pinned between a tractor and an object (20%, 8/41). Seven additional farming machinery fatalities resulted from hay baler incidents, hydraulic lift systems, and a mower incident.

Thirteen (15%) farming-related deaths were traffic-related; eight involved single or multi-vehicle crashes during farming-related activities and five persons were struck by their farm vehicles while working. Five (7%) deaths were animal-related, including two while corralling cattle, two were kicked by horses inside a pen, and one from being gored by a deer.

The most commonly reported immediate causes of farming-related deaths (some persons had multiple causes) were head injuries (32%), chest/back injuries (31%), multiple traumatic body injuries (16%), and suffocation (13%). Of persons with a known blood alcohol status (40), 8% had a positive blood alcohol level.

Baseline: 25.3 deaths per 100,000 farmers/ranchers*** in 1998 (crude rate)

Target setting: 30 percent reduction

Data source: OSDH Occupational Fatality Surveillance System, 1998

***Source for the denominator: U.S. Department of Agriculture – National Agricultural Statistics Service (Oklahoma).

Table 2. Causes of Farming-Related Fatalities, Oklahoma, 1998-2001

Type of Incident	Number of Deaths	Percent
Agriculture Machinery	48	55%
Traffic Crashes	13	15%
Animal-Related Incidents	6	7%
Electrocution	6	7%
Struck and/or Crushed by Object	5	6%
Falls from Elevation	3	3%
Accidental Drug Intoxication	2	2%
Aircraft Crash	1	1%
Explosion	1	1%
Controlled Fire	1	1%
Suicide	1	1%
Total	87	100%

YEAR 2010 OBJECTIVES

Occupational Injury Objectives

Reduce deaths from work-related injuries to 4.6 deaths per 100,000 workers.

Baseline: 6.4 deaths per 100,000 workers occurred in 1998 (crude rate)

Target setting: 28 percent reduction

Data source: OSDH Occupational Fatality Surveillance System, 1998

Reduce deaths from work-related agricultural injuries to 17.7 deaths per 100,000 farmers/ranchers.***

PREVENTION STRATEGIES

Rollover Protective Structure (ROPS)

Each year, over 700 farmers and ranchers die from agriculture-related injuries.²⁴

Tractors are common to all farm operations. They are also one of the leading causes of agriculture-related deaths. A rollover protective structure (ROPS), is a cab or frame that is designed to prevent death or injury by providing a protective zone for the tractor operator if the tractor overturns or rolls over.²⁵ The operators of tractors equipped with ROPS must wear seatbelts. Without the seatbelt the operator will not be confined to the protective zone. Rollover protective structure (ROPS) and seatbelt-equipped

tractors could save approximately 350 lives annually on U.S. farms.²⁴

A public awareness/educational campaign designed to increase the number of ROPS and seatbelts on tractors and to promote safe operation of farm tractors was implemented in two counties in Kentucky. Educational materials and messages were delivered to farming communities through businesses and local employers, radio public service announcements, newspapers, newsletters and magazines. This campaign provided important findings for the development of future campaigns that will be designed to overcome farmers' objections to ROPS.²⁵

Power Take-Off (PTO) Master Shield

The Power Take-Off (PTO) shaft is an efficient means of transferring mechanical power between farm tractors and implements. Power Take-Off entanglements may cause serious injuries or deaths to farmers. Power Take-Off master shields prevent accidental contact with the machine driveline. The spinning shaft can grab and entangle farmers if proper guards or shields for the PTO-driven machinery are not in place.²⁶⁻²⁷

Sensor Systems

Sensor systems have been designed to reduce injuries or deaths from machinery. This technological advancement can be adapted to agricultural equipment. Multiple sensing technologies, such as radar, microwave, and infra-red, have been designed to detect persons entering the defined danger areas. These sensors have been evaluated to protect operators or bystanders approaching the rotating components found on farm equipment, such as PTO and other shafts, gears, and belts.²⁸⁻²⁹

Slow Moving Vehicle (SMV), proper lighting/reflectors

Many agricultural equipment/vehicles driven on public roads are not equipped with a Slow Moving Vehicle (SMV) emblem, proper lighting, and/or reflectors. These features will alert other drivers and subsequently may reduce considerable risks for motor vehicle crashes. Enforcing current state laws may be required to ensure the safety of farmers and other motorists.³⁰

Cattle Handling Safety in Working Facilities

According to the Bureau of Labor Statistics, from 1992-1997, more than 75,000 workers received injuries and 375 workers were killed from animal-related injuries. Cattle are responsible for most injuries caused by farm animals. A 1997 study conducted by Oklahoma State University (OSU), Biosystems and Agricultural Engineering Department, found 150 cases of cattle handling-related injuries among 100 Oklahoma cow-calf operations. The study also showed that more than half of the injury cases resulted from human error.³¹⁻³² An educational campaign on cattle handling safety in working facilities containing proper cattle handling techniques is posted on various web-pages.

Health and Safety for Kids on the Farm

The National Institute for Occupational Safety and Health (NIOSH) has funded the National Children's Center for Agricultural Injury Prevention through a cooperative agreement with the National Farm Medicine Center in Marshfield, Wisconsin. The Center has developed *North American Guidelines for Children's Agricultural Tasks* that is used to assist adults in assigning farm tasks to children between 7-16 years who live or work on farms. Various organizations committed to safety, children, and agricultural workers have been working together with the Center to implement educational and training

programs in childhood agricultural health and safety. The organizations include Farm Safety 4 Just Kids, National Future Farmers of America, National SAFE KIDS Campaign, Progressive Farmer Foundation, and others. These organizations collaborate with schools, farm families, agricultural businesses, producer groups, university extension services, emergency medical personnel, health professionals, civic groups, and persons who are interested in the safety of children on the farm.

Farm safety day camp programs are one way to teach children how to stay safe and healthy. The purpose of the program is to teach children 8 to 13 years of age the basics of farm safety and health. Farm safety day camps are designed based on specific

contents/formats, usually determined by a planning group or committee in the designated community. Topics covered may include general farm safety, farm chemical safety, power take-off devices (PTO), tractor rollovers, electrical hazards, first aid, fire safety, grain entrapment/suffocation, safety around equipment on the farm, and animal safety. Although farm safety day camp programs focus on keeping children safe and healthy, adults are encouraged to participate. Classes such as first aid, CPR, stages of development for children, characteristics of each stage of development, causes of most farm injuries for children, and suggestions for preventing farm injuries among children can be offered. Farm safety day camps can be an effective tool in preventing farm injuries in children. ³³⁻³⁴

RECOMMENDED STRATEGIES FOR THE PREVENTION OF OCCUPATIONAL INJURIES/FATALITIES IN OKLAHOMA

RECOMMENDATION

1. Continue statewide surveillance of fatal work-related injuries.

2. Continue on-site investigations of selected deaths and write fatality reports.

3. Develop new partnerships and maintain existing working relationships with professional associations.

IMPLEMENTATION PLAN

1a. Obtain state funding to continue surveillance of fatal work-related injuries by 2006.

1b. Continue to receive reports of work-related fatalities from news clipping service and other internal and external sources through 2010.

2a. Actively investigate selected work-related cases (i.e. machinery-related, highway work zones, and youth fatalities) through 2010.

2b. Continue to write fatality reports providing a summary of the incident, condition of the work environment, cause of death, and recommend prevention strategies through 2010.

2c. Increase awareness of work-related fatalities by disseminating fatality reports to constituents on an ongoing basis.

3a. Continue participation in work groups addressing the need to reduce work-related injuries and fatalities on an ongoing basis. The work groups include (Occupational Safety and Health Administration, Oklahoma Safety Council, Department of Labor, Public Employees Occupational Safety and Health Program, Worker's Compensation Court, and other organizations involved in the safety and health of workers in Oklahoma.

3b. Continue to actively participate with the Farm Safety Day Camp organization to promote farm safety among children living in farming communities through 2010.

3c. Create a partnership with the Southwest/Northwest Area Health Educational Centers to promote farm safety education through their quarterly publication by 2005.

RECOMMENDATION

3. Develop new partnerships and maintain existing working relationships with professional associations.
(continued)

4. Implement a farm safety education campaign.

IMPLEMENTATION PLAN

- 3d. Create a new partnership with Legal Aid of Western Oklahoma to disseminate farm safety material among Hispanic farmers by 2005.

- 3e. Identify and develop working relationships with rural farm coops and insurance companies by 2005.

- 3f. Create partnerships with specific work-groups which are at risk of work-related injuries, such as restaurant, construction, and automotive associations. Disseminate specific safety information within these groups by 2005.

- 4a. Define a geographical area where agriculture is the leading industry or occupation, and farmers have the highest occupational injury rates by 2005.

- 4b. Create a farm safety advisory group including representatives from farm co-ops, insurance companies, county health departments, Oklahoma State University, and community representatives by 2005.

- 4c. Pilot-test the farm safety campaign in the defined geographical area and evaluate for effectiveness by 2006.

- 4d. Develop an educational strategy and materials for dissemination to area farmers through partners by 2005.

- 4e. Develop an evaluation strategy for educational materials by 2005.

- 4f. Utilize county health department services (i.e., immunizations and hearing screenings) conducted at rural farm co-ops to promote farm safety educational campaign by 2005.

- 4g. Create an evaluation form for staff to administer to farmers/ranchers participating in farm safety clinics in the defined geographical area by 2005.

RECOMMENDATION

4. Implement a farm safety education campaign. (continued)

IMPLEMENTATION PLAN

- 4h. Evaluate the effectiveness of the farm safety educational campaign in reducing occupational injuries among farmers/ranchers by 2006.
- 4i. Expand the educational campaign to a statewide program if the evaluation proves successful by 2007.

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