

# Purdue University

## *Agricultural Safety and Health Program*

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### **2008 Indiana Farm Fatality Summary**

**Compiled by the Purdue University Agricultural Safety and Health Program**

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The 2008 Indiana farm fatality report was compiled by Purdue's Agricultural Safety and Health Program through a variety of sources, including a contracted news clipping service, Web searches, voluntary reporting from Extension educators and individuals, and personal interviews. In addition, fatality data gathered by the Indiana Department of Labor were made available, and they yielded five additional fatalities that the regular surveillance methods did not. No cases were identified from sources outside of the state, including the Federal government. Neither were any cases identified using official death certificates due to the lack of access to these records at the Indiana Department of Health.

In 2006, only eight farm-work-related fatalities were recorded— exactly one half of the lowest number ever previously reported (16); however, that uncharacteristically low number of fatalities was not sustained with 24 fatalities in 2007 and 28 fatalities in 2008. These currently wide variations in the fatality frequency from year to year have also historically occurred in the past. This report includes a summary of those 28 farm-work-related fatalities<sup>1</sup> that were documented in 2008. For over 30 years there has been a steady downward trend in the number of farm-work-related fatalities, and the 2008 total is somewhat larger than would be expected from that downward trend. The average age for farm-work-related fatality victims in 2008 was 49.4 (Table 1) while the average age over the past ten years was 52.6.<sup>2</sup> All but two documented cases involved males. The two female fatalities were 23- and 51-years old, and there were two fatalities of males under the age of 18; their ages were three and four. Those two incidents involving children accounted for 7.1% of the total number of fatalities reported in 2008. Only one or two fatalities of children or adolescents under age 18 have been reported annually over the last ten years except seven occurred in 2000 and four occurred in 2007. Victims over the age of 60 (N=11) accounted for 39% of all documented cases, and that is consistent with a continuing trend of older individuals being involved in a disproportionate number of fatal incidents.

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<sup>1</sup> A farm-work-related fatality is defined as any fatal injury to a farm or ranch worker (or bystander) occurring in the course of performing an agricultural work-related task, or as a result of exposure to hazards in the agricultural workplace. Motor vehicle incidents not clearly involving agricultural equipment or vehicles are excluded. In addition the report does not include fatalities that may have occurred due to chronic exposures to hazardous environments or substances, or heart attacks that occurred during work activities.

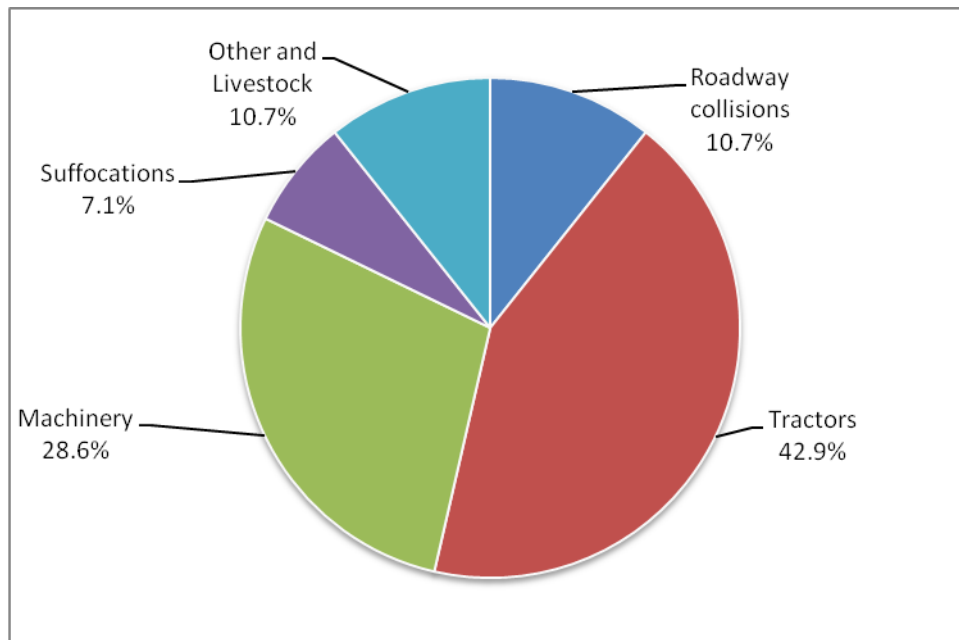
<sup>2</sup> According to current census data, the average age of farm operators in the state is 57.

Gender	Age Distribution					Total	%
	1-17	18-35	36-59	60+	Unknown		
Males	2	7	6	11	0	26	92.9
Females	0	1	1	0	0	2	7.1
Total	2	8	7	11	0	28	100
%	7.1	28.6	25.0	39.3	0	100	-
Average Age	3.5	26.4	52.3	72.6	-	49.4	-

**Table 1. Age distribution of Indiana farm-work-related fatalities in 2008.**

Tractor-related incidents were the leading category of fatalities and accounted for 12 (42.9%) of the recorded fatalities (Table 2), and that percentage approaches the historical average. Machinery-related incidents were the other leading type of farm-related fatalities in the state-- accounting for eight (28.6%) of all identified fatalities. Tractor overturns accounted for eight (28.6%) of the fatalities and continue to be the leading cause of farm- work-related fatalities nationally accounting for approximately 25% of all fatalities. In contrast to the three ATV/Utility Vehicle, farm-work-related fatalities in 2007, there were none in 2008, even though there has been a rapid increase in fatalities and injuries in the ATV recreational sector. The three cases in 2007 represent the highest number of work-related ATV/Utility vehicle fatalities ever recorded during a single year.

Table 2 summarizes the specific types of incidents associated with Indiana’s farm fatalities in 2008. Note that roadway collisions involving machinery are listed in the “Roadway” category instead of the “Machinery” category. Figure 1 displays the distribution of farm-related fatalities by general type of incident.



**Figure 1. Distribution of 2008 Indiana farm-work-related fatalities by general type of incidents.**

<b>Type of Incident</b>		<b>Fatalities</b>
Entrapments, suffocations, or asphyxiation	Grain entrapments	-
	Drownings	1
	Buried in trench	1
	Gas asphyxiation (manure pit)	-
	Anhydrous ammonia	-
	Fire	-
Livestock-related incidents	Trampled by livestock	-
	Kicked by horse	1
	Horse-drawn wagon incidents	1
Machinery-related incidents	Entanglements	1
	Crushings/pinnings	5
	Runovers	1
	Fall from machinery	1
Tractor-related incidents	Overturns	8
	Runovers	1
	Crushings/pinnings	2
	Unspecified	1
Roadway collisions	With livestock	-
	With combine	-
	With tractor	-
	With pull-behind machinery	1
	With farm truck	2
Other incidents	Struck by falling tree	1
<b>Total</b>		<b>28</b>

**Table 2. 2008 Indiana farm-work-related fatalities by specific type of incident.**

Table 3 provides a more detailed listing of fatalities that occurred in Indiana counties in 2008. Fatal farm-work-related incidents are described here by (1) date of incident, (2) county of incident, (3) age of victim, (4) gender of victim, (5) description of circumstances surrounding the incident, and (6) the Farm and Agricultural Injury Classification (FAIC) Code. The FAIC code is used to facilitate consistent and accurate classification of farm and agriculture-related injuries. Additional information on the FAIC code is available from the American Society of Agricultural and Biological Engineers (ASABE<sup>3</sup>) or by contacting Purdue's Extension Safety Specialist.

The FAIC code system:

- parallels, to the extent appropriate, current nationally established methods for classifying and assigning work-related injury cases to an industry;
- provides a systematic scheme for separating farm production work cases from non-farm-production work cases; and
- permits the identification of cases that uniquely reflect the situational exposures predominate to the agricultural industry.

<sup>3</sup>ASABE Standard S575.1, 2002. ASABE, 2950 Niles Road, St. Joseph, MI 49085. Tel: 616-429-0300

Figure 2 represents a geographic distribution of Indiana’s documented farm-related fatalities in 2008. Five counties had two fatalities in 2008 (Decatur, Harrison, Madison, Montgomery, Porter); however, six counties had fatalities in both 2007 and 2008: Greene, Harrison, LaGrange, LaPorte, St. Joseph, and Wells, but only LaGrange had fatalities in 2006, 2007 and 2008. Figure 3 represents a geographic distribution of 738 of Indiana’s 811 documented farm-related fatalities in the years 1980 through 2008 where the county of incident was known. Interestingly, Howard County, which was one of only two counties without a documented farm-work-related fatality in the past 28 years, had one in 2008. Counties where relatively few fatalities had occurred in the past 28 years also added to their low totals this year. Porter County went from a total of four to six; Brown from four to five; Decatur from five to seven; Ohio from one to two; and Howard from zero to one. The counties with 12 or more identified fatalities over the past 29 years are as follows:

Elkhart	22	Allen	12
LaGrange	22	Franklin	12
Greene	18	Harrison	12
Dubois	16	Huntington	12
St. Joseph	15	Jefferson	12
Adams	14	Morgan	12
Jennings	14	Randolph	12
Madison	13		
Ripley	13		

Date	County	Age	Sex	Description of Incident	FAIC <sup>a</sup>
1/22/08	Harrison	32	M	Buried in trench collapse	1
1/24/08	Harrison	57	M	Struck by falling tree	1
4/5/08	Delaware	86	M	Crushed by falling mower	1
4/25/08	Madison	72	M	Crushed by lowering loader	1
4/25/08	Brown	49	M	Tractor overturned, pulling stuck truck	1
5/18/08	Montgomery	4	M	Kicked by horse	NA
5/18/08	Floyd	66	M	Tractor overturned	1
5/29/08	Hendricks	56	M	Tractor overturned rearward, plow caught on tree roots	1
6/1/08	Decatur	26	M	Collision with semi truck load of hogs, killing passenger in car	9
6/1/08	Decatur	23	F	Collision with semi truck load of hogs, killing passenger in car	9
6/11/08	Porter	78	M	Tractor overturned, mowing hillside	1
6/17/08	LaGrange	51	F	Fell off horse drawn baler cart and was run over	1
6/29/08	Switzerland	63	M	Farmer crushed by bulldozer	1
7/7/08	Owen	87	M	Unspecified farm tractor accident	1
7/30/08	Madison	55	M	Crushed between loader and barn while in loader	1
9/6/08	Jennings	19	M	Fell off wagon and hit head on pavement	1
9/17/08	Ripley	34	M	Tractor overturned while pulling tree up hill	1
9/17/08	Putnam	58	M	Tractor overturned on hill	1
9/18/08	La Porte	29	M	Motorcycle collided with tractor and drill, killing motorcycle rider	9
9/19/08	Miami	71	M	Fell from equipment	1
9/19/08	Ohio	78	M	Tractor overturned	1
9/26/08	Whitley	67	M	Tractor overturned pushing log up hill	1
10/5/08	Montgomery	68	M	Gravity wagon overturned onto worker	1
10/17/08	Howard	3	M	Entangled in conveyor	NA
10/19/08	Porter	25	M	Crushed under combine head	1
10/31/08	St. Joseph	40	M	Crushed between skid-steer cage and lift arms	1
11/1/08	Greene	63	M	Fell off tractor and was run over	1
12/19/08	Wells	23	M	Drowned while trapped under skid-steer, overturned in manure lagoon	1

**Table 3. Listing of 2008 Indiana farm-work-related fatalities, N=28.**

<sup>a</sup>FAIC-1 Farm Production Work, Victim engaged in work activity related to agricultural production.

FAIC-9 Farm Hazard Exposure: Roadway collision. Victim not actively engaged in a work activity but injured as a result of collision with agricultural hazard on roadway.

NA Not applicable

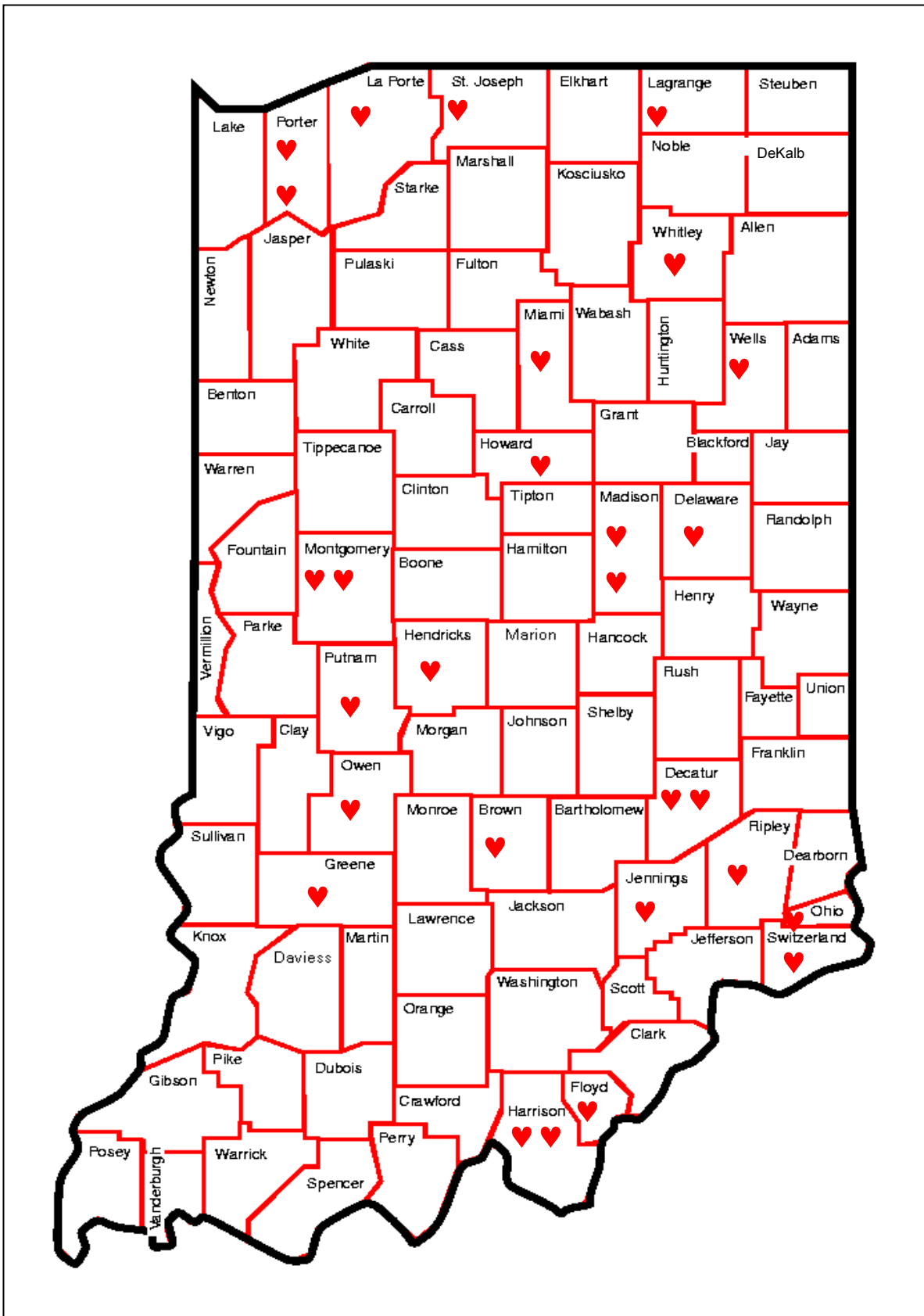


Figure 2. Geographic distribution of 2008 Indiana farm-work-related fatalities, N=28.

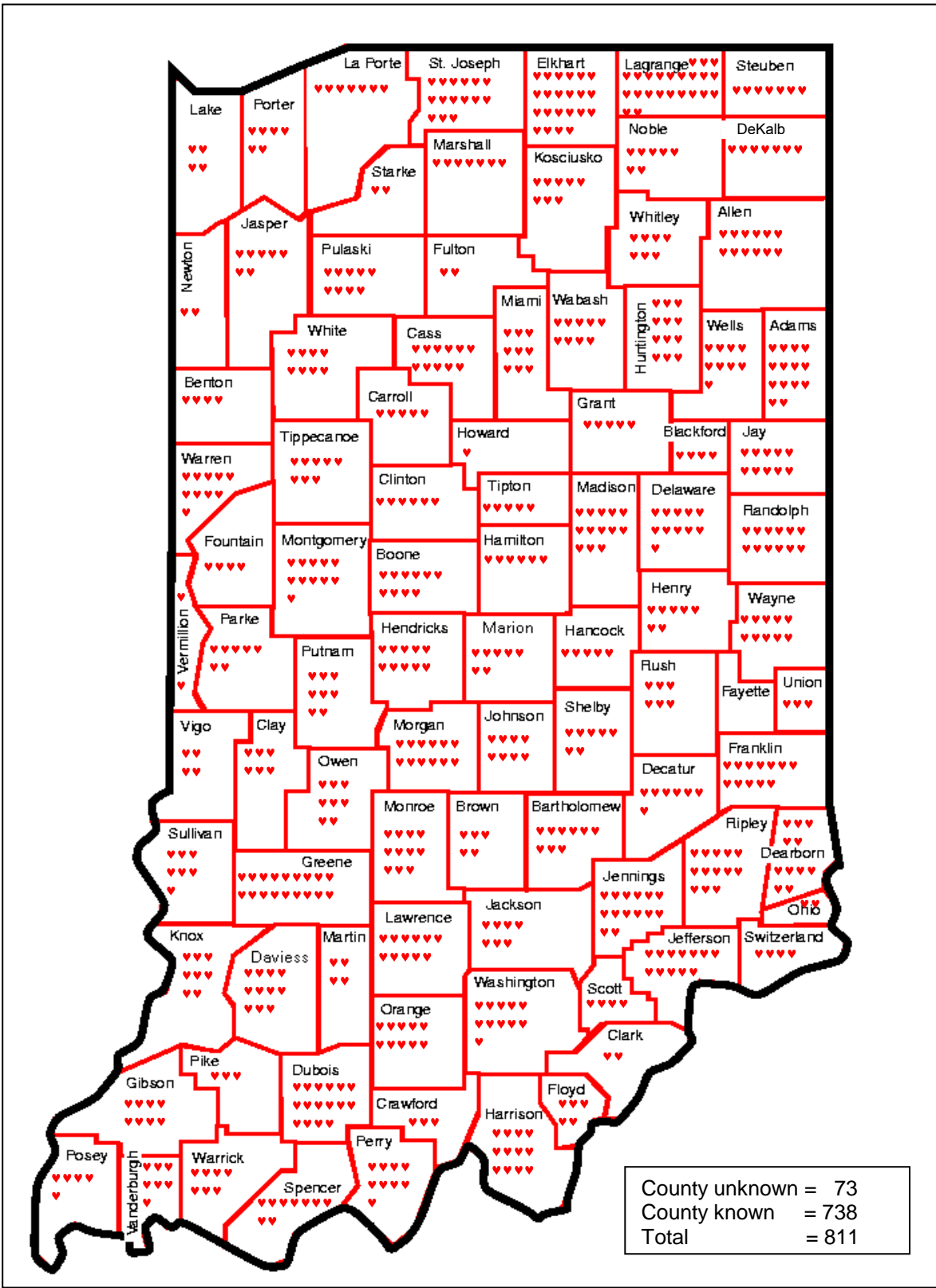
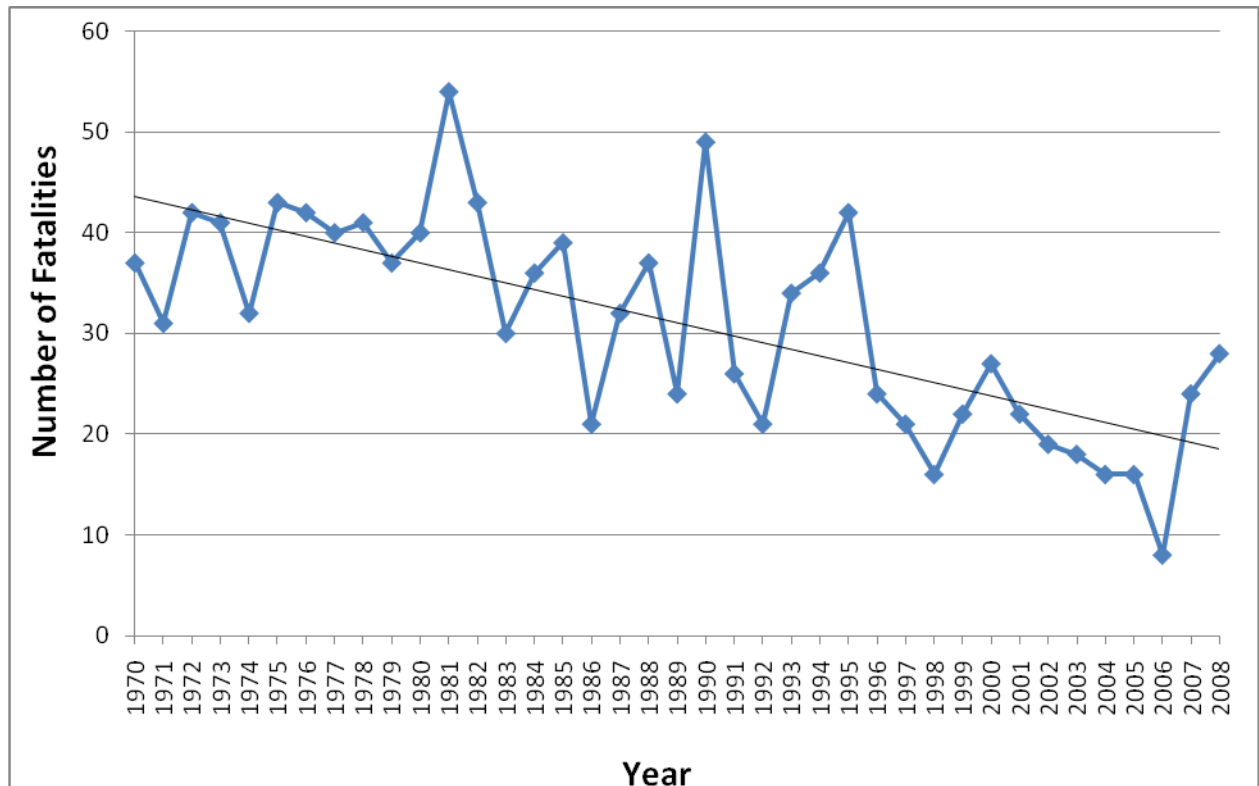


Figure 3. Geographic distribution by county of Indiana’s farm-work-related fatalities from 1980 through 2008.

Figure 4 displays the general downward trend of identified farm-related fatalities over the past 39 years. The 1998, 2004, and 2005 years each recorded the second lowest number of fatalities (N=16) while 2006 recorded only eight fatalities, the lowest since Purdue’s Agricultural Safety and Health Program has been keeping records. The number of identified fatalities increased in 1999 and 2000 then continued the general decreasing trend from 2001 through 2006; however the 24 fatalities in 2007 and 28 in 2008 again fall above the general downward trend line.



**Figure 4. Annual summary of farm-work-related fatalities.**

Using the number of 60,938 productive farms in Indiana with sales of over \$1,000, it was estimated for 2008 that one out of every 2260 farms experienced a farm-work-related fatality<sup>4</sup>. Using a population of 133,000 operators and hired workers on farms in Indiana, the death rate was approximately 21.1 per 100,000 farm workers<sup>5</sup>. That rate compares to an estimated national death rate of 3.5 per 100,000 for workers in all industries and 31.6 per 100,000 for those engaged in agricultural production nationwide<sup>6</sup>. It is believed, however, that the Indiana and national agricultural rates would be lower if unpaid family labor were included in the population of those exposed to farm hazards on a regular basis. Furthermore, the National Safety Council data does not include children under 16 in their calculation of rates while Purdue’s Agricultural Safety and Health Program does if the children were involved with or exposed to farm-work activities.

<sup>4</sup> **Estimated number of farms** from the final report of the 2007 US Census of Agriculture.

<sup>5</sup> **Estimated farm population** of operators and hired workers on farms from the final report of the 2007 US Census of Agriculture.

<sup>6</sup> **Estimated death rates** from the National Safety Council Injury Facts, 2007 edition.



## Summary of Indiana's Farm-Related, Non-Fatal Incidents and Their Economic Impact

While the Purdue Agricultural Safety and Health Program's surveillance of farm-related fatalities is rather comprehensive, farm-related non-fatal injuries are not well documented by any source in the state; therefore, there is little data on the frequency and severity of injuries that occur annually during farm work. However, many of Indiana's non-fatal farm-related injuries that were identified in 2008 were severe. The reported incidents included: a 14-year-old boy impaled on the spikes of a silage wagon; four severe falls from a hay mow ladder, two grain bins, and a scaffold in a bin; horse-drawn planter runover; large 1200 lb. bale that rolled onto a farmer causing brain injury; grain bin collapse; and four tractor or equipment runovers caused by jumpstarting, climbing onto a rolling tractor, breaking of a tractor seat, and falling off a tractor seat by an operator.

In addition to the three roadway fatalities reported in Table 2, four nonfatal collisions between vehicles and farm tractors, trucks, and equipment were reported: semi-truck load of cattle overturned and 20 cattle died; a semi load of grain overturned spilling grain and closing an interstate highway; a semi-truck collided with a tractor requiring the 13-year-old tractor operator to be air lifted to a trauma center; a pickup truck collided with a combine causing the combine to overturn. Several incidents involving fertilizer and manure included: anhydrous ammonia tank that fell off its running gear, manure runoff into a creek killing 15,000 fish, and manure runoff into a drain-tile hole that led to a creek and killed an unspecified number of fish.

Where surveillance for barn fires on farms was possible, three barn fires were reported in Tippecanoe County and four in Clinton County. Injuries and losses reported from these fires were two fire fighters treated at hospitals and total loss of barns, hay, straw and equipment. A large hay-barn fire near Angola, Indiana, exhibited the havoc that a fire can create. It was fought by 100 fire fighters, required the closing of a highway, and caused an estimated property loss of \$400,000. Reported causes of the barn fires were: heat lamp, exhaust from a skid steer loader, recently used hay baler, and trash fire that spread.

From all of the nonfatal incidents, at least five of the victims had to be airlifted to regional trauma centers, and the terms serious or critical were used to describe most of the victims' conditions. These nonfatal incidents resulted in extremely severe disabling conditions, such as paralysis from spinal cord injury, leg amputations, and brain trauma. Historically, many of these injuries would have been fatal but were not, due to rapid access to emergency medical services. All of the known farm injury victims were males, and the ages of recorded victims ranged from 13 to 72 with a total of three teenagers.

It is estimated, based upon prior research, that approximately one out of every nine farms annually experiences a farm-related injury requiring medical attention. Based upon the estimated 60,938 farms in the state, it can be projected that in 2008 there were approximately 6,770 treated injuries. Prior research by the National Safety Council indicated that 2% of reported farm injuries result in permanent disabilities which suggests that approximately 135 such cases occurred in the state in 2008.

To gain a perspective of the potential economic impact of farm injuries to the state, a conservative estimated medical treatment cost of \$1200 per injury<sup>7</sup> would result in an economic loss of \$8.04 million excluding the costs of transportation to receive medical services, replacement labor, property damage, emergency services, and long-term rehabilitation services. This estimated total, however, would be substantially increased if both the direct and indirect costs associated with the 28 fatalities and the 135 permanent disabilities were included. For example, the estimated cost of medical and rehabilitation care for a person experiencing a permanent spinal cord injury now exceeds \$1 million.

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<sup>7</sup> Estimated cost per injury based upon research conducted at the University of Illinois

The general trend for the total number of fatalities and injuries has been on the decline until the last two years, but even during the decline it is believed that the economic impact on the state was on the rise due to the significant increase in medical and rehabilitation costs. This is especially problematic considering that a disproportionate number of farm families do not carry or cannot afford sufficient health care insurance. A single serious injury can result in almost insurmountable financial disaster for an otherwise successful farm family which is further emphasized by the fact that Indiana leads the nation in the rate of bankruptcies filed for medical reasons.

Another issue that can create significant hardships for both Indiana farm families and hired farm labor is that most are not covered by nor can they afford state workers compensation insurance programs that nearly all employees of other industries have available to them. Therefore, an on-the-job injury can result in both excessive personal debt due to medical costs and long-term loss of income. The lack of both affordable health care insurance and insurance for lost wages due to injury are complex issues that need attention to ensure that the economic impact of work-related injuries on the state's farm families and agricultural workforce is minimized.

### **Other Incidents**

Other incidents were reported which were not directly farm-work related but involved circumstances similar to those encountered with farm work. These included: a fatal roadway collision involving a highway worker operating a tractor, a hayride tractor and trailer overturn in a side ditch injuring nine people, two ATVs operated by 15-year-olds colliding and causing a head injury and air evacuation. Other nonfarm work incidents included: a six-year-old fatality from the rollover of an ATV driven by a seven year old, tractor runover, tractor overturn into a pond causing crushing injuries and near drowning, and serious injury of a three-year-old backed over by a mowing lawn tractor.

Several incidents that occurred at commercial grain facilities were also demonstrated: corn-cob blaze that required around-the-clock fire fighting for over a week, a grain silo explosion with no injuries, a fall from a grain silo with severe injuries, and a nonfatal grain entrapment in a 92-foot tall wheat silo.

### **The Changing Agricultural Workforce**

Over the past 30 years, the agricultural workforce in Indiana has changed dramatically. In 1976, when the Occupational Safety and Health Act (OSH Act) was passed by Congress, the US Census of Agriculture showed there were fewer than 100 farm operations in Indiana that were required to comply with the workplace safety and health provisions of the act due to their workforce exceeding 10 non-family member employees. In 2007, the estimated number that could be interpreted as needing to be in compliance has grown to around 850. It is assumed that this number will continue to increase with additional farm consolidation. Many of the farms have grown slowly and quietly, and their owners may not even realize that they should be in compliance with the Occupational Safety and Health Administration (OSHA) regulations.

Another major change has been the rapid growth in the number of Hispanics that are now employed in agricultural production operations on a full-time basis. This trend is especially notable on dairy, poultry, and hog operations. Many of these workers have limited English speaking skills and lower literacy levels that make traditional agricultural safety and health resources ineffective. To address the workplace safety and health needs of this new workforce, attention must be given to developing new and innovative instructional material that addresses the hazards of newer and more complex farm operations. That material needs to be culturally sensitive and delivered in a format that can be interpreted by the target audience.

Based upon the most recent agricultural census data, the growth of small farms is an important change occurring in rural communities. This audience of part-time and hobby farmers have very different educational needs as compared to larger commercial operations. A review of fatality data over the last few years suggests that these smaller operations are beginning to account for a disproportionate share of all documented fatalities.

### **Farm-related Injuries in the Amish/Old Order Communities**

Amish are a part of the Old Order Anabaptist subculture, and Indiana is home to the third largest Amish community in North America. This group is closely associated with agriculture, has a larger than average number of children per household, and is doubling in population approximately every 20-22 years. In 1996 one third of all documented farm-related fatalities occurred in Amish communities. Elkhart, LaGrange, Adams, and Allen counties, home to some of the largest Amish communities, are also counties with the largest number of farm-related fatalities over the past 30 years.

There are several contributing factors to the larger number of cases being reported from these communities. These include the widespread use of horses and horse drawn vehicles and equipment, more labor intensive farm practices, greater use of children in completing farm work, and the recent acceptance of certain hybrid equipment that is engine powered yet still horse drawn.

Purdue Agriculture Safety and Health Program identified 203 farm-related injuries and 14 deaths that occurred in 2002 to Anabaptist children and youth under the age of 18 in the U.S. and Canada.<sup>8</sup> Direct animal contact, hay-hole falls, and horse-drawn equipment runovers were the most common causes of incidents, and the injuries occurred most frequently at ages 3-4 and 13-15.

Over the past 10 years, Purdue Extension has undertaken an aggressive effort to raise the awareness level within the Amish community of the hazards being identified by the injury data collection efforts and has facilitated over 20 family safety days that have attracted several thousand Amish family members. Intervention strategies have been developed and presented which include new safety material that is more culturally acceptable.

### **Bull Attacks--Nationwide and Indiana**

With the advent of artificial insemination, the frequency of farmers and ranchers in close contact with bulls was reduced, and little attention has been given to bull attacks in agricultural safety and health literature over the past two decades. However, when Purdue University's agricultural safety and health program's surveillance project detected 31 bull attacks on people **nationwide** in 2006 and 29 in 2007 (not counting recreational attacks from bull riding), the program began a study researching bull attacks. It appears there is a trend to bring back the yearling bull for "clean up" breeding purposes, and intact bulls are also being raised for meat production. In Indiana there was one fatal attack and one nonfatal attack in 2006 and no attacks recorded in 2007 and 2008, but all of these numbers are most likely very conservative because minor injuries are often not reported.

The study showed that over half of the attacks resulted in a fatality, with the nonfatal attacks often causing severe disabling physical injuries. The study concluded that better bull handling facilities should be used to minimize direct contact with bulls and that aggressive bulls should be culled from the herd and slaughtered because several cases demonstrated if a bull attacks once it is likely to attack again. Due to the unpredictable nature of bulls which can be docile one day and aggressive the next, bull handlers should be aware of the risks associated with mature bulls and never turn their back on a

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<sup>8</sup> "Farm-Related Injuries among Old Order Anabaptist Children ...," Gilliam et. al., Journal of Agromedicine, Vol. 12(3) 2007.

bull just because the bull has always been docile in the past. The complete results and recommendations from the study can be found in Volume 13 of the Journal of Agromedicine.

### **Impact on Agriculture from Natural Disasters**

An ongoing review of reports from across the state indicates that farmers are also regularly impacted by a variety of environmental forces including flooding, tornadoes, winter storms, lightning and high winds. In most cases, the bulk of these losses are absorbed by the farm operation due to a lack of adequate insurance coverage, high levels of deductibles, and policy coverage limitations. Though not always preventable, some of these losses can be mitigated through adequate planning and more effective response strategies. A good example is the damage caused by frozen pipes, a significant source of insurance claims. Utilizing appropriate design criteria, recognizing the need to protect vulnerable pipes and providing short-term but safe supplemental heating could save farm families hundreds of thousands of dollars annually that are spent to repair broken pipes and water damage.

### **Motor Vehicle Safety**

The most frequent cause of work-related deaths for Indiana farm families and farm labor are, and always have been, motor vehicle crashes. The total number of deaths may be lower, but the rate is just as high as and probably higher than other segments of the population due to the exemption in the past that farm truck operators had from having to comply with the state motor vehicle seatbelt law (that exemption was rescinded effective July 1, 2007). It may be that the single most important step that could be taken to reduce work-related fatalities among farmers is to encourage them to buckle up every time they get behind the wheel and head out on the highway.

### **Diminishing Resources**

As budgets have tightened and legislators at the state and federal levels have explored ways to reduce expenditures, farm safety efforts have not gone untouched. In Indiana, reduced travel budgets and increased fuel costs for Extension staff have made coordination and participation in local safety initiatives more difficult. Educational material that was once free and readily available is now expensive and restricted to on-line access. Most commercially available farm safety videos and DVDs have become so expensive that they are now out of reach to most public schools and groups such as 4-H and FFA. The Indiana Rural Safety and Health Council, the only non-profit group in the state with its sole mission being to promote agricultural safety and health, has a budget of only a few thousand dollars per year to spend on exhibits, displays, and information dissemination. To make matters worse, USDA eliminated all earmarked farm safety funds for the states from the budget for the past five years leaving several states with no, or greatly diminished farm safety programs. Due to the foresight of Purdue's earlier Extension directors, Purdue's commitment to farm safety and health had already been incorporated into line item budgets and was not impacted as much as most states.

Farm safety and health is not, nor will it ever be, a topic that will make the front page of the paper, turn the heads of legislators or generate an outpouring of public support. However, if you belonged to one of the 811 Indiana farm families that experienced the loss of a family member over the past 29 years, including the 28 in 2008, you know personally the impact these events can have. In some cases, the effects last a lifetime.

If you are interested in supporting the work of Purdue's Agricultural Safety and Health Program or the Indiana Rural Safety and Health Council, please feel free to call 765-494-1191.

**For additional information, contact 765-494-1191 or visit [www.farmsafety.org](http://www.farmsafety.org).**