

# *Agricultural Fatalities in Canada 1990-2005*

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*-with the support of*



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***www.caisp.ca***

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### ***Agricultural Fatalities in Canada 1990-2005***

This report from *The Canadian Agricultural Injury Surveillance Program* describes the occurrence and patterns of fatal agricultural injuries in Canada by age group over the sixteen years from 1990-2005.

#### ***CAISP's Vision:***

***A pillar of agricultural safety providing a comprehensive national system of surveillance for fatal and non-fatal agricultural injuries.***

# *Agricultural Fatalities in Canada 1990-2005*

## *Table of Contents*



	<i>Acknowledgments</i>	<i>v</i>
	<i>Foreword &amp; Executive Summary</i>	<i>ix</i>
<b>Chapter</b>		<b>Page</b>
	<b>Section I</b>	
<b>1</b>	Introduction	<b>1</b>
<b>2</b>	Methods	<b>3</b>
	<b>Section II Fatal Agricultural Injuries in Canada</b>	
<b>3</b>	Agricultural fatalities in Canada 1990-2005: overview	<b>5</b>
<b>4</b>	Agricultural fatalities in Canada: children and youth under age 15	<b>21</b>
<b>5</b>	Agricultural fatalities in Canada: adults aged 15 to 59	<b>29</b>
<b>6</b>	Agricultural fatalities in Canada: adults aged 60 and over	<b>39</b>
<b>Appendix A</b>	Decision rules	<b>49</b>
<b>Appendix B</b>	Glossary	<b>51</b>
<b>Appendix C</b>	Fatality data abstraction form	<b>53</b>
<b>Appendix D</b>	Denominator data	<b>55</b>
<b>Appendix E</b>	Contact information	<b>57</b>
<b>Appendix F</b>	References	<b>59</b>



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CASA (formerly called the Canadian Coalition for Agricultural Safety and Rural Health) was established in 1993 by a coalition of agencies from across Canada. These agencies joined together to address problems of illness, injury, and accidental death in farmers and ranchers and their families, agricultural workers and other issues related to rural health. For more information, please visit [www.casa-acsa.ca](http://www.casa-acsa.ca)

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## Foreword and Executive Summary

**Agricultural Fatalities in Canada For 1990-2005** includes an analysis of Canadian Agricultural Surveillance Program (CAISP) fatal agricultural injury data in Canada for the sixteen calendar years from 1990 to 2005. The purpose of this report is to describe the magnitude of the agricultural fatality problem in Canada and to determine age-related patterns of injury. A main objective of CAISP is to identify agricultural injury patterns in order to facilitate the design and targeting of specific prevention initiatives. Also, by collecting agricultural injury data on an ongoing basis, CAISP is able to monitor the effectiveness of prevention programs and to identify patterns of injury arising from new equipment and changes in farming practices.

CAISP data show that agricultural injuries are not due to random or isolated “accidents”. There are many recurrent patterns of injury. In the sixteen years from 1990-2005, 1,769 people were killed in agricultural injury events in Canada. Agricultural machines were involved in 70.9% of the fatalities. Adults aged 60 and over had the highest percentage of machine related deaths (74.1%), whereas children aged 1 to 14 had the lowest percentage of deaths involving agricultural machines (64.1%). Overall, more than half of the agricultural fatalities were due to four machine-related causes: machine rollovers, machine runovers, machine entanglements and traffic collisions. The top five causes of agricultural fatalities in Canada were machine rollovers (20.5%), machine runovers (18.6%), machine entanglements (8.3%), traffic collisions (7.3%), and being pinned or struck by a machine (7.0%).

Of those fatally injured as a result of agricultural work, 91.6% were male. The percentage of males killed was highest for adults aged sixty and over (95.2%) and lowest for children under age fifteen (79.3%). From 1990 to 2005, Canada’s average agricultural fatality rate<sup>1</sup> was 13.7 per 100,000 agricultural population, per year (including non-workers). Fatality rates were highest for adults aged 50 and over and extraordinarily high for adults aged 80 and over (94.3/100,000/year). Children under age five had an extremely high age specific fatality rate (14.3/100,000/year). The child fatality rate was much higher if only male children were considered (21.7/100,000/year). From 1990 to 2005, 99 children under age five were killed on Canadian farms. Fatality rates were lowest for adults of normal working age, though they should have had the greatest exposure to the hazards of agricultural work.

The most common causes of fatalities varied greatly among age groups. For children aged fourteen and under, machine runovers were the predominant cause of death (41.9%), followed by drownings (15.2%), machine rollovers (11.1%), animal-related injuries (6.5%), and being caught in or under a non-machine object (5.1%). In children, three mechanisms of injury (machine runovers, drownings and machine rollovers) were associated with two thirds of all deaths. Runovers and drownings were most common among young children. Older children and teenagers were more frequently killed in machine rollovers and runovers. In adults aged 15 to 59, the top five causes of fatal injuries were machine rollovers (20.7%), machine entanglements (11.3%), traffic collisions (10.3%), machine runovers (10.2%) and being pinned or struck by a machine (8.2%). In adults aged 60 and over, machine rollovers (23.7%) and runovers (22.6%) were the leading causes of death. The next most frequent mechanisms of fatal injury in older adults were being struck by an animal (8.3%), being pinned or struck by a machine (6.9%) and machine entanglement (5.9%).

The most frequent types of machine runovers and rollovers also varied among age groups. Overall, unmanned runovers were most common (37.4%), followed by bystander runovers (27.4%), fallen operator runovers (18.5%), and extra rider runovers (15.2%). Most adults aged 15 to 59 were runover by unmanned machines (45.7%). In 22.8% of the runovers for that age group, the victim was struck by a machine he/she had fallen from. Bystander (18.5%) and extra rider runovers (8.7%) were the least frequent fatal runover mechanisms in younger adults. In contrast, 54.9% of all runover deaths in children were due to bystander runovers. Another 40.7% of child victims fell from a machine where they had been an extra rider and were then runover by it. In 4.4% of the cases, children were runover by machines that they had been operating themselves. In adults aged 60 and over, most runovers involved unmanned machines (55.9%). The next most frequent mechanisms were fallen operator runovers (24.8%), bystander runovers (15.2%) and extra rider runovers (3.4%). This pattern was similar to that seen in

## *Foreword and Executive Summary*

younger adults, but older adults were involved in higher proportions of both unmanned and fallen operator runovers. The most frequent types of machine rollovers differed slightly between younger and older adults. In adults aged 15 to 59, 62.0% of the machine rollovers were sideways in direction and 26.7% were backwards. In adults aged 60 and over, 59.9% of the rollovers were sideways and 34.9% were backwards. Most backwards rollovers took place in woodlots during wood harvesting activities, whereas most sideways rollovers occurred next to roads or fields when a machine or vehicle traveled too close to the edge of a steep surface like a ditch or swale.

\*Average agricultural fatality rates for 1990 to 2005 were calculated using *Canada Census of Agriculture* 1996 agricultural population data. Since the Canadian farm population declined by 19.6% from 1990 to 2006, the fatality rates given in this report will be lower than the actual fatality rates.



## Highlights

1990 to 2005	All age groups	Children 1-14	Adults 15-59	Adults 60+
<i>Age range</i>	1-99	1-14	15-59	60-99
<i>Number killed*</i>	1,769	217	904	642
<i>Percentage of all fatalities for all ages</i>	100	12.3	51.1	36.3
<i>Percentage of machine injuries</i>	70.9	64.1	70.5	74.1
<i>Percentage of non-machine injuries</i>	29.1	35.9	29.5	25.9
<i>Number and percentage of males</i>	1,621 (91.6)	172 (79.3)	832 (92.0)	611 (95.2)
<i>Number and percentage of females</i>	148 (8.4)	45 (20.7)	72 (8.0)	31 (4.8)

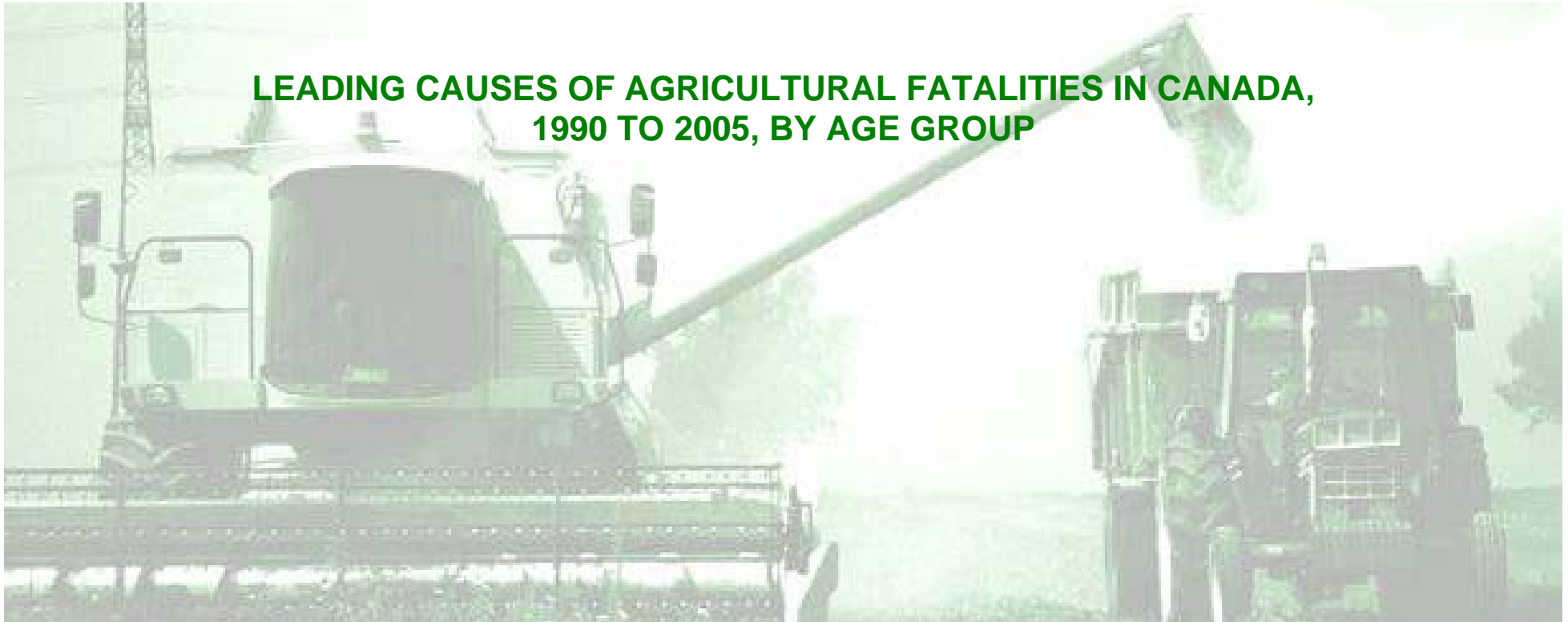
\*Age was not known in six cases.

## LEADING CAUSES OF AGRICULTURAL FATALITIES IN CANADA, 1990 TO 2005, OVER ALL AGE GROUPS

Rank	Mechanism of injury	Number	Percent
1	Machine rollover	363	20.5
2	Machine runover	329	18.6
3	Machine entanglement	147	8.3
4	Traffic collision	130	7.3
5	Pinned/struck by machine	124	7.0
6	Animal-related	104	5.9
7	Struck by object (non-machine)	93	5.3
8	Drowned	56	3.2
9	Fall from height	55	3.1
10	Struck by object (machine)	50	2.8
11	Toxic substance	47	2.7
12	Suffocated in grain or soil	37	2.1
13	Fall from machine	33	1.9
14	Fire/explosion	30	1.7
15	Exposure to electric current	23	1.3

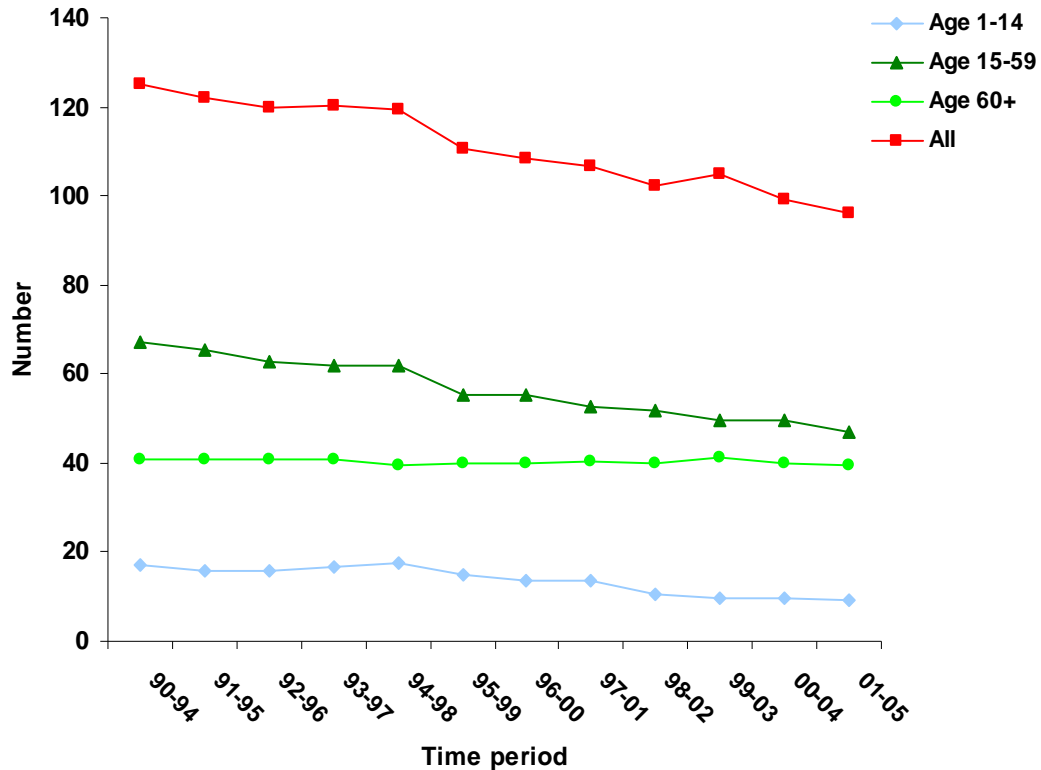


## LEADING CAUSES OF AGRICULTURAL FATALITIES IN CANADA, 1990 TO 2005, BY AGE GROUP



Children 1 to 14				Adults 15 to 59				Adults 60+			
Rank	Mechanism of injury	#	%	Rank	Mechanism of injury	#	%	Rank	Mechanism of injury	#	%
1	Runover	91	41.9	1	Rollover	187	20.7	1	Rollover	152	23.7
2	Drowned	33	15.2	2	Entanglement	102	11.3	2	Runover	145	22.6
3	Rollover	24	11.1	3	Traffic collision	93	10.3	3	Animal-related	53	8.3
4	Animal related	14	6.5	4	Runover	92	10.2	4	Pinned/struck (machine)	44	6.9
5	Caught in/under	11	5.1	5	Pinned/struck by machine	74	8.2	5	Entangled	38	5.9
6	Struck by object	9	4.1	6	Struck by object	50	5.5	6	Traffic collision	33	5.1
7	Entangled	7	3.2	7	Toxic substances	42	4.6	7	Struck by object	32	5.0
8	Pinned/struck (machine)	6	2.8	8	Animal-related	37	4.1	8	Struck by object (machine)	22	3.4
9	Traffic collision	4	1.8	9	Fall from height	31	3.4	8	Fall from height	22	3.4
10	Fall from machine	3	1.4	10	Asphyxiation in grain or soil	29	3.2	9	Fall from machine	18	2.8
								10	Fire/explosions	13	2.0

## Rolling five year averages of fatal agricultural injuries by age group, 1990 to 2005

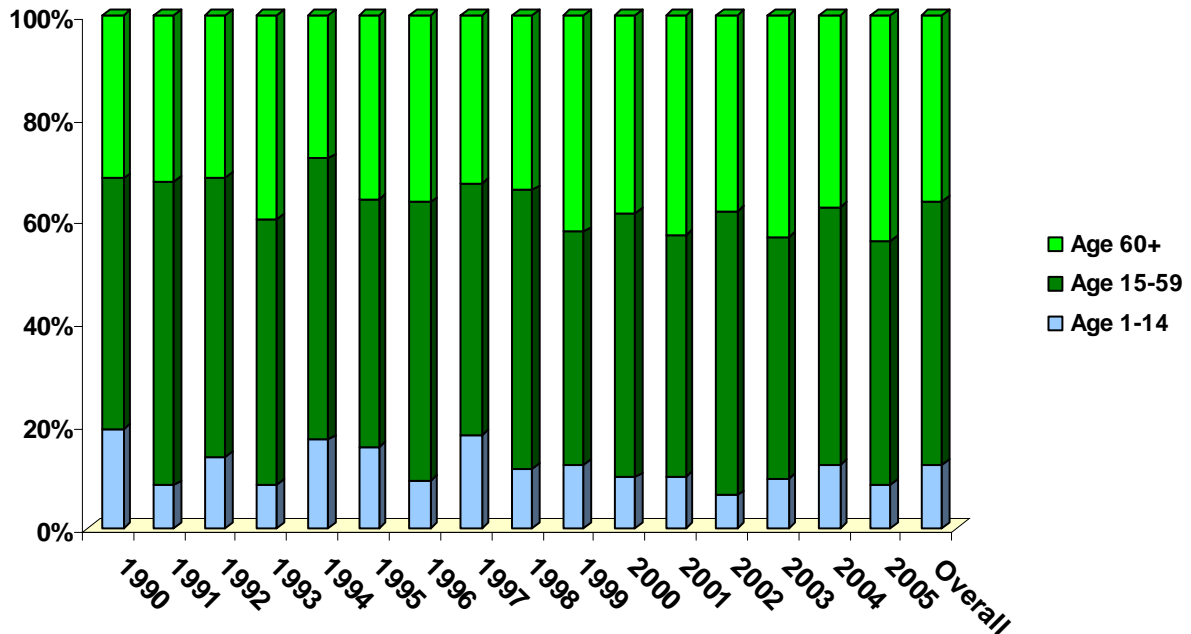


From 1990 to 2005, there was a reduction in the five-year rolling average of fatal injuries over all age groups. During the 16-year surveillance period there was also a decline in the five year rolling average of fatal injuries among adults aged 15 to 59 and children aged 1 to 14. From 1990 to 2005 there was no significant change in the five-year rolling average of fatal injuries in adults aged 60 and over.

Although the average annual number of fatal agricultural injuries has declined over the surveillance period for younger adults and for children under fifteen, part of the decline must be attributed to a reduction in the Canadian farm population. From the 1996 to the 2006 Canada Census of Agriculture, the number of people living on Canadian farms and ranches declined by 19.6%.

In spite of the fall in farm population, the average annual number of fatal agricultural injuries among adults aged 60 and over remained relatively constant over the surveillance period. This indicates that older adults may face an increasing risk of being killed as a result of agricultural work.

## Proportion of agricultural fatalities in each age group by year, 1990 to 2005



### Proportions of the 1996 and 2001 agricultural populations and numbers of agricultural injuries from 1990 to 2005 by age group

Age group:		<15	15-59	60+
<b>Population*</b> <b>2001</b>	Number	164,585	457,595	104,940
	Percent	22.6	62.9	14.4
<b>Population*</b> <b>1996</b>	Number	207,185	532,025	112,195
	Percent	24.3	62.5	13.2
<b>1990 to 2005</b> <b>Injuries</b>	Number <sup>^</sup>	217	904	642
	Percent	12.3	51.3	36.4

\* From Canada Census of Agriculture 1996 and 2001.

<sup>^</sup> The ages of six victims were not known.

Fatal agricultural injuries continue to be a serious occupational health and safety concern for older adults. Far more adults aged 60 and over were killed in agricultural injury events than would be expected given their representation in the farm population. From 1990 to 2005, 36.4% of the 1,769 people killed in agricultural injury events were older adults who represented only 13.2% to 14.5% of the agricultural population. In contrast, children under 15, who were 22.6% to 24.3% of the agricultural population, sustained 12.3% of the fatal agricultural injuries. Youth and adults aged 15 to 59 represented 62.5% to 62.9% of the agricultural population, but only 51.3% of those fatally injured over the surveillance period.

## Age-Specific Recommendations

### Ages 1-4:

- Preschool children should not be permitted in the farm or ranch work site, which includes the farm yard and driveway where most bystander runovers occur.
- Children of any age should not be taken as extra riders on tractors or other farm machines.
- Preschool children should be supervised closely and constantly by an adult whenever they are outside of the farm home or a safe, fenced-in play area.
- Drowning hazards, such as manure pits, should be fenced off.
- Heavy objects such as machine parts, large tires, fence panels, gates and steel dividers should be stored securely or left lying flat on the ground so they do not fall and crush young children.

### Ages 5-9:

- Children of any age should not be taken as extra riders on tractors or other farm machines.
- Young school children should not be permitted in areas of the farm or ranch work site where machinery is kept or used.
- According to the North American Guidelines for Children's Agricultural tasks (NAGCAT<sup>^</sup>), 5 to 7 year old children should not be assigned work tasks.
- 8 and 9 year old children can be assigned age-appropriate work tasks, as defined by NAGCAT. Adequate training and close, continuous supervision should be provided.
- Tasks involving machinery are not appropriate for children in this age group.
- Barn lofts should be recognized as hazardous areas where many falls from height occur, causing serious injury or death.

<sup>^</sup><http://www.nagcat.org/nagcat/pages/default.aspx>

### Ages 10-14:

- Work tasks assigned to children aged 10 to 14 should be in accordance with the North American Guidelines for Children's Agricultural tasks (NAGCAT<sup>^</sup>). Adequate training and close, continuous supervision should be provided.
- According to NAGCAT, children under 12 should not operate tractors of any size, including lawn tractors.
- Tractors over 70HP should not be operated by children under 15.
- Tractors should be equipped with seatbelts and rollover protection structures.
- Children should not be permitted to ride in the cargo areas of trucks, on bumpers or on running boards.
- CSA-approved helmets should be worn when riding horses and when operating any off road vehicle.
- Off road vehicles, such as ATVs, should not be operated by children.

<sup>^</sup><http://www.nagcat.org/nagcat/pages/default.aspx>

## **Age 15 and over:**

### **All Rollovers**

- The use of Roll Over Protection Structures (ROPS) and seatbelts by all operators would reduce the number of rollover fatalities.
- ROPs and seat belts should be retrofitted on older tractors. In Victoria Province Australia, the retrofitting of ROPs (only) on tractors was estimated to have lowered the rate of tractor rollover fatalities by 67.5% (Day and Rechnitzer 2006).
- Most farm machines are not designed to seat passengers. Extra riders should not be taken on farm machines as they are very likely to be killed or seriously injured in a rollover event.

### **Sideways Rollovers**

- Machine operators should stay well away from ditches bordering fields and at the sides of roads.
- Operating machines on steep slopes should be avoided, if possible.
- When required to work in the vicinity of slopes or embankments, operators should use machines that are equipped with ROPs and seat belts.
- Operators should always assess their work areas to determine the slopes that may be encountered as well as the stability of their equipment.
- Operators should not corner at excessive speeds.

### **Backwards Rollovers**

- Operators should adhere to manufacturers' recommendations concerning maximum towing capacity and appropriate hitching points. Failure to follow these recommendations may alter a tractor's centre of gravity causing it to overturn suddenly.
- A tow rope or chain should never be attached anywhere above the level of the draw pin.
- Poor terrain conditions such as thick mud, ice, and steep slopes adversely affect a tractor's normal towing capacity and could lead to a backwards rollover.
- Dragging a tree, log, or other object can lead to a backwards rollover if the object becomes caught while the tractor continues to drive forward.

### **Unmanned Machine Runovers**

- Tractors and other farm machines should not be parked on slopes. If parking on a slope is absolutely necessary, operators should not work in the potential path of the tractor.
- If an unmanned tractor's engine must be left running, the tractor and any attached equipment should be immobilized to prevent unintentional movement.
- Before commencing repairs to a vehicle or machine, operators should ensure that the transmission is in neutral or park and that the engine is turned off. Blocking can also be used on smaller tractors/machines.
- Children should never be allowed to play in or around a vehicle or machine as they may inadvertently activate controls.
- Brakes and electrical systems on tractors, farm trucks and other vehicles should be maintained properly.
- The practice of bypass starting a tractor by short circuiting its ignition system is associated with a very high incidence of fatal unmanned machine runovers.

### **Fallen Operator Events**

- Seat belts should be worn when operating a tractor or other farm machine.
- Tractor operators should remain seated at all times. It is a dangerous practice to stand while operating a tractor or other farm machine.

### **Animal-Related Events**

- Handlers of large animals should not work on foot inside an animal holding pen or chute system unless they are protected by secure panels or gates which would prevent them from being crushed.
- Escape routes should be planned and farmers should avoid being trapped in small areas with large animals, especially horses and bulls.

### **Age 60 and over:**

- Older farmers tend to operate older machinery. The much higher fatal rollover rate in this age group may, in part, reflect a relatively lower availability of ROPs and seat belts due to the age of the tractors used.
- As individuals age, physiological and cognitive changes can occur that may affect their ability to perform some tasks. It is therefore important that an older farmer and his/her fellow workers assess the skills required to perform particular tasks and determine whether he/she can safely perform the tasks.
- The types of agricultural tasks attempted and the methods used to accomplish the tasks should be adjusted to fit the changing abilities and limitations of older farmers.
- Older farmers should not work alone around unpredictable large animals, especially bulls and horses.
- In situations where an older farmer must work alone, a geographic positioning system should be used to ensure that the farmer's exact location can easily be established. An effective two-way communications system should also be available.
- Communication devices should be kept securely attached to clothing.
- For farmers of any age, long hours spent operating machinery should be avoided.
- Falls are a problem for all older persons. Care should be taken when completing any tasks where dynamic balance or static strength is required. Heavy objects should not be carried when climbing ladders or working at elevated heights.
- More research is required to determine older farmers' levels of exposure to machine and non-machine hazards. It is not known how older farmers' work tasks differ in type and in quantity from those of younger farmers.
- Prevention programs should be targeted at older males, since older females are at relatively low risk for fatal injuries.





# 1 INTRODUCTION

## 1.1 GENERAL INTRODUCTION

The Canadian Agricultural Injury Surveillance Program (CAISP) was established in 1995 in response to the need for better information about fatal and hospitalized agricultural injuries in Canada. CAISP is a national program with collaborators in each of the ten provinces of Canada. ***Agricultural Fatalities in Canada 1990-2005*** examines Canadian agricultural fatality data for the sixteen calendar years from 1990-2005. This report includes agricultural fatality data for all persons who were part of the Canadian farm population or who were otherwise exposed to agricultural injuries in Canada from 1990-2005. There were 1,769 agricultural fatalities in Canada from 1990 to 2005, an average of 111 per year. Over the 16-year surveillance period, the average fatality rate per 100,000 agricultural population, per year (including non-workers) was 13.1.

Following this introduction, there is a description of the methods used in CAISP's surveillance program. Agricultural fatalities in Canada are then reviewed comprehensively in an overview chapter. After the overview, important trends and patterns in agricultural fatalities are presented for children under fifteen, adults aged 15 to 59 and adults aged 60 and over. The executive summary of this report highlights its major findings and makes recommendations for injury prevention and further research.

## 1.2 HISTORY OF AGRICULTURAL INJURY SURVEILLANCE IN CANADA

Agricultural injuries have been recognized as an important rural health issue since the 1960s, when the problem was first recognized in the medical literature. At that time, some provincial groups began to monitor agricultural injuries, but only recently have substantial national resources been committed to the study of agricultural injuries. When compared with other Canadian industrial sectors, agriculture is a dangerous occupation. Agriculture ranks as the third most hazardous industry in Canada with respect to rates of fatal injury. In terms of absolute numbers of fatalities, there is no more dangerous occupation (Pickett et al., 1999). Economic costs associated with agricultural injuries are also substantial. In the United States, when one factors in the costs of treatment, rehabilitation and losses in productivity, agricultural injuries are responsible for over \$10 billion in economic losses annually (Leigh et al., 2001). Canadian estimates of economic burden are in the hundreds of millions of dollars annually (Locker et al., 2003).

Until the establishment of CAISP, Canadian data on agricultural injuries were historically limited. This surveillance program has filled an important void in providing national evidence of agricultural injury occurrence that can be used in developing and targeting effective injury-prevention strategies.

## 1.3 THE CANADIAN AGRICULTURAL INJURY SURVEILLANCE PROGRAM

The Canadian Agricultural Injury Surveillance Program (CAISP) is a national program that is funded by the Canadian Agricultural Safety Association (CASA). CAISP is a collaborative program run by organizations from across Canada. It is coordinated from a national office at Queen's University in Kingston, Ontario. The people and organizations that contribute to CAISP include researchers, government agencies and the agricultural industry.

The main purpose of CAISP is to collect and interpret information on agricultural injuries from across Canada. During the pilot phase of CAISP, national standards were developed for this process and representatives from each of the ten provinces were recruited. The CAISP fatality and hospitalization databases include data from all ten Canadian provinces.

**CAISP's vision:** *A pillar of agricultural safety providing a comprehensive national system of surveillance for fatal and non-fatal agricultural injuries.*

**CAISP's mission:** *To provide Canada with national and provincial leadership in the prevention of agricultural injuries as a world leader in gathering information, conducting research and translating knowledge into products and services.*

## CAISP's strategic goals and aim:

*To develop formalized partnerships that*

1. strengthen the reliability and comprehensiveness of agricultural surveillance data at federal and provincial levels
2. advance the usefulness of surveillance information for the prevention of agricultural injuries (knowledge translation)
3. establish mechanisms to monitor program impacts

CAISP strives to ensure that fatality and hospitalized injury data are collected, compiled, and analyzed in a standard manner by all provinces and that the information is interpreted and communicated in ways that are helpful to potential data users in the agricultural industry.

CAISP's primary audience is individuals within the agricultural industry who need to make informed decisions about safety programs and policy. CAISP's reports represent one approach to making these data accessible to this audience. Other dissemination formats include articles in scientific journals, presentations at national conferences, information on our website at [www.CAISP.ca](http://www.CAISP.ca), and press releases.

### 1.4 USES OF CAISP DATA

CAISP has developed a surveillance system for Canada that describes the occurrence and patterns of agricultural injuries at a higher level of detail than was available previously. At both national and provincial levels, CAISP has provided evidence that has assisted in the development of priorities for health and safety programs as well as strategies for the targeting of these initiatives. CAISP data have also facilitated the post-implementation assessment of injury-prevention programs.

Agricultural safety specialists and others require objective evidence so that they can promote awareness of agricultural injury issues and advocate the allocation of additional resources to injury prevention and research programs. CAISP information has been used repeatedly to assist in advocacy efforts. This has contributed to the development of informed safety policy in the agricultural industry and to the funding of safety programs at international, national and provincial levels.

CAISP has provided baseline evidence to support several applied research projects. These projects include focused investigations aimed at the prevention of agricultural injuries in children and the elderly, studies of agricultural machinery injuries and their causes, and studies examining the economic burden of agricultural injuries.

### 1.5 THE CHALLENGES OF INJURY CONTROL IN AGRICULTURE

In other industries, victims of occupational injuries are usually workers aged 18 to 65. Agriculture is unique in that children and the elderly sustain significant numbers of severe work-related injuries. This is partly because farms and ranches are not just work sites, but also places where people of all ages live, play and participate in recreational activities. Also, unlike other industries, it is common for farmers and ranchers to work full time and to operate tractors and other heavy machinery well into their 70s and 80s.

The prevention of injuries in agricultural work settings is challenging because of the unique nature of the agricultural work environment. Also, in most jurisdictions, agriculture is not a heavily regulated industry in terms of occupational health and safety standards. Unlike other industrial workplaces, many Canadian agricultural workplaces have not benefited from modern industrial hygiene and safety practices. The composition of the agricultural workforce is also geographically diverse. This diversity adds to the difficulty in enforcement of safety standards. There has traditionally been reliance on voluntary rather than regulatory safety standards, but the effectiveness of voluntary safety standards has not been well evaluated.

## 2 METHODS

### 2.1 Identification of Agricultural Fatalities

A detailed review of CAISP's data collection and analysis methods is available in CAISP's national report *Agricultural Injuries in Canada for 1990-2000*. The process used in the identification of agricultural fatalities varies by province. This is a general description of the process:

1. Potential sources of agricultural fatality data are identified. These are kept by a variety of agencies that vary by province. Examples of these agencies include: offices of the provincial coroner or chief medical examiner, occupational health agencies, departments of vital statistics, ministries of transportation and provincial agricultural safety associations.
2. A comprehensive list of all potential agriculture-related fatalities is assembled within each province. These lists draw upon each available source of fatality data.
3. Once cases are identified, detailed case reports are sought for review and data abstraction. The main sources of information are coroners' investigation reports; occupational safety and health agency investigation reports; and RCMP / provincial police reports.
4. Data abstraction and entry are completed on each eligible fatality. This is done in a consistent manner using a standard data abstraction form (Appendix C). Data abstraction is completed on-site at provincial chief coroners' or medical examiners' offices. Data are then sent to the national site for verification, coding and analysis<sup>^</sup>.

### 2.2 Key Definitions

**Agricultural Fatalities:** CAISP defines an agricultural fatality as 1) *Any unintentional injury resulting in death that occurs during activities related to the operation of a farm or ranch in Canada and/or* 2) *Any unintentional injury resulting in death that involves any hazard of a farm or ranch environment in Canada (excluding fatal non work-related injuries that take place in the farm residence). This includes deaths that occur away from agricultural work locations if agricultural work is being done; e.g., transporting workers, livestock, supplies or harvested crops on public highways; farm animals roaming on public highways. Deaths where victims are killed because a third party is engaged in agricultural work are also included.*

**Study Population:** *All persons who live, work on, or visit a Canadian farm or ranch (as defined below), as well as all persons who are fatally injured in other locations (such as public highways) as a result of agricultural activity.*

**Farm:** *In the Census of Agriculture, Statistics Canada defined a farm as "any farm, ranch or other agricultural holding that produces at least one of the following agricultural products intended for sale: crops, livestock, poultry, animal products, greenhouse or nursery products, mushrooms, sod, honey, or maple syrup products." Canada Census of Agriculture, 1996, Statistics Canada.*

**Other Inclusion/Exclusion Criteria:** *These rules are provided in Appendix A.*

## 2.3 CONFIDENTIALITY OF CAISP DATA

Data are maintained in an electronic database that is managed centrally by the national coordinator under the supervision of the program co-directors. The provincial collaborators retain the complete data set for their own provinces.

Access to the national dataset is strictly limited to CAISP collaborators for the following activities:

1. CAISP provincial collaborators assigned the task of producing special technical reports for Canada.
2. CAISP collaborators who have permission from the CAISP group to conduct special analyses for the purpose of producing scientific reports for submission to peer-reviewed journals.
3. The national program co-coordinator and program co-directors for the purpose of maintaining the database and producing periodic comprehensive reports for Canada.
4. To support agricultural injury prevention initiatives by others through analyses presented as tabular data.

## 2.4 ANALYSIS

The analysis presented in this report is descriptive. It has three main objectives: 1) to illustrate the magnitude of the agricultural fatality problem in Canada 2) to compare trends in the causes and occurrence of fatal agricultural injuries among regions, genders and age groups and 3) to identify emerging patterns of injuries.

The statistics used include simple counts and frequencies as well as cross-tabulations. Where appropriate, injury rates were calculated. Formal hypothesis-testing methods and tests of statistical significance were not employed in comparisons.

Selected average rates of fatal agricultural injuries are presented in this report. The numerators used in calculating these rates are the numbers of agricultural fatalities for particular age categories and mechanisms of injury. These include fatal injuries to farm residents, hired agricultural workers, contractors, persons traveling on public highways and a small number of visitors to farms. Denominators for these rate calculations are taken from the 1996 Canada Census of Agriculture. The 1996 census data were used in the denominators because they were collected roughly halfway through the surveillance period. Since the farm and ranch population has declined since 1996 (Canada Census of Agriculture 1996, 2001, 2006), the use of 1996 population data in the rate calculations is conservative.

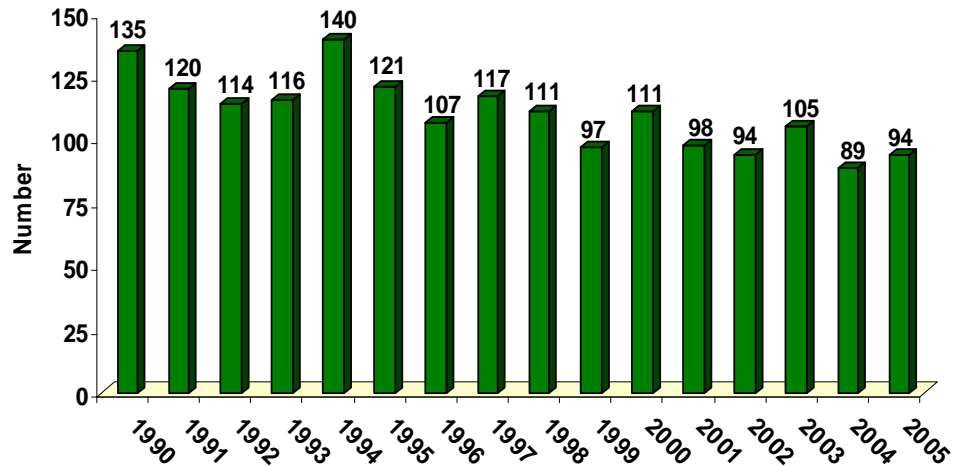
Some caution is warranted in the interpretation of the rates because it is not possible to obtain complete data on the full population at risk, or to determine relative amounts of exposure to agricultural work and associated hazards. Also, the Canada Census of Agriculture includes all farm and ranch residents, some of whom have relatively little exposure to agricultural work hazards, but excludes visitors to farms or ranches and agricultural workers who are not resident on farms or ranches. The accuracy of agriculture census information may vary among provinces, but is the best source of denominator information available at this time.

*^Québec fatality data for 2004 and 2005 have not been made available to CAISP. Québec data for 2004 and 2005 were therefore imputed for this report based on Québec's 2000 to 2003 fatality data by age category, gender and mechanism of injury.*

## 3 AGRICULTURAL FATALITIES IN CANADA 1990-2005: OVERVIEW

### 3.1 Fatal agricultural injuries by calendar year, 1990-2005

From 1990 to 2005, there were 1,769 agricultural fatalities in Canada. (An average of about 110.6 deaths per year). The peak year for fatalities was 1994, with 140 cases (7.9% of the total number of cases). During the first eight years of the surveillance period, there were seven years with a higher than average number of cases, whereas in the last eight years of the surveillance period there were only two years with higher than average numbers of cases (1998 and 2000).

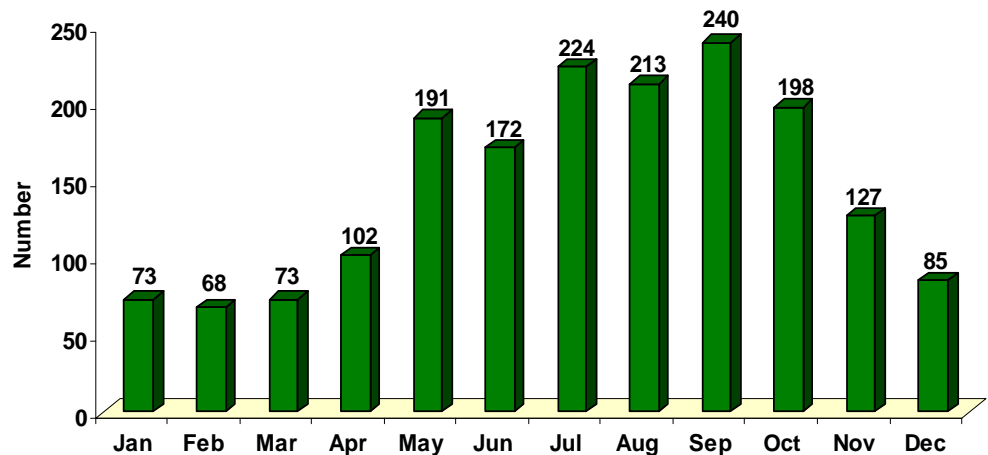


### 3.2 Fatal agricultural injuries by month, 1990-2005

70.1% of all agricultural fatalities in Canada occurred from May to October.

The highest proportion of fatalities took place in September (13.6%). Another 12.7% of the deaths were in the month of July and 12.1% in the month of August.

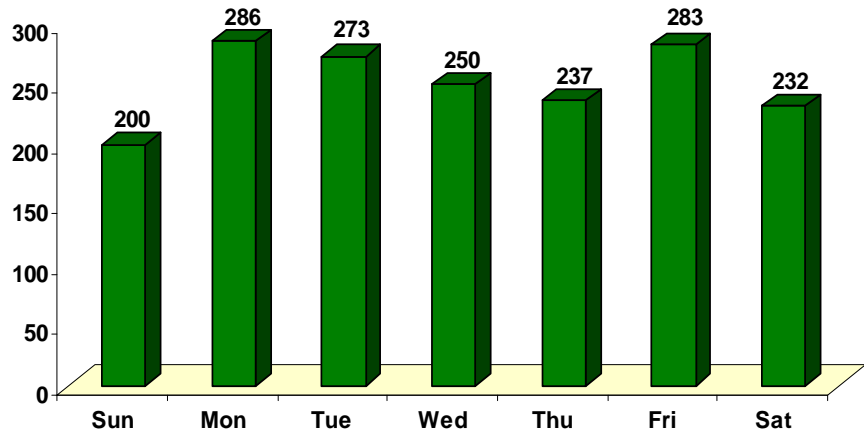
Relatively few fatal agricultural injuries occurred in the winter months of December to March.



### 3.3 Fatal agricultural injuries by weekday, 1990-2005

Fewer agricultural fatalities occurred on Sundays (11.4%) than on any other day of the week.

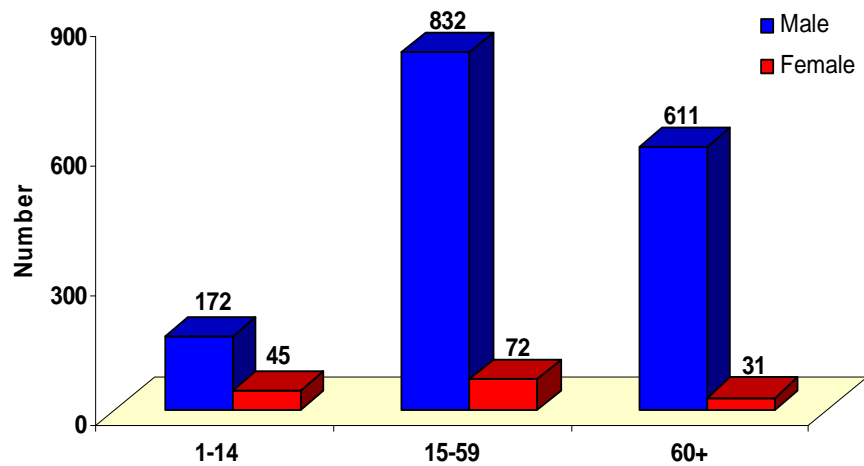
More fatalities tended to occur on non-weekend days, ranging from a low of 14.2% (Wednesdays) to a high of 16.2% (Mondays).



Weekday was not available for eight cases.

### 3.4a Fatal agricultural injuries by age group and gender, 1990-2005

91.6% of the persons who died in agricultural injury events were male. The ratio of males to females was highest for the 60+ age group (19.7:1), and lowest for the 1-14 year age group (3.8:1).



### 3.4b Fatal agricultural injuries by age group and gender, 1990-2005

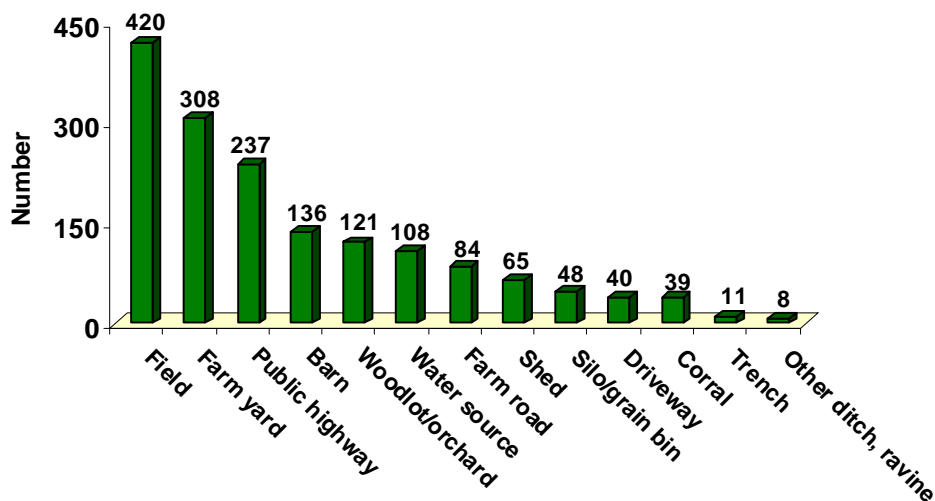
The majority of those fatally injured were in the 15 to 59 age group (51.3%). Larger numbers of children and older adults were killed than would have been expected given their representation in the farm population.

Age group	1-14	15-59	60+	Total	Percent
Male*	172	832	611	1621	91.6
Female	45	72	31	148	8.4
<b>Total</b>	<b>217</b>	<b>904</b>	<b>642</b>		
<b>Percent</b>	<b>12.3</b>	<b>51.3</b>	<b>36.4</b>		

\*Age was not known for six males

### 3.5 Fatal agricultural injuries by location of injury occurrence, 1990-2005

The most common locations of injury for agricultural fatalities in Canada were fields and their adjacent ditches (25.8%), farm yards (19.0%), public roads and their adjacent ditches (14.6%), and barns (8.4%).



Location was not known in 106 cases.

### 3.6 Fatal agricultural injuries: population numbers and fatality rates by age category and gender, 1990-2005

BOTH GENDERS	Farm population*	Percentage of population	Number of fatal injuries	Percentage of all fatal injuries**	Age specific fatality rate/ 100,000/year^
1-4	43,315	5.1	99	<b>5.6</b>	<b>14.3</b>
5-9	71,035	8.4	67	3.8	5.9
10-14	84,025	10.0	51	2.9	3.8
15-19	80,455	9.5	89	5.0	6.9
20-29	80,775	9.6	135	7.7	10.4
30-39	121,230	14.4	185	10.5	9.5
40-49	139,425	16.5	226	12.8	10.1
50-59	110,135	13.1	269	<b>15.3</b>	<b>15.3</b>
60-69	73,620	8.7	279	<b>15.8</b>	<b>23.7</b>
70-79	30,825	3.7	246	<b>14.0</b>	<b>49.9</b>
80+	7,755	0.9	117	<b>6.6</b>	<b>94.3</b>
<b>Total:</b>	<b>842,595</b>	<b>100.0</b>	<b>1763<sup>1</sup></b>	<b>100.0</b>	<b>13.7</b>

MALES	Farm population*	Percentage of population	Number of fatal injuries	Percentage of all fatal injuries**	Age specific fatality rate/ 100,000/year^
1-4	22,420	5.0	78	4.8	<b>21.7</b>
5-9	36,415	8.1	50	3.1	8.6
10-14	43,415	9.7	44	2.7	6.3
15-19	42,760	9.5	80	5.0	11.7
20-29	45,645	10.2	126	7.8	17.3
30-39	60,910	13.6	167	10.3	17.1
40-49	72,100	16.1	212	13.1	18.4
50-59	58,685	13.1	247	<b>15.3</b>	<b>26.3</b>
60-69	42,870	9.6	266	<b>16.5</b>	<b>38.8</b>
70-79	18,690	4.2	233	<b>14.4</b>	<b>77.9</b>
80+	4,090	0.9	112	<b>6.9</b>	<b>171.1</b>
<b>Total:</b>	<b>448,000</b>	<b>100.0</b>	<b>1615<sup>1</sup></b>	<b>100.0</b>	<b>22.6</b>

FEMALES	Farm population*	Percentage of population	Number of fatal injuries	Percentage of all fatal injuries**	Age specific fatality rate/ 100,000/year
1-4	20,895	5.3	21	<b>14.2</b>	<b>6.3</b>
5-9	34,620	8.8	17	<b>11.5</b>	<b>3.1</b>
10-14	40,600	10.3	7	4.7	1.1
15-19	37,695	9.6	9	6.1	1.5
20-29	35,130	8.9	9	6.1	1.6
30-39	60,320	15.3	18	12.2	1.9
40-49	67,325	17.1	14	9.5	1.3
50-59	51,455	13.0	22	<b>14.9</b>	<b>2.7</b>
60-69	30,750	7.8	13	<b>8.8</b>	2.6
70-79	12,135	3.1	13	<b>8.8</b>	<b>6.7</b>
80+	3,665	0.9	5	<b>3.4</b>	<b>8.5</b>
<b>Total:</b>	<b>394,590</b>	<b>100.0</b>	<b>148</b>	<b>100</b>	<b>2.3</b>

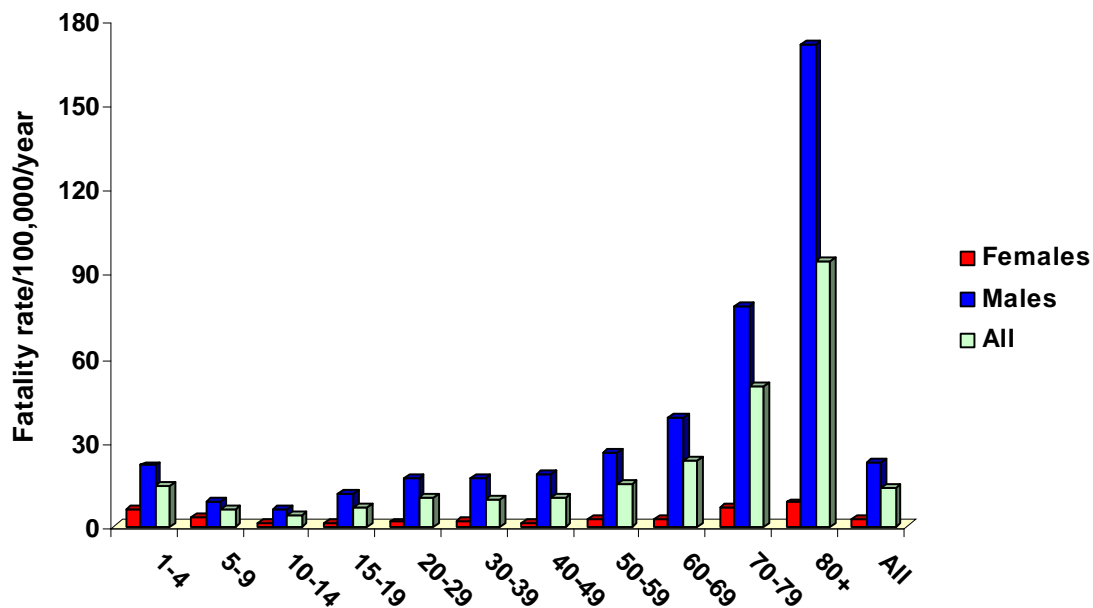
<sup>1</sup> Age was unknown in 6 cases

\* Statistics Canada, Census of Agriculture 1996

\*\*The over represented groups are highlighted

^The top five rates are highlighted

### 3.7 Agricultural fatality rates by gender and age category, 1990-2005



For both genders combined as well as males only, fatal agricultural injuries were most frequent for children aged 1-4 and for adults aged 50 and over. Overall, children aged 1-4 and adults in the older age groups (50-80+) were over-represented as victims of fatal agricultural injury events relative to their proportion of the farm population. This was especially true for older adults. The percentage of adults aged 80+ who were killed was 7.3 times the percentage of adults that age in the Canada farm population. Considering males only, the percentage of adults 80+ who were killed during agricultural work was 7.7 times the percentage of male adults that age in the farm population. In females, the pattern was slightly different. Children under ten and adults aged 50 and over were over-represented as victims of fatal agricultural injury events relative to their proportion of the female farm population. This was especially true for girls under five years old and women over age 70. The percentage of preschool girls killed was 2.7 times the percentage of girls under five in the farm population. The percentage of women 70 and over who were fatally injured was 3.1 times the percentage of women that age in the farm population.

In males, fatality rates showed a marked bimodal distribution with age. There was a very high fatality rate for boys under five (21.7/100,000/year), and extraordinarily high rates for males aged 60 and over. Within every age group, the fatality rate for males was higher than for females.

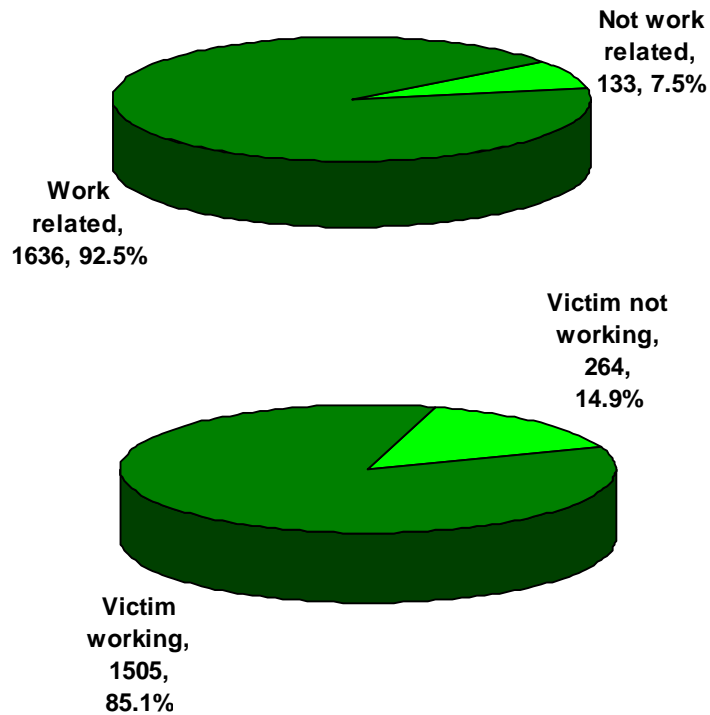
The high rates of death among very young children are likely due to their easy and often unsupervised access to very dangerous work areas where many bystander runovers occur. They are also heavily exposed to hazards of the farm environment such as dugouts, manure pits and improperly secured heavy objects. In addition, taking young children as extra riders on machinery results in many runover fatalities.

The extremely high rates of death among elderly males reflect their active participation in long hours of difficult and dangerous machine-related farm work well into their eighties, in spite of increasing physical limitations. The incidence of unmanned machine runovers, fallen operator runovers, falls from machines and machine rollovers is extremely high in this age group.

### 3.8 Fatal agricultural injuries: the relationship to agricultural work, 1990-2005

92.5% of the agricultural fatalities in Canada were work related. The few deaths that were not work related (7.5%) were due to hazards of the farm environment.

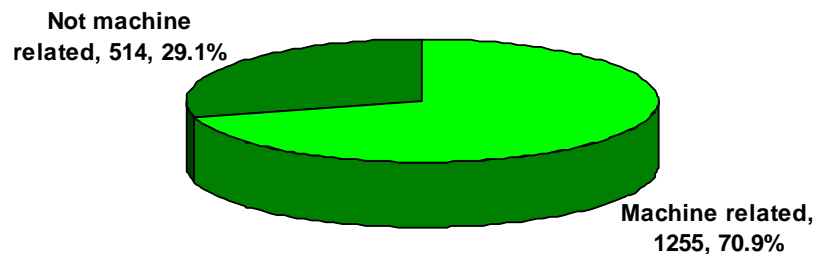
Most adults who died were engaged in agricultural work, whereas the majority of children who were killed in work-related injury events were not working themselves. Overall, 85.1% of those killed in agricultural injury events were actually engaged in agricultural work.



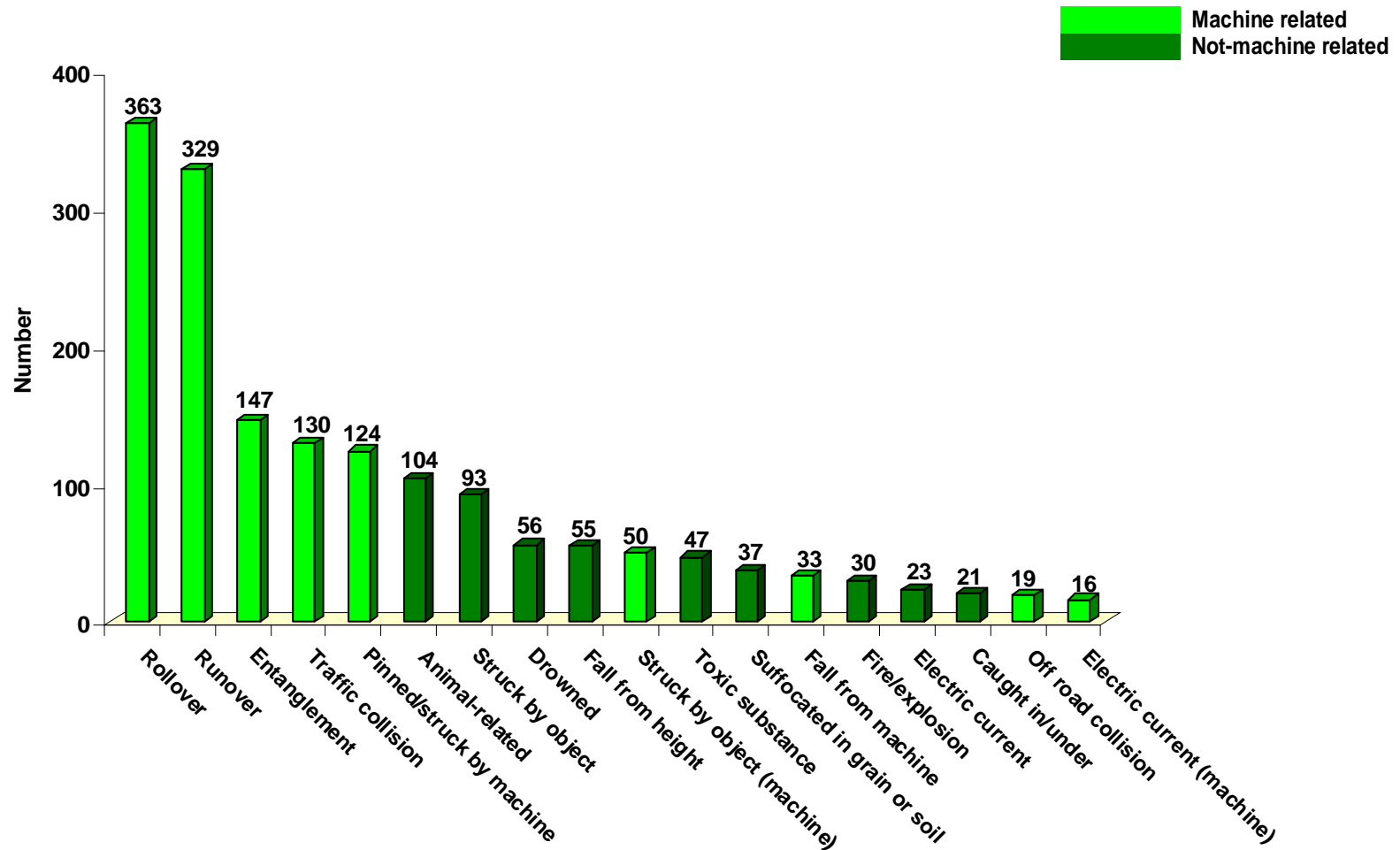
### 3.9 Fatal agricultural injuries by major cause, 1990-2005

70.9% (1,255) of agricultural fatalities were machine related. The leading machine-related mechanisms of fatal injury were machine rollovers, machine runovers and machine entanglements. (Figure 3.10).

The 514 agricultural fatalities that were not machine related (29.1%) included being struck by an animal or an object, drownings (mainly in children), falls from height, and exposure to toxic substances. (Figure 3.10).



### 3.10 Fatal agricultural injuries by cause of injury\*, 1990-2005



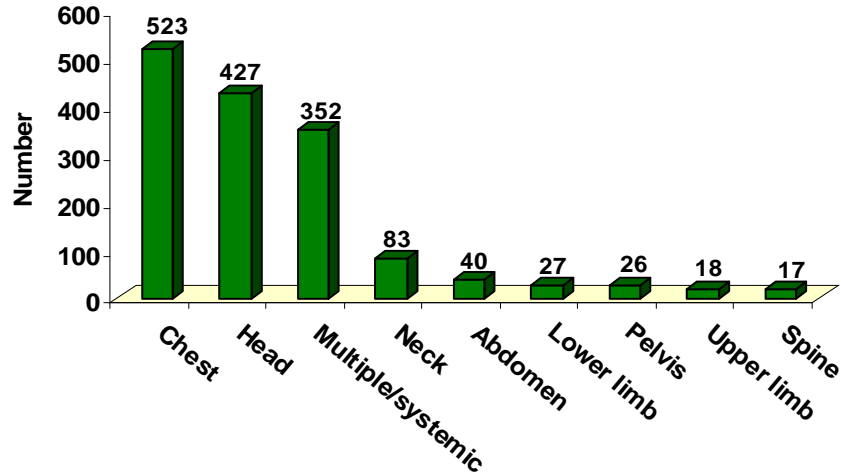
Almost half of all agricultural fatalities in Canada (47.4%) were due to three machine-related causes: machine rollovers, machine runovers and machine entanglements. Over all age groups, the leading causes of agricultural fatalities in Canada were machine rollovers (20.5%), machine runovers (18.6%), machine entanglements (8.3%), traffic collisions (7.3%), being pinned or struck by a machine (7.0%), animal-related events (5.9%) and being struck by a non-machine object (5.3%).

Another 44 machine-related and 48 non machine related cases with less than fifteen fatalities per cause of injury were not included in the above figure.

### 3.11 Fatal agricultural injuries by body part injured, 1990-2005

Where the primary nature of injury was known, the chest was cited as the body part involved in 34.6% of the injuries that most probably caused death. In 28.2% of the fatalities, the head was the most severely injured body part.

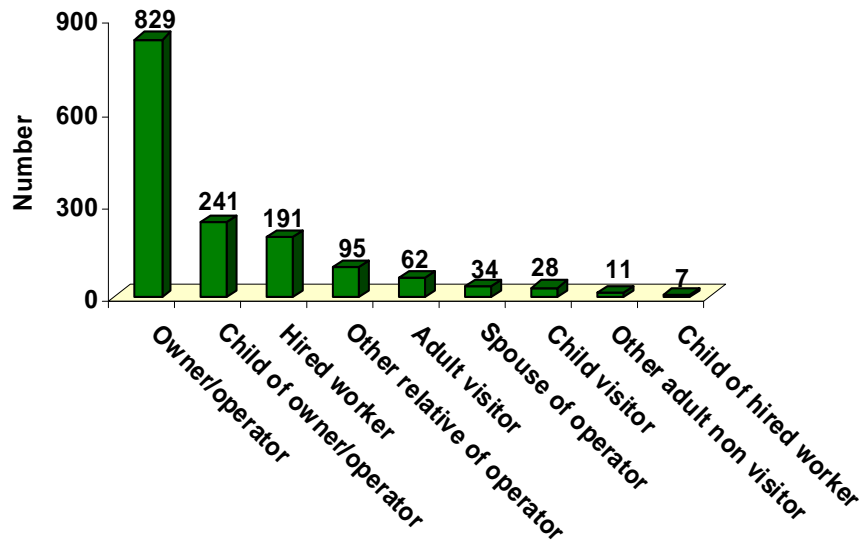
23.3% of the deaths involved injuries to multiple body parts (such as severe crush injuries and extensive burns), or systemic injuries like poisonings or suffocations.



The body part involved in the most important injury ('nature of injury 1') was not known in 256 cases.

### 3.12 Fatal agricultural injuries by relationship to farm operator, 1990-2005

Of the cases where the relationship between the victim and the farm operator was known, 55.3% of the persons killed in agricultural injury events were farm operators. A further 16.1% of the victims were children of farm operators and 12.8% were hired workers. Only 6.0% of those fatally injured were visitors or contractors.

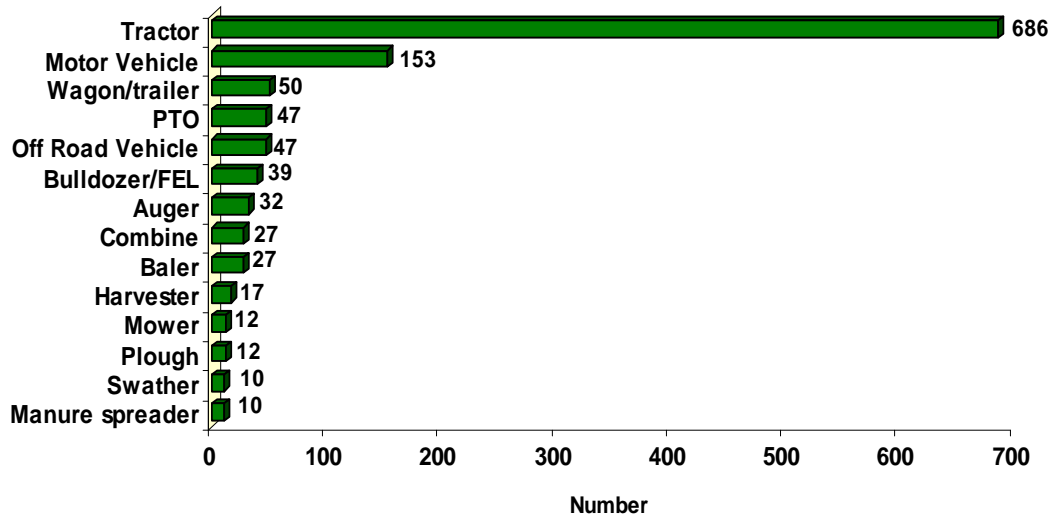


Relationship was cited as 'other' or 'unknown' in 271 cases.

### 3.13 Fatal machine-related agricultural injuries by machine type, 1990-2005

There were 1,255 machine-related agricultural fatalities in Canada from 1990 to 2005. Machine types most frequently involved in agricultural fatalities were tractors (54.7%), followed by motor vehicles (12.2%), wagons and trailers (4.0%), power take offs (3.7%), and off road vehicles (3.7%).

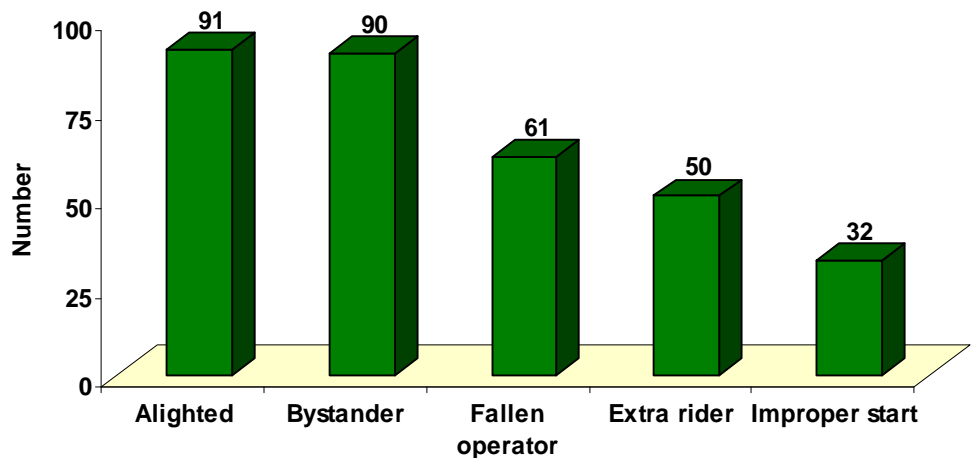
Tractors were associated with 38.8% of all agricultural deaths in Canada.



Other machine types: airplane (9), rock picker (6), hay elevator (6), power tool (4), snow blower (4), spraying equipment (3), other named (6), unknown (8).

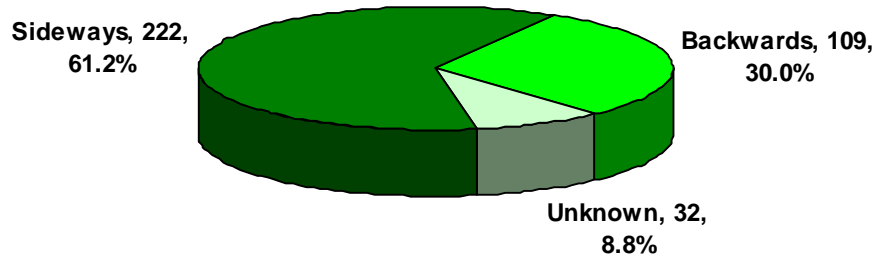
### 3.14 Fatal agricultural runovers by runover category, 1990-2005

There were 329 agricultural runover fatalities from 1990 to 2005. Alighted operator runovers (27.7%) were the most frequent type of fatal runover. In this kind of injury event, the victim is runover by a vehicle he/she had left running or unblocked on a slope. Bystander runovers caused the second largest percentage of runover fatalities (27.4%), followed by fallen operator runovers (18.5%), extra rider runovers (15.2%), and improper start runovers (9.7%).



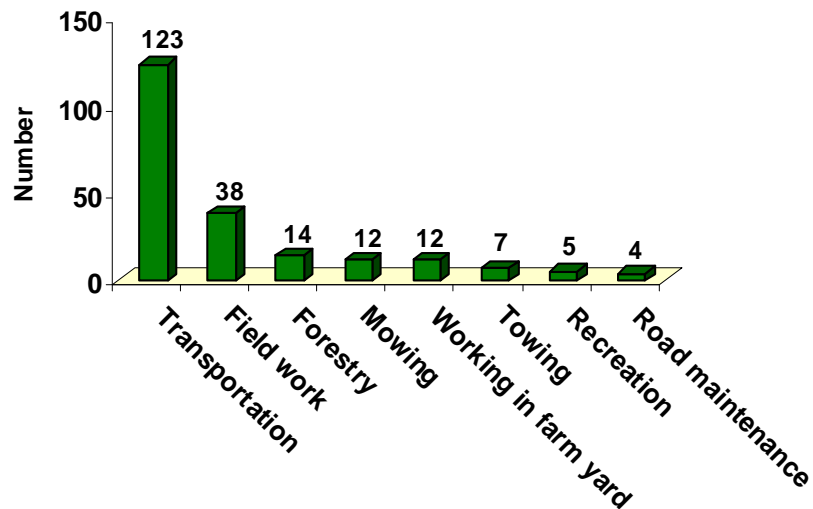
### 3.15 Fatal agricultural machine rollovers by rollover type, 1990-2005

Overall, 61.2% of the 363 fatal agricultural machine rollovers in Canada from 1990 to 2005 were sideways in direction. Another 30.0% of the rollovers were backwards. In 8.8% of the cases, the direction of rollover could not be determined. Sideways rollovers were more frequent in younger adults and children while backwards rollovers were more frequent in adults aged 60 and over.



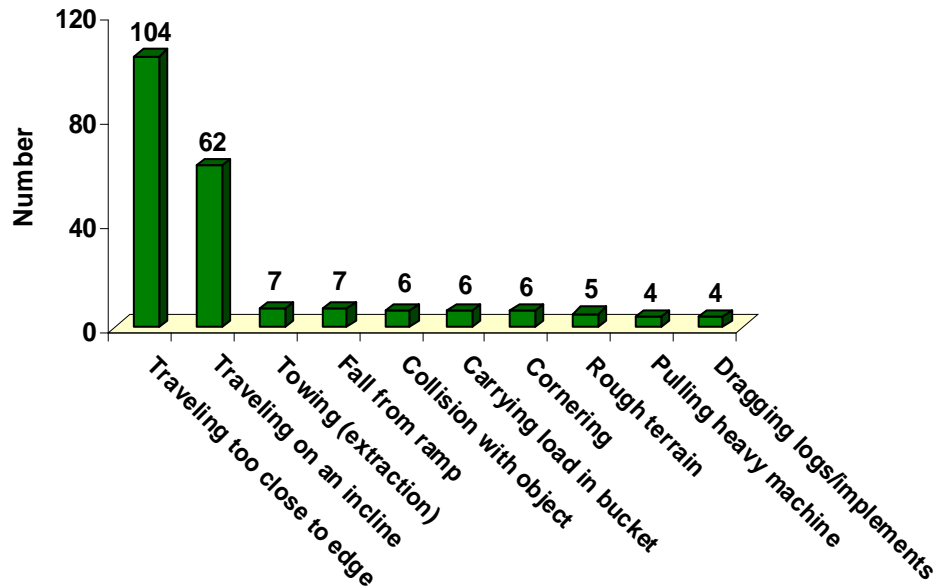
### 3.16 Fatal sideways agricultural rollovers by activity prior to rollover, 1990-2005

In fatal sideways machine rollovers, injury circumstance text descriptions showed that the decedents' most common activities prior to the rollover were driving on highways and farm roads (55.4%) and field work (17.1%).



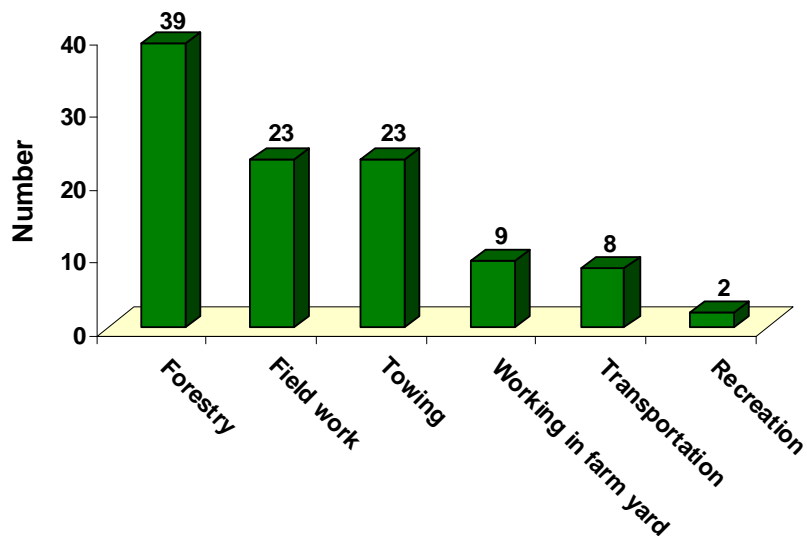
### 3.17 Fatal sideways agricultural rollovers by immediate cause of rollover, 1990-2005

In 46.8% of fatal sideways machine rollovers, circumstance text descriptions attributed the rollover to the machine or vehicle travelling too close to the edge of a ditch or other steep slope bordering a road or field. In 27.9% of the cases, the rollover was said to be due to the machine or vehicle travelling on a steep incline. In 28.4% of the rollovers overall, towing a machine or trailer may have been a contributing factor. Considering both circumstance text and location of occurrence, 72.5% of sideways rollovers involved steep slopes such as ditches, ravines, ramps and embankments.



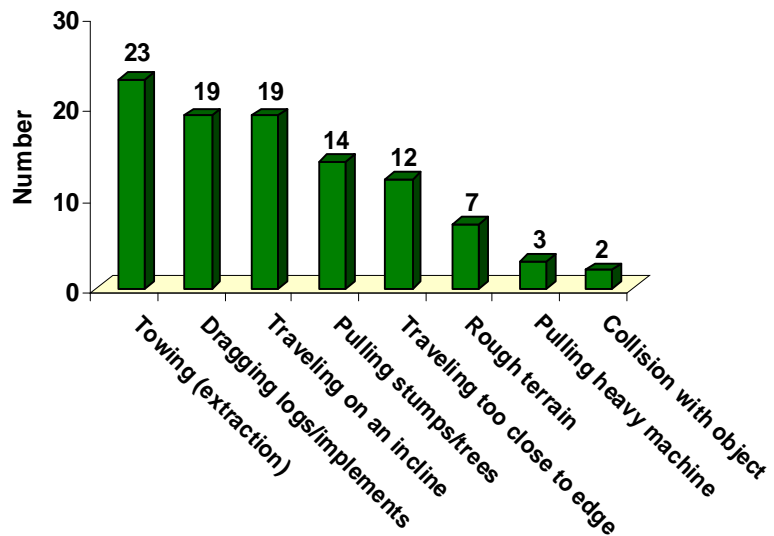
### 3.18 Fatal backwards agricultural rollovers by activity prior to rollover, 1990-2005

In fatal backwards machine rollovers, circumstance text descriptions showed that the decedents' most common activities prior to the rollover were harvesting wood and maintaining woodlots (35.8%), field work (21.1%) and towing (21.1%).



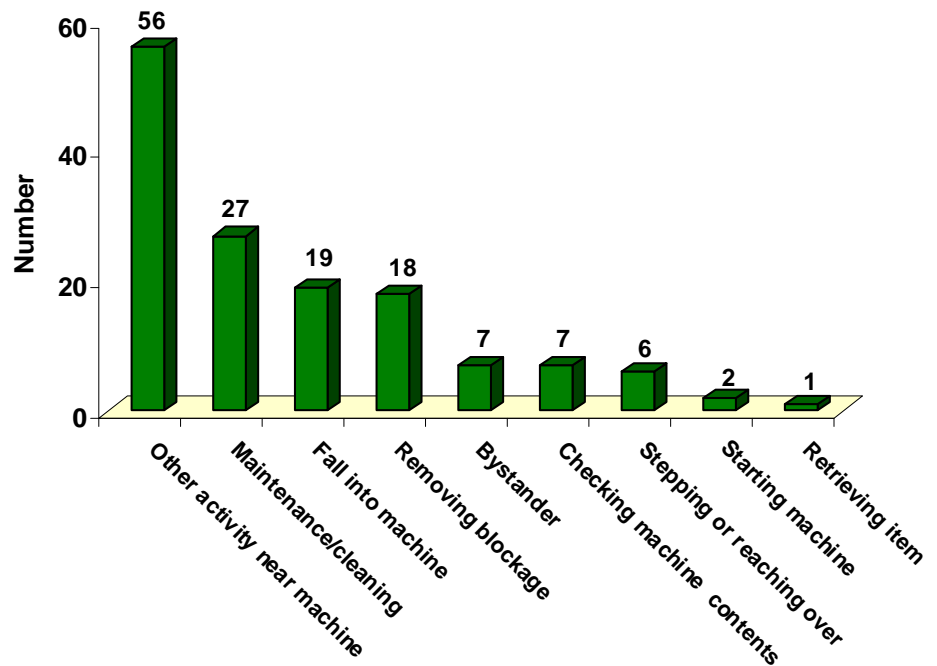
### 3.19 Fatal backwards agricultural rollovers by immediate cause of rollover, 1990-2005

According to circumstance text descriptions, 21.1% of fatal backwards rollovers were due to improper towing (extraction) practices. A further 17.4% were caused by dragging logs or implements along the ground, 17.4% were due to travelling on a steep incline, and 12.8% occurred because of stump pulling. In another 11.0% of the cases the machine or vehicle was said to be travelling too close to the edge of a ditch, ravine or other steep surface. In 61.5% of the cases overall, towing may have been a contributing factor. In 36.7% of the cases, a steep slope was either described in the circumstance text or was apparent from the location of occurrence.



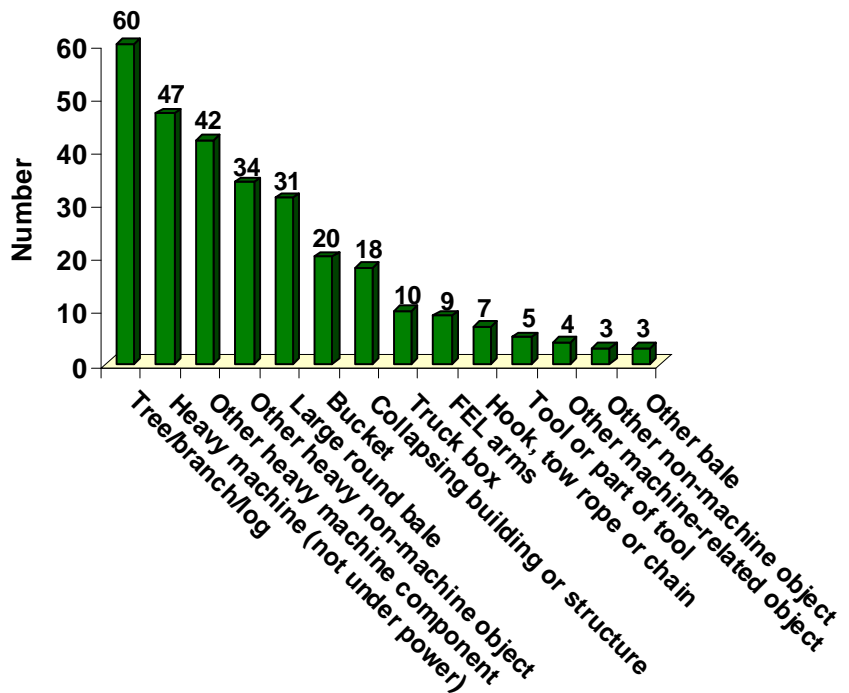
### 3.20 Fatal entanglements by activity prior to entanglement, 1990-2005

Circumstance text descriptions cite loose clothing or hair as the cause of 53.7% of the 147 fatal machine entanglements from 1990 to 2005. In 38.1% of the cases, victims were performing a variety of work tasks close to an entanglement hazard. In 18.4% of entanglements the victim had been cleaning or repairing a machine without shutting it off. In 12.9% of fatal entanglements, the decedent slipped and fell into a machine. In a further 12.2% of cases he/she was removing a blockage without first shutting the machine off. Only 4.8% of entanglement deaths were due to the actions of someone other than the deceased.



### 3.21 Fatal struck by object and pinned or struck by machine injuries, by type of object or component, 1990-2005

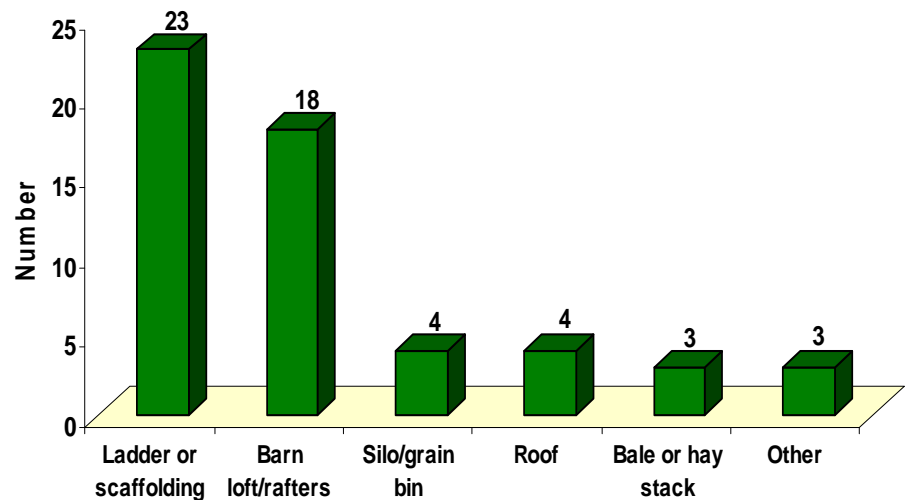
From 1990 to 2005, 143 people were struck and killed by an object on a farm. In 20.5% of all struck by object deaths, the victim was killed by a tree or tree branch during woodcutting activities. In another 16.0% of the fatalities, victims were crushed under a machine or vehicle because of jack, blocking or hydraulic failure. Other objects cited in fatality circumstance descriptions include heavy machine components such as transmissions, hay racks, tires and booms (14.3%), heavy non-machine objects such as gates and fence panels (11.6%), and large round bales (10.6%).



### 3.22 Fatal agricultural non-machine and machine falls from height, by fall location, 1990-2005

42.6% of the 55 fatal non-machine falls from height that occurred from 1990 to 2005 involved ladders or scaffolding. Barn lofts and rafters were the location of occurrence for another 33.3% of fatal falls.

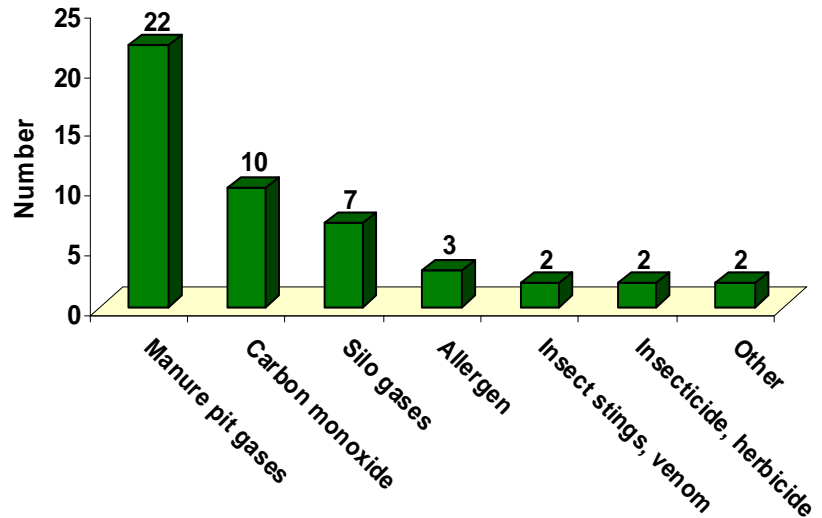
No falls from stationary machines resulted in death, but there were a total of 33 fatal falls from moving machines and 111 falls from moving machines where the victim was subsequently runover.



### 3.23 Fatal agricultural toxic substance injuries by type of substance, 1990-2005

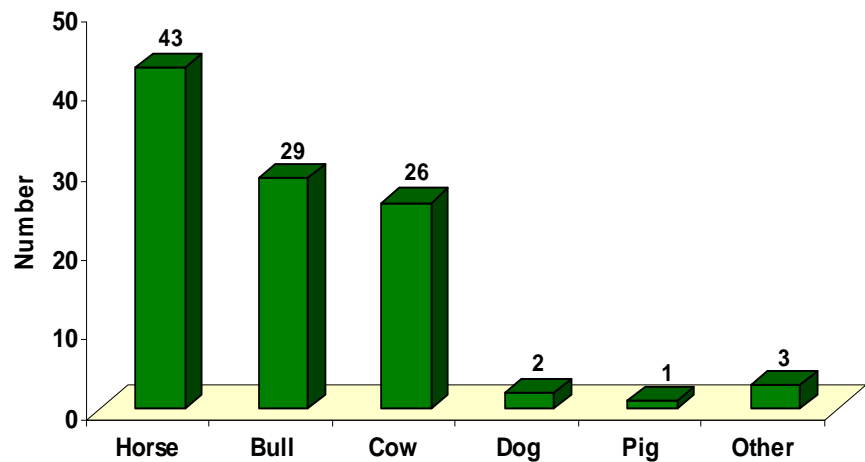
45.8% of the 47 agricultural fatalities from 1990 to 2005 due to toxic substance exposure were attributed to hydrogen sulfide poisoning. Another 20.8% were caused by carbon monoxide inhalation, most frequently associated with running engines indoors in winter with insufficient ventilation. 14.6% of the deaths were due to inhalation of silo gases.

Hydrogen sulfide exposure occurs when workers enter a poorly ventilated area containing manure or sewage. Storage areas for hog manure are especially prone to hydrogen sulfide accumulation. 63.6% of the hydrogen sulfide deaths involved multiple fatalities when would-be rescuers entered dangerous confined spaces without the proper equipment. There were two triple and four double hydrogen sulfide fatalities from 1990 to 2005.



### 3.24 Fatal agricultural animal injuries by type of animal, 1990-2005

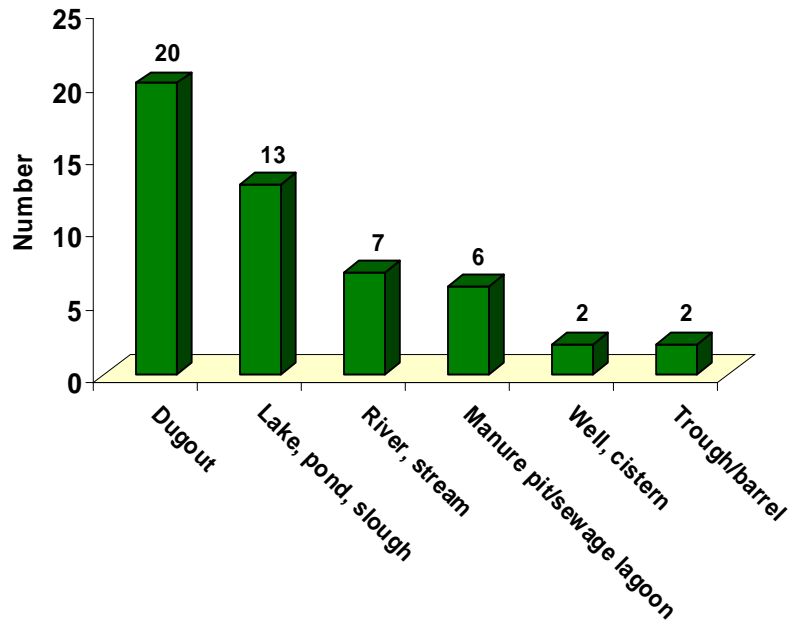
There were 104 animal-related deaths in Canada from 1990-2005 (5.9% of all agricultural deaths). Of these, 41.3% were caused by horses, 27.9% involved bulls and 25.0% were due to cows. 32.6% of the deaths associated with horses were not work related. They are included in the CAISP fatality database because horses are considered to be a hazard of the farm environment.



### 3.25 Fatal agricultural drownings by drowning location, 1990-2005

Of the 56 non-machine related drowning deaths from 1990 to 2005, 37.5% occurred in dugouts, 23.2% in lakes or ponds, 12.5% in rivers or streams and 10.7% in manure pits or sewage lagoons. 55.4% of the victims were less than ten years old.

There were nine machine-related drownings due to collisions with water. Five of these drownings took place in dugouts. The other four drownings occurred in a creek, a slough, a pond and a water-filled ditch.

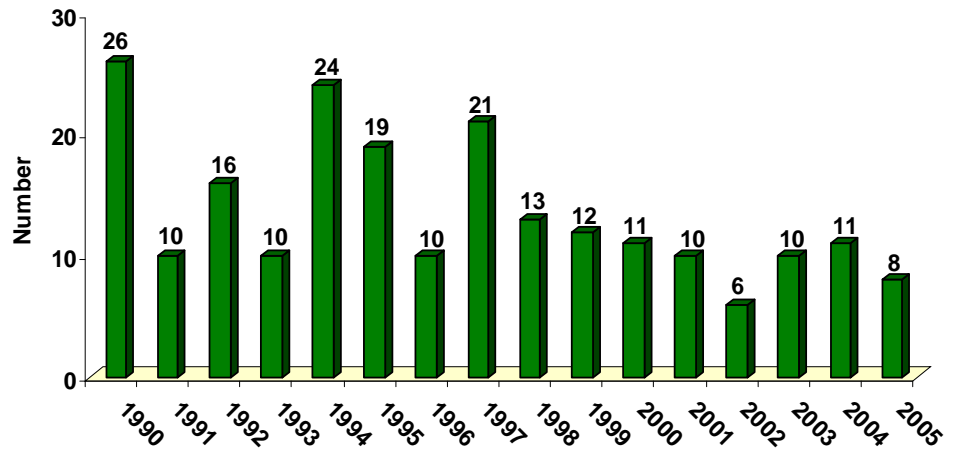




## 4 AGRICULTURAL FATALITIES IN CANADA: CHILDREN AND YOUTH UNDER AGE 15

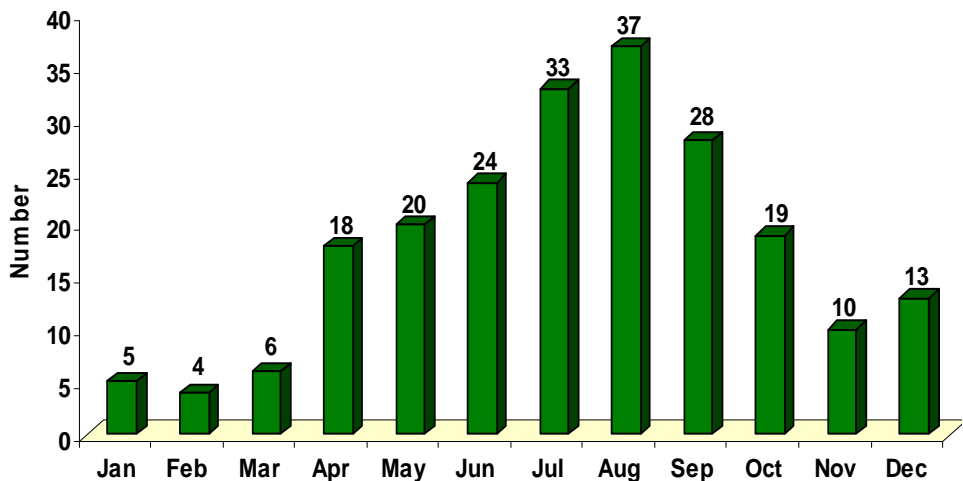
### 4.1 Fatal agricultural injuries in children and youth by calendar year, 1990-2005

From 1990 to 2005, there were 217 agricultural fatalities among children and youth aged 14 and under. (An average of 13.6 per year.) The peak year for fatalities was 1990, with 26 cases (12.0% of the total number of cases). The average number of child fatalities per year was 17.0 for the first eight years of the surveillance period, but only 10.1 for the last eight years. This decline in the average annual number of fatalities may be due, in part, to better child safety practices



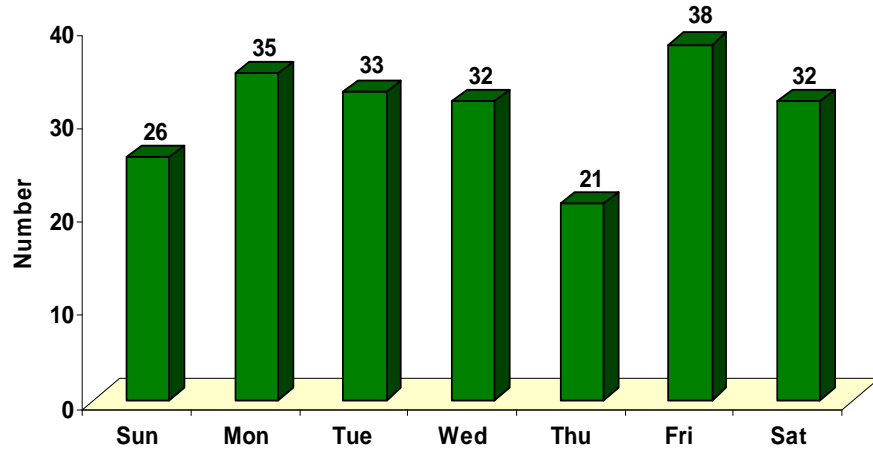
### 4.2 Fatal agricultural injuries in children and youth by month, 1990-2005

From 1990 to 2005, 32.3% of all child agricultural fatalities occurred during the school holiday months of July and August, with August having the highest proportion of fatalities (17.1%). 56.2% of the deaths occurred in the four months from June to September. Very few children were killed in the winter months of January, February and March.



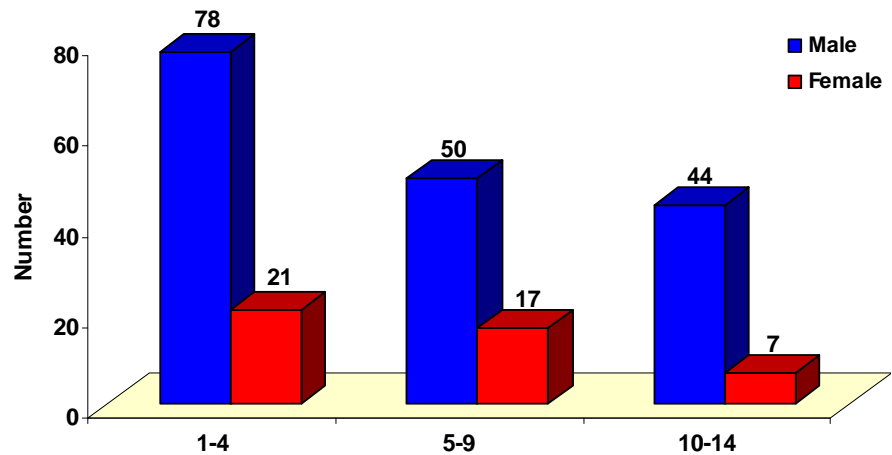
### 4.3 Fatal agricultural injuries in children and youth by weekday, 1990-2005

In children, there was no clear pattern of injury occurrence by day of the week. The smallest number of child deaths occurred on Thursdays (9.7%). As was the case for adults, a relatively low number of fatalities took place on Sundays.



### 4.4a Fatal agricultural injuries in children and youth by age group and gender, 1990-2005

From 1990 to 2005, 79.3% of the child victims of agricultural fatalities were male. The ratio of males to females was highest for the 10- to 14-year-old age group (6.3:1), and lowest for the 1- to 4-year-old age group (3.7:1). There was a higher proportion of females killed in the one- to four-year-old age group than in any other age group, including adults.



#### 4.4b Fatal agricultural injuries in children and youth by age group and gender, 1990-2005

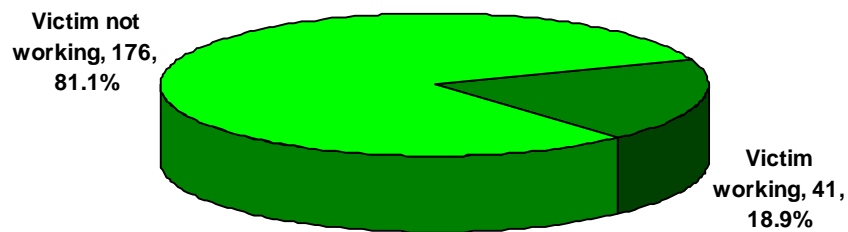
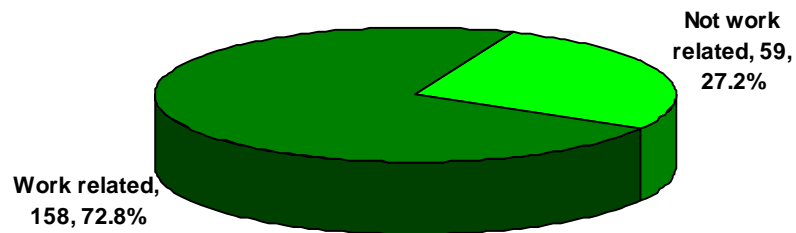
45.6% (99) of the children killed in agricultural injury events from 1990 to 2005 were less than five years old, including 17 one-year-old toddlers and 62 two- and three-year-old toddlers. 78.5% of them were male. 55.7% were killed in machine runovers and 17.7% drowned.

Age group	1-4	5-9	10-14	Total	Percent
Male	78	50	44	172	79.3
Female	21	17	7	45	20.7
<b>Total</b>	<b>99</b>	<b>67</b>	<b>51</b>		
<b>Percent</b>	<b>45.6</b>	<b>30.9</b>	<b>23.5</b>		

#### 4.5 Fatal agricultural injuries in children and youth: the relationship to agricultural work, 1990-2005

Although 72.8% of the agricultural fatalities among children were work related, in most cases (81.1%) the victim was not performing the work. He or she was killed by someone else who was engaged in agricultural work.

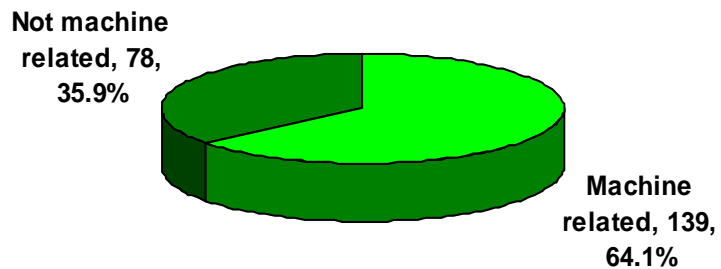
Non-work related agricultural deaths included those due to hazards of the farm environment such as large animals, improperly stored equipment, barn lofts, dugouts, sewage lagoons and troughs.



#### 4.6 Fatal agricultural injuries in children and youth by major cause, 1990-2005

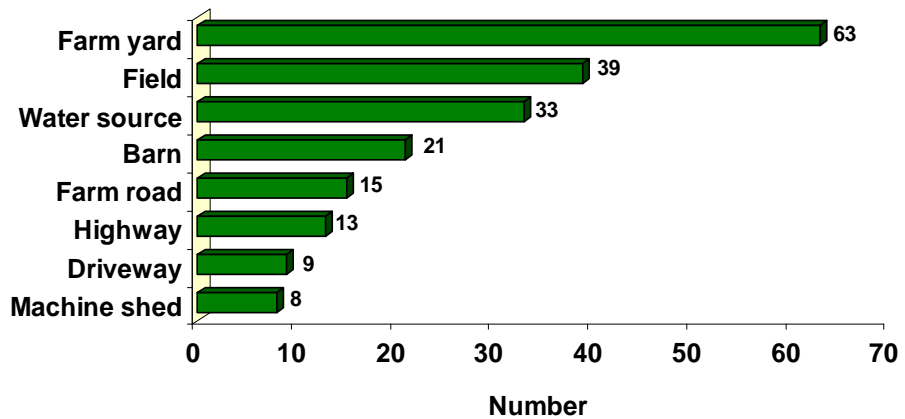
64.1% of agricultural fatalities in children were machine related. These included machine runovers, machine rollovers and machine entanglements. (Figure 4.8).

The 35.9% of agricultural fatalities that were not machine related included drownings, being struck by objects, being caught under heavy objects and falling from a height. (Figure 4.8).



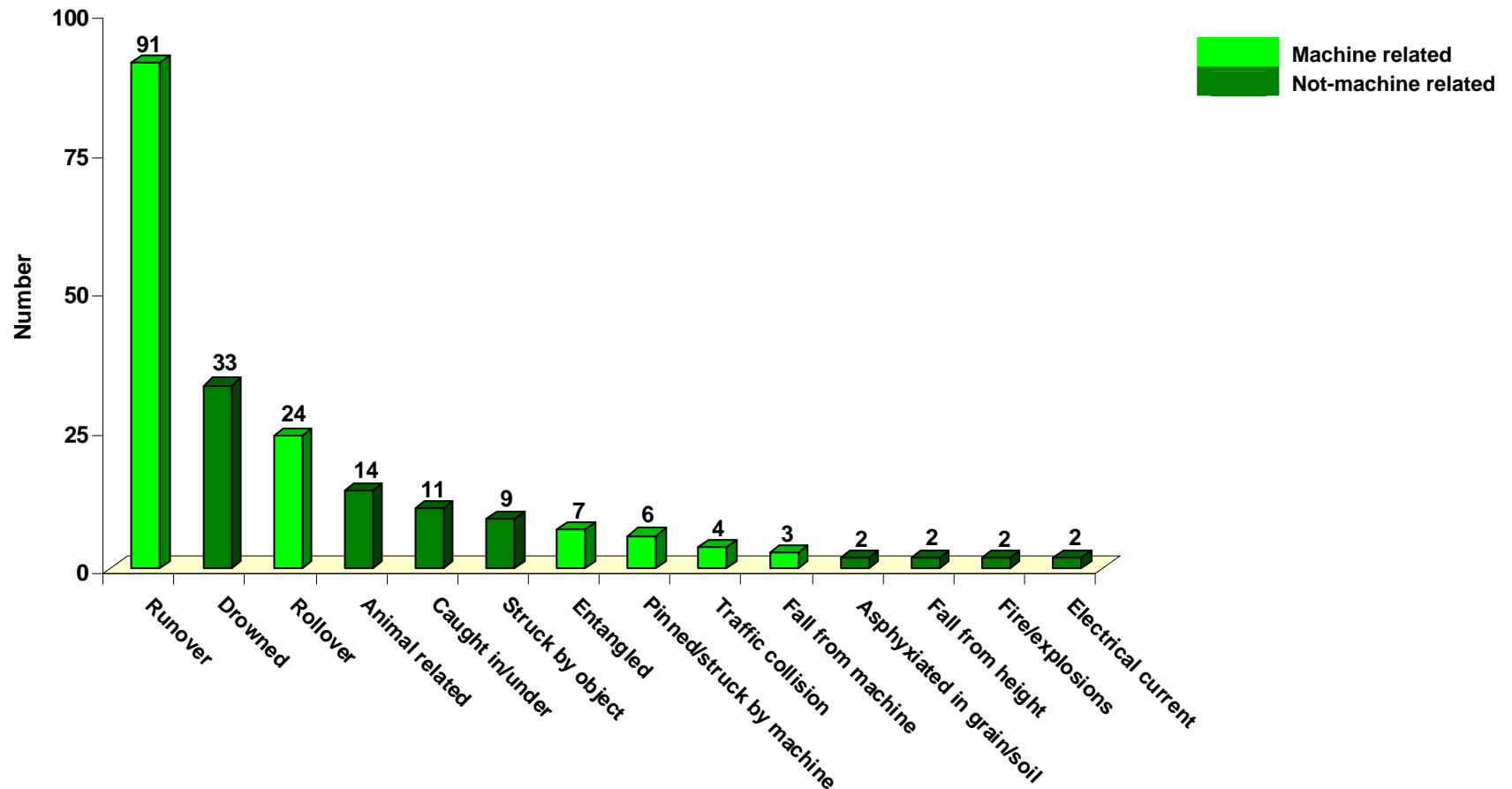
#### 4.7 Fatal agricultural injuries in children and youth by location of injury, 1990-2005

The most common locations for child agricultural fatalities were farm yards (29.0%), fields (18.0%), water sources (15.2%) and barns (9.7%). At least 47.0% of the deaths occurred in locations close to the farm home such as the farm yard, farm driveway, barn and sheds. Leaving small children to play unsupervised near the farm home is a dangerous practice.



Location was not known in 7 cases.

#### 4.8 Fatal agricultural injuries in children and youth by cause of injury, 1990-2005



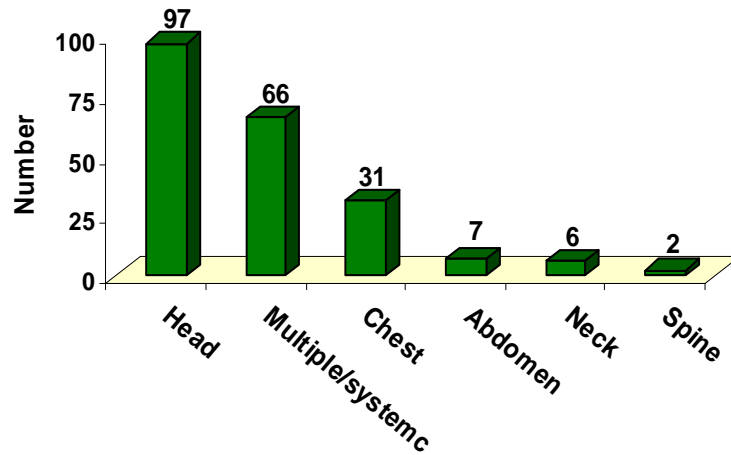
For children aged fourteen and under, machine runovers caused by far the largest proportion of fatal injuries (41.9%), followed by drownings (15.2%), machine rollovers (11.1%), animal-related incidents (6.5%), being caught in or under an object (5.1%) and being struck by a non-machine object (4.1%). In children, just three mechanisms of injury (machine runovers, drownings and machine rollovers) were responsible for 68.2% all deaths. Runovers and drownings were most common among young children. Older children and teenagers were more often killed in machine runovers and rollovers.

Another 4 machine-related and 1 non machine related cases with less than two fatalities per cause of injury were not included in the above figure.

#### 4.9 Fatal agricultural injuries in children and youth by body part injured, 1990-2005

Where the primary nature of injury was known, the head was cited as the body part involved in 44.7% of the injuries that most probably caused death in children. 30.4% of the deaths involved injuries to multiple body parts (such as severe crush injuries), or systemic injuries like drownings. In 14.3% of the fatalities, the head was the most severely injured body part.

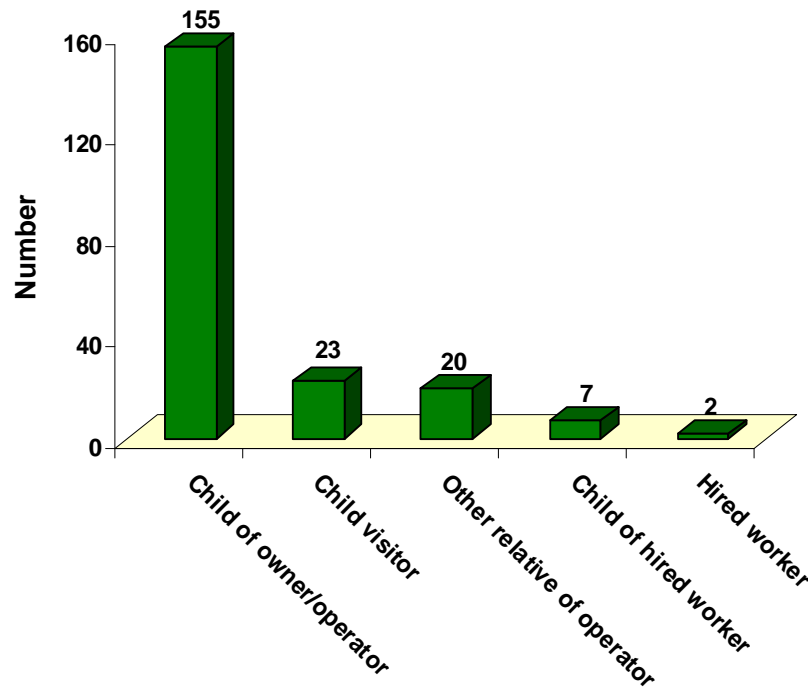
62.2% of the children were so badly injured that they either died at the scene or on the way to hospital.



The body part involved in the most important injury ('nature of injury 1') was not known in 8 cases.

#### 4.10 Fatal agricultural injuries in children and youth by relationship to farm operator, 1990-2005

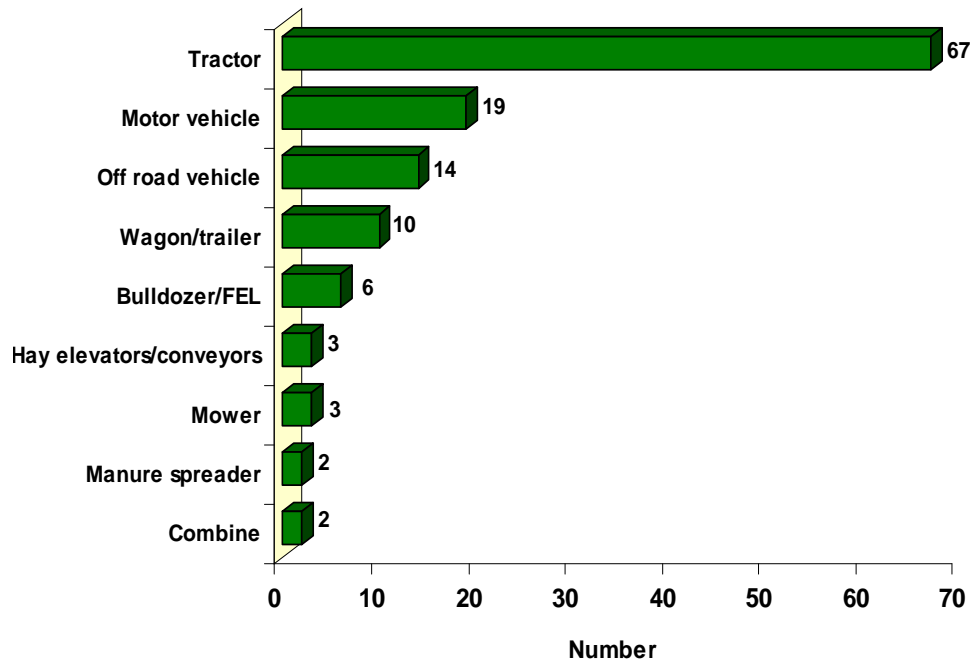
From 1990 to 2005, 71.4% of persons aged one to fourteen killed in agricultural injury events were children of owner/operators. A further 10.6% were child visitors and 9.2% were other relatives of farm operators.



#### 4.11 Fatal agricultural injuries in children and youth by machine type, 1990-2005

The machine types most frequently involved in agricultural fatalities among children were tractors (48.2%), motor vehicles (13.7%), off road vehicles (10.1%) and wagons/trailers (7.2%).

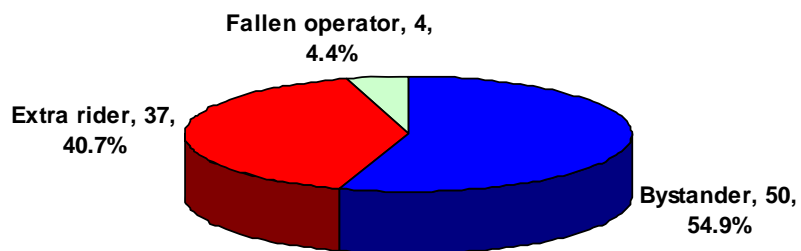
Tractors were associated with 30.9% of child deaths overall. The practice of taking a child as an extra rider on a tractor frequently results in serious injury or death.



Other machine types: plough (1), auger (1), baler (1), power tool (1), harvester (1), other named (6), unknown (1).

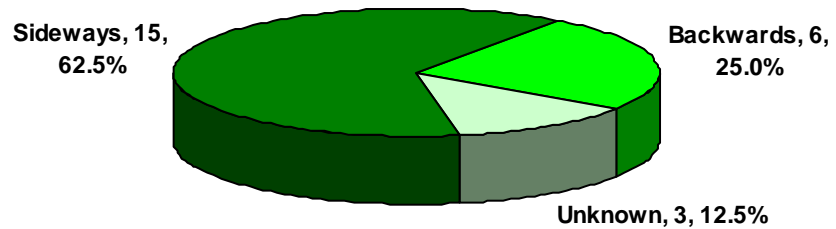
#### 4.12 Fatal agricultural runovers in children and youth by runover category, 1990-2005

Of the 91 fatal child runovers from 1990 to 2005, bystander runovers were the most frequent runover type (54.9%). A further 40.7% of the child runover victims were killed when they fell from a machine that they had been riding as a passenger and were subsequently runover. 4.4% of the children were runover by machines that they had been operating themselves.



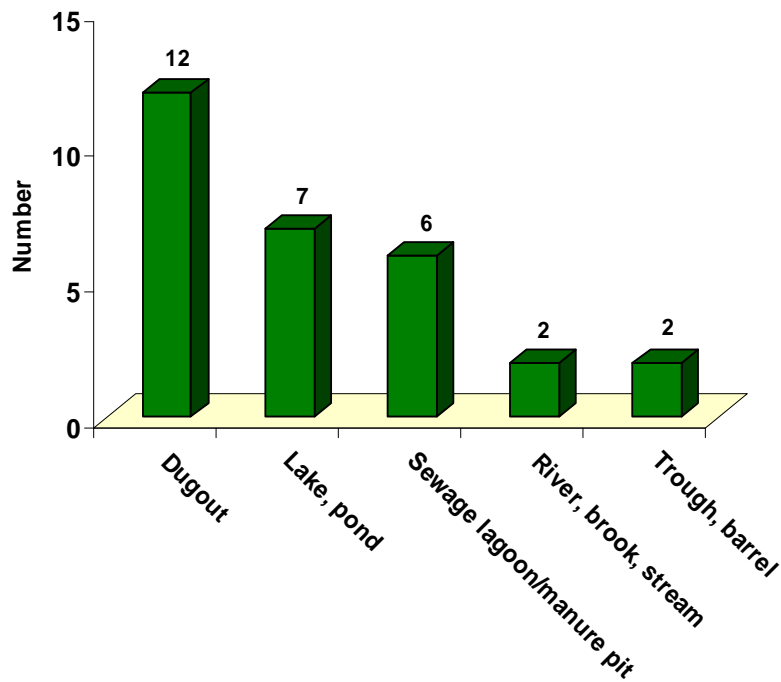
#### 4.13 Fatal agricultural rollovers in children and youth by rollover type, 1990-2005

Overall, 62.5% of the 24 fatal machine rollovers in children from 1990 to 2005 were sideways in direction. Another 25.0% of the rollovers were backwards. In 12.5% of the cases, the direction of rollover could not be determined.



#### 4.14 Fatal agricultural drownings in children and youth by drowning location, 1990-2005

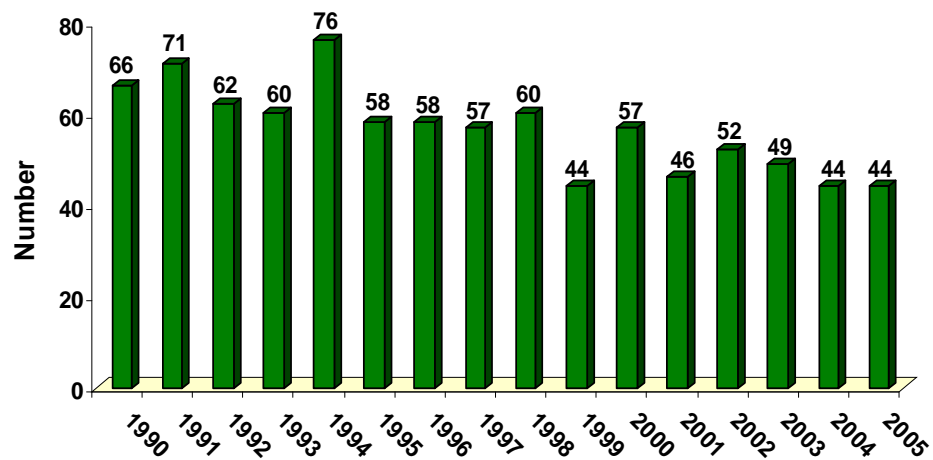
Of the 34 drowning deaths in children and youth from 1990 to 2005, 35.3% occurred in dugouts, 20.6% in lakes or ponds and 17.6% in manure pits or sewage lagoons. 73.5% of the victims were less than six years old. Only one drowning was machine-related.



## 5 AGRICULTURAL FATALITIES IN CANADA: ADULTS AGED 15 TO 59

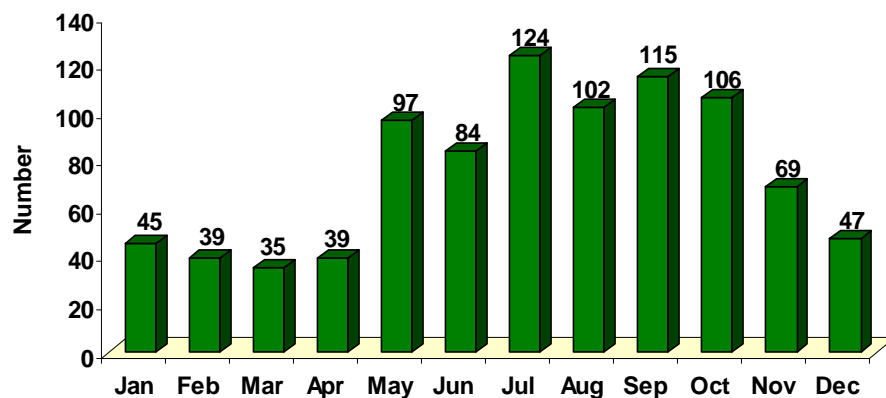
### 5.1 Fatal agricultural injuries in adults aged 15 to 59 by calendar year, 1990-2005

From 1990 to 2005, there were 904 agricultural fatalities among Canadian adults aged 15 to 59. (An average of about 56.5 per year.) The peak year for fatalities was 1994, with 76 cases (8.4% of the total number of cases). The average number of fatalities per year was 63.5 for the first eight years of the surveillance period, and 49.5 for the last eight years. The decline in the average annual number of fatalities was mainly due to a reduction in machine rollover fatalities over the surveillance period.



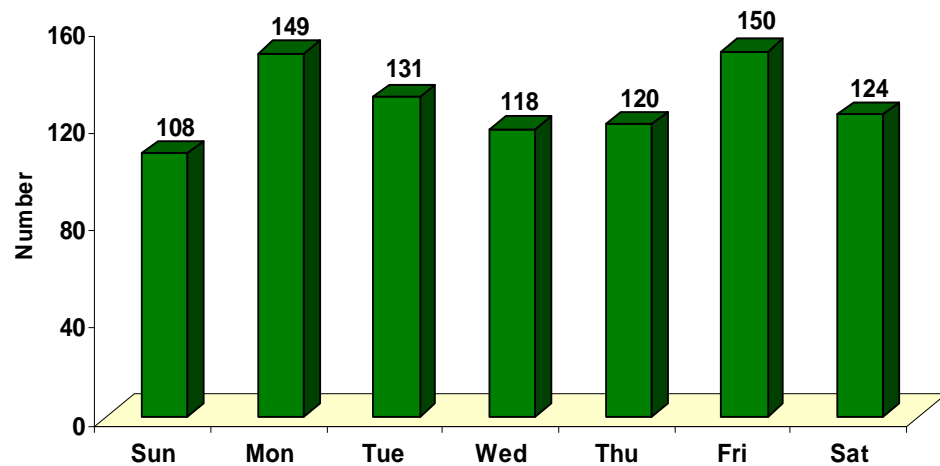
### 5.2 Fatal agricultural injuries in adults aged 15 to 59 by month, 1990-2005

69.5% of all agricultural fatalities in younger adults aged 15 to 59 occurred from May to October. July was the peak month, with 13.7% of all fatalities. Relatively few younger adults were killed from December to April.



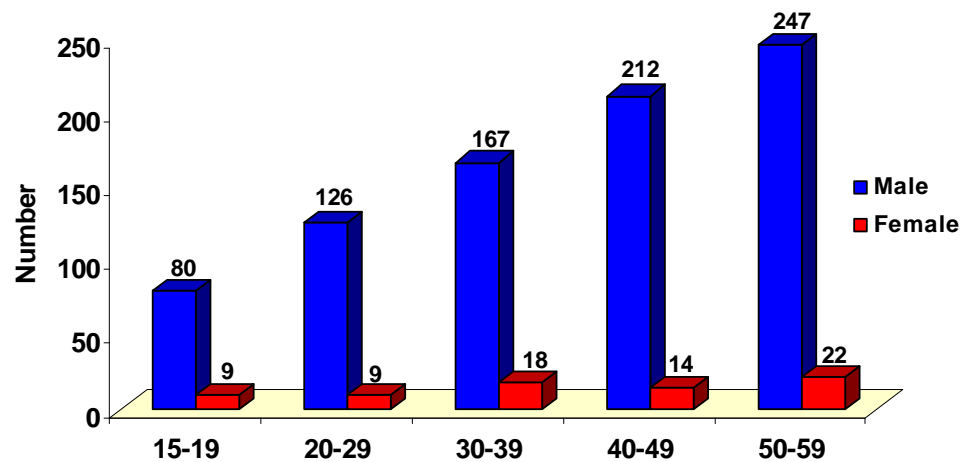
### 5.3 Fatal agricultural injuries in adults aged 15 to 59 by weekday, 1990-2005

Fewer fatalities occurred on Sundays (11.9%) than on any other day of the week. Mondays and Fridays were the days with the highest proportions of fatal injury events (16.5% and 16.6% respectively.)



### 5.4a Fatal agricultural injuries in adults aged 15 to 59 by age group and gender, 1990-2005

92.0% of the younger adults killed in agricultural injury events were male. The proportion of younger adult victims who were male was 12.7% higher than the proportion of children under fifteen who were male because of the large number of young female children who were killed. In younger adults, the ratio of males to females was highest for the 50- to 59-year-old age group (15.1:1), and lowest for the 15- to 19-year-old age group (8.8:1). In males, there was a clear trend for an increase in fatalities with increasing age.



### 5.4b Fatal agricultural injuries in adults aged 15 to 59 by age group and gender, 1990-2005

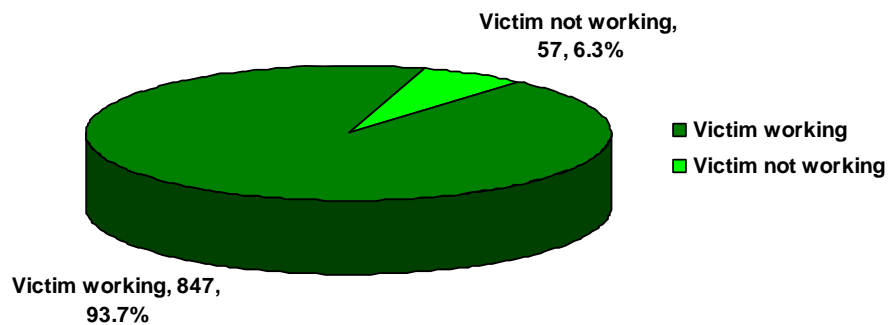
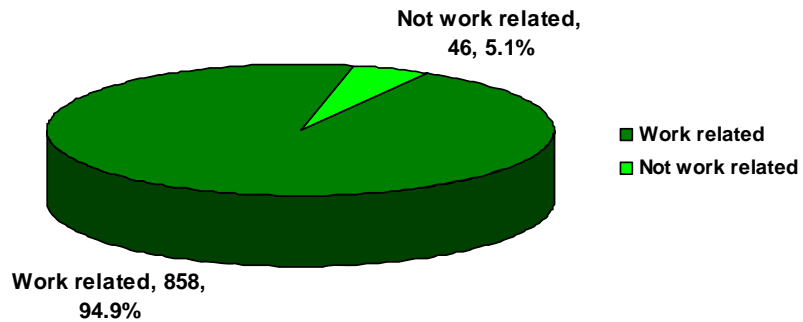
Older members of the 15- to 59-year-old age group were more likely to be killed in an agricultural injury event than younger members were. The proportion of adults in the 15- to 59-year-old age group who were fatally injured increased steadily from the 20 to 29 age category to the 50 to 59 age category.

Fatalities by age group and gender							
Age group	15-19	20-29	30-39	40-49	50-59	Total	Percent
Male	80	126	167	212	247	832	92.0
Female	9	9	18	14	22	72	8.0
<b>Total</b>	<b>89</b>	<b>135</b>	<b>185</b>	<b>226</b>	<b>269</b>		
<b>Percent</b>	<b>9.8</b>	<b>14.9</b>	<b>20.5</b>	<b>25</b>	<b>29.8</b>		

### 5.5 Fatal agricultural injuries in adults aged 15 to 59: the relationship to agricultural work, 1990-2005

94.9% of the deaths in younger adults were work related. The few deaths that were not work related (5.1%) were due to hazards of the farm environment.

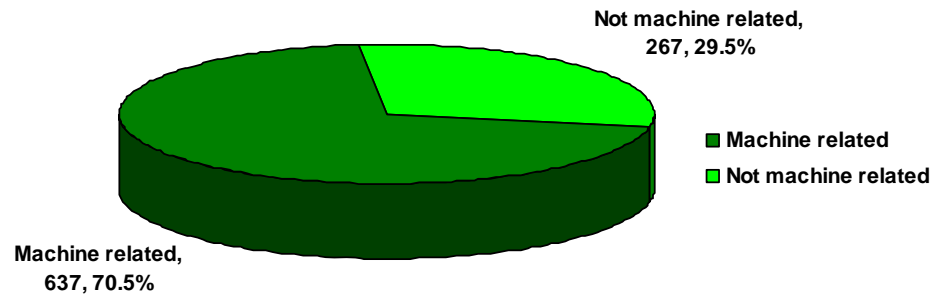
Most of the younger adults who died were engaged in agricultural work (93.7%). In contrast, the majority of children who were killed in work-related injury events were not working themselves.



## 5.6 Fatal agricultural injuries in adults aged 15 to 59 by major cause, 1990-2005

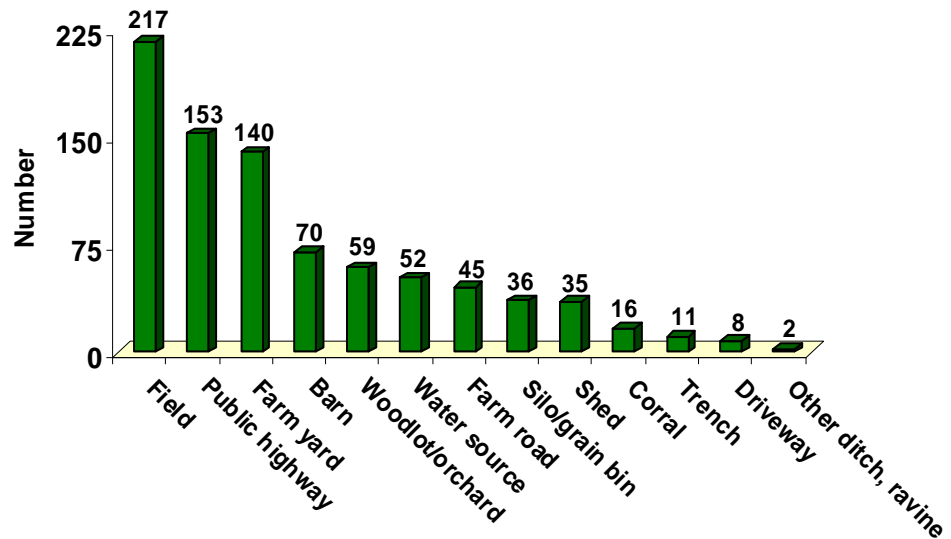
70.5% of agricultural fatalities in younger adults were machine related. The leading machine-related mechanisms of injury for this age group were machine rollovers, entanglements, traffic collisions and machine runovers. (Figure 5.8).

The agricultural fatalities that were not machine related (29.5%) included struck by object events, exposure to toxic substances, animal-related events and falls from height. (Figure 5.8).



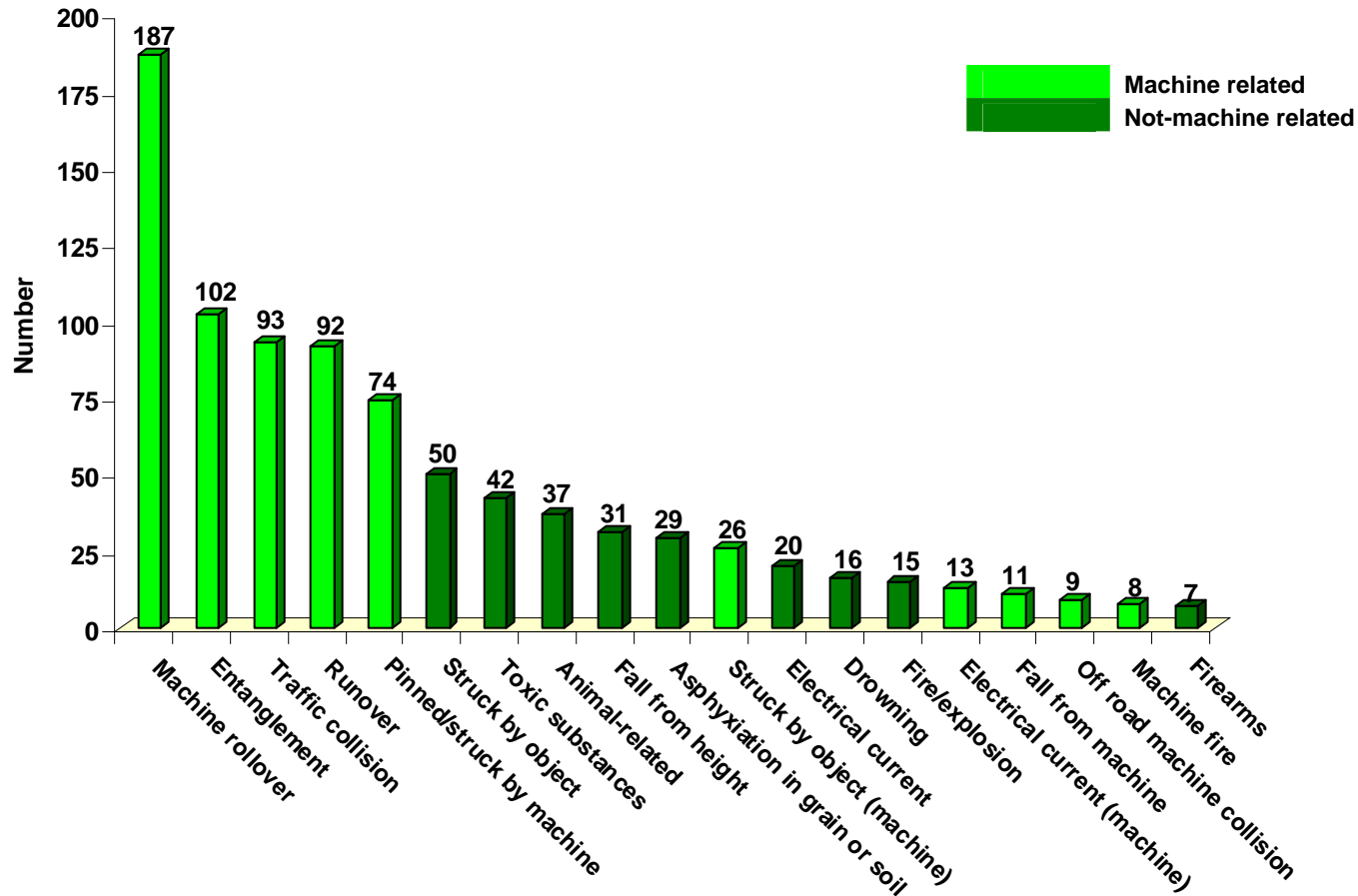
## 5.7 Fatal agricultural injuries in adults aged 15 to 59 by location of injury, 1990-2005

The most common locations of occurrence for agricultural fatalities in younger adults were fields and their adjacent ditches (24.0%), public roads and their adjacent ditches (16.9%), farm yards (15.5%), barns (7.7%) and woodlots (6.5%).



Location was not known in 40 cases.

## 5.8 Fatal agricultural injuries in adults aged 15 to 59 by cause of injury, 1990-2005



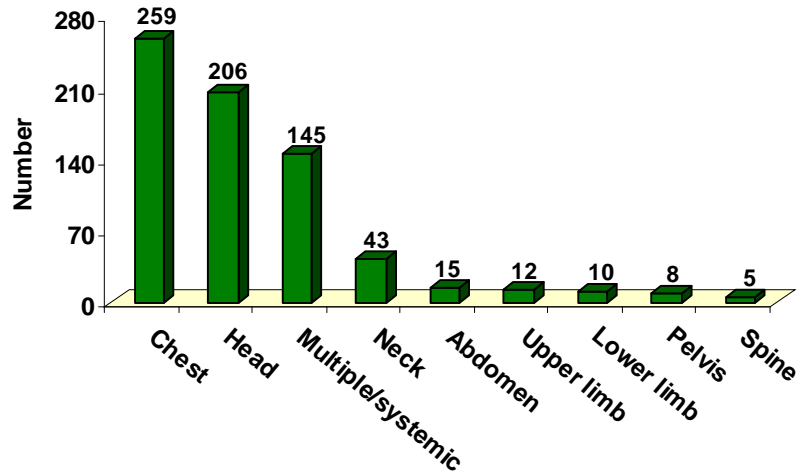
In adults aged 15 to 59, the leading causes of fatal injuries were machine rollovers (20.7%), machine entanglements (11.3%), traffic collisions (10.3%), machine runovers (10.2%), being pinned or struck by a machine (8.2%), being struck by a non-machine object (5.5%), and being exposed to toxic substances (4.6%). In contrast to children, where machine runovers were the leading cause of death, and to older adults where runovers caused almost as many deaths as machine rollovers, in younger adults machine rollovers were responsible more than twice as many fatalities as machine runovers.

Another 22 machine-related and 20 non machine related cases with less than six fatalities per cause of injury were not included in the above figure.

## 5.9 Fatal agricultural injuries in adults aged 15 to 59 by body part injured, 1990-2005

In younger adults, where the primary nature of injury was known, the chest was identified as the body part involved in 28.7% of the injuries that most probably caused death. Another 22.8% of the most serious injuries involved the head and 16.0% involved multiple body parts or systemic injuries like poisonings.

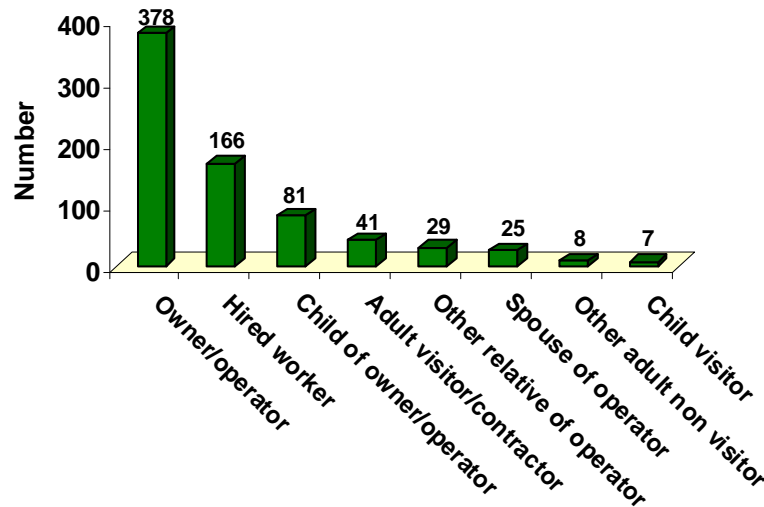
70.0% of the victims were so badly injured that they either died at the scene or on the way to hospital.



The body part involved in the most important injury ('nature of injury 1') was not known in 201 cases.

## 5.10 Fatal agricultural injuries in adults aged 15 to 59 by relationship to farm operator, 1990-2005

41.8% of younger adults killed in agricultural injury events were farm operators. A further 18.4% of the victims were hired workers and 9.0% were children or other relatives of operators. Only 5.3% of those killed were visitors or contractors.

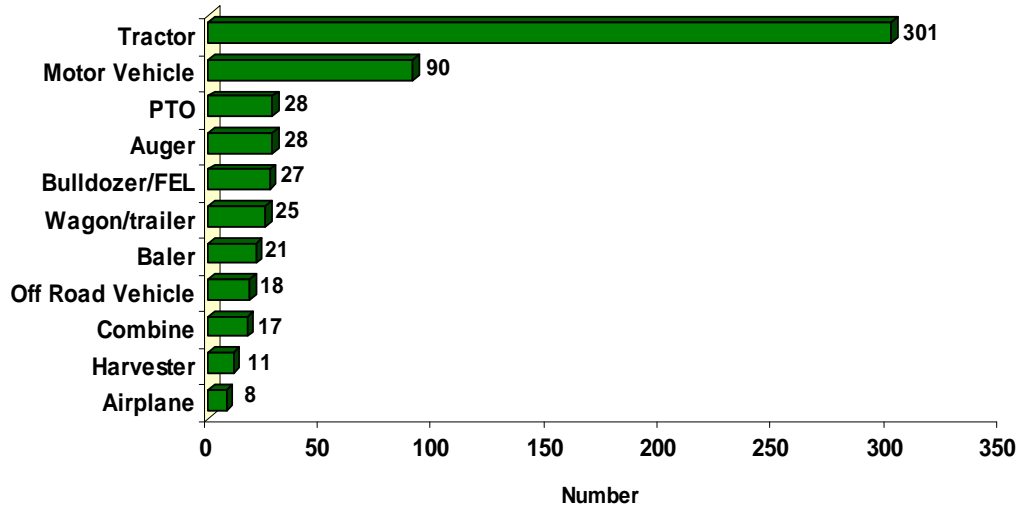


Relationship was not known in 103 cases.

## 5.11 Fatal agricultural injuries in adults aged 15 to 59 by machine type, 1990-2005

The machine types most frequently involved in agricultural fatalities among younger adults were tractors (47.3%) followed by motor vehicles (14.1%), wagons and trailers, augers and power take offs (both 4.4%), and bulldozer/FELs (4.2%).

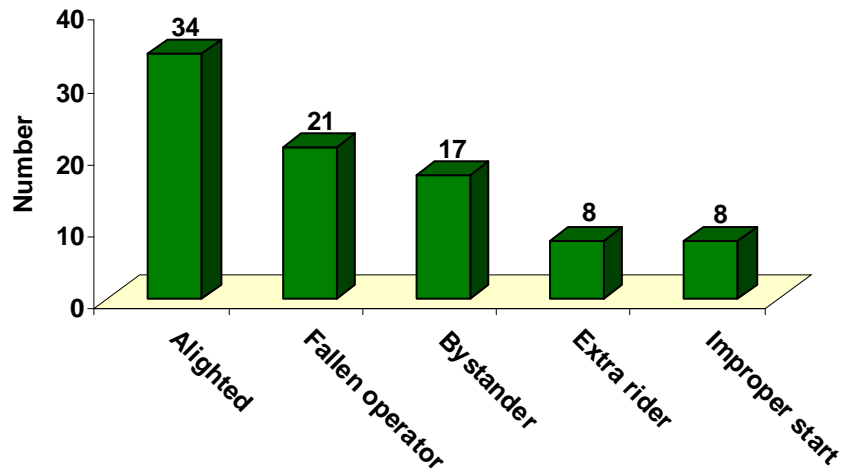
Tractors were associated with 33.4% of all agricultural deaths among younger adults.



Other machine types: plough (5), manure spreader (3), mower (3), hay elevator (3), power tool (3), snow blower (3), rock picker (2), chain saw (1), fencing equipment (1), planting equipment (1), other (29), and unknown (3).

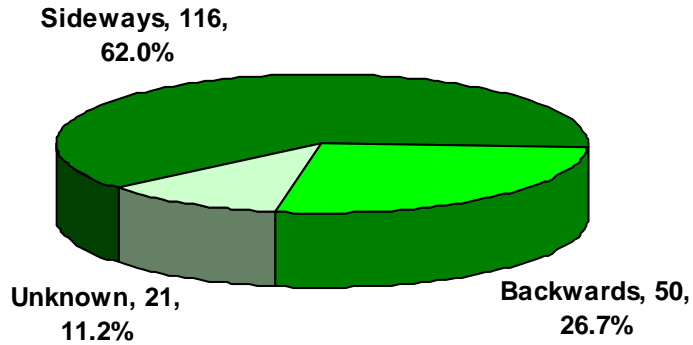
## 5.12 Fatal agricultural runovers in adults aged 15 to 59 by runover category, 1990-2005

There were 92 agricultural runover fatalities in younger adults from 1990 to 2005. Alighted operator runovers were by far the most frequent type of fatal runover (37.0%). In this kind of injury event, the victim is runover by a machine or vehicle he/she had left running or unblocked on a slope. Fallen operator runovers caused the second largest percentage of runover fatalities among younger adults (22.8%), followed by bystander runovers (18.5%), extra rider runovers and improper start runovers (both 8.7%).



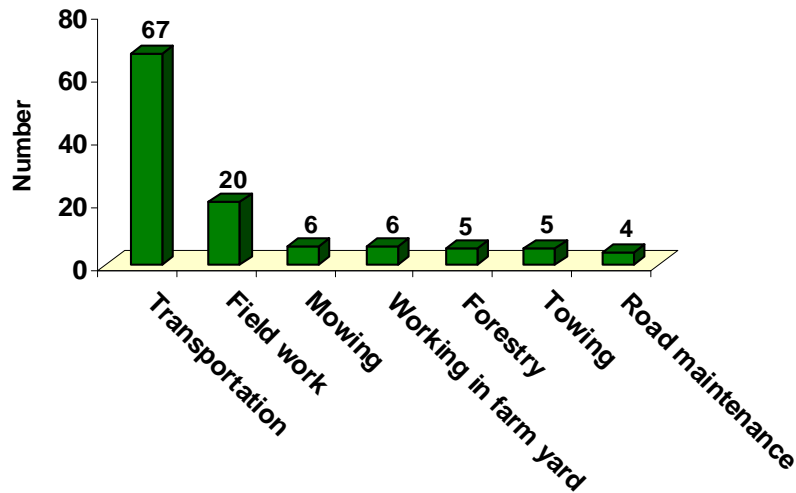
### 5.13 Fatal agricultural rollovers in adults aged 15 to 59 by rollover type, 1990-2005

In youth and adults aged 15 to 59, 62.0% of the fatal machine rollovers were sideways in direction and 26.7% were backwards. In 11.2% of the cases, the direction of rollover could not be determined. Sideways rollovers were more frequent in younger adults than in adults aged 60 or over.



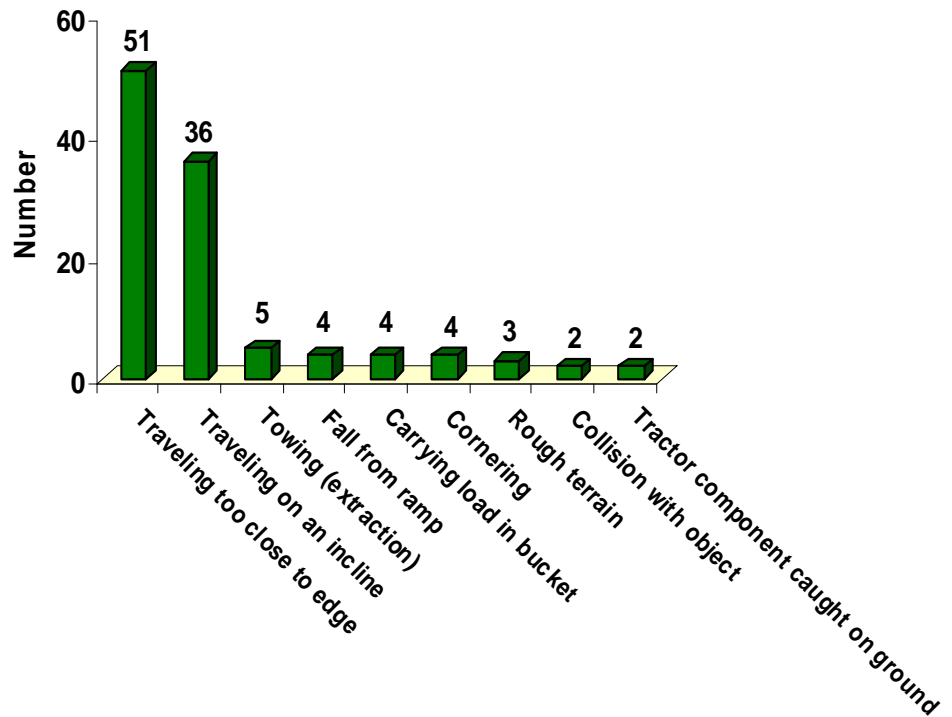
### 5.14 Fatal sideways agricultural rollovers in adults aged 15 to 59 by activity prior to rollover, 1990-2005

In fatal sideways machine rollovers among younger adults, injury circumstance text descriptions showed that the decedents' most common activities prior to the rollover were driving on highways and farm roads (57.8%) and doing field work (17.2%).



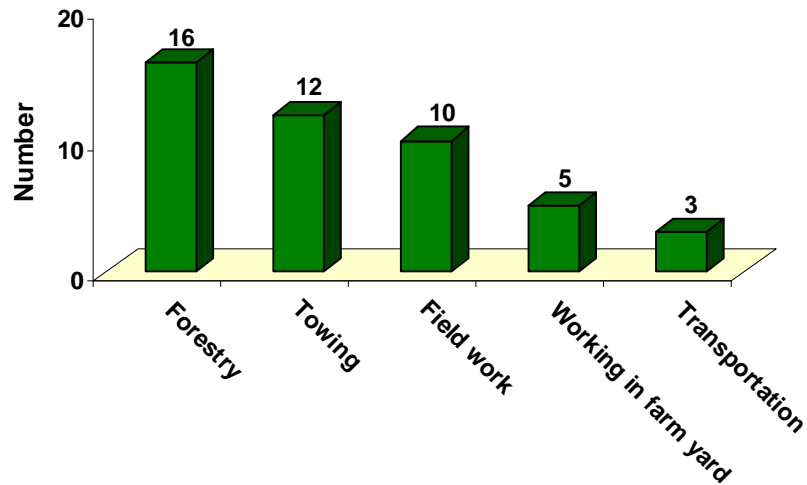
### 5.15 Fatal sideways agricultural rollovers in adults aged 15 to 59 by immediate cause of rollover, 1990-2005

According to circumstance text descriptions, in 44.0% of the fatal sideways machine rollovers, the rollover occurred because the machine or vehicle was travelling too close to the edge of a ditch or other steep slope bordering a road or field. In 31.0% of the cases, the rollover was most probably due to the machine or vehicle travelling on a steep incline. In 34.5% of the rollovers overall, towing a machine or trailer may have been a contributing factor. Considering both circumstance text and location of occurrence, 52.2% of sideways rollovers involved steep slopes such as ditches, ravines, ramps and embankments.



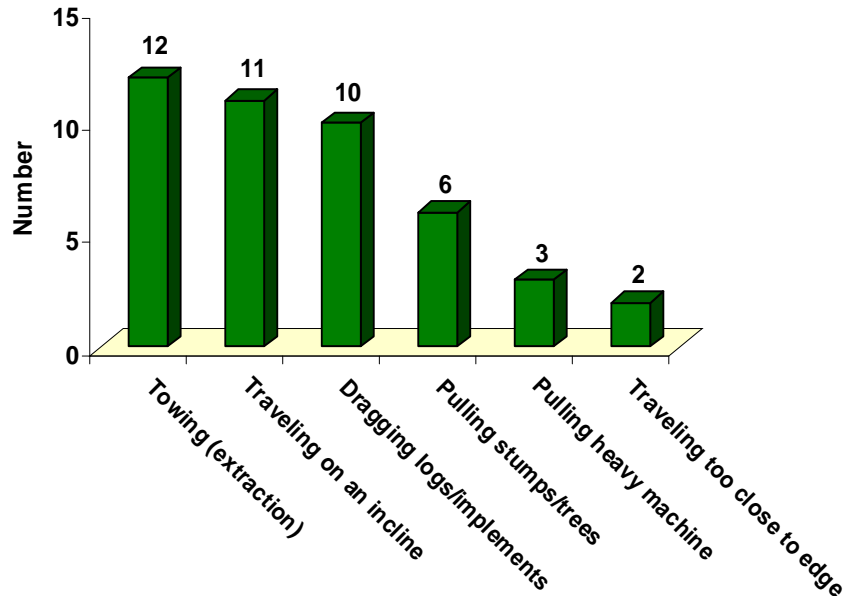
### 5.16 Fatal backwards agricultural rollovers in adults aged 15 to 59 by activity prior to rollover, 1990-2005

In fatal backwards machine rollovers among younger adults, circumstance text descriptions indicated that the victims' most common activities prior to the rollover were harvesting wood and maintaining woodlots (32.0%), towing (24.0%) and doing field work (20.0%).



### 5.17 Fatal backwards agricultural rollovers in adults aged 15 to 59 by immediate cause of rollover, 1990-2005

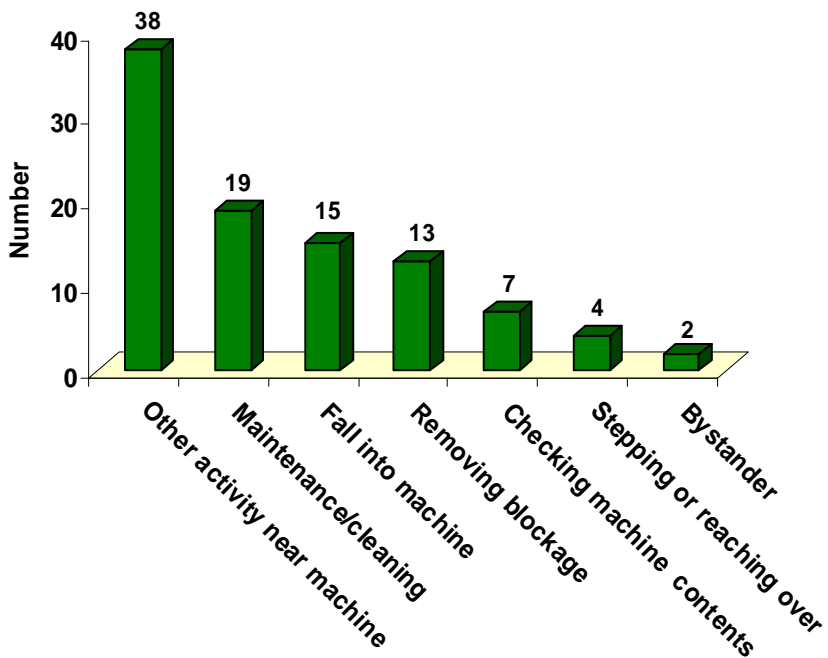
According to circumstance text descriptions, 24.0% of fatal backwards rollovers were due to improper towing (extraction) practices. Another 22.0% were the result of travelling on an incline, 20% were associated with dragging logs or implements, and 12.0% were the result of pulling stumps and trees. In 64.0% of the backwards rollovers overall, towing may have been a contributing factor. In 32.0% of the cases, a steep slope was either described in the circumstance text or was apparent from the location of occurrence.



### 5.18 Fatal entanglements in adults aged 15 to 59 by activity prior to entanglement, 1990-2005

Overall, circumstance text descriptions directly identify loose clothing or hair as the cause of 52.0% of the 102 fatal machine entanglements from 1990 to 2005.

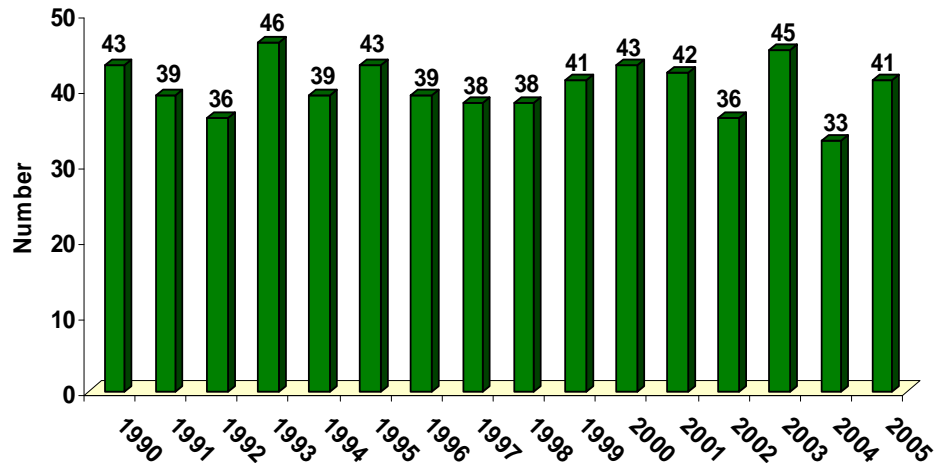
In 37.3% of the cases, victims were simply working too close to an entanglement hazard. In 18.6% of the cases, the victim had been cleaning or repairing a machine without shutting it off. In a further 14.7% of fatal entanglements, the decedent slipped and fell into a machine and in 12.7% he/she was removing a blockage while the machine was running. Only 2.0% of entanglement deaths were due to the actions of someone other than the deceased.



## 6 AGRICULTURAL FATALITIES IN CANADA: ADULTS AGED 60 AND OVER

### 6.1 Fatal agricultural injuries in adults aged 60 and over by calendar year, 1990-2005

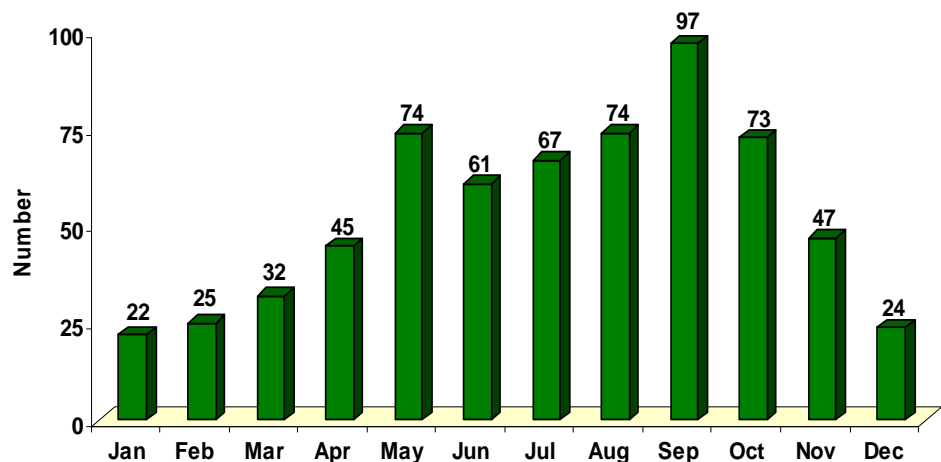
From 1990 to 2005, there were 642 agricultural fatalities among adults aged 60 and over. (An average of 40.1 per year.) The peak years for fatalities were 1993 and 2003. The average number of fatalities per year was 40.4 for the first eight years of the surveillance period, and 39.9 for the last eight years. There was no appreciable change in the average annual number of fatalities over the surveillance period.



### 6.2 Fatal agricultural injuries in adults aged 60 and over by month, 1990-2005

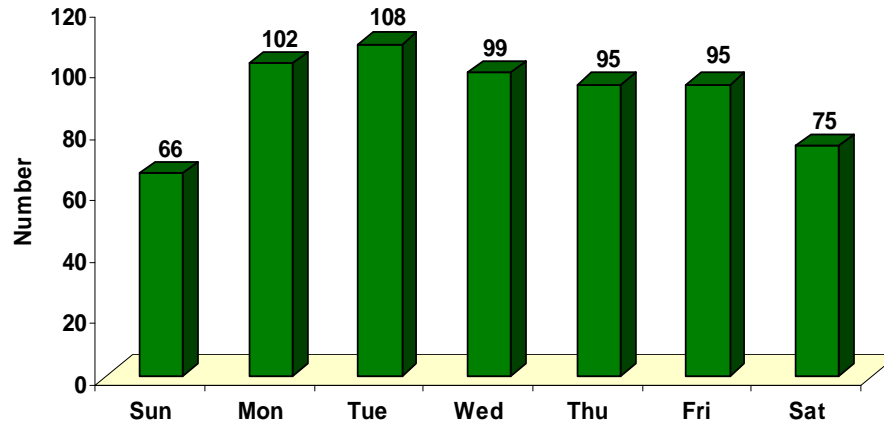
69.5% of all agricultural fatalities in adults aged 60 and over occurred from April to October.

There were two distinct peak periods for fatal injuries, May (11.5%) and August (11.5%), September (15.1%), and October (11.4%). Fewer older adults were killed from December to March.



### 6.3 Fatal agricultural injuries in adults aged 60 and over by weekday, 1990-2005

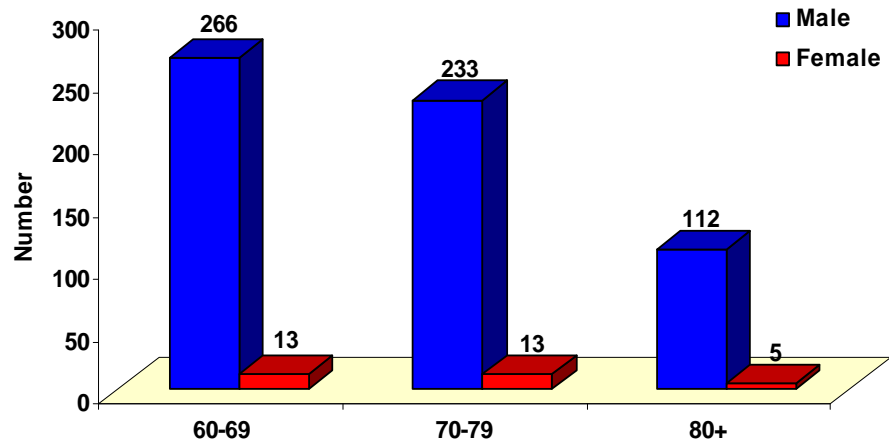
Fewer fatalities occurred on Sundays (10.3%) and Saturdays (11.7%) than on any other day of the week. The average proportion of fatalities that occurred on other days of the week was 15.5%.



### 6.4a Fatal agricultural injuries in adults aged 60 and over by age group and gender, 1990-2005

95.2% of the older adults killed in agricultural injury events were male. The ratio of males to females was lowest for the 70- to 79-year-old age group (17.9:1), and highest for the 80+ age group (22.5:1).

18.2% (117) of all older adults killed during agricultural work were males aged 80 or over. This accounts for the extraordinarily high fatality rate in the very elderly male farm population. Of these deaths, 78 (66.7%) involved farm work with tractors and other machines.



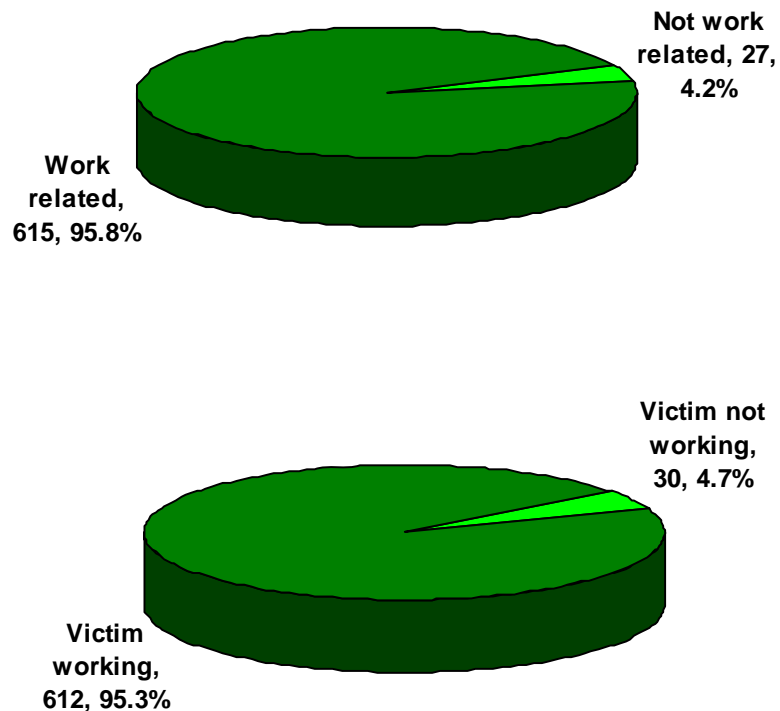
### 6.4b Fatal agricultural injuries in adults aged 60 and over by age group and gender, 1990-2005

The lower numbers of deaths recorded for the higher age ranges reflects the steady decline in the farm population with age (section 3.6).

Fatalities by age group and gender					
Age group	60-69	70-79	80+	Total	Percent
Male	266	233	112	611	95.2
Female	13	13	5	31	4.8
<b>Total</b>	<b>279</b>	<b>246</b>	<b>117</b>		
<b>Percent</b>	<b>43.5</b>	<b>38.3</b>	<b>18.2</b>		

### 6.5 Fatal agricultural injuries in adults aged 60 and over: the relationship to agricultural work, 1990-2005

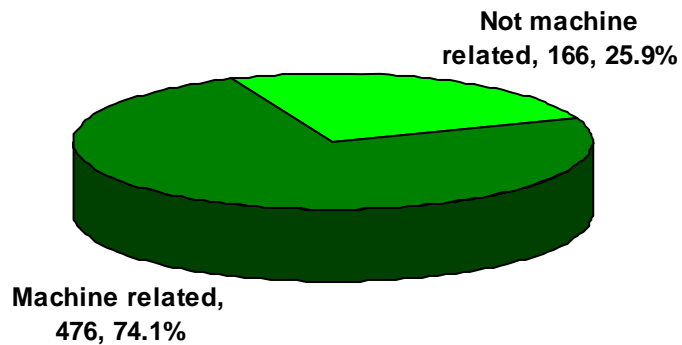
95.8% of the deaths in older adults were related to agricultural work. 95.3% of the older adults who died were themselves engaged in agricultural work. Both the proportion of work-related fatalities and fatalities where the victims were working were higher in adults aged 60 and over than in younger adults.



## 6.6 Fatal agricultural injuries in adults aged 60 and over by major cause, 1990-2005

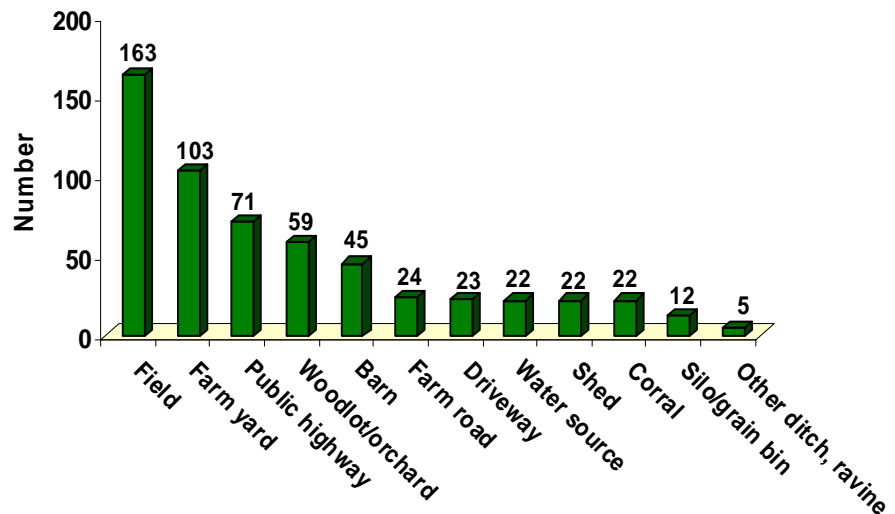
74.1% of agricultural fatalities in older adults were machine related. The proportion of machine-related injuries in older adults was 3.6% higher than for younger adults.

The leading machine-related mechanisms of injury were machine rollovers and machine runovers. Non-machine agricultural fatalities (25.9%) included animal-related events, being struck by an object and falls from height. (Figure 6.8).



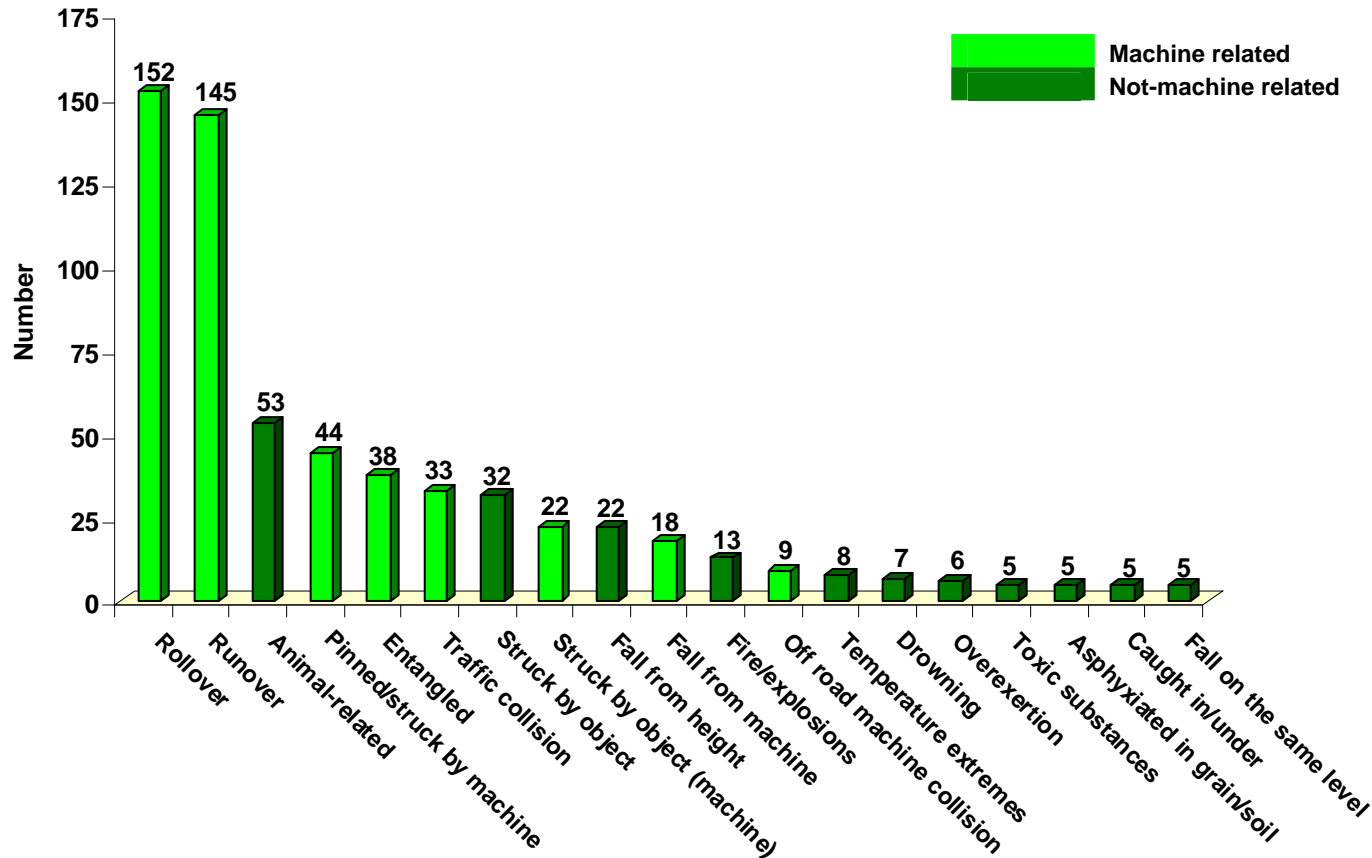
## 6.7 Fatal agricultural injuries in adults aged 60 and over by location of injury, 1990-2005

The most common locations of fatal injury for older adults were fields and their adjacent ditches (25.4%), farm yards (16.0%), public roads and their adjacent ditches (11.1%), woodlots (9.2%) and barns (7.0%). Public highways were a less common location of fatal injury in older adults (11.1%) than in younger adults (16.9%), whereas woodlots were a more frequent location of fatal injury for older adults than for younger adults (9.2% versus 6.5%).



Location was not known in 59 cases.

## 6.8 Fatal agricultural injuries in adults aged 60 and over by cause of injury, 1990-2005



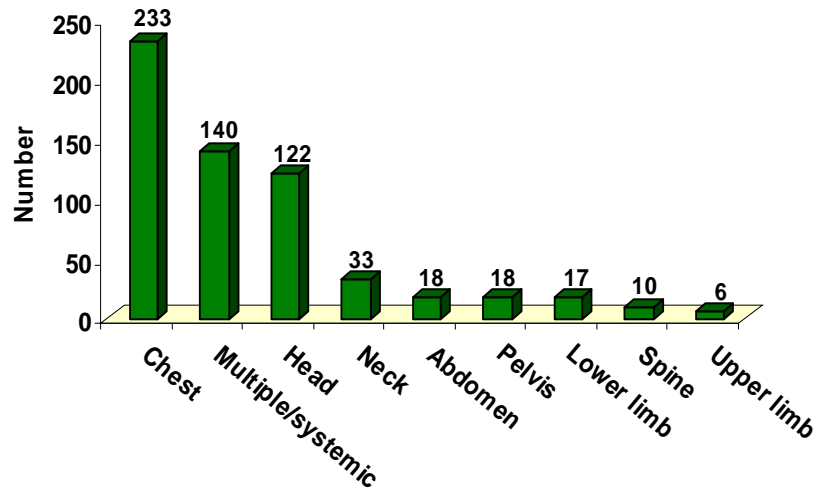
In adults aged 60 and over, 46.3% of all deaths were due to two main mechanisms of injury, machine rollovers (23.7%) and machine runovers (22.6%). The next most common mechanisms of fatal injury in older adults were being struck by an animal (8.3%), being pinned or struck by a machine (6.9%), machine entanglements (5.9%), traffic collisions (5.1%) and being struck by an object (5.0%). Older adults had a far higher proportion of animal-related fatalities (8.3%) than younger adults (4.1%). Also, in older adults the proportion of fatalities that were due to runovers (22.6%) was more than twice the proportion of fatalities due to runovers in younger adults (10.2%).

Another 15 machine-related and 5 non machine related cases with less than five fatalities per cause of injury were not included in the above figure.

## 6.9 Fatal agricultural injuries in adults aged 60 and over by body part injured, 1990-2005

In older adults, where the primary nature of injury was known, the chest was identified as the body part involved in 36.3% of the injuries that most probably caused death. Another 21.8% of the most serious injuries involved multiple body parts or systemic injuries like drownings. In a further 19.0% of cases, the head was cited as the body part involved in the primary injury.

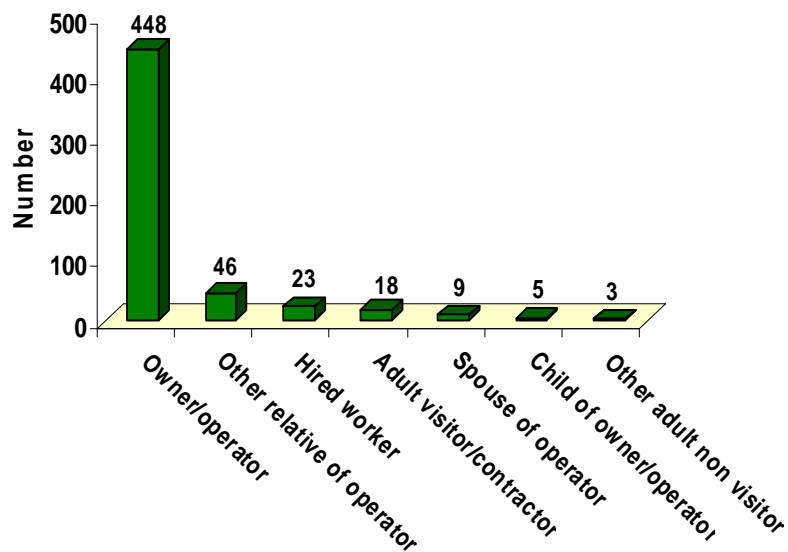
67.9% of the victims were injured so seriously that they either died at the scene or on the way to hospital.



The body part involved in the most important injury ('nature of injury 1') was not known in 45 cases.

## 6.10 Fatal agricultural injuries in adults aged 60 and over by relationship to farm operator, 1990-2005

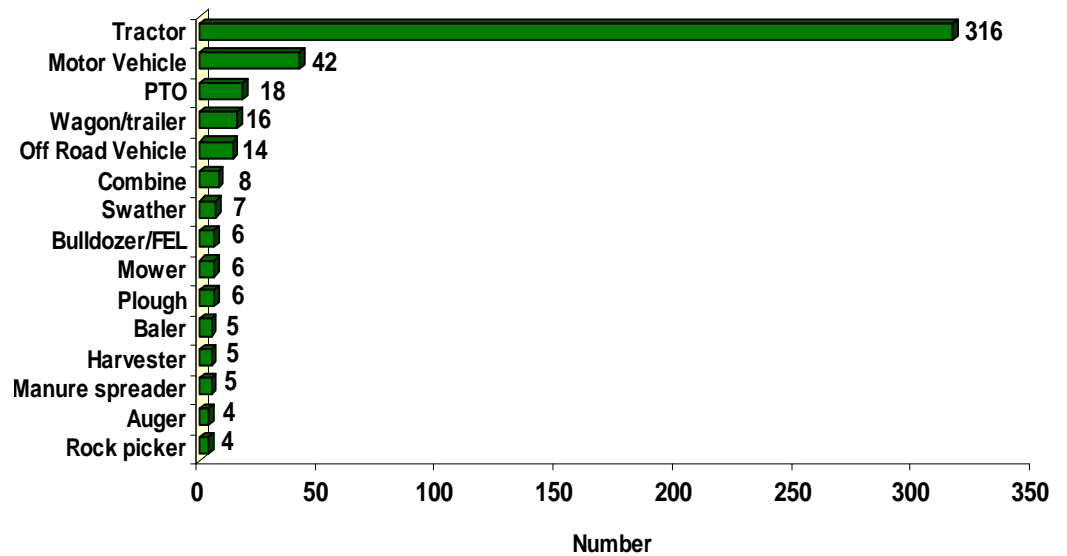
69.8% of older adults killed in agricultural injury events were farm operators. A further 7.2% of the victims were relatives of farm operators and 3.5% were hired workers. Only 2.8% were adult visitors or contractors.



Relationship was not known in 69 cases.

## 6.11 Fatal agricultural injuries in adults aged 60 and over by machine type, 1990-2005

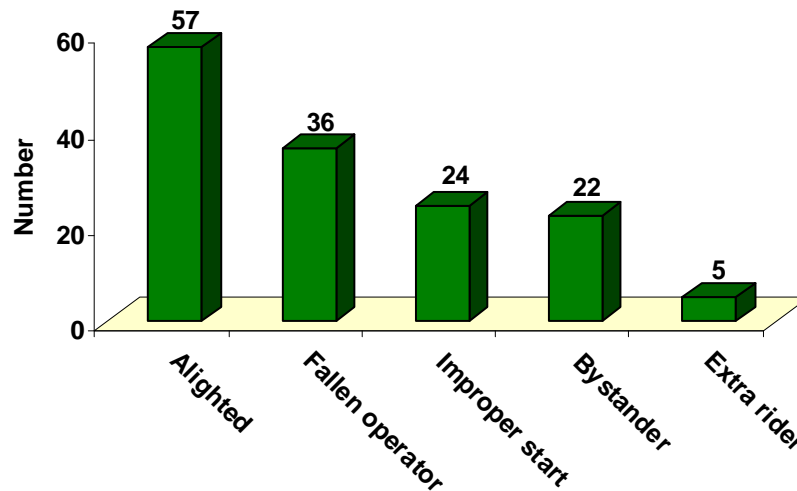
The types of machines most frequently involved in agricultural fatalities among older adults were tractors (66.4%), followed by motor vehicles (8.8%), PTOs (3.8%), wagons/trailers (3.4%), and off road vehicles (2.9%). The proportion of tractor-related deaths in adults aged 60 and over was 19.1% greater than for younger adults.



Other machine types: chain saw (1), airplane (1), other (7), and unknown (5).

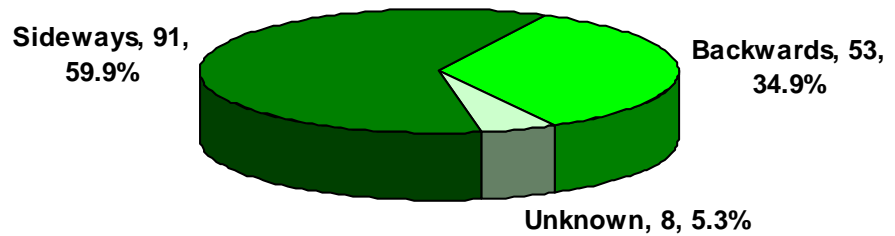
## 6.12 Fatal agricultural runovers in adults aged 60 and over by runover category, 1990-2005

In adults aged 60 and over there were 145 fatal runovers from 1990 to 2005. Most runovers involved unmanned machines which had been left running or left unblocked on a slope (39.3%). Operator runovers subsequent to falls from machines (24.8%) were the next most frequent runover mechanism followed by improper start runovers (16.6%). Bystander runovers (15.2%) and extra rider runovers (3.4%) were not common fatal runover mechanisms among older adults. The proportion of improper start runovers was much higher in older adults than in younger adults.



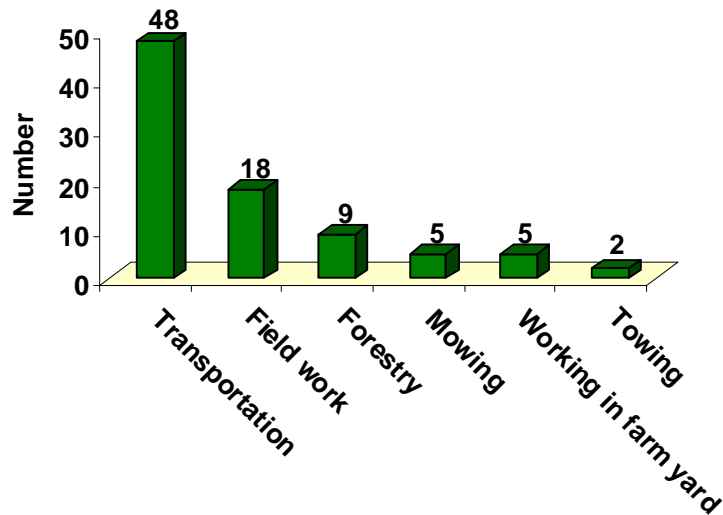
### 6.13 Fatal agricultural rollovers in adults aged 60 and over by rollover type, 1990-2005

In adults aged 60 and over, 59.9% of the fatal rollovers were sideways and 34.9% were backwards. Rollover direction could not be determined in 5.3% of the cases. Backwards rollovers were less frequent in younger adults (26.7%) than in older adults (34.9%). Most backwards rollovers occurred in woodlots.



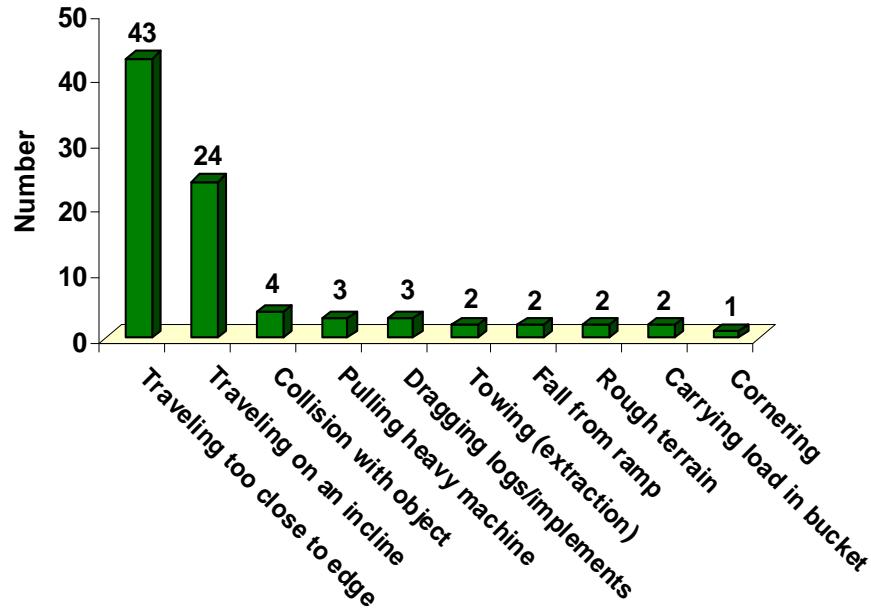
### 6.14 Fatal sideways agricultural rollovers in adults aged 60 and over by activity prior to rollover, 1990-2005

In fatal sideways machine rollovers, injury circumstance text descriptions showed that the decedents' most common activities prior to the rollover were driving on highways and farm roads (52.7%) and doing field work (19.8%).



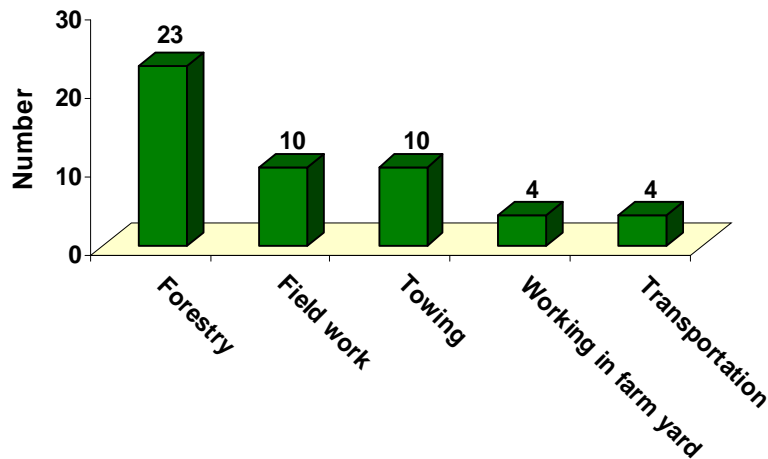
### 6.15 Fatal sideways agricultural rollovers in adults aged 60 and over by immediate cause of rollover, 1990-2005

According to circumstance text descriptions, in 47.3% of fatal sideways machine rollovers, the rollover most likely occurred because the machine or vehicle was travelling too close to the edge of a ditch or other steep slope bordering a road or field. In 26.4% of the cases, the rollover was attributed to the machine or vehicle travelling on a steep incline. In 24.2% of the rollovers overall, towing a machine or trailer may have been a contributing factor. Considering both circumstance text and location of occurrence, 72.5% of fatal sideways rollovers in older adults involved steep slopes such as ditches, ravines, ramps and embankments.



### 6.16 Fatal backwards agricultural rollovers in adults aged 60 and over by activity prior to rollover, 1990-2005

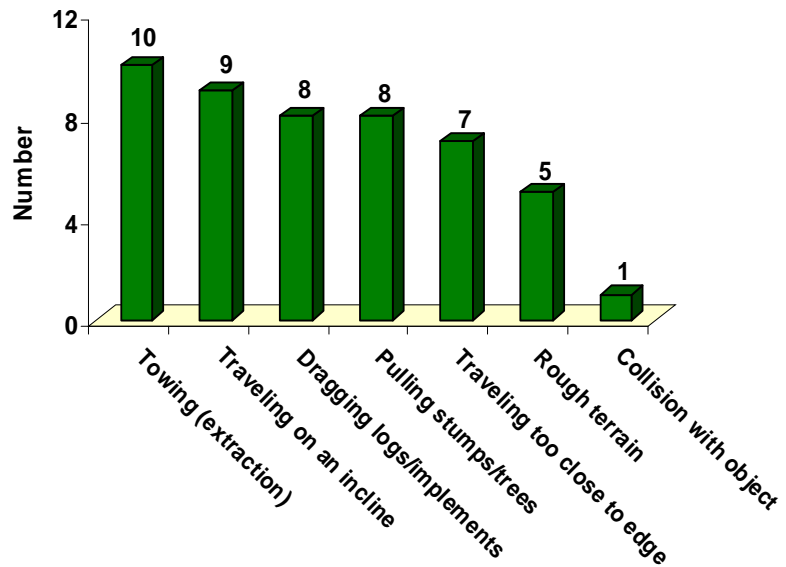
In fatal backwards machine rollovers among older adults, circumstance text descriptions indicated that the most common activities prior to the rollover were harvesting wood and maintaining woodlots (43.4%), towing (18.9%) and doing field work (18.9%).



## 6.17 Fatal backwards agricultural rollovers in adults aged 60 and over by immediate cause of rollover, 1990-2005

According to circumstance text descriptions, 18.9% of fatal backwards rollovers were due to improper towing (extraction) practices and 17.0% were attributed to traveling on an incline. Another 15.0% were associated with dragging logs or implements, and 15.0% were the result of pulling stumps and trees. In 13.2% of the cases the machine was backed over a steep slope. In 13.2% of the cases the machine was backed over a steep slope.

In 58.5% of the backwards rollovers overall, towing may have been a contributing factor. In 41.5% of the cases, a steep slope was either described in the circumstance text or was apparent from the location of injury occurrence.



## *Appendix A Decision Rules*

### *Inclusion of deaths and injuries in the CAISP fatality database*

#### **Alcohol Involvement**

Fatal injuries where the victim was under the influence of alcohol were included in the database if they involved agricultural work or an agricultural hazard.

#### **Deaths on Highways**

Fatal injuries on public highways that involved agricultural vehicles, agricultural machinery or farm animals were included in the database.

#### **Medical Conditions**

Deaths attributed to pre-existing medical conditions (e.g., previous seizure or heart attack) were excluded from the fatality database. Deaths where an agricultural injury (such as a fall from a machine) was immediately preceded by a significant medical event such as a stroke, seizure or heart attack, were also excluded. Deaths from a heart attack where the victim was engaged in strenuous agricultural work at the time of or immediately before the heart attack are included in the fatality database as “overexertion”.

#### **Secondary Complications**

Deaths that occurred in hospital from secondary complications of agricultural injuries (e.g., embolism, respiratory distress) were included in the fatality database. Note: New Brunswick does not identify these cases as farm-related if the death occurred more than two weeks after the agricultural injury.

#### **Off Road Vehicles**

Deaths involving off road vehicles such as ATVs, dirt bikes and dune buggies were included in the fatality database if they occurred on a farm or ranch and/or involved agricultural work.

#### **Children at Play**

Deaths of children who were playing in the agricultural work place were included e.g., cases where a person engaged in agricultural work was unable to supervise a child whom he/she had taken to the agricultural work place; cases where a child was killed as a direct result of someone engaged in an agricultural work activity; cases where a child was killed due to a hazard of the farm or ranch environment such as a farm animal, dugout, manure pit etc.



## Appendix B Glossary

### General Terms

#### **Agricultural Fatalities**

CAISP defines an agricultural fatality as 1) Any unintentional injury resulting in death that occurs during activities related to the operation of a farm or ranch in Canada and/or 2) Any unintentional injury resulting in death that involves any hazard of a farm or ranch environment in Canada (excluding fatal non work-related injuries that take place in the farm residence). This includes deaths that occur away from agricultural work locations if agricultural work is being done; e.g., transporting workers, livestock, supplies or harvested crops on public highways; farm animals roaming on public highways. Deaths where victims are killed because a third party is engaged in agricultural work are also included.

#### **Denominator data**

Data used as denominator values in rate calculations. If presented as a fraction, the lower half of an injury rate refers to the population exposed over a given period of time.

#### **Farm**

Any farm or other agricultural holding that produces at least one of the following agricultural products intended for sale: crops, livestock, poultry, animal products, greenhouse or nursery products, mushrooms, sod, honey, or maple syrup products. (*Census of Agriculture, Statistics Canada.*)

#### **Numerator data**

Data used as numerator values in rate calculations. If presented as a fraction, the top half of an injury rate refers to the number of cases (events) for a particular mechanism of injury and/or age group.

#### **Runovers**

Machine-related agricultural injuries were identified and coded by CAISP as “agricultural runovers” if the victim was runover, struck, or pinned by an upright vehicle or agricultural machine that was under power or rolling on an incline.

#### **Alighted operator runover (subcategory of unmanned runover)**

*An operator is runover, pinned or struck by an unmanned machine under power or rolling on an incline, or by a machine or implement towed by it. Includes being runover while attempting to board a moving unmanned machine. Does not include cases where the decedent had been improperly starting the machine.*

#### **Bystander runover**

*A bystander is runover, pinned or struck by a manned machine, or by a machine or implement towed by it; includes being runover while attempting to board or alight from a moving manned machine.*

#### **Extra rider runover**

*A passenger falls from a machine and is then runover, pinned or struck by the machine, or by a machine or implement towed by it.*

#### **Improper start runover (subcategory of unmanned runover)**

*A person is runover by an unmanned machine subsequent to starting it by any means other than that specified by the machine’s manufacturer. Includes bypass and jump starting.*

#### **Operator runover**

*An operator falls from a machine and is then runover, pinned or struck by the machine, or by a machine or implement towed by it.*

**Unmanned runover**

*A person is runover, pinned or struck by an unmanned machine, or by a machine or implement towed by it. Includes being runover while attempting to board a moving unmanned machine.*

**Surveillance**

The ongoing systematic collection, analysis, interpretation and dissemination of health data.

# Appendix C CAISP's Agricultural Fatality Data Abstraction Form



## CAISP FATAL FARM INJURIES – DATA ABSTRACTION FORM

Please complete all fields. For fields where information is recorded as missing, please enter **99** in the database, with the exception of date fields – these should be left blank.

Coroner's File #: \_\_\_\_\_ - \_\_\_\_\_  
year no.

CAISP ID: \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_  
prov. year no.

**Agricultural Fatalities:** 1) Any unintentional injury resulting in death that occurred during activities related to the operation of a farm or ranch and/or 2) Any unintentional injury resulting in death that involved any hazard of a farm or ranch environment in Canada (excluding fatal non work-related injuries that took place in the farm residence). This includes deaths that occurred away from agricultural work locations if agricultural work was being done; e.g., transporting livestock or harvested crops on public highways. Deaths where victims were killed because a third party was engaged in agricultural work are also included.

Age: \_\_\_\_\_ Birth Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ Birth date missing (circle)? Yes No  
mm dd yyyy

Sex (circle): M F Province: \_\_\_\_\_ County/Regional Municipality: \_\_\_\_\_

Region: \_\_\_\_\_ Date of Injury: \_\_\_\_/\_\_\_\_/\_\_\_\_ Weekday of Injury (circle): S M T W T F S  
mm dd yyyy

Time of Injury \_\_\_\_\_ (24:00) Date of Death: \_\_\_\_/\_\_\_\_/\_\_\_\_  
mm dd yyyy

Source of data for case identification (circle all that apply):

- |                 |                     |         |
|-----------------|---------------------|---------|
| 1 Coroner       | 2 Medical Examiner  | 3 Media |
| 4 RCMP / police | 5 Registrar General | 6 Other |

### A. DESCRIPTION OF INJURY EVENT

Circumstances and activity - describe with as much detail as possible the circumstances surrounding the injury event. Please include as many details as possible about 1) activity at the time of the incident, 2) task, and 3) any machinery involved in the incident.

*If the injury was not machinery or vehicle related, complete Section B and then proceed to Section E.  
 If the injury was machinery or vehicle related, begin with Section C and continue.*

MARCH 2007



<p><b>B. CAUSE OF INJURY NOT MACHINERY OR VEHICLE RELATED</b></p> <p>1 crushed or struck by animal. Specify animal: _____</p> <p>2 other type of animal injury. Specify animal: _____</p> <p>3 fall from animal. Specify animal: _____</p> <p>4 struck by non-machine object</p> <p>5 struck against non-machine object</p> <p>6 caught inside, under or between non-machine objects</p> <p>If 4, 5 or 6, specify object: _____</p> <p>7 fall from height. Give specific fall location: _____</p> <p>8 fall on same level</p> <p>9 jumped to lower level</p> <p>10 overexertion</p> <p>11 drowning</p> <p>12 exposure to fire/explosion</p> <p>13 contact with temperature extremes</p> <p>14 contact with electric current</p> <p>16 contact with radiation, caustic, toxic or noxious substance by (circle): inhalation ingestion absorption injection</p> <p>Specify agent: _____</p> <p>18 asphyxiation by grain or soil. Specify: _____</p> <p>19 firearm</p> <p>77 other non machine related. Specify: _____</p> <p>88 unknown non machine related</p> <p>99 not applicable</p>	<p><b>C. CAUSE OF INJURY MACHINERY OR VEHICLE RELATED</b></p> <p>1 sideways rollover</p> <p>2 backwards rollover</p> <p>3 unspecified rollover</p> <p>4 entangled/caught in machinery</p> <p>5 pinned or struck by machine component or collapsing machine</p> <p>6 traffic collision on road or highway</p> <p>7 operator fell from moving machine, not runover, pinned, or struck by it</p> <p>8 operator fell from moving machine, then runover, pinned, or struck by it</p> <p>9 passenger fell from moving machine, not runover, pinned, or struck by it</p> <p>10 passenger fell from moving machine, then runover, pinned, or struck by it</p> <p>11 alighted operator/other person runover, pinned, or struck by unmanned machine</p> <p>12 alighted passenger runover, pinned, or struck by moving machine</p> <p>13 bystander runover, pinned, or struck by moving machine</p> <p>14 machine-related contact with electrical current</p> <p>15 machine related fire, explosion or burn</p> <p>16 machine collision off-road</p> <p>17 machine-related drowning</p> <p>18 struck by object falling or propelled from machine</p> <p>20 runover, pinned, or struck by moving machine - unspecified</p> <p>77 other machine related. Specify: _____</p> <p>88 unknown machine related</p> <p>99 not applicable</p> <p>If 5 or 18, specify object/component: _____</p>	<p><b>D. TYPE OF MACHINERY</b></p> <p>(Circle appropriate number if the injury event was machinery or vehicle related)</p> <p>1 tractor</p> <p>2 auger. Specify whether freestanding, attached to machine, or unknown (circle)</p> <p>3 mower</p> <p>4 power take off, specify machine PTO attached to: _____</p> <p>5 baler</p> <p>6 farm wagon/trailer</p> <p>7 combine</p> <p>8 power tool (not chainsaw)</p> <p>9 chainsaw</p> <p>10 welder</p> <p>11 harvester</p> <p>12 plough/disk</p> <p>13 hay elevator</p> <p>14 manure spreader</p> <p>15 bulldozer, bob cat, skid steer</p> <p>16 motor vehicle. Specify: _____</p> <p>17 off-road vehicle. Specify: _____</p> <p>19 fencing equipment</p> <p>20 spraying equipment</p> <p>22 garden equipment</p> <p>24 planting equipment</p> <p>25 swather</p> <p>77 other farm implement/machine. Specify: _____</p> <p>88 unknown</p> <p>99 not applicable</p>
<p><b>E. IMMEDIATE LOCATION OF INJURY</b></p> <p>1 Field (includes dry ditches next to field)</p> <p>2 Barn</p> <p>3 Silo/grain bin, (circle)</p> <p>4 Shed</p> <p>5 Farmyard</p> <p>6 Road/highway (includes dry ditches)</p> <p>7 Driveway (includes dry ditches)</p> <p>8 Farm house</p> <p>9 Farm road (includes dry ditches)</p> <p>10 Woods, orchard</p> <p>11 Water source; includes water-filled ditch, dugout, manure lagoon, sewage pit, etc. Specify: _____</p> <p>12 Corral/outdoor animal enclosure</p> <p>77 Other location. Specify: _____</p> <p>88 Unknown</p> <p><b>F. LOCATION OF DEATH</b></p> <p>1 Found dead</p> <p>2 Died <i>en route</i></p> <p>3 Died in hospital</p> <p>77 Other location of death. Specify: _____</p> <p>88 Unknown</p>	<p><b>G. RELATIONSHIP OF INJURED PERSON TO FARM OWNER/OPERATOR</b></p> <p>1 Operator</p> <p>2 Spouse of farm operator</p> <p>3 Child of farm operator</p> <p>4 Other relative of farm operator. Specify: _____</p> <p>5 Hired worker</p> <p>6 Spouse of hired worker</p> <p>7 Child of hired worker</p> <p>8 Other relative of hired worker. Specify: _____</p> <p>9 Other non-visiting child</p> <p>10 Other non-visiting adult</p> <p>11 Adult visitor or contractor</p> <p>12 Child visitor</p> <p>77 Other relationship. Specify: _____</p> <p>88 Unknown</p>	<p><b>H. METHOD OF DISCOVERY</b></p> <p>Who found the deceased? (i.e. relationship to deceased) _____</p> <p>Was the fatality witnessed? (circle) Y N (Indicate if information not available)</p> <p><b>I. NATURE OF INJURY BY BODY PART</b> e.g., N11 crush injury, BP1 chest. (List from most to least serious injury, where the most serious injury was the cause of death.)</p> <p><b>Nature of injury 1:</b> _____</p> <p><b>Body part 1:</b> _____</p> <p><b>Nature of injury 2:</b> _____</p> <p><b>Body part 2:</b> _____</p> <p><b>Nature of injury 3:</b> _____</p> <p><b>Body part 3:</b> _____</p>

J. WAS AN EXTERNAL CAUSE OF INJURY CODE GIVEN? If so, specify: \_\_\_\_\_

K. REVIEW FOR CONSENSUS? (Circle) Yes No If yes, please explain the points needing consensus of opinion.



## Appendix D Denominator Data

### Canadian Farm Population by Age Group and Province: Statistics Canada, Census of Agriculture 1996

Province	Age Group												Total
	< 1 yr	1 - 4	5 - 9	10 - 14	15 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79	80+ yrs	
NL	5	10	115	130	200	170	225	405	210	105	85	25	1680
PE	65	335	620	660	725	1040	1110	1080	1095	580	420	80	7810
NS	100	580	1040	1260	975	1335	1690	2200	1960	1245	475	205	13060
NB	110	380	725	1020	995	1030	1320	1890	1290	925	485	185	10350
QC	1225	6205	9820	11315	11460	12380	18195	18485	14690	7165	2780	880	114605
ON	2165	10925	17510	21180	20440	23005	29635	34840	29020	20650	9510	2345	221225
MB	935	4575	7265	8170	7155	7950	11585	13015	9680	6260	2545	700	79835
SK	1295	6645	11335	14855	15055	11635	19860	25255	18180	14260	5930	1245	145560
AB	2250	10570	16835	18700	17540	16670	28085	30020	24065	16205	6185	1370	188510
BC	670	3085	5765	6735	5895	5550	9535	12240	9940	6220	2415	725	68770
<b>CANADA</b>	<b>8810</b>	<b>43315</b>	<b>71035</b>	<b>84025</b>	<b>80455</b>	<b>80775</b>	<b>121230</b>	<b>139425</b>	<b>110135</b>	<b>73620</b>	<b>30825</b>	<b>7755</b>	<b>851405</b>

Note: Statistics Canada randomly rounds category totals up or down by a factor of five.

### Number of Farms by Province: Statistics Canada, Census of Agriculture 1996

Province	Number
Newfoundland	742
Prince Edward Island	2,217
Nova Scotia	4,453
New Brunswick	3,405
Québec	35,991
Ontario	67,520
Manitoba	24,383
Saskatchewan	56,995
Alberta	59,007
British Columbia	21,835
<b>CANADA</b>	<b>276,548</b>

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