

Agricultural Fatalities in Canada 1990-2008

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This report from *Canadian Agricultural Injury Reporting* describes the occurrence and patterns of fatal agricultural injuries in Canada by age group over the nineteen years from 1990-2008.

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Table of Contents



	Acknowledgements	1
	Executive Summary	4
Chapter		Page
1	Introduction	9
2	Methods	10
3	Agriculture fatalities in Canada 1990-2008: overview	15
4	Agriculture fatalities in Canada: children and youth	30
5	Agriculture fatalities in Canada: adults 15 to 59 years	39
6	Agriculture fatalities in Canada: adults 60 and over	49
Appendix A	Decision Rules	61
Appendix B	Glossary	62
Appendix C	Fatality data abstraction form	65
Appendix D	Agriculture Populations	67
Appendix E	CAIR Collaborators	70

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Executive Summary

Injury has been identified as a major public health problem in Canada and a significant threat to the economy, health care system and overall quality of life. 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.

Although the greatest cost of an agriculture-related injury is human suffering and loss to individuals and families, the financial costs are far from trivial. In 2004, agriculture-related injuries in Canada cost \$465 million dollars.¹

There are three categories of injury by intent:

- unintentional injuries which are very responsive to injury prevention programming, such as: motor vehicle collisions, falls, poisoning, drowning and suffocation from grain,
- intentional injuries including acts of suicide (self-harm), violence
- undetermined injuries; those in which intent could not be determined.

This report focuses on unintentional injuries. Unintentional injuries accounted for the majority of costs; 80% of all agriculture-related injury costs (\$374 million).¹

Agricultural Fatalities in Canada for 1990-2008 includes an analysis of the Canadian Agricultural Injury Reporting System (CAIR) fatal agricultural injury data in Canada for the nineteen calendar years from 1990 to 2008. 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 CAIR 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, CAIR is able to monitor the effectiveness of prevention programs and to identify patterns of injury arising from new equipment and changes in farming practices.

CAIR data show that agricultural injuries are not due to random or isolated “accidents”. There are many recurrent patterns of injury. From 1990-2008, in Canada:

- 1,975 people were killed in agricultural injury events.
- The agricultural fatality rate was 12.9 per 100,000 farm population (including non-workers).
- The fatality rate for agriculture injuries in the agriculture population is higher than either motor vehicle collision and suicide fatality rates in the general population.
- 70% of the agricultural fatalities involved machines.
- 4 machine-related causes were responsible for more than half the fatalities: machine rollovers, machine runovers, machine entanglements and traffic collisions.
- The top five causes of agricultural fatalities were machine rollovers (20%), machine runovers (18%), machine entanglements (8%), traffic collisions (7%), and being pinned or struck by a machine (7%).
- 92% of the fatalities were work related, 85% of the victims were working.
- 92% of those fatally injured as a result of agricultural work were male.
- 47% of the fatalities were farm owner/operators.
- 37% of all agriculture fatalities involved a tractor.
- 44% of fatalities due to toxic substance exposure were attributed to hydrogen sulfide (manure gas) poisoning.
- Of the drowning-related fatalities 39% occurred in a dugout.

¹ SMARTRISK, (2010). The Economic Burden of Injury within the Agricultural Population in Canada. SMARTRISK: Toronto, ON (unpublished).

Children and Youth (< 15 years of age), Canada, 1990-2008

- There were 248 deaths due to agriculture-related injuries.
- 81% of the fatalities were boys.
- 71% of the fatalities were work-related.
- 73% of those who died were children of the owner/operators.
- 30% of the deaths involved a tractor.
- Runover deaths accounted for 39% of all deaths. Of those, 52% were passengers, 44% were bystanders, and another 4% were operators of a piece of machinery.
- Of those who died due to drowning, 42% occurred in a dugout.

Adults (15-59 years old), Canada, 1990-2008

- There were 1,008 fatalities due to agriculture injuries.
- 92% of the fatalities were males.
- 94% of the fatalities were work-related.
- 70% of the fatalities were machine-related.
- The leading causes of fatal injuries were machine rollovers (21%), machine entanglements (11%), traffic collisions (11%), machine runovers (10%), being pinned or struck by a machine (9%).
- 42% of the fatalities were owner/operator.
- 35% of the fatalities involved a tractor.
- Those between 50 and 59 years of age had the highest number of deaths with 312 over the 19 year period (16 deaths per year).

Older Adults (60+ years), Canada, 1990-2008

- There were 712 fatalities due to agriculture injuries.
- 95% of the fatalities were males.
- 95% of the fatalities were work-related.
- 72% of the fatalities involved machinery.
- 46% of all fatalities were due to two main mechanisms of injury; machine rollovers (25%) and machine runovers (24%). The next most common mechanism of fatal injury was being struck by an animal (10%).
- 78% of the fatalities were owner/operators.
- 47% of the fatalities involved a tractor.
- Those between 60 and 69 years of age had the highest number of fatalities, 309 (an average of 16 each year). However, those over 80 years of age had the highest fatality rate with 79.7 deaths per 100,000 farm population (130 fatalities over the 19 year period).

Note: there were 7 males with age unknown



1 INTRODUCTION

1.1 GENERAL INTRODUCTION

The Canadian Agricultural Injury Reporting (CAIR), formerly known as the Canadian Agriculture Injury Surveillance Program (CAISP) was established in 1995 in response to the need for better information about fatal and hospitalized agricultural injuries in Canada. CAIR is a national program with collaborators in each of the ten provinces of Canada. *Agricultural Fatalities in Canada 1990-2008* examines Canadian agricultural fatality data for the nineteen calendar years from 1990-2008. This report includes reported agricultural fatality data for persons who were part of the Canadian farm population, those in the temporary foreign workers under the seasonal agriculture works program from Citizenship & Immigration Canada or who were at risk to agricultural injuries in Canada from 1990-2008. There were 1,975 agricultural fatalities in Canada from 1990 to 2008, an average of 104 per year. Over the 19-year surveillance period, the average fatality rate per 100,000 farm population, per year was 12.9 deaths.

Following this introduction, there is a description of the methods used in CAIR. 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.

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 fourth 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.² Economic costs associated with agricultural injuries are also substantial. In 2004, agriculture-related injuries in Canada cost \$465 million dollars. Unintentional injuries accounted for the majority of costs, 80% of all agriculture related injury costs (\$374 million).³

Until the establishment of CAIR, Canadian data on agricultural injuries were 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. CAIR data has been used by various groups internationally, including Australia, Brazil, Hong Kong, India, Ireland, Netherlands, New Zealand, the United Kingdom and the United States. CAIR has been referenced in a variety of inventories and compendiums including guides to occupational and environmental health and safety, casebooks and inventories published by the Public Health Agency of Canada. In terms of policy, CAIR has been used as a reference source for agricultural injury at an international, national, provincial, and regional levels. Information gathered indicated that the program's data has contributed to informing, influencing and enacting policy development at both federal and provincial levels. Evidence of strategic planning influences at provincial and organizational levels is also apparent, and contributions can be linked to: child safety guidelines⁴, child labour laws⁵, occupational health and safety guidelines⁶

² Pickett W, Hartling L, Brison RJ, Guernsey J (1999). *Fatal farm injuries in Canada*. *Can. Med Assoc. J.* 160:1843-1848.

³ SMARTRISK, (2010). *The Economic Burden of Injury within the Agricultural Population in Canada*. SMARTRISK: Toronto, ON (unpublished).

⁴ National Children's Centre for Rural and Agricultural Health and Safety, Marshfield Clinic Research Foundation, 2006. Available at: http://www.marshfieldclinic.org/nccrahs/?page=nccrahs_aboutus_center_highlights.

⁵ Irwin, John, Stephen McBride and Tanya Strubin. 2005. "Child and Youth Employment Standards: The Experience of Young Workers Under British Columbia's New Policy Regime." Canadian Centre for Policy Alternatives, September 2005. 40 pp.

⁶ Ontario Ministry of Labour, 2006; Workers Compensation Board of Prince Edward Island, 2006.

engineering standards⁷ and injury reduction and health promotion strategies. At an international level, the Government of Canada has cited CAIR reports in its 2003 submission to the United Nations, on the Convention on the Rights of the Child and identified CAIR as playing an important role in influencing children's rights in Canada⁸. CAIR has also been identified as a tool for awareness raising, skill building and knowledge development through conference presentations, teleconferences, lectures, course materials, social marketing campaigns, and resource materials. From a research perspective, 132 articles in 56 journals reaching a very wide range of disciplines were related to CAIR.

1.3 THE CANADIAN AGRICULTURAL INJURY REPORTING

The Canadian Agricultural Injury Reporting (CAIR) is a national program that is funded by the Canadian Agricultural Safety Association (CASA). CAIR is a collaborative program involving various organizations from across Canada. It is coordinated from a national office at the Alberta Centre for Injury Control & Research, University of Alberta, in Edmonton, Alberta. The people and organizations that contribute to CAIR include researchers, government agencies and the agricultural industry.

The main purpose of CAIR is to collect and analyze information on agricultural injuries from across Canada. CAIR established national standards for the collection of fatality and hospitalizations. Although a very rich data source, in 2002, CAIR ceased the collection of hospital admission data on a national basis due to budget cuts. The collection of hospital admissions data requires the review of hospital records in order to extract the circumstances around the injury producing event. Due to the sheer number of hospital admissions annually, 1,354, in Canada the costs proved to be prohibitive.

⁷ Canadian Standards Association. Available at: <http://www.csa.com/>

⁸ Government of Canada, 2003. Available at: http://www.canadiancrc.com/UN_CRC/UN_Committee_Rights_Child_Canada_2nd_Report-Overview_SEP_2003_34th_Session.aspx

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

CAIR'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.*

CAIR strives to ensure that fatality 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 those in the agricultural industry.

CAIR's primary audience is individuals within the agricultural industry who need to make informed decisions about safety programs and policy. CAIR'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 and information on our website www.CASA-ACSA.ca and click on injury reporting.

1.4 USES OF CAIR DATA

CAIR 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, CAIR 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. CAIR 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. CAIR 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.

CAIR has provided baseline evidence to support several applied research projects such as the Saskatchewan Farm Injury Cohort Study funded by the Canadian Institutes of Health Research (2005-2010). 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.

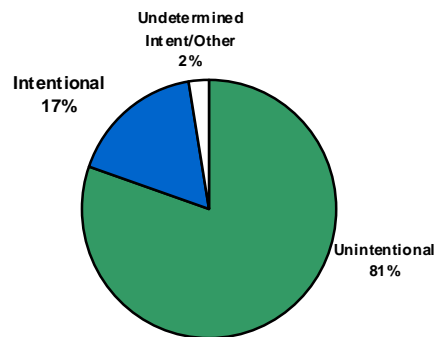
The prevention of injuries in agricultural work settings is challenging because of the unique nature of the agricultural work environment. Also, in most jurisdictions, agriculture is not a heavily regulated industry in terms of occupational health and safety standards. Unlike other industrial workplaces, many Canadian agricultural workplaces have not benefited from modern industrial hygiene and safety practices. The composition of the agricultural workforce, farming practices and safety practices is geographically diverse. This diversity adds to the difficulty of establishment and 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.

1.6 ECONOMIC BURDEN OF AGRICULTURE-RELATED INJURIES IN CANADA

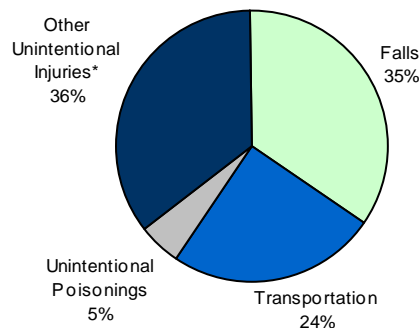
Injury has been identified as a major public health problem in Canada and a significant threat to the economy, health care system and overall quality of life and this is especially true in agriculture because of the unique nature of the work environment.⁹

Although the greatest cost of an agriculture-related injury is human suffering and loss to individuals and families, the financial costs are far from trivial. In 2004, agriculture-related injuries in Canada cost 465 million dollars. This includes costs arising from the use of health care and costs related to reduced productivity from hospitalization, disability and premature death. The vast majority of the injuries described in this report are both predictable and preventable.

Injuries can be classified by examining intent. Unintentional injuries such as motor vehicle collisions, falls, poisonings, drownings and grain suffocations accounted for 81% of all agriculture-related injury costs (\$374 million). Intentional injuries, those resulting from violence directed at oneself or another person (suicide, self-harm, assaults, homicide) accounted for 17% of the costs (\$80 million). For the remaining 2% (\$11 million) of agriculture-related injury costs, the intent of injury could not be determined¹⁰.



Falls were the leading cause of unintentional injuries accounting for 35% (\$130 million), this was followed by transportation collisions at 24% (\$91 million) and unintentional poisonings at 5% (\$18 million).



* contact with tools and machinery, firearms, bitten or struck by and animal, fire and other unintentional injuries

⁹ SMARTRISK, (2005). Ending Canada's Invisible Epidemic: A Strategy for Injury Prevention. SMARTRISK: Toronto, ON. Available at: http://www.smartrisk.ca/index.php/publications/item/ending_canadas_invisible_epidemic_a_strategy_for_injury_prevention

¹⁰ SMARTRISK, (2010). The Economic Burden of Injury within the Agricultural Population in Canada. SMARTRISK: Toronto, ON (unpublished).

2 METHODS

2.1 IDENTIFICATION OF AGRICULTURE FATALITIES

A detailed review of CAIR's data collection and analysis methods is available in CAIR'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.

2.2 KEY DEFINITIONS

Agricultural Fatalities: CAIR 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.*

Population of Fatalities: *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 and all temporary foreign workers under the seasonal agriculture workers program from Citizenship & Immigration Canada. See appendix D: Agriculture Populations..*

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 CAIR DATA

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

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

1. CAIR provincial collaborators assigned the task of producing special technical reports for Canada.
2. CAIR collaborators who have permission from the CAIR group to conduct special analyses for the purpose of producing scientific reports for submission to peer-reviewed journals.
3. The national program coordinator and program 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 and not interpretive to imply cause and effect. 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 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. To allow for comparison across the provinces and years, age-standardized rates were calculated using the direct method. This method controls for potential sources of bias resulting from variations in age distributions of populations. See Appendix E for calculation explanation and details. Formal hypothesis-testing methods and tests of statistical significance were not employed in comparisons.

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, 2001 and 2006 Canada Census of Agriculture and extrapolated for the years in which the census was not performed. In addition to the Canada Census of Agriculture population, temporary foreign workers under the seasonal agriculture workers program from Citizenship & Immigration Canada were included. For the year(s) for provinces who did not submit fatality data, the populations for those years were not included in the denominator.* **

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 to 2008 have not been made available to CAIR. Québec data for 2004 and 2005 were imputed for this report based on Québec's 2000 to 2003 fatality data by age category, gender and mechanism of injury. Data for 2006 to 2008 are unavailable.*

***Prince Edward Island fatality data for 2007 to 2008 have not been made available to CAIR.*

The change in trending of the age-standardized rates over time is expressed in average annual per cent between time periods. The sum of the average percentage change will give the overall change. The trending was done with the Joinpoint Regression Program^{11,12}. To ensure the data in this report are illustrated in an effective and useful manner, data fields with small numbers are often not included in graphs. In these cases, a note is included below the graph.

2.5 DATA LIMITATIONS

The data collected in accordance to section 2.1 Identification of Agriculture Fatalities. However, there are limitations to this data collection if the injury has not been identified as having occurred on the on the farm or involving agriculture machinery or agriculture activities these incidents are not captured.

Data abstraction is completed on-site at provincial chief coroners' or medical examiners' offices. The quality of the data is reflective of the detailed documentation available in the records at the provincial chief coroners' or medical examiners' offices. Data is collected in a consistent manner using a standard data abstraction form (Appendix C). Data are then sent to the national site for verification, coding and analysis.

There is also limitation identifying migrant workers. The numbers of migrant workers included in the denominator for calculating of rates only accounted for those workers who participated in the seasonal agricultural workers program from Citizenship & Immigration Canada.

¹¹ Joinpoint, Version 3.3.1. April 2008; Statistical Research and Applications Branch, National Cancer Institute.

¹² Methods by Kim HJ, Fay MP, Feuer EJ, Midthune DN. Permutation tests for joinpoint regression with applications to cancer rates. *Stat Med* 2000;19:335-51 (correction: 2001;20:655).

2.6 AGRICULTURE AREA AND POPULATION

Area and Use of Land

Canada is a vast country with diverse agriculture commodities. There is dairy, fruit, vegetables and tobacco production in the east provinces, and fruit, grain and cattle production in the west.

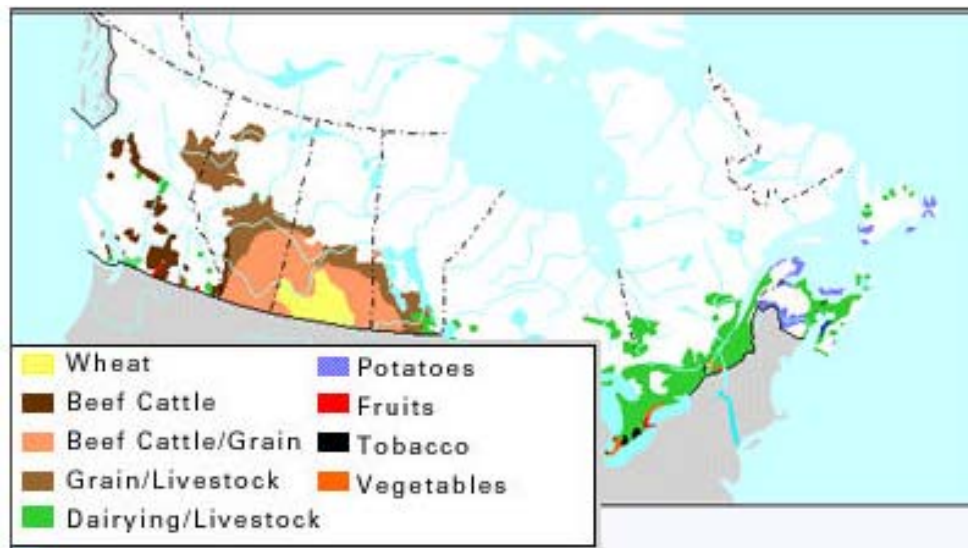
The majority of agriculture land is located in Western Canada. Some 38% of Canada's agriculture land is located within Saskatchewan, while Alberta and Manitoba contain 31% and 11%, respectively. Ontario accounts for 8% of agriculture land, Québec for 5%, BC for 4%, while Nova Scotia, New Brunswick and Prince Edward Island each account for less than 1% and Newfoundland and Labrador for a fraction of 1%.

The average farm size in Saskatchewan, in which grain farming is predominate, is 1500 acres. In addition to grain farming there is beef production in Alberta, where the average farm size is about 1100 acres. The average farm size in Manitoba is about 1000 acres.

In contrast to the Prairie region, the average farm size is much smaller in BC (353 acres), Quebec (279 acres), Ontario (233 acres), and Atlantic provinces (ranging from 364 acres in PEI to 160 acres in Newfoundland and Labrador).

The reduction in farm numbers and employment in farming reflect major changes in society. In 1951 the farm population was 21% of the total Canadian population. By 1961, less than 12% of Canada's population lived on farms. Currently about 2% of the population live on farms. However, farmers are not the only residents of rural areas: the farm population is about 12% of Canada's total rural population. Farm numbers have shown a steady decline over time. The 1961 Census recorded 480,903 Canadian farms. There are now 229,000 recorded farms and about 327,000 people employed in primary agriculture (also about 2% of total employment).¹³

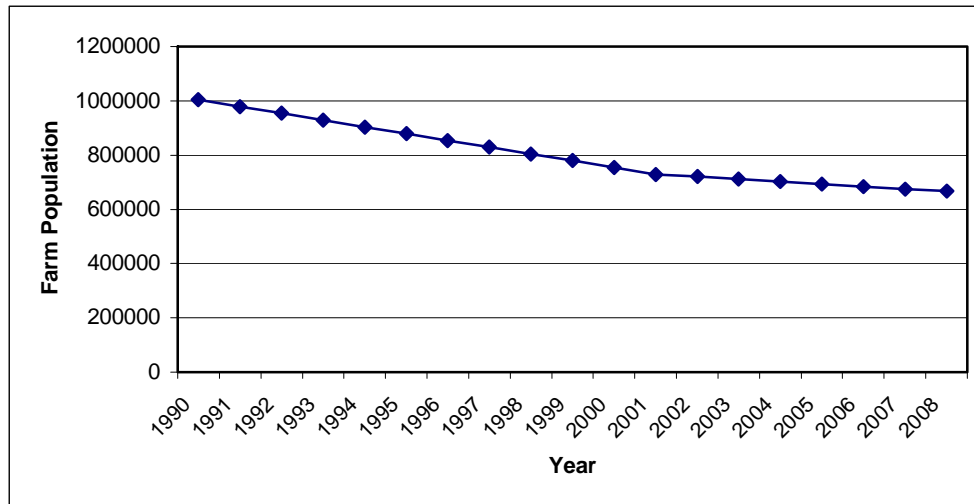
Farm Types



¹³ Veeman, M and Veeman, T. The Canadian Encyclopedia. Accessed Dec. 2011. Available at: <http://www.thecanadianencyclopedia.com/articles/agriculture-and-food>
Agricultural Fatalities in Canada 1990-2008

Farm Populations

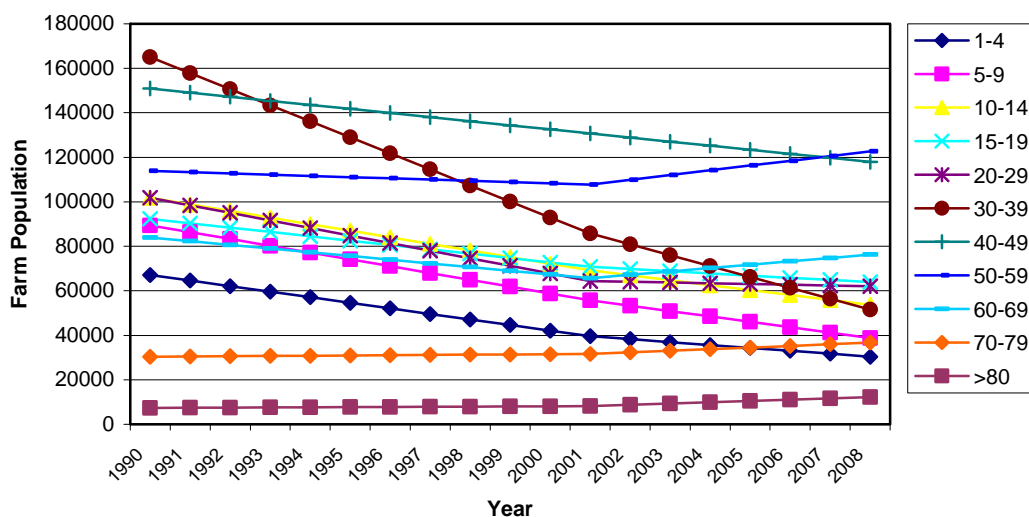
Over the period from 1990-2008 there has been a decrease in the Canadian farm population of 34%. This equates to 341,370 fewer people on farms. In 1990 there were 1,004,030 people counted in the agriculture census and based on linear extrapolation using the 1996, 2001 and 2006 Canada Census of Agriculture the agriculture population in 2008 the count dropped to 666,205.¹⁴ (see appendix D).



Farm Population by Age Group

Over the time period from 1990-2008 the age group which experienced the largest percentage decline in farm population was those between the ages of 30 to 39 years with a decline of 69%. This was followed by children 5 to 9 years of age with a decline of 57%, children 1 to 4 years of age with a decline of 55%, 10 to 14 years with a decline of 47%.

There were increases in the older farm population, with the largest increase experienced by those 80 years of age and older with a 67% increase, followed by those 70 to 79 years of age with an increase of 21% and then those 50 to 59 years of age with an increase of 8%.¹⁴

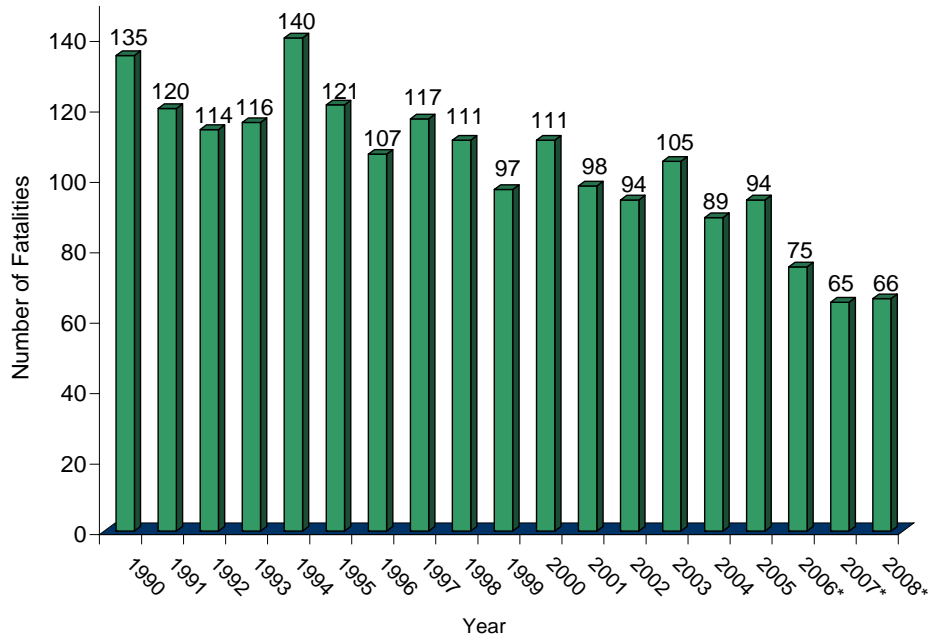


¹⁴ Canada Census of Agriculture 1996, 2001, 2006. Statistics Canada, Ottawa, Ontario, Canada.

3 AGRICULTURAL FATALITIES IN CANADA 1990-2008: OVERVIEW

3.1 Fatal agricultural injuries by calendar year, 1990-2008

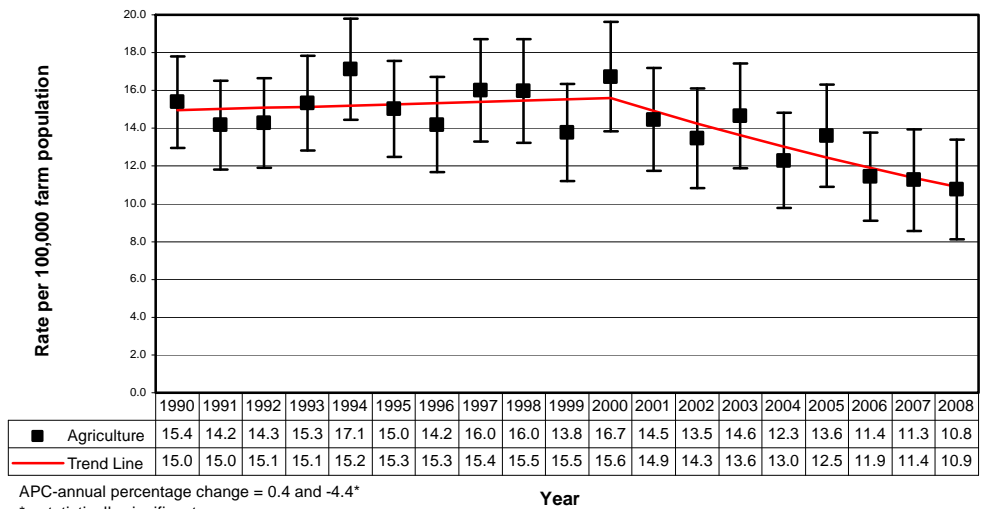
From 1990 to 2008, there were 1,975 agricultural fatalities in Canada. An average of 104 deaths each year. The peak year for fatalities was 1994, with 140 cases (7% of the total number of cases). During the first 10 years of the surveillance period there was an average of 118 fatalities each year. During the last 9 years the average number of fatalities dropped to 89 each year.



*Note: 2006-2008 numbers are incomplete for the province of Quebec, and 2007-2008 are incomplete for the province of PEI.

3.2 Fatal agricultural injury rates by year (age-stnd), 1990-2008

Over the 19 year period there were 2 distinct trends. The first trend, from 1990 to 2000 was a slight annual percentage increase of 0.4%. The second trend, from 2000 to 2008, was a significant annual percentage decrease of 4.4%. This may be due to a decrease in the number of reported fatalities and an increase in the older farm population.



*Note: 2006-2008 numbers are incomplete for the province of Quebec, and 2007-2008 are incomplete for the province of PEI and the rates have been adjusted accordingly.

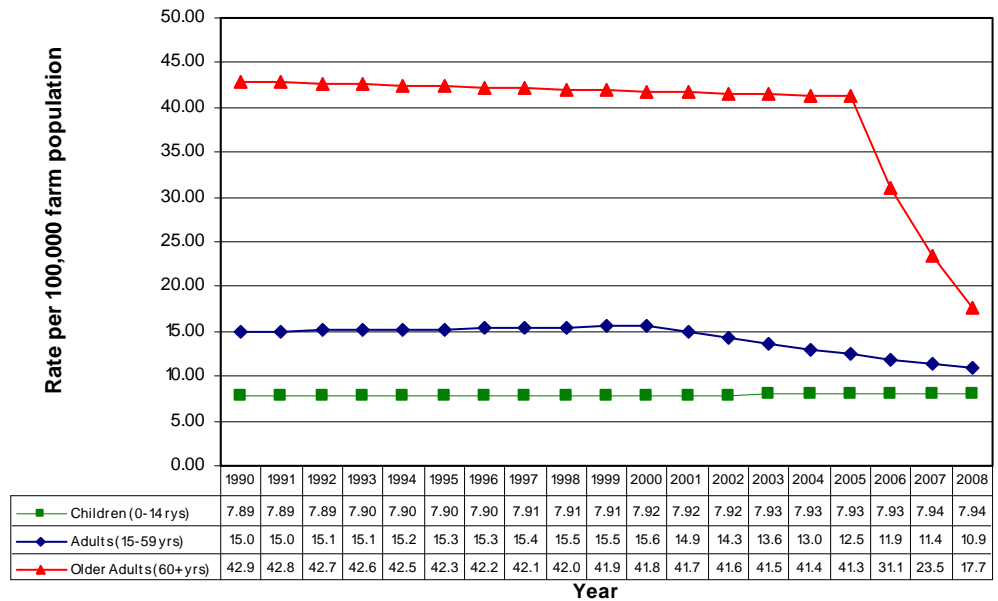
see appendix D for age group population changes

3.3 Fatal agricultural injury comparison by Age Group, 1990-2008

When comparing the fatality rates by population group, older adults (60+ years) consistently had higher rates. From 2005 to 2008 this age group experienced a significant decrease in the rate of an average of 24.5 per cent annually.

Adults (15-59 years), also had a significant decrease in the rate from 2000 to 2008, with an average of 4.4 per cent annually.

The fatality rate of children (0-14 years) increased an annual average of 0.4 per cent.



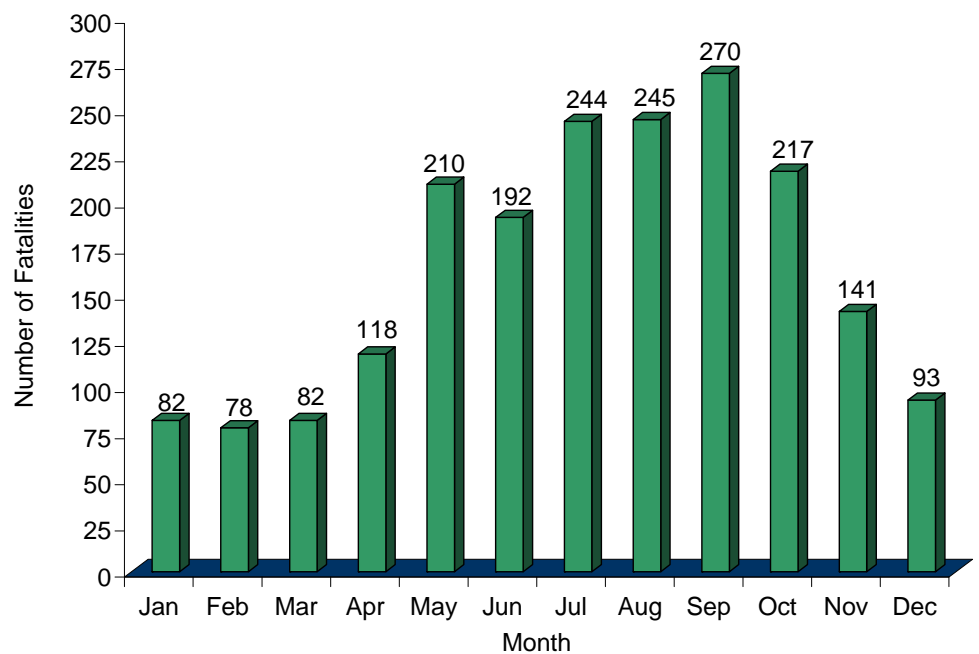
APC-annual percentage change:
 Children = 0.4
 Adults = 0.4 and -4.4*
 Older Adults = -0.3 and -24.5*
 * = statistically significant

3.4 Fatal agricultural injuries by month, 1990-2008

70% of all agricultural fatalities in Canada occurred from May to October with 1,378 deaths.

The highest proportion of fatalities took place in September (14%). Another 12% of the deaths occurred in the months of July and August.

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



3.5 Fatal agricultural injuries by season, 1990-2008

Overall rollovers accounted for 20% of the machine-related fatalities. They were the leading cause of death in every season except the winter season when entanglements in moving machinery parts was the leading cause.

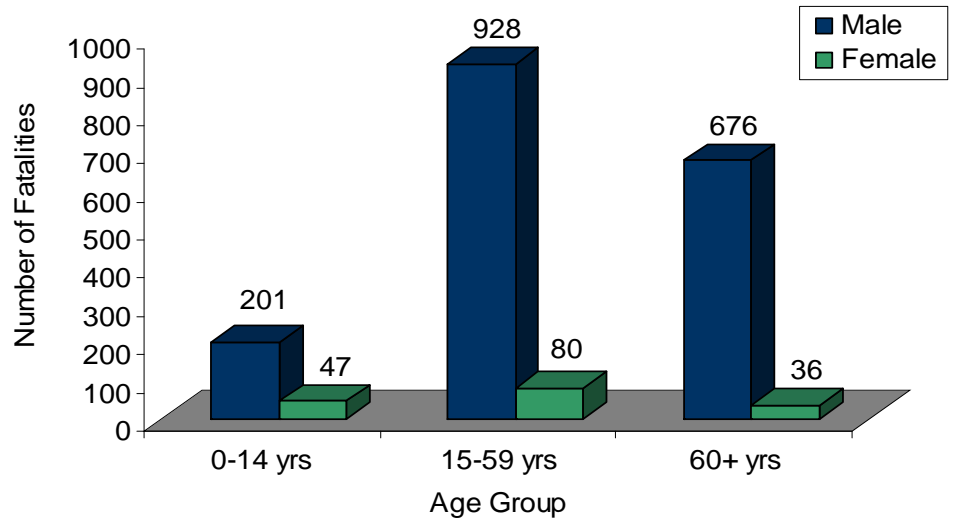
The per cent is based on all injury fatalities within the season.

Spring Mar-May	Summer Jun-Aug	Fall Sep-Nov	Winter Dec-Feb
Machinery rollovers 19%	Machinery rollovers 23%	Machinery rollovers 20%	Entanglement in moving machinery parts 14%
Pinned/struck by machine component 11%	Machinery versus Traffic collisions 8%	Entanglement in moving machinery parts 10%	Machinery rollovers 12%
Machinery versus traffic collision and dismantled machinery operator runover by machine each with 6%	Animal-related 8%	Machinery versus traffic collision 8%	Animal-related 8%
Struck by non-machine object 6%	Pinned/struck by machine component 6%	Dismounted machinery operator runover by machine 8%	Pinned/struck by machine component 7%
Animal-related 6%	Dismounted machinery operator runover by machine 6%	Pinned/struck by machine component 6%	Struck against non-machine object 7%
All other injuries 46%	All other injuries 49%	All other injuries 48%	All other injuries 52%

3.6 Fatal agricultural injuries by age group and gender, 1990-2008

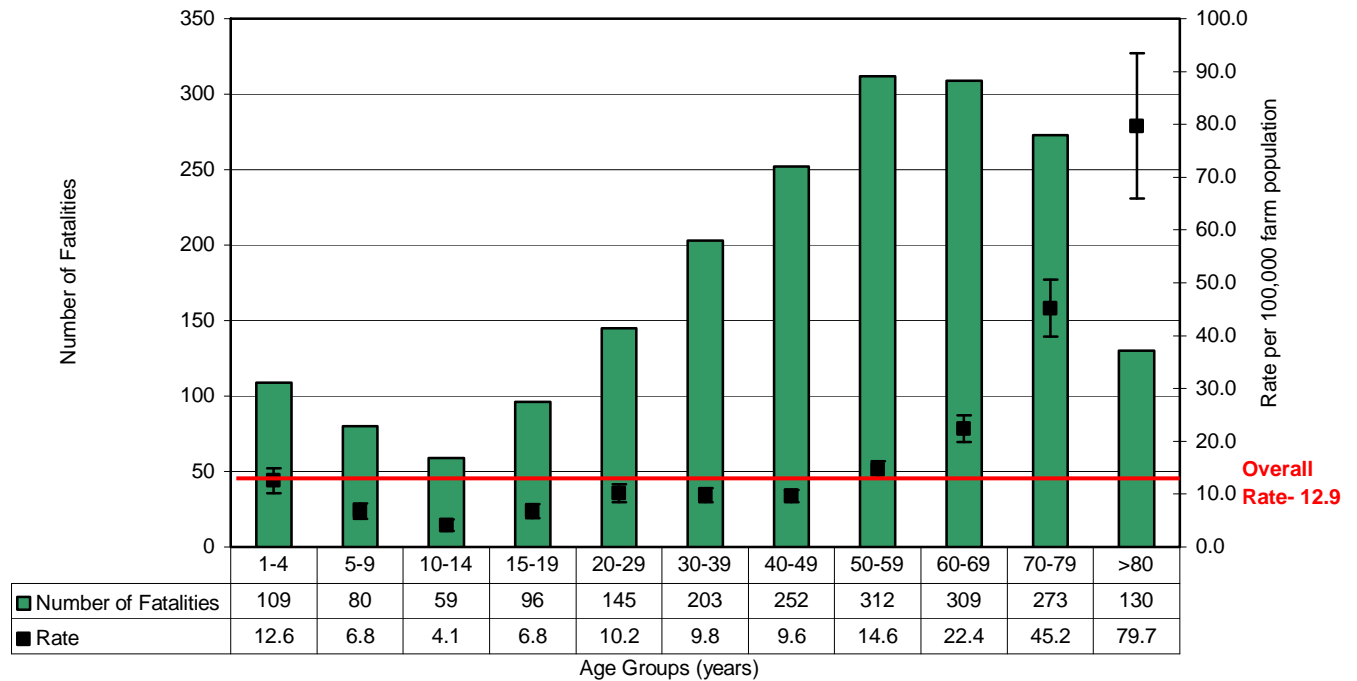
92% of the persons who died in agricultural injury events were male. The ratio of males to females was highest for the 60+ age group (18.8:1), and lowest for the 1 to 14 year age group (4.3:1).

Note: there were 7 males with age unknown



Sex	0-14 yrs	15-59 yrs	60+ yrs	Total	%
Male	201	928	676	1805	92
Female	47	80	36	163	8
Total	248	1008	712	1968	100
Per cent	13	51	36	100	

3.7 Agricultural fatality number and rates by age group, 1990-2008



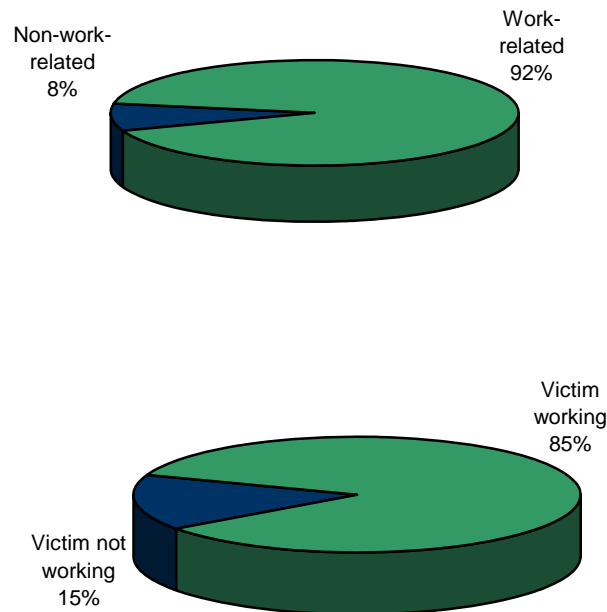
The overall crude fatality rate was 12.9 deaths per 100,000 farm population.

The age groups with the highest number of deaths, those 50 to 59 years of age (312 deaths) and those 60 to 69 (309 deaths) years of age did not have the highest rate, 14.8 deaths per 100,000 farm population and 22.5 deaths per 100,000 population respectively. The age group with the highest fatality rate was experienced by those 80 years of age and older with a rate of 79.7 deaths per 100,000 farm population with 130 deaths.

3.8 Fatal agricultural injuries: the relationship to agricultural work, 1990-2008

92% of the agricultural fatalities in Canada were work-related. The few deaths that were non-work-related (8%) were due to hazards of the farm environment.

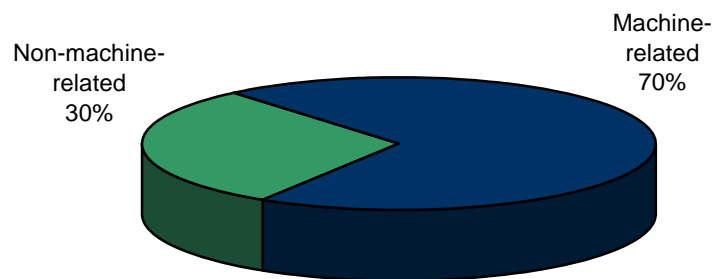
Most adults who died were engaged in agricultural work, whereas the majority of children who were killed in work-related injury events were not working themselves. Overall, 85% of those killed in agricultural injury events were actually engaged in agricultural work.



3.9 Fatal agricultural injuries by major cause, 1990-2008

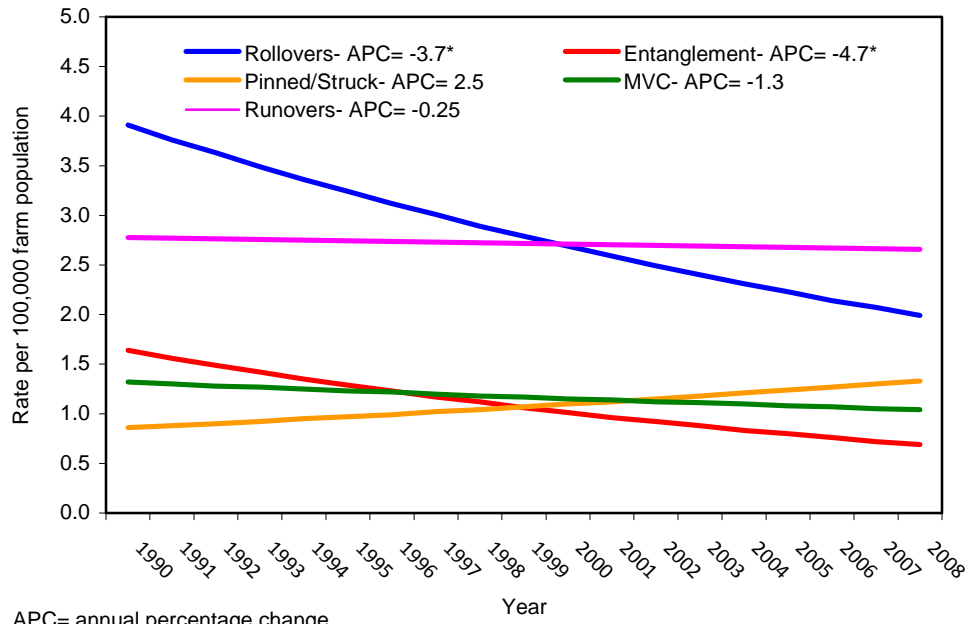
70% (1,381) of agricultural fatalities were machine-related. The leading machine-related mechanisms of fatal injury were machine rollovers, machine runovers and machine entanglements. (Figure 3.10).

The 594 agricultural fatalities that were non-machine-related (30%) included being struck by an animal or an object, drownings (mainly in children), falls from height, and exposure to toxic substances. (Figure 3.10).



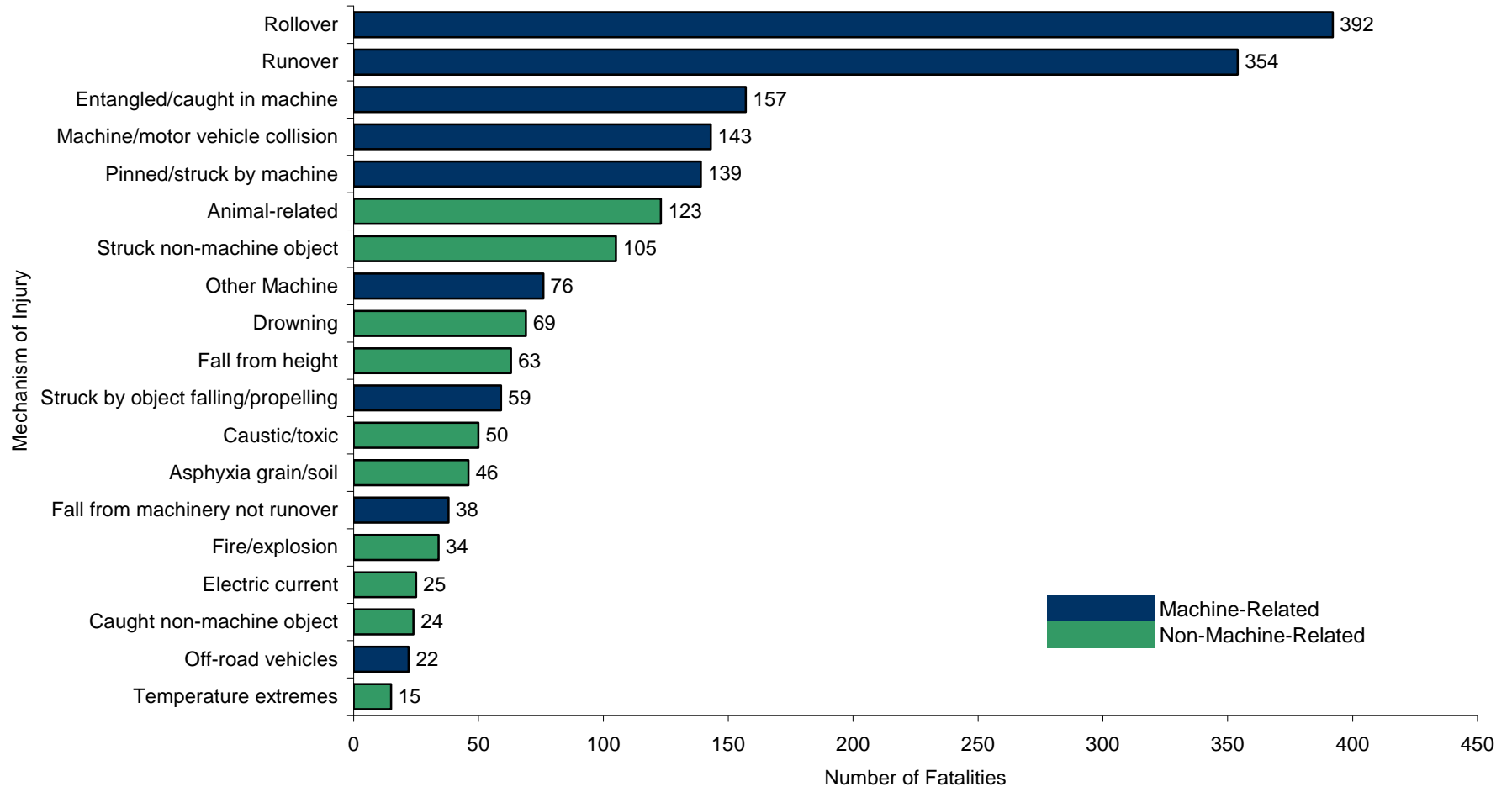
3.10 Comparison of fatal agricultural machine-related injuries (age-stnd), 1990-2008

When analyzing the top 5 machine-related mechanisms of injuries over time, injury rates due to rollovers experienced a decrease on average of 3.7% annually, injury rates due to entanglements decreased by an average of 4.7% each year, motor vehicle collision injury rates decreased by an average of 1.3% each year. The decreases are thought to be due to improvements in machinery safety design. There was also a decrease in runovers by an average of 0.25% each year. However, injury rates due to being pinned/struck increased by an average of 2.5% each year.



APC= annual percentage change
 *= statistically significant

3.11 Fatal agricultural injuries by cause of injury, 1990-2008



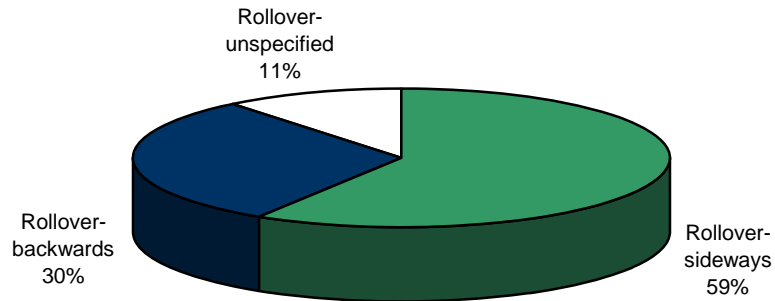
Almost half of all agricultural fatalities in Canada (46%) were due to three machine-related causes: machine rollovers, machine runovers and machine entanglements (903 fatalities). Over all age groups, the leading causes of agricultural fatalities in Canada were machine rollovers and machine runovers each with 20% and 18% respectively. Machine entanglements (8%), traffic collisions and being pinned or struck by a machine each with 7%, animal-related events with another 6% and being struck by a non-machine object (5%).

Another 6 machine-related and non-machine-related mechanisms of injury categories with 41 cases composing less than fifteen per cent of injury total, were not included in the above graph.

3.12 Fatal agricultural machine rollovers by rollover type, 1990-2008

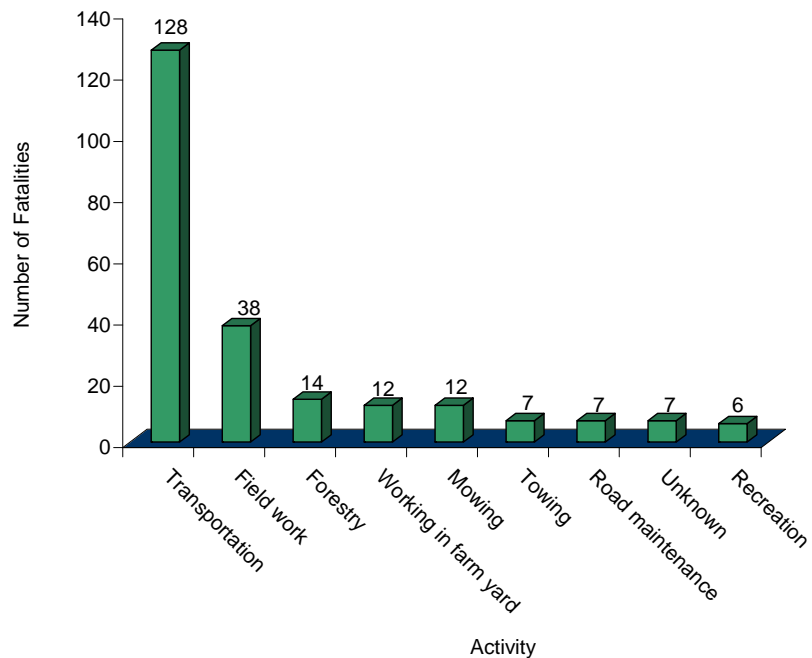
Overall, 59% of the 392 fatal agricultural machine rollovers in Canada from 1990 to 2008 were sideways in direction. Another 30% of the rollovers were backwards. In 11% of the cases, the direction of rollover could not be determined.

The majority of the rollovers involved a tractor (84%), and another 8% involved an off-road vehicle.



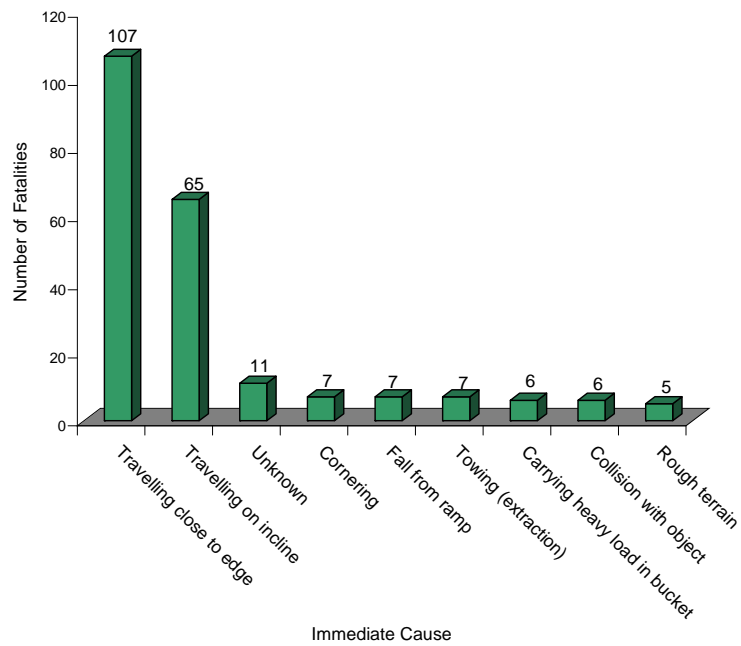
3.13 Fatal agricultural sideways rollovers by activity prior to rollover, 1990-2008

In fatal sideways machine rollovers, injury circumstance text descriptions showed that the decedents' most common activities prior to the rollover were driving on highways (transportation) and farm roads (55%) and field work accounted for another 16%.



3.14 Fatal sideways agricultural rollovers by immediate cause of rollover, 1990-2008

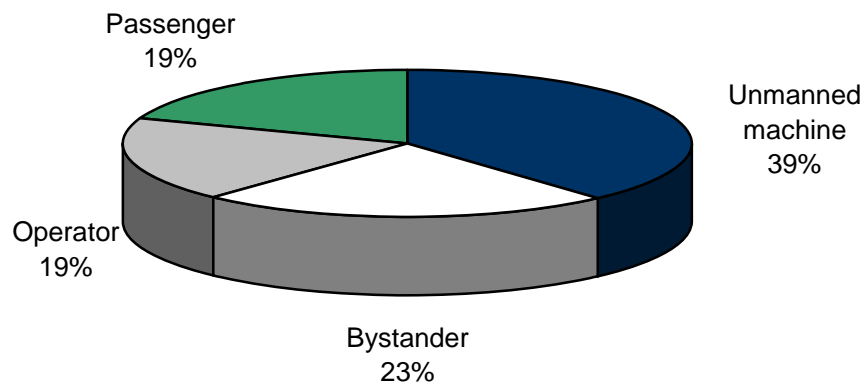
In 46% of fatal sideways machine rollovers, circumstance text descriptions attributed the rollover to the machine or vehicle travelling too close to the edge of a ditch or other steep slope bordering a road or field. In 28% of the cases, the rollover was said to be due to the machine or vehicle travelling on a steep incline.



Another 4 immediate causes with a total of 15 fatalities each with less than 5 were not included in the above graph.

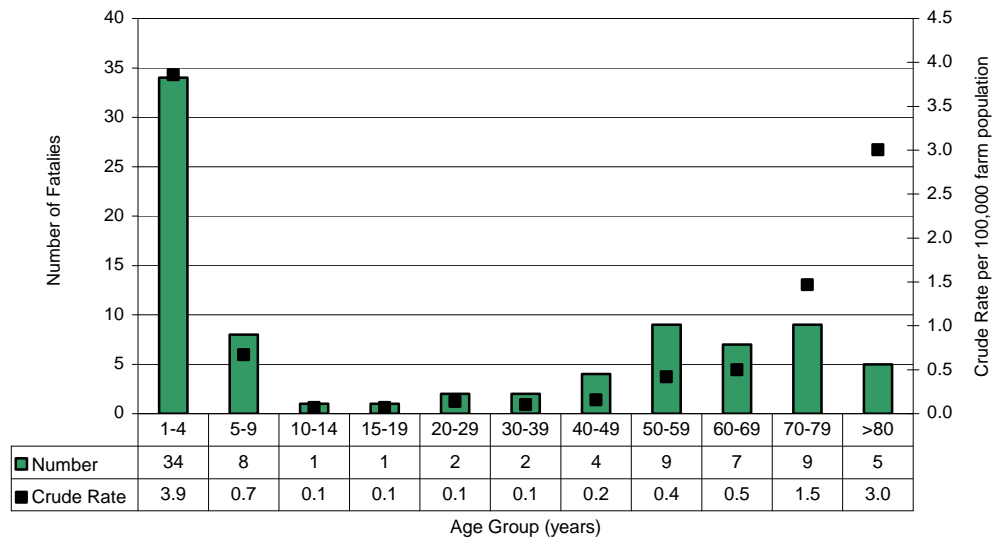
3.15 Fatal agricultural runovers, 1990-2008

There were 354 agricultural runover fatalities from 1990 to 2008. Alighted operator runovers (39%) 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 (23%), followed by fallen operator runovers (19%), passenger/extra rider runovers (19%).



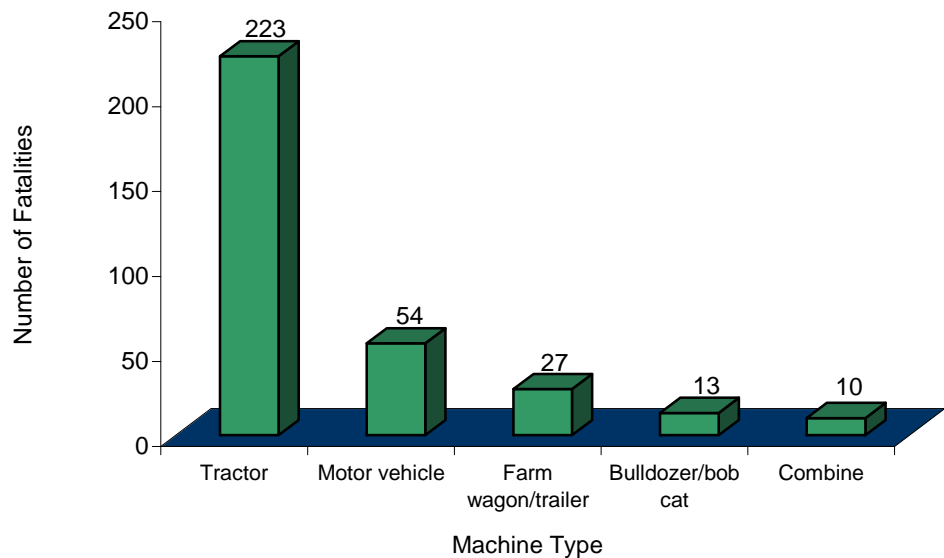
3.16 Fatal agriculture bystander runovers by age group, 1990-2008

Of the 83 bystander runover, more than half (51%) were children between 1 and 9 years of age. Children between 1 and 4 years of age had the highest number of bystander runover fatalities and the highest crude rate of 3.9 fatalities per 100,000 farm population.



3.17 Fatal agricultural runovers by machine type, 1990-2008

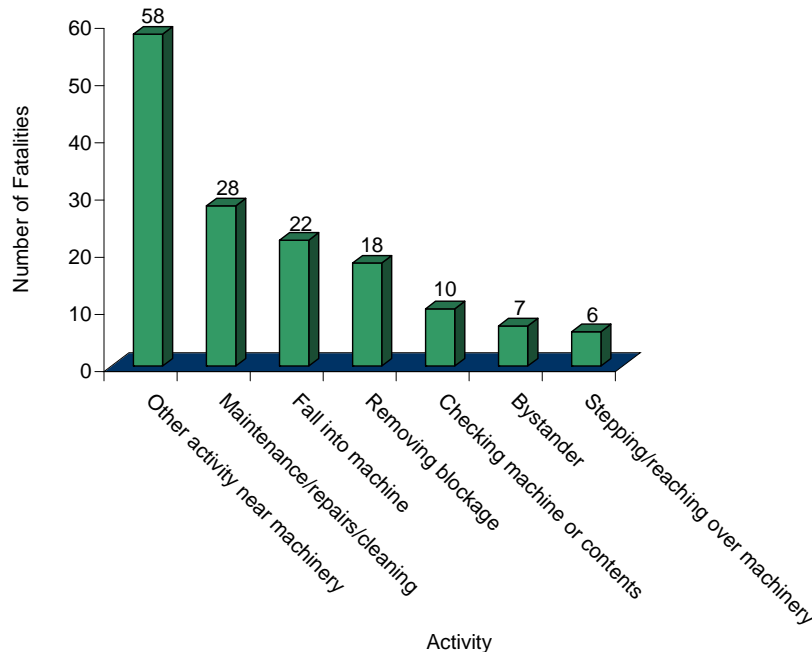
Of the 354 agricultural runover fatalities 63% involved the use of a tractor, another 15% involved a motor vehicle.



Another 11 machine types with a total of 27 fatalities each with less than 10 per machine type were not included in the above graph.

3.18 Fatal entanglements by activity prior to entanglement, 1990-2008

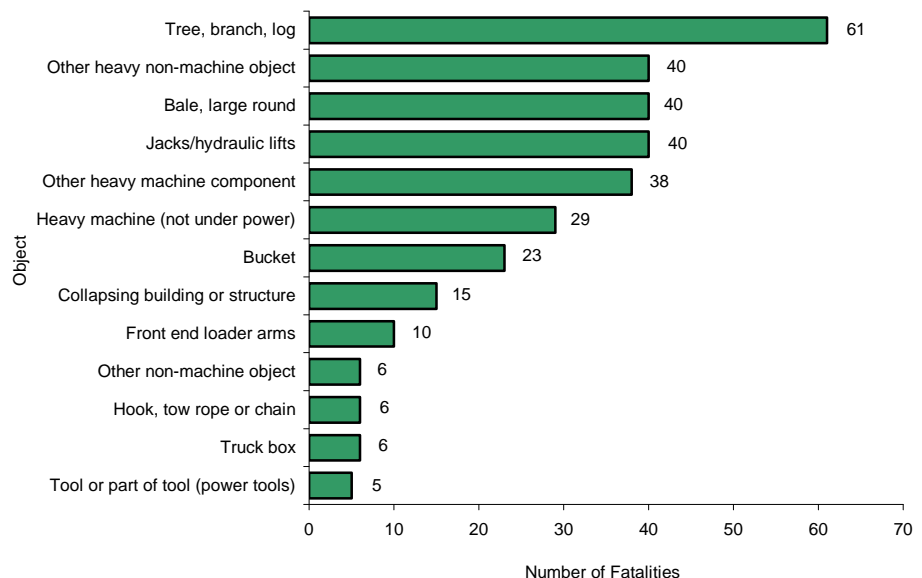
Circumstance text descriptions cite loose clothing or hair as the cause of 56% of the 157 fatal machine entanglements from 1990 to 2008. In 37% of the cases, victims were performing a variety of work tasks close to an entanglement hazard. In 18% of entanglements the victim had been cleaning or repairing a machine without shutting it off. In 14% of fatal entanglements, the decedent slipped and fell into a machine. In a further 11% of cases they removed a blockage without first shutting the machine off.



Another 3 activities with a total of 8 fatalities each with less than 6 were not included in the above graph.

3.19 Fatally pinned or struck by machine and non-machine injuries, 1990-2008

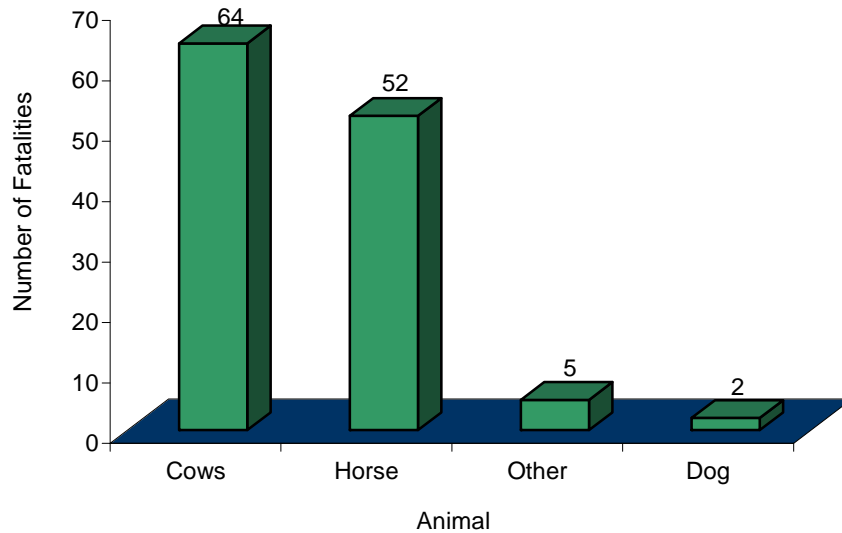
From 1990 to 2008, 327 people were killed by being struck, caught/pinned in machinery or a non-machinery object on a farm. In 19% of all struck by object deaths, the victim was killed by a tree or tree branch during woodcutting activities. In another 12% of the fatalities, victims were crushed under a machine or vehicle while jacking, blocking, hoisting a vehicle or piece of machinery. Other objects cited in fatality circumstance descriptions include bales and other heavy objects each accounting for 12%.



Another 3 objects with a total of 8 fatalities each with less than 5 were not included in the above graph.

3.20 Fatal agricultural animal injuries by type of animal, 1990-2008

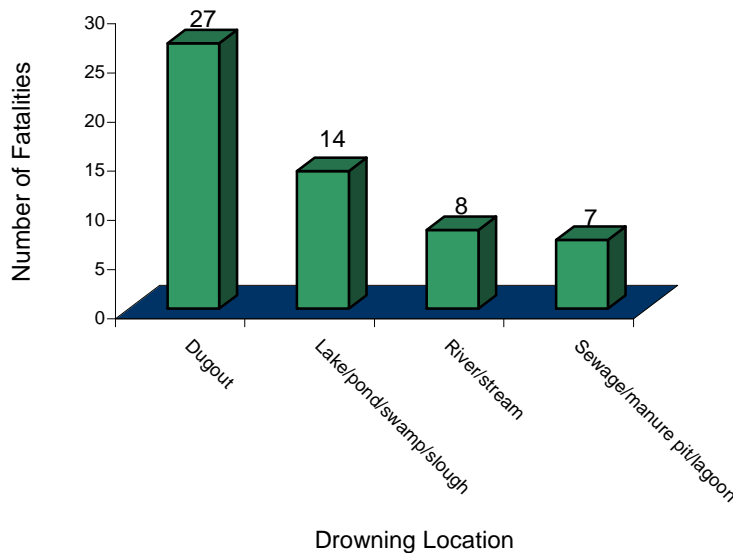
There were 123 animal-related deaths in Canada from 1990-2008 (6% of all agricultural deaths). Of these more than half (52%) involved cows/steers/calves, another 42% were caused by horses/stallions/colts. Of the deaths associated with horses 83% were not work-related. They are included in the CAIR fatality database because horses are considered to be a hazard of the farm environment.



3.21 Fatal agricultural drownings by drowning location, 1990-2008

Of the 69 non-machine related drowning deaths from 1990 to 2008, 39% occurred in dugouts, 20% in lakes or ponds, 12% in rivers or streams and 10% in manure pits or sewage lagoons. More than half, 53% of the victims were less than ten years old.

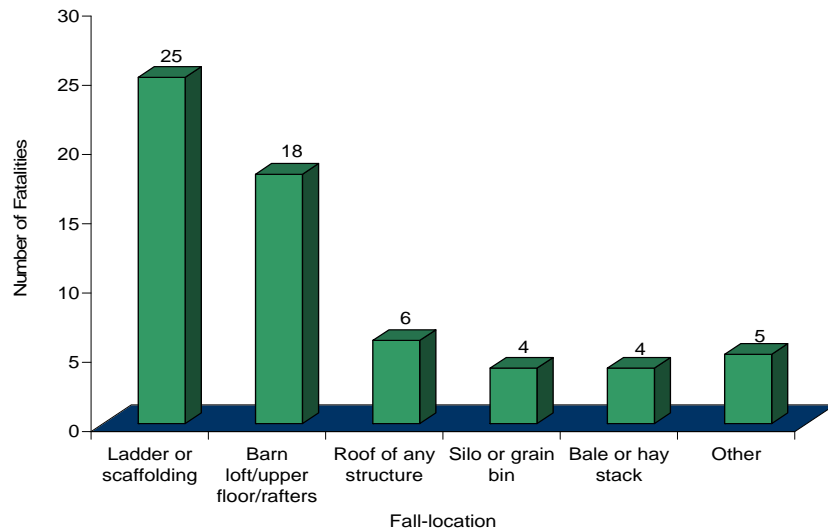
There were 11 machine-related drownings were as a result of a collision. Six of these drownings took place in dugouts.



Another 5 drowning locations with a total of 13 fatalities each with less than 4 were not included in the above graph.

3.22 Fatal agricultural non-machine falls from height, by fall location, 1990-2008

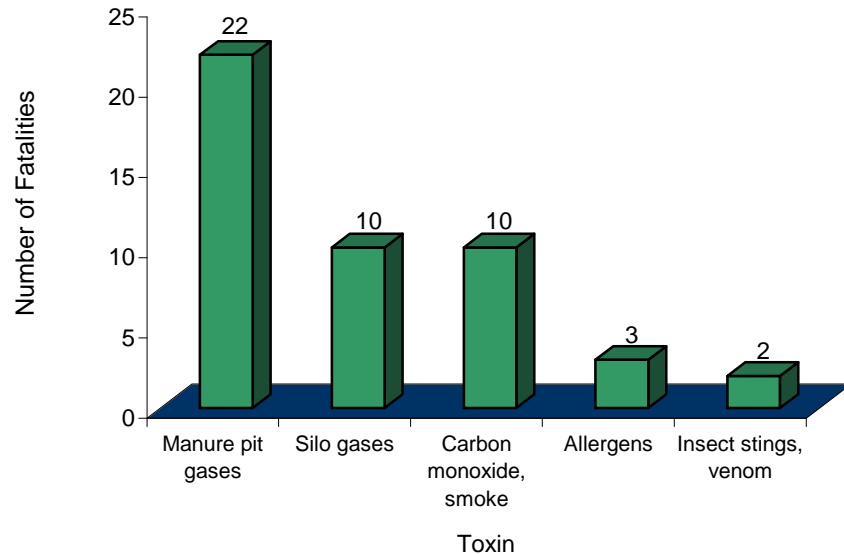
40% of the 63 fatal non-machine falls from height that occurred from 1990 to 2008 involved ladders or scaffolding. Barn lofts and rafters were the location of occurrence for another 29% of fatal falls.



3.23 Fatal agricultural toxic substance injuries by type of substance, 1990-2008

44% of the 50 agricultural fatalities from 1990 to 2008 due to toxic substance exposure were attributed to hydrogen sulfide poisoning. Another 20% were caused by inhalation of silo gases. Carbon monoxide inhalation, most frequently associated with running engines indoors in winter with insufficient ventilation accounted for another 20%.

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 2008.

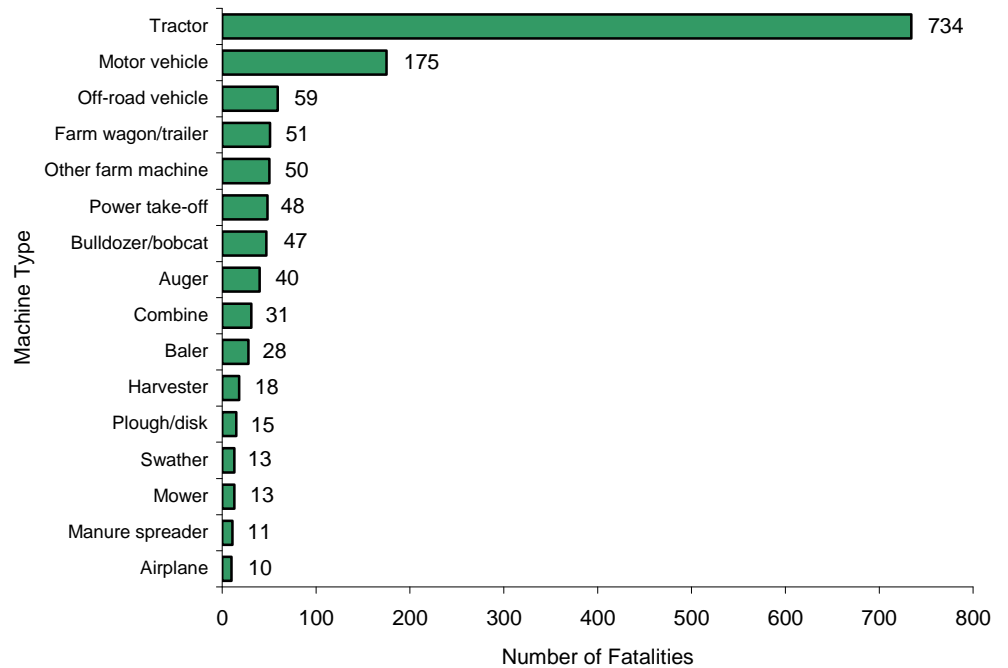


Another 3 toxins each with 1 fatality were not included in the above graph.

3.24 Fatal machine-related agricultural injuries by machine type, 1990-2008

There were 1,381 machine-related agricultural fatalities in Canada from 1990 to 2008. Machine types most frequently involved in agricultural fatalities were tractors (53%), followed by motor vehicles (13%), off-road vehicles (4%), wagons and trailers (4%).

Tractors were associated with 37% of all agricultural deaths in Canada.

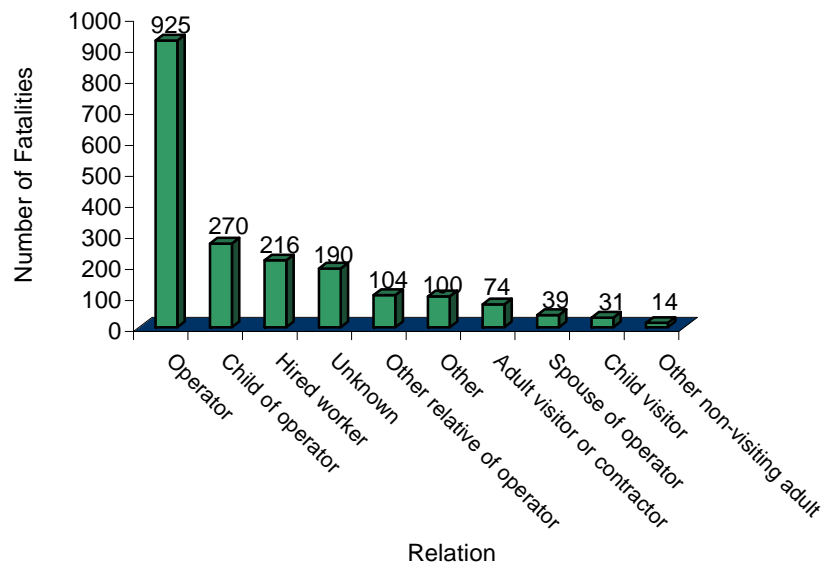


Another 10 machine types with a total of 38 fatalities each with less than 10 per machine type were not included in the above graph.

3.25 Fatal agricultural injuries by relationship to farm operator, 1990-2008

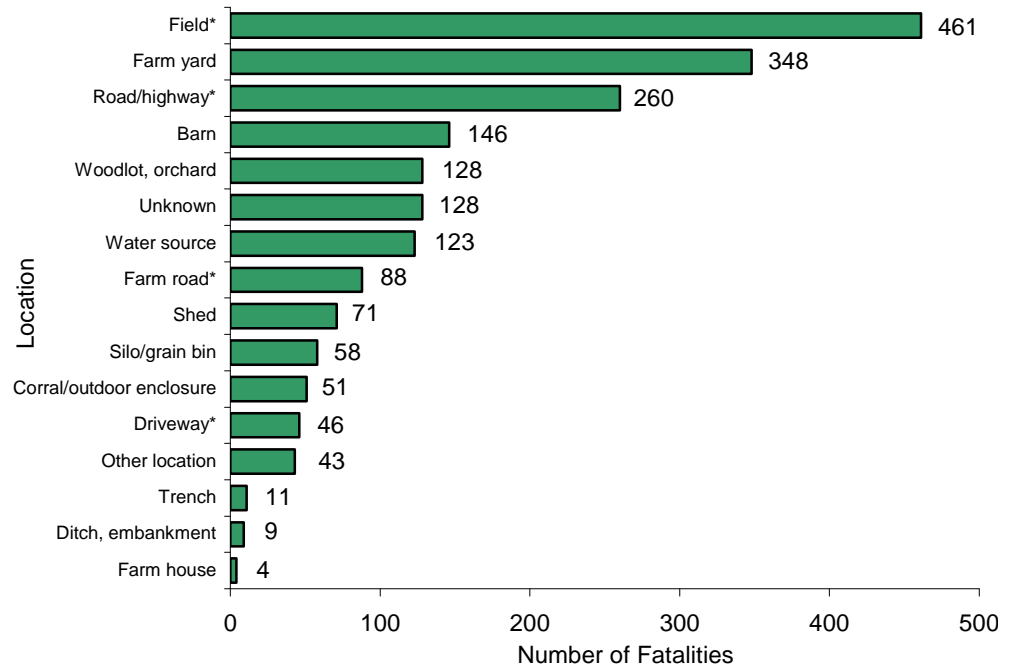
Of the cases where the relationship between the victim and the farm operator was known, 47% of the persons killed in agricultural injury events were farm owner/operator. A further 14% of the victims were children of farm owner/operator and 11% were hired workers.

Of the "other relative of operator" the majority of them were identified as being the father of the operator.



3.26 Fatal agricultural injuries by location of injury, 1990-2008

The most common locations for agricultural fatalities were fields (23%), farm yard (18%), road/highway (13%) and barns (7%).



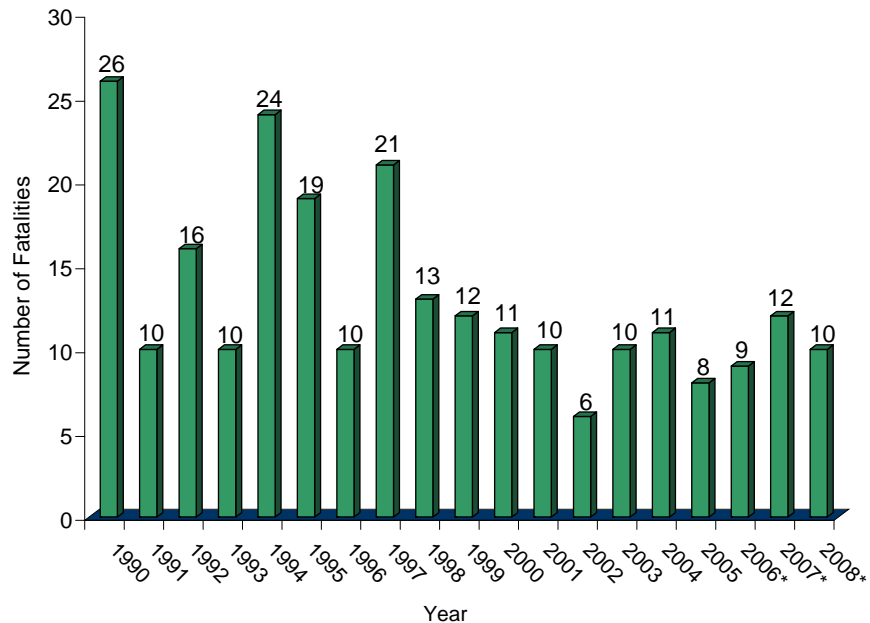
* Includes adjacent dry ditches.

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

4.1 Fatal agricultural injuries in children and youth by calendar year, 1990-2008

From 1990 to 2008, there were 248 agricultural fatalities among children and youth under 15 years of age. This is an average of 13 per year. The peak year for fatalities was 1990, with 26 cases (10% of the total number of cases). The average number of child fatalities per year was 16 for the first ten years of the surveillance period, and 10 deaths for the last nine years.

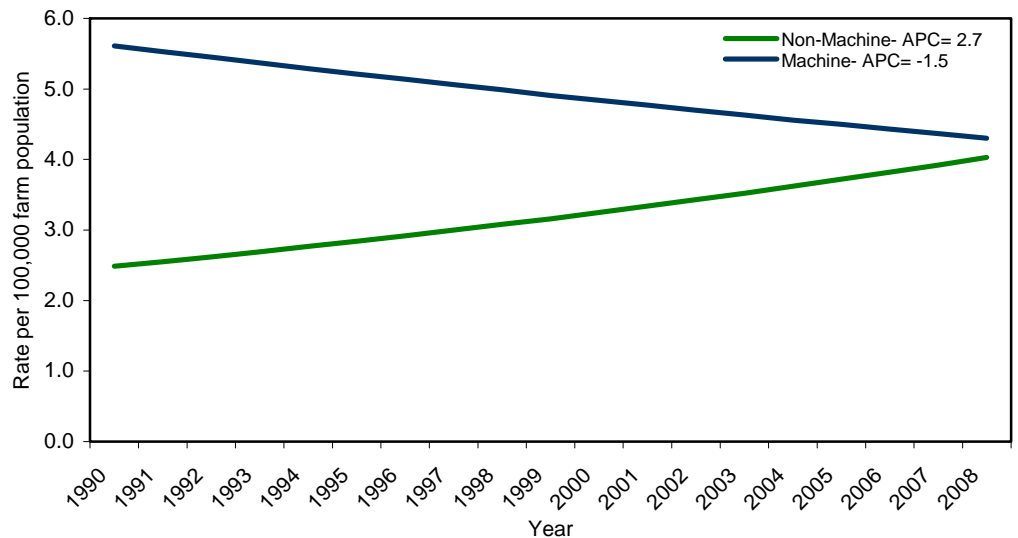
*Note: 2006-2008 numbers are incomplete for the province of Quebec, and 2007-2008 are incomplete for the province of PEI.



4.2 Fatal agricultural injury rates in children and youth by year (age-stnd), 1990-2008

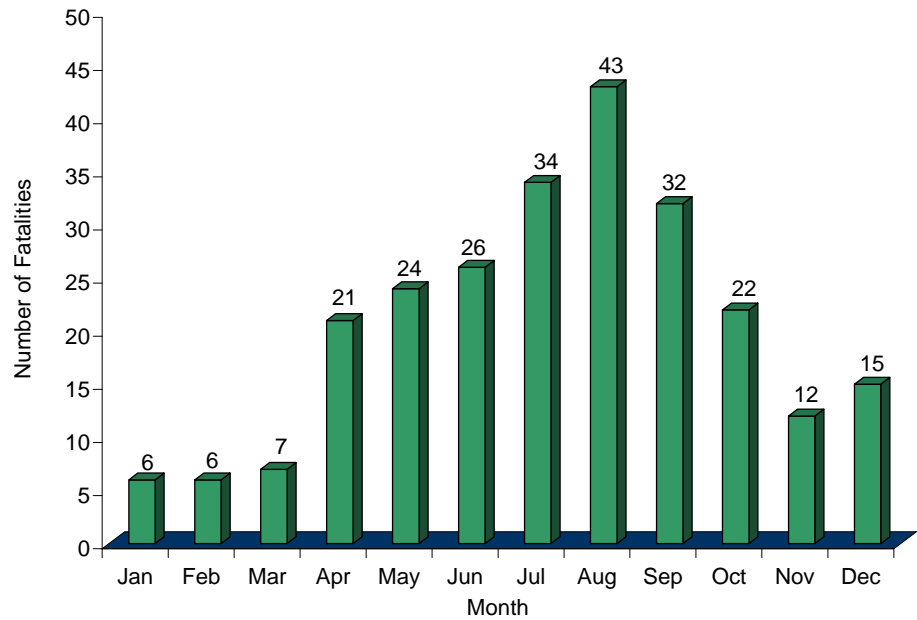
From 1990 to 2008, the rate of non-machine-related fatalities increased an average of 2.7% annually. The number of non-machine fatalities has remained consistent, but the number of children on farms has decreased over the years, thereby increasing the rate.

The rate of machine-related fatalities decreased an average of 1.5% annually. The number of fatalities has decreased over the years.



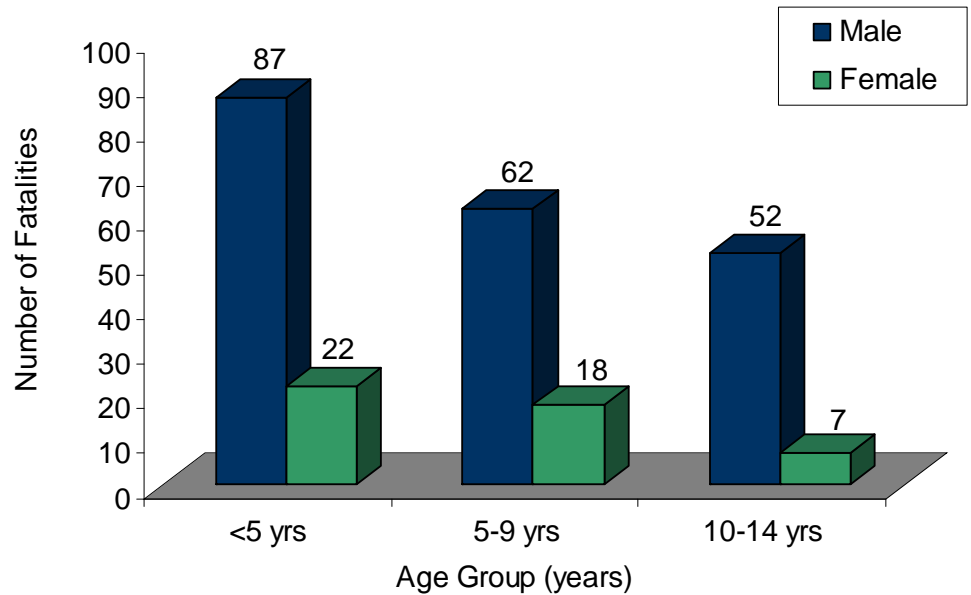
4.3 Fatal agricultural injuries in children and youth by month, 1990-2008

From 1990 to 2008, 31% of all child agricultural fatalities occurred during the school holiday months of July and August, with August having the highest proportion of fatalities (17%). 54% 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.



4.4a Fatal agricultural injuries in children and youth by age group and gender, 1990-2008

From 1990 to 2008, 81% 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 (7.4:1), and lowest for the 5 to 9 year-old age group (3.4:1). This age group experienced the highest proportion of females killed than in any other age group, including all adult age groups.



4.4b Fatal agricultural injuries in children and youth by age group and gender, 1990-2008

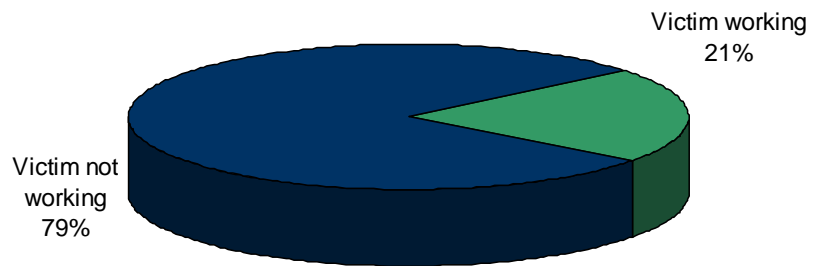
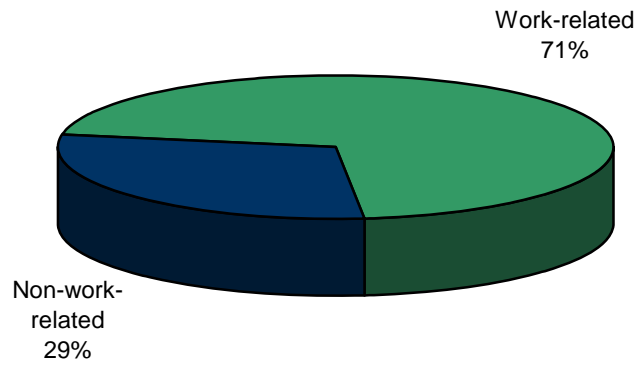
44% (109) of the children killed in agricultural injury events from 1990 to 2008 were less than five years old, including 17 one-year old toddlers and 68 two and three-year old toddlers. 81% of the children who died were boys.

Sex	<5 yrs	5-9 yrs	10-14 yrs	Total	%
Male	87	62	52	201	81
Female	22	18	7	47	19
Total	109	80	59	248	100
Percent	44	32	24	100	

4.5 Fatal agricultural injuries in children and youth: the relationship to agricultural work, 1990-2008

Although 71% of the agricultural fatalities among children were work related, in most cases (79%) the victim was not performing the work. He or she was killed by someone else who was engaged in agricultural work.

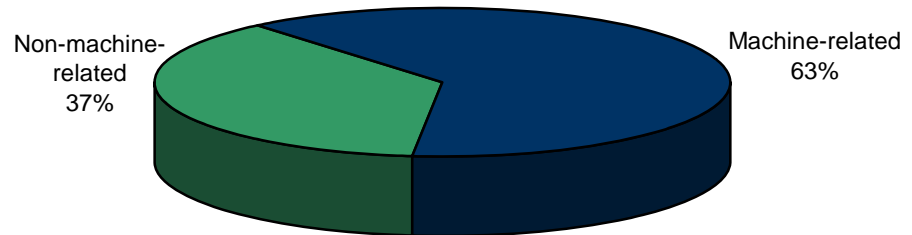
Non-work related agricultural deaths included those due to hazards of the farm environment such as large animals, improperly stored equipment, barn lofts, dugouts, sewage lagoons and troughs.



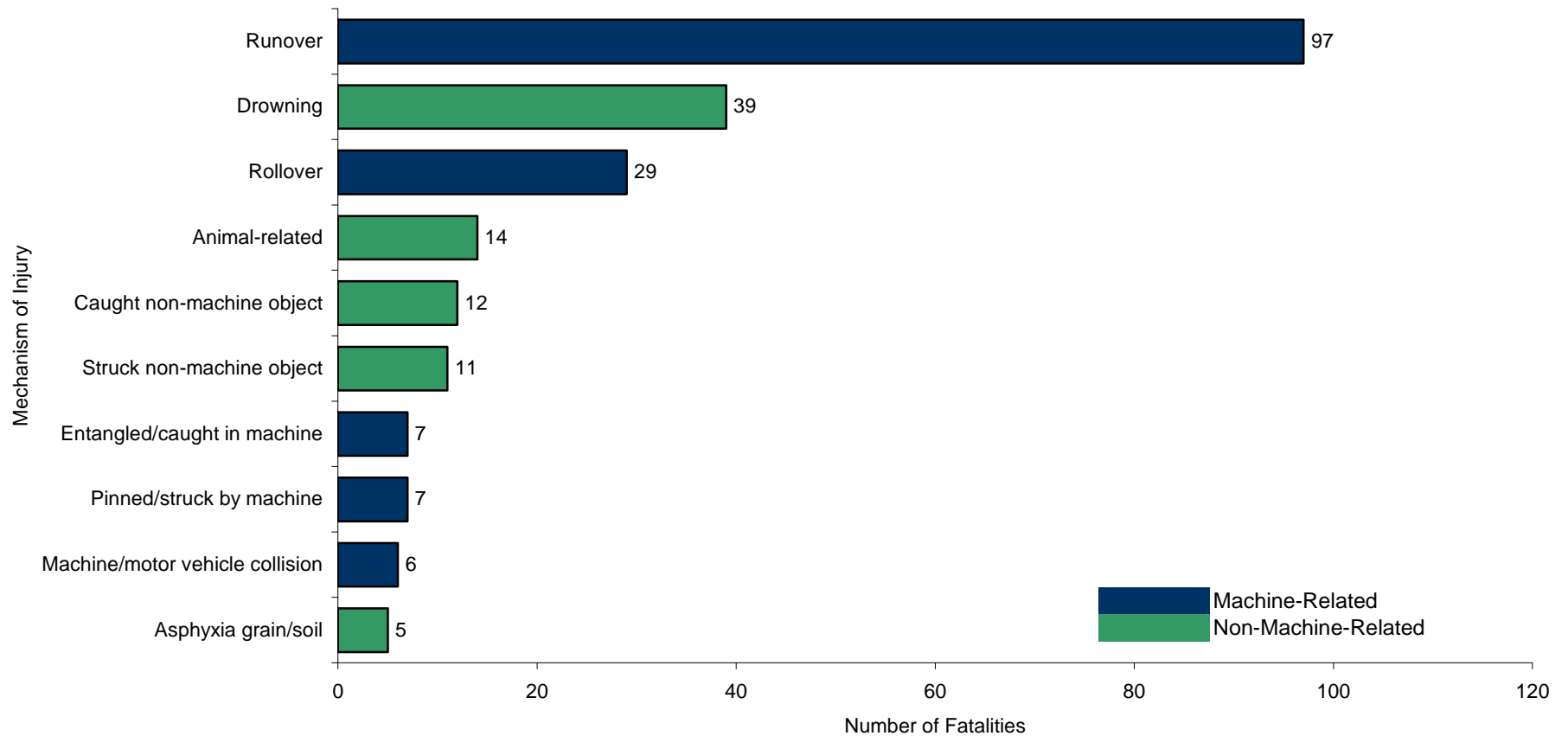
4.6 Fatal agricultural injuries in children and youth by major cause, 1990-2008

63% of agricultural fatalities in children were machine-related. These included machine runovers, machine rollovers and machine entanglements. (Figure 4.7).

The 37% of agricultural fatalities that were non-machine-related included drownings, being struck by objects, being caught under heavy objects and falling from a height.



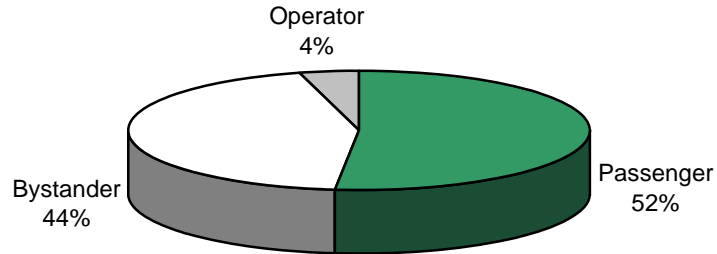
4.7 Fatal agricultural injuries in children and youth by cause of injury, 1990-2008



For children aged fourteen and under, machine runovers caused by far the largest proportion of fatal injuries (39%), followed by drownings (16%), machine rollovers (12%), animal-related incidents (6%), being caught in or under an object (5%) and being struck by a non-machine object (4%). In children, just three mechanisms of injury (machine runovers, drownings and machine rollovers) were responsible for 67% of all deaths. Runovers and drownings were most common among young children. Older children and teenagers were more often killed in machine runovers and rollovers.

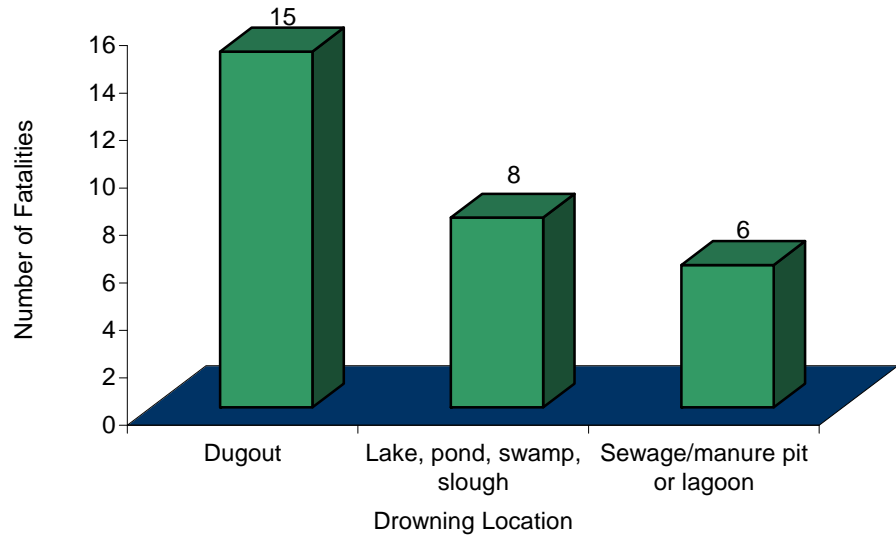
4.8 Fatal agricultural runovers in children and youth by runover category, 1990-2008

Of the 97 fatal child runovers from 1990 to 2008, passengers/extra riders were the most frequent runover type (52%). Another 44% of the child runover victims were bystanders and 4% of the children were runover by machines that they had been operating themselves.



4.9 Fatal agricultural drownings in children and youth by drowning location, 1990-2008

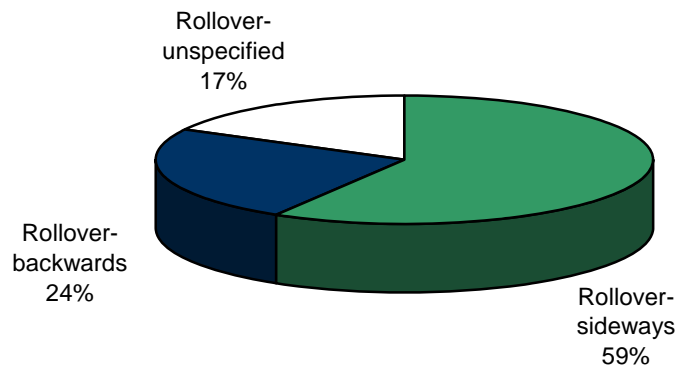
Of the 39 drowning deaths in children and youth from 1990 to 2008, 38% occurred in dugouts, 21% in manure pits or sewage lagoons, 15% in lake/ponds and another 8% in river/stream. 69% of the victims were less than six years old. Only one drowning was machine-related.



Another 6 drowning locations with a total of 10 fatalities, each with less than 5 per location were not included in the above graph.

4.10 Fatal agricultural rollovers in children and youth by rollover type, 1990-2008

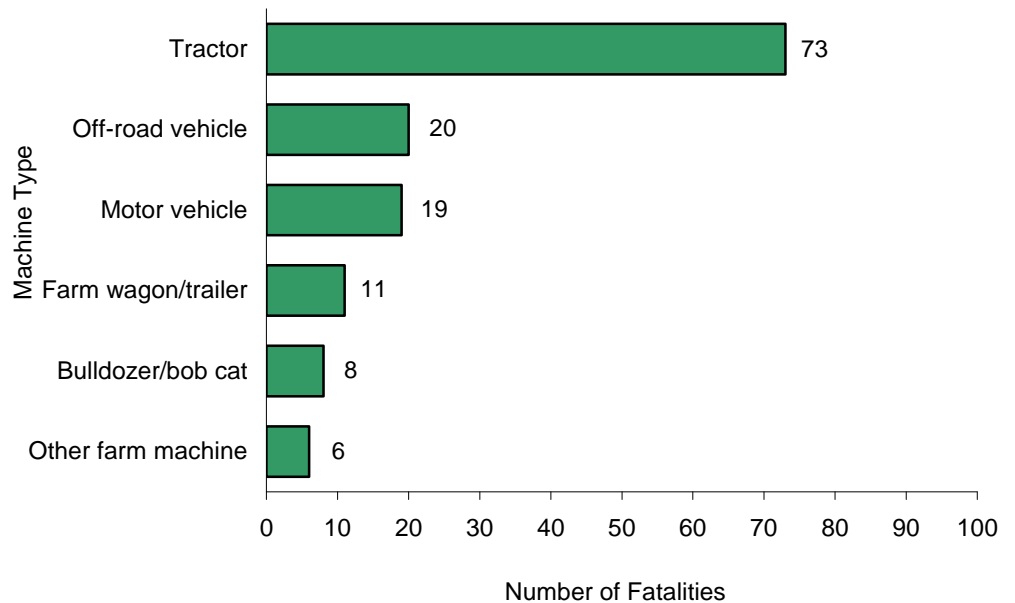
Overall, 59% of the 29 fatal machine rollovers in children from 1990 to 2008 were sideways in direction. Another 24% of the rollovers were backwards. In 17% of the cases, the direction of rollover could not be determined.



4.11 Fatal agricultural injuries in children and youth by machine type, 1990-2008

The machine types most frequently involved in agricultural fatalities among children were tractors (47%), off-road vehicles (13%), motor vehicles (12%) and wagons/trailers (7%).

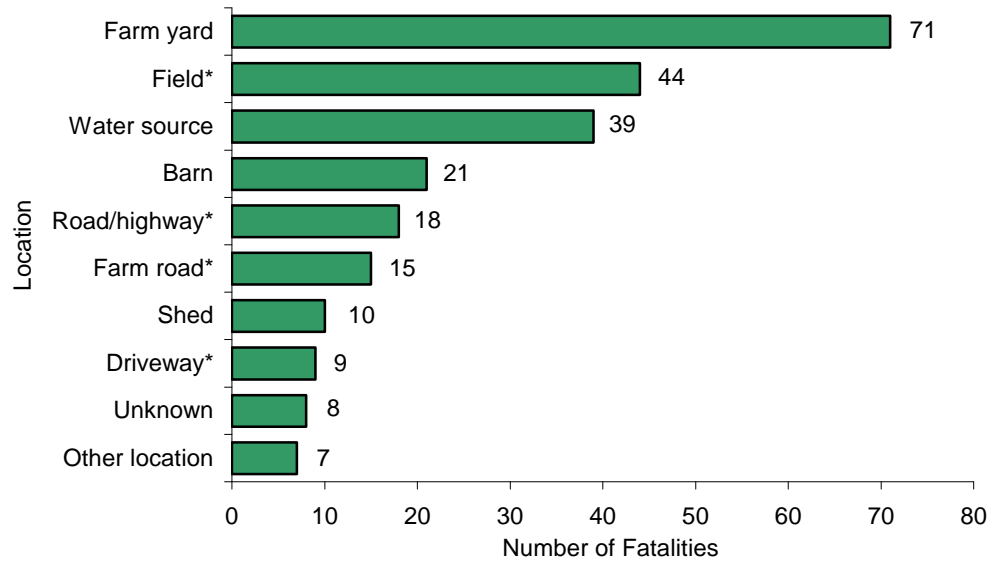
Tractors were associated with 30% of child deaths overall. The practice of taking a child as an extra rider on a tractor frequently results in serious injury or death.



Another 12 machine types with a total of 19 fatalities each with less than 6 per machine type were not included in the above graph.

4.12 Fatal agricultural injuries in children and youth by location of injury, 1990-2008

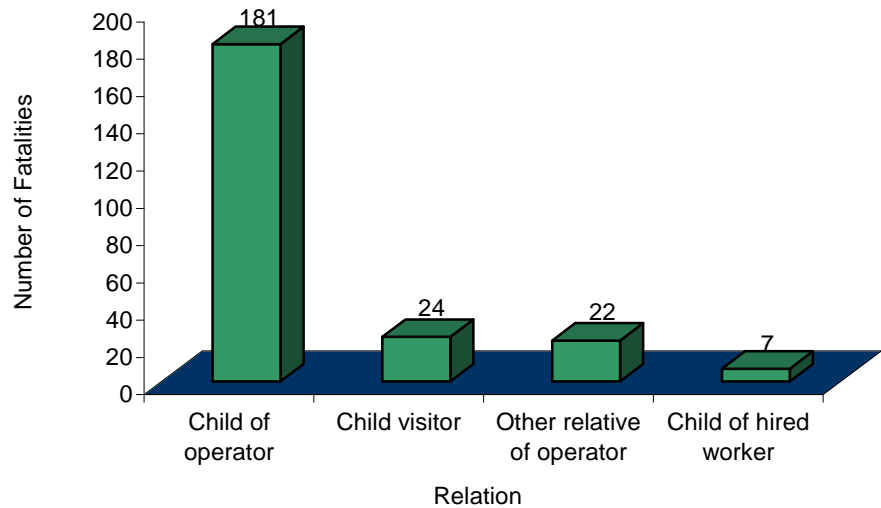
The most common locations for child agricultural fatalities were farm yards (29%), fields (18%), water sources (16%) and barns (8%). At least 45.0% of the deaths occurred in locations close to the farm home such as the farm yard, farm driveway, barn and sheds. Leaving small children to play unsupervised near the farm home is a dangerous practice.



* Includes adjacent dry ditches.
Another 6 locations with a total of 10 fatalities each with less than 7 per location were not included in the above graph.

4.13 Fatal agricultural injuries in children and youth by relationship to farm operator, 1990-2008

From 1990 to 2008, 73% of persons aged one to fourteen killed in agricultural injury events were children of owner/operators. A further 10% were child visitors and 9% were other relatives of farm owner/operator.



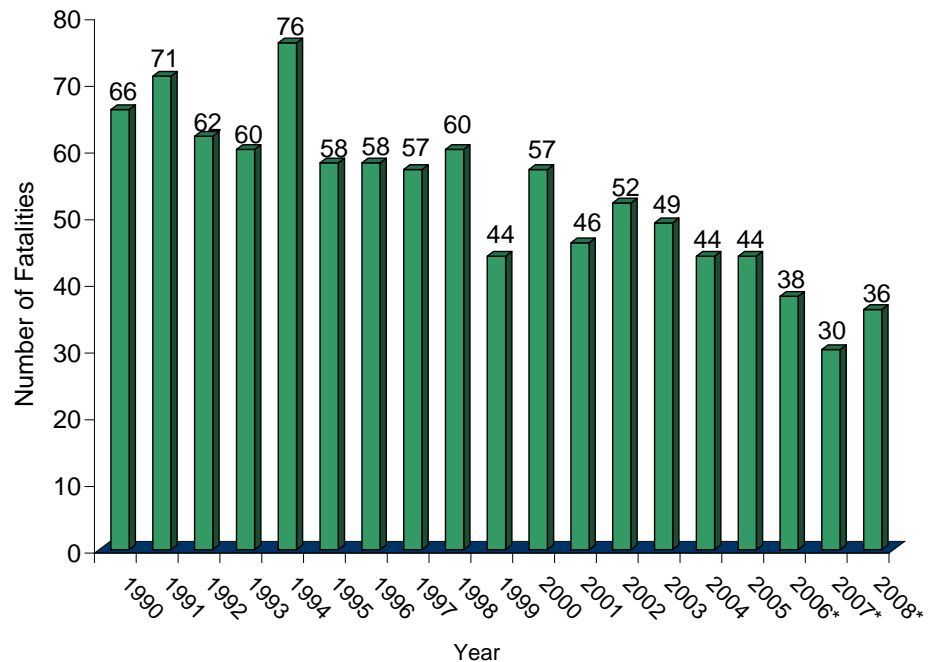
Another 5 relationship types with a total of 14 fatalities each with less than 7 per type were not included in the above graph.

5 AGRICULTURAL FATALITIES IN CANADA: ADULTS AGED 15 TO 59

5.1 Fatal agricultural injuries in adults aged 15 to 59 by calendar year, 1990-2008

From 1990 to 2008, there were 1008 agricultural fatalities among Canadian adults aged 15 to 59. This is an average of 53 deaths each year. The peak year for fatalities was 1994, with 76 cases. For the first 10 years the average number of fatalities each year was 61, for the last 9 years, the average was 44 fatalities each year. The decline in the average annual number of fatalities was mainly due to a reduction in machine rollover and entanglement fatalities over the surveillance period. (figure 3.10).

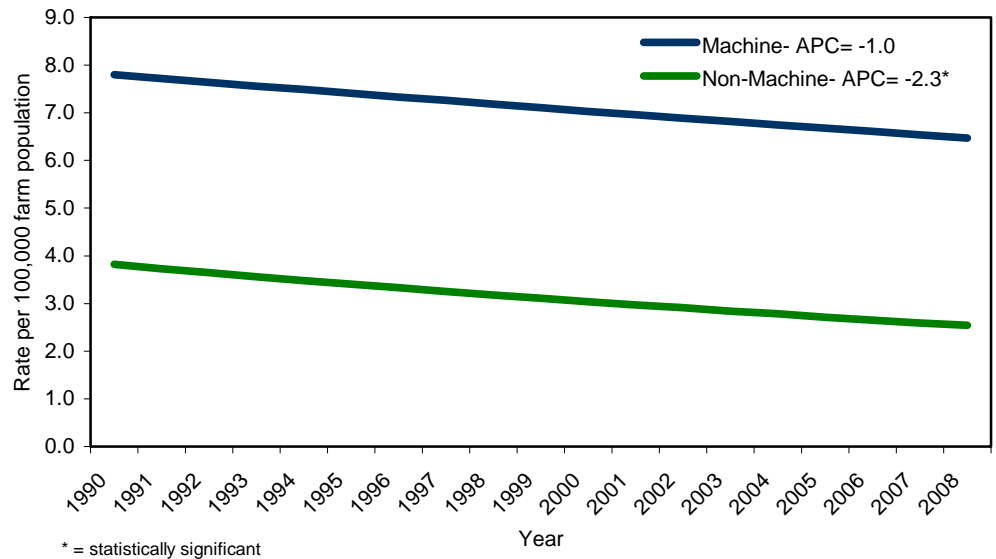
*Note: 2006-2008 numbers are incomplete for the province of Quebec, and 2007-2008 are incomplete for the province of PEI.



5.2 Fatal agricultural injury rates in adults aged 15 to 59 by year (age-stnd), 1990-2008

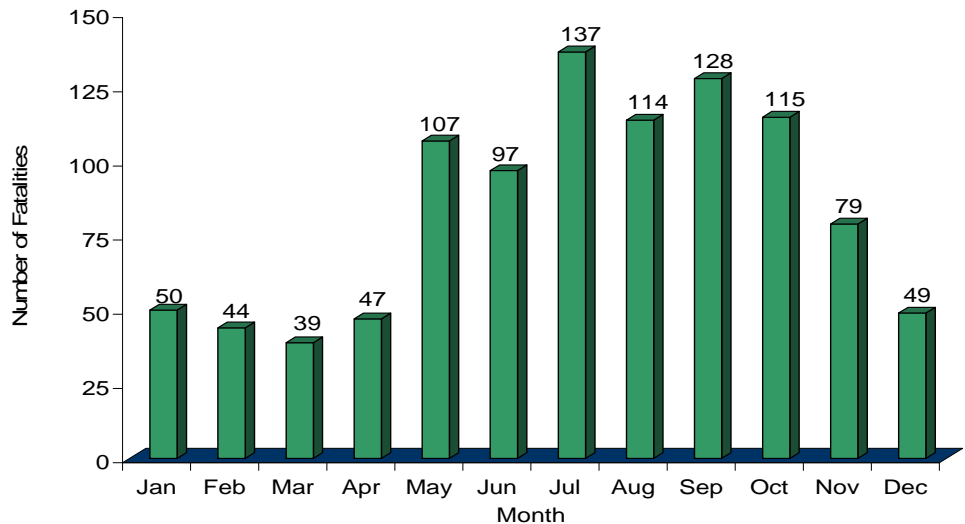
From 1990 to 2008 the machine-related fatality rate decrease an average of 1% annually.

The fatality rate for non-machine-related decreased an average of 2.3% annually.



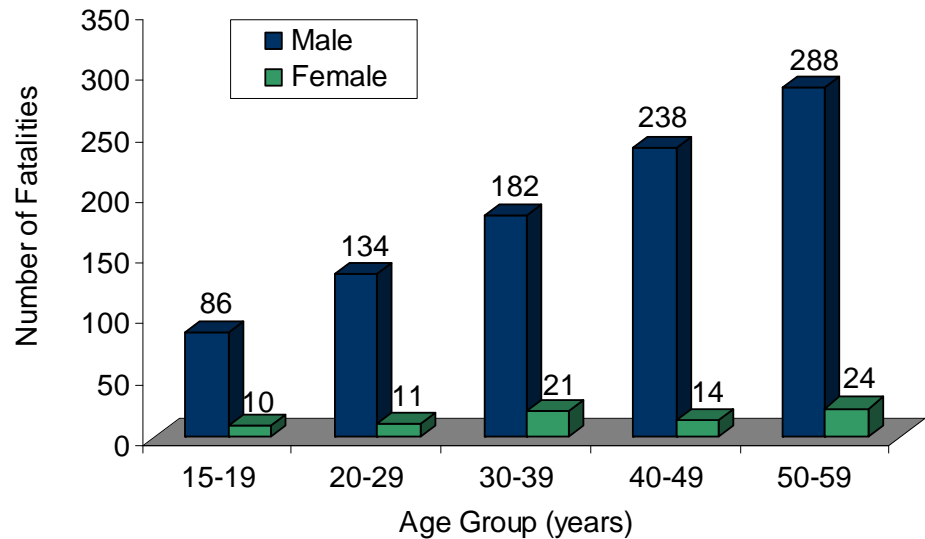
5.3 Fatal agricultural injuries in adults aged 15 to 59 by month, 1990-2008

69% of all agricultural fatalities in younger adults aged 15 to 59 occurred from May to October. July was the peak month, with 14% of all fatalities. Relatively few younger adults were killed from December to April.



5.3a Fatal agricultural injuries in adults aged 15 to 59 by age group and gender, 1990-2008

92% of the younger adults killed in agricultural injury events were male. In younger adults, the ratio of fatal agriculture injuries of males to females was highest for the 40 to 49 year old age group (17.0:1), and lowest for the 15 to 19 years old age group with 8.6:1.



5.3b Fatal agricultural injuries in adults aged 15 to 59 by age group and gender, 1990-2008

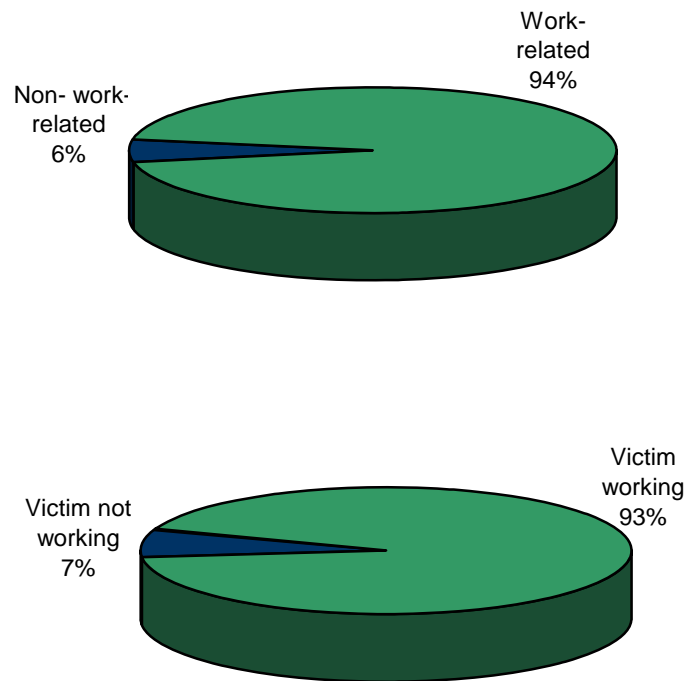
Older members of the 15 to 59 year-old age group were more likely to be killed in an agricultural injury event than younger members were. The proportion of adults in the 15 to 59 year-old age group who were fatally injured increased steadily from the 20 to 29 age group to the 50 to 59 age group.

Sex	15-19 yrs	20-29 yrs	30-39 yrs	40-49 yrs	50-59 yrs	Total	%
Male	86	134	182	238	288	928	92
Female	10	11	21	14	24	80	8
Total	96	145	203	252	312	1008	100
Percent	10	14	20	25	31	100	

5.4 Fatal agricultural injuries in adults aged 15 to 59: the relationship to agricultural work, 1990-2008

94% of the deaths in younger adults were work-related. The deaths that were non-work-related (6%) were due to hazards of the farm environment such as drownings in dugouts and horseback riding.

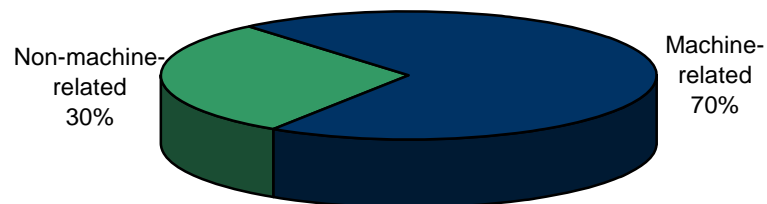
Most of the younger adults who died were engaged in agricultural work (93%). In contrast, the majority of children who were killed in work-related injury events were not working themselves.



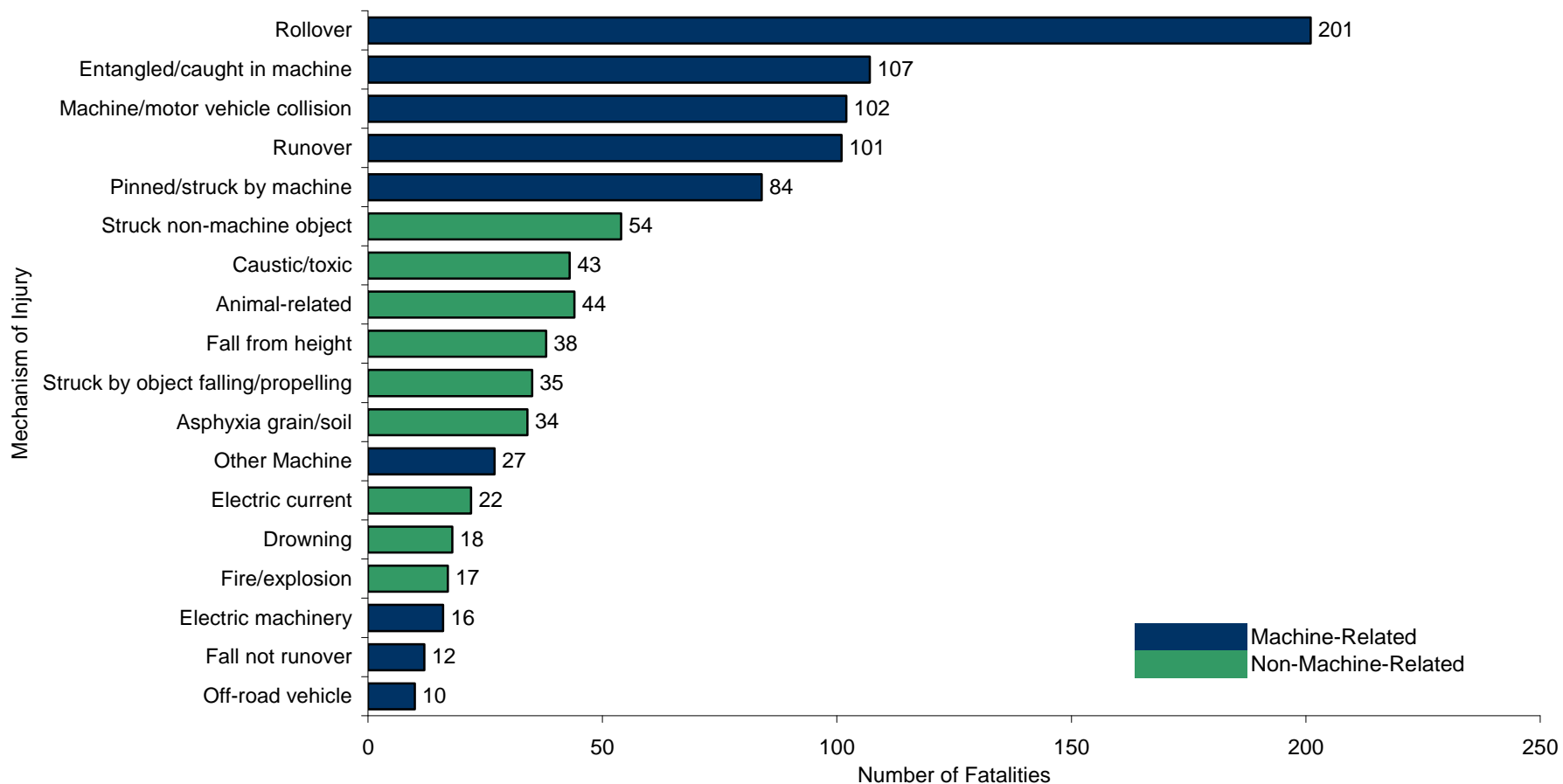
5.5 Fatal agricultural injuries in adults aged 15 to 59 by major cause, 1990-2008

70% 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 5.6).

The agricultural fatalities that were non-machine-related (30%) included struck by object events, exposure to toxic substances, animal-related events and falls from height (Figure 5.6).



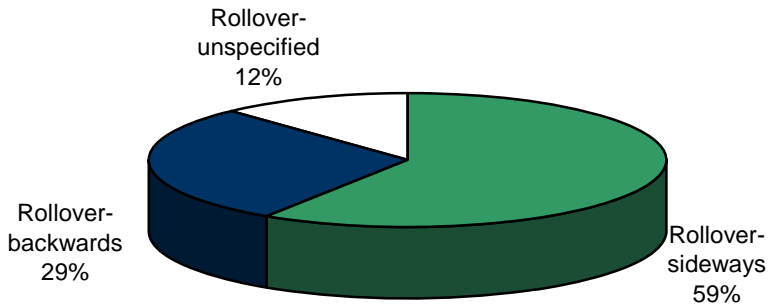
5.6 Fatal agricultural injuries in adults aged 15 to 59 by cause of injury, 1990-2008



In adults aged 15 to 59, the leading causes of fatal injuries were machine rollovers (21%), machine entanglements (11%), traffic collisions (11%), machine runovers (10%), being pinned or struck by a machine (9%), being struck by a non-machine object (6%), and being exposed to toxic substances (4%). 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 for more than twice as many fatalities as machine runovers.

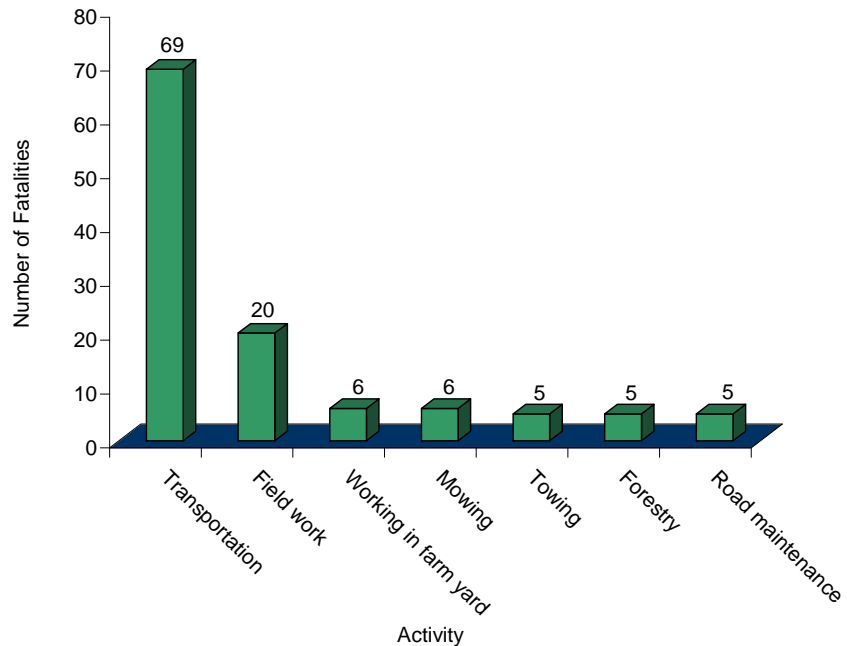
5.7 Fatal agricultural rollovers in adults aged 15 to 59 by rollover type, 1990-2008

In youth and adults aged 15 to 59, 59% of the fatal machine rollovers were sideways in direction and 29% were backwards. In 12% 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.



5.8 Fatal sideways agricultural rollovers in adults aged 15 to 59 by activity prior to rollover, 1990-2008

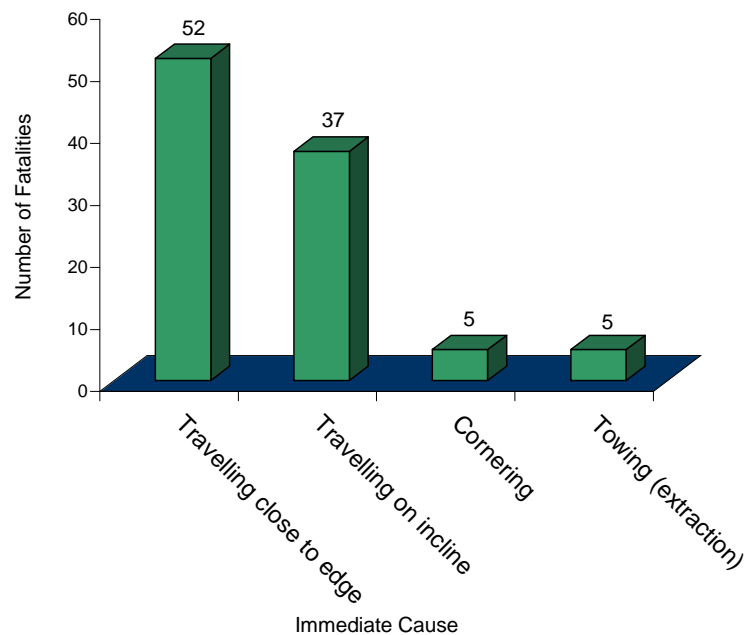
In fatal sideways machine rollovers among younger adults, injury circumstance text descriptions showed that the decedents' most common activities prior to the rollover were driving on highways and farm roads involved in transportation (69%) and doing field work (20%).



There were 3 rollover fatalities where the activity was unknown.

5.9 Fatal sideways agricultural rollovers in adults aged 15 to 59 by immediate cause of rollover, 1990-2008

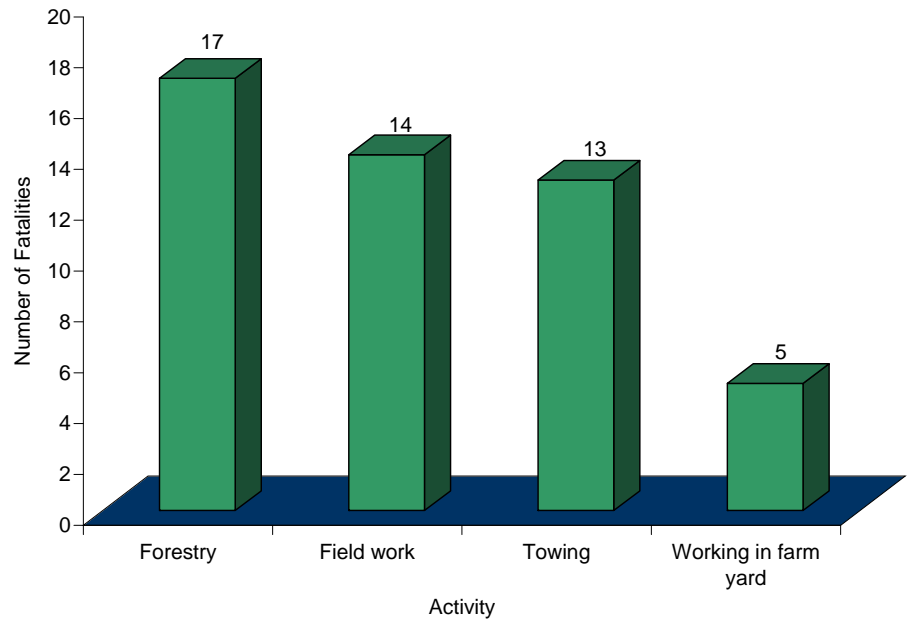
According to circumstance text descriptions, 44% of the rollovers were most probably due to the machine or vehicle travelling too close to the edge of a ditch or other slope bordering a road or field. Another 31% occurred because the machine or vehicle was travelling on a steep incline.



Another 8 immediate causes were identified with a total of 20 fatalities each with fewer than 5 fatalities were not included in the graph above.

5.10 Fatal backwards agricultural rollovers in adults aged 15 to 59 by activity prior to rollover, 1990-2008

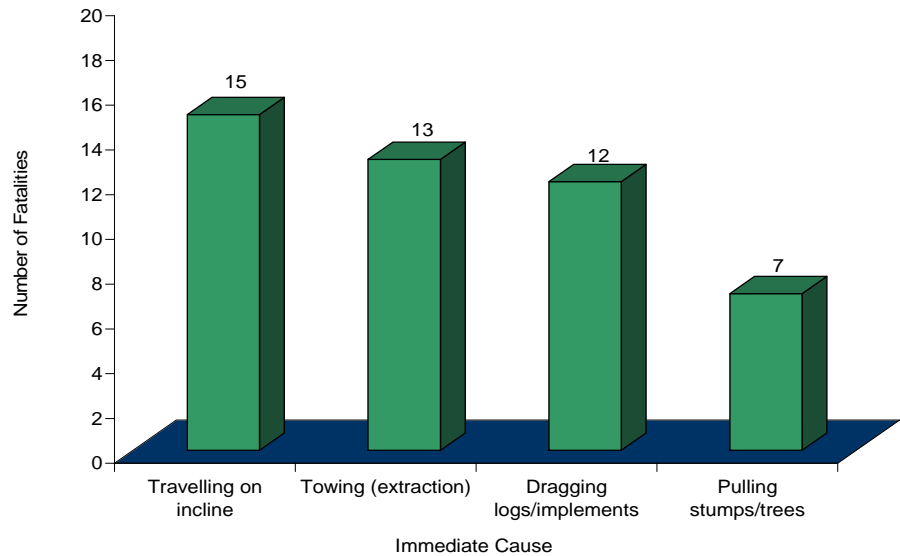
In fatal backwards machine rollovers among younger adults, circumstance text descriptions indicated that the victims' most common activities prior to the rollover were harvesting wood and maintaining woodlots (29%), doing field work (24%) and towing (22%).



Another 4 activities were identified with a total of 9 fatalities each with fewer than 5 fatalities were not included in the graph above.

5.11 Fatal backwards agricultural rollovers in adults aged 15 to 59 by immediate cause of rollover, 1990-2008

According to circumstance text descriptions, 26% of fatal backwards rollovers were due to traveling on an incline, improper towing (extraction) practices accounted for another 22%, 21% were associated with dragging logs or implements, and 12% were the result of pulling stumps and trees.

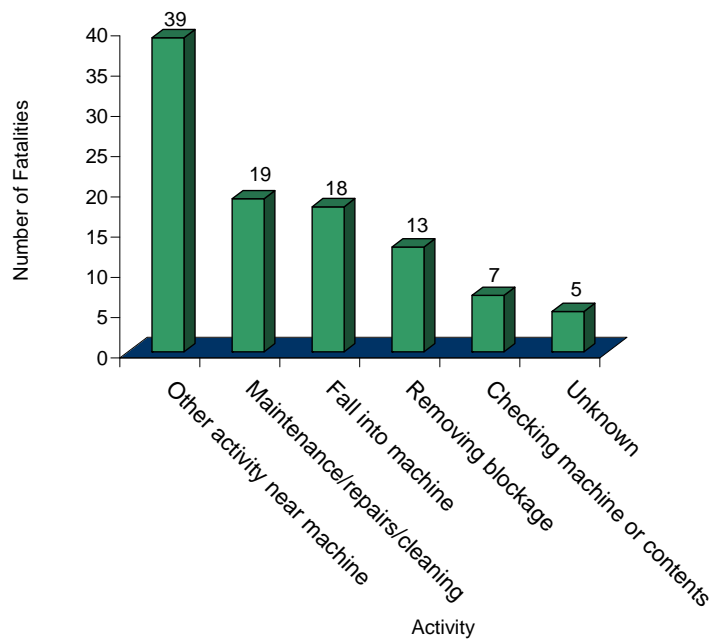


Another 6 immediate causes were identified with a total of 11 fatalities each with each with fewer than 7 fatalities were not included in the graph above.

5.12 Fatal entanglements in adults aged 15 to 59 by activity prior to entanglement, 1990-2008

Overall, circumstance text descriptions directly identify loose clothing or hair as the cause of 54% of the 107 fatal machine entanglements from 1990 to 2008.

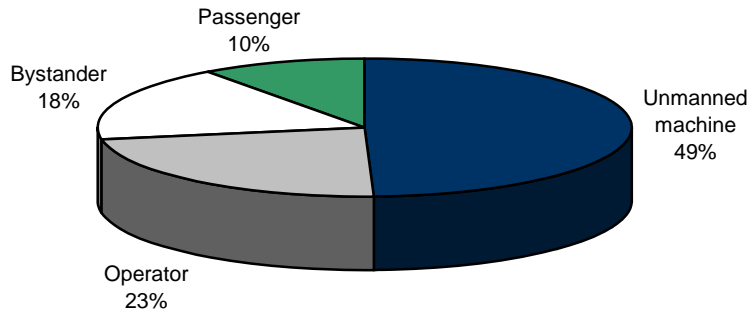
In 36% of the cases, victims were simply working too close to an entanglement hazard. In 18% of the cases, the victim had been cleaning or repairing a machine without shutting it off. In a further 17% of fatal entanglements, the decedent slipped and fell into a machine and in 12% they were removing a blockage while the machine was running. Only 2% of entanglement deaths were due to the actions of someone other than the deceased.



Another 2 activities were identified with a total of 6 fatalities each with each with fewer than 5 fatalities were not included in the graph above.

5.13 Fatal agricultural runovers in adults aged 15 to 59, 1990-2008

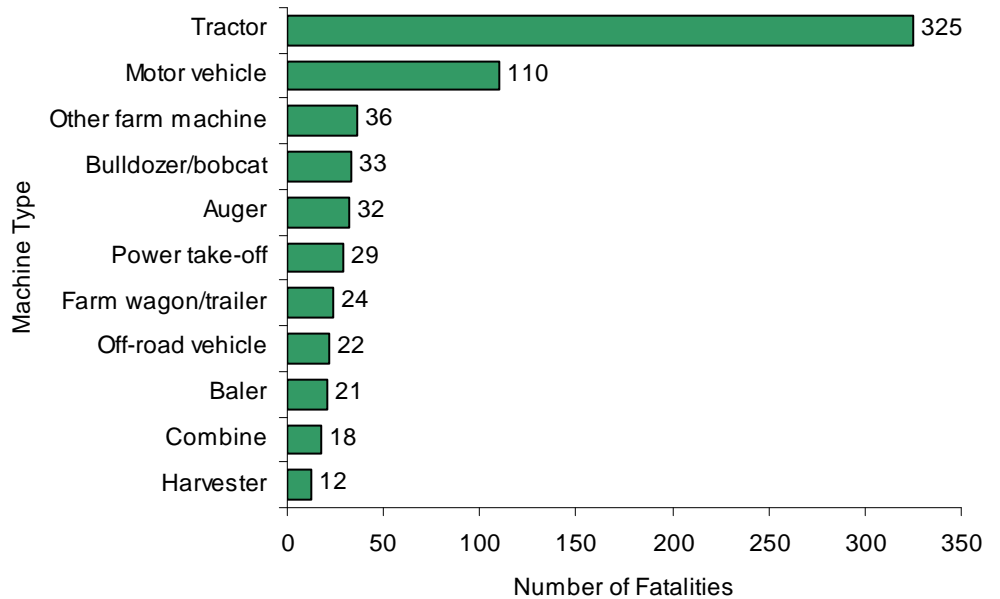
There were 101 agricultural runover fatalities in younger adults from 1990 to 2008. Alighted operator runovers were by far the most frequent type of fatal runover (49%). In this kind of injury event, the victim is runover by a machine or vehicle they had left running or unblocked on a slope. Fallen operator runovers caused the second largest percentage of runover fatalities among younger adults (23%), followed by bystander runovers (18%), passenger/extra rider runovers (9%).



5.14 Fatal agricultural injuries in adults aged 15 to 59 by machine type, 1990-2008

The machine types most frequently involved in agricultural fatalities among younger adults were tractors (46%) followed by motor vehicles (16%).

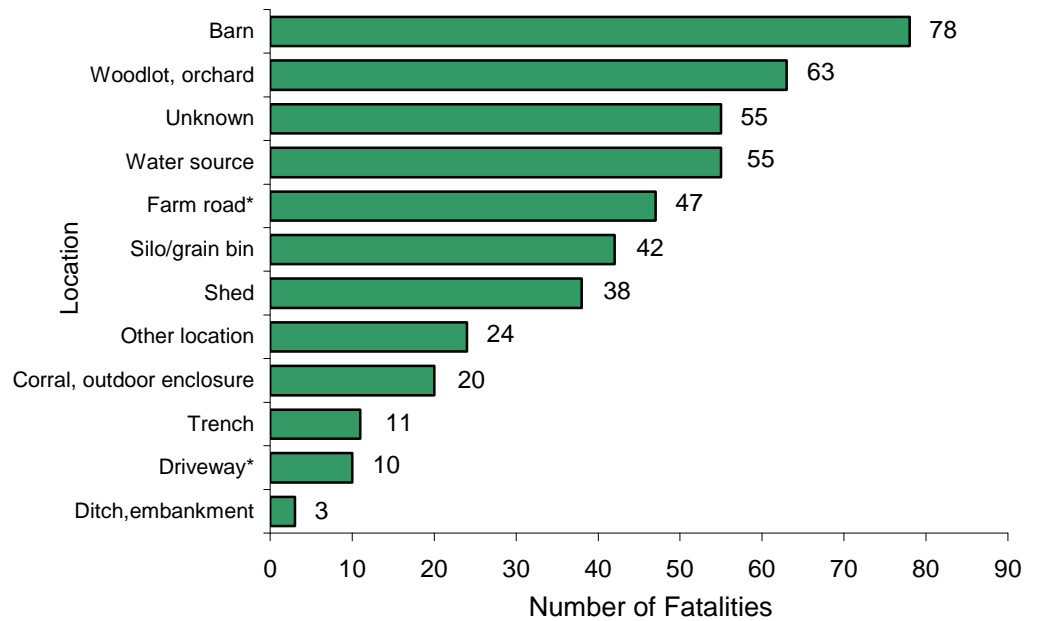
Tractors were associated with 35% of all agricultural deaths among younger adults.



Another 14 machine types with a total of 47 fatalities each with fewer than 12 fatalities were not included in the graph above.

5.15 Fatal agricultural injuries in adults aged 15 to 59 by location of injury, 1990-2008

The most common locations of occurrence for agricultural fatalities in younger adults were fields and their adjacent ditches (24%), public roads and their adjacent ditches (16%), farm yards (15%), barns (8%) and woodlots (6%).

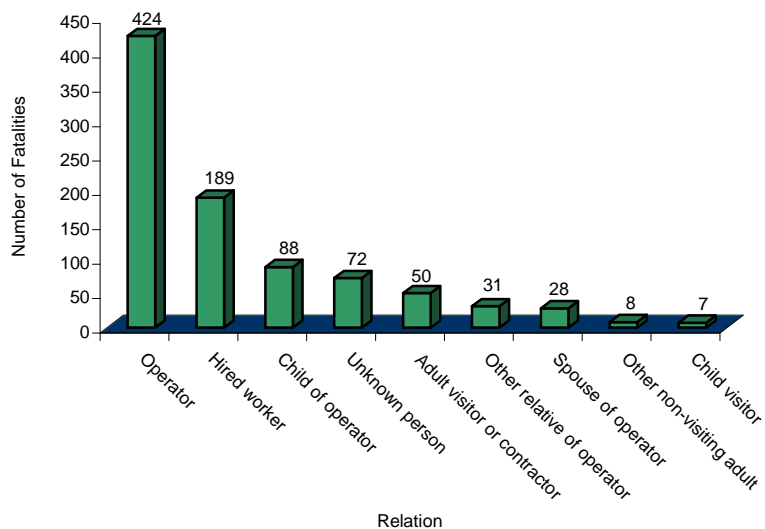


* Includes adjacent dry ditches. Another 3 locations with a total of 24 fatalities each with less than 20 were not included in the above graph.

5.16 Fatal agricultural injuries in adults aged 15 to 59 by relationship to farm operator, 1990-2008

42% of younger adults killed in agricultural injury events were farm owner/operator. A further 19% of the victims were hired workers and 9% were children of owner/operator.

7% of the fatalities were to persons unknown to the farmer. In most cases these were people who died as a result of a traffic collision with farm machinery.



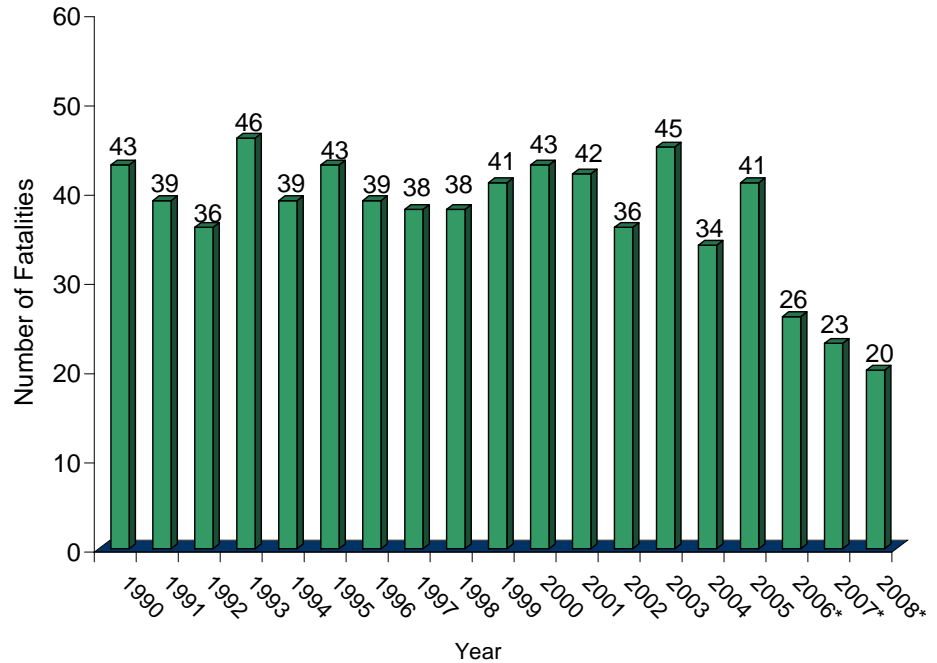
Relationship was not known in 109 cases. Another 2 relationship types each with one fatality were not included in the graph above.

6 AGRICULTURAL FATALITIES IN CANADA: ADULTS AGED 60 AND OVER

6.1 Fatal agricultural injuries in adults aged 60 and over by calendar year, 1990-2008

From 1990 to 2008, there were 712 agricultural fatalities among adults aged 60 and over. This is an average of 37 deaths each year. The average number of fatalities per year was 40 for the first 10 years of the surveillance period, the average for the last 9 years was 34 fatalities each year. There was a significant decrease in the number of fatalities in the last 3 years.

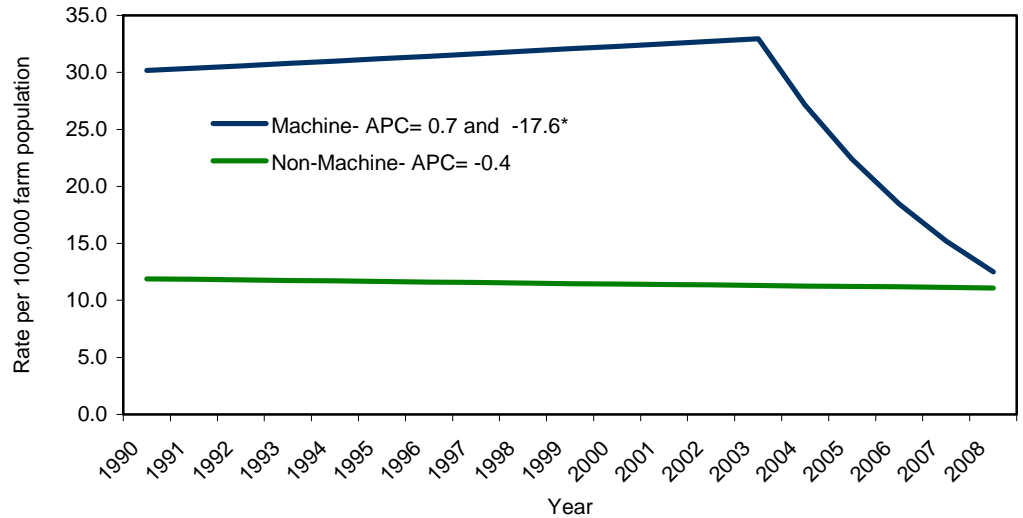
*Note: 2006-2008 numbers are incomplete for the province of Quebec, and 2007-2008 are incomplete for the province of PEI.



6.2 Fatal agricultural injury rates in adults aged 60 and over by year (age-stnd), 1990-2008

Over the 19 year period from 1990-2008 there were 2 distinct trends for machine-related fatality rates. From 1990 to 2004 there was an average increase of 0.7% annually. However, from 2005 to 2008 there was a statistically significant decrease of an average of 17.6% annually. This is due to the increasing number of adult farmers and a decrease in the number of machine fatalities, particularly those involving tractors.

The non-machine-related fatality rate decrease an average of 0.4% annually.



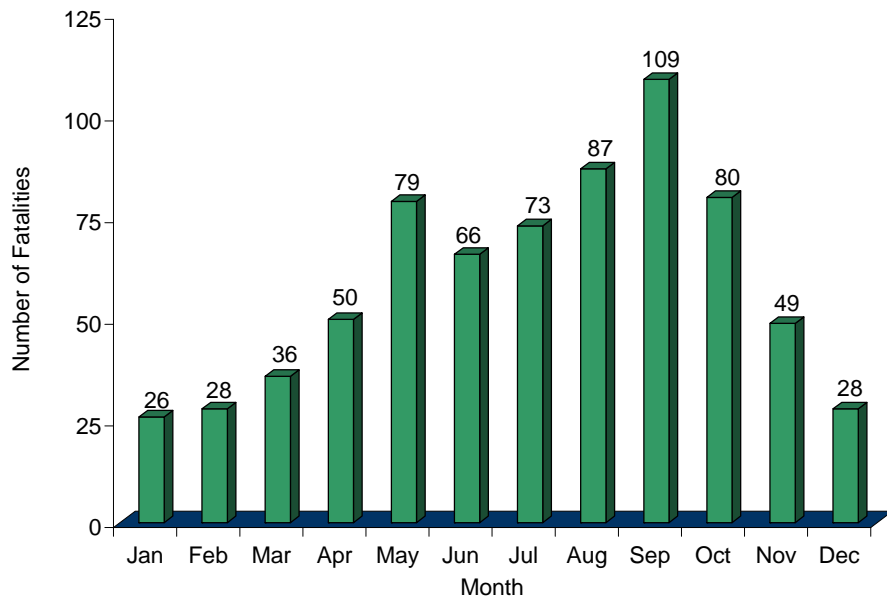
*= statistically significant

see appendix D for age group population changes

6.3 Fatal agricultural injuries in adults aged 60 and over by month, 1990-2008

69% of all agricultural fatalities in adults aged 60 and over occurred from May to October.

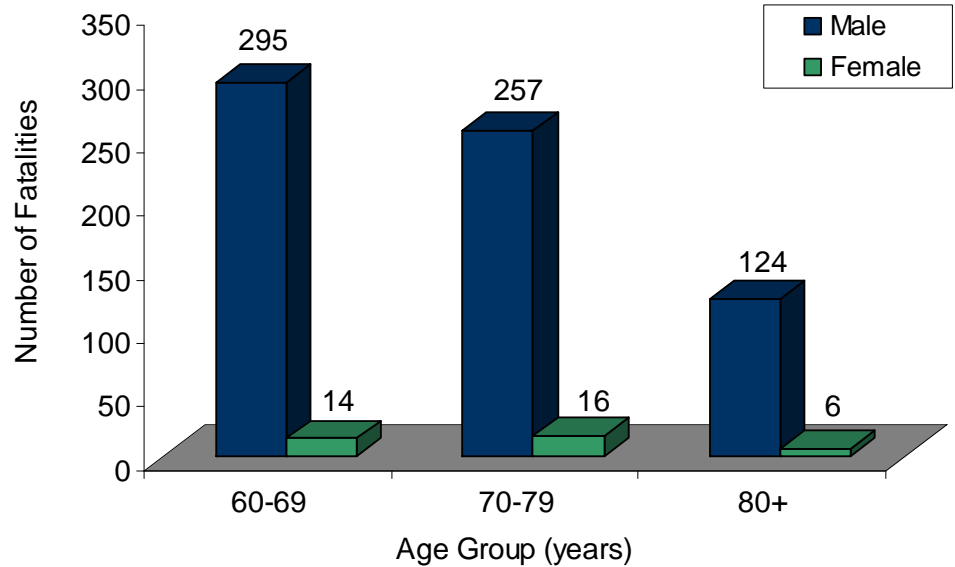
September had the most deaths with 109 (15%). Fewer older adults were killed from December to March.



6.4a Fatal agricultural injuries in adults aged 60 and over by age group and gender, 1990-2008

95% of the older adults killed in agricultural injury events were male. The ratio of males to females was highest for the 60 to 69 year-old age group (21.1:1) and lowest for the 70 to 79 year-old age group (16.1:1),

41% (295) of all older adults killed during agricultural work were males aged 60 to 69 years.



6.4b Fatal agricultural injuries in adults aged 60 and over by age group and gender, 1990-2008

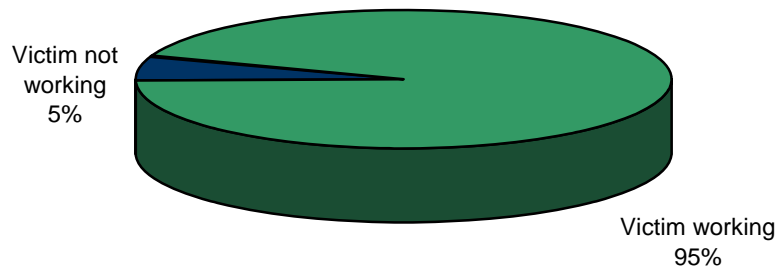
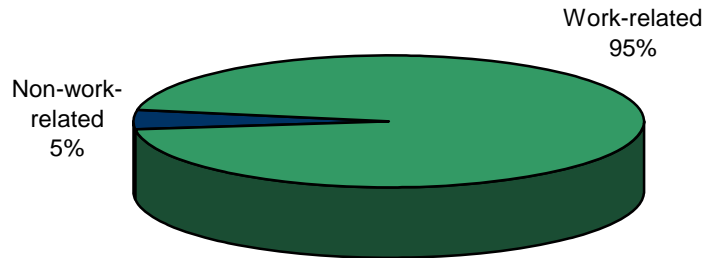
The lower numbers and higher rates of fatalities recorded for the higher age ranges reflects the steady decline in the farm population. (figure 3.7)

Sex	60-69 yrs	70-79 yrs	80+ yrs	Total	%
Male	295	257	124	676	95
Female	14	16	6	36	5
Total	309	273	130	712	100
Percent	43	38	18	100	

6.5 Fatal agricultural injuries in adults aged 60 and over: the relationship to agricultural work, 1990-2008

For 95% of the deaths of older adults the circumstances involved in some form of agricultural work. Of the remaining 5% the death circumstances were non-work-related, such as horseback riding.

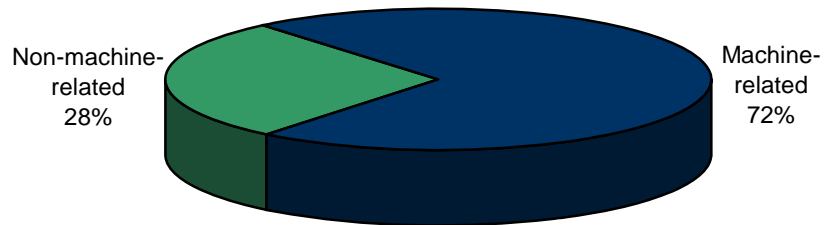
95% of the older adults who died were engaged in agricultural work. The remaining 5% were not involved in agriculture work and included cases such as the passenger of a vehicle was killed due to a motor vehicle collision with a piece of agriculture machinery.



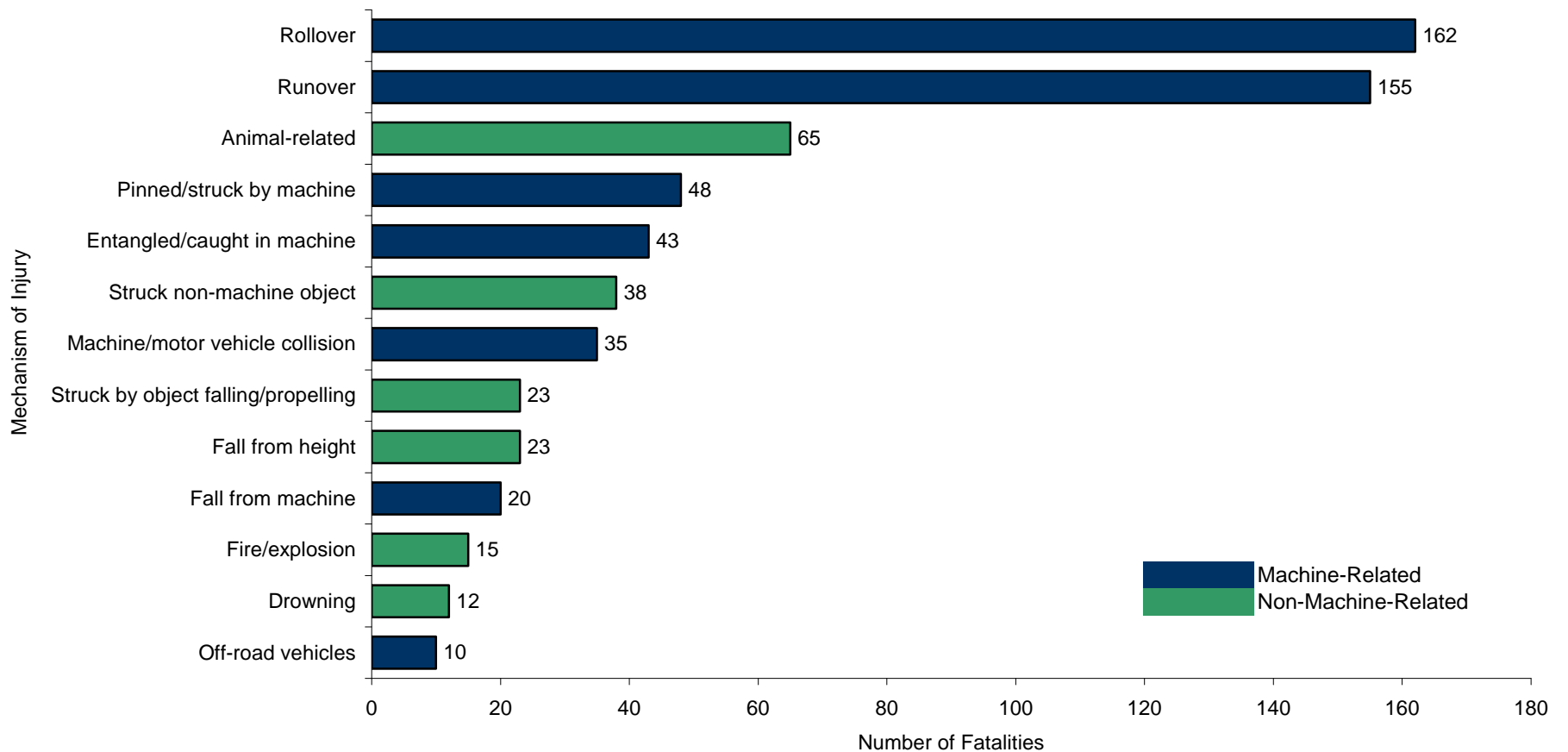
6.6 Fatal agricultural injuries in adults aged 60 and over by major cause, 1990-2008

72% of agricultural fatalities in older adults were machine-related. The proportion of machine-related injuries in older adults was higher than for younger adults at 70%.

The leading machine-related mechanisms of injury were machine rollovers and machine runovers. Non-machine-related agricultural fatalities (28%) included animal-related events, being struck by an object and falls from height. (Figure 6.7).



6.7 Fatal agricultural injuries in adults aged 60 and over by cause of injury, 1990-2008

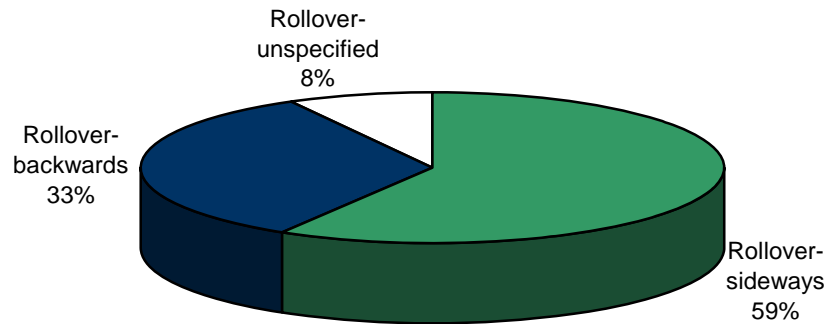


In adults aged 60 and over, 46% of all deaths were due to two main mechanisms of injury, machine rollovers (25%) and machine runovers (24%). The next most common mechanisms of fatal injury in older adults were being struck by an animal (10%), being pinned or struck by a machine (7%), machine entanglements (7%), and traffic collisions (5%). Older adults had a far higher proportion of animal-related fatalities (10%) than younger adults (5%). Also, in older adults the proportion of fatalities that were due to runovers (24%) was more than twice the proportion of fatalities due to runovers in younger adults (10%).

A total of 63 machine-related and non machine related deaths with less than 10 fatalities per cause of injury were not included in the above figure.

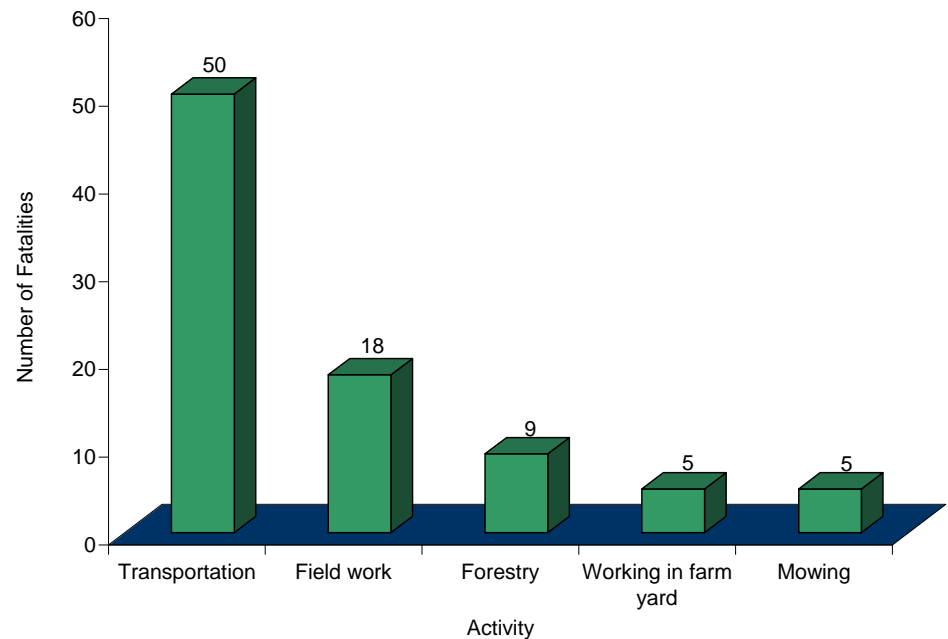
6.8 Fatal agricultural rollovers in adults aged 60 and over by rollover type, 1990-2008

In adults aged 60 and over, 59% of the fatal rollovers were sideways and 33% were backwards. Rollover direction could not be determined in 8% of the cases. Backwards rollovers were less frequent in younger adults (29%) than in older adults (33%). Most backwards rollovers occurred in woodlots.



6.9 Fatal sideways agricultural rollovers in adults aged 60 and over by activity prior to rollover, 1990-2008

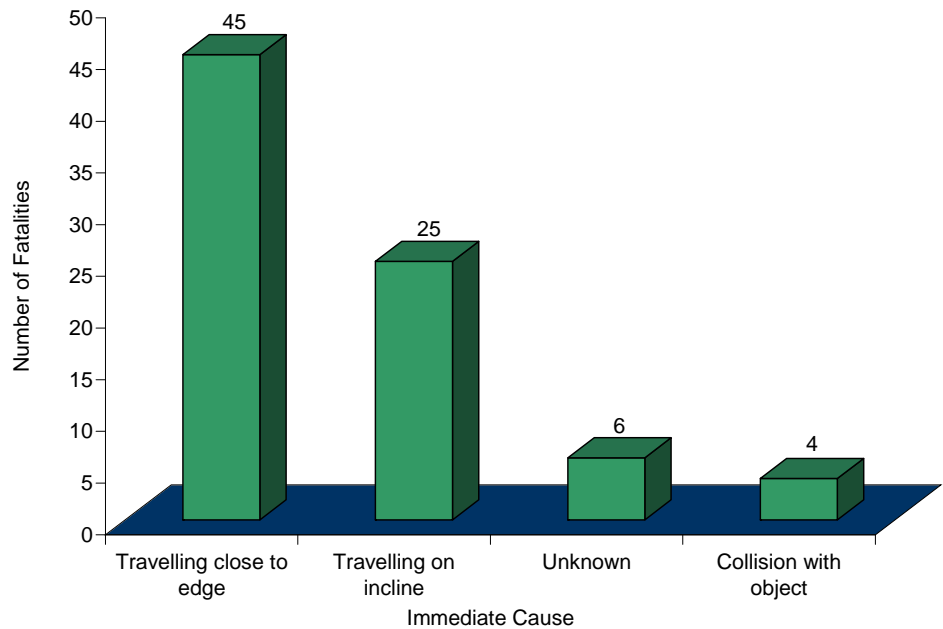
In fatal sideways machine rollovers, injury circumstance text descriptions showed that the decedents' most common activities prior to the rollover were driving on highways and farm roads (53%) and doing field work (19%).



Another 3 activities were identified with a total of 8 fatalities each with fewer than 5 were not included in the graph above.

6.10 Fatal sideways agricultural rollovers in adults aged 60 and over by immediate cause of rollover, 1990-2008

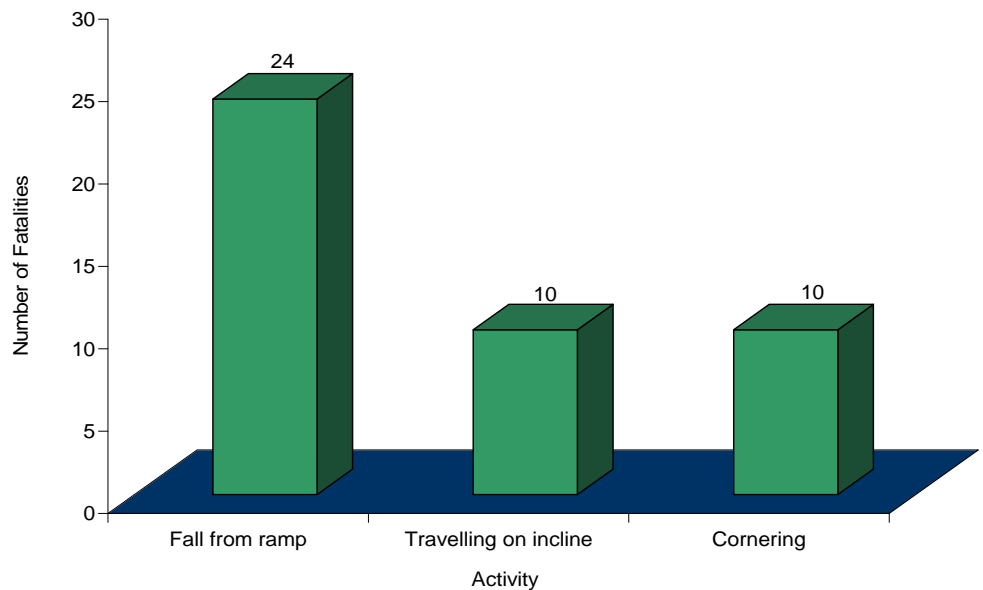
According to circumstance text descriptions. In 47% of fatal sideways machine rollovers, the rollover most likely occurred because the machine or vehicle was travelling too close to the edge of a ditch or other steep slope bordering a road or field. In 26% of the cases, the rollover was attributed to the machine or vehicle travelling on a steep incline. In 6% of the rollovers overall, the cause was clearly identified and 4% of the sideways rollovers were as a result of a collision with an object, such as hitting large tree roots, or a post.



Another 7 immediate causes were identified with a total of 15 fatalities each with fewer than 4 were not included in the graph above.

6.11 Fatal backwards agricultural rollovers in adults aged 60 and over by activity prior to rollover, 1990-2008

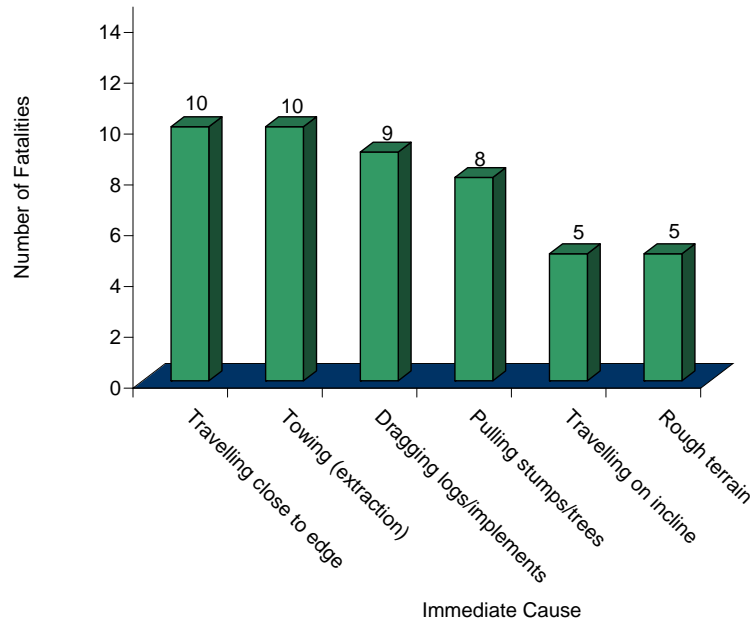
In fatal backwards machine rollovers among older adults, circumstance text descriptions indicated that the most common activities prior to the rollover were machinery falling from a ramp (44%), travelling on an incline and cornering each with 19%.



Another 3 activities were identified with a total of 10 fatalities each with fewer than 4 were not included in the graph above.

6.12 Fatal backwards agricultural rollovers in adults aged 60 and over by immediate cause of rollover, 1990-2008

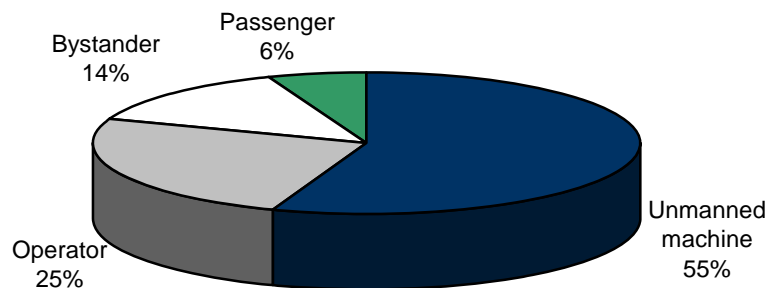
According to circumstance text descriptions, 19% of fatal backwards rollovers were due to travelling too close to the edge. Another 19% were due to improper towing (extraction) practices and 17% were attributed to dragging logs or implements, and 15% were the result of pulling stumps and trees.



Another 4 immediate causes were identified with a total of 7 fatalities each with fewer than 5 were not included in the graph above.

6.13 Fatal agricultural runovers in adults aged 60 and over by runover category, 1990-2008

In adults aged 60 and over there were 155 fatal runovers from 1990 to 2008. Most runovers involved unmanned machines which had been left running or left unblocked (55%). Operator runovers subsequent to falls from machines (25%) were the next most frequent runover mechanism. Bystander runovers (14%) and extra rider runovers (2%) 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.

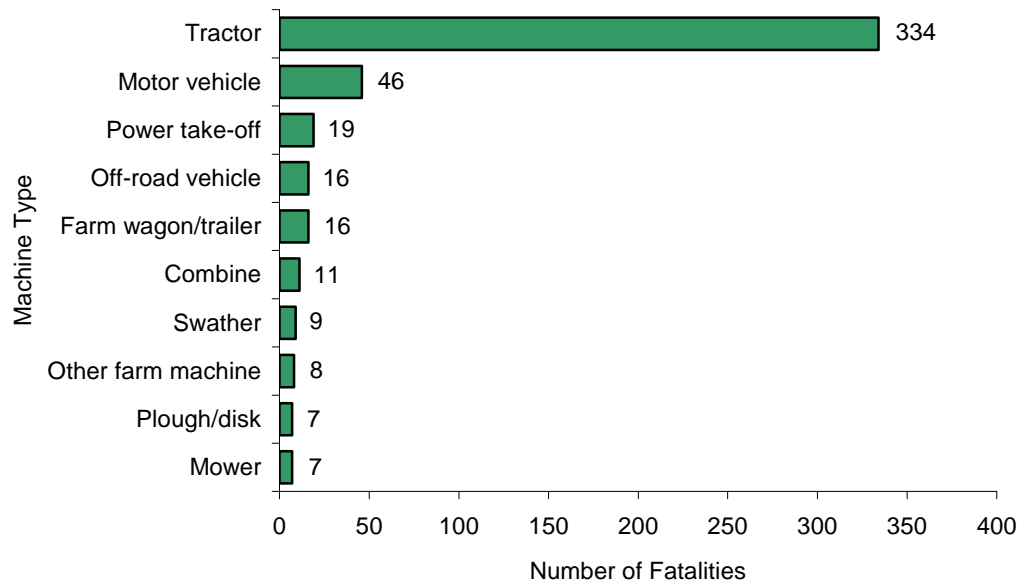


6.14 Fatal agricultural injuries in adults aged 60 and over by machine type, 1990-2008

The types of machines most frequently involved in agricultural fatalities among older adults were tractors (65%), followed by motor vehicles (9%), power take-offs (PTOs) (4%), wagons/trailers (3%), and off-road vehicles (3%).

The proportion of tractor-related deaths in adults aged 60 and over was 19% greater than for younger adults.

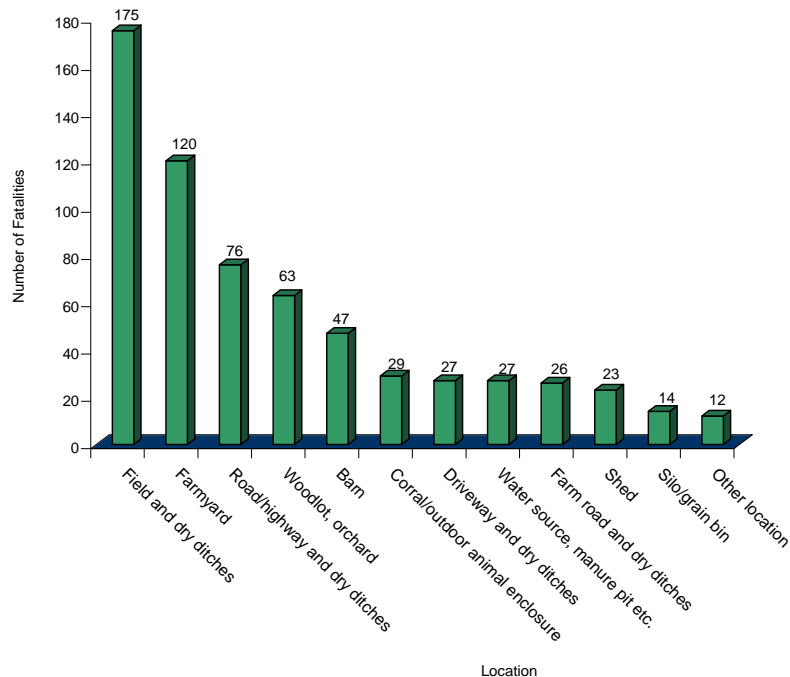
47% of the fatalities involved a tractor.



Another 9 machine types with a total of 40 fatalities each with fewer than 7 fatalities were not included in the graph above.

6.15 Fatal agricultural injuries in adults aged 60 and over by location of injury, 1990-2008

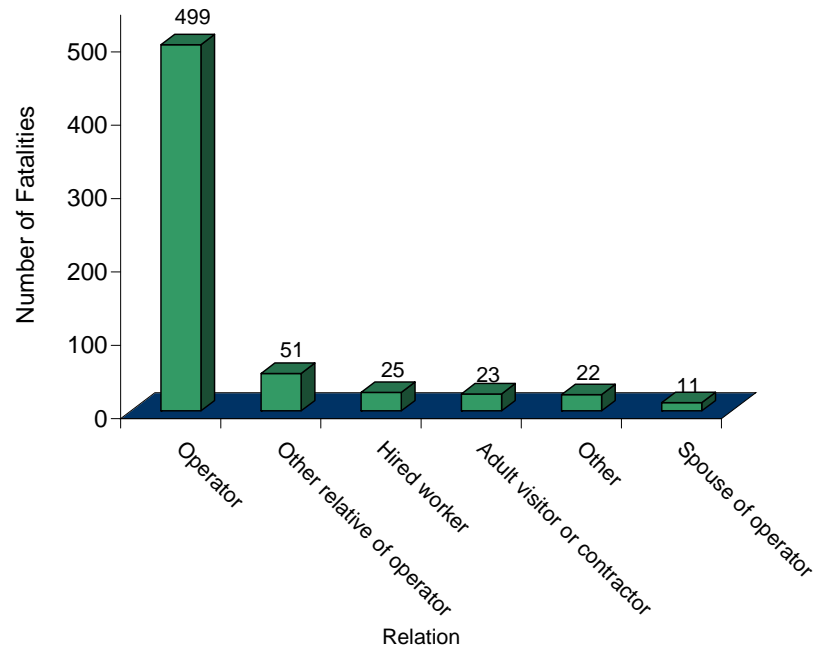
The most common locations of fatal injury for older adults were fields and their adjacent ditches (25%), farm yards (17%), public roads and their adjacent ditches (11%) and woodlots (9%).



Another 88 fatalities identified as unknown location and another 2 locations with a total of 8 fatalities each with fewer than 10 fatalities were not included in the graph above.

6.16 Fatal agricultural injuries in adults aged 60 and over by relationship to farm operator, 1990-2008

Of the 706 fatalities in which the relationship was identified, 71% were farm owner/operator. A further 7% of the victims were relatives of farm owner/operator and 4% were hired workers.



There were 74 fatalities where the relationship was unknown and were not included in the graph above.

Agricultural Fatalities in Canada 1990-2008



Appendices

Appendix A: Decision Rules

Inclusion of deaths and injuries in the CAIR 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 workplace were included. For example, 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 riding horses, tending to farm animals, drowning in dugouts/sloughs or manure pit, etc.

Appendix B: Glossary

General Terms

Agricultural Fatalities

CAIR 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.*)

Injury

Damage to a person caused by an acute transfer of energy (mechanical, thermal, electrical, chemical, or radiation) or by the sudden absence of heat or oxygen.

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.

Non-work Hazards

Non-work hazards of the farm environment would include things that one wouldn't typically find in a "non-farm" residence. This would include; various location such as dugouts/sloughs, orchards, wood lots, manure pits, various farm machinery such as tractors, combines, ploughs. It would also include various outbuildings such as barns, quonsets, chicken coops, and various activities of tending to animals, improper storage of equipment and riding of horses.

Runovers

Machine-related agricultural injuries were identified and coded by CAIR 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.

Unintentional Injury.

Unintentional injuries consist of that subset of injuries for which there is no evidence of predetermined intent.

To further identify the activities or circumstances surrounding the leading causes of the fatalities, additional analysis was done based on the documentation in the circumstances text field of the abstract.

Activity prior to rollover

- Included transportation of goods/livestock
- towing
- field work
- forestry
- working in the farm yard
- recreation, moving
- road maintenance
- extra rider
- unknown

Cause of Rollover

- Travelling too close to the edge
- travelling on an incline, cornering
- falling from a ramp
- carrying a heavy load in a bucket
- dragging logs/implements
- pulling stumps/trees
- towing
- collision with an object
- rough terrain
- tractor arms/bucket caught on ground
- pulling heavy machine/trailer
- unknown

Activity prior to entanglement

- Maintenance/repairs/cleaning of equipment
- checking on machine or contents
- removing blockage from machinery
- retrieving an item (not blocked)
- fall into machine
- stepping/reaching over entanglement hazard
- starting machine
- bystander
- other activity near entanglement hazard,
- unknown.

Objects involved with injuries as a result of being pinned or struck by a machine or non-machine

- bale (large round)
- bale other
- tree, branch, log
- collapsing building or structure
- other heavy non-machine object example: gate or door
- heavy machine (not under power)
- truck box
- bucket
- Front end loader arms
- Other heavy machine component
- Knife or blade
- Baling or barbed wire
- Tool or part of tool (includes power tools)
- Hook, tow rope or chain
- Hitch or tongue
- Jacks or hydraulic lifts
- Other non-machine object
- Unknown
- Other machine-related object

Appendix C: CAIR's Agricultural Fatality Data Abstraction Form

To facilitate consistent data collection a standardized data collection form is completed for each eligible fatality identified.



FARM INJURIES – DATA ABSTRACTION FORM

Coroner's File #: _____ - _____

CAIR ID: _____ - _____ - _____

_____ year no.
no.

prov. year

An Agricultural Fatality is: 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, supplies, workers 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

Gender (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

Please include as many details as possible about the decedent's activity, task and location at the time of the incident. For falls and drownings, please describe exact location. For struck or pinned by object injuries, please specify object or machine component. For entanglements, please state whether clothing was involved. For tractor rollovers, please indicate whether the tractor had ROPS. For machine injuries, please describe the machine in as much detail as possible.

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.

<p>B. CAUSE OF INJURY NOT MACHINERY OR VEHICLE RELATED</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 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>C. CAUSE OF INJURY MACHINERY OR VEHICLE RELATED</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 (specify) _____</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 (specify) _____</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>G. RELATIONSHIP OF INJURED PERSON TO FARM OWNER/OPERATOR</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>D. TYPE OF MACHINERY</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>26 rock picker</p> <p>27 snow blower</p> <p>28 airplane</p> <p>77 other farm implement/machine. Specify: _____</p> <p>88 unknown</p> <p>99 not applicable</p>
<p>E. IMMEDIATE LOCATION OF INJURY</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>13..Other unspecified ditch/embankment/dyke</p> <p>14 Trench</p> <p>77 Other location. Specify: _____</p> <p>88 Unknown</p> <p>F. LOCATION OF DEATH</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>H. METHOD OF DISCOVERY</p> <p>Who found the deceased? (i.e. relationship to deceased) _____</p> <p>Was the injury event witnessed? (circle) Y N (Indicate if the information is not available)</p> <p>I. NATURE OF INJURY BY BODY PART 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>Nature of injury 1: _____</p> <p>Body part 1: _____</p> <p>Nature of injury 2: _____</p> <p>Body part 2: _____</p> <p>Nature of injury 3: _____</p> <p>Body part 3: _____</p>	<p>J. REVIEW FOR CONSENSUS? (Circle) Yes No If yes, please explain the points needing consensus of opinion.</p>

Appendix D: Agriculture Populations

Canadian Farm Population by Age Group and Year Including Temporary Foreign Workers

Age Group	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1-4	67170	64665	62160	59655	57151	54645	52141	49635	47131	44625
5-9	89421	86361	83299	80238	77179	74118	71055	67994	64933	61872
10-14	101847	98881	95913	92946	89979	87012	84045	81078	78111	75144
15-19	92325	90365	88405	86448	84485	82525	80565	78605	76645	74685
20-29	102978	99283	95535	92098	88658	85283	81741	78351	75072	71878
30-39	170575	163089	155355	148129	140792	133645	126344	119306	112869	106487
40-49	154673	152752	150817	149069	147322	145816	144193	142944	141457	140150
50-59	114991	114507	113939	113452	112979	112457	112168	111955	111419	110924
60-69	83980	82335	80694	79049	77401	75769	74133	72510	70877	69261
70-79	30348	30459	30572	30683	30792	30903	31014	31125	31242	31362
>80	7334	7405	7476	7547	7619	7689	7760	7831	7902	7973
blank	0	0	0	0	1	0	0	0	0	0
Total	1015642	990102	964165	939314	914358	889862	865159	841334	817658	794361

Age Group	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
1-4	42120	39615	38295	36975	35655	34335	28765	27377	26224	868339
5-9	58811	55750	53327	50904	48481	46058	37825	35475	33435	1176536
10-14	72177	69210	66992	64774	62556	60338	50105	47874	46003	1424985
15-19	72725	70765	69783	68799	67813	66829	56430	54989	54133	1417319
20-29	68808	65526	65111	64672	64260	63882	53656	52973	52754	1422519
30-39	99842	93202	88360	83465	78532	73942	60426	56338	52689	2063387
40-49	138963	138014	136307	134495	132861	131678	112434	110064	108908	2612917
50-59	110381	109996	112158	114368	116773	119166	106445	107831	110126	2136035
60-69	67650	66018	67547	69132	70674	72206	65734	66310	67539	1378819
70-79	31473	31585	32323	33067	33809	34554	32428	32858	33509	604106
>80	8046	8120	8704	9291	9873	10459	10170	10654	11220	163073
blank	0	0	0	0	0	0	0	0	0	0
Total	770996	747801	738907	729942	721287	713447	614418	602743	596540	15268036

Numbers from the 1996, 2001 and 2006 Canada Census of Agriculture were used to extrapolate the data for the years in which the census was not performed. In addition to the Canada Census of Agriculture population, temporary foreign workers under the seasonal agriculture workers program from Citizenship & Immigration Canada were included.

Note: numbers from Statistics Canada and Citizenship & Immigration were randomly rounds category totals up or down by a factor of five. For age group cells which were incomplete due to confidentiality were completed based on existing distributions.

Source: Citizenship & Immigration Canada, RDM, Preliminary 2010 Data

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Canadian Farm Population by Age Group and Year

Includes all provinces, 1990-2008

Age Group	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1-4	67131	64630	62129	59628	57127	54626	52125	49624	47123	44622
5-9	89381	86325	83269	80213	77157	74101	71045	67989	64933	61877
10-14	101825	98860	95895	92930	89965	87000	84035	81070	78105	75140
15-19	92307	90350	88393	86436	84479	82522	80565	78608	76651	74694
20-29	101856	98450	95044	91638	88232	84826	81420	78014	74608	71202
30-39	165046	157835	150624	143413	136202	128991	121780	114569	107358	100147
40-49	150946	149105	147264	145423	143582	141741	139900	138059	136218	134377
50-59	113896	113340	112784	112228	111672	111116	110560	110004	109448	108892
60-69	83934	82275	80616	78957	77298	75639	73980	72321	70662	69003
70-79	30369	30480	30591	30702	30813	30924	31035	31146	31257	31368
>80	7339	7415	7491	7567	7643	7719	7795	7871	7947	8023
blank										
Total	1004030	979065	954100	929135	904170	879205	854240	829275	804310	779345

Age Group	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total	% Change
1-4	42121	39620	38299	36978	35657	34336	33015	31694	30373	880858	-55
5-9	58821	55765	53342	50919	48496	46073	43650	41227	38804	1193387	-57
10-14	72175	69210	66991	64772	62553	60334	58115	55896	53677	1448548	-47
15-19	72737	70780	69797	68814	67831	66848	65865	64882	63899	1446458	-31
20-29	67796	64390	64059	63728	63397	63066	62735	62404	62073	1438938	-39
30-39	92936	85725	80844	75963	71082	66201	61320	56439	51558	1968033	-69
40-49	132536	130695	128871	127047	125223	123399	121575	119751	117927	2553639	-22
50-59	108336	107780	109912	112044	114176	116308	118440	120572	122704	2144212	8
60-69	67344	65685	67191	68697	70203	71709	73215	74721	76227	1399677	-9
70-79	31479	31590	32324	33058	33792	34526	35260	35994	36728	613436	21
>80	8099	8175	8755	9335	9915	10495	11075	11655	12235	166549	67
blank										0	0
Total	754380	729415	720385	711355	702325	693295	684265	675235	666205	15253735	-34

Totals do not include data for Yukon, Northwest Territories and Nunavut.

Numbers from 1996, 2001 and 2006 Canada Census of Agriculture were used to extrapolate the data for the years in which the census was not performed.

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Percentage Changes in the Canadian Farm Population by Age Group and Year

Includes all provinces, 1990-2008

Age Group	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
1-4	-3.7	-3.9	-4.0	-4.2	-4.4	-4.6	-4.8	-5.0	-5.3
5-9	-3.4	-3.5	-3.7	-3.8	-4.0	-4.1	-4.3	-4.5	-4.7
10-14	-2.9	-3.0	-3.1	-3.2	-3.3	-3.4	-3.5	-3.7	-3.8
15-19	-2.1	-2.2	-2.2	-2.3	-2.3	-2.4	-2.4	-2.5	-2.6
20-29	-3.3	-3.5	-3.6	-3.7	-3.9	-4.0	-4.2	-4.4	-4.6
30-39	-4.4	-4.6	-4.8	-5.0	-5.3	-5.6	-5.9	-6.3	-6.7
40-49	-1.2	-1.2	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.4
50-59	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
60-69	-2.0	-2.0	-2.1	-2.1	-2.1	-2.2	-2.2	-2.3	-2.3
70-79	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
>80	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
blank	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	-2.5	-2.5	-2.6	-2.7	-2.8	-2.8	-2.9	-3.0	-3.1

Age Group	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05	2006/07	2007/08
1-4	-5.6	-5.9	-3.3	-3.4	-3.6	-3.7	-3.8	-4.0
5-9	-4.9	-5.2	-4.3	-4.5	-4.8	-5.0	-5.3	-5.6
10-14	-3.9	-4.1	-3.2	-3.3	-3.4	-3.5	-3.7	-3.8
15-19	-2.6	-2.7	-1.4	-1.4	-1.4	-1.4	-1.5	-1.5
20-29	-4.8	-5.0	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
30-39	-7.2	-7.8	-5.7	-6.0	-6.4	-6.9	-7.4	-8.0
40-49	-1.4	-1.4	-1.4	-1.4	-1.4	-1.5	-1.5	-1.5
50-59	-0.5	-0.5	2.0	1.9	1.9	1.9	1.8	1.8
60-69	-2.4	-2.5	2.3	2.2	2.2	2.1	2.1	2.1
70-79	0.4	0.4	2.3	2.3	2.2	2.2	2.1	2.1
>80	0.9	0.9	7.1	6.6	6.2	5.8	5.5	5.2
blank	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	-3.2	-3.3	-1.2	-1.3	-1.3	-1.3	-1.3	-1.3

From 1990-2008 the overall Canadian agriculture population decreased by 34%. However, there has been an increase in the older population. Those 50 to 59 and 60 to 69 years of age experienced a slight decrease in the population from 1990 to 2000. However, from 2001 to 2008 there was an increase. Those 70 years of age and older experienced a slight increase in population from 1990 to 2000. However, from 2000 to 2008 there was a greater increase. The increase in population in the older age groups affected the yearly injury fatality rates.

Appendix E: CAIR Collaborators as of August, 2011

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