Agricultural runovers in Canada for 1990 - 2000

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Agricultural Runovers in Canada for 1990-2000.

This report from *The Canadian Agricultural Injury Surveillance Program* describes the occurrence of fatal and hospitalized agricultural runover injuries in Canada from 1990-2000.

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Foreword and Executive Summary

Agricultural Runovers in Canada for 1990 - 2000 includes an analysis of Canadian Agricultural Injury Surveillance Program (CAISP) fatal runover data for eleven calendar years from 1990-2000, and hospitalized runover data for ten fiscal years from April 1990 to March 2000. Over the surveillance period, there were 207 fatal runovers and 746 hospitalized runovers in Canada.

Agricultural runover injuries are not random or isolated “accidents”. Injuries resulting from being runover by farm vehicles and machines represented 23.7% of all agricultural machine-related fatalities and 10.6% of agricultural machine-related hospitalizations. They were second only to tractor rollovers as a cause of agricultural fatalities, and were the fourth most common reason people were hospitalized for machine-related agricultural injuries. In children aged 0-14 runovers were by far the leading mechanism of fatal injury. They caused six times the number of child fatalities as rollovers. Runovers should clearly be an injury prevention priority.

There are five types of runover scenarios: 1. Where an extra rider falls from a tractor or farm machine and is then runover by the machine or by an implement or wagon towed by it. ("Extra rider runovers.") 2. Where an operator falls from a tractor or farm machine and is then runover by the machine or by an implement or wagon towed by it. ("Operator runovers.") 3. Where a bystander (often a child) is inadvertently run over by a tractor, pick up truck or other machine. ("Bystander runovers.") 4. Where an operator is runover by his/her machine after alighting from it to perform a task. ("Alighted operator runovers.") 5. Where an operator starts a machine using any method other than the procedure recommended by the machine’s manufacturer and is then runover or pinned by it. "Improper start runovers" include cases of ground starting as well as by pass starting, where an operator starts a tractor or other machine by short circuiting its ignition box.

Overall, bystander runovers were the most frequent type of fatal runover (28.5%). Among children, 56.1% of the runover fatalities were due to bystander runovers and 41.1% were due to extra rider runovers. Both male and female children are at very high risk for fatal runovers. Children under 10 years old represented 63.6% of the bystander and extra rider runover fatalities, and 43.6% of the hospitalizations related to those events. Very young children are frequently killed in bystander runovers. 49.2% of the victims of fatal bystander runovers were 0-4 years old. Nine one year olds and twelve two year olds were killed in bystander runovers during the surveillance period. 52.4% of the bystander runover victims aged two and under

died while observing children playing or adults working in farmyards or driveways.

Persons aged 60 and over were the demographic group at highest risk for fatal runovers. The runover rates among senior farmers ranged from 3.5/100,000 per year for persons aged 60-69 to 21.1/100,000 per year for the 80+ age group. 95.3% of the fatal runover victims aged 60 and over were male. Most older farmers were killed in alighted operator runovers (37.7%), operator runovers (25.9%) and improper start runovers (17.6%). Over all age groups, alighted operator runovers were the second most common runover type (24.6%). Senior farmers aged 60+ represented 62.7% of the victims of alighted operator runovers, 62.9% of those killed in operator runovers, and 68.2% of those killed in improper start runovers.

Based on the data presented in this report CAISP recommends the following runover prevention strategies:

Bystander runovers

- Young children are curious and impulsive and should be kept away from the farm work site.
- Most bystander runovers of children occurred in the farmyard and farm driveway. Young children cannot be supervised adequately while in the company of an adult who is working. If a child cannot be supervised independently, alternate childcare arrangements should be made.
- Drivers and operators should always walk around and check under their vehicles or machines before moving off.

Extra rider runovers

- Extra riders are at extremely high risk for a fatal injury. Young children should not be allowed to ride anywhere on a tractor or other farm machine, even those with cabs. Adults should only be taken as extra riders if a machine is equipped with an additional manufacturer-designed workstation or passenger seat.
- Wagon passengers should remain seated while a wagon is moving.

Child runovers of all types

- The farm work site is particularly hazardous for young children.
- Accessible childcare options should be made available to farm families.
- Play enclosures with self-locking gates are recommended for families with pre-school children.

Alighted operator runovers

- Tractors and other farm machines should not be parked on slopes. If parking on a slope is absolutely necessary, operators should not work in the potential path of the tractor.
- If an unmanned tractor's engine must be left running, the tractor and any attached equipment should be immobilized to prevent unintentional movement.
- Before commencing repairs to a vehicle or machine, operators should ensure that the transmission is placed in neutral or park and that the engine is turned off. Blocking can also be used on smaller tractors.
- Children should not be allowed to play in a vehicle or machine while repairs are taking place.
- Brakes on tractors, farm trucks and other vehicles should be maintained properly.

Operator runovers

- Seat belts should be worn when operating a tractor or other farm machine. Tractor operators should remain seated at all times. It is a dangerous practice to stand while operating a tractor or other farm machine. This is especially important for farmers aged 70+, who are at very high risk for operator runovers as well as falls from machines.

Improper start runovers

- Electrical systems of tractors and other farm machines/vehicles should be maintained properly.
- The practice of by pass starting a tractor by short circuiting its ignition system is associated with a very high incidence of fatal runovers among alighted operators.

HIGHLIGHTS AND RECOMMENDATIONS

HIGHLIGHTS	RECOMMENDATIONS
Magnitude of the Problem. Runovers are a leading cause of fatal injury. They are also important causes of injury associated with hospitalization. The incidence of these events has remained stable over time. Runovers are particularly a problem for children who are either killed as bystanders, or who are runover after falling off tractors or machinery being operated by others (Extra-Rider runovers). Alighted Operator, Operator and Improper Start runovers are leading causes of death among older farmers.	▪ *Over the surveillance period, there were 207 fatal runovers and 784 hospitalized runovers in Canada. Agricultural runover injuries should be recognized nationally as an important, very preventable cause of death and disability.*
High Risk Groups. This report identifies male and female children under ten years old and male adults aged 60 and over as the demographic groups at highest risk for fatal runovers.	▪ *Effective prevention programs should be targeted at parents of young children, at school-aged children and at senior farmers.*
Young Children. Children under five are at very high risk for fatal runovers. (7.8/100,000 per year).	▪ *Young children should be kept away from the farm or ranch work site, including the farmyard and farm driveway. Parts of all farms and ranches should be "child-free zones". Fences and barriers are of clear importance in preventing children from accessing work sites. Farm families with preschool children should use play enclosures with self-locking gates.* ▪ *Innovative solutions to address the need for low-cost, accessible, flexible rural childcare are urgently required.*
Senior Farmers. Eighty-five persons aged 60 and over were killed in runover events during the surveillance period. The crude annual runover rate for farmers aged 80+ was 21.1/100,000 per year.	▪ *Farm operators work with dangerous heavy equipment far beyond the normal industrial retirement age of 65. Prevention programs aimed at senior farmers should stress the necessity of changing the types of agricultural tasks attempted, and of adapting the methods used to accomplish tasks to fit their changing abilities and limitations.*

Types of Fatal Runovers: Fast Facts

Bystander – 59 cases ➢ 28.5% of all fatal cases ➢ 66.1% of victims were less than ten years' old ➢ 49.2% of victims were less than five years' old ➢ 76.3% of the cases were blind runovers ➢ 21 children aged one and two were killed. 52.4% of these deaths occurred in the farmyard or driveway. ➢ 23.7% of the victims were aged 50+ ➢ Youths and younger adults were unlikely to be victims of fatal bystander runovers. ➢ 74.6% of the victims were male	▪ *Young children should not be allowed to play in the farmyard or driveway. These locations should be regarded as active work sites. Unless they can be cared for in a secure, fenced play enclosure, pre-school children, toddlers and infants should not be allowed to play outside the farm residence property without close and constant adult supervision. They cannot be supervised adequately by an adult who is working.* ▪ *Drivers and operators should always walk around and check under their vehicles or machines before moving off.* ▪ *Reversing alarms on pick up trucks, tractors and other farm vehicles/machines might alert older children and adults to reversing vehicles. This would help them avoid serious or fatal runover events.* ▪ *It is possible that older adults are more likely than younger adults to be victims of fatal runovers because they are unable to hear vehicles and machines moving towards them. Farm operators are known to experience hearing loss as a result of occupational exposure[1], which is progressive with increasing age.[2]*
Alighted operator – 51 cases ➢ 24.5% of all fatal cases ➢ 62.7% of the victims were aged 60+ ➢ Only one victim was under 30 years' old ➢ All but two victims were male	▪ *The practice of alighting from a stationary operating tractor in order to carry out chores near it is very dangerous. It is equally as dangerous to work near a tractor that has its engine shut off unless the tractor and any attached equipment has been immobilized to prevent unintentional movement.* ▪ *Tractors and other machines should not be parked on slopes. If parking on a slope is absolutely necessary, operators should not work in the potential path of the tractor.*

1. Lupescu, C., et al. (1999) Hearing Conservation Program for Farm Families: An Evaluation. Journal of Agricultural Safety and Health. 5(3): 329-337. 2. Reesal, M.R,. et al. (1994). Hearing Loss in a Saskatchewan Farm Community. In Agricultural Health and Safety: Workplace, Environment, and Sustainability, pp. 201-206. H.H. McDuffie et al, editors. Centre for Agricultural Medicine, University of Saskatchewan.

Extra-rider – 40 cases ➢ 19.3% of all fatal cases ➢ 75% of the victims were under fifteen years' old ➢ 40% of the victims were under five years' old ➢ 80% of the victims were male	▪ *Children should never be taken as extra riders on tractors and other farm machinery, even in cabs. The practice of allowing children to sit or stand on fenders, FEL attachments, buckets, tow bars and other parts of a tractor body or its attachments is associated with a very high incidence of fatal injuries.* ▪ *Children should not be allowed to ride in the back of pick-up trucks or to hang on to the tailgate or running board while a truck is in motion.* ▪ *Passengers riding on a wagon or any mobile work platform should not stand and harvest fruit while the wagon or platform is in motion, unless there are workstations specifically designed for that activity. Drivers should warn all passengers before moving the wagon or platform to another location.*
Operator – 35 cases ➢ 16.9% of all fatal cases ➢ 62.9% of the victims were aged 60+ ➢ Only one victim was under the age of 30 ➢ Only one victim was female ➢ 57.1% of falls may have been related to adverse terrain conditions	▪ *Seat belts should be worn at all times when operating a tractor or other farm machine. Without a seatbelt, it is easy to fall from an open machine traveling over rough terrain, on slopes or around corners. Seatbelts are especially critical for operators aged 70^{+} who fall from tractors far more frequently than younger operators.*
Improper start – 22 cases ➢ 10.6% of all fatal cases ➢ 68.2% of the victims were aged 60+ ➢ None of the victims were under the age of 40 ➢ None of the victims were female	▪ *Older farmers may be more susceptible to this type of runover event because they are more likely to operate older tractors that have ignition problems. The practice of by pass starting tractors and other machines is inherently dangerous. Electrical systems should be maintained properly, especially on older tractors.*

1 INTRODUCTION

1.1 GENERAL INTRODUCTION

The Canadian Agricultural Injury Surveillance Program (CAISP) was established in 1995 in response to the need for better information about fatal and hospitalized agricultural injuries in Canada. CAISP is a national program with partners in each of the ten provinces of Canada.

Agricultural Runovers in Canada for 1990-2000 examines fatality data for eleven calendar years from 1990-2000, and hospitalization data for ten fiscal years from April 1990 to March 2000. There were 207 fatal runovers and 746 hospitalized runovers in Canada over the surveillance period.

The report is organized into several sections. Following this introduction, there is a description of the methods used in our surveillance program. Fatal and hospitalized agricultural runover injuries are then reviewed comprehensively. Important trends and patterns are highlighted and recommendations are made for injury prevention and further research.

1.2 HISTORY OF AGRICULTURAL INJURY SURVEILLANCE IN CANADA

Agricultural injuries have been recognized as an important rural health issue since the 1960s, when the problem was first recognized in the medical literature. At that time, some provincial groups began to monitor agricultural injuries, but only recently have substantial national resources been committed to the study of agricultural injuries.

When compared with other Canadian industrial sectors, agriculture is a dangerous occupation. Agriculture ranks as the third most hazardous industry in Canada with respect to rates of fatal injury. In terms of absolute numbers of fatalities, there is no more dangerous occupation (Pickett et al., 1999). Economic costs associated with agricultural injuries are also substantial. In the United States, when one factors in the costs of treatment, rehabilitation and losses in productivity, agricultural injuries are responsible for over $10 billion in economic losses annually (Leigh et al., 2001). Canadian estimates of economic burden are in the hundreds of millions of dollars annually (Locker et al., 2003).

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

1.3 THE CANADIAN AGRICULTURAL INJURY SURVEILLANCE PROGRAM

The Canadian Agricultural Injury Surveillance Program (CAISP) is a national program that is funded by the Canadian Agricultural Safety Association (CASA).

CAISP is a collaborative program run by organizations from across Canada. It is coordinated from a national office at Queen's University in Kingston, Ontario. The people and organizations that contribute to CAISP include researchers, government agencies and the agricultural industry.

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

1.4 OBJECTIVES OF CAISP

The objectives of CAISP are:

1. **To develop a coordinated system for the assembly of national agricultural injury surveillance data**. CAISP's fatality and hospitalized injury data were collected, compiled, and analyzed in a standard manner by all provinces.

2. **To ensure that the collected information is interpreted and communicated in forms that are useful to potential data users in the agricultural industry**. The CAISP collaborators are committed to ensuring that the data are disseminated in an appropriate and useful manner. Our primary audience is individuals within the agricultural industry who need to make informed decisions about safety programs and policy. Our reports represent one approach to making these data accessible to this audience. Other dissemination formats include articles in scientific journals, presentations at national conferences, our website at www.caisp.ca, and press releases.

1.5 USES OF CAISP DATA

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

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

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

1.6 THE CHALLENGES OF INJURY CONTROL IN AGRICULTURE

In other industries, victims of occupational injuries are usually workers aged 18 to 65. Agricultural injuries are unique in that children under 15 and adults over 65 sustain significant numbers of severe work-related injuries. This is partly because farms and ranches are not only work sites, but also places where people of all ages live, play and participate in recreational activities. Also, children begin to work on farms and ranches at an early age and, unlike other industries, it is not uncommon for farmers and ranchers to work and operate heavy equipment well into their 70s and 80s.

In the case of agricultural runovers, 68.6% of the fatal injury victims were either children under fifteen or adults over 65. These demographic groups also sustained 43.6% of the hospitalized runover injuries. Although children were carrying out agricultural work in only 2.8% of the work-related fatal child runover cases, 97.3% of all child runover deaths were classified as work-related because they occurred as a result of agricultural work.
The prevention of runover injuries in agricultural work settings is challenging because of the unique nature of the agricultural work environment. Also, in most jurisdictions, agriculture is not a heavily regulated industry in terms of occupational health and safety standards. Unlike other industrial workplaces, many Canadian agricultural workplaces have not benefited from modern industrial hygiene and safety practices. The composition of the agricultural workforce is also geographically diverse. This diversity adds to the difficulty in enforcement of safety standards. There has traditionally been reliance upon voluntary rather than regulatory safety standards; however, the effectiveness of voluntary safety standards has not been well evaluated.

2 METHODS

2.1 FATAL AGRICULTURAL INJURIES

2.1.1 Identification of Agricultural Fatalities

A detailed review of CAISP's data collection and analysis methods is available in our 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 standard data abstraction forms (Appendix C) and a database program that has been developed centrally. Data abstraction is generally done on-site at the Provincial Chief Coroners' Office by reading and abstracting the relevant information from coroners' files. Data are then sent to the national site for verification and analysis.

2.1.2 Key Definitions

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

Work-Related Agricultural Fatalities: *Work-related agricultural fatalities are deaths that occurred during the course of agricultural work. This includes deaths that took place away from the farm or ranch if agricultural work was being done.*

Non Work-Related Agricultural Fatalities: *This category includes those deaths that, while occurring on a farm (as defined below) or ranch, or caused by some aspect of the agricultural environment, were not directly related to agricultural work. Examples of these fatalities include deaths on agricultural vehicles being used for recreational purposes.*

Fatal Agricultural Runover: *For the purpose of this technical report, a fatal agricultural runover was considered to be any case assigned to one of the following CAISP fatal mechanical cause of injury categories Operator fell from machine, then runover; Passenger fell from machine, then runover; Runover of alighted operator by his/her unmanned machine; Runover of alighted passenger by a machine he/she dismounted; and Bystander runover. In addition, cases from the category Pinned or struck by machine were included if it was inferred that the victim would have been runover rather than pinned had he/she been standing out in the open.*

Study Population: *All persons who live, work on, or visit a Canadian farm (as defined below).*

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.

2.1.3 Definitions of Fatal Runover Types

Operator runover: *An operator fell from his/her machine and was then runover or pinned by the machine and/or by an implement, wagon or trailer towed by it.*

Alighted operator runover: *An operator was runover or pinned by his/her machine after alighting from it to perform a task. This includes cases where the operator left the engine running as well as cases where the operator turned the engine off.*

Improper start runover: *An operator was runover or pinned by a machine that he/she started using any method other than the procedure recommended by the machine's manufacturer.*

Bystander runover: *A bystander was runover or pinned by a machine and/or by an implement, wagon or trailer towed by it. At the time of the runover, the bystander may have been inactive or*

engaged in any activity other than operating a machine or riding an animal. This category also includes recently alighted former passengers and persons attempting to board a machine, wagon or trailer. Bystander runovers include both blind runovers, where the machine's operator was unaware of the victim's presence, as well as cases where the operator saw the victim prior to the injury event but was unable to prevent the collision.

Extra rider runover: *A passenger fell from a machine he/she was riding on and was then runover or pinned by the machine and/or by an implement, wagon or trailer towed by it*.
A glossary of terms used in this report is provided in Appendix B.

2.2 HOSPITALIZED AGRICULTURAL INJURIES

2.2.1 Basic Hospital Separation Data

Hospital separation data are obtained by CAISP collaborators through agreements with their provincial Departments of Health. Agricultural machinery-related injuries were identified using a systematic computer search of these hospital separation databases. Cases were considered for inclusion if the primary external cause of injury (International Classification of Diseases – version 9, World Health Organization E-code) is E919.0: *Accidents Caused by Agricultural Machines*.

2.2.2 Enhanced Hospital Data

The patient identifier and institution code in the basic hospital separation data set are used to identify individual cases and the institutions to which they were admitted. The Chief Executive Officer (or equivalent) from each hospital or health district is approached for permission to request chart data from his/her medical records department. Once permission is granted, information is requested using a mail survey format. A standardized data abstraction form (Appendix C) for each case is mailed to the medical records personnel at the appropriate institution. Medical records personnel abstract specific information from the individual patient charts. Regular mail and telephone follow-ups are conducted following the initial mailing in order to ensure a high response rate.

The information from the computerized hospital record, combined with that obtained from the mail survey abstraction form, constitutes the enhanced data set. This data set includes variables in addition to those in the basic data set that can be used to better describe injury patterns. For instance, there is information describing what happened to cause each of the injuries, and whether or not a tractor or other agricultural machine was involved.

2.2.3 Key Definitions

Agricultural (Farm) Machine-related Injury: *Agricultural machine-related injuries include cases admitted to a Canadian hospital, where the International Classification of Diseases (version 9, W.H.O.) external cause of injury (E-Code) was E919.0, Injuries Caused by Agricultural Machinery. These cases are identified using E-Codes recorded on the hospital discharge record. Cases coded with the location of injury code indicating a farm are also included if the incident involved a machine or a motorized vehicle (see Appendix B for more detailed definitions).*

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

Hospitalized Agricultural Runover: *For the purpose of this technical report, a hospitalized agricultural runover was considered to be any case assigned to one of the following CAISP hospitalized mechanical cause of injury categories:* Operator fell from machine, then runover; Passenger fell from machine, then runover; Unspecified person fell from machine, then runover, Runover of alighted operator by his/her unmanned machine; Runover of alighted passenger by machine he/she dismounted; Runover of bystander, Runover of person unspecified.

2.2.4 Definitions of Runover Types for Hospitalization Data

There are some differences between the runover definitions used for hospitalized cases and those used for fatal cases. Circumstance text descriptions for the hospitalized cases, where available, were not as detailed. It was therefore not possible to include any cases from the category *Pinned or Struck by Machine*. It also was not possible to differentiate *Improper start runovers* from the *Alighted operator runover* category. Further, assigning cases from the category *Fell from machine, then runover, person unspecified* to the *Operator runover* and *Extra rider runover* categories required the assumption that all unspecified persons less than ten years old were passengers.

Operator runover: *A person identified as an operator fell from his/her machine and was then runover by the machine and/or by an implement, wagon or trailer towed by it. This type of runover also includes any cases from the CAISP hospitalized mechanical cause of injury category "Fell from machine, then runover, person unspecified", where the unspecified person was ten years' old or over. It is assumed that persons under age ten were passengers rather than operators. It is acknowledged that some unspecified persons aged ten or over may have been passengers, so the number of operator runovers could have been overestimated relative to the number of extra rider runovers.*

Alighted or improper start operator runover: *a) An operator was runover by his/her machine after alighting from it to perform a task. This includes cases where the operator left the engine*

running as well as cases where the operator turned the engine off; or b) An operator was runover by a machine that he/she started using any method other than the procedure recommended by the machine's manufacturer.

Bystander runover: *A bystander was runover by a machine and/or by an implement, wagon or trailer towed by it. At the time of the runover, the bystander may have been inactive or engaged in any activity other than operating a machine or riding an animal. This category also includes recently alighted former passengers and persons attempting to board a machine, wagon or trailer. Bystander runovers include blind runovers, where the machine's operator was unaware of the victim's presence, as well as cases where the operator saw the victim prior to the injury event.*

Extra rider runover: *A person identified as a passenger fell from a machine he/she was riding on and was then runover by the machine and/or by an implement, wagon or trailer towed by it. This type of runover also includes any cases from the CAISP hospitalized mechanical cause of injury category "Fell from machine, then runover, person unspecified", where the unspecified person was less than ten years' old. It is assumed that persons under age ten were passengers rather than operators.*

Other Definitions: Definitions of terms used in this report are provided in Appendix B.

2.3 CONFIDENTIALITY AND CAISP DATA

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

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

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

2.4 ANALYSIS

2.4.1 APPROACH TO ANALYSIS

The analysis presented in this report is descriptive. It has three main objectives: 1) to describe the magnitude of the agricultural runover injury problem in Canada; 2) to describe trends in the causes and occurrence of fatal and hospitalized agricultural runover injuries in Canada; and 3) to identify emerging patterns of runover injuries.

The basic approach to the analysis was to summarize, in a simple manner, risks, trends and other patterns among fatal and hospitalized runover injuries. Where possible, these patterns were represented in bar charts. The statistics used include simple counts and frequencies as well as cross-tabulations. Where appropriate, injury rates were calculated. Formal hypothesis-testing methods were not employed in comparisons.

2.4.2 Use of Calendar Versus Fiscal Year

Fatalities are reported on a calendar year basis. Records of hospitalization data are kept according to fiscal years (April 1 to March 31). For this reason, hospitalization data have been analyzed and reported on a fiscal year basis.

2.4.3 Length of Stay Analyses

For hospitalized cases, readmissions to hospital, transfer cases, and cases treated in rehabilitation hospitals are excluded from the hospitalized injury database. This was done in order to avoid the “double counting” of injury events. A value for the total length of stay variable was calculated for each case. This variable includes all days in hospital for the treatment of the same injury and takes into account all reported days in hospital for transfers and re-admissions.

2.4.4 Rates

Selected rates of agricultural runover injuries are presented in this report. The numerators used in calculating these rates are the numbers of agricultural runover injury fatalities or hospitalizations for particular age categories. These include injuries to farm residents, agricultural workers and a small number of visitors to the farms. Denominators for these rates are taken from the 1996 Canada Census of Agriculture. The 1996 census data were used in the denominators for rate calculations because they were collected roughly halfway through the surveillance period.

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 excludes visitors to farms (as defined by Statistics Canada) and some agricultural workers, but it includes all farm residents, some of whom have relatively little exposure to agricultural work hazards. The accuracy of agriculture census information may vary among provinces, but is the best source of denominator information available at this time.

3 AGRICULTURAL RUNOVER FATALITIES: OVERVIEW

3.1 AGE GROUP

Fatal agricultural runovers were most frequent for children aged 0-9 and for adults aged 60 and over. Children aged 0-4 and adults in the older age groups (60-80+) were over-represented as victims of fatal runovers relative to their proportion of the farm population. This was especially true for older adults. The percentage of adults aged 80+ who died in fatal runovers was 8.7 times the percentage of adults that age in the general farm population. The percentage of adults 70-79 who were victims of fatal runovers was 5.2 times the percentage of adults that age in the farm population.

TABLE 3.1 Fatal agricultural runovers by age group, 1990-2000 (207 cases)

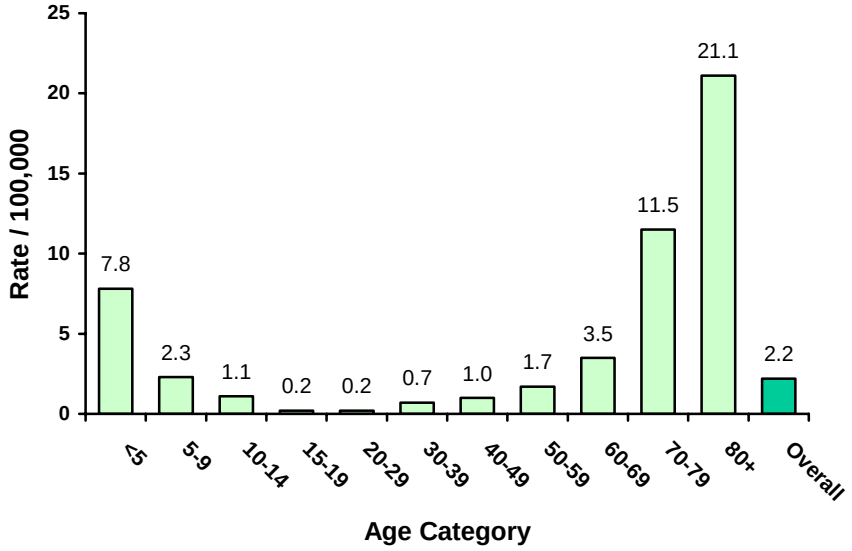
Age Group (Years)	Deaths		Farm Population*		Crude Rate Per
	No.	%	No.	%	100,000/yr
<5	45	21.7	52,125	6.1	7.8
5 - 9	18	8.7	71,035	8.3	2.3
10 - 14	10	4.8	84,025	9.9	1.1
15 - 19	2	1.0	80,455	9.4	0.2
20 - 29	2	1.0	80,775	9.5	0.2
30 - 39	9	4.3	121,230	14.2	0.7
40 - 49	15	7.2	139,425	16.4	1.0
50 - 59	21	10.1	110,135	12.9	1.7
60 - 69	28	13.5	73,620	8.6	3.5
70 - 79	39	18.8	30,825	3.6	11.5
80 +	18	8.7	7,755	1.0	21.1
Total	**207**	**100.0**	**851,405**	**100.0**	**2.2**

* Statistics Canada, Census of Agriculture, 1996

3.2 RUNOVER RATE BY AGE GROUP

The age specific rates of agricultural runover fatalities were highest in children under five and in adults 70 and over.

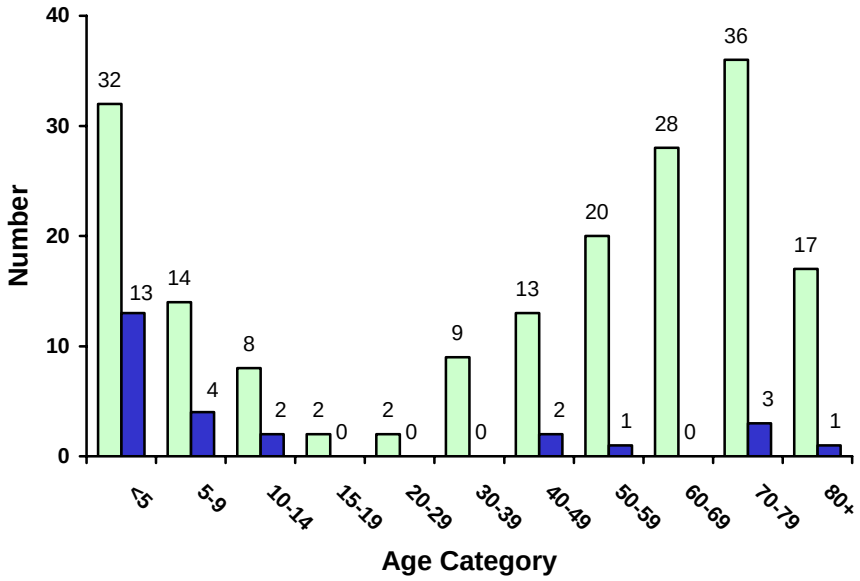
FIGURE 3.1 Age-specific fatal agricultural runover rates in Canada, 1990-2000 (207 cases)



3.3 AGE AND GENDER

FIGURE 3.2 Number of fatal agricultural runovers by age and gender, 1990-2000 (207 cases)

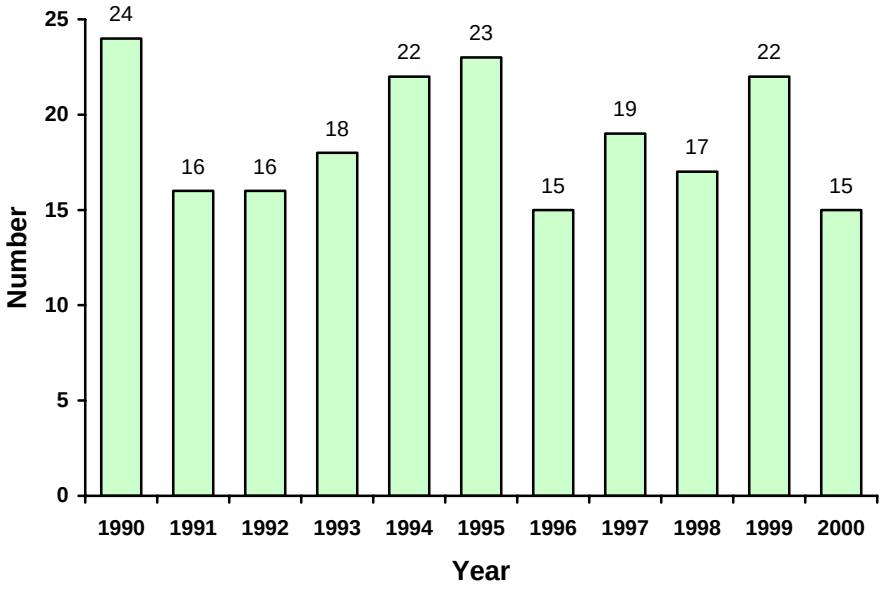
The ratio of males to females involved in fatal runovers was lowest for the youngest three age categories, ranging from 2.5:1 for children under 5 to 4:1 for children aged 10-14. In the older age categories very few females were killed in runover events.



3.4 FATALITIES BY YEAR

FIGURE 3.3 Fatal agricultural runovers by year, 1990-2000 (207 cases)

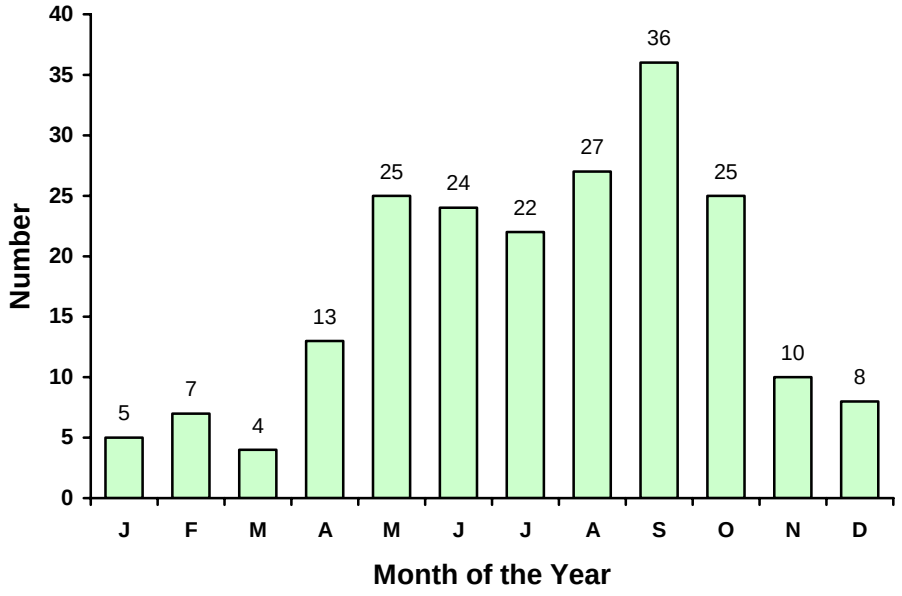
There was no discernable trend in the annual number of agricultural runover fatalities in Canada over the eleven-year surveillance period. There was an average of 18.8 runovers per year.



3.5 FATALITIES BY MONTH

FIGURE 3.4 **Fatal agricultural runovers by month of the year, 1990-2000 (206 cases*)**

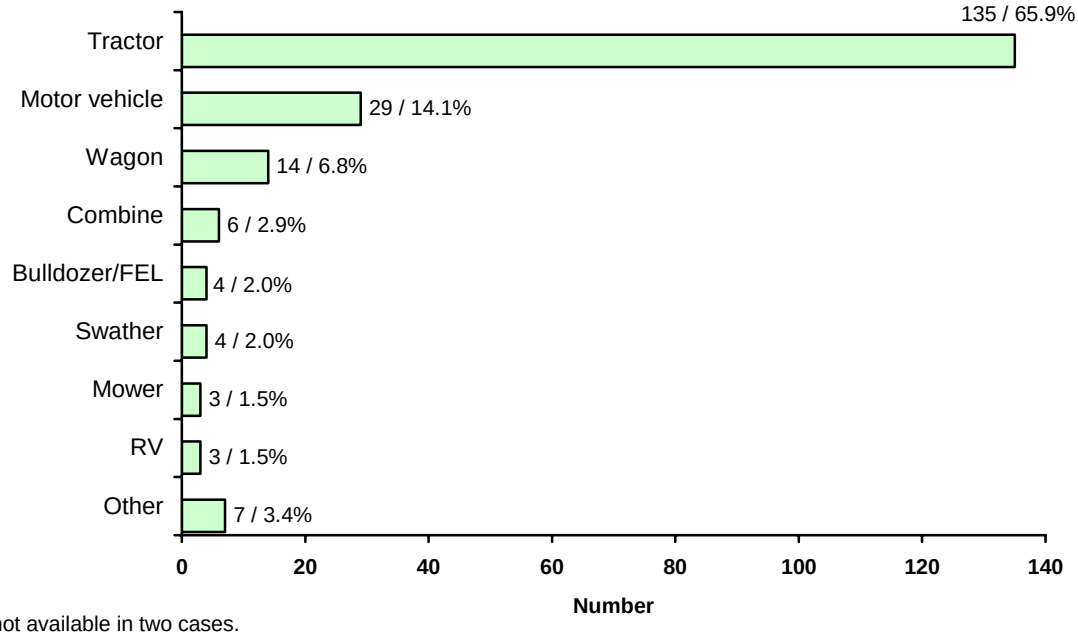
The distribution of agricultural runovers reflects seasonal changes in exposure to runover hazards. Most fatal runovers occurred from May to October, with a marked peak in September.



*One value was not available.

3.6 FATALITIES BY MACHINE TYPE

FIGURE 3.5 **Fatal agricultural runovers by machine type, 1990-2000 (205 cases*)**



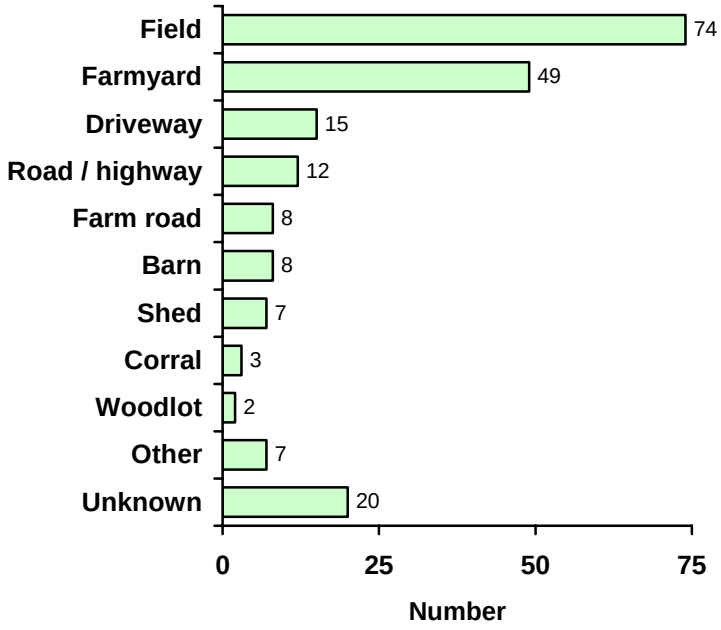
*Information was not available in two cases.

Tractors were by far the most frequent machine type involved in fatal runovers. Motor vehicles (mainly pick up trucks) and wagons were also implicated in several fatal runovers.

3.7 FATALITIES BY LOCATION

Fields, farmyards and driveways were the most frequent locations of fatal agricultural runovers.

FIGURE 3.6 Fatal agricultural runovers by location of injury event, 1990-2000 (205 cases*)



*Information was not available in two cases.

3.8 TYPE OF RUNOVER EVENT

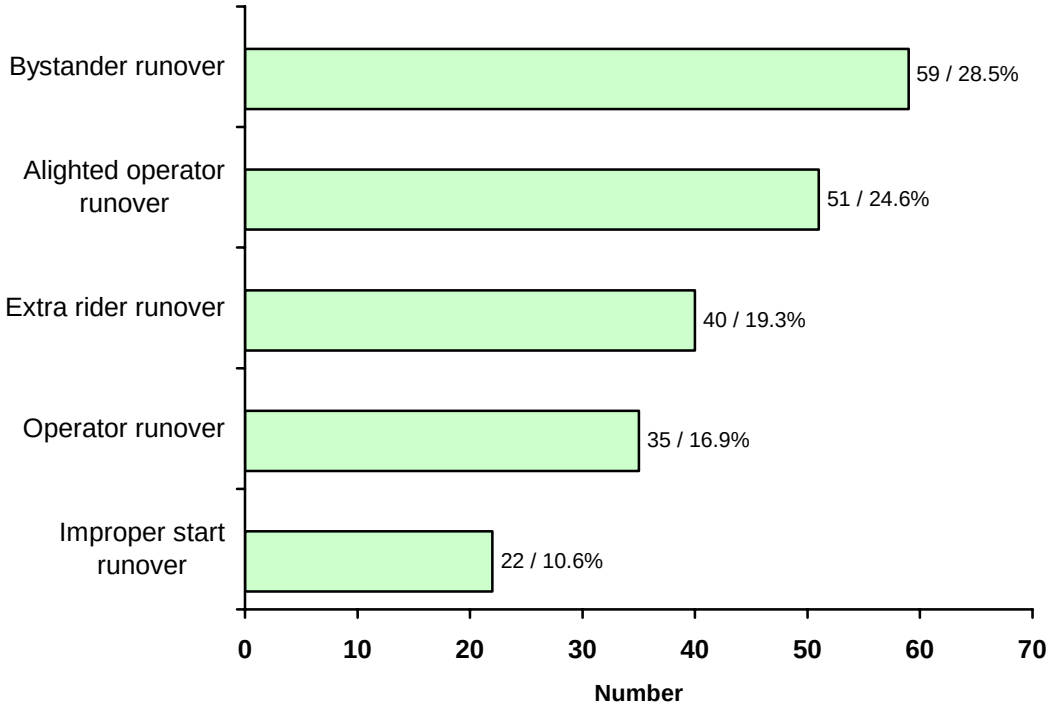
TABLE 3.2 Fatal agricultural runover fatalities by age group and runover type*, 1990-2000

	0 – 14 years		15 – 59 years		60 + years		TOTAL	
Cause of Injury	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Operator runover	1	1.4	12	24.5	22	25.9	35	16.9
Alighted operator runover	1	1.4	18	**36.7**	32	**37.6**	51	24.6
Improper start runover	--	--	7	14.3	15	17.6	22	10.6
Bystander runover	41	**56.2**	6	12.2	12	14.1	59	**28.5**
Extra rider runover	31	42.5	8	16.3	7	8.2	40	19.3
TOTAL*	**73**	**100.0**	**49**	**100.0**	**85**	**100.0**	**207**	**100.0**

*Runover types are defined in chapter 2.

Overall, bystander and alighted operator runovers were the most common types of fatal runover event. In children, the vast majority of tractor runovers were bystander or extra rider events. In both adult age groups, alighted operator runovers were the most frequent runover type, followed by operator runovers. Extra rider runovers were almost twice as common in adults aged 15-59 than in adults aged 60+.

FIGURE 3.7 Agricultural runover fatalities by type of runover event, 1990-2000 (207 cases)



Bystander runovers (including blind runovers) and alighted operator runovers were the most frequent types of fatal runover event.

4 AGRICULTURAL RUNOVER FATALITIES: TRACTORS

4.1 AGE GROUP

Fatal tractor runovers were most frequent for children aged 0-4 and for adults aged 60 and over. Children under five and adults in the age groups 60-69, 70-79 and 80+ were over-represented as victims of fatal tractor runovers relative to their proportion of the farm population. This was especially true for older adults. The percentage of adults aged 80+ who died in fatal tractor runovers was 5.9 times the percentage of adults that age in the general farm population. The percentage of adults 70-79 who were victims of fatal tractor runovers was 6.4 times the percentage of adults of that age in the farm population.

TABLE 4.1 Fatal agricultural tractor runovers by age group, 1990-2000 (135 cases)

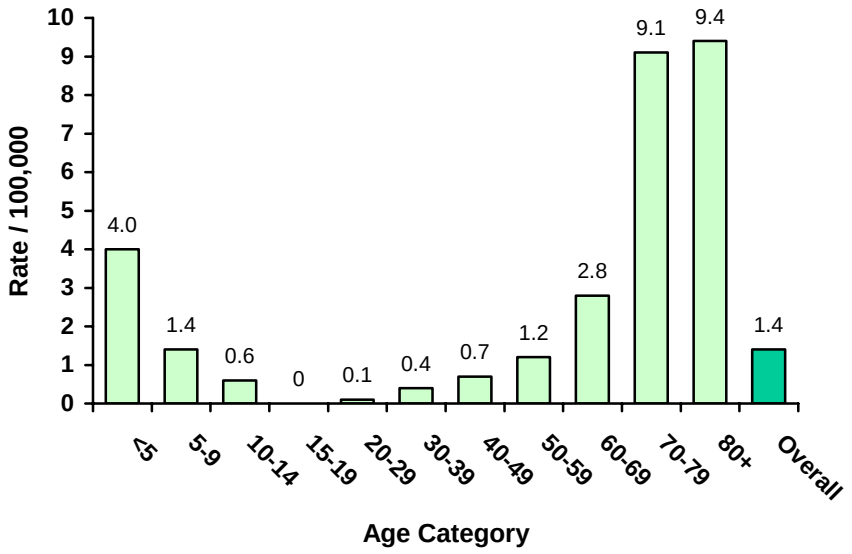
Age Group (Years)	Deaths		Farm Population*		Crude Rate Per
	No.	%	No.	%	100,000/yr
<5	23	17.0	52,125	6.1	4.0
5 – 9	11	8.1	71,035	8.3	1.4
10 – 14	6	4.4	84,025	9.9	0.6
15 – 19	0	0.0	80,455	9.4	0
20 – 29	1	0.7	80,775	9.5	0.1
30 – 39	6	4.4	121,230	14.2	0.4
40 – 49	11	8.1	139,425	16.4	0.7
50 – 59	15	11.1	110,135	12.9	1.2
60 – 69	23	17.0	73,620	8.6	2.8
70 – 79	31	23.0	30,825	3.6	9.1
80 +	8	5.9	7,755	1.0	9.4
Total	**135**	**100.0**	**851,405**	**100.0**	**1.4**

* Statistics Canada, Census of Agriculture, 1996

4.2 RUNOVER RATE BY AGE GROUP

Age specific tractor runover rates were highest in children under five years old and adults aged 70 and over.

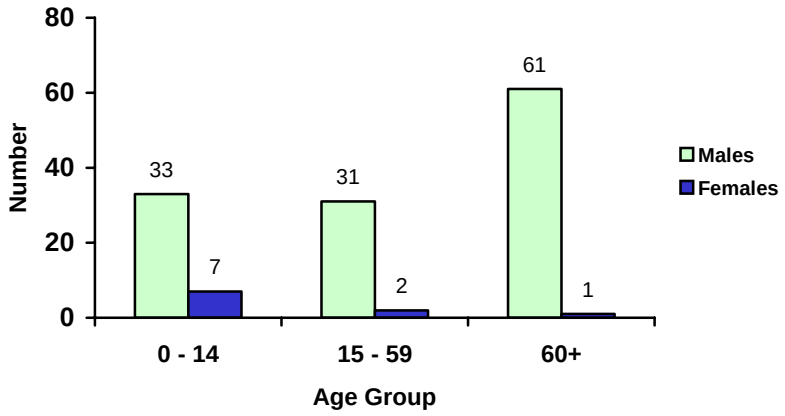
FIGURE 4.1 Age-specific fatal agricultural tractor runover rates in Canada, 1990-2000 (135 cases)



4.3 AGE AND GENDER

In all age groups, fatal tractor runovers were much more frequent for males than for females. The lowest ratio of male deaths to female deaths (4.7:1) was in the youngest age group.

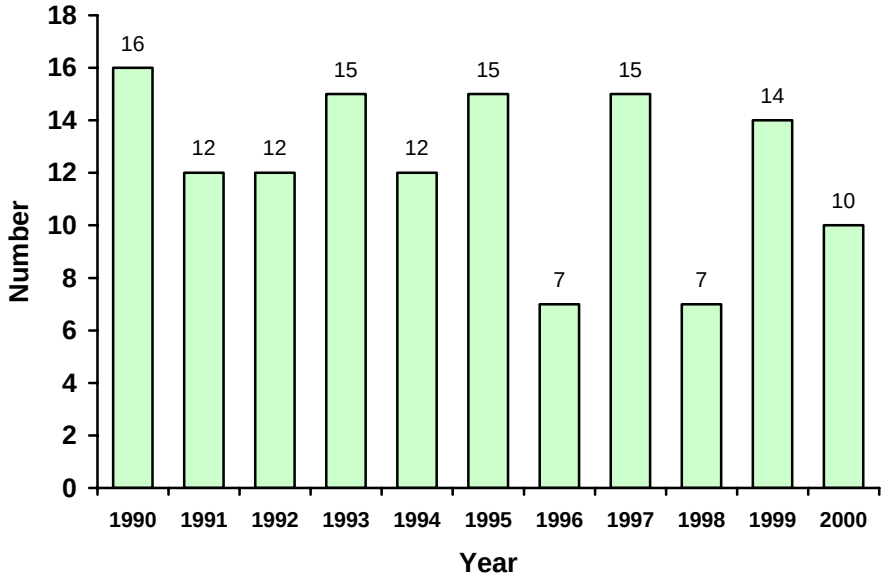
FIGURE 4.2 **Fatal agricultural tractor runovers by age and gender, 1990-2000 (135 cases)**



4.4 FATALITIES BY YEAR

There was no discernable trend in the annual number of agricultural tractor runovers in Canada over the eleven-year surveillance period. On average, there were 12.3 tractor runovers per year.

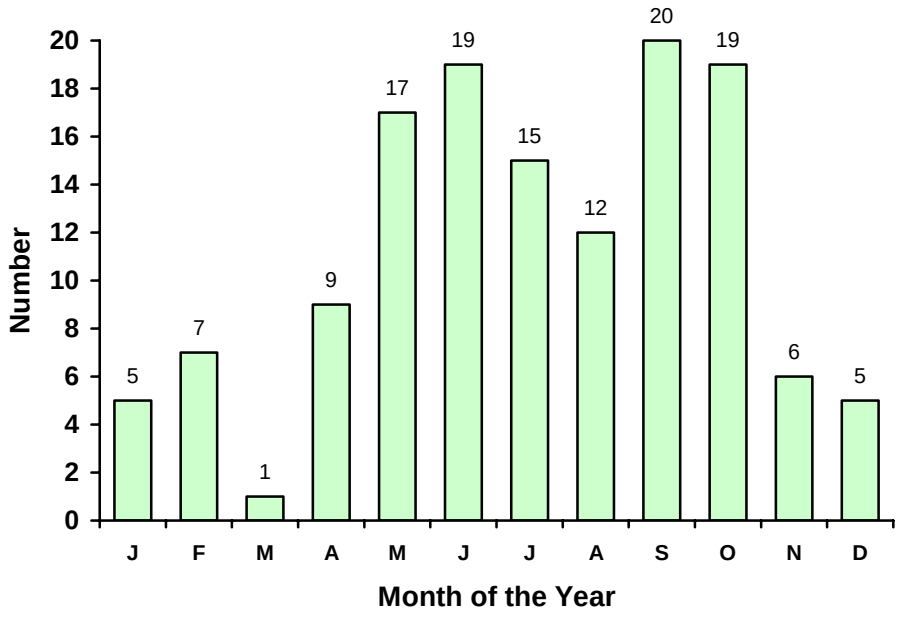
FIGURE 4.3 **Fatal agricultural tractor runovers by year, 1990-2000 (135cases)**



4.5 FATALITIES BY MONTH

There were peaks in agricultural tractor runover fatalities during the months of May to June and September to October.

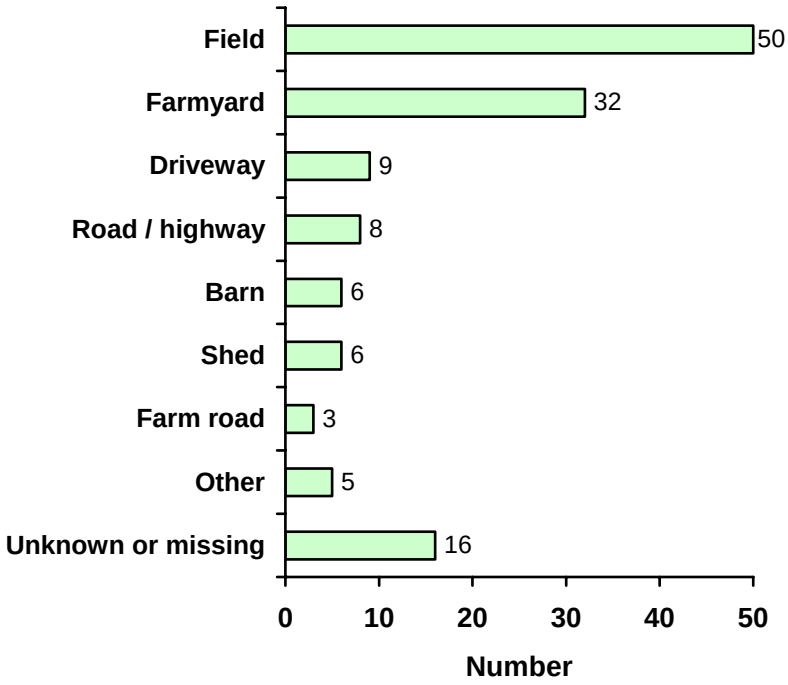
FIGURE 4.4 **Fatal agricultural tractor runovers by month of the year, 1990-2000 (135 cases)**



4.6 FATALITIES BY LOCATION

Fields and farmyards were the most frequent locations of fatal tractor runovers.

FIGURE 4.5 **Fatal agricultural tractor runovers by location of injury event, 1990-2000 (135 cases)**



4.7 TYPE OF RUNOVER EVENT (135 cases)

TABLE 4.2 Fatal agricultural tractor runover fatalities by age group and runover type*, 1990-2000

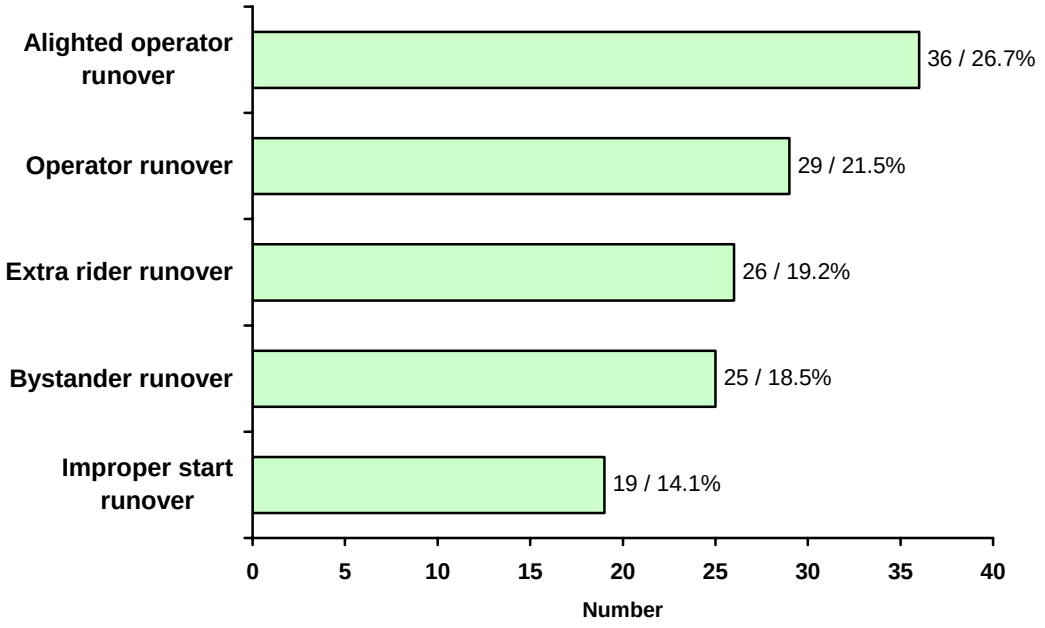
Cause of Injury	0 – 14 years No.	%	15 – 59 years No.	%	60 + years No.	%	TOTAL No.	%
Operator runover	1	2.5	10	30.3	18	29.0	29	21.5
Alighted operator runover	--	--	13	**39.4**	23	**37.1**	36	**26.7**
Improper start runover	--	--	6	18.2	13	21.0	19	14.1
Bystander runover	19	47.5	1	3.0	5	8.1	25	18.5
Extra rider runover	20	**50.0**	3	9.1	3	4.8	26	19.3
TOTAL*	**40**	**100.0**	**33**	**100.0**	**62**	**100.0**	**135**	**100.0**

*Runover types are defined in chapter 2.

Overall, the majority of fatal tractor runover events were alighted operator runovers and operator runovers. This was mainly due to the large number of alighted operator and operator runovers in the adult age groups. In children, tractor runover fatalities almost all involved extra rider or bystander runover events.

In younger adults, extra rider and bystander tractor runovers were relatively uncommon. Most of the fatal tractor runovers in younger adults were due to alighted operator runovers, operator runovers and improper start runovers. In older adults all potential types of fatal tractor runover events occurred in significant numbers, with alighted operator runovers being the most frequent type of fatal tractor runover.

FIGURE 4.6 Fatal agricultural tractor runover fatalities by type of runover event, 1990-2000 (135 cases)



Alighted operator runovers and operator runovers were the most frequent types of fatal tractor runover event.

5 AGRICULTURAL RUNOVER FATALITIES: OTHER MACHINES

5.1 AGE GROUP

Fatal non-tractor runovers were most frequent for children aged 0-4 and for adults aged 80 and over. Children aged 0-4 and 5-9 as well as adults in the age groups 70-79 and 80+ were over-represented as victims of fatal non-tractor runovers relative to their proportion of the farm population. This was especially true for the very young and the very old. The percentage of adults aged 80+ who died in fatal non-tractor runovers was 12.9 times the percentage of adults that age in the farm population. The percentage of children aged 0-4 who were victims of fatal non-tractor runovers was 5.2 times the percentage of children that age in the farm population.

TABLE 5.1 Fatal agricultural non-tractor runovers by age group, 1990-2000 (70 cases)

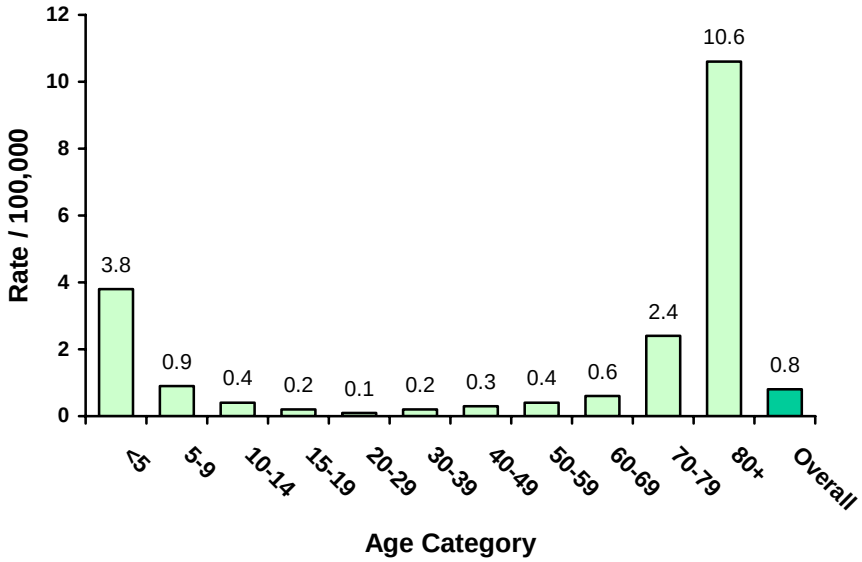
Age Group (Years)	Deaths		Farm Population*		Crude Rate Per
	No.	%	No.	%	100,000/yr
<5	22	31.4	52,125	6.1	3.8
5 - 9	7	10.0	71,035	8.3	0.9
10 - 14	4	5.7	84,025	9.9	0.4
15 - 19	2	2.9	80,455	9.4	0.2
20 - 29	1	1.4	80,775	9.5	0.1
30 - 39	3	4.3	121,230	14.2	0.2
40 - 49	4	5.7	139,425	16.4	0.3
50 - 59	5	7.1	110,135	12.9	0.4
60 - 69	5	7.1	73,620	8.6	0.6
70 - 79	8	11.4	30,825	3.6	2.4
80 +	9	12.9	7,755	1.0	10.6
Total	**70**	**100.0**	**851,405**	**100.0**	**0.8**

* Statistics Canada, Census of Agriculture, 1996

5.2 RUNOVER RATE BY AGE GROUP

Fatal non-tractor runovers were most frequent in adults 70 and older and in children under 5.

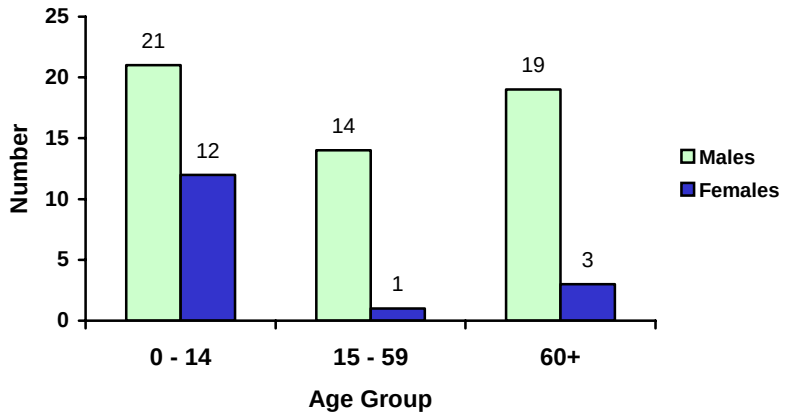
FIGURE 5.1 Age-specific fatal agricultural non-tractor runover rates in Canada, 1990-2000 (70 cases)



5.3 AGE AND GENDER

For fatal non-tractor runovers in children there was a relatively low ratio of male deaths to female deaths (1.8:1) in comparison with other types of farm fatalities. Non-tractor runover fatalities among females were not common in the older age groups.

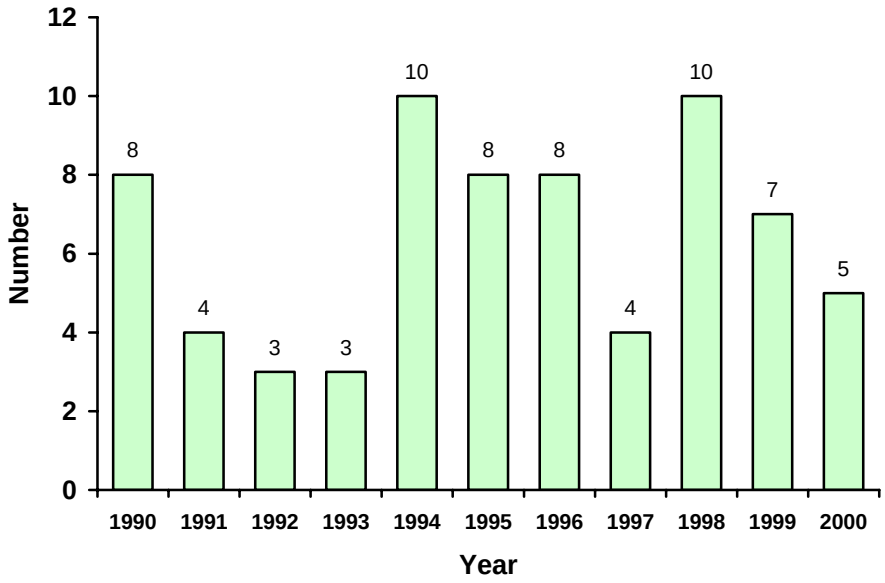
FIGURE 5.2 **Fatal agricultural non-tractor runovers by age and gender, 1990-2000 (70 cases)**



5.4 FATALITIES BY YEAR

There was no discernable pattern in the annual number of agricultural non-tractor runover fatalities over the eleven-year surveillance period. There was an average of about 6.4 non-tractor runovers per year.

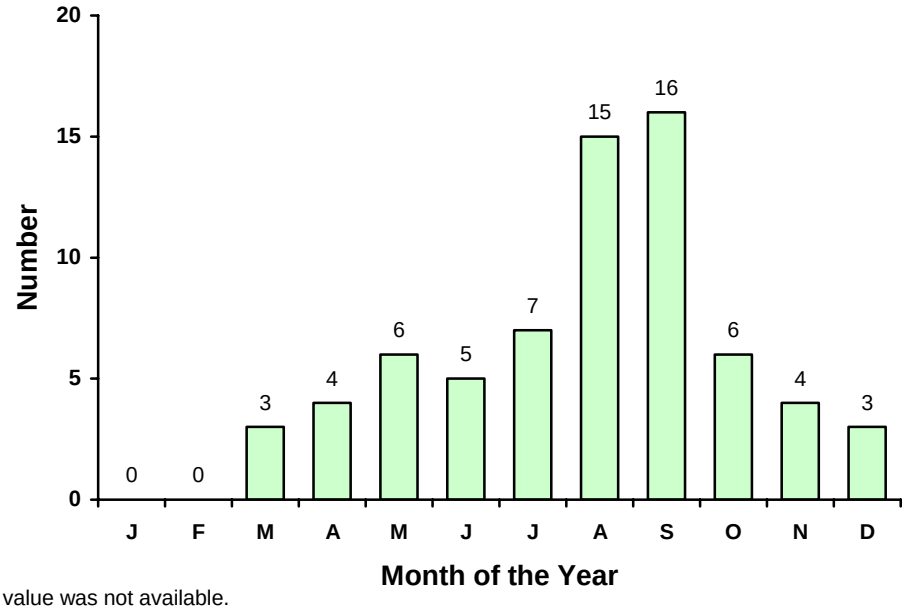
FIGURE 5.3 **Fatal agricultural non-tractor runovers by year, 1990-2000 (70 cases)**



5.5 FATALITIES BY MONTH

There was a clear peak in the number of fatal non-tractor runovers during the months of August and September.

FIGURE 5.4 Fatal agricultural non-tractor runovers by month of the year, 1990-2000 (69 cases*)

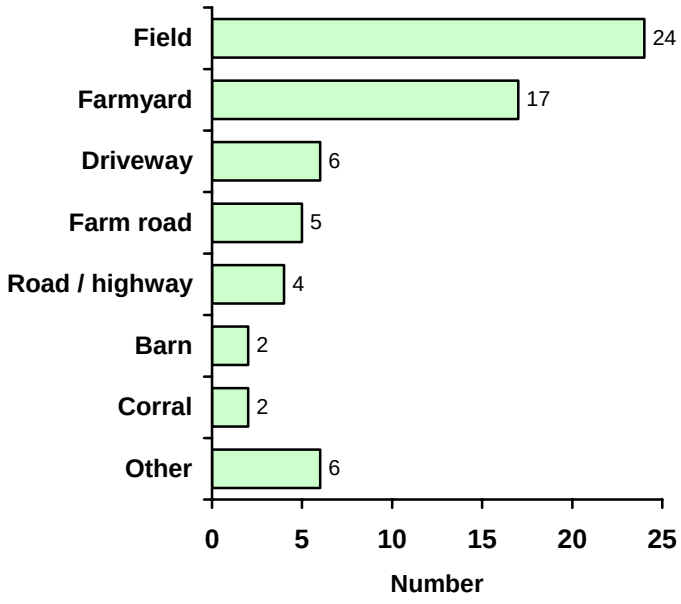


*One value was not available.

5.6 FATALITIES BY LOCATION

Fields, farmyards and driveways are the most frequent locations of fatal non-tractor runovers.

FIGURE 5.5 Fatal agricultural non-tractor runovers by location of injury event, 1990-2000 (66 cases*)



*Location was not known for four cases.

5.7 TYPE OF RUNOVER EVENT

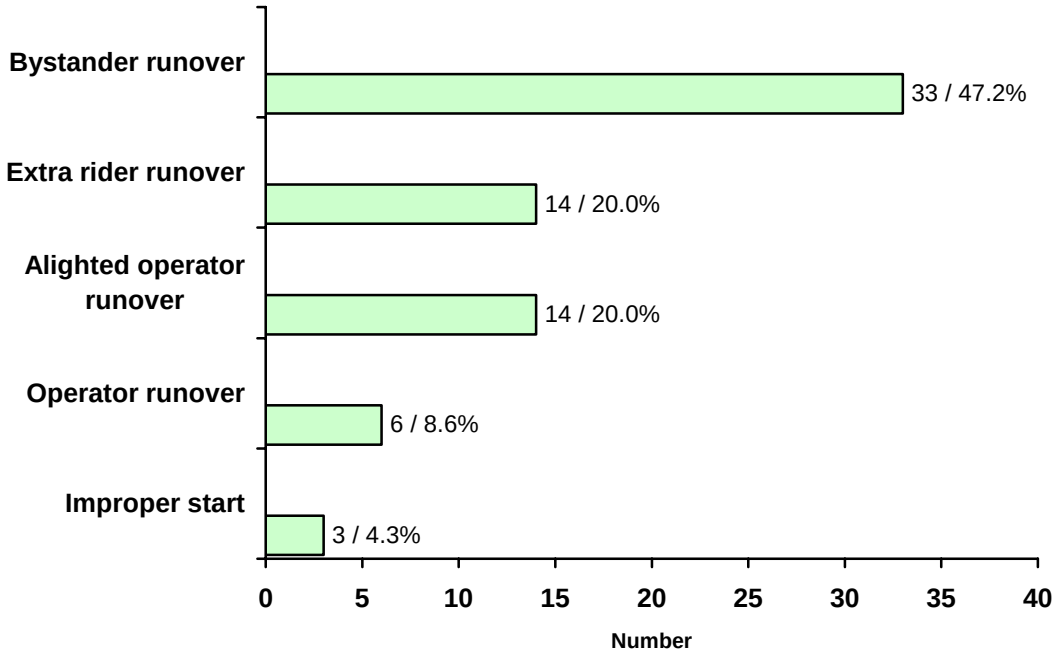
TABLE 5.2 Fatal agricultural non-tractor runovers by age group and runover type*, 1990-2000

Cause of Injury	0 – 14 years No.	0 – 14 years %	15 – 59 years No.	15 – 59 years %	60 + years No.	60 + years %	TOTAL No.	TOTAL %
Operator runover	0	0.0	2	13.3	4	18.2	6	8.6
Alighted operator runover	1	3.0	5	**33.3**	8	**36.4**	14	20.0
Improper start runover	0	0.0	1	6.7	2	9.1	3	4.3
Bystander runover	22	**66.7**	4	26.7	7	31.8	33	**47.1**
Extra rider runover	10	30.3	3	20.0	1	4.5	14	20.0
TOTAL*	**33**	**100.0**	**15**	**100.0**	**22**	**100.0**	**70**	**100.0**

*Runover types are defined in chapter 2.

Overall, bystander runovers were by far the most common type of non-tractor runover event. This was due to the large number of fatal bystander non-tractor runovers in children. In children, most of the non-tractor runover fatalities were caused by bystander or extra-rider events. In younger adults, alighted operator runovers were the most frequent type of non-tractor runover. In older adults, alighted operator runovers and bystander runovers both occurred relatively frequently.

FIGURE 5.6 Agricultural non-tractor runovers by type of runover event, 1990-2000 (70 cases)



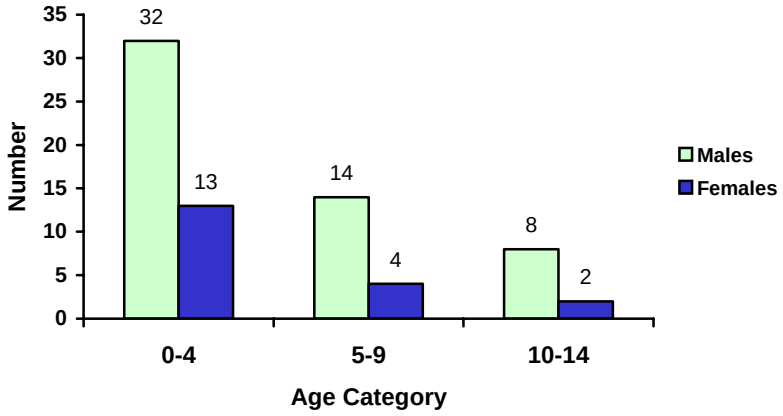
Bystander runovers were the most common type of non-tractor runover event, followed by extra rider and alighted operator runovers. The non-tractor machine types most commonly involved in the bystander runovers were pick up trucks (21.2%), grain trucks (18.2%) and wagons/trailers (18.2%).

6 AGRICULTURAL RUNOVER FATALITIES: CHILDREN UNDER 15

6.1 AGE AND GENDER

74% of the child victims of fatal runovers were male. 61.6% of the runover victims were under five years' old. 15.1% were toddlers or infants less than two years' old. The ratio of males to females runover was lowest in the 0-4 age group. (2.5:1)

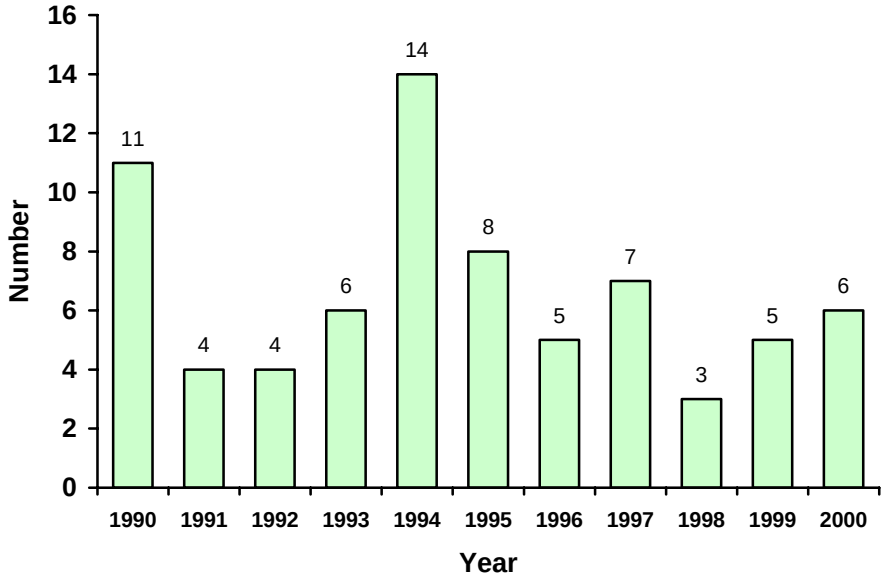
FIGURE 6.1 **Fatal agricultural runovers in children by age and gender, 1990-2000 (73 cases)**



6.2 FATALITIES BY YEAR

There was marked variation in the number of fatal agricultural runovers per year in children. Over the eleven-year surveillance period, there was an average of 6.6 fatal agricultural runovers per year.

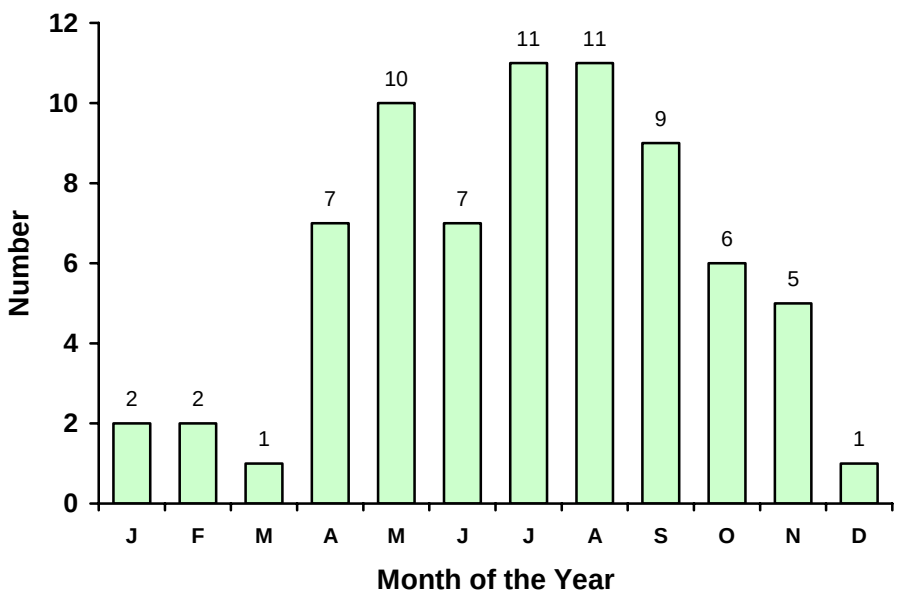
FIGURE 6.2 **Fatal agricultural runovers in children by year, 1990-2000 (73 cases)**



6.3 FATALITIES BY MONTH

Most fatal runovers in children occurred in May, and in the months of July to September.

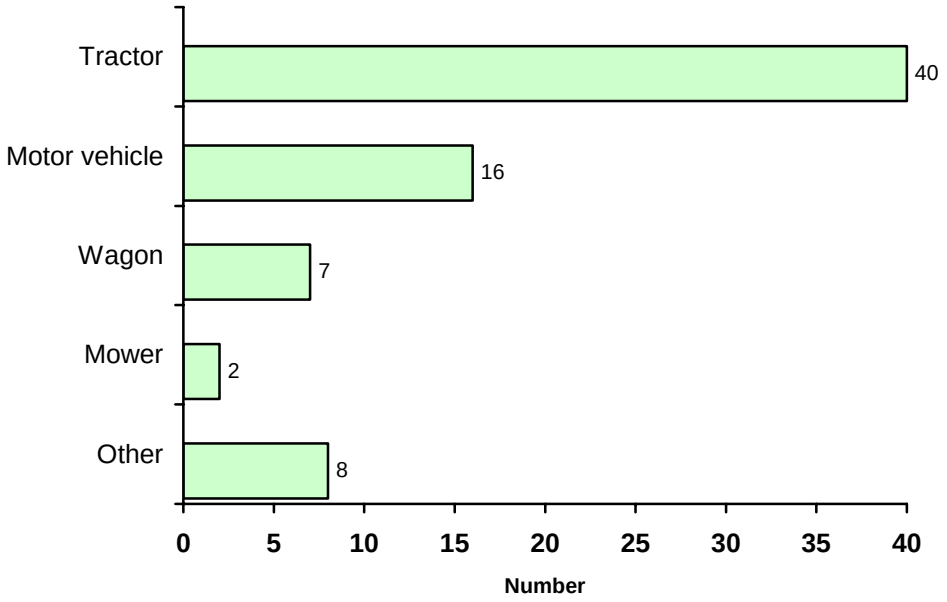
FIGURE 6.3 **Fatal agricultural runovers in children by month of the year, 1990-2000 (72 cases*)**



*This information was not available for one case.

6.4 FATALITIES BY MACHINE TYPE

FIGURE 6.4 **Fatal agricultural runovers in children by machine type, 1990-2000 (73 cases)**

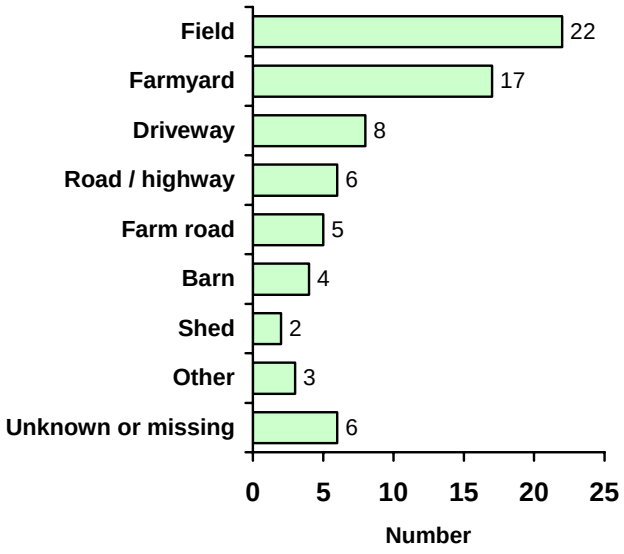


Most fatal runovers in children involved tractors and motor vehicles (mainly pick up trucks.)

6.5 FATALITIES BY LOCATION

FIGURE 6.5 **Fatal agricultural runovers in children by location of injury event, 1990-2000 (67 cases*)**

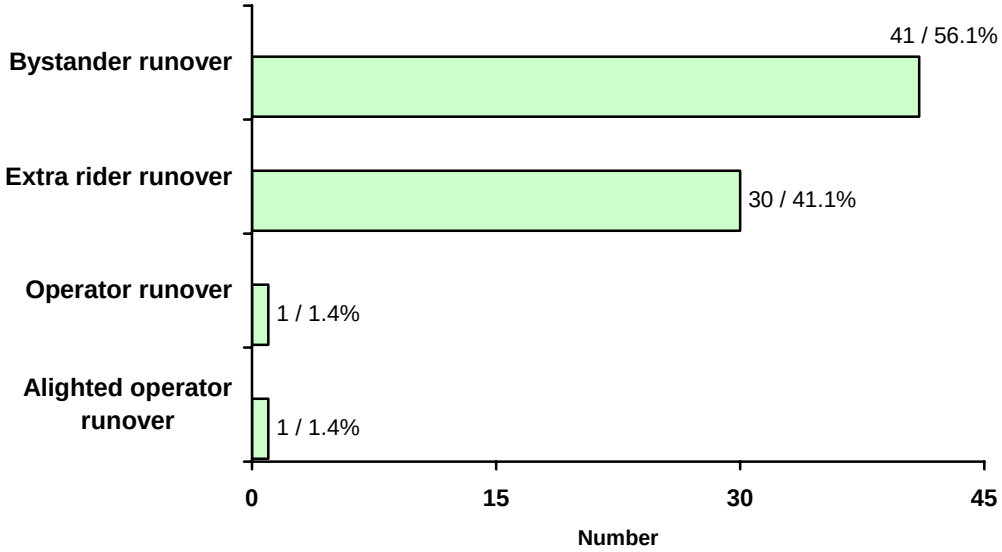
In children, fatal runovers most frequently occurred in fields and farmyards.



* Location was unknown or missing in six cases.

6.6 TYPE OF RUNOVER EVENT

FIGURE 6.6 **Fatal agricultural runover fatalities in children by type of runover event*, 1990-2000 (73 cases)**



*Runover types are defined in chapter 2

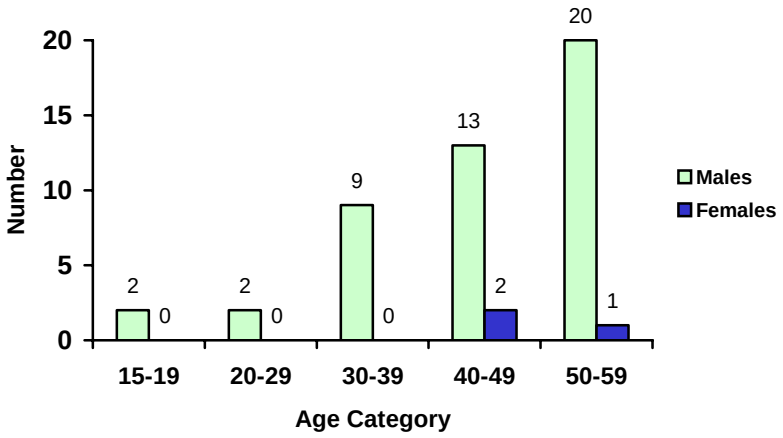
The vast majority of fatal runovers in children were either bystander or extra-rider events. Most of the child victims of bystander (70.7%) and extra rider (53.3%) runovers were less than five years old.

7 AGRICULTURAL RUNOVER FATALITIES: ADULTS AGED 15-59

7.1 AGE AND GENDER

In adults aged 15-59, 93.9% of the victims of fatal runovers were male. There was a clear trend towards increasing numbers of runovers in the older age categories. 73.5% of the adults aged 15-59 killed in fatal runovers were 40 and over.

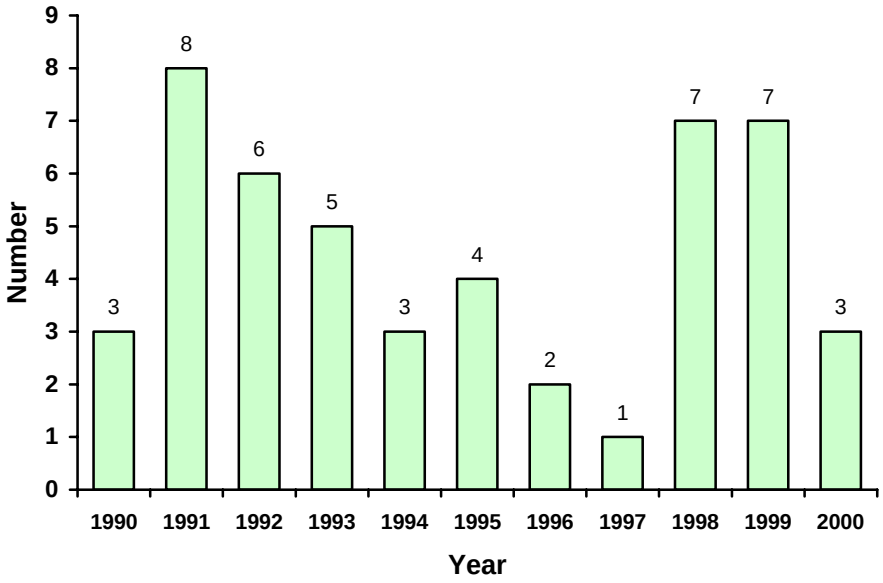
FIGURE 7.1 **Fatal agricultural runovers in adults aged 15-59 by age and gender, 1990-2000 (49 cases)**



7.2 FATALITIES BY YEAR

Over the surveillance period, there was wide variation in the number of adults aged 15-59 killed in runover events annually. There was an average of 4.5 runovers per year in this age group.

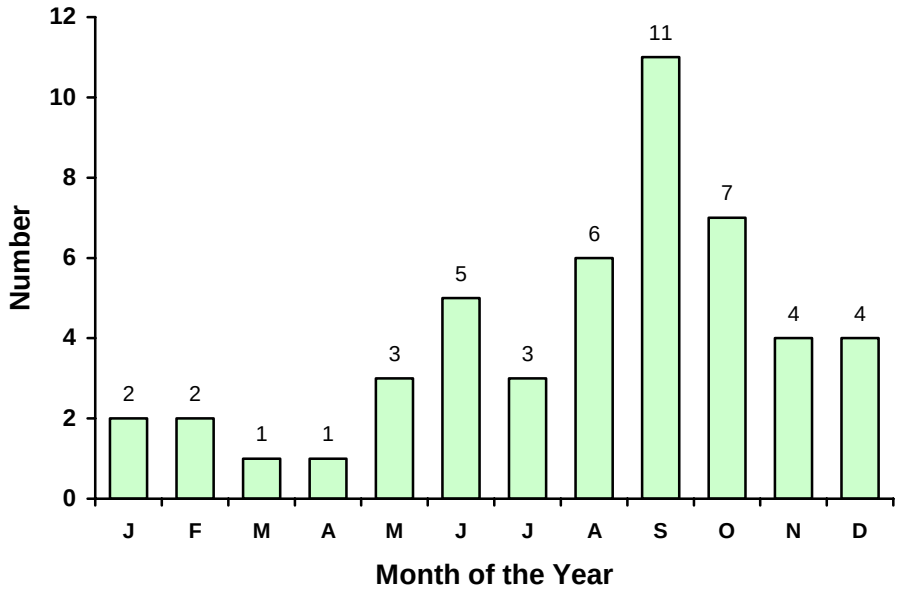
FIGURE 7.2 **Fatal agricultural runovers in adults aged 15-59 by year, 1990-2000 (49 cases)**



7.3 FATALITIES BY MONTH

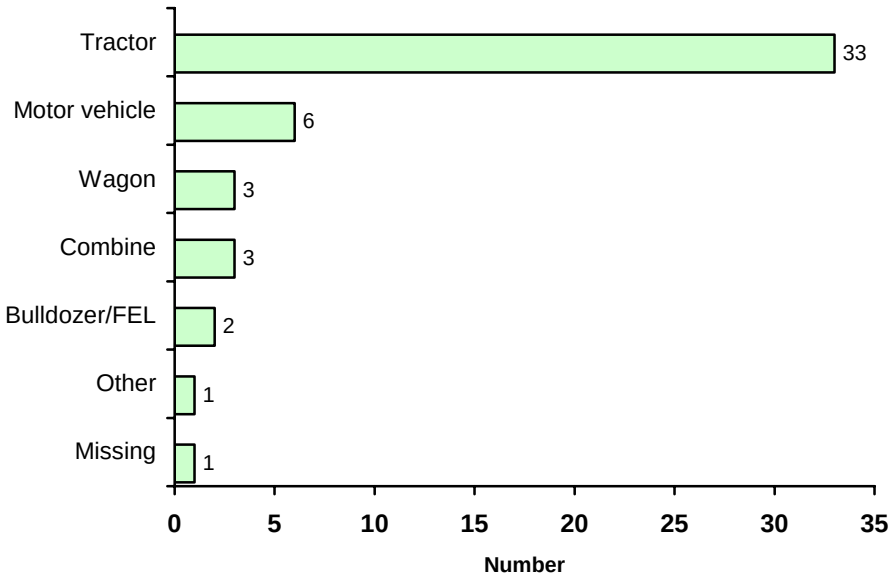
FIGURE 7.3 **Fatal agricultural runovers in adults aged 15-59 by month of the year, 1990-2000 (49 cases)**

In adults aged 15-59, there were more runover fatalities in the fall around harvest season.



7.4 FATALITIES BY MACHINE TYPE

FIGURE 7.4 **Fatal agricultural runovers in adults aged 15-59 by machine type, 1990-2000 (48 cases)**

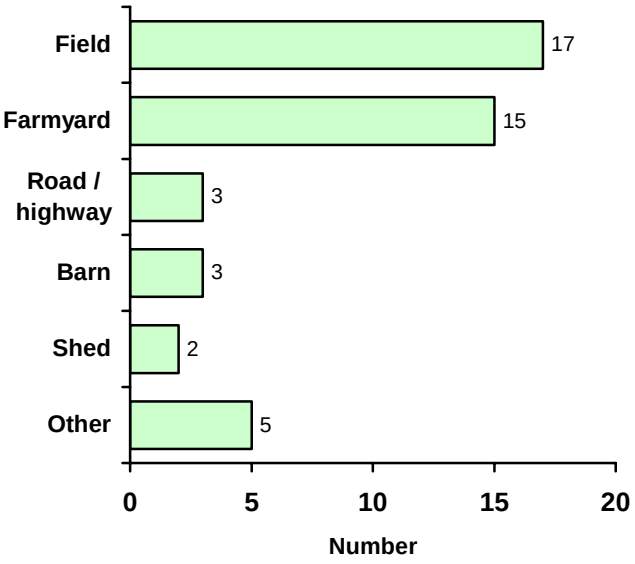


Tractors were by far the most common type of machine involved in fatal runovers of adults aged 15-59.

7.5 FATALITIES BY LOCATION

FIGURE 7.5 **Fatal agricultural runovers in adults aged 15-59 by location of injury event, 1990-2000 (45 cases)**

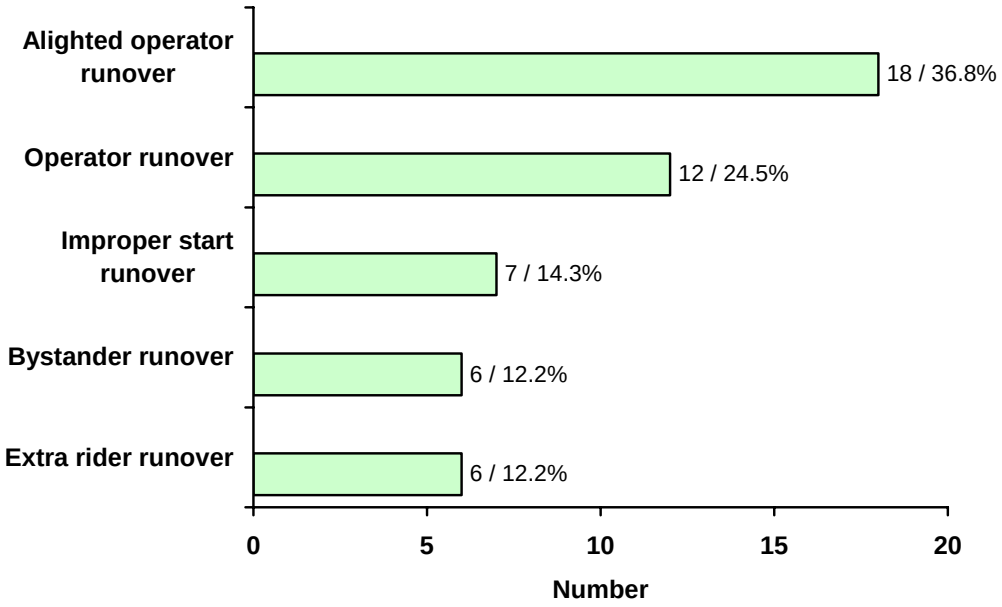
Fields and farmyards were almost equally likely to be locations of fatal runovers in adults aged 15-59. Runovers were relatively rare on roads and highways.



* Location was not available in 4 cases.

7.6 TYPE OF RUNOVER EVENT

FIGURE 7.6 **Fatal agricultural runovers in adults aged 15-59 by type of runover event*, 1990-2000 (49 cases.)**



*Runover types are defined in chapter 2

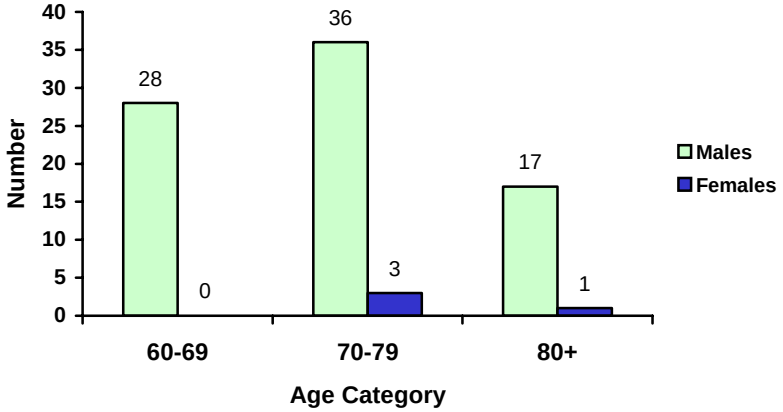
Alighted operator and operator runovers were the most common types of fatal runover events in adults aged 15-59.

8 AGRICULTURAL RUNOVER FATALITIES: ADULTS AGED 60+

8.1 AGE AND GENDER

95.3% of the adults aged 60+ involved in fatal runovers were male. 65.4% of the male victims of these fatal runovers were 70 years old or older. All four of the females involved in fatal runovers were 70 or older.

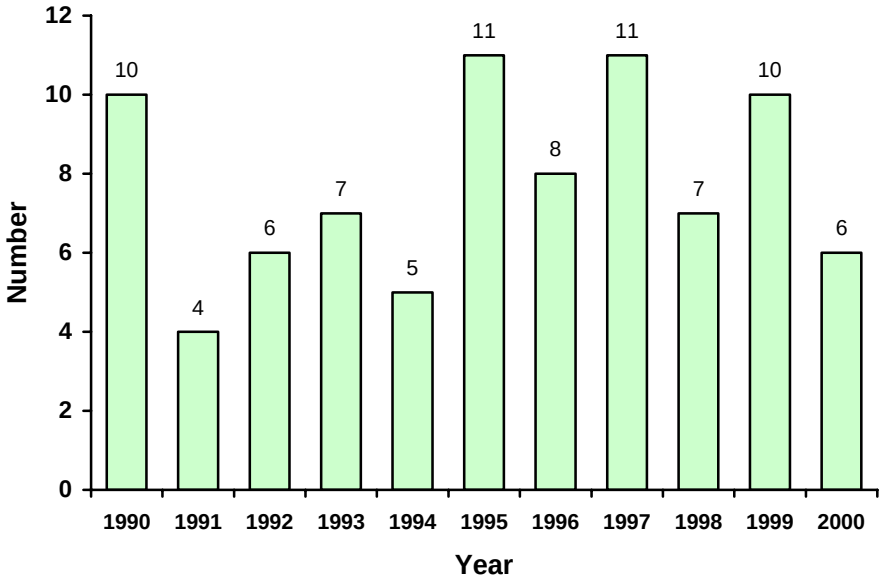
FIGURE 8.1 Fatal agricultural runovers in adults aged 60+ by age and gender, 1990-2000 (85 cases)



8.2 FATALITIES BY YEAR

There was a wide variation in the annual number of runover deaths in adults aged 60+ over the surveillance period. Runovers continue to be a leading cause of death for this age group, with an average of 7.7 adults aged 60+ killed per year in runover events.

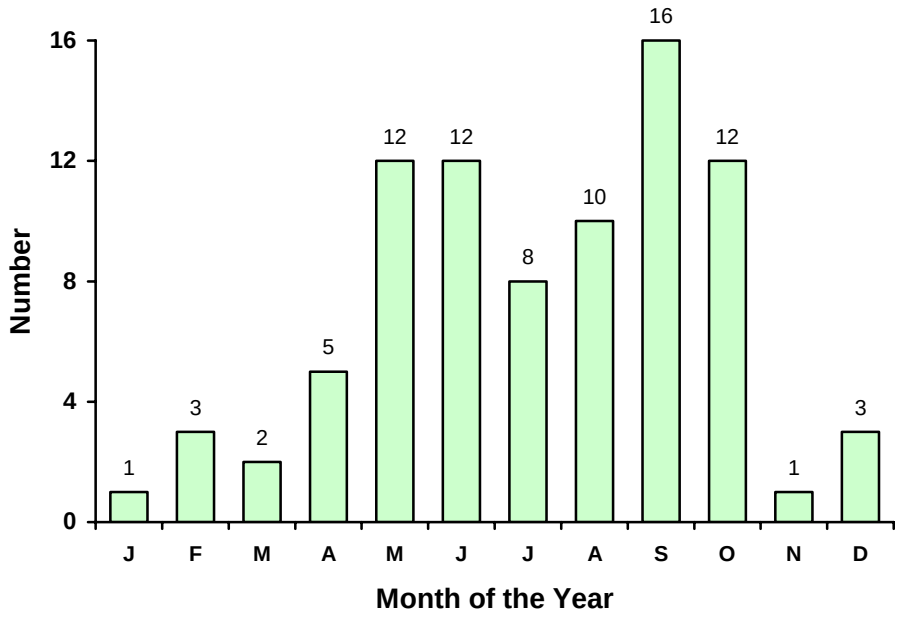
FIGURE 8.2 Fatal agricultural runovers in adults aged 60+ by year, 1990-2000 (85 cases)



8.3 FATALITIES BY MONTH

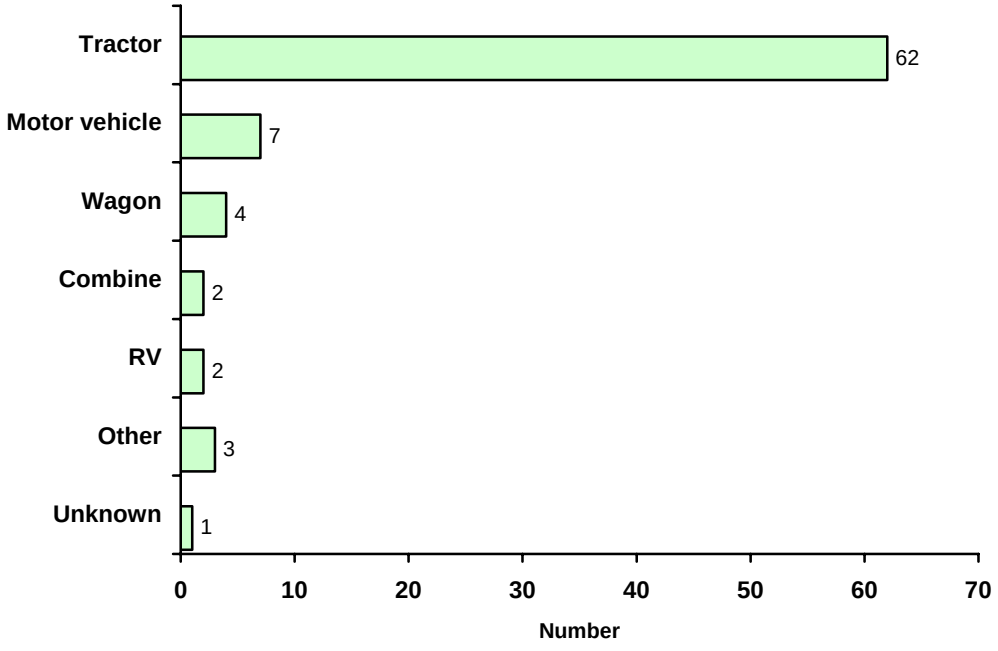
There were more runover fatalities in adults aged 60+ during active farming months.

FIGURE 8.3 **Fatal agricultural runovers in adults aged 60+ by month of the year, 1990-2000 (85 cases)**



8.4 FATALITIES BY MACHINE TYPE

FIGURE 8.4 **Fatal agricultural runovers in adults aged 60+ by machine type, 1990-2000 (83 cases)**

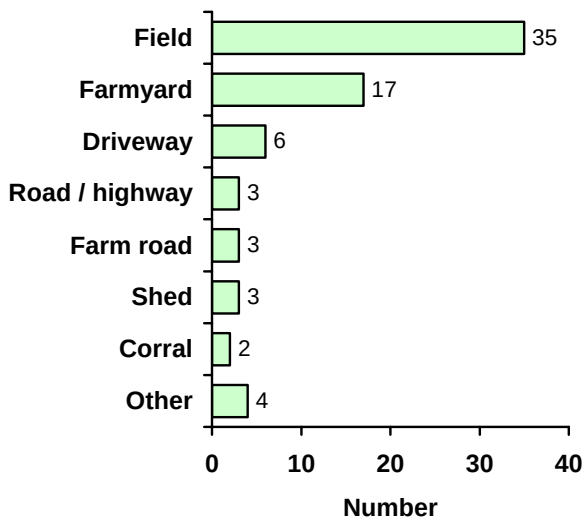


As was the case for adults aged 15-59, tractors were the machine type involved in by far the greatest number of fatal runovers for adults aged 60+.

8.5 FATALITIES BY LOCATION

FIGURE 8.5 **Fatal agricultural runovers in adults aged 60+ by location of injury event, 1990-2000 (73 cases)**

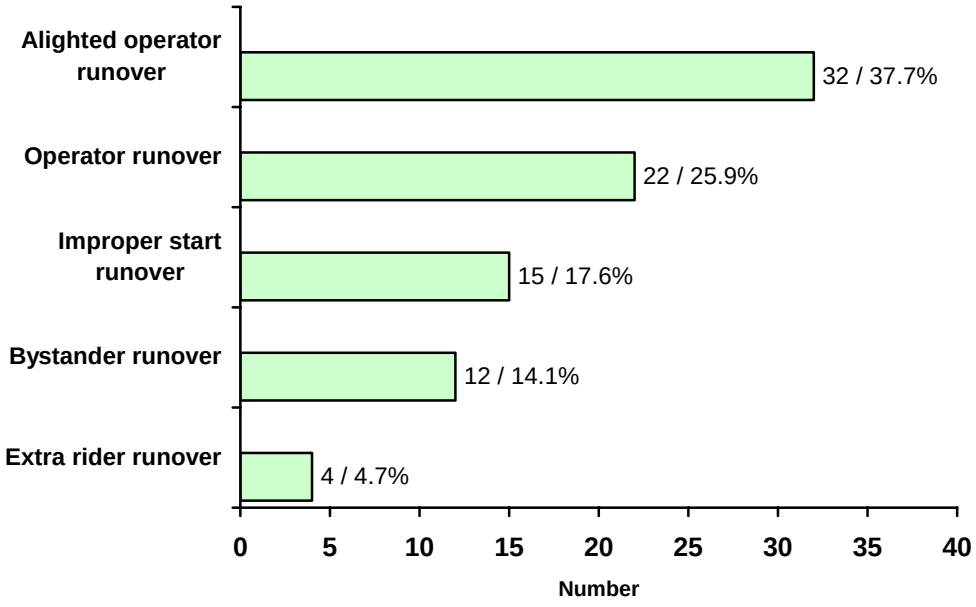
Fatal runovers in adults aged 60+ most often occurred in fields. Many adults in this age group were also involved in fatal runovers in farmyards.



*Location information was not available for 12 cases.

8.6 TYPE OF RUNOVER EVENT

FIGURE 8.6 **Fatal agricultural runover fatalities in adults aged 60+ by type of runover event*, 1990-2000 (85 cases)**



*Runover types are defined in chapter 2.

Alighted operator, operator and improper start runovers were the most common types of runover in adults aged 60+. 62.7% of all alighted operator runover fatalities and 68.2% of all improper start runover fatalities involved adults in this age group.

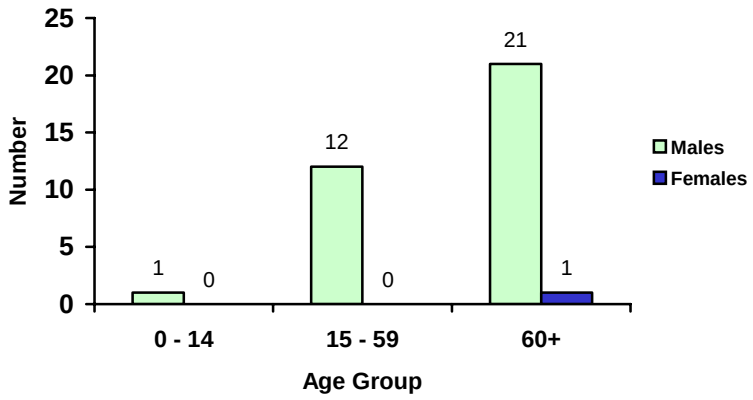
9 AGRICULTURAL RUNOVER FATALITIES: TYPE OF RUNOVER EVENT

9.1 OPERATOR RUNOVERS

9.1.1 AGE AND GENDER

FIGURE 9.1.1 **Fatal operator runovers by age and gender, 1990-2000 (35 cases)**

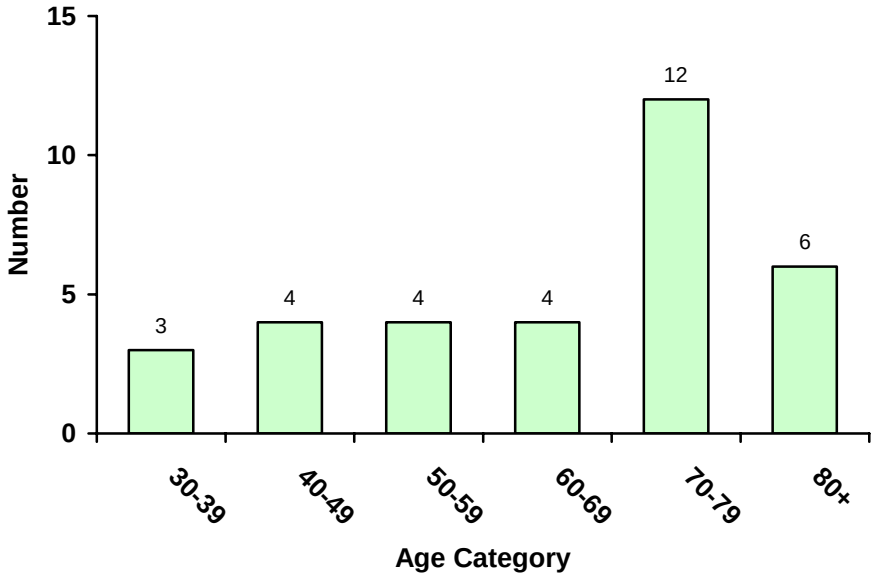
Only one female was involved in a fatal operator runover. Most fatal operator runovers occurred in adults aged 60+ and adults aged 15-59.



9.1.2 AGE CATEGORY

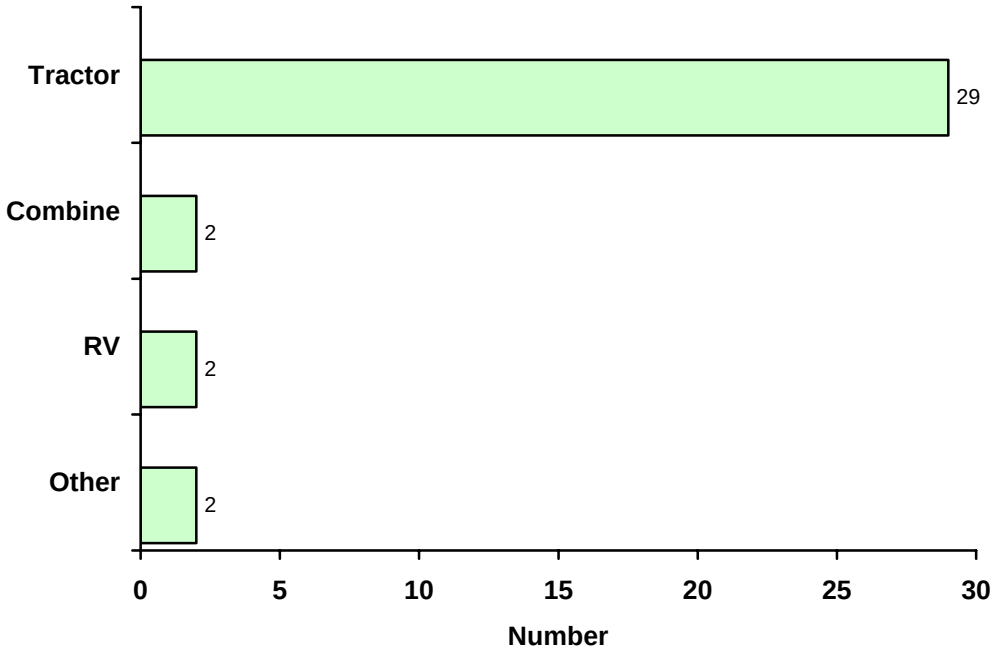
FIGURE 9.1.2 **Fatal operator runovers by age category, 1990-2000 (35 cases)**

94.3% of operator runover victims were aged 30 or over. 51.4% of those killed in operator runovers belonged to the two oldest age categories.



9.1.3 FATALITIES BY MACHINE TYPE

FIGURE 9.1.3 **Fatal operator runovers by machine type, 1990-2000 (35 cases)**

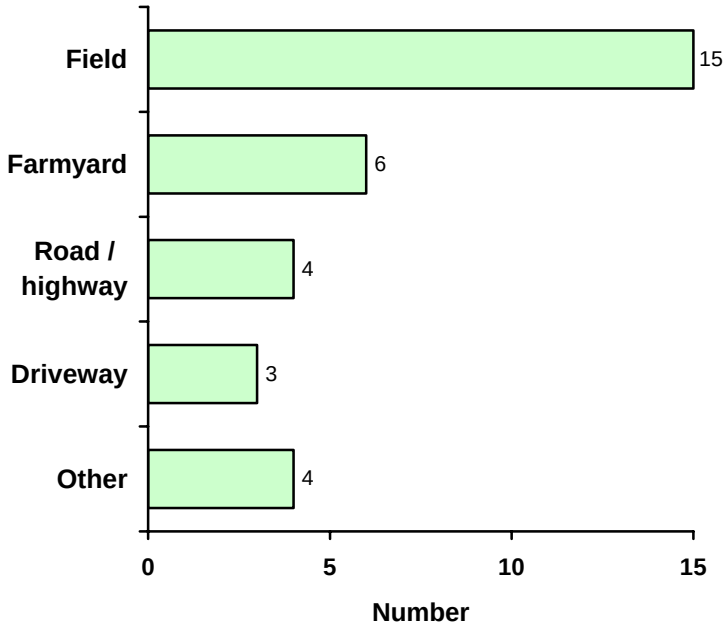


Tractors were involved in 82.9% of operator runovers.

9.1.4 FATALITIES BY LOCATION

FIGURE 9.1.4 **Fatal operator runovers by location of injury event, 1990-2000 (32 cases*)**

42.9% of the 35 operator runovers occurred in fields. A further 37.1% of operator runovers happened in farmyards, highways or driveways.

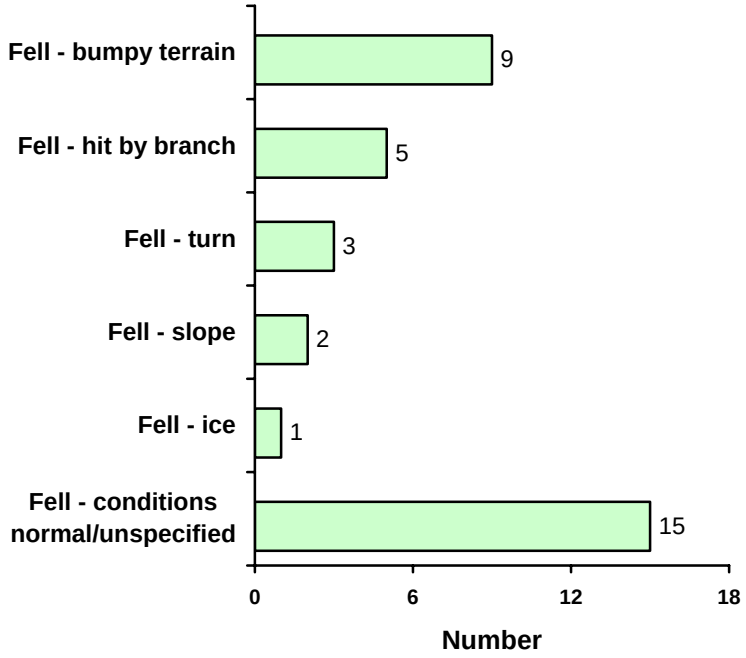


*This information was not available in 3 cases.

9.1.5 FATALITIES BY CIRCUMSTANCE

In 57.1% of the cases where an operator fell from a machine and was runover, environmental circumstances might have contributed to the fall. In three of the cases where adverse environmental circumstances were not mentioned, the operator's fall was attributed partly to a medical condition.

FIGURE 9.1.5 **Fatal operator runovers by circumstance of runover, 1990-2000 (35 cases)**

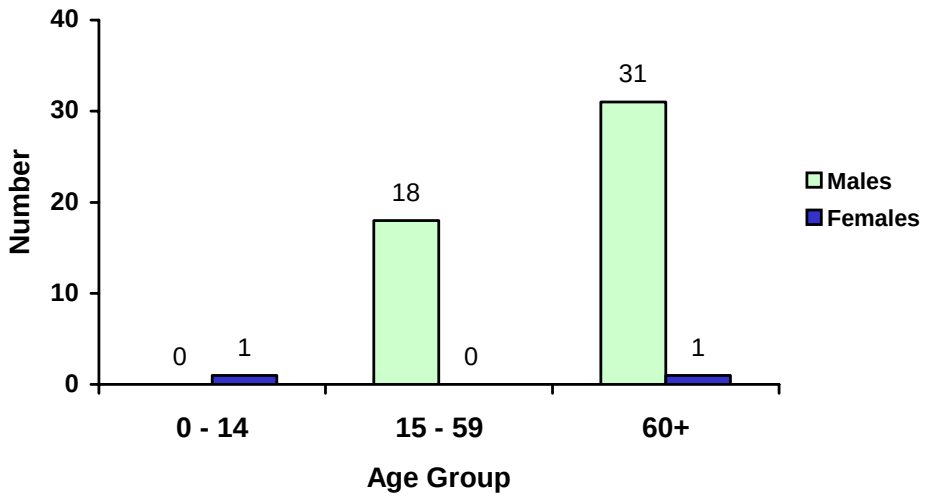


9.2 ALIGHTED OPERATOR RUNOVERS

9.2.1 AGE AND GENDER

FIGURE 9.2.1 **Fatal alighted operator runovers by age and gender, 1990-2000 (51 cases)**

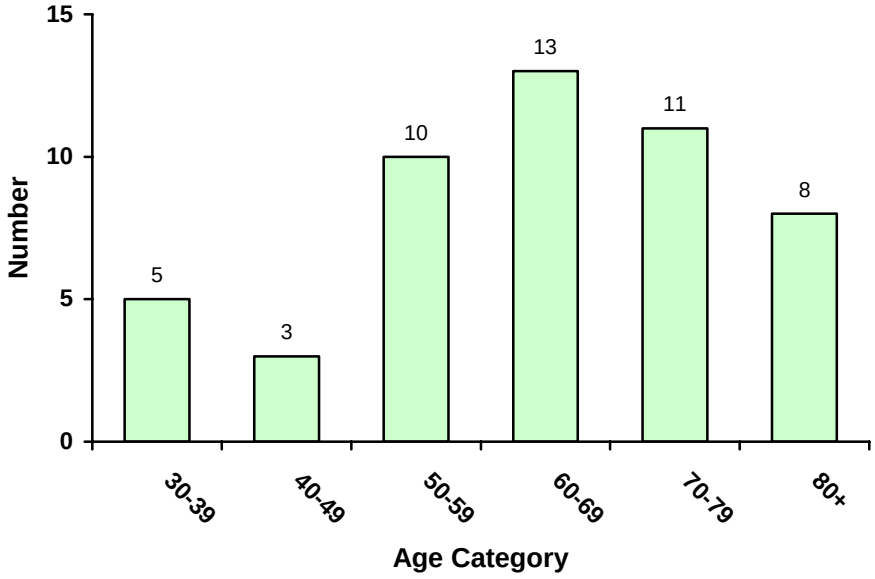
96.1% of the victims of alighted operator runovers were male. 98% of those killed belonged to the two oldest age groups.



9.2.2 AGE CATEGORY

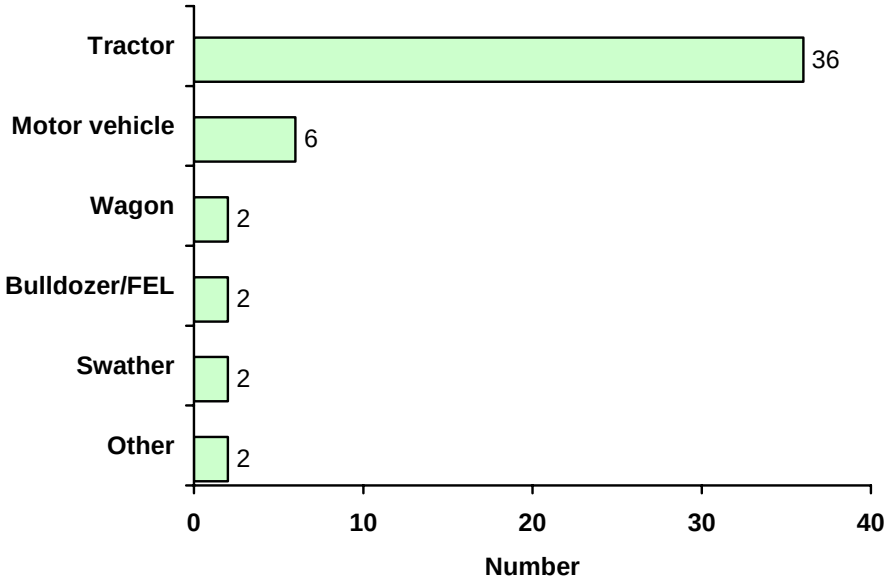
FIGURE 9.2.2 **Fatal alighted operator runovers by age category, 1990-2000 (51cases)**

Only one person under 30 years' old was killed in an alighted operator runover. 62.7% of the victims were adults aged 60+. 15.7% of those killed were aged 80 and over, which is an unusually high percentage given that only 0.9% of the farm population is aged 80+.



9.2.3 FATALITIES BY MACHINE TYPE

FIGURE 9.2.3 **Fatal alighted operator runovers by machine type, 1990-2000 (50 cases)**



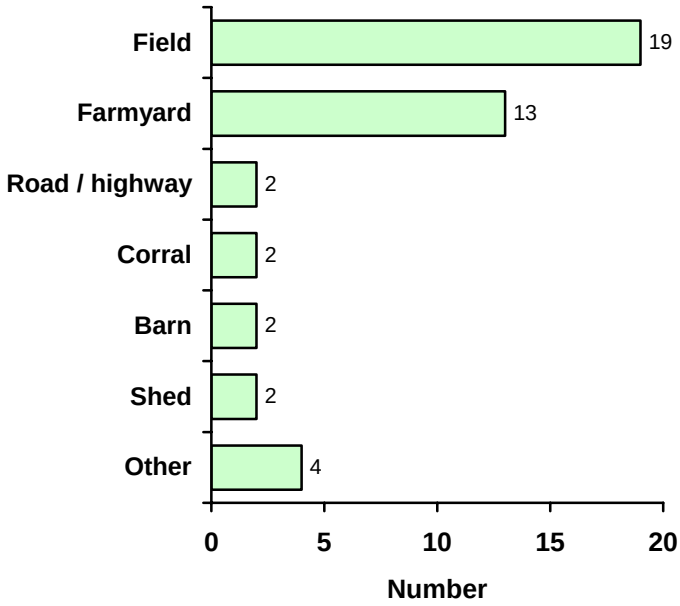
* This information was not available in one of the cases.

Tractors were involved in 70.6% of the alighted operator runovers. Motor vehicles, mainly trucks, were the machine type cited in 11.8% of the runovers.

9.2.4 FATALITIES BY LOCATION

FIGURE 9.2.4 **Fatal alighted operator runovers by location of injury event, 1990-2000 (44 cases*)**

62.7% of the 51 alighted operator runovers occurred in a field or in a farmyard.



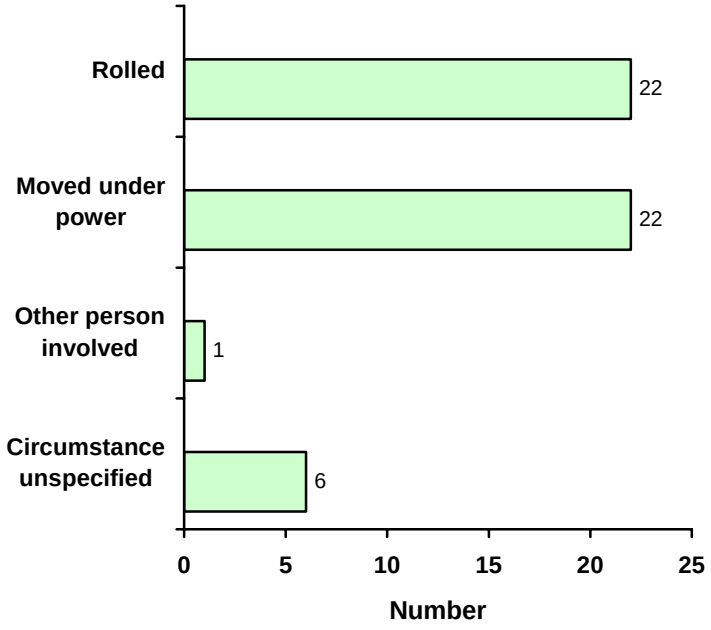
*This information was not available in seven of the cases.

9.2.5 FATALITIES BY CIRCUMSTANCE

In 43.1% of alighted operator runovers, the machine simply rolled into the victim. In at least 72.7% of those cases, it was stated that the machine rolled down an incline. Only one case description mentioned that the emergency brake had been set prior to the operator alighting.

In another 43.1% of alighted operator runovers, victims were runover by machines moving forwards under their own power. In 45.5% of those cases, the operator had left the machine's transmission in neutral, but it had either slipped or been knocked into gear.

FIGURE 9.2.5 **Fatal alighted operator runovers by circumstance of injury event, 1990-2000 (51 cases)**

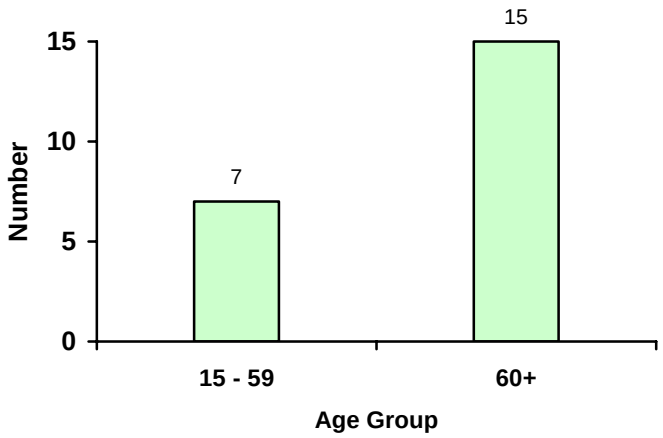


9.3 IMPROPER START RUNOVERS

9.3.1 AGE AND GENDER

All of the victims of improper start runovers were male. 68.2% were aged 60 or older.

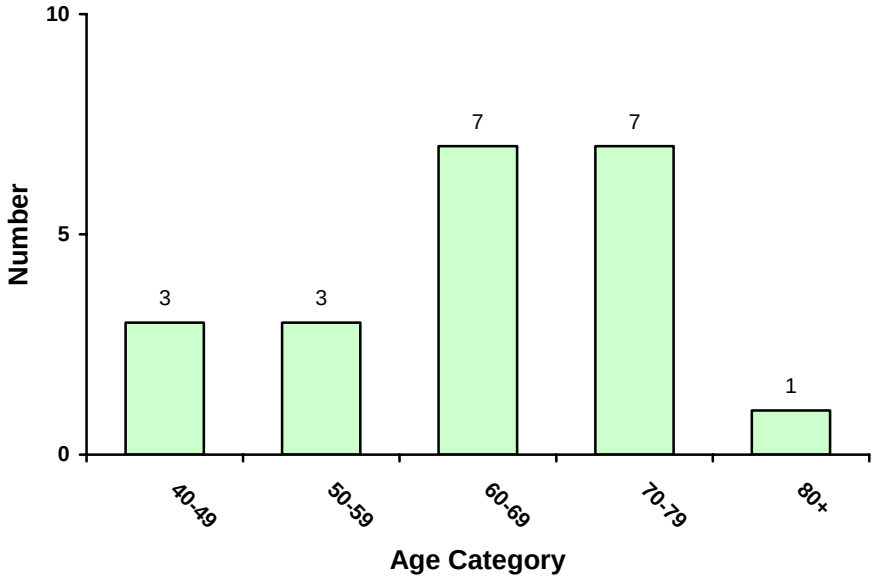
FIGURE 9.3.1 **Fatal improper start runovers by age and gender, 1990-2000 (22 cases)**



9.3.2 AGE CATEGORY

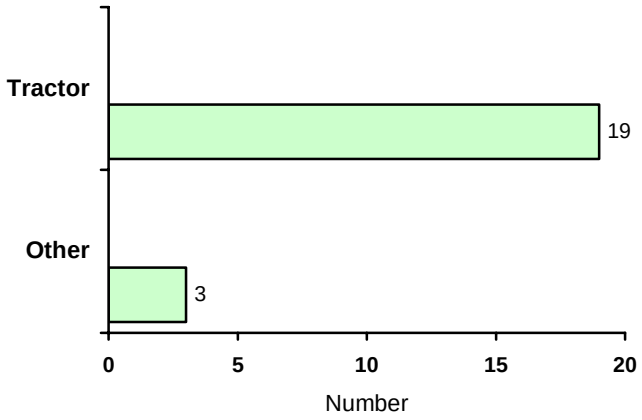
Only one person under 40 years old was killed in an improper start runover. Most of the victims of improper start runovers were aged 60-79.

FIGURE 9.3.2 **Fatal improper start runovers by age category, 1990-2000 (22 cases)**



9.3.3 FATALITIES BY MACHINE TYPE

FIGURE 9.3.3 **Fatal improper start runovers by machine type, 1990-2000 (22 cases)**

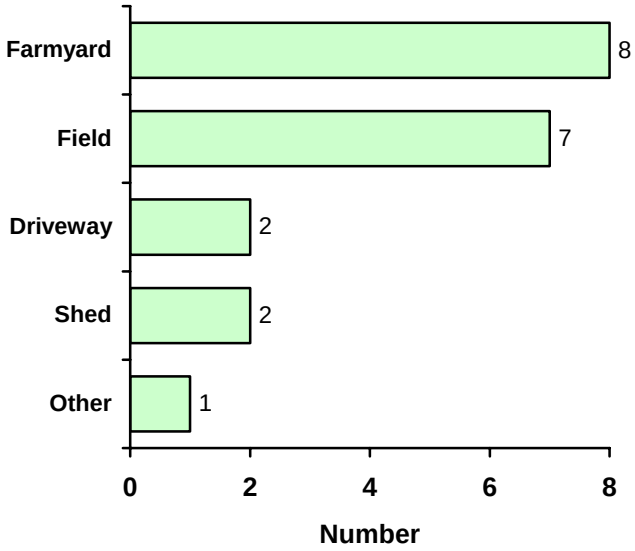


86.4% of improper start runovers involved tractors. The other vehicle types were a bobcat, a truck and a swather. One of the tractors dated from the 1930s.

9.3.4 FATALITIES BY LOCATION

FIGURE 9.3.4 **Fatal improper start runovers by location of injury event, 1990-2000 (20 cases)**

36.4% of the 22 improper start runovers occurred in farmyards and 31.8% in fields.



*This information was not available in 2 cases.

9.3.5 FATALITIES BY CIRCUMSTANCE

Fatal improper start runovers by circumstance of injury event, 1990-2000 (22 cases)

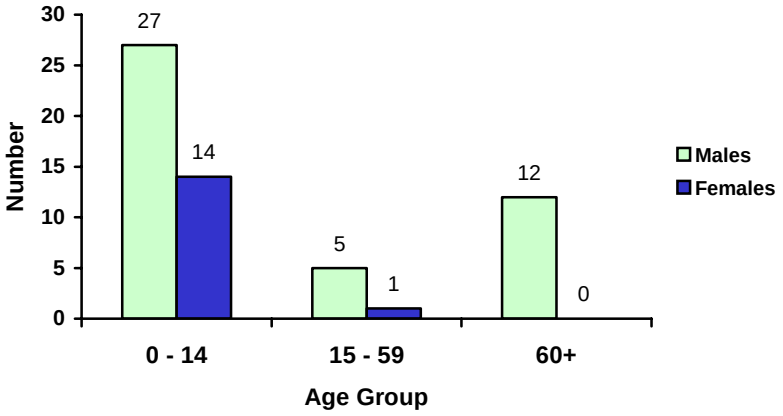
In 13.6% of the improper start runovers, the victim was engaged in a repair at the time of the runover event. In most of the other cases, the victim was starting the machine via its ignition box because he was unable to start it in the conventional manner.

9.4 BYSTANDER RUNOVERS

9.4.1 AGE AND GENDER

69.5% of the victims of bystander runovers were aged 14 or under. Bystander runovers were also a relatively serious problem for older farmers. 20.3% of those killed in bystander runovers were aged 60+.

FIGURE 9.4.1 **Fatal bystander runovers by age and gender, 1990-2000 (59 cases)**



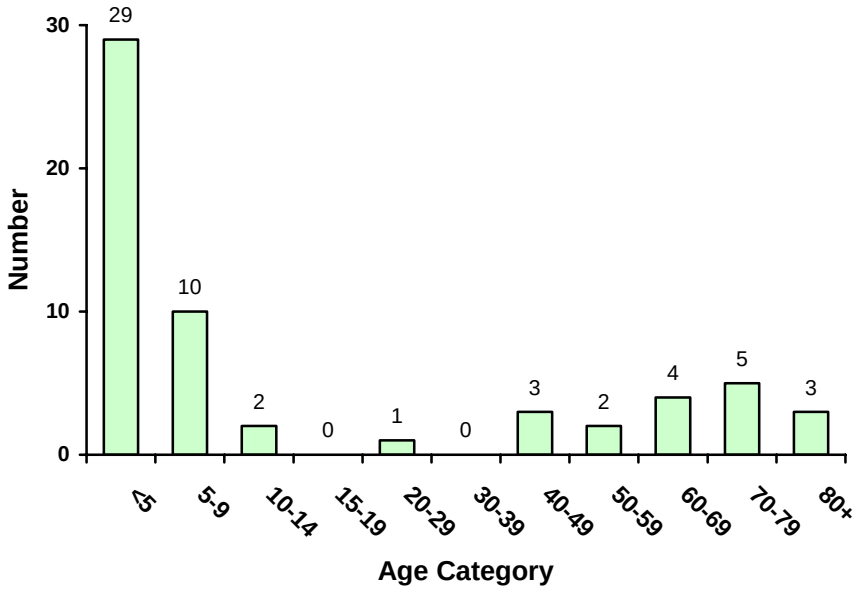
9.4.2. AGE CATEGORY

49.2% of the victims of bystander runovers were less than five years old. 16.9% of those killed were children aged 5 to 9.

15.1% of all bystander runovers involved crawling infants and toddlers under age two.

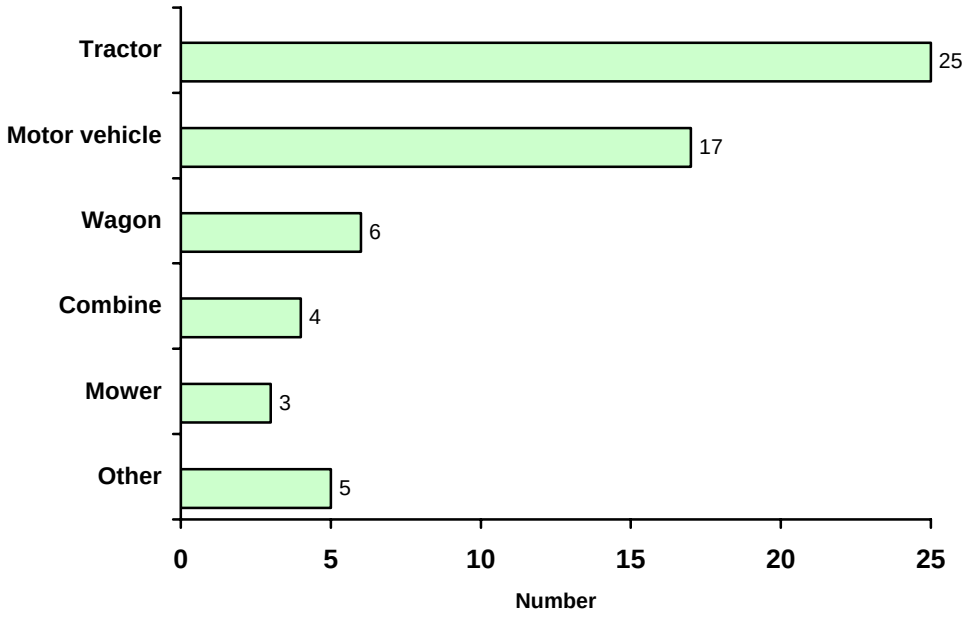
Very young children are at extremely high risk of being runover as bystanders.

FIGURE 9.4.2 **Fatal bystander runovers by age category, 1990-2000 (59 cases)**



9.4.3 FATALITIES BY MACHINE TYPE

FIGURE 9.4.3 Fatal bystander runovers by machine type, 1990-2000 (58 cases*)



*This information was not available for one case.

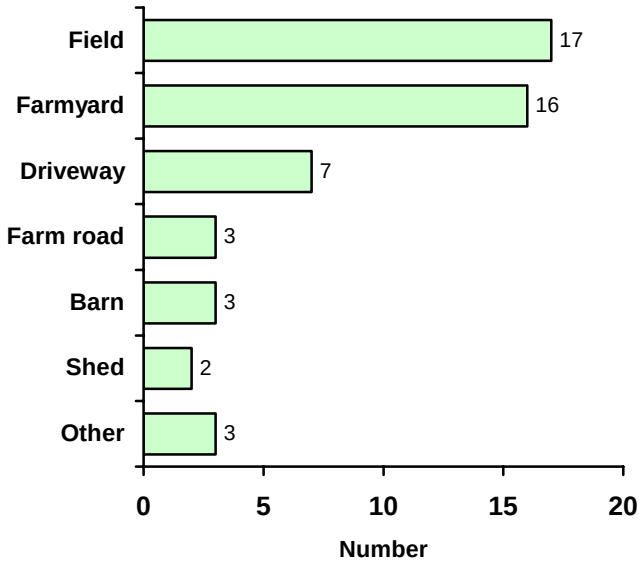
42.4% of bystander runover victims were killed by tractors. Motor vehicles (mainly pick up trucks) were involved in another 28.8% of bystander runovers.

9.4.4 FATALITIES BY LOCATION

FIGURE 9.4.4 Fatal bystander runovers by location of injury event, 1990-2000 (51 cases*)

Fields and farmyards were frequent locations for bystander runovers. 28.8% of the 59 bystander runovers occurred in fields and 27.1% in farmyards.

56.3% of victims killed in the farmyard and 71.4% of victims killed in the driveway were less than five years old.



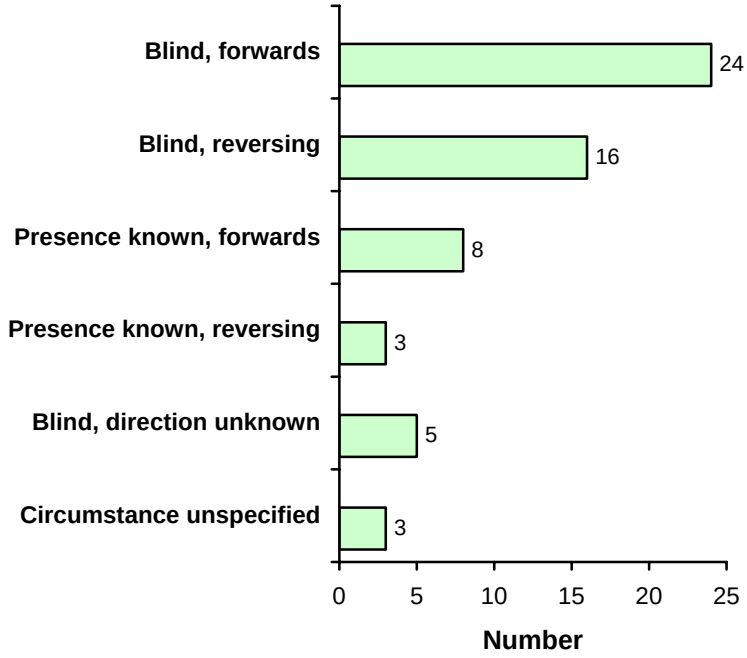
*This information was not available for 8 cases.

9.4.5 FATALITIES BY CIRCUMSTANCE

In 76.3% of the cases, the operator of the machine was unaware of the victim's presence (blind runovers). In 40% of the blind runovers where direction was known, the machine or vehicle was reversing.

In runovers where the operator was aware of the victim, 54.4% were due to the operator inadvertently starting the machine in gear, 18.2% were due to brake failure, and 27.3% were due to human error.

FIGURE 9.4.5 **Fatal bystander runovers by circumstance of injury event, 1990-2000 (59 cases)**

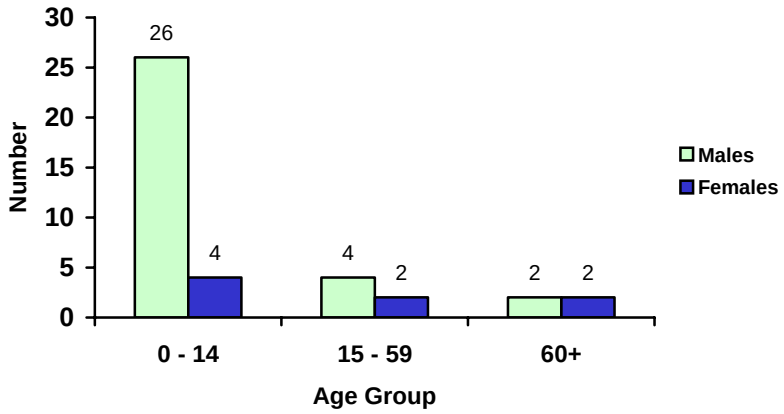


9.5 EXTRA RIDER RUNOVERS

9.5.1 AGE AND GENDER

FIGURE 9.5.1 **Fatal extra-rider runovers by age and gender, 1990-2000 (40 cases)**

75% of those killed in extra rider runover events were aged 14 or younger. 80% of the victims were male.

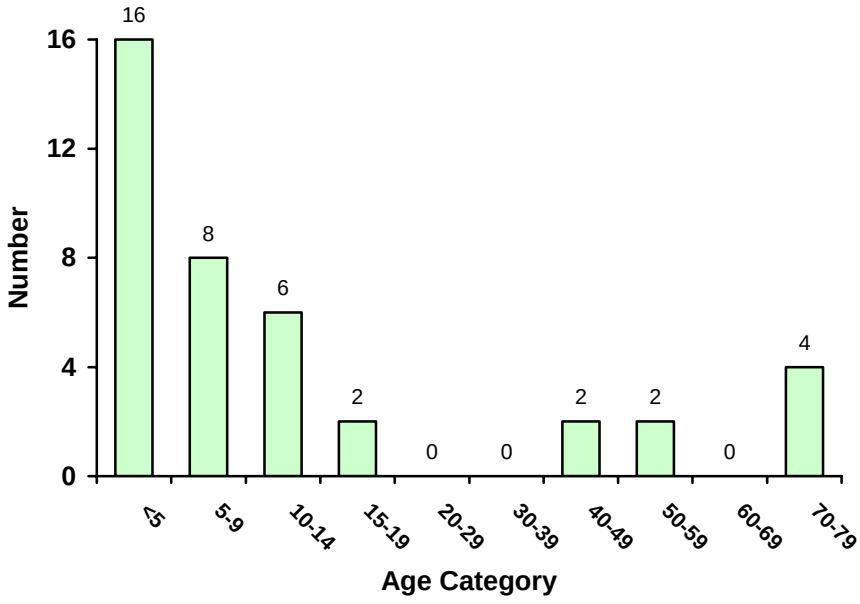


9.5.2 AGE CATEGORY

FIGURE 9.5.2 **Fatal extra rider runovers by age category, 1990-2000 (40 cases)**

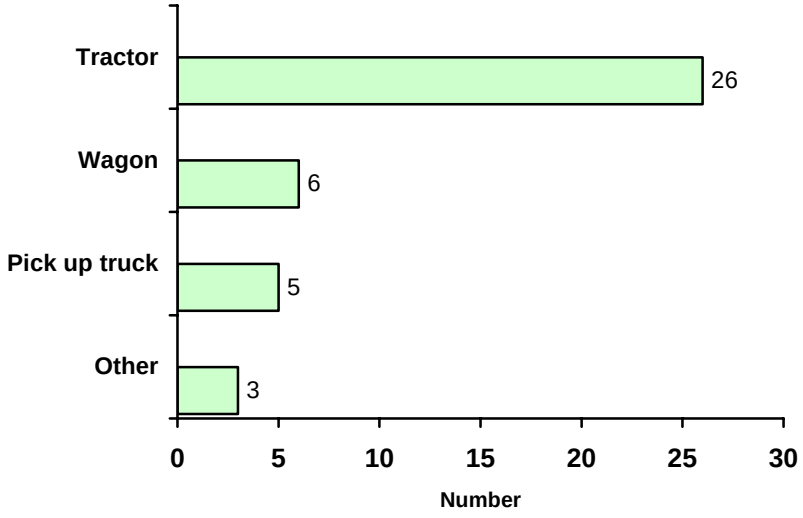
40% of the victims of extra rider runovers were four years old or less. A further 20% were aged 5-9.

Relatively few adults were killed in extra rider runovers.



9.5.3 FATALITIES BY MACHINE TYPE

FIGURE 9.5.3 **Fatal extra-rider runovers by machine type, 1990-2000 (40 cases)**

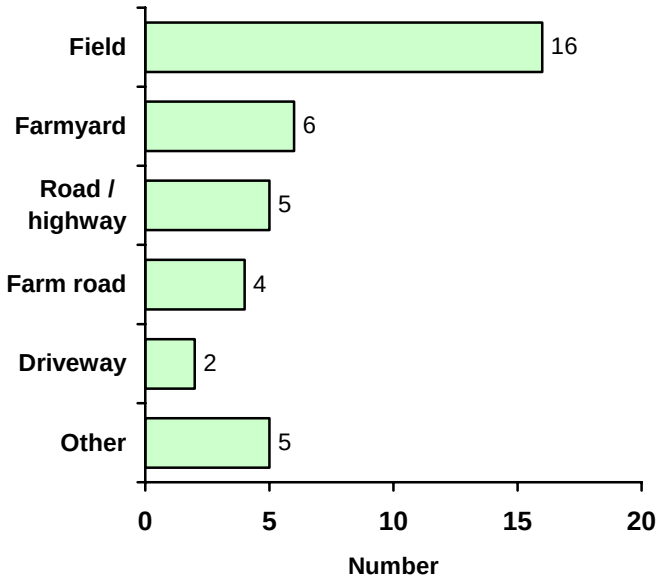


65% of the extra rider runovers followed falls from tractors. Other vehicle types frequently involved in extra rider runovers were wagons (15%) and pick up trucks (12.5%).

9.5.4 FATALITIES BY LOCATION

FIGURE 9.5.4 **Fatal extra-rider runovers by location of injury event, 1990-2000 (38 cases*)**

40% of the 40 extra rider deaths occurred in a field. Other common locations for extra rider runovers were farmyards, highways and farm roads. Half of the victims killed in the field were less than five years old.

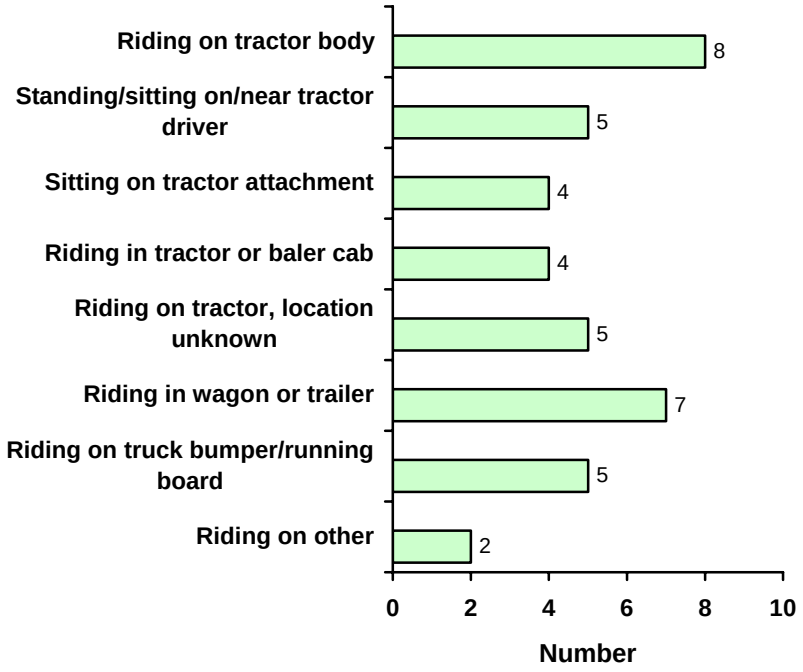


*This information was not available for 2 cases.

9.5.5 FATALITIES BY CIRCUMSTANCE

FIGURE 9.5.5 **Fatal extra-rider runovers by circumstance of injury event, 1990-2000 (40 cases)**

Of the victims who were runover after they fell from a tractor or baler, 30.8% were riding on some outer portion of the machine's body (fender, gas tank, weight box, tow bar), 22.7% were sitting or standing close to the driver, 18.2% were sitting on an attachment (three on an FEL, one on a bucket.), and 18.2% fell out of a cab window or door. Of the victims who fell from a pick up truck, four were riding on the back of the truck and one was on a running board. Of those runover by a wagon or trailer, 42.9% were actively engaged in harvesting activities at the time of the event.



10 AGRICULTURAL RUNOVER HOSPITALIZATIONS: OVERVIEW

10.1 AGE GROUP

Hospitalized agricultural runovers were most frequent for adults aged 60 and over and children aged 1-9. Persons in those age groups were over-represented as victims of hospitalized runovers relative to their proportion of the farm population. This was especially true for older adults. The percentage of adults aged 80+ injured in hospitalized runovers was 4.9 times the percentage of adults that age in the general farm population. The percentage of adults 70-79 who were victims of hospitalized runovers was 2.8 times the percentage of adults that age in the farm population.

TABLE 10.1 **Hospitalized agricultural runovers by age group, 1990-2000 (783 cases*)**

Age Group (Years)	Hospitalized Injuries		Farm Population*		Crude Annual Rate Per
	No.	%	No.	%	100,000/yr
1 - 4	55	7.0	43,315	6.1	12.7
5 - 9	71	9.1	71,035	8.3	10.0
10 - 14	52	6.6	84,025	9.9	6.2
15 - 19	63	8.0	80,455	9.4	7.8
20 - 29	70	8.9	80,775	9.5	8.7
30 - 39	68	8.7	121,230	14.2	5.6
40 - 49	88	11.2	139,425	16.4	6.3
50 - 59	85	10.9	110,135	12.9	7.7
60 - 69	115	14.7	73,620	8.6	15.6
70 - 79	78	10.0	30,825	3.6	25.3
80 +	38	4.9	7,755	1.0	49.0
Total	**783**	**100.0**	**842,595**	**100.0**	**9.3**

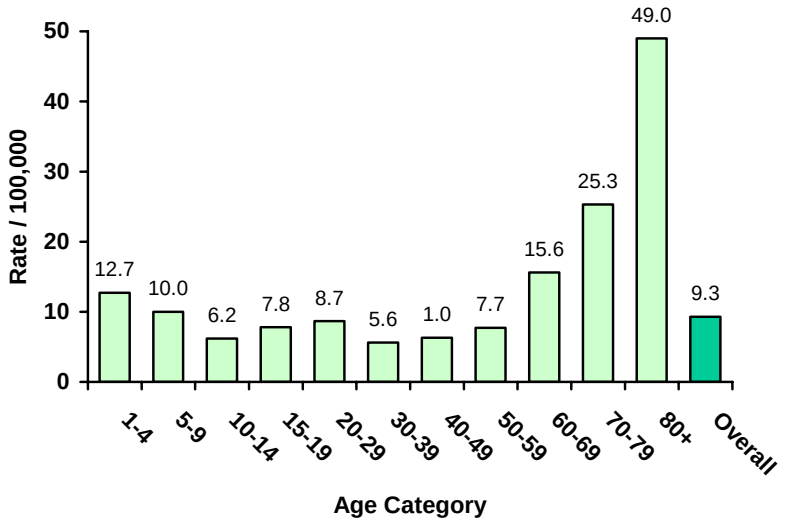
* Age was not available in one case.
* *Statistics Canada, Census of Agriculture, 1996

10.2 RUNOVER RATE BY AGE

The age specific rates of agricultural runover hospitalizations were extremely high in adults aged 70+. Persons aged 80 and over are at great risk of sustaining a hospitalized runover injury.

The hospitalized injury rate for children aged 1-4 was not much lower for hospitalized injuries than it was for fatalities.

FIGURE 10.1 **Age-specific hospitalized agricultural runover rates in Canada, 1990-2000 (783 cases*)**

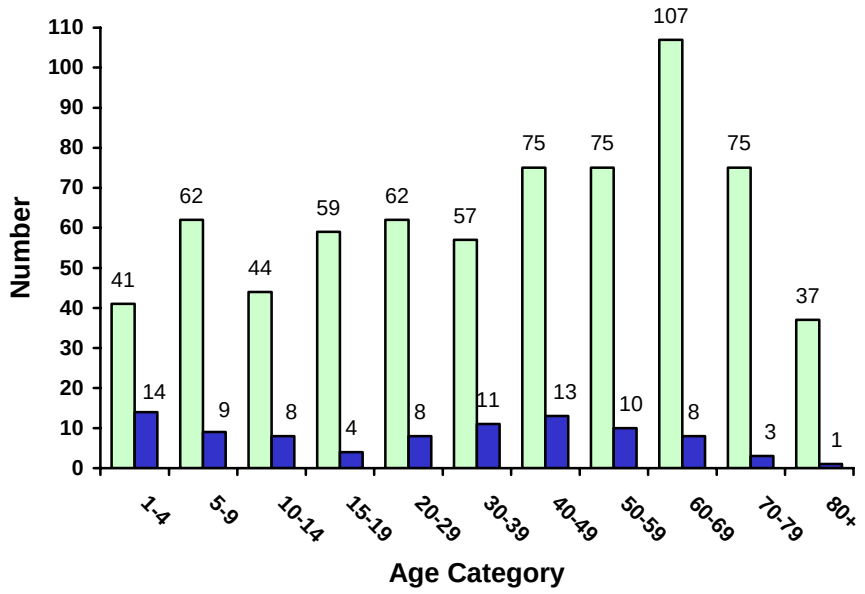


* Age was not available in one case.

10.3 AGE AND GENDER

The ratio of males to females involved in hospitalized runovers was lowest for the youngest age category. (2.9:1 for children aged 1-4). In the older age categories very few females were injured in runover events.

FIGURE 10.2 Hospitalized agricultural runovers by age and gender, 1990-2000 (784 cases)

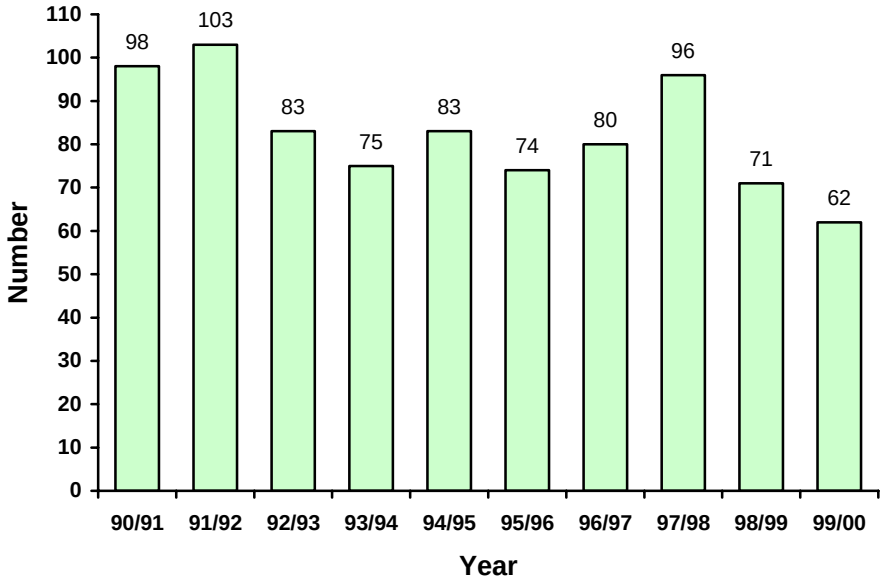


10.4 BY YEAR

There appeared to be a moderate decline in the annual number of agricultural runover hospitalizations over the surveillance period. This may be partly attributed to changes in hospital admission practices. Injured persons who would have been admitted for overnight observation in 1990 were more likely to be treated and released in 2000.

Note: data are imputed for Alberta from April 1, 1998 to March 31, 2000 and for Nova Scotia from April 1, 1997 to March 31, 2000. Imputed values are not included in the total number of cases.

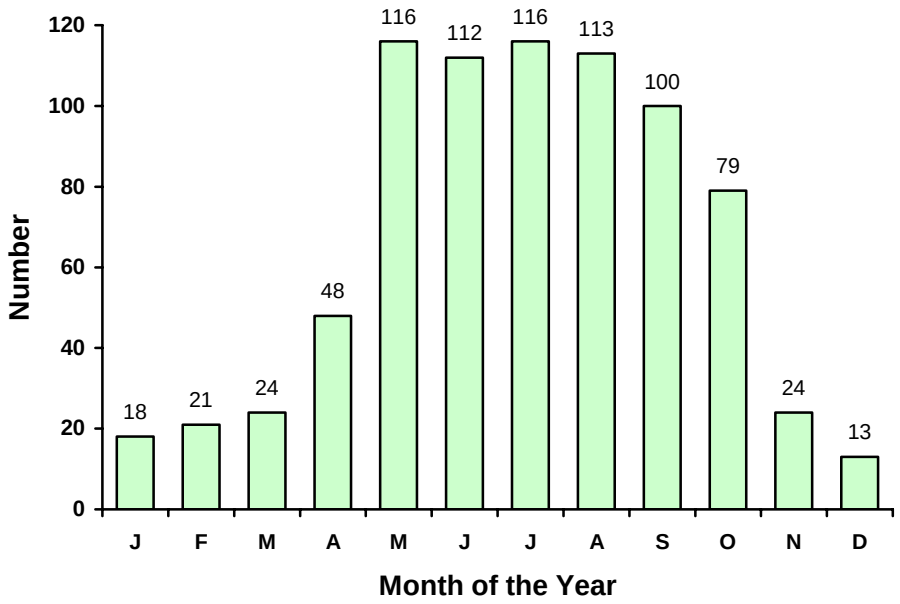
FIGURE 10.3 Hospitalized agricultural runovers by year, 1990-2000 (784 cases)



10.5 BY MONTH

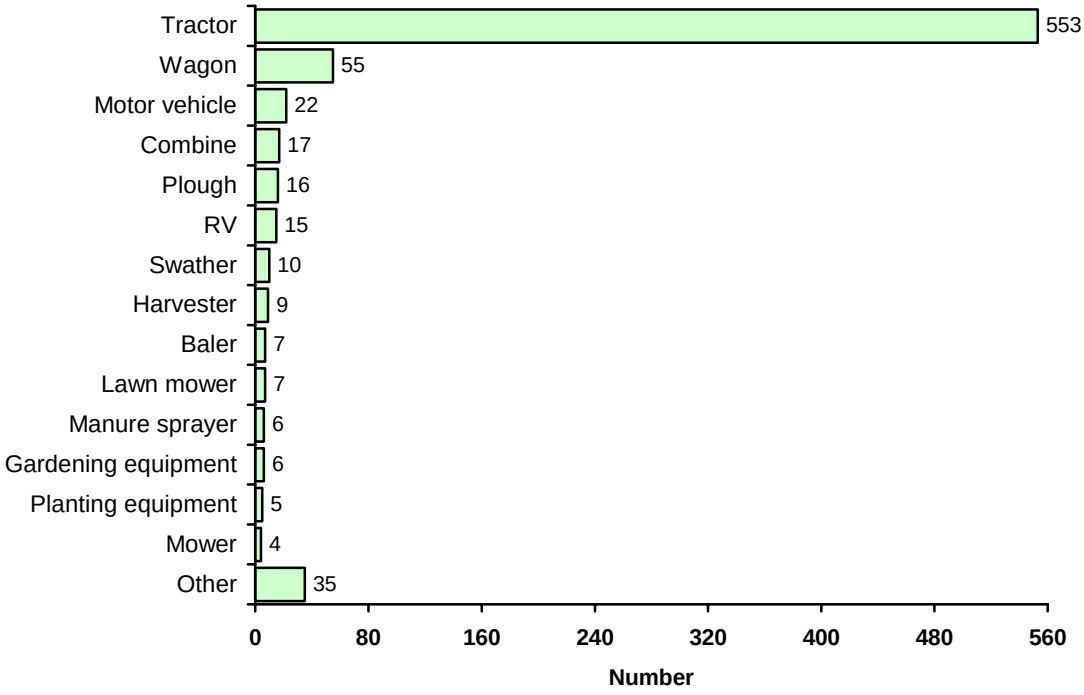
The distribution of agricultural runovers reflects seasonal changes in exposure to runover hazards. As was the case with fatal runovers, most hospitalized runovers occurred from May to October. Unlike fatal runovers, there was no marked peak in September, instead there was a plateau from May to August.

FIGURE 10.4 Hospitalized agricultural runovers by month of the year, 1990-2000 (784 cases)



10.6 BY MACHINE TYPE

FIGURE 10.5 Hospitalized agricultural runovers by machine type, 1990-2000 (767cases*)



Tractors were by far the most common machine type involved in the 784 hospitalized runovers (70.5% of cases). They caused ten times as many hospitalized runover injuries as wagons, which were the next most common machine type.

*Machine type was not available in 17 cases.

10.7 TYPE OF RUNOVER EVENT

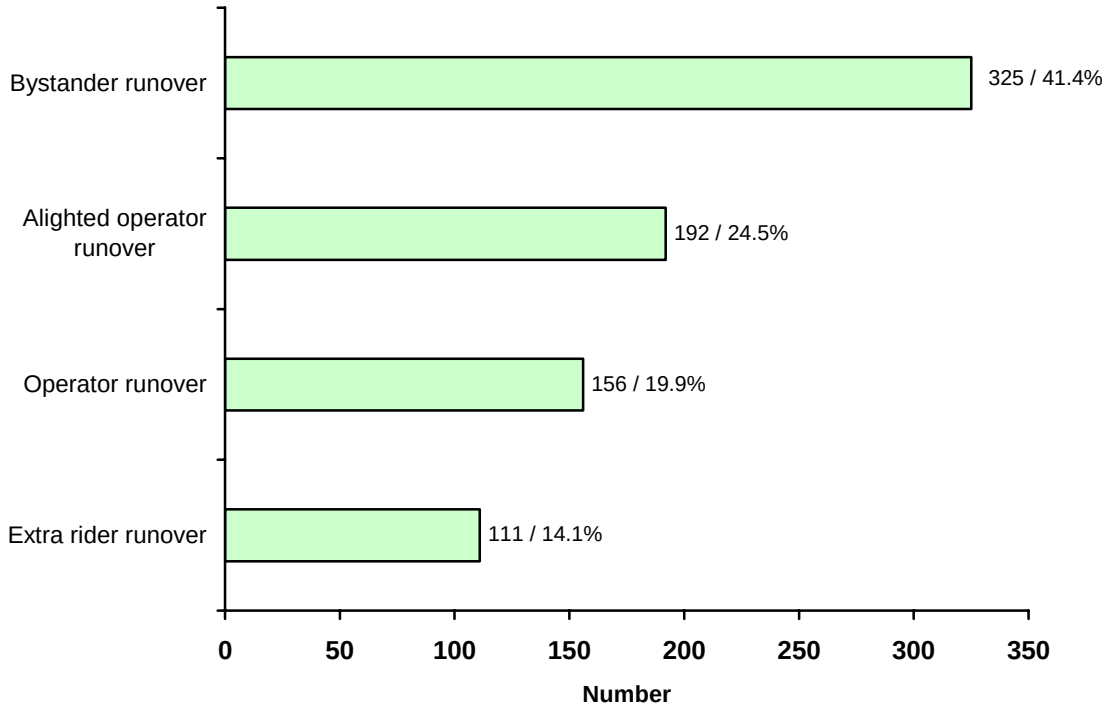
TABLE 10.2 Hospitalized agricultural runovers by age group and runover type*, 1990-2000 (784 cases)

	1–14 years		15–59 years		60 + years		TOTAL	
Cause of Injury	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Operator runover	15	8.4	84	22.4	57	24.7	156	19.9
Alighted operator runover	3	1.7	97	25.9	92	**39.8**	192	24.5
Bystander runover	83	**46.6**	162	**43.2**	79	34.2	325	**41.4**
Extra rider runover	77	43.3	31	8.3	3	1.3	111	14.1
TOTAL*	**178**	**100.0**	**374**	**100.0**	**231**	**100.0**	**784**	**100.0**

Overall, bystander runovers were the most common type of hospitalized runover event (41.4%). In children, the vast majority of runovers were bystander or extra rider events. In younger adults, bystander runovers were the most frequent hospitalized runover type. In older adults alighted operator runovers were most frequent, followed by bystander runovers. Extra rider runovers were more than six times as common in adults aged 15-59 than in adults aged 60+.

*Runover types are defined in chapter 2.

FIGURE 10.6 Agricultural runover hospitalizations by type of runover event, 1990-2000 (784 cases)

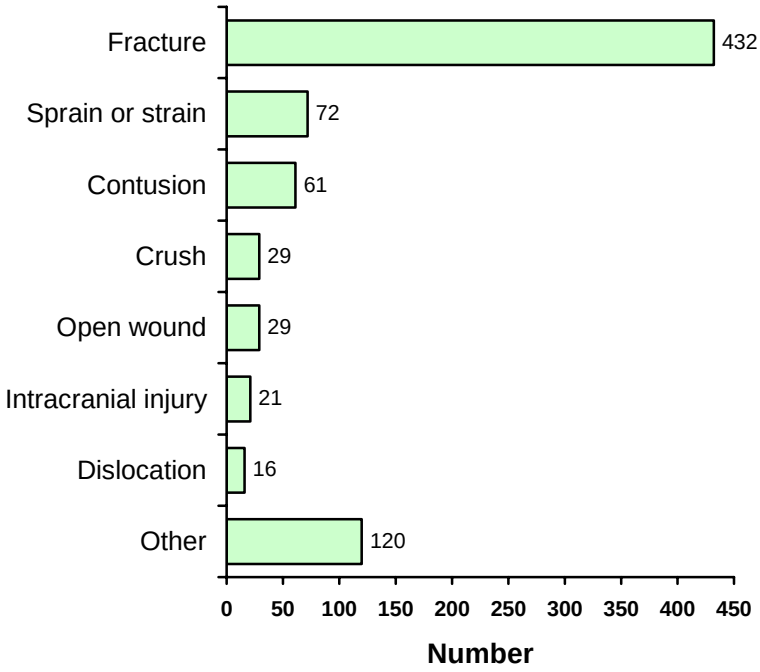


Bystander runovers (including blind runovers) and alighted operator runovers (which include improper start runovers) were the most frequent types of hospitalized runover events.

10.8 DIAGNOSIS

Overall, 55.1% of the 784 hospitalized runover injuries were fractures, 9.2% were sprains or strains, and 7.8% were contusions. The other types of diagnoses each comprised less than 4% of the total cases.

FIGURE 10.7 Hospitalized agricultural runovers by diagnosed injury, 1990-2000 (780 cases*)



* Diagnosis was not available in 4 cases.

11 AGRICULTURAL RUNOVER HOSPITALIZATIONS: TRACTORS

11.1 AGE GROUP

Hospitalized tractor runovers were most frequent for children aged 1-4 and for adults aged 60 and over. Children aged 1-4 and adults in the three oldest age groups were over-represented as victims of hospitalized tractor runovers relative to their proportion of the farm population. This was especially true for the oldest adults. The percentage of adults aged 80+ who were injured in hospitalized tractor runovers was 5.6 times the percentage of adults that age in the general farm population. The percentage of adults 70-79 who were injured was 3.4 times the percentage of adults that age in the farm population.

TABLE 11.1 Hospitalized agricultural tractor runovers by age group, 1990-2000 (552 cases*)

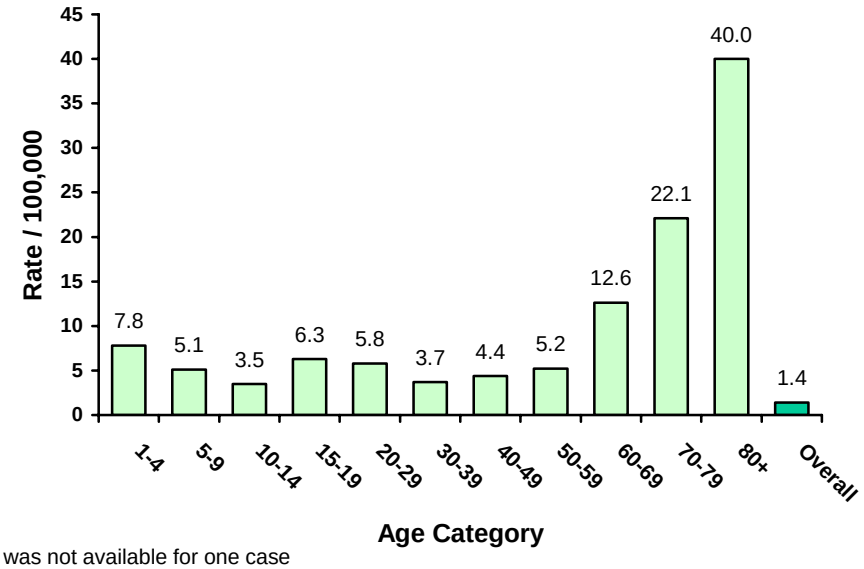
Age Group (Years)	Hospitalized Injuries		Farm Population*		Crude Annual Rate Per
	No.	%	No.	%	100,000/yr
1 – 4	34	6.2	43,315	6.1	7.8
5 – 9	36	6.5	71,035	8.3	5.1
10 – 14	29	5.3	84,025	9.9	3.5
15 – 19	51	9.2	80,455	9.4	6.3
20 – 29	47	8.5	80,775	9.5	5.8
30 – 39	45	8.2	121,230	14.2	3.7
40 – 49	61	11.1	139,425	16.4	4.4
50 – 59	57	10.3	110,135	12.9	5.2
60 – 69	93	16.8	73,620	8.6	12.6
70 – 79	68	12.3	30,825	3.6	22.1
80 +	31	5.6	7,755	1.0	40.0
Total	**552**	**100.0**	**842,595**	**100.0**	**6.6**

* Age was not available for one case
** Statistics Canada, Census of Agriculture, 1996

11.2 RUNOVER RATE BY AGE GROUP

Age specific hospitalized tractor runover rates were highest in children under five years old and adults aged 70 and over. The hospitalized tractor runover rate was extremely high for adults aged 80 and over.

FIGURE 11.1 Age-specific hospitalized agricultural tractor runover rates in Canada, 1990-2000 (552 cases*)

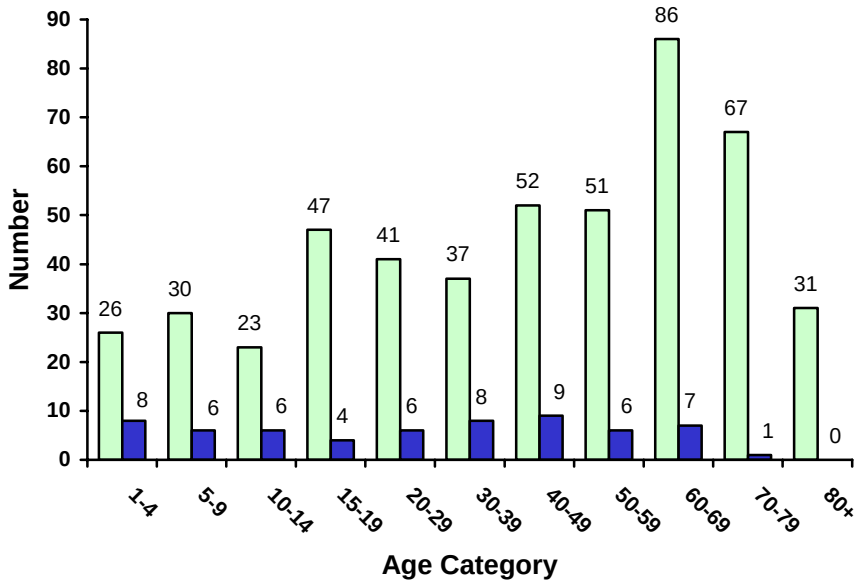


* Age was not available for one case

11.3 AGE AND GENDER

In all age groups, hospitalized tractor runovers were much more frequent for males than for females. The lowest ratio of male cases to female cases (3.3:1) was in the youngest age group. Only one female aged 70+ sustained a hospitalized injury.

FIGURE 11.2 **Hospitalized agricultural tractor runovers by age and gender, 1990-2000 (552 cases*)**



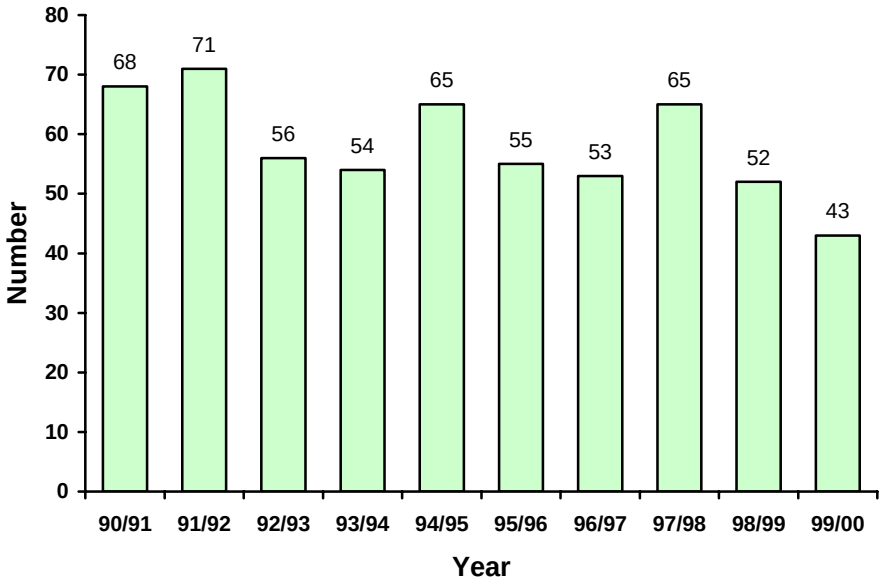
* Age was not available for one case

11.4 BY YEAR

There appeared to be a moderate decline in the annual number of tractor runover hospitalizations over the surveillance period. This may be partly attributed to changes in hospital admission practices. Injured persons who would have been admitted for overnight observation in 1990 were more likely to be treated and released in 2000.

Note: data are imputed for Alberta from April 1, 1998 to March 31, 2000 and for Nova Scotia from April 1, 1997 to March 31, 2000. Imputed values are not included in the total number of cases.

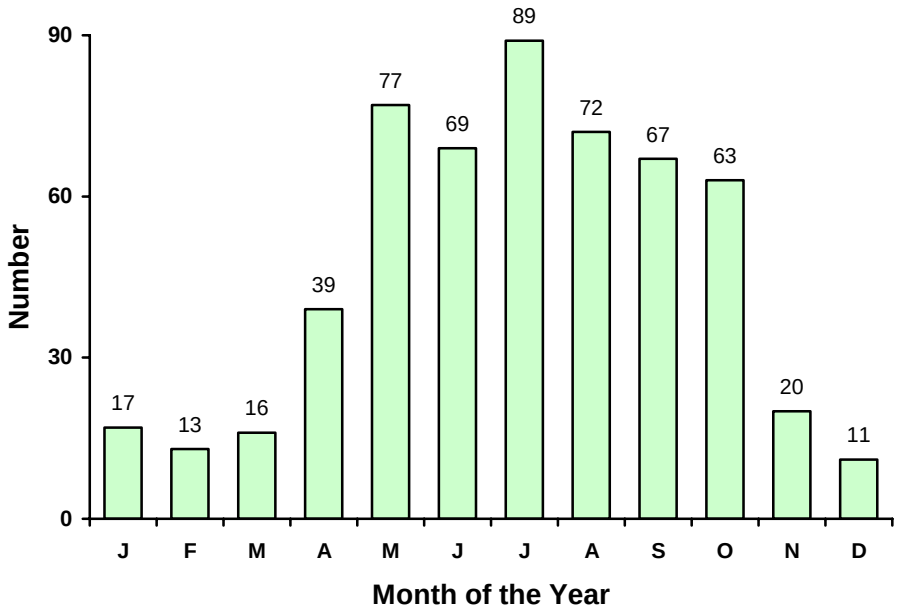
FIGURE 11.3 **Hospitalized agricultural tractor runovers by year, 1990-2000 (553cases)**



11.5 BY MONTH

FIGURE 11.4 **Hospitalized agricultural tractor runovers by month of the year, 1990-2000 (553 cases)**

Tractor runover hospitalizations peaked during the months of May and July, whereas tractor fatalities peaked in May and again in September to October.



11.6 TYPE OF RUNOVER EVENT (553 cases)

TABLE 11.2 **Hospitalized agricultural tractor runovers by age group and runover type*, 1990-2000 (552 cases**)**

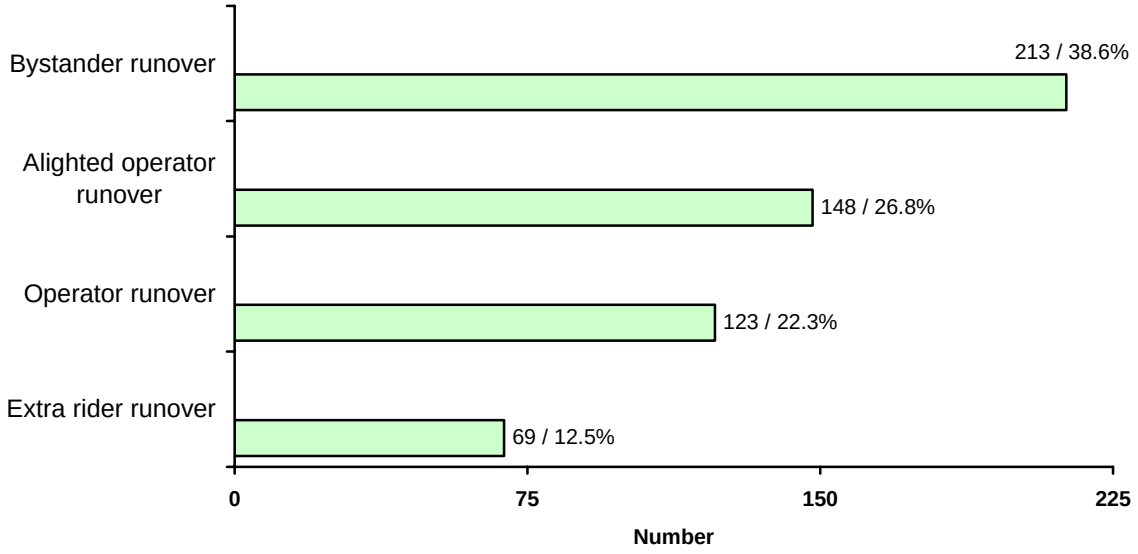
	1–14 years		15–59 years		60 + years		TOTAL	
Cause of Injury	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Operator runover	9	9.1	61	23.4	53	27.6	123	22.2
Alighted operator runover	1	1.0	69	26.4	78	**40.6**	148	26.8
Bystander runover	39	39.4	113	**43.3**	60	31.3	213	**38.5**
Extra rider runover	50	**50.5**	18	6.9	1	0.5	69	12.5
TOTAL	**99**	**100.0**	**261**	**100.0**	**192**	**100.0**	**553**	**100.0**

Overall, for hospitalized tractor runover injuries, the majority of cases were bystander runovers. In contrast, for tractor runover fatalities the majority of events were alighted operator or operator runovers. In children, tractor runover hospitalizations almost all involved extra rider or bystander runover events. In younger adults most of the hospitalized tractor runovers were due to bystander, alighted operator and operator runovers. In older adults alighted operator runovers were the most frequent type of hospitalized tractor runover. In both adult age groups, bystander runovers were more far more frequent than they were among tractor runover fatalities. It appears that in adults alighted operator and operator runovers are more likely to cause death than bystander runovers.

*Runover types are defined in chapter 2.

**Age was not available for one case.

FIGURE 11.5 **Hospitalized agricultural tractor runovers by type of runover event*, 1990-2000 (553 cases)**

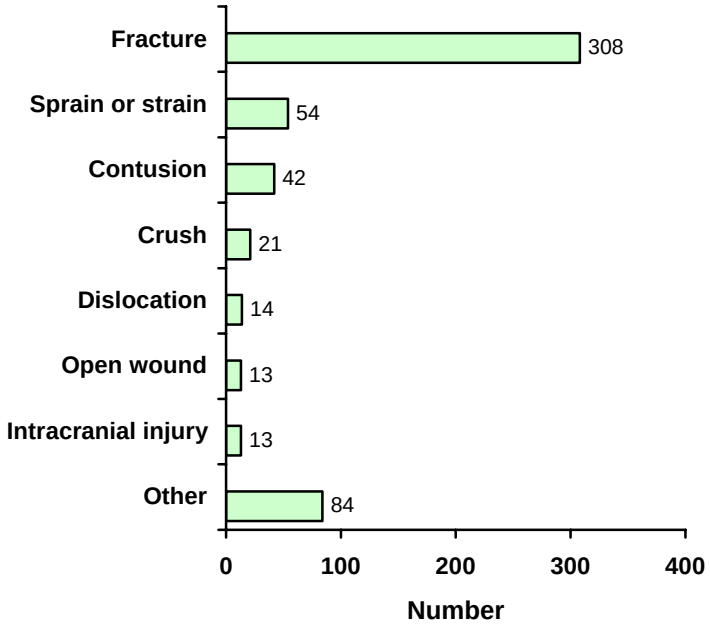


Bystander runovers were the most frequent type of hospitalized tractor runover event.

11.7 DIAGNOSIS

56.1% of the hospitalized tractor runover injuries were diagnosed as fractures. A further 9.8% were sprains or strains and 7.7% were contusions. Other diagnosis types each comprised less than 4% of the hospitalized tractor runover cases.

FIGURE 11.6 **Hospitalized agricultural tractor runovers by diagnosed injury, 1990-2000 (549cases*)**



* Diagnosis was not available in 4 cases.

12 AGRICULTURAL RUNOVER HOSPITALIZATIONS: OTHER MACHINES

12.1 AGE GROUP

Hospitalized non-tractor runovers were most common in children aged 1-9 and adults aged 80 and over. Children under 15 and adults in the age groups 20-29 and 60+ were over-represented as victims of hospitalized non-tractor runovers relative to their proportion of the farm population. Adults in the oldest age group had the highest risk for a hospitalized non-tractor runover injury. The percentage of adults aged 80+ who were injured in hospitalized non-tractor runovers was three times the percentage of adults that age in the farm population.

TABLE 12.1 Hospitalized agricultural non-tractor runovers by age group, 1990-2000 (231 cases)

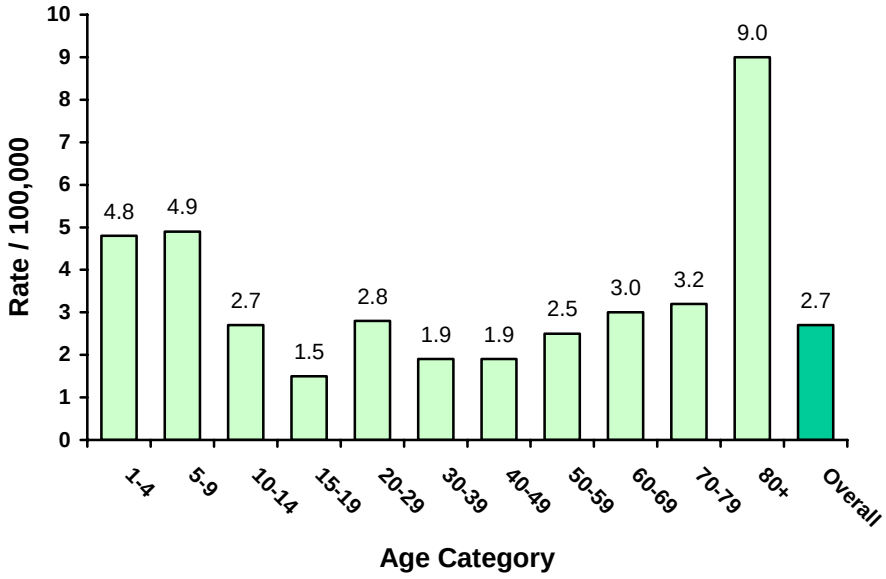
Age Group (Years)	Hospitalized Injuries		Farm Population*		Crude Annual Rate Per
	No.	%	No.	%	100,000/yr
1 - 4	21	9.1	43,315	6.1	4.8
5 - 9	35	15.2	71,035	8.3	4.9
10 - 14	23	10.0	84,025	9.9	2.7
15 - 19	12	5.2	80,455	9.4	1.5
20 - 29	23	10.0	80,775	9.5	2.8
30 - 39	23	10.0	121,230	14.2	1.9
40 - 49	27	11.7	139,425	16.4	1.9
50 - 59	28	12.1	110,135	12.9	2.5
60 - 69	22	9.5	73,620	8.6	3.0
70 - 79	10	4.3	30,825	3.6	3.2
80 +	7	3.0	7,755	1.0	9.0
Total	**231**	**100.0**	**842,595**	**100.0**	**2.7**

* Statistics Canada, Census of Agriculture, 1996

12.2 RUNOVER RATE BY AGE GROUP

Hospitalized non-tractor runovers were most frequent in adults 80+ and in children aged 1 to 10.

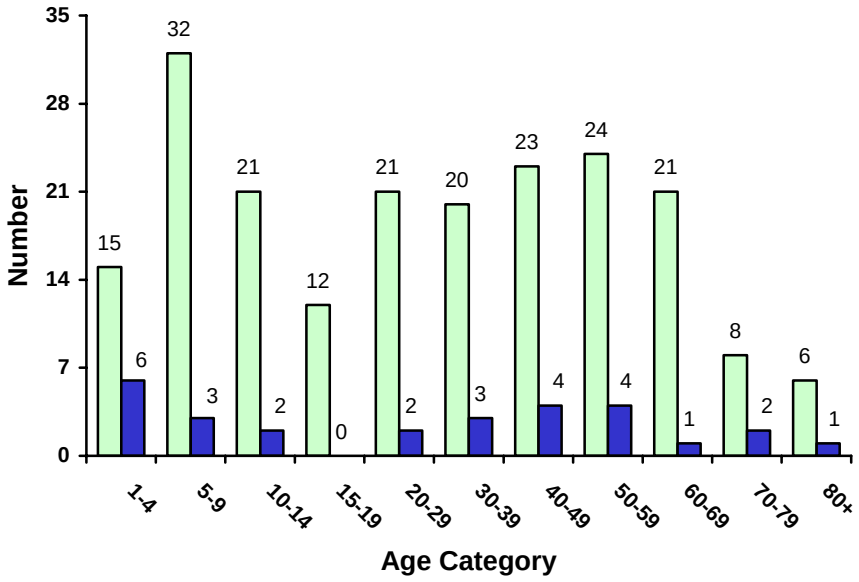
FIGURE 12.1 Age-specific hospitalized agricultural non-tractor runover rates in Canada, 1990-2000 (231 cases)



12.3 AGE AND GENDER

FIGURE 12.2 **Hospitalized agricultural non-tractor runovers by age and gender, 1990-2000 (231 cases)**

The ratio of males to females involved in hospitalized non-tractor runovers was lowest for the youngest age category. (2.5:1 for children aged 1-4). Non-tractor runover hospitalizations were not common among older females.

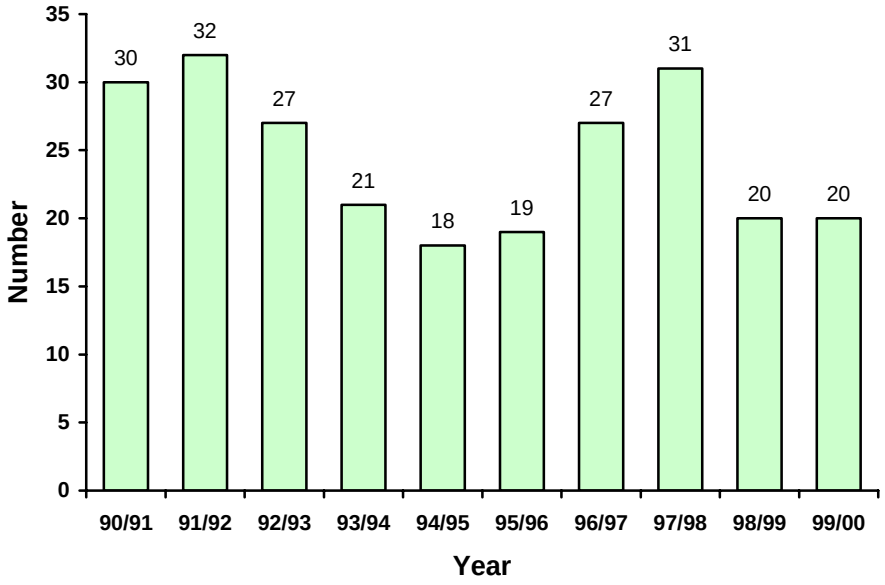


12.4 BY YEAR

FIGURE 12.3 **Hospitalized agricultural non-tractor runovers by year, 1990-2000 (231 cases)**

There appeared to be a moderate decline in the annual number of non-tractor runover hospitalizations over the surveillance period. This may be partly attributed to changes in hospital admission practices. Injured persons who would have been admitted for overnight observation in 1990 were more likely to be treated and released in 2000.

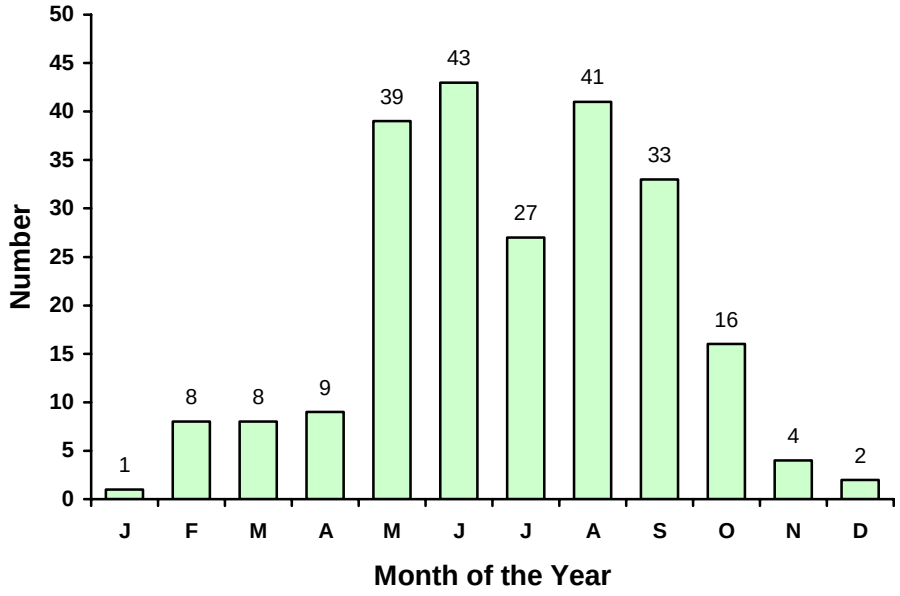
Note: data are imputed for Alberta from April 1, 1998 to March 31, 2000 and for Nova Scotia from April 1, 1997 to March 31, 2000. Imputed values are not included in the total number of cases.



12.5 BY MONTH

FIGURE 12.4 **Hospitalized agricultural non-tractor runovers by month of the year, 1990-2000 (231 cases)**

As with fatal non-tractor runovers, there was a peak in the number of hospitalized non-tractor runovers during the months of August and September. Unlike fatal runovers, there was a second peak for hospitalized non-tractor runover injuries in May and June.



12.6 TYPE OF RUNOVER EVENT

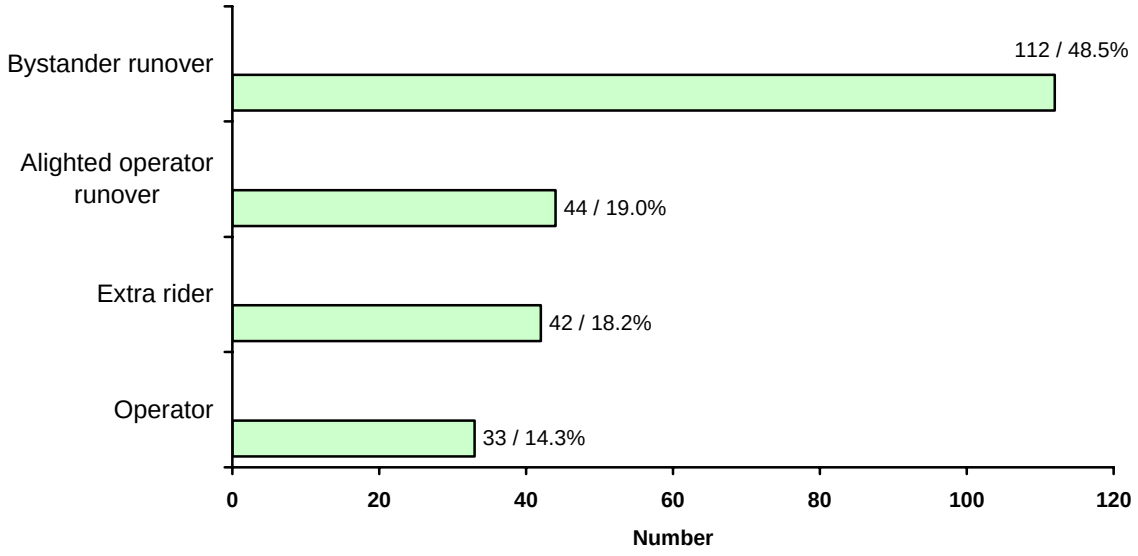
TABLE 12.2 **Hospitalized agricultural non-tractor runovers by age group and runover type*, 1990-2000**

	1–14 years		15–59 years		60 + years		TOTAL	
Cause of Injury	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Operator runover	6	7.6	23	20.4	4	10.3	33	14.3
Alighted operator runover	2	2.5	28	24.8	14	35.9	44	19.0
Bystander runover	44	**55.7**	49	**43.4**	19	**48.7**	112	**48.5**
Extra rider runover	27	34.2	13	11.5	2	5.1	42	18.2
TOTAL*	**79**	**100.0**	**113**	**100.0**	**39**	**100.0**	**231**	**100.0**

Overall, bystander runovers were by far the most common type of non-tractor runover event. In children, bystander or extra rider runovers caused most of the non-tractor runover hospitalizations. In both younger and older adults, bystander runovers were the most frequent cause of hospitalized non-tractor runover injuries. In contrast, the most common fatal runover type in adults was alighted operator runovers. It may be that in adults bystander runovers are less likely to be fatal than alighted operator runovers.

* Runover types are defined in chapter 2.

FIGURE 12.5 **Hospitalized agricultural non-tractor runovers by type of runover event, 1990-2000 (231 cases)**

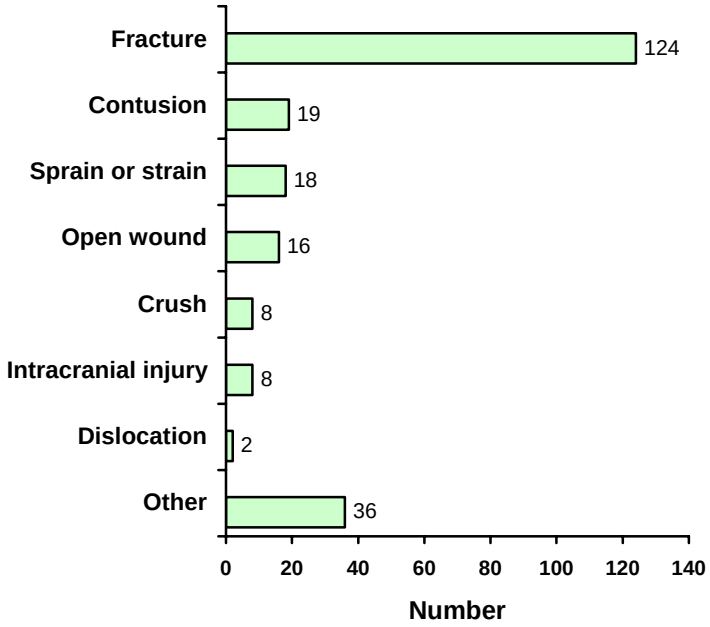


Bystander runovers were the most common type of non-tractor runover event, followed by alighted operator and extra rider runovers. Bystander runovers caused 2.5 times more hospitalized injuries than the next most frequent type of runover.

12.7 DIAGNOSIS

53.7% of the hospitalized non-tractor runover injuries were diagnosed as fractures. A further 8.2% of the injuries were contusions, 7.8% were strains or sprains and 6.9% were open wounds. Other diagnosis types each comprised less than 4% of the hospitalized non-tractor runover cases.

FIGURE 12.6 **Hospitalized agricultural non-tractor runovers by diagnosed injury, 1990-2000 (231 cases)**

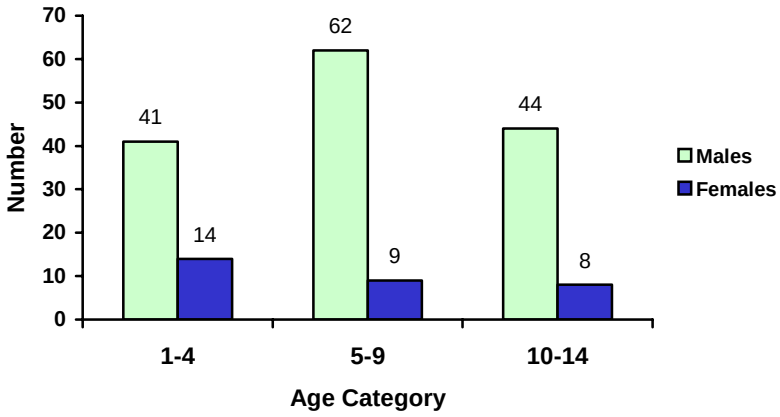


13 AGRICULTURAL RUNOVER HOSPITALIZATIONS: CHILDREN UNDER 15

13.1 AGE AND GENDER

82.6% of the child victims of hospitalized runovers were male. The ratio of males killed to females killed was 4.7:1, which is a higher male:female ratio than for fatal child runovers. 30.9% of the children injured in hospitalized runovers were aged 1-5, whereas 61.6% of the children killed in runovers were under five. It may be that runover events are more likely to cause death in young children than in older children.

FIGURE 13.1 Hospitalized agricultural runovers in children by age and gender, 1990-2000 (178 cases)

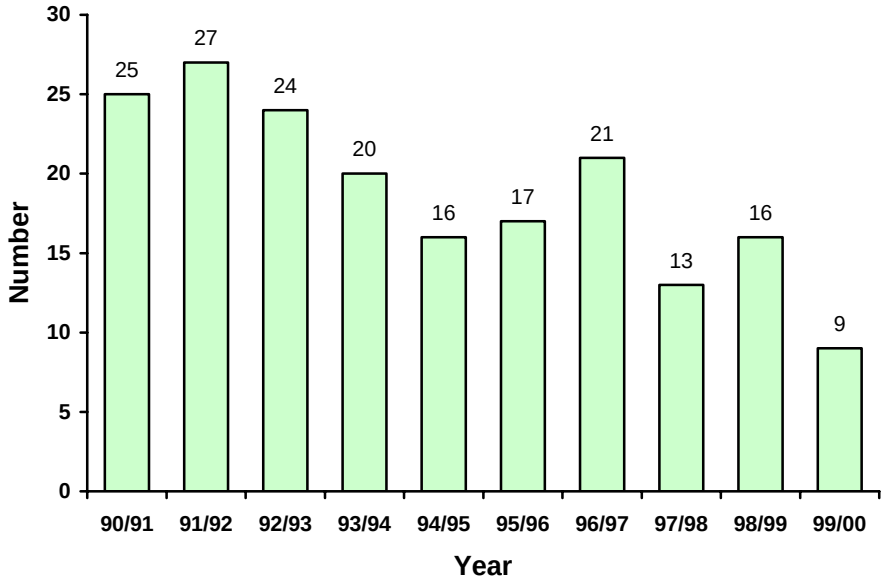


13.2 BY YEAR

The annual number of hospitalizations appeared to decline over the surveillance period. This may be partly attributed to changes in hospital admission practices. Injured persons who would have been admitted for overnight observation in 1990 were more likely to be treated and released in 2000.

Note: data are imputed for Alberta from April 1, 1998 to March 31, 2000. Imputed values are not included in the total number of cases.

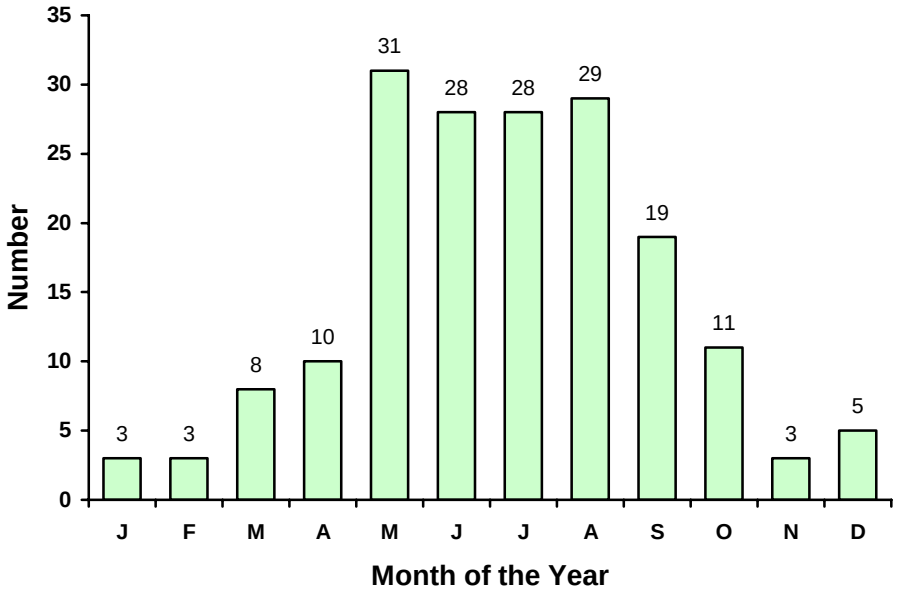
FIGURE 13.2 Hospitalized agricultural runovers in children by year, 1990-2000 (178 cases)



13.3 BY MONTH

FIGURE 13.3 **Hospitalized agricultural runovers in children by month of the year, 1990-2000 (178 cases*)**

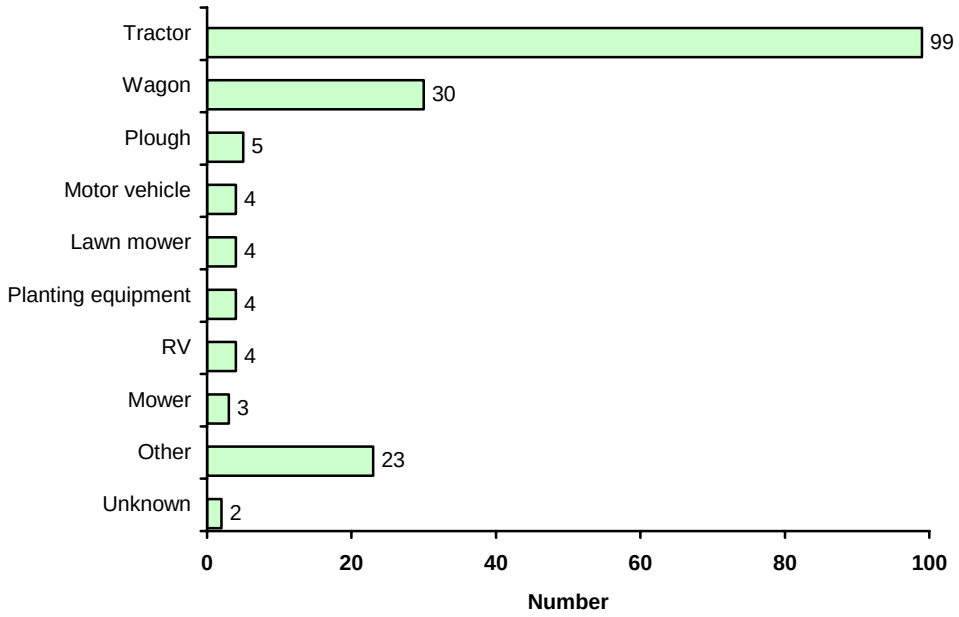
Most hospitalized runovers in children occurred from May to August.



*This information was not available for one case.

13.4 BY MACHINE TYPE

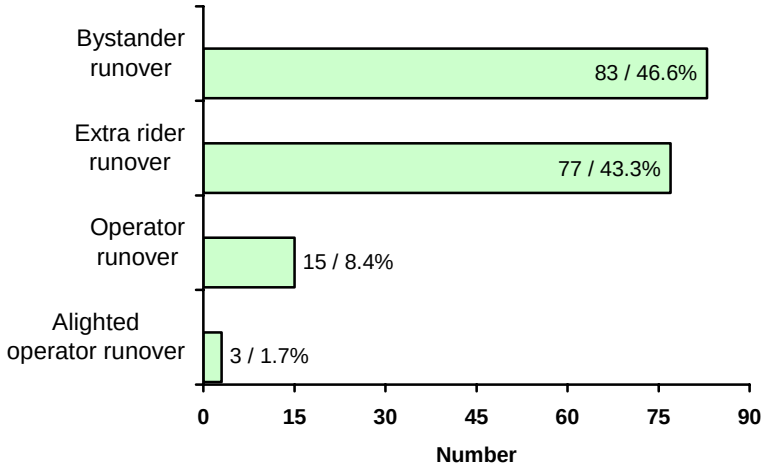
FIGURE 13.4 **Hospitalized agricultural runovers in children by machine type, 1990-2000 (178 cases)**



Most of the hospitalized runovers involved tractors (55.6%) and wagons (16.9%). 54.5% of all wagon-related injuries occurred in children. Motor vehicles were not a major cause of hospitalized runover injuries in children, though they were involved in the second highest number of child fatalities. It may be that children are usually killed if runover by a motor vehicle.

13.5 TYPE OF RUNOVER EVENT

FIGURE 13.5 **Hospitalized agricultural runovers in children by type of runover event*, 1990-2000 (178 cases)**



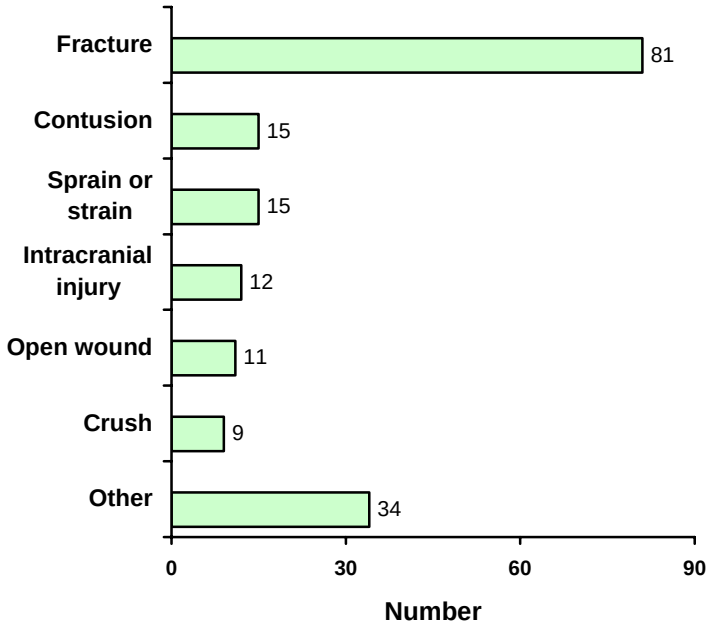
* Runover types are defined in chapter 2.

Bystander and extra rider runovers caused an almost equal number of hospitalized injuries in children.

13.6 DIAGNOSIS

FIGURE 13.6 **Hospitalized agricultural runovers in children by diagnosed injury, 1990-2000 (177 cases)**

45.8% of the hospitalized injuries to children were diagnosed as fractures. Other diagnosis types included: 8.5% contusions; 8.5% strains or sprains; 6.8% intracranial injuries; 6.2% open wounds; 5.1% crush injuries. Other diagnosis types each comprised less than 4% of the hospitalized injuries to children.



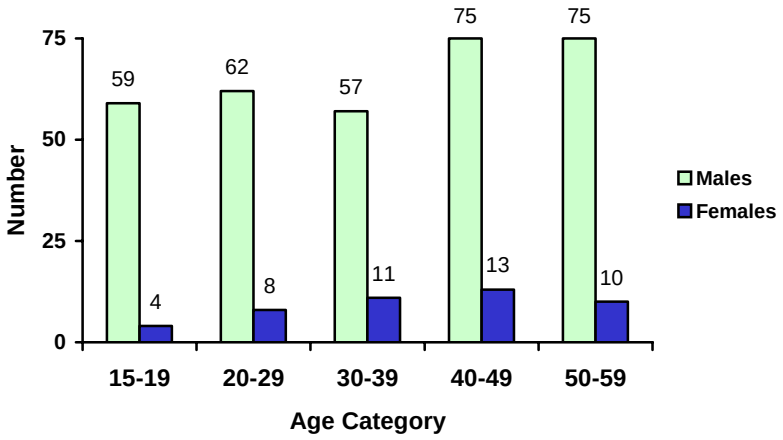
*For one case, diagnosis was not available.

14 AGRICULTURAL RUNOVER HOSPITALIZATIONS: ADULTS AGED 15-59

14.1 AGE AND GENDER

In adults aged 15-59, 87.7% of those who sustained hospitalized runover injuries were male. Adults in the older age categories were somewhat more likely to be injured than younger adults, but this trend was far less pronounced than it was for fatalities. It may be that runover events are more likely to cause death in older adults than in younger adults. It is also possible that older adults may be involved in more lethal types of runovers than younger adults.

FIGURE 14.1 **Hospitalized agricultural runovers in adults aged 15-59 by age and gender, 1990-2000 (374 cases)**

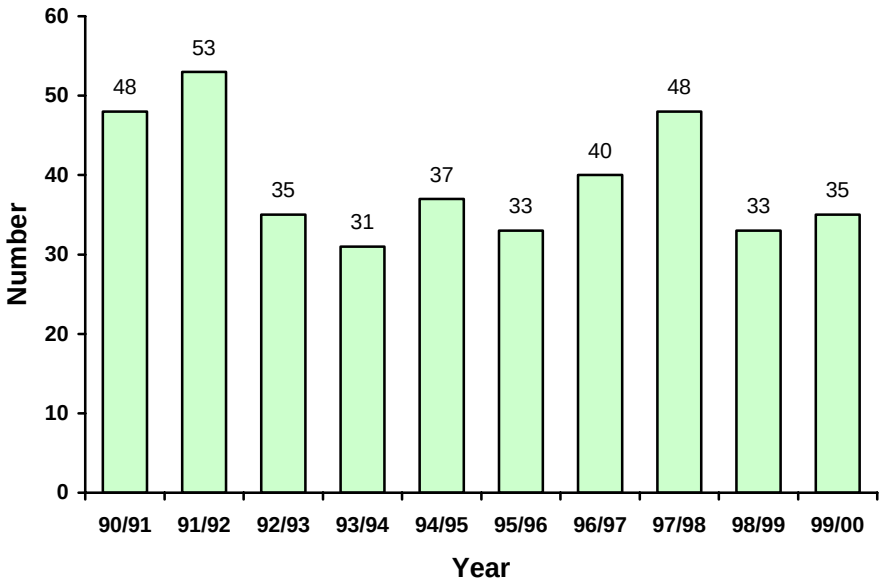


14.2 BY YEAR

There was no consistent pattern in the number of runover hospitalizations among adults aged 15-59 over the surveillance period.

Note: data are imputed for Alberta from April 1, 1998 to March 31, 2000 and for Nova Scotia from April 1, 1997 to March 31, 2000. Imputed values are not included in the total number of cases.

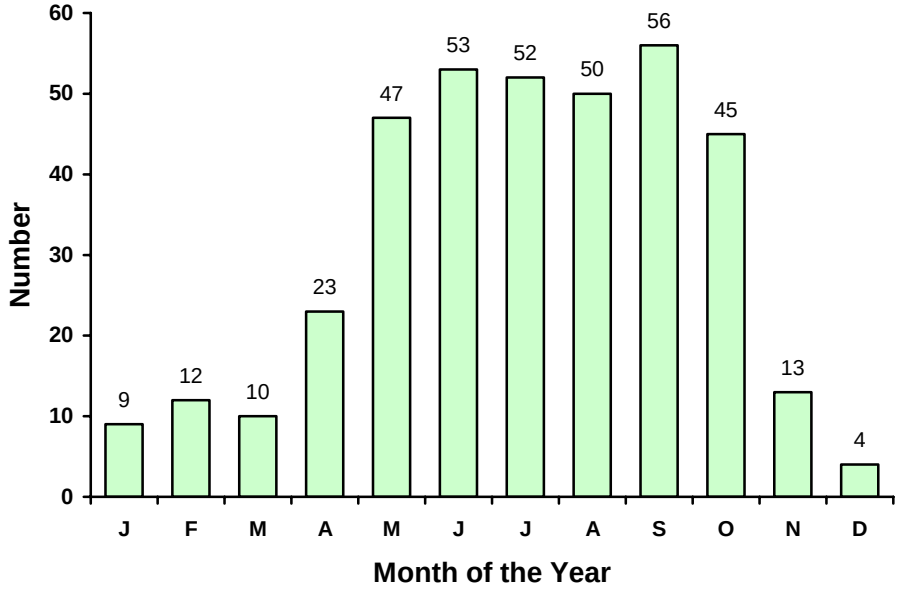
FIGURE 14.2 **Hospitalized agricultural runovers in adults 15-59 by year, 1990-2000 (374 cases)**



14.3 BY MONTH

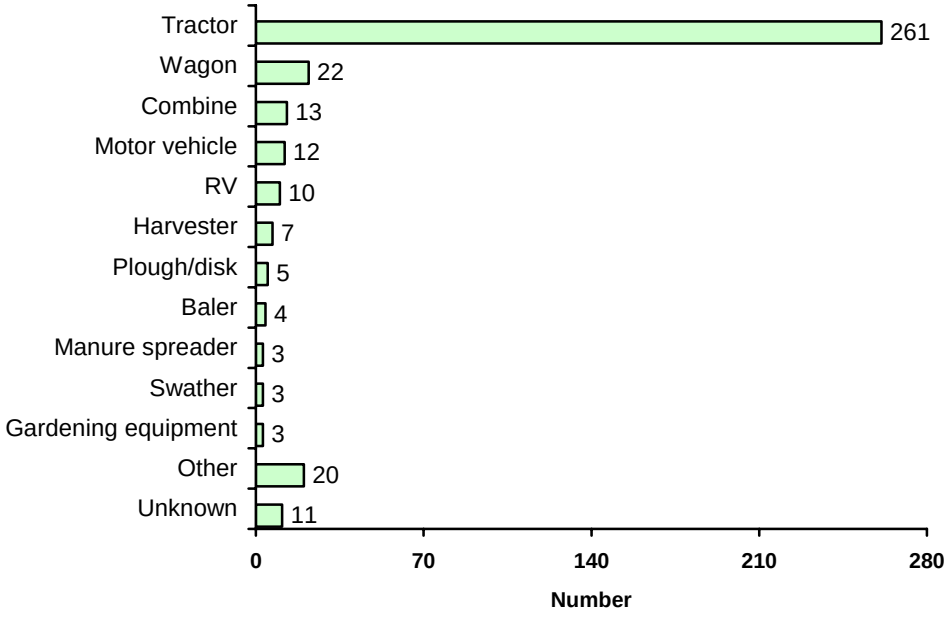
In adults aged 15-59, most hospitalized runover injuries occurred from May to October. In contrast to the fatality data, there was no marked peak in the month of September.

FIGURE 14.3 **Hospitalized agricultural runovers in adults 15-59 by month of the year, 1990-2000 (374 cases)**



14.4 HOSPITALIZATIONS BY MACHINE TYPE

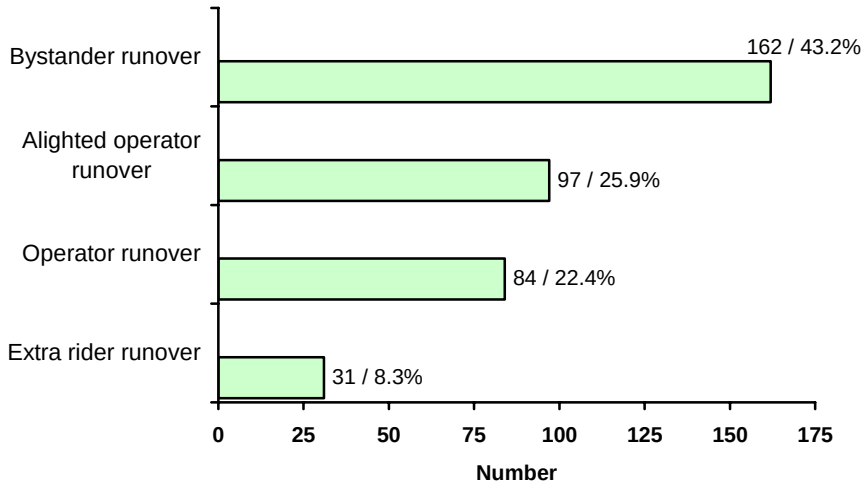
FIGURE 14.4 **Hospitalized agricultural runovers in adults 15-59 by machine type, 1990-2000 (374 cases)**



Tractors were by far the most common type of machine involved in hospitalized runovers of adults aged 15-59 (69.8%). In adults, tractors caused almost twelve times the number of hospitalized runover injuries as the next most common machine type. Wagons were implicated in 5.9% of the hospitalized runovers. Other machine types were each involved in less than 4% of the hospitalized runovers in adults over the surveillance period.

14.5 TYPE OF RUNOVER EVENT

FIGURE 14.5 **Hospitalized agricultural runovers in adults 15-59 by type of runover event*, 1990-2000 (374 cases.)**



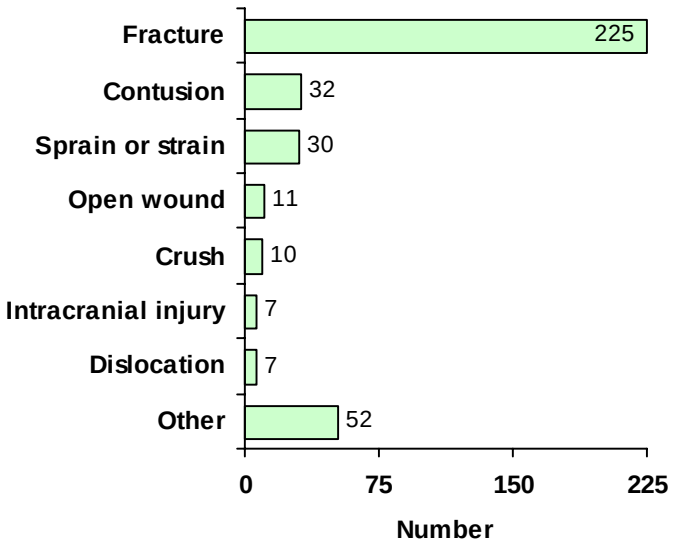
*Runover types are defined in chapter 2.

Bystander runovers were the most common type of hospitalized runover event in adults aged 15-59. In contrast, the most frequent fatal runover types in adults aged 15-59 were alighted operator and operator runovers. It is likely that, in adults, bystander runovers are less likely to cause death than alighted operator and operator runovers.

14.6 DIAGNOSIS

FIGURE 14.6 **Hospitalized agricultural runovers in adults 15-59 by diagnosed injury, 1990-2000 (374 cases)**

60.2% of the hospitalized runover injuries to adults were diagnosed as fractures. A further 8.6% of the injuries were contusions, 8.0% were strains or sprains and 6.9% were open wounds. Other diagnosis types each comprised less than 5% of the hospitalized runover cases.

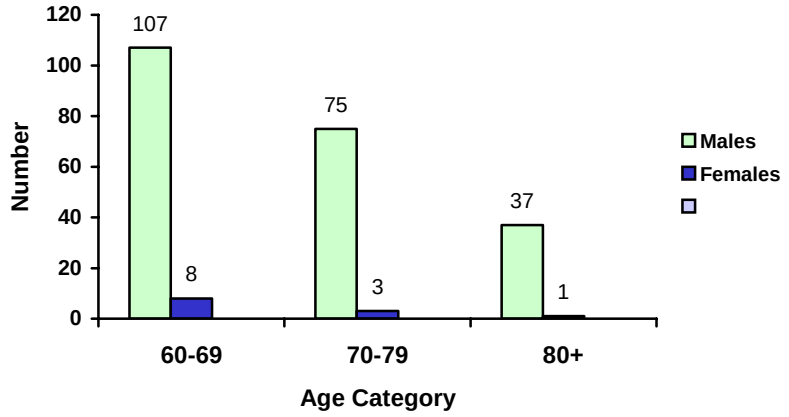


15 AGRICULTURAL RUNOVER HOSPITALIZATIONS: ADULTS AGED 60+

15.1 AGE AND GENDER

94.8% of the senior adults who sustained hospitalized runover injuries were male. Compared with fatalities, a smaller proportion of the seniors involved in hospitalized runovers belonged to the two oldest age categories. It is possible that adults in the older age categories may be involved in a greater number of more lethal types of runover events, such as alighted operator runovers.

FIGURE 15.1 Hospitalized agricultural runovers in senior adults by age and gender, 1990-2000 (231 cases)

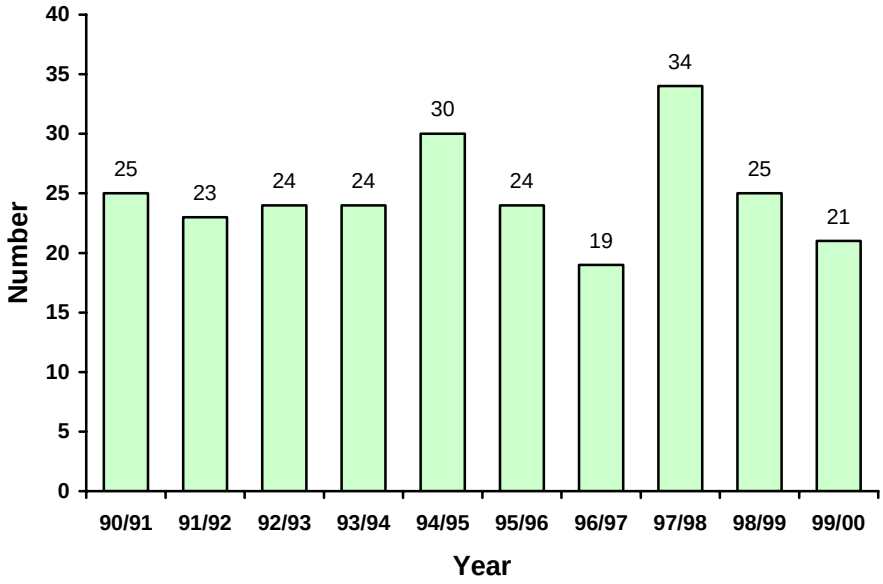


15.2 BY YEAR

There was no consistent pattern in the number of runover hospitalizations among senior adults over the surveillance period.

Note: data are imputed for Alberta from April 1, 1998 to March 31, 2000 and for Nova Scotia from April 1, 1997 to March 31, 2000. Imputed values are not included in the total number of cases.

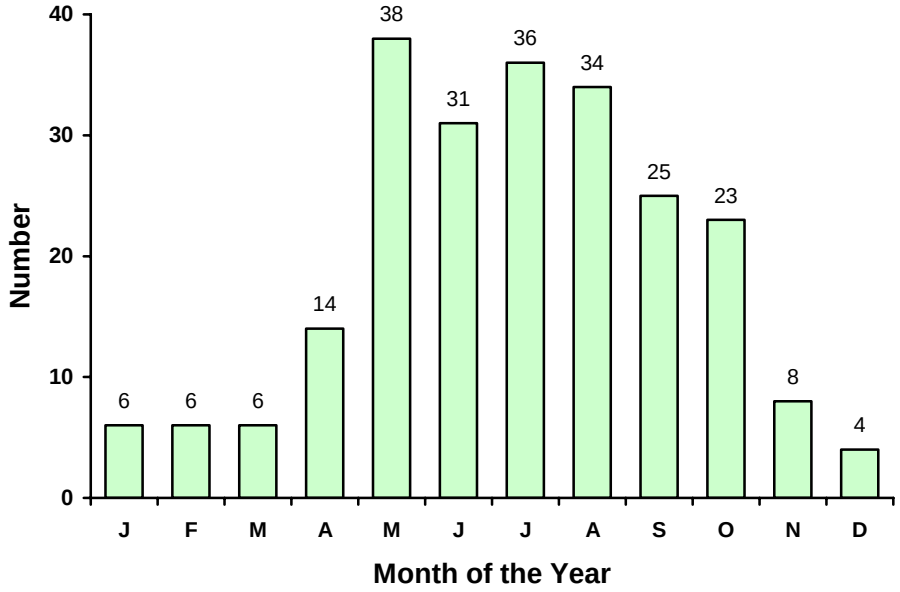
FIGURE 15.2 Hospitalized agricultural runovers in senior adults by year, 1990-2000 (231 cases)



15.3 BY MONTH

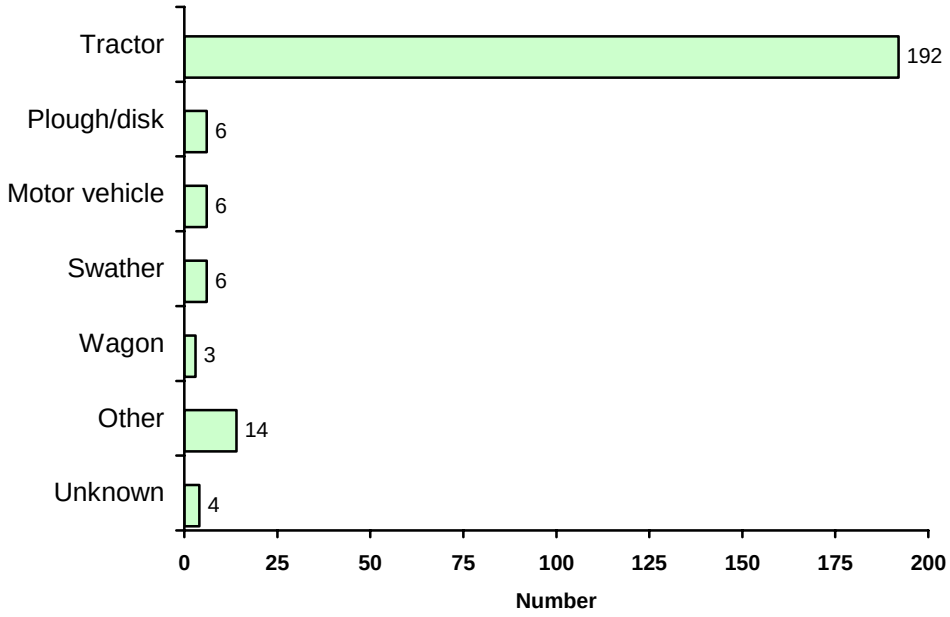
FIGURE 15.3 **Hospitalized agricultural runovers in senior adults by month of the year, 1990-2000 (231 cases)**

There were more hospitalized runovers in senior farmers from May to October than in the other months of the year. Unlike the pattern seen in fatal runovers, there was no peak in the number of hospitalized runovers from September to October. The peak months for hospitalized injuries were May to August.



15.4 BY MACHINE TYPE

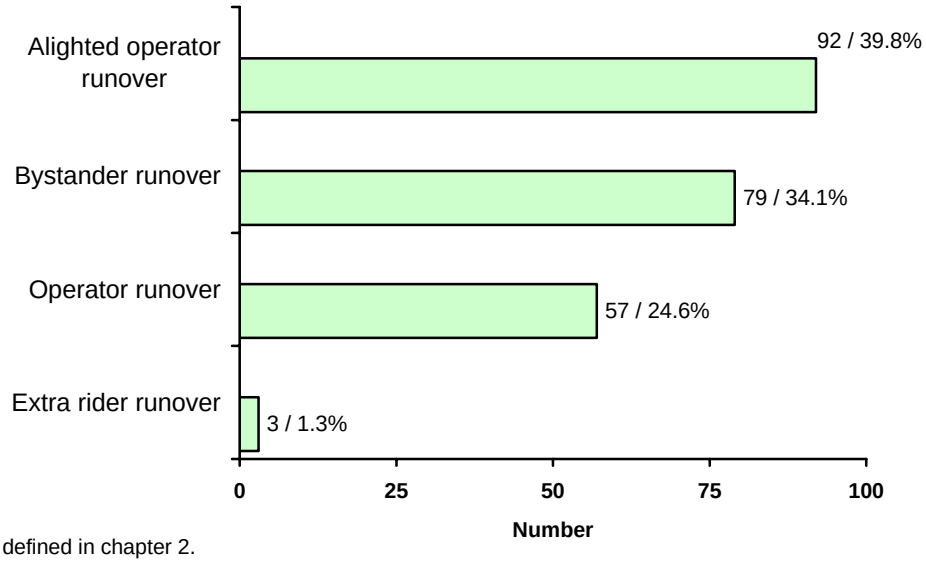
FIGURE 15.4 **Hospitalized agricultural runovers in senior adults by machine type, 1990-2000 (231 cases)**



Tractors were the machine type involved in the greatest number of hospitalized runovers among senior farmers (83.1%). Tractors were implicated in 32 times the number of hospitalized injuries as the next most common machine types (ploughs, motor vehicles and swathers.) Seniors were more likely than younger adults to be runover by tractors.

15.5 TYPE OF RUNOVER EVENT

FIGURE 15.5 **Hospitalized agricultural runovers in senior adults by type of runover event*, 1990-2000 (231 cases)**



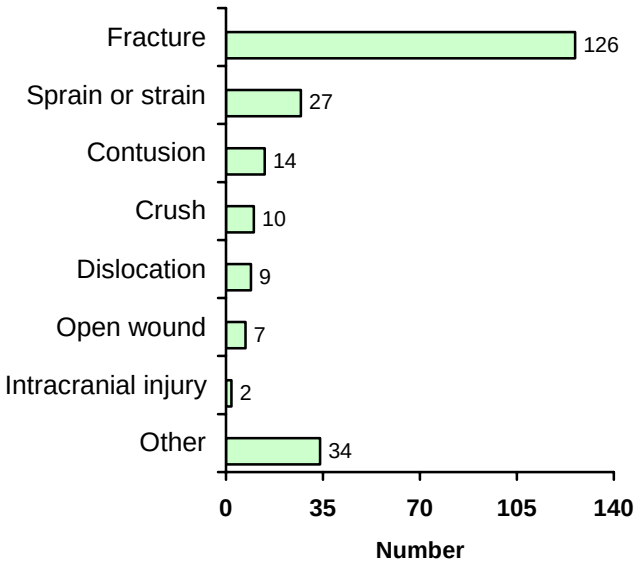
*Runover types are defined in chapter 2.

In senior adults, alighted operator and bystander runovers caused the greatest number of hospitalized injuries. Operator runovers caused a lower proportion of hospitalized injuries than fatal injuries among seniors. In contrast, bystander runovers caused a higher proportion of hospitalized injuries than fatal injuries for this age group. In senior adults, operator runovers may be more likely to cause death than bystander runovers.

15.6 DIAGNOSIS

FIGURE 15.6 **Hospitalized agricultural runovers in senior adults by diagnosed injury, 1990-2000 (229 cases*)**

55.0% of the hospitalized runover injuries to seniors were diagnosed as fractures. A further 11.8% of the injuries were strains or sprains and 6.1% were contusions. Other diagnosis types each comprised less than 5% of the hospitalized runover cases in seniors.



*In two cases, diagnosis was not available.

Appendix A Decision Rules

Inclusion of deaths and injuries in the fatality and hospitalization runover databases

Alcohol Involvement

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

Runovers on Highways

Deaths and injuries due to runovers on public highways that involved agricultural vehicles or agricultural machinery were included in the databases.

Inclusion of deaths in the fatality runover database

Pre-existing Medical Conditions

Deaths attributed to pre-existing medical conditions (e.g., seizure, heart attack) are excluded from the fatality database. Deaths where an agricultural injury was immediately preceded by a significant medical event such as a stroke, seizure or heart attack, are also excluded.

Secondary Complications

Deaths that occurred in hospital from secondary complications of agricultural injuries (e.g., embolism, respiratory distress) are 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.

Designation as work-related deaths in the fatality runover database

Off Road Vehicles

Deaths involving off road vehicles such as ATVs, dirt bikes and dune buggies were not designated as work-related fatalities unless the RV was being used for agricultural work at the time of the event.

Children at Play

Deaths of children who were playing in the agricultural work place were designated as work-related if their deaths occurred because someone was engaged in agricultural work. This included cases where a person engaged in agricultural work was unable to supervise a child that he/she had taken to the agricultural work place and cases where a child was killed as a direct result of someone engaged in an agricultural work activity (e.g., extra rider deaths, bystander runovers).

Runovers on Highways

Deaths due to collisions on public highways were designated as work-related if an agricultural work activity was involved; e.g., transporting livestock, machinery or harvested crops; herding livestock.

Appendix B Glossary

General Terms

Agricultural Fatalities
CAISP defined an agricultural injury fatality as: 1) Any unintentional injury resulting in death that occurred during activities related to the operation of a farm (as defined below) 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 took place away from agricultural work locations if agricultural work was being done. Deaths where victims were killed because a third party was engaged in agricultural work are also included. CAISP further sub-divides agricultural injury fatalities into two types: work-related agricultural fatalities and non work-related agricultural fatalities.

Denominator data
Data used as denominator values in rate calculations. If presented as a fraction, the lower half of an injury or illness 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.)*

Non work-related agricultural fatalities
Deaths that, while occurring on a farm or ranch, or caused by some aspect of the agricultural environment, were either not directly related to agricultural work or not collected in a consistent manner across the country. For the purposes of clarity, they are analyzed separately from work-related agricultural fatalities. Examples of these fatalities include deaths on agricultural vehicles being used for recreational purposes.

Numerator data
Data used as numerator values in rate calculations. If presented as a fraction, the top half of an injury or illness rate refers to the number of cases (events).

Rates
In the context of injuries or fatalities, this means the number of cases per time period or per population group over a given time period; for example, the number of persons injured per 100,000 agricultural workers per year.

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

Work-related agricultural fatalities
Work-related agricultural fatalities are deaths that occurred during the course of agricultural work. This includes deaths that took place away from the farm or ranch if agricultural work was being done. Deaths where the victim(s) were killed while a third party was engaged in agricultural work are also included.

Definitions: fatal runovers

Fatal agricultural runover: *For the purpose of this technical report, a fatal agricultural runover was considered to be any case assigned to one of the following CAISP fatal mechanical cause of injury categories* Operator fell from machine, then runover; Passenger fell from machine, then runover, Runover of alighted operator by his/her unmanned machine; Runover of alighted passenger by the machine he/she dismounted; Runover of bystander*. In addition, cases from the CAISP mechanical cause of injury category* Pinned or struck by machine *were included if it was determined that the victim would have been runover rather than pinned had he/she been standing out in the open.*

Alighted operator runover: *An operator was runover or pinned by his/her machine after alighting from it to perform a task. This includes cases where the operator left the engine running as well as cases where the operator turned the engine off.*

Bystander runover: *A bystander was runover or pinned by a machine and/or by an implement, wagon or trailer towed by it. At the time of the runover, the bystander may have been inactive or engaged in any activity other than operating a machine or riding an animal. This category also includes recently alighted former passengers and persons attempting to board a machine, wagon or trailer. Bystander runovers include blind runovers, where the machine's operator was unaware of the victim's presence, as well as cases where the operator saw the victim prior to the injury event.*

Extra rider runover: *A passenger fell from a machine he/she was riding on and was then runover or pinned by the machine and/or by an implement, wagon or trailer towed by it*.

Improper start runover: *An operator was runover or pinned by a machine that he/she started using any method other than the procedure recommended by the machine's manufacturer.*

Operator runover: *An operator fell from his/her machine and was then runover or pinned by the machine and/or by an implement, wagon or trailer towed by it.*

Definitions: hospitalized runovers

Hospitalized agricultural runover: *For the purpose of this technical report, a hospitalized agricultural runover was considered to be any case assigned to one of the following CAISP hospitalized mechanical cause of injury categories:* Operator fell from machine, then runover; Passenger fell from machine, then runover; Unspecified person fell from machine, then runover, Runover of alighted operator by his/her unmanned machine; Runover of alighted passenger by machine he/she dismounted; Runover of bystander, Runover of person unspecified.

Alighted or improper start operator runover: *a) An operator was runover by his/her machine after alighting from it to perform a task. This includes cases where the operator left the engine running as well as cases where the operator turned the engine off; or b) An operator was runover by a machine that he/she started using any method other than the procedure recommended by the machine's manufacturer.*

Bystander runover: *A bystander was runover by a machine and/or by an implement, wagon or trailer towed by it. At the time of the runover, the bystander may have been inactive or engaged in any activity other than operating a machine or riding an animal. This category also includes recently alighted former passengers and persons attempting to board a machine, wagon or trailer. Bystander runovers include blind runovers, where the machine's operator was unaware of the victim's presence, as well as cases where the operator saw the victim prior to the injury event.*

Extra rider runover: *A person identified as a passenger fell from a machine he/she was riding on and was then runover by the machine and/or by an implement, wagon or trailer towed by it. This type of runover also includes any cases from the CAISP hospitalized mechanical cause of injury category "Fell from machine, then runover, person unspecified", where the unspecified person was less than ten years' old. It is assumed that persons under age ten were passengers rather than operators.*

Operator runover: *A person identified as an operator fell from his/her machine and was then runover by the machine and/or by an implement, wagon or trailer towed by it. This type of runover also includes any cases from the CAISP hospitalized mechanical cause of injury category "Fell from machine, then runover, person unspecified", where the unspecified person was ten years' old or over. It is assumed that persons under age ten were passengers rather than operators. It is acknowledged that some unspecified persons aged ten or over may have been passengers, so the number of operator runovers could have been overestimated relative to the number of extra rider runovers.*

Appendix C Data Collection Forms

CAISP FATAL FARM INJURIES – DATA ABSTRACTION FORM

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

Coroner's File #: _____-_____ (year / no.)

CAISP ID: _____-_____-_____ (prov. / year / no.)

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

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

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

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

Time of Injury _____ (24:00) Date of Death: ____ / ____ / ____ (mm / dd / yyyy)

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

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

A. DESCRIPTION OF INJURY EVENT

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

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

B. CAUSE OF INJURY NOT MACHINERY OR VEHICLE RELATED

1 crushed or struck by animal. Specify animal:
_____
2 other type of animal injury. Specify animal:
_____
3 fall from animal. Specify animal:
_____
4 struck by object
5 struck against object
6 caught in, under or between objects
If 4, 5 or 6, specify object:
_____
7 fall from height. Specify fall location:
_____
8 fall on same level
9 jumped to lower level
10 overexertion
11 drowning
12 exposure to fire/explosion
13 contact with temperature extremes
14 contact with electric current
16 contact with radiation, caustic, toxic or noxious substance by (circle):
inhalation ingestion absorption
Specify agent: _____
18 asphyxiation by grain or soil. Specify:
_____
19 firearm
77 other non machine related. Specify:
_____
88 unknown non machine related
99 not applicable

C. CAUSE OF INJURY MACHINERY OR VEHICLE RELATED

1 sideways rollover
2 backwards rollover
3 unspecified rollover
4 entangled/caught in machinery
5 pinned or struck by machine, machine component, collapsing machine
6 traffic collision
7 operator fell from machine, not runover
8 operator fell from machine, then runover
9 passenger fell from machine, not runover
10 passenger fell from machine, then runover
11 runover of alighted operator
12 runover of alighted passenger
13 runover of bystander
18 struck by object falling/propelled from machine.
77 other machine related. Specify:
_____
88 unknown machine related
99 not applicable
If 5 or 18, specify object/component:
_____

D. TYPE OF MACHINERY

(Circle appropriate number if the injury event was machinery or vehicle related)
1 tractor
2 auger. Specify whether attached to machine or not attached to machine
3 mower
4 power take off, specify machine PTO attached to:
_____
5 baler
6 farm wagon
7 combine
8 power tool (not chainsaw)
9 chainsaw
10 welder
11 harvester
12 plough/disk
13 hay elevator
14 manure spreader
15 bulldozer, bob cat, skid steer
16 motor vehicle. Specify:
_____
17 off-road vehicle. Specify:
_____
18 swather
77 other farm implement/machine. Specify:
_____
88 unknown
99 not applicable

E. IMMEDIATE LOCATION OF INJURY

1 Field
2 Barn
3 Silo/grain bin, (circle)
4 Shed
5 Farmyard
6 Road/highway (includes dry ditches)
7 Driveway (includes dry ditches)
8 Farm house
9 Farm Road (includes dry ditches)
10 Woods, orchard
11 Water source; includes water-filled ditch, dugout, manure lagoon, sewage pit, etc. Specify:
_____
12 Corral/outdoor animal enclosure
77 Other location. Specify:
_____
88 Unknown

F. LOCATION OF DEATH

1 Found dead
2 Died *en route*
3 Died in hospital
77 Other location of death. Specify:
_____
88 Unknown

G. RELATION OF INJURED PERSON TO FARM OWNER

1 Operator
2 Spouse of farm operator
3 Child of farm operator
4 Other relative of farm operator. Specify:
_____
5 Hired worker
6 Spouse of hired worker
7 Child of hired worker
8 Other relative of hired worker. Specify:
_____
9 Other non-visiting child
10 Other non-visiting adult
11 Adult visitor or contractor
12 Child visitor
77 Other relationship. Specify:
_____
88 Unknown

H. METHOD OF DISCOVERY

Who found the deceased? (i.e. relationship to deceased) _____ Was the fatality witnessed? (circle) Y N
(Indicate if information not available)

I. NATURE OF INJURY BY BODY PART e.g., NI1 crush injury, BP1 chest.
(List from most to least serious injury, where the most serious injury was the cause of death.)

NATURE OF INJURY 1: _____ **BODY PART 1:** _____
NATURE OF INJURY 2: _____ **BODY PART 2:** _____
NATURE OF INJURY 3: _____ **BODY PART 3:** _____

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

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

09/2005

CAISP HOSPITALIZED FARM INJURIES – DATA ABSTRACTION FORM

ID: XX-XX-XXXX
Prov yr number

Instructions:
The <respective provincial agency> has provided us with the hospital separation record for the following patient treated in your hospital for an agricultural injury. Please confirm the information below and provide us with the additional information requested on the back of this form. Thank you for your help.

Hospital Information

Chart number:
Year:
Institution code:

Patient Information

Date of birth:
Sex:

Services

Date of admission:
Date of discharge:
Length of stay:
Admission category:
Ambulance required:

Injury Information

Main diagnostic code:
External cause of injury code:

Is the above information correct? (circle number)
1 YES
2 NO Please comment on any corrections:

Was this patient transferred from another hospital? (circle number)
1 YES Please tell us which hospital: _____
2 NO

Was this a readmission for a previous injury? (circle number)
1 YES Date of original injury: _____/_____/_____ (yy/mm/dd)
2 NO

If this was not a farm-related injury, please describe with as much detail as possible what type of injury this was:
_____
_____

1. Please describe in detail the circumstances surrounding the injury event and what the injured person was doing at the time of the injury:
_____
_____
_____
_____

2. Did the injury event involve a machine or vehicle?
No complete section 1.
Yes complete section 2, parts A and B.

09/2005

SECTION 1 – NON-MACHINE	SECTION 2 – MACHINE/VEHICLE RELATED	
Cause of injury	Part A Cause of injury	Part B Machine type
Animal-related Specify animal: _____ 1 crushed or struck by animal 2 other type of animal injury 3 fall from animal **Struck/caught by object(s)** Specify object: _____ 4 struck by object 5 struck against object 6 caught in/under/between objects **Fall/Jump** Specify fall from where: _____ 7 fall from height 8 fall on same level 9 jumped to lower level 10 **Overexertion** 11 **Drowning** Specify where: _____ 12 **Exposure to fire** **Contact with:** 13 temperature extremes 14 electric current 16 toxic substances Specify substance: _____ Contact by: (circle) inhalation ingestion absorption 19 firearms 77 other non-machine cause, Specify: _____ 88 Unknown, not machine related 99 Does not apply (machine-related)	**Machine/vehicle rollover** 1 sideways rollover 2 backwards rollover 3 unspecified rollover 4 **Entangled in machine** **Struck by/against or pinned by** Specify: _____ 5 pinned or struck by machine, machine component, collapsing machine 18 struck by object propelled or falling from machine 23 struck against machine/machine component 6 **Traffic collision (public road)** **Fall from moving machine, not run over** 7 operator 9 passenger 15 person unspecified **Fall from moving machine, then run over** 8 operator 10 passenger 16 person unspecified **Run over by moving machine (no fall)** 11 alighted operator 12 alighted passenger 13 bystander 17 person unspecified 21 **Overexertion** 22 **Jumped from machine** 77 Other cause, specify: _____ 88 Unknown machine-related 99 Does not apply	1 Tractor 2 Auger Specify: freestanding, attached to machine or unknown. 3 Mower 4 Power take off. Specify machine PTO attached to: _____ 5 Baler 6 Farm wagon 7 Combine 8 Power tool (not chainsaw) 9 Chainsaw 10 Welder 11 Harvester 12 Plough/disk 13 Hay elevators/conveyors 14 Manure spreader 15 Bulldozer, bobcat, skid steer, FEL 16 Motor vehicle, Specify type:_____ 17 Off-road vehicle, Specify type:_____ 19 Fencing equipment 20 Spraying equipment 21 Lawn mower 22 Garden equipment 24 Planting equipment 25 Swather 77 Other type, specify: _____ 88 Unknown machine 99 Does not apply

Location

1	Field	8	Farm house
2	Barn	9	Farm road
3	Silo/grain bin	10	Woodlot
4	Shed	11	Water source (any kind), manure lagoon, sewage pit etc. (specify)
5	Farm yard	12	Corral/outdoor animal enclosure
6	Road/highway	77	Other (specify)
7	Driveway	88	Unknown

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

09/2005

Appendix D Denominator Data

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

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

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

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

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

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Appendix F References

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