NORTHEAST CENTER For occupational health and safety

AGRICULTURAL INJURIES IN VERMONT 2017–2018



THE NORTHEAST CENTER FOR OCCUPATIONAL HEALTH AND SAFETY IN AGRICULTURE, FORESTRY AND FISHING

Jobs in agriculture, forestry and fishing share a few challenges: they are all labor intensive, weather dependent and risky.

That last common denominator—risk—is what the Northeast Center is dedicated to reducing. We work to understand safety challenges and identify actionable solutions so that workers in these three essential industries can thrive and survive on the job.

OUR MISSION

WHY WE EXIST

Agriculture, forestry and fishing (AgFF) workers experience the highest fatal injury rate at **25.3 deaths per 100,000 full-time workers**, compared to **3.4 deaths per 100,000 workers** for all U.S. industries. We believe AgFF workers should have the chance to make a living without getting hurt, losing a limb, or losing their lives.

By conducting research, providing education and developing outreach programs, we work to improve the health and safety of farmers, loggers and fishery workers.

Agriculture consistently ranks among the most dangerous industries in the United States, with five times more fatal injuries than the all-worker fatal injury rate [1]. This risk is heightened with younger workers, who are 45 times more likely to be killed than workers in other industries [1].

According to the United States Department of Agriculture (USDA), Vermont has over 6,800 farms in operation, spread across almost 1.2 million acres of land, producing over \$780 million in revenue each year [2]. Unfortunately, over 500 VT farms went out of business between 2012-2017, representing a 7% decrease in just five years [3]. This decline is exacerbated by the steadily increasing age of farmers, with the average age of principal operators in Vermont now at 56 years old [4]. This illustrates that additional support and attention are needed to help bolster this key industry in Vermont.

Injury may also play a role in the shuttering of farms. According to our research, after a tractor rollover event seven out of ten farms go out of business within the next five years.

Agriculture is a vital component of the U.S. economy, representing \$134.7 billion of the country's GDP [5]. While surveillance efforts are in place to monitor this sector, they are subject to various limitations. The Census of Fatal Occupational Injury (CFOI) [6] captures fatal injuries, while non-fatal injuries are tracked through a random sampling of U.S. businesses by the Survey of Occupational Injuries and Illnesses (SOII). Military, self-employed individuals, federal agencies, and farms with less than 11 employees are all excluded from the SOII sampling frame [7]. As the majority of agricultural businesses in the Northeast consist of small farms that do not meet these criteria [8-10], the region, including Vermont, is not adequately represented in the SOII survey.

Exacerbating these surveillance limitations, various long-standing agricultural injury surveys have been discontinued due to unsustainable costs [11]; notably, the Occupational Injury Surveillance of Production Agriculture survey (OISPA). Due to this lack of adequate representation and the discontinuation of applicable surveillance data, it is more important than ever to develop a low-cost, sustainable surveillance system, and to disseminate the findings to those in a position to make decisions that impact the AgFF community.

The high rate of injuries in agriculture do not have a single source. Instead, there are various issues within the agricultural sector that directly contribute to these elevated numbers. The consequences of these go beyond the farms and surrounding communities, impacting the United States as a whole.

Who We Are

The Northeast Center for Occupational Health and Safety in Agriculture, Forestry, and Fishing (Northeast Center) gathers injury statistics for agriculture, forestry, and fishing through various sources in order to remain informed about trends in these fields. The goal of this

VERMONT QUICK FACTS

6,800 Farms 1.2 million acres of farmland \$7.8 million in revenue Average farmer age: 56

Top Commodities:



Dairy products (65%)

Cattle and calves (8.5%)

Maple products (7.3%)

research is to prevent future injuries, and mitigate factors which contribute to these injuries.

How We Find Injuries

The Northeast Center analyzed Vermont prehospital care reports (PCR) from 2017-2018 using a Naïve Bayes machine learning algorithm to identify traumatic agricultural injuries and acute health events. After identifying likely cases through the algorithm, cases were verified through visual inspection, and subsequently coded for the Farm and Agricultural Injury Classification (FAIC), Occupational Injury and Illness Classification System (OIICS), intentionality, and location. The details of this process have been described elsewhere [12].

What We Found

The findings in this report align with those for other states. Traumatic injuries constitute the largest percentage of all agricultural injuries, representing 82% of identified cases, with the remainder being due to acute diseases, conditions, or injuries of a non-classifiable nature.

Within traumatic injury, 27% of all injuries result from falls, slips, and trips; while another 31% arise from contact with objects and equipment. Slips and falls were particularly likely in indoor locations, representing 33% of all indoor injuries, as opposed to 28% of outdoor injuries. Of these, 36% resulted from icy ground or other irregularities. In opposition to this, injuries sustained through contact with objects or equipment were much more likely to occur outdoors, representing 30% of all injuries outdoors vs only 9% indoors, with 69% of these injuries coming from a fairly even split between tree, vehicles, and machinery. Collectively, 53% of all injuries are accounted for by two event categories: Falls, slips, and trips (26%), and Contact with objects and equipment (27%).

Beyond the nature and events leading to injuries, this analysis also accounted for the primary

source of agricultural injuries in Vermont.

As one might expect, at almost 19% people, plants and animals constitute one of the largest sources of agricultural injuries in Vermont, followed by tractors and power take-offs (PTO) at a bit over 15%. Within the source category of people, plants and animals, non-human mammals are the source of over 54% of all incidents, with cattle in particular representing the majority of incidents. Forestry sources are a distant second, at 27%.



Men still represent the vast majority of agricultural injuries. Interestingly, however, almost half of all injuries sustained by women involved some form of fall (49%), whereas falls constituted only 19% of male injuries. Women were significantly more likely than men to sustain an injury in or around the barn, at 49% of all female injuries compared to just 22% for males. Men were much more likely than women to suffer an injury outside, with 51% of all male injuries occurring outside, as opposed to only 29% of female injuries. Females were ten times more likely to sustain an injury due to horses or other equines, with 7% of female injuries coming from this source, compared to 0.7% for males.

Of the 11 fatal injuries identified in this data set, all were male. Of these, 27% occurred as a result of contact with objects and equipment, while an additional 27% were due to transportation incidents. Lastly, 18% of fatal injuries occurred as a result of intentional selfharm.



Figure 1: Agricultural Injuries by Event, Vermont, 2017-2018

What This Means

The numbers above paint a clear picture of the most common hazards on Vermont farms: agricultural equipment and falls. While these findings may come as no surprise to those in the agricultural community, these injuries should not be disregarded as unavoidable. Falling while egressing a tractor has been identified as one of the most common causes for falling injuries in other agricultural research, with operator experience and hours worked being the key indicators as to the likelihood of an injury [13]. Additional research has identified sex, age, and body mass index (BMI) to be indicators of risk factor among agricultural workers [14].

Options abound regarding the prevention of slips, trips, and falls. Installation of handrails around stairs, ladders, and haylofts can provide stability or last-ditch handholds. Slip-resistant mats can be placed in areas with a tendency to get slick. Surfaces can be kept dry and free of manure, while uneven surfaces can be repaired. In addition, behavioral changes such as maintaining three points of contact when mounting or dismounting, and moving slowly while taking shorter steps can also mitigate the risk of injury.

Looking at the fatalities in this data set, it is important to note that while transportation incidents constitute only 10% of all agricultural injuries, they account for almost 30% of fatalities (Figure 2). This indicates that agricultural transportation incidents are more likely to result in at least one fatality, aligning with prior research in NY State which shows the fatality rate for agricultural vehicle crashes is roughly five times that of non-agricultural incidents [15]. As such, transportation incidents should receive more attention than they would otherwise garner from numerical occurrence alone.

There are various steps that agricultural operators can take to minimize the likelihood of transportation incidents. While avoidance of pedestrian roadways is the most sure-fire way of decreasing motor vehicle accidents, this is often not a feasible option for farmers.

Ensuring proper functionality of lights on farm equipment can increase visibility when travelling on the roadway. Further attention can be drawn to the vehicle by placing appropriate flags, slow-moving vehicle emblems, and additional flashers. Individually these may not seem like much, but collectively they can reduce the risk of roadside collisions.

On the occasions that a farmer must operate their vehicle on a roadway, it is best to do so during daylight hours. However, farm hours tend not to follow the 9-to-5 workday, so it is common for agricultural vehicles to travel in low -light conditions. In these cases, properly functioning headlights will increase visibility both for the farmer and for other motorists. Additional care should be taken when driving agricultural equipment near hazards such as bridges, gravel, roadside shoulders, or ruts, as all of these can contribute to a tractor rollover, the leading cause of fatalities within the agricultural community.



Figure 2: Agricultural Fatalities by Event, Vermont, 2017-2018

Looking more closely at the agricultural fatalities in this data set, 27% of victims were minors. While it is unrealistic to think that children will not be present on farms, there are steps which can be taken to minimize their risk of harm. Children should have designated areas where they can play, away from hazardous equipment, animals, and other dangers. In order to help facilitate this, the Marshfield Clinic research foundation has released a safe-play booklet to guide parents in delineating play areas on their farms.

The booklet suggests that play areas be located far away from farm equipment, but close to first aid, handwashing, and toilet facilities. Further, they recommend a physical barrier such as a fence to cordon off the play area, and that a competent adult always be available for supervision. The Marshfield Clinic's safe-play guide can be found in this report's reference section. It includes a worksheet and checklist to assist parents in planning the play area on their farm [16]. Additional safety guidelines have been released by cultivatesafety.org, providing guidance on recommended ages for tasks such as cleaning calf pens, feeding livestock, and everything in between [17].

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