



The Status of Farm Safety in Minnesota

A Report to the Legislature



Susan VonBank, 651-201-6603
625 Robert St. N., St. Paul, MN 55155
www.mda.state.mn.us

February 1, 2017

Acknowledgments

Content Specialists

Minnesota Safety Council Farm Safety Working Group

Paul Aasen, Minnesota Safety Council
Bruce Alexander, Upper Midwest Agricultural Safety and Health Center
Sarah Dornink, Minnesota Agricultural Education Leadership Council
Beverly Durgan, University of Minnesota Extension
Carol Fury, EquipALife
Mary Hanks, Minnesota Department of Agriculture
Bernie Hesse, UFCW Local 1189
Diane Kampa, Upper Midwest Agricultural Safety and Health Center
Adrienne Landsteiner, Minnesota Department of Health
Michelle Medina, Minnesota Farmers Union
Emily Neuman, Minnesota Safety Council
Erin Petersen, Minnesota Safety Council
Ruth Rasmussen, Upper Midwest Agricultural Safety and Health Center
Nancy Reeck, Department of Labor and Industry
Megan Roberts, Southern Minnesota Center of Agriculture
Nick Sinner, Minnesota-South Dakota Equipment Dealers Association
Tyrone Taylor, Department of Labor and Industry
Andrea Vaubel, Minnesota Department of Agriculture
Lee Wendel, SFM Insurance
Alauna Yust, Minnesota Department of Agriculture
Brian Zaidman, Department of Labor and Industry

Brandi Janssen, University of Iowa
Joni Scheftel, Minnesota Department of Health
Michele Schermann, University of Minnesota
John Shutske, University of Wisconsin
Jaime Villelaz, Latino Economic Development Center

Editors

Jessica DelFiacco, Minnesota Department of Agriculture
Meg Moynihan, Minnesota Department of Agriculture

Pursuant to Minn. Stat. § 3.197, the cost of preparing this report was approximately \$6392.

In accordance with the Americans with Disabilities Act, this information is available in alternative forms of communication upon request by calling 651/201-6000. TTY users can call the Minnesota Relay Service at 711.

The MDA is an equal opportunity employer and provider.

Table of Contents

Acknowledgments	2
Content Specialists.....	2
Editors.....	2
Executive Summary	4
Introduction.....	6
Safety Issues Faced by Farmers and Farm Workers	6
Characteristics and Causes of Farm-Related Fatalities	6
Common Causes of Farm-Related Illnesses and Injuries.....	7
Farm Safety Legislation and Reports in Minnesota	8
Comparing Minnesota Farm Safety Efforts with Other Midwestern States	11
Barriers to Better Safety.....	14
Better Serving People Who Work on Farms	15
Recommendations to Improve Farm Safety Efforts in Minnesota	16
References.....	18
Appendices	20
Appendix 1. Farm Safety Working Group Members	20
Appendix 2. Final Recommendations of the Minnesota Advisory Task Force on Farm Safety, 1991	21

Executive Summary

The 2016 Minnesota Legislature charged the Commissioner of Agriculture with analyzing and reporting on Minnesota's farm safety challenges, including: common causes of farm-related accidents, information about how other Midwestern states address farm safety issues, and recommendations for improving farm safety and programs (Laws of MN 2016, Ch 184, Sec 13).

Although only about 2% of Minnesota's workforce is engaged in agriculture, it accounted for more than 30% of workplace fatalities in 2014 (U.S. Bureau of Labor Statistics, 2014). Agricultural workers are exposed to numerous safety, health, environmental, biological, and respiratory hazards including heat exposure, falls, unpredictable livestock, hazardous equipment, grain bins, and pesticides. The Centers for Disease Control and Prevention (CDC) and other sources consistently cite tractors (including rollovers, entanglements, collisions, etc.) as the most common cause of death on farms nationally. Researchers at the Minnesota Department of Health recently found that costs of injury and illness in the agricultural sector ranged between \$21 and \$31 million annually, mostly attributed to indirect costs such as lost productivity at work (Landsteiner, et al., 2016).

In the 1980's and 1990's, the Minnesota Legislature established and funded several farm safety initiatives, including a University of Minnesota (UMN) Extension program for rural health and safety, a UMN School of Public Health research center for agricultural safety and health, and a farm equipment safety program for youth. Then in 2015, the Star Tribune published a four-part series, *Tragic Harvest*, which reported on the increasing rate of farm deaths in the Midwest, explored their causes, and sounded a call to prioritize farm safety and accident prevention (Meitrodt, 2015). In 2016, the Legislature appropriated \$250,000 for a pilot Rollover Protective Structures (ROPS) rebate program and requested the Minnesota Department of Agriculture (MDA) explore Minnesota's farm safety challenges (M. S. 17.119; Laws of MN 2016 Chap 184, Sec 13; Chap 189 Art 2 Sec 2 & 8).

Minnesota, Iowa, Nebraska, and Wisconsin all have farm safety education and training efforts primarily delivered by university extension services and nonprofit and community organizations. Each of these states also hosts a CDC National Institute for Occupational Safety and Health (NIOSH) Agricultural Health and Safety Center. In addition to their NIOSH centers, Iowa and Wisconsin have state-mandated and -funded centers (I-CASH, UWCASH), similar to the rural health and safety program formerly operated by UMN Extension. The UMN Extension program is no longer funded. Iowa and Nebraska are both in the process of setting up ROPS rebate programs similar to those offered in Wisconsin and Minnesota.

Many of the barriers to adoption of safety practices identified in the late 1990's still exist today: education and training, lack of injury and economic impact data, economic pressures, and regulations. Much farm safety programming has previously been geared toward owner/operators and their families. However, as farms grow larger and non-family farm labor increases, reaching farm workers who face additional safety barriers has become increasingly important.

Taking all of this into consideration, the MDA recommends the following:

- Continue the ROPS rebate program and explore the expansion of rebates to other farm safety equipment.
- Re-establish the statewide UMN Extension farm safety faculty position.
- Establish support for the Upper Midwest Agricultural Safety and Health Center (UMASH).
- Improve data collection about farm illnesses, injuries, and fatalities.
- Promote the existing Minnesota Department of Labor and Industry's Workplace Safety Consultation Program to farmers.
- Create a Farm Safety Certification Program.
- Investigate financial incentives to increase farm safety measures.
- Research and improve programs for a changing farm labor population.

- Encourage and support programs offered by allied industries and organizations.
- Promote existing training programs and expand educational opportunities for 4-H, FFA, and beginning farmer education programs.
- Create a coordinated media campaign.
- Continue the Farm Safety Working Group.

Introduction

The 2016 Minnesota Legislature directed the Minnesota Department of Agriculture (MDA) to examine the range of farm safety challenges and report the findings to the legislative committees with jurisdiction over agricultural policy by February 1, 2017. At a minimum, the report needed to:

1. Provide information on how other states in the Midwest, including but not limited to Wisconsin, Iowa, and Nebraska, address farm safety issues;
2. Identify common safety issues faced by Minnesota farmers that need attention, including common causes of farm-related accidents;
3. Identify how farm safety programs can better serve the growing farm labor population; and
4. Make recommendations to the legislature on how to improve farm safety efforts in Minnesota.

(Laws of MN 2016, Ch 184, Sec 13)

MDA prepared this report to fulfill that obligation, in cooperation with the Farm Safety Working Group (FSWG).

The FSWG is an informal collaboration between state agencies, higher education institutions, agriculture membership organizations, farm safety advocates, private sector companies, and labor and safety organizations focused on improving safety in agriculture (Appendix 1). The FSWG grew out of farm safety conversations during the 2015 Legislative session and met as a group for the first time in June of 2015. The FSWG's purpose is to provide a forum to discuss safety issues in agriculture, connect groups and organizations who are working on farm safety, and organize a collective effort to improve agricultural safety.

Safety Issues Faced by Farmers and Farm Workers

Agriculture is widely recognized as one of the most dangerous industries, and farming in Minnesota is no exception. Although only about 2% of Minnesota's workforce is engaged in agriculture, it accounted for more than 30% of workplace fatalities in 2014 (U. S. Bureau of Labor Statistics, 2014). From 2011 to 2014, 78 Minnesotans engaged in agriculture, forestry, and fishing died of workplace-related illnesses or injuries – nearly 40% more than the next most dangerous industry, construction (MN Dept. of Labor & Industry, et al., 2016). Using data from the Bureau of Labor Statistics, Minnesota Department of Industry and Labor, death certificates, sheriff departments, and State Patrol records, reporters from the Star Tribune identified 210 farming related deaths between 2003 and 2013 (Meitrodt, 2015). Researchers at the Minnesota Department of Health (MDH) recently found that costs of injury and illness in the agricultural sector ranged between \$21 and \$31 million annually, mostly attributed to indirect costs such as lost productivity at work (Landsteiner, et al., 2016).

Characteristics and Causes of Farm-Related Fatalities

The Great Plains Center for Agricultural Health documented the following characteristics of agriculture-related fatalities in the Midwest between 2005 and 2012 (GPCAH, 2015):

Age and Gender

- Adults age 65 or older account for 41% of farm fatalities, with 77% occurring among persons age 45 or older.
- 94% of people killed were male.

Time and Location

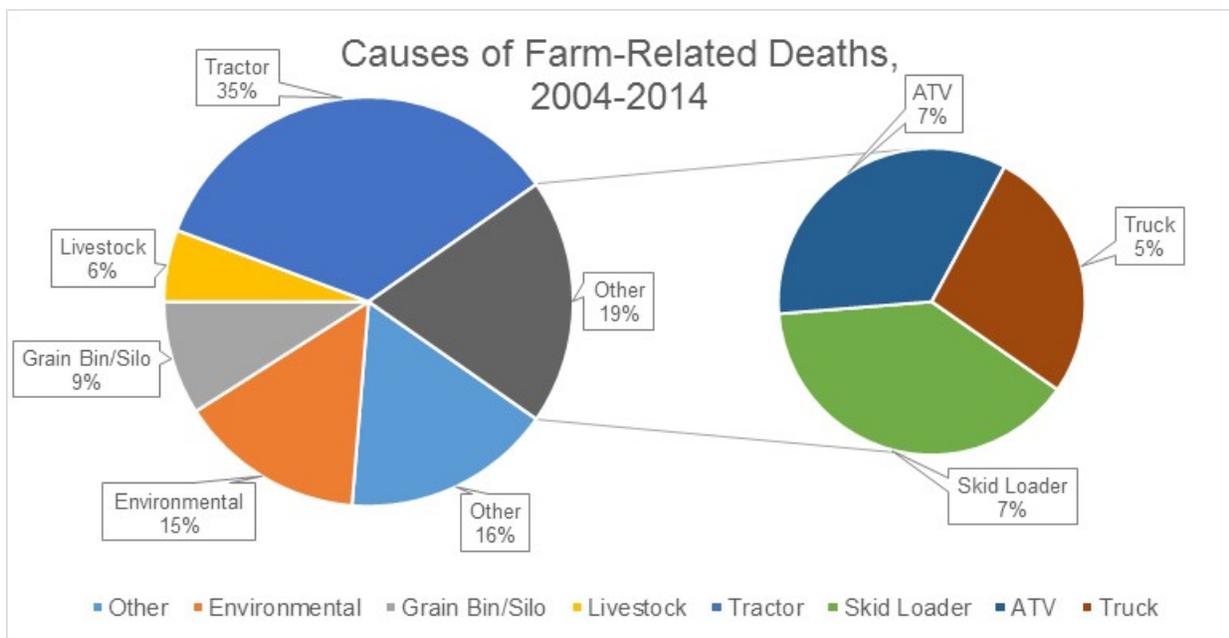
- Two out of three fatalities occurred between May and October, with the greatest number in July.
- Nearly half of the deaths occurred between noon and 6:00 pm.
- 80% of fatalities occurred on the farm, while 15% occurred on a street or highway.

Activity

- More than half of people who died were operating a vehicle (tractor, truck, skid loader, ATV).
- 33% of these deaths were due to rollovers.
- Nearly one out of five fatalities occurred during construction, maintenance, or cleaning, with 10% more attributed to tools and machinery.

The Centers for Disease Control and Prevention (CDC) and other sources consistently cite tractors (including rollovers, entanglements, collisions, etc.) as the most common cause of death on farms nationally. The Star Tribune newspaper documented Minnesota's farm-related deaths in a four-part series called *Tragic Harvest* that ran in October 2015. (Figure 1).

Figure 1. Causes of Farm-Related Deaths, 2004-2014 (Meitrodt, 2015)¹



Common Causes of Farm-Related Illnesses and Injuries

Agricultural workers are exposed to numerous safety, health, environmental, biological, and respiratory hazards including heat exposure, falls, unpredictable livestock, hazardous equipment, grain bins, and pesticides. It's difficult to know the number of non-fatal farm injuries and illnesses on Minnesota farms, however, because these are not as well documented as deaths.

One important source of workplace injury and illness data is the Survey of Occupational Injuries and Illnesses (SOII), operated by the U.S. Bureau of Labor Statistics. According to the SOII, there were 8,000

¹ Environmental causes include drowning, electrocution, falls, fire, and poisoning.

agriculture-related injuries in Minnesota between 2000 and 2011 (Landsteiner, et al., 2015). However, this survey does not report information about owner/operators, family farm workers, or from small operations (fewer than 11 employees), so many agriculture-related injuries and illnesses are not accounted for. Additionally, chronic or progressive injuries and illnesses such as noise-induced hearing loss, skin cancers and other skin diseases, respiratory conditions, and poisoning may not appear immediately. These conditions are often difficult to attribute to workplace causes and may not be identified in time to be included in reports (Zaidman & MN Dept. of Labor & Industry, 2014).

In fact, the MDH estimates agriculture illness/injury rates are much higher than those reported by the SOII. Using hospital discharge data, the MDH found there were 22,343 injuries related to agriculture between 2000 and 2011 – three times as many as the SOII reported for the same time period (Landsteiner, et al., 2015).

The FSWG has identified some other limitations to collecting accurate farm injury data, including:

- Farmers who don't have health insurance or who carry high deductible policies sometimes don't seek medical care for illnesses or injuries;
- Farmers may not feel they can afford to take time off or hire help, so they work through the injury or illness;
- Family members and farm visitors may not report an injury or illness as agriculture-related;
- Farm workers may worry about losing their jobs if they report injuries or illnesses.

Farm Safety Legislation and Reports in Minnesota

The following historical timeline provides further context for the farm safety challenges, efforts, and recommendations presented in this report.

1988

In 1988, the Minnesota Legislature directed UMN Extension to create a rural health and safety program and set forth a number of program goals and responsibilities for it. The program was to be funded by legislative appropriation (Table 1), the University of Minnesota (UMN), Extension, gifts, and grants. The program continues in statute (M.S. 137.34).

Extension staff assessed the state of rural health and safety education in Minnesota. They reported that valuable farm safety educational materials were available, and noted there were barriers to widespread distribution and use of these materials. The primary barrier was the lack of a resource center that could collect and distribute materials, develop accessible programs, and reach broader audiences. Another barrier was the lack of data available regarding farm accidents and injuries. Though adequate data had been collected regarding fatalities, there were no national or state-wide agricultural injury and disease surveillance programs at that time – a situation that continues today, as noted earlier in this report (Brennan, 1989).

The report concluded that farmers would only improve the safety of their equipment and farming practices if they were more aware of the dangers posed. The report recommended more education and proactive efforts by safety advocates, specifically:

- Implement a comprehensive program for recording and reporting data on farm accidents.
- Continue to promote farm safety in print, on the radio and on television, ensuring that the information reaches its intended audience.
- Train farm advisors like insurance agents, county extension agents, veterinarians, and equipment dealers about farm safety and trends in the field.

(Brennan, 1989)

1989

In 1989, the Minnesota Legislature established an advisory task force on farm safety to “determine ways in which the very high risks of accident and injury to farm operators and their families and employees can be minimized.” The task force’s preliminary report found that:

- Tractor roll-overs were the single greatest cause of accidental deaths on Minnesota farms.
- Financial constraints often result in improper maintenance of equipment, taking shortcuts, farming at night after working another job, or putting children to work at what might be considered age-inappropriate tasks.
- When there is an accident, the nearest hospital or rescue team is likely many miles away.
- There is no legal minimum wage for children to perform any task on their parents’ farm.

(MN Advisory Task Force on Farm Safety & MDA, 1990)

In its final report, the task force provided 10 recommendations to increase farm safety, including continuing support for the farm safety specialist position at the UMN; revitalizing and expanding the availability of the 4-H/FFA tractor and machinery operation, maintenance, and safety training program; and providing funding for a pilot project to develop a comprehensive farm safety audit to be conducted by Extension in cooperation with selected farm insurance companies (MN Advisory Task Force on Farm Safety & MDA, 1991). The full set of recommendations is presented in Appendix 2. Task force authorization expired in 1992.

1991

In 1991, the Minnesota Legislature urged Extension “to retain and, to the extent practicable, keep filled at all times, the staff position of farm safety specialist” because “the extension service has unique opportunities for delivering health and safety messages to farm families.” This recommendation remains in statute (M.S. 137.341).

The legislature also created three other farm safety-related entities in 1991: a research center for agricultural health and safety within the UMN School of Public Health; a farm safety advisory commission; and a farm equipment safety and maintenance program for youth. Table 1 shows the funding appropriated by the Minnesota legislature in 1991, 1995, and 1999. The farm safety advisory commission was repealed in 2001, but the other entities remain in statute (M.S. 17.107 and M.S. 137.342).

Throughout the 1990s and into the 2000s, Extension retained a full-time agricultural safety specialist who coordinated with extension educators, University specialists, nonprofit organizations, and industry leaders to promote and manage the rural health and safety program. In the early 2000s, program work focused on the connection of stress on the farm to family safety, health, and mental health. Throughout this period, the program conducted research, produced educational materials, and engaged other organizations in promoting farm safety (John Shutske, personal communication, September 22, 2016).

In 2008, the Extension farm safety specialist left for another opportunity. The position was not refilled (Meitrodt, 2015).

2011

In 2011, the National Institute for Occupational Safety and Health (NIOSH), a branch of the CDC, created the Upper Midwest Agricultural Safety and Health Center (UMASH) at the UMN (umash.umn.edu). UMASH is one of 10 NIOSH-funded Centers for Agriculture and is a multidisciplinary collaboration of the UMN School of Public Health, UMN College of Veterinary Medicine, National Farm Medicine Center of the Marshfield Clinic, Migrant Clinicians Network, and MDH. The collaboration addresses existing and

emerging occupational health and safety issues in agriculture, such as health and safety in the pork production industry, surveillance of zoonotic diseases in agriculture workers, and immigrant dairy worker health and safety.

2015

In October 2015, the Star Tribune published a four-part series, *Tragic Harvest*, which reported on the increasing rate of farm deaths in the Midwest and explored their causes. The series took a hard and detailed look at the culture and practices that surround farm safety and sounded a call to prioritize farm safety and accident prevention in Minnesota (Meitrodt, 2015).

2016

The 2016 Minnesota Legislature asked the MDA to analyze the range of safety challenges presented in the operation of a farm, in consultation with organizations in Minnesota that address issues of farm safety, and report the findings to the legislative committees with jurisdiction over agricultural policy (Laws of MN 2016, Ch 184, Sec 13).

Table 1. Minnesota Farm Safety Funding

Year	Laws of Minnesota	Appropriation
1988	Chapter 688, Article 21, Section 8	\$50,000 appropriated from general fund to MN Extension Service for the rural health and safety program, to be matched by \$25,000 of university or extension service funds. Available until June 30, 1989.
1989	Chapter 350, Article 20, Section 29	\$5,000 appropriated from the general fund to MDA for purposes of the advisory task force on farm safety.
1991	Chapter 254, Article 1, Section 7	\$160,000 the first year for farm safety programs (\$120,000 for payment to instructors in a youth farm safety program and \$40,000 for a farm safety audit pilot project); available either year of the biennium. If any amount remains unencumbered on September 1, 1992, it becomes available for the other program.
1995	Chapter 220, Section 7	\$150,000 the first year and \$150,000 the second year to MDA for agriculture information centers, only available on a match basis. Any appropriated amounts not matched by April 1 of each year are available for other purposes within the department, of which \$10,000 each year may be used for farm safety programs and remains available until June 30, 1997.
1999	Chapter 231, Section 11	\$100,000 the first year to UMN extension service for its farm safety and health program (one-time appropriation).
2016	Chapter 189, Article 2, Section 2	\$250,000 the second year to MDA for the tractor rollover protection pilot program (one-time appropriation).

Comparing Minnesota Farm Safety Efforts with Other Midwestern States

Minnesota, Iowa, Nebraska, and Wisconsin all have farm safety education and training efforts led by governments, universities, extension services, and nonprofits.

In all of these states, education and training are primarily delivered by university extension services and nonprofit and community organizations. State government's role is generally limited to funding, regulation, and enforcement.

Key sources of farm safety education and training materials in these states are the Centers for Agricultural Disease and Injury Research, Education, and Prevention. Created as part of a CDC/NIOSH Agricultural Health and Safety Initiative in 1990, 10 centers located across the U.S. conduct research, education, and prevention projects that address agricultural health and safety problems. Four out of the 10 are located in the Midwest:

- Central States Center for Agricultural Safety and Health (CS-CASH) in Nebraska, www.unmc.edu/publichealth/cscash/
- Great Plains Center for Agricultural Health (GPCAH) in Iowa, www.public-health.uiowa.edu/gpcah/
- National Children's Center for Rural and Agricultural Health and Safety (NCCRAHS) in Wisconsin, www.marshfieldresearch.org/nccrahs
- Upper Midwest Agricultural Safety and Health Center (UMASH) in Minnesota, umash.umn.edu

The objectives of these centers are to prevent illness and injury among agricultural workers and their families by:

- Developing and conducting research.
- Developing and implementing model educational outreach and intervention programs.
- Develop and evaluating control technologies.
- Developing and implementing model programs.
- Evaluating agricultural injury and disease prevention and educational materials and programs implemented by the Center.
- Providing consultation and/or training to researchers, health and safety professionals, graduate/professional students, and agricultural extension agents and others in a position to improve the health and safety of agricultural workers.
- Developing linkages and communication with other governmental and non-governmental bodies involved in agricultural health and safety with special emphasis on communications with other CDC/NIOSH sponsored agricultural health and safety programs.

(NIOSH, 2016)

NIOSH also oversees the National Occupational Research Agenda (NORA), a partnership program to encourage groundbreaking research and improve workplace practices in 10 industry sectors, including agriculture, forestry, and fishing (AgFF). In 2008, NORA created its first-ever formal research agenda for occupational safety and health in the AgFF sector. Based on scientific evidence, public testimonies, peer reviews, and personal expertise, this agenda "provides guidance on prioritization of safety and health issues to industry, labor, federal, state, and local governments, as well as to experts in professional associations, academia, and public interest/advocacy groups." (NORA, 2008).

NORA's five agricultural strategic goals are:

1. **Surveillance** – Improve surveillance within the Agriculture, Forestry, and Fishing Sector to describe: the nature, extent, and economic burden of occupational illnesses, injuries, and fatalities; occupational hazards; and worker populations at risk for adverse health outcomes.
2. **Vulnerable Workers** – Reduce deleterious health and safety outcomes in workers more susceptible to injury or illness due to circumstances limiting options for safeguarding their own safety and health.
3. **Outreach, Partnerships, and Communications** – Move proven health and safety strategies into agricultural, forestry, and fishing workplaces through the development of partnerships and collaborative efforts.
4. **Agriculture Safety** – Reduce the number, rate, and severity of traumatic injuries and deaths involving hazards of production agriculture and support activities.
5. **Agriculture Health** – Improve the health and well-being of agricultural workers by reducing occupational causes or contributing factors to acute and chronic illness and disease.

(NORA, 2008)

Other organizations deliver information on and advocate for agricultural health and safety, including:

- AgrAbility, www.agrability.org, a program partnering state extension services with nonprofit disability organizations to help farmers, ranchers, and other agricultural workers with disabilities succeed in rural America through access to assistive technologies, networking, and family support.
- Agricultural Safety and Health Council of America, www.ashca.org, a coalition of nonprofits, businesses, and government agencies which address the safety and health issues found in the agricultural industry.
- Farm & Ranch eXtension in Safety & Health (FReSH), <http://articles.extension.org/pages/66221/fresh-community-information>, which provides online access to farm safety and health information and education through a partnership of 74 universities.
- Farm Safety for Just Kids, www.farmsafetyforjustkids.org, an international non-profit based in Iowa that promotes a safe farm environment to prevent health hazards, injuries, and fatalities to children and youth.
- National Ag Safety Database, nasdonline.org, a national resource that provides educational and research materials for farmers, farmworkers, researchers, and others in the agricultural safety and health community.
- National Education Center for Agricultural Safety, www.necasag.org, which houses a hands-on farm safety training center in northeast Iowa, works to advocate for agricultural safety, and partners with agribusiness and other organizations to prevent illnesses, injuries, and deaths among farmers, farm workers, and their families.
- Progressive Agriculture, www.progressiveag.org, a foundation that sponsors the Progressive Agriculture Safety Day® program which provides training and resources to make rural life safer and healthier for children, their families, and communities.

In addition, farmer groups such as Farm Bureau (www.fb.org) and National Farmers Union (nfu.org/farmsafety/) have farm safety programs. Furthermore, organizations such as the AgriSafe Network (www.agrisafe.org) and the International Society for Agricultural Safety and Health (isash.org) are committed to the professional development of rural health professionals and educators.

Though many of these resources are available in Minnesota, Iowa, Nebraska, and Wisconsin, and programs within each state are focused on the same big picture items, there are also some differences (Table 2).

Table 2. Comparison of Farm Safety Efforts in Iowa, Nebraska, Wisconsin, and Minnesota (as of October 2016)

	Wisconsin	Iowa	Nebraska	Minnesota
NIOSH Agricultural Center	National Children's Center for Rural and Agricultural Health and Safety (NCCRAHS) National Farm Medicine Center (part of UMASH)	Great Plains Center for Agricultural Health (GPCAH)	Central States Center for Agricultural Safety and Health (CS-CASH)	Upper Midwest Agriculture Safety and Health Center (UMASH)
University and Cooperative Extension Service	UW Center for Agricultural Safety and Health (UWCASH) (a legislatively-mandated, state-funded farm safety center) UW-River Falls Center for Dairy Farm Safety UW Extension Pesticide Applicator Training program	Iowa Center for Agricultural Safety and Health (I-CASH) (a legislatively-mandated, state-funded farm safety center) ISU Extension: Safe Farm factsheets; Pesticide Safety Education program	NU Extension-Lancaster County: information on farm safety, child safety, and disaster preparedness UNL Pesticide Safety Education Program	UMN Extension: statewide topic-based teams provide farm safety information related to area of focus (e.g., small grains, dairy, horse, small farms); Pesticide Safety and Environmental Education program
ROPS Rebate Program	Est. in 2012, managed by National Farm Medicine Center. Funded by annual auction. ~\$176,000 available in 2016.	In process	In process	Est. in 2016, by MDA. Funded by state appropriation and private donations. ~\$290,000 available in 2016.
State Government – Department of Agriculture	Provides information on pesticide applicator program, worker protection standard, and emergency response to chemical spills. Offers farm rewiring certification courses and dairy farm energy management and safety information.	Provides information on pesticide applicator program, worker protection standard, and emergency response to chemical spills.	Provides information on pesticide applicator program and worker protection standards. Emergency response to chemical spills information (Dept. of Environmental Quality). Web page on kids' agricultural topics, including a link to Farm Safety for Just Kids.	Provides information on pesticide applicator program, worker protection standards, best practices, education, and outreach. Responds to chemical spills and investigates pesticide misapplication incidents. Web-based Farm Safety Resources inventory, http://www.mda.state.mn.us/protecting/farmsafety.aspx .

Each of the NIOSH Agricultural Centers has a slightly different agenda and research focus. For example, the center in Nebraska offers grants for outreach to youth, including FFA safety video contests, and offers a course on agricultural safety and health for rural professionals. Minnesota's UMASH center offers resources on animal handling and needlestick prevention, programs to keep agritourism visitors healthy and safe, and a dairy safety training curriculum created especially for Spanish-speaking farm workers, *Seguridad en las Lecherias (Safety in Dairies)*.

In addition to their NIOSH centers, Iowa and Wisconsin have state-mandated and -funded centers (I-CASH, UWCASH), similar to the rural health and safety formerly operated by UMN Extension. I-CASH (www.public-health.uiowa.edu/icash) gives community grants to youth projects for preventing farm-related

injuries. I-CASH also offers seasonal campaigns, listservs, newsletters, and co-hosts the annual Midwest Rural Agricultural Safety and Health Conference.

UWCASH (fyi.uwex.edu/agsafety) is led by a full-time staff person and offers matching grants to counties to promote farm safety and health programs, including safe tractor operation certification, farm safety day camps, and hazard inspections training. It also offers webinars on topics like manure gas safety and OSHA recordkeeping requirements. The webinars are geared toward farmers, farm labor, and related professionals.

Iowa and Nebraska are both in the process of setting up Rollover Protective Structures (ROPS) rebate programs similar to those offered in Wisconsin and Minnesota. Wisconsin's program is managed by the National Farm Medicine Center (www.marshfieldresearch.org/nfmc/national-farm-medicine-center), which holds an annual "Auction of Champions" to raise funds for farm safety programs such as this one. Minnesota's program received funding from the 2016 Legislature and business donors and was administered by the MDA² (Laws of MN 2016 Chap 189 Art 2 Sec 2).

The University of Iowa created the Certified Safe Farm program in 1998. The program offers health screenings, education, and incentives such as discounts on insurance and safety equipment. It has since spread to Wisconsin, North Carolina, and Nebraska (Brandi Janssen, personal communication, January 19, 2017).

In each of the states, there are also local and regional groups that are addressing farm safety. For example, in Minnesota, youth organizations such as FFA and 4-H continue to do ad-hoc programming, even though the youth farm safety education program is no longer funded by the state. Some implement dealers are offering tractor and skid-steer safety programs, and Minnesota State Colleges and Universities (MnSCU) include basic safety training in their farm management courses. MnSCU's Southern Minnesota Center of Agriculture (www.centerofagriculture.org) has an Agricultural Safety Trailer which is available for other groups to use.

The 2015 Star Tribune *Tragic Harvest* series highlighted the farm safety successes in a state outside the Midwest. Washington State requires agricultural employers to implement written accident prevention plans, offers an extensive listing of agricultural safety resources, provides on-farm safety consulting, actively investigates agricultural accidents, and enforces safety rules on all sizes of farms. Washington State has the lowest farm fatality rate in the U.S (Meitrodt, 2015).

Barriers to Better Safety

According to the Farm Safety Working Group (FSWG), many of the barriers to adoption of safety practices identified in the 1989 Extension report still exist today:

Education and Training – Many valuable materials are available, but barriers to widespread distribution and use of these materials continue. The number of immigrant farmers and farm workers with limited English skills is growing, and they need culturally-relevant and language-appropriate materials. In addition, people who don't have reliable Internet access can have a hard time getting the information, since most of it is now only offered online. Finally, articles, brochures, videos, and other materials are not always actively promoted and distributed and therefore may not be sought out by farmers and farm workers.

² As of the writing of this report, 90 Minnesota farmers have been reimbursed for installed ROPS and 141 additional farmers are in the process of installing them. Costs of ROPS vary substantially and reimbursements range from \$553 to \$3,400. It is anticipated that all of the State appropriation and about one-quarter of the private donations are obligated.

Lack of Injury and Economic Impact Data – There is still little or no national or state-level agricultural injury and disease data that policy-makers and public health professionals can use to prioritize efforts and resources. As evidenced earlier in this report, there are discrepancies in how agricultural injuries and illnesses are tracked due to inconsistencies in injury reporting or non-reporting. There is also very little information on the economic impacts of injuries, illnesses, and deaths on farms and surrounding communities.

Economic Pressures – Financial concerns can result in farmers deferring maintenance of equipment, taking shortcuts, farming at night after working another job, or putting children to work at what might be considered age-inappropriate tasks. As stated in the Star Tribune, “The nature of farm work can sometimes make safety a secondary concern. The priority is to get the job done.” (Meitrodt, 2015).

Regulations – There is no required tractor or skid-steer training, no legal minimum age for children to perform any task on their parents’ farm, and no enforcement of OSHA safety standards on most farms. According to the Star Tribune review of farm fatalities, “at least two-thirds [of the cases] involved practices that violate federal workplace rules” (Meitrodt, 2015).

Better Serving People Who Work on Farms

Creating a culture of safety is important across the board – for farmers and their families, farm workers, customers, and visitors. Much farm safety programming has been geared toward owner/operators and their families, but as farms grow larger and non-family farm labor increases, it’s increasingly important to reach farm workers, many of whom come from other countries and speak little or no English. In this section, we try to recognize some of the specific challenges to improving farm safety for farm labor.

According to 2012 data from the United States Department of Agriculture (USDA) Economic Research Service (ERS), there are just over 1 million hired farmworkers in the U.S. (ERS, 2017). However, using data from the USDA and Department of Labor, the National Center for Farmworker Health (NCFH) estimates there are more than 3 million agricultural workers (NCFH, 2016). This large variation in numbers indicates the difficulty in recognizing and connecting with farm workers, who are not as readily identifiable as farmer owner/operators.

The seasonality of farm work and mobility of the labor force also make it difficult to reach these workers. ERS data show that the number of workers was 47% higher in July 2011 than in January of the same year. In 2012, only 54% of farm workers had full-time positions, while 19% held part-time positions and 27% were brought to farms by contractors (ERS, 2017). NCFH found that 42% of farm workers traveled at least 75 miles within the previous year (NCFH, 2016). Crop farm workers tend to have more seasonal employment, while livestock workers experience more stability. A critical problem in agriculture is the supply of a labor force. The role of new immigrants in the labor force is growing in the Midwest, including Minnesota. For example, while it is difficult to determine the actual number of immigrant workers working in the dairy industry, the Minnesota Milk Producers Association and others have estimated that half of hired dairy workers are immigrant, largely from Mexico (Steil, 2014; Adcock et al., 2015).

The expanding role of immigrant workers in agriculture is making language and culture an important communication issue between farmers and workers. In its 2013-2014 survey, the National Agricultural Workers Survey found that 31% of farm workers said they could speak English well, while 27% said not at all (US Dept. of Labor, 2016). Projects such as UMASH’s *Seguridad en las Lecherías: Immigrant Dairy Worker Health and Safety* program help bridge the cultural and language divide by using a community health worker model in the native language of many workers. UMASH has also developed a basic series of posters and fact sheets in the Spanish, Hmong, and Karen languages to address some of the language concerns. However, most educational and training materials are still only available in English.

Like farm owner/operators, farm workers may not have health insurance and/or feel they can take time off to seek medical care. On the other hand, workers may not know all the rights that are afforded to them under the law or may hesitate to voice concerns about safety for fear of the repercussions such as losing work time, or even employment.

Employers, especially those who only hire a handful of additional workers each year, may not know about all the regulations that apply to them, and therefore may not take all the steps necessary to comply with the law. Most probably want to be good employers and recognize the cost-effectiveness of having a healthy, safe workplace. However, many regulations are only applicable and/or enforced on larger operations, and even those employers may not focus on safety training and education of their workers.

Limited resources for safety advocates mean difficulty in both the distribution of safety materials and the lack of face time to encourage the use of these materials among farmers, farm workers, and communities. Since every audience is different, partnerships among a variety of organizations may do the best job reaching as wide an audience as possible. For example, programs such as the Latino Economic Development Center teach basic agricultural business courses, but these generally have an economic focus and don't include information on safety and health. More collaborations between farm safety advocates and business and cultural groups could increase access to and knowledge of farm safety information.

Recommendations to Improve Farm Safety Efforts in Minnesota

Following the 2016 farm safety legislation, the FSWG met to analyze the challenges to farm safety efforts in Minnesota, and to offer recommendations to improve farm safety in the state.

State government agencies, schools and universities (including high schools, the UMN and MnSCU), farm organizations, and nonprofit groups all have important roles to play in promoting the safety and wellbeing of Minnesota farmers and farm workers. Based on the National Occupational Research Agenda and on input from the Farm Safety Working Group, MDA recommends the following:

- **Continue the ROPS rebate program and explore the expansion of rebates to other farm safety equipment.** The success of the 2016 Roll-Over Protective Structure Rebate program indicates there is a need and a willingness of farmers to improve safety on their farms, as long as the changes can be made in an efficient, cost-effective manner.
- **Re-establish the statewide UMN Extension farm safety faculty position.** This research and outreach person was key to developing and delivering farm safety programs in the 1990s-2000s, and would serve as a key link in connecting industry, government, and community in striving to improve farm safety throughout the state.
- **Establish support for the Upper Midwest Agricultural Safety and Health Center (UMASH).** UMASH is a multidisciplinary collaboration of five leading research and health care institutions in the Upper Midwest, including the UMN School of Public Health, where the research center for rural health and safety resides. Its goal is to improve the safety and health of agricultural workers and families through research, education and prevention.
- **Improve data collection about farm illnesses, injuries, and fatalities.** MDH investigated farm deaths until federal-funding ended in 2006. Resuming this program would take advantage of MDH's experience and expertise in identifying and investigating farm-related deaths and could inform preventative efforts to promote farm safety. In 2014, MDH developed and pilot tested a method to track injuries that might be related to agriculture using the Minnesota hospital discharge data. This approach merits further evaluation as it seeks to fill the absence of such data from state or national surveys.

- **Promote the existing Minnesota Department of Labor and Industry’s (DLI) Workplace Safety Consultation Program to farmers.** Staff conduct on-site visits that help employers identify potential hazards, improve safety management systems, and apply for safety grants of up to \$10,000. This voluntary program targets small, high-hazard businesses such as farms, and is separate from Minnesota OSHA Compliance. DLI does not issue citations for violations it finds during one of these consultation visits – as long as the employer agrees to correct all serious hazards the consultant identifies.
- **Create a Farm Safety Certification Program.** Similar to the Minnesota Agricultural Water Quality Certification Program or the Certified Safe Farm (CSF) programs in Iowa and North Carolina, this program would recognize farmers who either participate in a Minnesota DLI Workplace Safety Consultation, or in a similar audit designed for smaller operations. Certification would be voluntary and non-regulatory, but could possibly lead to lower health and insurance costs.
- **Investigate financial incentives to increase farm safety measures.** Approach insurance providers about lowering insurance premiums for farms certified by a Farm Safety Certification Program (similar to the reduction that older drivers receive for attending safe driving classes).
- **Research and improve programs for a changing farm labor population.** Develop and implement a community health worker program similar to the one tested in the UMASH project, *Seguridad en las Lecherías: Immigrant Dairy Worker Health and Safety*. Encourage community organizations such as the Latino Economic Development Center, Hmong American Farmers Association, and the United Food & Commercial Workers to identify workers’ needs and develop culturally-appropriate materials, training, and other support.
- **Encourage and support programs offered by allied industries and organizations.** Use established links with farmers to build farm safety into the interactions they are already having with farm advisors like farm business management instructors, veterinarians, extension educators, salespeople, and others. Consider a pilot program with these trusted sources to do mini-audits for farm safety when on the farm, similar to those done by WSC or CSF.
- **Promote existing training programs and expand educational opportunities for 4-H, FFA, and beginning farmer education programs.** Promote current safety training programs and increase support for including farm safety in youth education, focusing on the personal and economic impacts of farm accidents.
- **Create a coordinated media campaign.** Raise awareness of the impacts of farm accidents and the educational and financial resources available to initiate farm safety strategies. Find ways to connect with farmers in a method that is more urgent and personalized in order to save lives.
- **Continue the Farm Safety Working Group.** This group has proven to be an effective way to coordinate work and resources and to monitor the impacts of these farm safety initiatives in Minnesota.

References

Adcock, Flynn, Anderson, David, & Rosson, Parr. 2015. *The Economic Impacts of Immigrant Labor on US Dairy Farms*. The Center for North American Studies. College Station, TX: Texas A&M AgriLife Research. Accessed 30 November 2015 at <http://www.nmpf.org/files/immigration-survey-090915.pdf>.

Brennan, Thomas M. 1989. *Findings and recommendations of the rural health and safety educational program in Minnesota: A report to the director of the Minnesota Extension Service*. Minnesota Extension Service. St. Paul, MN.

Economic Research Service. Farm labor background. United States Department of Agriculture. Washington, D.C. Accessed 26 January 2017 at <https://www.ers.usda.gov/topics/farm-economy/farm-labor/background.aspx>.

Great Plains Center for Agricultural Health. 2015. *Fatal occupational injuries in selected agricultural industries, 2005-2012 (Midwest region)*. Great Plains Center for Agricultural Health. Iowa City, IA. Accessed 28 September 2016 at http://www.public-health.uiowa.edu/gpcah/wp-content/uploads/2015/03/CFOI0512_slides_wNotes_010820151.pptx.

Landsteiner, Adrienne M.K., McGovern, Patricia, M, Alexander, Bruce H., Lindgren, Paula G., & Williams, Allan N. 2016. *The economic impact for farm injury in Minnesota, 2004-2010*. Journal of Agromedicine, DOI: 10.1080/1059924X.2016.1143904.

Landsteiner, Adrienne M.K., McGovern, Patricia, M, Nyman, John A., Alexander, Bruce H., Lindgren, Paula G., & Williams, Allan N. 2015. *Incidence rates and trend of serious farm-related injury in Minnesota, 2000-2011*. Journal of Agromedicine, DOI: 10.1080/1059924X.2015.1075449.

Laws of Minnesota 1988, Chapter 688, Article 21, Section 8

Laws of Minnesota 1989, Chapter 350, Article 20, Section 29

Laws of Minnesota 1991, Chapter 254, Article 1, Section 7

Laws of Minnesota 1995, Chapter 220, Section 7

Laws of Minnesota 1999, Chapter 231, Section 11

Laws of Minnesota 2016, Chapter 184, Section 13; Chapter 189, Article 2 Section 2; Chapter 189, Article 2, Section 8

Meitrodt, Jeffrey. October 2015. *Tragic harvest*. Star Tribune. Minneapolis, MN. Accessed 22 September 2016 at <http://www.startribune.com/deadliest-workplace-the-family-farm/330403811/>.

Minnesota Advisory Task Force on Farm Safety & Minnesota Department of Agriculture. 1990. *Safe farms for Minnesota: A preliminary report to the Minnesota House and Senate Agriculture Committees from the Advisory Task Force on Farm Safety*. Minnesota Department of Agriculture. St. Paul, MN.

Minnesota Advisory Task Force on Farm Safety & Minnesota Department of Agriculture. 1991. *State action for safe farms: Final report of the Minnesota Advisory Task Force on Farm Safety*. Minnesota Department of Agriculture. St. Paul, MN.

Minnesota Department of Labor and Industry, Minnesota Department of Health, & Minnesota Safety Council. 2016. *Minnesota workplace safety*. Minnesota Safety Council. St. Paul, MN. Accessed 28 September 2016 at <http://www.minnesotasafetycouncil.org/WorkplaceSafetyDashboard.pdf>.

Minnesota Statutes 1988, section 137.34

Minnesota Statutes 1991, sections 17.107, 137.341, and 137.342

Minnesota Statutes 2016, section 17.119

National Center for Farmworker Health. 2016. *Demographics [factsheet]*. National Center for Farmworker Health. Buda, TX. Accessed 20 January 2017 at http://www.ncfh.org/uploads/3/8/6/8/38685499/naws_ncfh_factsheet_demographics_final_revised.pdf.

National Center for Farmworker Health. 2009. *Migrant and seasonal farmworker demographics [factsheet]*. National Center for Farmworker Health. Buda, TX. Accessed 20 January 2017 at www.ncfh.org/uploads/3/8/6/8/38685499/fs-migrant_demographics.pdf.

National Institute for Occupational Safety and Health. 2009. *Occupational health of farmworkers in the United States: National Agricultural Worker Survey occupational health supplement, 1999*. Centers for Disease Control and Prevention. Atlanta, GA. Accessed 23 September 2016 at <https://www.cdc.gov/niosh/docs/2009-119/pdfs/2009-119.pdf>.

National Institute for Occupational Safety and Health. 2016. *Extramural Research and Training Programs*. Centers for Disease Control and Prevention. Atlanta, GA. Accessed 4 November 2016 at <https://www.cdc.gov/niosh/oep/agctrhom.html>.

Steil, Mark. 2014. *Farm push for immigration reform*. Minnesota Public Radio. St. Paul, MN. Accessed 25 November 2015 at <http://blogs.mprnews.org/statewide/2014/02/farm-push-for-immigration-reform/>.

United States Bureau of Labor Statistics. 2014. *Census of fatal occupational injuries, Minnesota, 2014*. United States Bureau of Labor Statistics. Washington, D.C. Accessed 19 September 2016 at <https://www.bls.gov/iif/oshwc/foi/tgs/2014/iifw27.htm>.

United States Department of Labor. 2016. *Findings from the National Agricultural Workers Survey (NAWS) 2013-2014*. United States Department of Labor. Washington, D.C. Accessed 26 January 2017 at https://www.doleta.gov/agworker/pdf/NAWS_Research_Report_12_Final_508_Compliant.pdf.

Zaidman, Brian. 2014. *Minnesota workplace safety report, 2012*. Minnesota Department of Labor and Industry. St. Paul, MN. Accessed 5 October 2016 at <http://www.dli.mn.gov/rs/PDF/saferpt12.pdf>.

Appendices

Appendix 1. Farm Safety Working Group Members

- EquipALife
- Land O'Lakes
- Latino Economic Development Center
- Minnesota Agricultural Education Leadership Council
- Minnesota AgriGrowth Council
- Minnesota Department of Agriculture
- Minnesota Department of Health
- Minnesota Department of Labor and Industry
- Minnesota Farm Bureau
- Minnesota Farmers Union
- Minnesota Safety Council
- Minnesota-South Dakota Equipment Dealers Association
- SFM Insurance Company
- Southern Minnesota Center for Agriculture
- UFCW Local 1189
- University of Minnesota Extension
- Upper Midwest Agricultural Safety and Health Center

Appendix 2. Final Recommendations of the Minnesota Advisory Task Force on Farm Safety, 1991

According to the task force's final report, the following recommendations were, in order:

1. Continue to support the farm safety specialist position at the University of Minnesota.
2. Revitalize and greatly expand the availability of the 4-H/FFA tractor and machinery operation, maintenance and safety training program.
3. Prohibit persons under 12 years of age from driving tractors or self-propelled farm machinery on public roads. Allow persons 12 to 15 years of age to drive such implements on public roads only if they have receive certification from the 4-H safe machine operation training program for the implement they are operating.
4. Provide funding for a pilot project to develop a comprehensive farm safety audit to be conducted by the Minnesota Extension Service in cooperation with selected farm insurance companies.
5. Establish an interagency, interdisciplinary research center for agricultural health at the University of Minnesota to undertake basic and applied research on the health effects of environmental and traumatic health risks.
6. At the time of resale, require used farm tractors to have a master shield that meets or exceeds original equipment specifications for safety and require lighting and slow moving vehicle signs to be in compliance with state requirements, exempting occasional sales such as farmer-to-farmer and farm auctions.
7. Direct the Department of Public Safety to study reflector and lighting requirements for farm vehicles and the driver's license exemption for persons operating farm implements on public roads, recommend clarifying language and improvements, and initiate public education regarding lighting and reflector requirements.
8. Create a farm safety commission to advise the proposed Center for Agricultural Health and Safety, raise funds and develop resources for farm safety promotion, and develop "best management practices" for safe use of farm equipment.
9. Direct the state pesticide applicator education and training review board to formally evaluate the effectiveness of the Minnesota Extension Service pesticide applicator training programs in improving safe handling of pesticides.
10. In 1993, evaluate the need for a state-funded surveillance system to track the frequency, severity and causes of injuries and environmental health incidents on farms.

The task force also included two areas not included in the recommendations but that called for additional follow-up:

1. The Minnesota Extension Service is urged to increase education initiatives regarding livestock buildings including a) demonstration of improved ventilation and waste management systems and b) holding workshops to raise awareness of health issues related to livestock confinement buildings. Education in production should be balanced with safety training.
2. The State of Minnesota, University of Minnesota, and other public institutions with setting such as experiment stations, parks, and roadsides where agricultural equipment is used are advised to maintain their equipment to at least meet original equipment standards or reasonable facsimile for safety features.