Journal of Agromedicine

ISSN: 1059-924X (Print) 1545-0813 (Online) Journal homepage: www.tandfonline.com/journals/wagr20

Navigating Complex Family and Social Support Systems Following an Agricultural Injury: A Qualitative Study of the True Burden of Injury

Madeleine Zenir, Heather Chauncey, Pam Milkovich, Julie Sorensen & Erika Scott

To cite this article: Madeleine Zenir, Heather Chauncey, Pam Milkovich, Julie Sorensen & Erika Scott (2025) Navigating Complex Family and Social Support Systems Following an Agricultural Injury: A Qualitative Study of the True Burden of Injury, Journal of Agromedicine, 30:4, 722-731, DOI: 10.1080/1059924X.2025.2539969

To link to this article: https://doi.org/10.1080/1059924X.2025.2539969

JOURNAL OF AGROMEDICINE
2025, VOL. 30, NO. 4, 722–731
https://doi.org/10.1080/1059924X.2025.2539969

Taylor & Francis
Taylor & Francis Group

Navigating Complex Family and Social Support Systems Following an Agricultural Injury: A Qualitative Study of the True Burden of Injury

Madeleine Zenir, Heather Chauncey, Pam Milkovich, Julie Sorensen, and Erika Scott

Northeast Center for Occupational Health and Safety in Agriculture, Forestry, and Fishing, Bassett Medical Center, Cooperstown, NY, USA

ABSTRACT

Objectives: Farm injuries impact more than the farmer, they affect family members, the community, and the local economy. In the Northeastern United States, while technology has improved safety measures significantly, rates of agricultural injuries, and fatalities are still very high.

Methods: In this study, we spoke with farmers who experienced a traumatic work injury as well as farm-support professionals to better understand the burden of agricultural injuries on the farmer and those closest to them. Interviews were recorded, transcribed, and coded in NVIVO 12.

Results: Using qualitative thematic analysis approach when coding and analyzing the interview dialogue, two prominent themes emerged; i) the role of familial support post-injury and, ii) the burden of navigating a complex administrative system when seeking assistance. The injured farmers that lacked strong family support struggled to keep their businesses viable and often felt isolated and overwhelmed. In these cases, mental health counselors acted much like surrogate family members by providing emotional and structural support, but in a limited capacity. Between both the farmers and farm-support professionals interviewed, many expressed their frustrations with the time-consuming and ineffective administrative processes that injured farmers experience when trying to obtain social assistance such as unemployment, disability, or assistive technology.

Conclusion: These data may be used to better inform policy recommendations that affect injured farmers.

KEYWORDS

Administrative burden; agriculture; family support; injury; northeastern US

Introduction

Farming continues to be one of the most dangerous professions in the United States (US). The national fatal injury rate in agriculture is six times higher than the national average for all workers[1] and when focusing on the Northeastern US, the rate of nonfatal injuries in agriculture is 11 times greater than the average of all occupations in this region.[2,3] While significant advancements in safety have made farming less dangerous, there are still thousands of nonfatal and fatal injuries on farms every year, and likely many more as underreporting is common in this industry.[4,5] In 2011, Leigh et al.[4] estimated 73.7% and 81.9% of injury or illness cases on crop farms and animal farms, respectively, were not reported. While the impact of agricultural injury is commonly accounted for by number killed, number injured, or medical expenses, such injuries have shown to expand beyond the individual and have ripple effects in rural communities.[6,7] This supports a socio-ecological framework in which farmers are directly linked to their surroundings and those around them. Kilanowski[8] describes the socio-ecological model in the context of agricultural public health with the individual at the center including their closest interactions and relationships nested within four systems of influences: 1) work, school, church, and neighborhood; 2) community and social networks; 3) societal, religious, cultural values; and 4) time, historical context, and policy. This system states "health is affected by the interactions between the characteristics of the individual, the community, and the environment that includes the physical, social, and political components."[8] p.295

Injury is not the only dangerous outcome on farms. Agricultural workers are also at risk for chronic health issues.[9] Difficult physical labor,[10] exposure to chemicals,[11] ad lack of access to health services[12] put farmers and farmworkers at risk for chronic pain and health issues. In addition to injury and physical health concerns, farmers have been known to experience depression, isolation, and

CONTACT Erika Scott Erika.Scott@Bassett.org Northeast Center for Occupational Health and Safety in Agriculture, Forestry, and Fishing, Bassett Medical Center, One Atwell Road, Cooperstown, NY 13326, USA

Supplemental data for this article can be accessed online at https://doi.org/10.1080/1059924X.2025.2539969

poor mental health, with this being a major focus of research and policy in recent years.[13–21] From examining 2021 data, Sussel et al.[22] found that the suicide rate amongst male agricultural workers was 49.9 per 100,000 Full-Time Equivalent (FTE) compared to the average of 32 per 100,000 FTE. Farming, Fishing, and Forestry as an occupational group had the second highest suicide rate across all occupations in 2021.[22] The unpredictable nature of farming, influenced by weather, fluctuating markets, changing regulations, labor shifts, among other factors, contribute to significant stress for farmers.[19,21]

As the agricultural landscape in the US changes due to mechanization, we must also consider societal changes that affect the industry. Although technology has allowed farms to scale, 2022 data indicate the vast majority (84%) of farms in the Northeast are still small operations that gross less than $100,000 a year.[23] This can be attributed to financial and physical barriers such as land inaccessibility, labor shortages, and land development.[24] Studies have suggested small- to mid-sized farms with limited resources and a lack of safety trainings are at higher risk for occupational injury.[25–28]

Small family owned-and-operated farms have traditionally been an important part of the US agrarian economy and history.[29] Almost half of all Northeastern farms still rely on unpaid family labor to run their businesses.[30] Due to the importance of familial and spousal support on farms, such as providing unpaid farm labor, household operational support, and emotional comfort especially during times of stress,[31] changes in family structure presumably have a strong influence on the industry. Over the last 70 years, traditional family structures have shifted in the rural Northeast with higher rates of divorce, fewer marriages, and lower birth rates trending all throughout the region, in both metropolitan and rural areas.[32–40] In rural America, remarriage, blended families, and cohabitating partnerships are common, suggesting more complex family dynamics and instability.[41–43] These trends suggest that, because family structures look different, family farm operations are likely changing shape as well. The agricultural economy has long relied on strong family support and as these dynamics shift, they may challenge the stability of this industry in the Northeast.

Farmers often turn to close family members during times of stress and their support can be crucial to the survival of a farm following an injury.[44–48] Family members, especially spouses, will often take on additional farm responsibilities, such as the physical labor and managing administrative aspects of the business. Studies have shown farmers without strong emotional support from close friends and family have worse outcomes when coping with stress.[44,45] Agricultural injuries can have serious effects on farm and family finances.[49,50]

To compound this, small farm owners often have difficulties accessing affordable health insurance coverage and many have to rely on off-farm work (either from themselves or a spouse) to obtain employer-sponsored insurance plans.[51–53] Remote areas often have limited access to broadband internet, further barring farmers in rural areas to online services such as telehealth.[54] Navigating the bureaucratic system can be extremely difficult and time consuming, and this can prevent farmers from receiving the benefits to which they are entitled. Additionally, farmers are often resistant to receiving help, as help-seeking behaviors bristle against traditional agrarian values and rural masculinity.[18,55–57] For some farmers, distrust of government assistance programs discourages seeking assistance.[58] By speaking with farmers who had experienced work-related injuries, as well as professionals from various fields that regularly encounter farmers with injuries, we investigated the burdens of agricultural injury on farmers and those closest to them. In this qualitative study we sought to better understand the burden of agricultural injury on farmers, those closest to them, and their support systems by conducting semi-structured interviews.

Methods

To be eligible for this study, interview participants had to reside in New York, Massachusetts, Vermont, New Hampshire, or Maine, and fit one of several categories: 1) experienced a farm injury themselves; 2) cared for a loved one who had a farm injury; or 3) interact through professional channels with any of the previously mentioned categories of people (referred to hereafter as farm-support professionals). Table 1 categorizes interviewees by eligibility criteria and profession and

Table 1. Interviewees by eligibility criteria and profession and assigns references.

Profession	Interview Eligibility Criteria*	Reference
Crop Farmer	1	F1
Dairy Farmer	1	F2
Crop/Cattle Farmer	1	F3
Dairy Farmer	2, 3	F4
Occupational Health & Safety professional	3	O1
OSHA Consultant	3	O2
EMS	3	O3
Farm Financial Advisor	2, 3	O4
Disability Resource Counselor	3	C1
Vocational Rehabilitation Counselor	3	C2
Family Consultant	3	C3
Advocate for injured workers	3	C4

*Eligibility criteria numbers are as follows: 1) experienced a farm injury themselves, 2) cared for a loved one who had a farm injury, or 3) interact through professional channels with any of the previously mentioned categories of people (farm-support professionals).

A Qualitative Study of the True Burden of Injury.

assigns references. Participants were recruited primarily by convenience sampling. In addition, study advertisements were placed in our organizational newsletter which was circulated throughout the Northeast region, and flyers were distributed through our professional and agricultural industry networks.

Two moderator's guides were developed, one for farmers and family and another for other professional services. Interviews were set up either in person or via video conference. The interviewer reviewed the participant consent information and proceeded with the interview once verbal consent was obtained. The study was approved by our organizational Institutional Review Board.

Interviews followed a semi-structured format with the intention to induce conversations about farm injury and its short- and long-term consequences. Farmer interviews were completed first and were followed by other associated professionals. This allowed themes mentioned during farmer interviews to be further explored in subsequent interviews. Not all industry professionals specialized in aiding farmers specifically, but interacted with injured farmers in their line of work. Questions were shaped in a way that explored the ripple-effect of farm injuries throughout the community and within society (see Appendix for interview guides). All farmer interviews were completed by the Principal Investigator with the organizational Case Manager present to provide mental health support to participants as needed. In total, 12 interviews were collected. Interview lengths were not constrained by time limits, lengths ranged from 26 minutes to 1 hour and 45 minutes with the average time being 1 hour and 3 minutes.

The transcripts were uploaded to a qualitative research software, NVivo 12 (QSR International, Queensland, AUS). During analysis, the Seven Steps to Conducting, Analyzing, and Reporting Semi-Structured Interview Data (7S CAR-SID) approach described by Adeoye-Olatunde and Olenik[59] was applied in conjunction with Thematic Analysis.[60] The first round of coding categorization included highlighting all of the irrelevant dialogue identified in the transcripts. This included any side conversations, interruptions, and simply anything deemed non-essential to the analysis by the coder.

Following the initial review and familiarization of all transcripts, they were read again and sections of dialogue were coded into subjects such as "depression in farmer as a result of injury" or "lack of family support following injury" and developed as the coding process progressed. To be coded into a specific category, dialogue had to mention or reference the topic at hand. These codes emerged throughout the coding process using a thematic analysis approach per Fereday,[60] combining inductive and deductive theme development. Due to the semi-structured format of the interviews and informal nature of the collected dialogue, this analysis method allowed for a wider range of themes to emerge. With each reading of the transcripts, more coding categories surfaced. Each transcript was read several (two to three) times until all relevant dialogue was appropriately coded. In total, 34 different coding categories were developed with overarching themes covering support services, injury experience, financial burden, mental health, and medical treatment.

As the transcripts were coded, and the research team met weekly to discuss and review the data and analysis. After all of the relevant dialogue from the interviews had been coded, a second coder reviewed the coded dialogue and made edits. Through the process of analyzing codes,

the research team recognized several recurring topics that were mentioned in almost all interviews, shaping the results below.

Results

Our interviews revealed several key factors that contribute to the burden of agricultural injury for farmers and those closest to them. Farmers shared their injury experiences and the recovery processes; the farm-support professionals discussed their perspectives on interactions with injured farmers. Within these interviews, two themes were consistently mentioned by most participants; the role of family support and navigating a complex bureaucratic system.

Impact of family support

One of the recurring themes identified with the participating farmers was that they had varied experiences with family support following their injuries. Two of the farmers who lacked a supportive family structure – meaning they did not have a partner, children, or healthy relationships with their extended family – struggled to keep their farms viable and had a challenging recovery process. The other farmer who experienced an injury that had strong family support through their spouse or close family members had an easier time maintaining and delegating the farm responsibilities. Several of the farm-support professionals also commented on the importance of familial support for injured farmers.

Of the four farmers interviewed, two struggled financially and physically following their farm injuries. These two farmers also had complicated family situations and did not have reliable help from family members. Both are over the age of 55 and are single men with small farm operations. They both struggled to find help while they were hospitalized immediately after the injury, as well as assistance during the recovery process. Here, one of those farmers who owned a dairy herd describes the difficulty finding help to milk his cows and how this led to him selling the majority of his herd:

> **F2**: "When I was [at the hospital], I had a herd of cows to milk. Once I got hurt, [a friend] came over here and said to my brothers that they need to milk cows, and they're all drunk and they weren't going to do nothing … Then [my nephew] came in and started milking and whatever … [My nephew] says, 'you gotta sell the cows. I can't take care of the cows.'"

Without consistent help with farm work from family members or friends, this farmer lost most of his cows after his injury. Family members can also be helpful in ways other than completing farm chores. Emotionally, farmers without family support may feel alone, adding to their stress. This same farmer recounts the lack of family visits while he was hospitalized and alludes to a traumatic family dynamic:

> **F2**: "My sister never came around when I was in the hospital. Neither did any of my brothers and [my nephew] never came to the hospital. He just wanted me out of this picture. They all want me off this farm. And this is, you know, I've been going through this traumatic drama thing with my family."

After this farmer's injury, he was supposed to get physical therapy on a regular basis. However, without a vehicle of his own and unreliable assistance, he stopped attending the appointments all together:

> **F2**: "It (physical therapy) helped out a lot, but I just couldn't get there (to the appointments). It was hard and I was using my mom's car and then she'd be off somewhere or whatever, and it was really hard to do, so I just quit going."

In a similar situation concerning family, the second farmer also found himself having to scale back his operation due to the lack of viable support. For the two farmers that lacked support, the mental health counselors involved in their cases took on some of the roles that a family member might normally assume. One farmer (F3) who had a supportive spouse shared with us that his wife often scheduled his appointments, reminded him to rest, and provided transportation. Here, he mentions how his wife provided medical attention during recovery:

> **F3**: "Well, my wife actually did the infusions (of medication) every day. I mean, she took the class

> down at the hospital and stuff…She said, 'I'll tell you, if you get hurt, you're going to the nursing home'. She's taken care of me for a lot of years."

For the farmers without close family to assist them after the injury, counselors can act as surrogates for family support and provide emotional and administrative assistance. They not only offered emotional support, but also structural support by making doctor's appointments for them and even bringing them to the appointments. The Family Consultant (C3) explains the difficulty of making an appointment for her client:

> **C3**: "[The farmer] does drink excessively, he used other things to self-medicate and he was extremely depressed and had on-and-off suicidal thoughts. I finally convinced them that it was a good idea to get mental health treatment, and he agreed to it. And I said, how about I just make the appointment for you? It took me forever to make the appointment because there was a telephone loop. He never would have put up with that telephone loop. And it was over an hour."

The same counselor describes transporting a different client to his appointment and shared with us that without her help, the farmer would not bring himself:

> I did get [him] an appointment. Initially he did agree. I went all the way out there. I took him to the appointment. Now [he] has some literacy issues, so I actually worked with him to fill out [the paperwork]. But he's two hours away. I can't take him every single time. I figured, OK, I took him to the first one. But he blew off the [second] appointment.

In all of our interviews, support was mentioned in the context of agricultural injury. Many participants noted that physical and emotional burdens often fall on close family members such as spouses or kin. Not only do family members take on extra responsibilities, but they also care for the farmer. In cases where family members are not present after an injury, counselors can and often provide emotional and structural support, but in a more limited capacity.

Navigating administrative burden following an injury

The other theme uncovered from the interviews was the burden of navigating the complex bureaucratic system following an injury. Both farmers and farm-support professionals repeatedly mentioned how difficult it is for farmers to receive the assistance they need to maintain their health and farm business after a traumatic injury. The farmers shared their difficulties trying to access basic care needs such as health insurance, worker's compensation, or disability insurance. The farm-support professionals also aired their frustrations with the organizations for which they are employed. They shared that in several cases, they worked with injured farmers who needed equipment modifications or special tools in order to continue doing their work on the farm. Although they needed these tools to keep working, they could not receive them due to barriers established by the bureaucratic system including extensive paperwork and rigid eligibility requirements.

Below is an example of this situation, explained by a Family Consultant from a farm-assistance consulting agency:

> **C3**: "He's talking about being in this chronic pain needing this special boot, he's got a special shoe, but they won't pay for the special boot that he needs to do his farm work."

And a similar situation from a Rehabilitation Counselor explaining how they were unable to provide a farm vehicle modification to a disabled farmer:

> **C2**: "There are no service providers. There's not a structure in place to say 'this is what we can do, this is what we can do to help'. So, we're kind of inventing the wheel as we go along [and] it's extremely frustrating on my part because I want to be able to provide these services"

From our interview with a Disability Insurance specialist, we also learned about how complex and stressful it is for injured farmers to navigate receiving health insurance if they fall below a certain income threshold.

> **C1**: "I've met some people who exit the workforce to be able to take care of a family member so that they don't have to tap into Medicaid or in-home care services to preserve the farm… [The farmer] may be eligible for Medicaid and if their income is low enough that they would financially be eligible for Medicaid, they're not going to apply because they

> don't want a lien placed on the home. That could limit their access to medical care."

The Disability Insurance specialist also shared that many farmers he has worked with face a complicated bureaucratic system if their injury results in a permanent disability. To be eligible for disability insurance, the person must have made a certain income in the years leading to the disability. If this income is too low, they are not eligible. On the other hand, if the farmer continues to work after incurring their disability, which is common, and makes over a certain amount of money, they are also ineligible to receive disability insurance. In addition to that, sufficient medical records are required to prove a disability, and if a farmer does not have enough medical history (also common among farmers), it is less likely they are going to receive disability benefits. The counselors in this study often helped their clients through this process by assisting with paperwork and offering guidance, although it is time consuming and complicated.

The two findings that emerged from the interviews – lack of family support and navigating a complex administrative system – are significant contributors to the burden of farm injury to the farmer and those closest to them. While the themes we identified are different, family support and administrative burden are intrinsically linked as family members often help fill out paperwork and make medical appointments.

Discussion

The typical reliance on family labor complicates the dynamics of small farm business operations that lack close family members to assist with work tasks, especially in the wake of a traumatic farm injury. Family support for farmers, both emotional and logistical, following an injury can determine the success of one's recovery process and ultimately, the farm's viability. In some cases, proxies for family members such as counselors and close friends can provide similar assistance. During our interviews, the importance of family assistance, or the lack thereof, was repeatedly mentioned. Not only can close family members, especially spouses, provide emotional support and physical care, they often take on additional farm responsibilities while the injured is unable to work. Similar qualitative studies suggest comparable findings that family members are crucial support systems for the farmer and their business after an injury.[46,48,50,61] This concept is upheld by the socio-ecological model in which an individual is most influenced by their closest relationships and immediate surroundings, and these interactions can impact the individual's health.[8] When lacking these relationships, farmers in this study had to access assistance that strayed farther from their direct system.

As previously mentioned, family structures in the rural Northeast are changing shape, likely impacting the traditional framework of small family farms. Between 2003 and 2022, the birthrate in this region decreased by 15%.[62] On a national level, age at first marriage and percent of population to never marry are the highest in recorded history,[62] and rural areas are starting to resemble metropolitan areas in terms of family structure, meaning smaller households consisting of single or unmarried parents.[43] Children in rural areas are now more likely to migrate to cities to pursue their educational and professional goals due to limited resources in small rural towns.[63] As evidenced by this study, strong family support systems can heavily influence outcomes in the wake of a traumatic farm injury. These societal changes are challenging the traditional structure of family farms in the Northeast, which could be especially influential for farms that experience traumatic injuries that require days lost from work.

For farmers seeking assistance post-injury – whether it be financial, emotional, or physical – navigating a complicated administrative system can be very time consuming and restrictive. Both farmers and farm-support professionals during our interviews expressed frustration and dissatisfaction with the current systems in place to assist farmers with debilitating injuries or health conditions. In this study, the farmer with close family members often relied on their help to fill out complex and lengthy paperwork and make medical appointments. For those without this support, mental health counselors acted much like surrogate family members – providing emotional support, making medical appointments, providing

transportation, and assisting with paperwork. However, the counselors interviewed expressed that they could never provide the same level of care a family member could because of long travel distances and work restrictions.

Interestingly, some locales outside of the Northeastern U.S. have addressed the burden for farmers in ways that sustain a better chance of the farm business surviving a catastrophic event. For example, in Ireland, the Farmer Relief Services (FRS) is a co-operative organization that connects farmers with skilled laborers during times of need.[64] Social safety net programs for farmers have been shown to ease access to services such as healthcare, childcare, and retirement funds.[65] In France, a country that provides more social services than the US, these programs have shown varying degrees of success in the farming community.[65] Becot et al.[65] points out that in contrast to the US, France has assistance policies engineered for the agriculture sector (the US has none), and eligibility guidelines for receiving services in France are universal, while in the US, almost all are income-based. Especially for farmers in the US, these factors can make it difficult to receive assistance following an injury. A study in New Zealand found agricultural professionals (veterinarians, farm consultants, and sales representatives) with established relationships with farmers play valuable roles in assisting farmer workers during times of crisis, suggesting they be incorporated in the approach to addressing farmer stress management.[66]

To best assist injured farmers who lack strong support from family members, it is imperative that navigating the administrative system be as effortless as possible. Streamlining bureaucracy to relieve the administrative burden on individuals seeking assistance has been an area of focus for the US government in recent years. Launched in 2022 by the federal government, the Burden Reduction Initiative assesses the effectiveness of the Paperwork Reduction Act of 1995 and implements new time-saving strategies to relieve the burden of lost time, additional stress, and stigma on individuals seeking government benefits.[67] Specifics of this initiative do include farmers in a farm loan assistance component. This kind of initiative, if tailored to agricultural injury assistance, could relieve a significant administrative burden on injured farmers who lack family support.

An important point brought up during our interviews with our farm-support professionals was the lack of existing protocols for farm-specific needs within assistance programs. For example, personal vehicle modifications for individuals with disabilities is a routine process, but there is no existing protocol to retrofit farm equipment. For a disabled farmer, these modifications are needed to perform their job, and without a system in place, these requests can lay stagnant for years. We suggest agencies establish such protocols tailored to farmers and agricultural equipment to not only lessen the bureaucratic headache but also deliver the services to farmers as quickly and efficiently as possible.

Strengths and limitations

A strength of this study is the care taken to ensure the trustworthiness per Elo et al.[68] in terms of credibility, conformability, transferability, and authenticity. Credibility was increased by including a diverse pool of interview participants from different industry backgrounds and experiences. Consensus was made before all decisions improved the conformability through routine weekly meetings amongst the research team throughout the entire study. Transferability was ensured by the use of interview guides and detailed NVIVO coding. Lastly, every step was taken to ensure the authenticity of the data collection, analysis, and presentation by the members of the research team. This study also included limitations. First, the group of farmers interviewed all owned small-scale operations and, thus, this research did not capture the perspectives of larger-scale farmers. In addition, the interview pool was small, as with most qualitative studies, limiting the diversity of potential responses.

Conclusion

Greater investment in farm support services is required to best assist farmers navigating the aftermath of their injuries. With changing family

structures and high (required and learned) self-reliance, it can be difficult for farmers to have access to appropriate support post-injury. Looking upstream, a focus on broader issues that impact the farm's viability and allow space for farmers to work safely could reduce overall injuries, but also the burden on farmers' post-injury recovery. Issues such as labor demands, easing of economic pressures, and accessible social support systems would contribute significantly to the agricultural industry as a whole, and not solely to injured farmers and farm-workers.

Acknowledgments

A debt of gratitude is owed to Matt Roslund, the information specialist who assisted with the literature search. Special thanks to the interview subjects that agreed to participate in the study, their time and perspectives are greatly appreciated.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the Centers for Disease Control and Prevention National Institute for Occupational Safety and Health under Grant K01OH011812.

References

1. BLS. *National Census of Fatal Occupational Injuries in 2022*. Washington, DC: Bureau of Labor Statistics: United States Department of Labor; 2023.
2. Injuries, Illnesses, and Fatalities IIF databases [Internet]. US department of labor bureau of labor Statistics. https://www.bls.gov/iif/data.htm. 2022. Accessed March 30, 2024.
3. Fatal injury rates by state, all ownerships, 2007-21 [Internet]. https://www.bls.gov/iif/state-data/fatal-injury-rates-by-state-2007-2021.htm#BLStable_2022_11_18_13_26_footnotes. 2022.
4. Leigh JP, Du J, McCurdy SA. An estimate of the U.S. government's undercount of nonfatal occupational injuries and illnesses in agriculture. *Ann Epidemiol*. 2014;24(4):254–259. doi: 10.1016/j.annepidem.2014.01.006.
5. Picciotto I, Beatty T, Hill AE. Estimating the nonfatal injury undercount in agriculture from 2004 to 2019. *J Agric Saf Health*. 2022;28(3):181–202. doi: 10.13031/jash.15039.
6. Pollock KS, Griffith GR, Fragar LJ. The economic cost of farm-related fatalities in Australia. *J Agric Saf Health*. 2012;18(1):11–30. doi: 10.13031/2013.41230.
7. Scott E, Sorensen J. Examining the facets of burden from agricultural injury: policy implications. *New Solut*. 2024;34(2):83–94. doi: 10.1177/10482911241257287.
8. Kilanowski JF. PhD Rn aprn cpnp faan. Breadth of the socio-ecological model. *J Agromedicine*. 2017;22(4):295–297. doi: 10.1080/1059924X.2017.1358971.
9. Rostamabadi A, Jahangiri M, Naderi Mansourabadi B, Javid M, Ghorbani M, Banaee S. Prevalence of chronic diseases and occupational injuries and their influence on the health-related quality of life among farmers working in small-farm enterprises. *J Agromedicine*. 2019;24(3):248–256. doi: 10.1080/1059924X.2019.1592047.
10. Osborne A, Blake C, Fullen BM, et al. Prevalence of musculoskeletal disorders among farmers: a systematic review. *Am J Ind Med*. 2012;55(2):143–158. doi: 10.1002/ajim.21033.
11. Nag PK, Gite LP. Pesticides and chemical toxicity—challenges in farming. In: Chakrabarti A, ed. *Human-Centered Agriculture: Ergonomics and Human Factors Applied*. Singapore: Springer; 2020:239–271.
12. Skaczkowski G, Hull M, Smith AE, Dollman J, Jones M, Gunn KM. Understanding farmers' barriers to health and mental health-related help-seeking: the development, factor structure, and reliability of the farmer help-seeking scale. *J Rural Health*. 2024;40(1):64–74. doi: 10.1111/jrh.12768.
13. Chauhan H, Satapathy S, Sahoo AK, Mishra D. Identification and prioritization of risk factors affecting the mental health of farmers. In: Khosla A, Chatterjee P Ali I, eds. *Optimization Techniques in Engineering*. Beverly, MA: Scrivener Publishing; 2023:275–296 doi: 10.1002/9781119906391.ch17.
14. Hagen BNM, Winder CB, Wootten J, McMullen CK, Jones-Bitton A. A systematic review and meta-analysis of depression among farming populations worldwide. *Int J Environ Res Public Health*. 2020;17(24):9376. doi: 10.3390/ijerph17249376.
15. Hagen BNM, Albright A, Sargeant J, Winder CB, Harper SL, O'Sullivan TL, Jones-Bitton A, et al. Research trends in farmers' mental health: a scoping review of mental health outcomes and interventions among farming populations worldwide. *PLOS ONE*. 2019;14(12):e0225661. doi: 10.1371/journal.pone.0225661.
16. Purc-Stephenson P, Doctor RJ, Keehn JE. Understanding the factors contributing to farmer suicide: a meta-synthesis of qualitative research. *Rural Remote Health*. 2023;23(3):8189. doi: 10.22605/RRH8189.
17. Ramos AK, Carlo G, Grant K, Trinidad N, Stress CA. Depression, and occupational injury among migrant farmworkers in Nebraska. *Saf (Basel)*. 2016;2(4):23. doi: 10.3390/safety2040023.

18. Roy P, Tremblay G, Oliffe JL, Jbilou J, Robertson S. Male farmers with mental health disorders: a scoping review. *Aust J Rural Health*. 2013;21(1):3–7. doi: 10.1111/ajr.12008.
19. Santos EGO, Queiroz PR, Nunes ADDS, Vedana KGG, Barbosa IR. Factors associated with suicidal behavior in farmers: a systematic review. *Int J Environ Res Public Health*. 2021;18(12):6522. doi: 10.3390/ijerph18126522.
20. Taylor ZE, Ruiz Y, Nair N, et al. Family support and mental health of Latinx children in migrant farmworker families. *Appl Dev Sci*. 2020;26(2):329–346. doi: 10.1080/10888691.2020.1800466.
21. Daghagh Yazd S, Wheeler SA, Zuo A. Key risk factors affecting farmers' mental health: a systematic review. *Int J Environ Res Public Health*. 2019;16(23):4849. doi: 10.3390/ijerph16234849.
22. Sussell A, Peterson C, Li J, Miniño A, Scott KA, Stone DM. Suicide rates by industry and occupation - national vital Statistics system, United States, 2021. *MMWR Morb Mortal Wkly Rep*. 2023;72(50):1346–1350. doi: 10.15585/mmwr.mm7250a2.
23. USDA. *Farms and Land in Farms 2022 Summary*. Washington, DC: National Agricultural Statistics Service; 2023.
24. Pottern JB, Barley LN. *Farms Under Threat: A New England Perspective*. Washington, DC: American Farmland Trust; 2020.
25. Bailey J, Dutton T, Payne K, Wilson R, Brew BK. Farm safety practices and farm size in New South Wales. *J Agromedicine*. 2017;22(3):229–234. doi: 10.1080/1059924X.2017.1318101.
26. Day L, Voaklander D, Sim M, et al. Risk factors for work related injury among male farmers. *Occup Environ Med*. 2009;66(5):312–318. doi: 10.1136/oem.2008.040808.
27. Jadhav R, Achutan C, Haynatzki G, Rajaram S, Rautiainen R. Risk factors for agricultural injury: a systematic review and meta-analysis. *J Agromedicine*. 2015;20(4):434–449. doi: 10.1080/1059924X.2015.1075450.
28. Johnson A, Baccaglini L, Haynatzki GR, Achutan C, Loomis D, Rautiainen RH. Agricultural injuries among farmers and ranchers in the Central United States during 2011-2015. *J Agromedicine*. 2021;26(1):62–72. doi: 10.1080/1059924X.2020.1845268.
29. Dreby J, Jung G, Sullivan R. At the nexus of work and family: family farms in upstate New York. *J Rural Stud*. 2017;49:151–161. doi: 10.1016/j.jrurstud.2016.12.001.
30. AgamericaLending. Northeast agriculture: 2021 data and trends report. 2021.
31. Deegan A, Dunne S. An investigation into the relationship between social support, stress, and psychological well-being in farmers. *J Community Psychol*. 2022;50(7):3054–3069. doi: 10.1002/jcop.22814.
32. Bureau USC Marital status and living arrangements: March 1996. *Current Population Reports: Population Characteristics*. 1996.
33. Bureau USC Profile of selected social Characteristics: 2000. *Decennial Census, DEC State Legislative District Demographic Profile (sample), Table DP2*. 2000.
34. Bureau USC. Marital status. *American Community Survey, ACS 1-Year Estimates Subject Tables, Table S1201*. 2012.
35. Bureau USC. Marital status. *American Community Survey, ACS 1-Year Estimates Subject Tables, Table S1201*. 2022.
36. Census USBot. United States Census of Population: 1950 – special Reports: marital status. 1950.
37. Census USBot. Supplementary Reports: marital status of the Population of the United States, by States: 1960. 1960.
38. Census USBot. Census of Population, Subject Reports: marital status. 1970.
39. Census USBot. Marital status and living arrangements: March 1980. *Current Population Reports: Population Characteristics, Table 2. Current Population Reports: Population Characteristics*. 1981.
40. Census USBot. Marital status for States, by sex, for the population 15 years old and over. *1990 Census of Population, Table st-MS1-1990*. 1990.
41. Brown SL. Residential differences in Cohabitors' Union transitions. *Rural Sociol*. 2006;71(2):311–334. doi: 10.1526/003601106777789729.
42. Burton ML. Inequality, family processes, and health in the "New" rural America. *Am Behavioral Scientist*. 2013;57(8):1128–1151.
43. Clark S, Harper S, Weber B. Growing up in rural America. RSF: the Russell Sage Foundation. *J Soc Sci*. 2022;8(4):1–47. doi: 10.7758/RSF.2022.8.4.01.
44. Bjornestad A, Cuthbertson C, Hendricks J. An analysis of suicide risk factors among farmers in the Midwestern United States. *Int J Environ Res Public Health*. 2021;18(7):3563. doi: 10.3390/ijerph18073563.
45. Caldwell K, Boyd CP. Coping and resilience in farming families affected by drought. *Rural Remote Health*. 2009;9(2):1088. doi: 10.22605/RRH1088.
46. Molyneaux-Smith LD. *Canadian Farmers' Experience of Disability: Impact, Challenged, and Coping Strategies* [masters thesis]. Halifax, Nava Scotia: Dalhousie University; 2001.
47. Murray M, Beattie J, McLeod C, Pedler D, Brumby SA, Gabbe B. 'It could have been a lot worse': the psychological effects of farm-related serious injury in Victoria. *Rural Remote Health*. 2019;19(3):5323. doi: 10.22605/RRH5323.
48. Rasinski JL. A qualitative exploratory study of farmers injured by Bovines [masters thesis]. Buffalo, NY: D'Youville College; 2007.
49. Douphrate D, Leigh P, John M Costs of tractor operator injuries from overturns and highway collisions progress report - year 2. Lexington, Kentucky: University of Kentucky; 2007.
50. Mcnamara J, Ruane DJ, Whelan S, Connolly L. Preliminary investigation of the incidence and impact of disability on Irish farms. *J Int Agric Ext Educ*. 2007;14(2). doi: 10.5191/jiaee.2007.14202.

51. Jones CA, Parker TS, Ahearn M, et al. Health status and health care access of farm and rural populations. *ERS Report Summary. Economic Research Service*. US Department of Agriculture. https://www.ers.usda.gov/publications/pub-details?pubid=44427. 2009.
52. Prince TS, Browning SR, Heath R. Health insurance and work: characteristics among multi-job holding farmers. *J Agromedicine*. 2001;7(2):81–91. doi: 10.1300/J096v07n02_07.
53. Wright N, Scherdt M, Aebersold ML, et al. Rural Michigan farmers' health concerns and experiences: a focus group study. *J Prim Care Community Health*. 2021;12:21501327211053519. doi: 10.1177/21501327211053519.
54. Cortelyou-Ward K, Atkins DN, Noblin A, Rotarius T, White P, Carey C. Navigating the digital divide: barriers to telehealth in rural areas. *J Health Care Poor Underserved*. 2020;31(4):1546–1556. doi: 10.1353/hpu.2020.0116.
55. Hammersley C, Richardson N, Meredith D, Carroll P, McNamara J. "That's me I am the farmer of the land": exploring identities, masculinities, and health among male farmers' in Ireland. *Am J Mens Health*. 2021;15(4):15579883211035241. doi: 10.1177/15579883211035241.
56. Judd F, Jackson H, Komiti A, et al. Help-seeking by rural residents for mental health problems: the importance of agrarian values. *Aust N Z J Psychiatry*. 2006;40(9):769–776. doi: 10.1080/j.1440-1614.2006.01882.x.
57. Roy P, Tremblay G, Robertson S, Houle J. "Do it all by myself": a salutogenic approach of masculine health practice among farming men coping with stress. *Am J Mens Health*. 2017;11(5):1536–1546. doi: 10.1177/1557988315619677.
58. Ranjan P, Church S, Floress K, et al. Synthesizing conservation motivations and barriers: what have we learned from qualitative studies of farmers' behaviors in the United States? *Soc Nat Resour*. 32 (11):1171–1199. doi: 10.1080/08941920.2019.1648710. Accessed November 2, 2019.
59. Adeoye-Olatunde OA, Olenik NL. Research and scholarly methods: semi-structured interviews. *JACCP: J Am Coll Clin Pharm*. 2021;4(10):1358–1367. doi: 10.1002/jac5.1441.
60. Fereday J, Muir-Cochrane E. Demonstrating rigor using thematic analysis: a hybrid approach of inductive and deductive coding and theme development. *Int J Qualitative Methods*. 2006;5(1):80–92. doi: 10.1177/160940690600500107.
61. Conrad RC. Children's resilience following trauma in farm settings: a phenomenological study. [[Doctoral thesis]]. Capella University; 2008.
62. CDC. *Natality 2007-2022. Centers for disease control and prevention, national center for health statistics*. Hyattsville, Maryland: National Vital Statistics System, Natality, on CDC WONDER Online Database https://wonder.cdc.gov/natality-current.html. Accessed August 4, 2025.
63. Mclaughlin DM, Shoff CM, Demi MA. Influence of perceptions of current and future community of residential aspirations of rural youth. *Rural Sociol*. 2014;79 (4):453–477. doi: 10.1111/ruso.12044.
64. Farm Relief Services. Ireland. https://frsfarmreliefservices.ie/. Accessed May 1, 2024.
65. Becot FAS. Linking farm households' social needs, social policy, and farm persistence to better understand and support family farms in the 21st century. [Doctoral thesis]. Ohio State University; 2020.
66. Stanley-Clarke N. The role of agricultural professionals in identifying, mitigating and supporting farming families during times of stress: findings of a qualitative study. *Aust J Rural Health*. 2019;27 (3):203–209. doi: 10.1111/ajr.12507.
67. Office of Management and Budget. Tackling the time tax. https://www.whitehouse.gov/omb/information-regulatory-affairs/burden-reduction-initiative/. Accessed May 1, 2024.
68. Elo S, Kääriäinen M, Kanste O, Pölkki T, Utriainen K, Kyngäs H. Qualitative content analysis: a focus on trustworthiness. *Sage Open*. 2014;4(1):1–10. doi: 10.1177/2158244014522633.