

Article



# Farm Suicides in Wisconsin, 2017–2018: Preliminary Findings and a Call for Future Research

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**Abstract**: Studies across the last few decades have consistently found farmers and farmworkers at an elevated risk of death by suicide compared to other occupational groups in the United States. Still, there is currently no comprehensive national surveillance system for agricultural-related injuries or suicides. For this study, we analyzed Wisconsin death certificate data from 2017 and 2018 to identify the burden of suicide among farmers and farmworkers. In 2017 and 2018, 44 farm-related suicides were identified, or 14.3 per 100,000 farmers and farmworkers. The median age of victims was  $51.5 \pm 20$ , and six (13.6%) were female. As these suicide cases were cross-checked, we found that none were identifiable solely from previously published news media or obituaries, indicating: (1) a clear need for a multi-sourced suicide data approach and inter-agency collaborations for future research, and (2) the need for a deeper investigation into the reporting of farm-related suicides. These data are necessary for informing state and local level policy, resource prioritization, and the evaluation of intervention efforts.

Keywords: agriculture; farm; suicide; injury; surveillance

# 1. Introduction

As of 2018, suicide is the 10th leading cause of mortality in the United States (US) [1]. Since 1999, the rate of suicides has increased roughly 35%, with those aged over 75 having the highest rates of suicide [1]. The rates and trends are particularly alarming in the agriculture community, with rates ranging from 1.6 to over 5 times that of non-farm workers [2–4]. This is not a new problem. From 1990–1998, farmers in the southeast US were at over twice the risk of death by suicide and at higher risk in Kentucky from 1979–1985 [5,6]. Data from 1980–1988 showed that male farmers in the Upper Midwest of the US were twice as likely to die by suicide compared to the nationwide general population [7]. Migrant farmworkers in the US also exhibited elevated levels of suicidal ideation [8].

Despite this high incidence and increased risk, farmer utilization of mental health services remains low [9–11]. This research area has been well-studied in countries such as Australia, Canada, and New Zealand. However, little recent information is available in the US [12–15]. Furthermore, while the data on increasing suicide is nationally quite clear, there is relatively little surveillance on this topic in the Upper Midwest of the US or specifically in Wisconsin [1,16].

Quality and comprehensive agricultural injury surveillance are stubbornly challenging and costly for any entity to consistently maintain. Some of those complexities stem from the diverse and disjointed agricultural industry that includes more than two million independently owned US operations [17]. Likewise, our abilities to systematically collect suicide statistics face challenges as well, with many reporting inconsistencies between states and countries [18]. Meanwhile, US agriculture is arguably the least regulated industry for workplace safety and health, and it is the only industry where young children are legally



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**Copyright:** © 2021 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https:// creativecommons.org/licenses/by/ 4.0/). allowed on the worksite, often forming an indistinguishable work–life balance between the farm and the home [19].

There is currently no comprehensive national agricultural injury surveillance system in place. Partially in response to this deficiency, the AgInjuryNews initiative was launched in 2015, led by the National Children's Center for Rural and Agricultural Health and Safety [20,21]. The growing collection of reports, housed at AgInjuryNews.org, includes fatal and nonfatal traumatic injuries, including incidents believed to be self-inflicted. The initiative and its dataset have lit pathways for new projects and collaborations, including the rejuvenation of formal Wisconsin (WI) farm-related fatality reports. The WI farm fatality report, a 2020 collaboration between the Marshfield Clinic Research Institute's National Farm Medicine Center and the University of Wisconsin-Madison, revived the annual summary of farm-related fatalities in the state that had not been published since 2006 [22].

As the research team analyzed the aforementioned farm workplace fatality data from 2017 and 2018, it became evident there was a striking number of documented farmer and farmworker suicides. As is the case with unintentional injuries, reliable and current injury and fatality data are essential for the planning and evaluation of targeted interventions for suicide prevention and mental health and well-being. The purpose of this project and this brief report was to explore and characterize farm suicides in Wisconsin from 2017–2018 and to call for future research, including the ongoing systematic surveillance of intentional and non-intentional agricultural fatalities.

#### 2. Materials and Methods

This study originated from a separate investigation of unintentional fatal farm injuries [22]. Suicides were identified from 2017–2018 mortality data, including circumstances surrounding death and demographics, collected from death certificates. Sources of these data include AgInjuryNews.org system (Accessed on 22 July 2020), the US Department of Health and Human Services (DHS), and the Wisconsin State Vital Records Office.

Relevant farm-related death certificates were identified and collated by Wisconsin State Vital Records Office, defined as incidents resulting in death that met at least one of the following criteria: (1) a fatal incident that occurred on a farm or agricultural operation; (2) a fatal roadway incident with agricultural equipment; (3) the manner of an individual's death was suicide, and the decedent's industry and occupation indicated agricultural work; and/or (4) the manner of death was homicide and the decedent's industry and occupation indicated agricultural work (see Supplementary Materials). All death events needed to have occurred within the geographic borders of the state of Wisconsin for inclusion. Based on the above inclusion criteria, a total of 89 and 75 death certificates were identified in 2017 and 2018, respectively.

Death certificate data in this review include a subset of cases from this original dataset where the decedent's manner of death was denoted "suicide" by the medical examiner(s) and at least one ICD-10 code identifying intentional self-harm. Fields analyzed include occupation, industry, other significant conditions, and how the injury occurred. No attempts were made to discern events that involved trauma not directly coded as suicide.

Data reported include age, gender, industry/occupation, and manner of death of decedents. Comorbidities are also reported. Temporal and location data were analyzed; however, reporting is limited to protect the decedents' anonymity. Comparison data were ascertained from the National Agricultural Statistics Service (NASS) 2017 Census of Agriculture. The protocol for this study was deemed exempt from review by the Marshfield Clinic Research Institute Institutional Review Board (MCRI IRB) as well as the IRB of the University of Wisconsin-Madison. A data use agreement was approved by the MCRI IRB and Wisconsin State Vital Records Office.

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# 3. Results

Our search criteria identified 164 potential farm-related fatalities from death certificate data; of these 164, 44 (26.8%) were suicides, or 14.3 per 100,000 farmers and farmworkers, based on employment data from the Wisconsin Department of Agriculture, Trade, and Consumer Protection (primary state agriculture department) [23]. We saw 30 instances of suicide in 2017 and 14 in 2018, for rates of 19.5 and 9.1 suicides per 100,000 farmers and farmworkers, respectively. In the general public, Wisconsin saw a rate of 15.9 and 15.3 suicides per 100,000 people in 2017 and 2018, respectively [24].

Across 2017 and 2018, the median age of victims was  $51.5 \pm 20$ , and six (13.6%) were female. As of 2017, the average age of Wisconsin producers was 56, and 35.1% were female. Of suicides reported, 14 (32%) cited comorbidity of depression, of which 2 (4.5%) also reported anxiety. A total of 29 individuals (66%) died by gunshot wound, while 7 (16%) died by hanging. For occupation, death certificates coded 35 (80%) as "farmers", "farmhand", etc. The other nine suicides were identified as truck drivers, mechanics, office workers, etc., working within/on the physical premises of a farm operation. There were no immediately distinguishable differences in time of year, though there are limited data to generate meaningful conclusions.

A review of available news media reports from AgInjuryNews.org revealed zero additional cases. While the news reports and obituaries did assist in verifying that the death occurred, the publicly available reports did not add any further details regarding circumstances leading up to or at the time of death.

# 4. Discussion

This study identified an estimated suicide death rate of 14.3 per 100,000 WI farmers. This rate is comparable to the suicide rate of the general public in Wisconsin and nationwide, with a rate ranging from 14 to 15.9 deaths by suicide per 100,000 people [24,25]. In 2017, we observed a suicide rate of 19.5 per 100,000 farmers and farmworkers, similar to the fatal agricultural injury rates of 22.8 per 100,000 workers reported by the National Safety Council [26]. Farmer mental health has been a topic of interest for researchers for many years, and suicide has often been a main cause for concern [27–29]. These data show that the recent rate of suicide in Wisconsin farmers and farmworkers is close to that of state and nationwide averages, despite previous discrepancies seen in the literature. However, it is impossible to determine whether or not these changes occurred due to past or existing intervention programs and activities to prevent suicide. To accurately and adequately continue providing mental health support and resources and to bolster prevention efforts in Wisconsin and elsewhere, comprehensive surveillance and data reporting methods are necessary.

Of suicide decedents in our dataset, 80% had a primary occupation listed as farming, with the rest consisting of agricultural support occupations. These data also provide insight into comorbidities and manner of death, indicating potential points of action for future interventions.

### 4.1. News Media Reports

Media outlets around the world have covered topics of farm stress and mental health for decades, with seemingly even more attention in recent years [30–33]. However, the specifics of actual suicide events are almost never reported in the way typical traumatic injuries are. Our review of 2017–2018 Wisconsin farm fatalities unveiled a complete absence of suicide details in the news media, which is a clear indication that death certificates are needed to identify these types of fatalities. The absence may be partially explained by guidelines that a number of organizations, including the World Health Organization (WHO), have developed specifically addressing journalists' reporting of suicides in news media [34–38]. One concern noted in these guidelines is the risk of suicide contagion [39] and the very real possibility of "copycat" attempts following a publicized suicide event. Undoubtedly, media portrayal of any event impact readers' knowledge, attitudes, and intended behaviors. These guidelines describe, at length, various considerations for reporting suicides in the news media.

Within this project's dataset, our team was not able to identify a single farm-related suicide case from news media or obituary reports alone. This does not mean the identification of farm-related suicides is completely absent in the news media. The cases are often in the media and published as obituaries; however, the report details do not identify the incidents as a self-inflicted fatality. Perhaps just as important is the realization that rural news media (at least in Wisconsin) do not report or identify the circumstances of death for agricultural suicides, potentially perpetuating an already stigmatized and silenced public health issue—mental health—that is in serious need of health and policy solutions. This is understandable given a family's need for privacy after the loss of a loved one, but the omission has consequences in the bigger picture with respect to awareness, understanding, and the ability to design and deliver effective suicide prevention interventions. Journalists have a tremendous responsibility to investigate and report factual events. Yet, they are often ethically challenged by the balance of publishing details and the risk that additional detail may have on readers. The aforementioned media guidelines provide much-needed frameworks for responsibly reporting suicide events in news media.

### 4.2. Limitations

The occupation field of death certificates is incomplete at times and may not capture all agricultural workers. For example, an individual who operates a modest agricultural operation but derives their main source of income from a different primary profession would be missed in these data requests. We have found news reports to be a reliable supplemental source for fatal agricultural injuries with the exception of suicide cases.

The individual cases in this study were not explored beyond data from death certificates, publicly available news media reports, and obituaries. No follow-up interviews were conducted to gather additional, confirming details related to the decedents' role in agriculture or the role agriculture may have had in the death. Future studies may benefit from an expanded in-depth analysis of these relationships through in-person interviews with family members, clergy, or other trusted information sources. Past studies have included decedents classified on death certificates as both "suicide" and "undetermined" in their analyses [7]. Our data request for this project was focused specifically on farm-related fatalities. The subsequent analyses of suicides as described herein included only cases specifically coded as "suicide" on the official death certificate. Future studies of this type should consider exploring both "suicide" and "undetermined" and ensure some level of ICD code is included in analyses.

The sample size of this study was small, though it likely captured most of the statelevel data as recorded on death certificates. This article is designed to elucidate and illustrate several issues in surveillance, as well as to provide evidence that can help to better ground intervention programs in the short term, though much more comprehensive and systematic work of this type is badly needed across all states. While it is promising that the number of farmer suicides was relatively low compared to the number of unintentional injuries, this provides relatively little in the way of meaningful conclusions and inhibits statistical analyses. Larger inclusion criteria, geographically and/or temporally, could provide additional insights and statistical power to this and future research. Further, regional analysis within the state could perhaps elucidate risk or protective factors, such as access to healthcare and mental health services, or community-based factors that are known to be positive contributors to the social determinants of health. We did not include in-depth population-level comparisons, which could identify additional mechanisms by which farmers are led to suicide.

#### 5. Conclusions

This descriptive report stemmed from an initial review of unintentional fatal farm injuries, yet investigators also identified a notable number of suicide events. We found that

suicides occurred at a rate of 14.3 per 100,000 WI farmers and farmworkers, compared to a general population nationwide rate of 14.0 per 100,000 individuals. While news media reports have been successful in identifying fatal and non-fatal agricultural injuries, we were unable to identify any instances of suicides via news media reports alone.

We acknowledge that this brief synopsis represents only a glimpse into these types of tragic fatalities, and it does not paint the full picture or explore the full magnitude of the issue. Still, these data remind us that the farm suicide issue is real, and it rivals the concerns related to unintentional injury examined in this study. Further, we are reminded of the violent nature of many suicide events connected to farms and the compounding impacts of depression and other potentially treatable mental health conditions. Research that explores and evaluates existing mental health and farm stress risk factors and prevention and intervention efforts is essential and must guide the many efforts underway nationally and internationally to address farm and rural suicide.

Future research should also expand beyond the individual or family-level risk factors of those who die by suicide and should consider the influence of community-based risk and protective factors. As we learned in this work, ongoing systematic surveillance of farm-related injuries is critical, but the discipline should also be prioritizing scientific investigation of self-inflicted injuries, including the psychological and socio-economic impacts on these families, farms, and communities. Together, they have a dramatic influence on the agricultural industry and deserve our attention.

**Supplementary Materials:** The following are available online at https://www.mdpi.com/article/10 .3390/safety7030051/s1.

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**Institutional Review Board Statement:** The protocol for this study was deemed exempt from review by the Marshfield Clinic Research Institute Institutional Review Board (MCRI IRB). A data use agreement was approved by the MCRI IRB and WI DHS. Relevant death certificates were identified and collated by DHS.

Informed Consent Statement: Not applicable.

**Data Availability Statement:** Data derived from obituaries and news media reports can be accessed via the www.AgInjuryNews.org (Accessed on 22 July 2020) website. Death certificate data have not been made publicly available in any form. Interested parties may contact the Wisconsin DHS office to establish a data use agreement and/or complete the applicable data request forms.

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