



# HHS Public Access

Author manuscript

*J Agromedicine*. Author manuscript; available in PMC 2023 March 17.

Published in final edited form as:

*J Agromedicine*. 2022 July ; 27(3): 315–328. doi:10.1080/1059924X.2022.2068716.

## Children, Work, and Safety on the Farm during COVID-19: A Harder Juggling Act

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### Abstract

**Objectives:** Measures to curb the spread of COVID-19 in the Spring of 2020 immediately raised concerns among farm safety experts about the increase in children’s risk exposure due to changes in childcare and schooling arrangements. The goal of this study is to understand how farm parents were taking care of their children in the early months of COVID-19.

**Methods:** I conducted univariate and inductive content analysis on survey data from 134 farm parents from 38 U.S. states to understand.

**Results:** My findings overall confirm experts’ predictions. The move to distance learning for about three-quarter of respondents with school-age children and changes in childcare arrangements for over half of those with pre-school-age children led respondents to contend with fewer options and added responsibilities. Most frequently used adaptation strategies reflected lower reliance on the traditionally important social networks, a desire to preserve household income, and greater involvement of children on the farm. As a result, taking care of their children became harder for more than half of respondents with likely repercussions on children’s exposure to risk, parents’ well-being, and on the farm business.

**Conclusion:** The empirical insights of this study provide descriptive baseline and contextual data for future research on the impact of COVID-19. The conceptual insights expand the farm safety literature by illustrating the need to study underappreciated structural factors shaping how farm parents juggle children with their professional obligations. Finally, findings around the complexity of raising children and connections to farm productivity and farm safety highlight the importance of considering farm women’s well-being alongside the safety of their children.

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#### Disclosure statement

The author has no financial or non-financial interests to disclose. The funders played no role in any aspects of the study including study design, data collection, analyses, interpretation, manuscript write up, and the decision to publish the results.

#### Ethics approval

The research protocol was determined to be exempt from review by the Marshfield Clinic Research Institutional Review Board.

## Keywords

Adaptation strategies; childcare and school; COVID-19 – farm children safety; farm and off-farm work; women in agriculture

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## Introduction

Farm children are exposed to greater risks of injury and fatality than children in the general population due in part to the overlap between the home and farm worksite and the involvement of children in farm work.<sup>1–5</sup> For these reasons, farm safety experts<sup>1</sup> have long recommended that younger children be supervised off the worksite by a dedicated adult, while children old enough to work should only be assigned age-appropriate tasks under the supervision of an adult.<sup>5–9</sup>

In the Spring of 2020, sudden and drastic measures to curb the spread of the Coronavirus disease 2019 (COVID-19) brought up concerns among farm safety experts about the impact of these measures on the safety of children.<sup>10–12</sup> As farm parents were entering the busy agricultural season, they had to contend with daycare and school closures, move to distance-education, and stay-at-home orders. All while, older adults, an important source of childcare for farm families,<sup>4,13</sup> were at greater risk of severe infection to COVID-19. Farm parents might also have had to adjust to changes in childcare and schooling arrangements at the same time that they were facing changes on the farm and in their off-farm work since COVID-19-related measures were also impacting agricultural and labor markets.<sup>14–16</sup> In short, while the limited research on childcare for farm families pre-COVID-19 has indicated high rates of childcare challenges largely due to cost and availability,<sup>13</sup> and considering childcare experts and advocates' warning about the disastrous consequences of COVID-19 on an already strained childcare supply,<sup>17–20</sup> the effects of COVID-19 on childcare and schooling arrangements for farm families and the implications of these changes on the safety of children have likely been broad and complex.

To begin teasing out these effects, I draw on quantitative and qualitative data from a primary survey of 134 farm parents from 38 U.S. states. In particular, my overarching research questions are (1) what changes in childcare and schooling arrangements did farm parents experience during the early months of the COVID-19 pandemic? (2) what adaptation strategies did farm parents use to take care of their children? and (3) what challenges did farm parents experience taking care of their children? The survey instrument and interpretations of findings are largely grounded in three bodies of literature: farm safety, farm persistence (a rich body of rural social science research focused on understanding how farm families adapt to ongoing changes), and the impact of COVID-19 on parents in the general population.

The empirical insights into the “what” farm parents did with the children and “why” provide descriptive baseline and contextual data for future research on the impact of COVID-19 on farm families including children safety and farm persistence. Conceptually, the sudden

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<sup>1</sup>Farm safety experts include researchers, outreach professionals, and occupational health and safety agencies employees.

changes in childcare and schooling environments due to COVID-19 containment measures provide fertile ground to deepen our understanding of the ways in which structural-level factors interact with farm parents' decision of what they do with their children while they work. Understanding how factors outside of farm parents' control may impact farm safety outcome provides a key expansion of the farm safety literature, a body of work largely focused on the individual-level factors (i.e. parents' behaviors and knowledge) and ideological beliefs (i.e. agrarian ethics and child rearing).<sup>21-24</sup>

## Methods

### Research design

My data are from a survey of farm parents administered on-line between August 3 and September 22, 2020. I developed the survey instrument using several bodies of literature: farm safety with a focus on children,<sup>5,25-27</sup> farm persistence,<sup>13,28</sup> childcare (to ensure adequate coverage of childcare arrangements),<sup>29,30</sup> and COVID-19 impact on parents assessments.<sup>31-35</sup> The survey instrument included a mix of closed- and open-ended questions about farm household demographic and farm operation characteristics, childcare and schooling arrangements pre- and during COVID-19, adaptation strategies, and involvement of children on the farm. I validated the instrument through standard social science practices.<sup>36-38</sup> First, I established face validity by obtaining feedback from four researchers with expertise in farm children safety, childcare in the agricultural sector, and farm persistence. I assessed weak, poorly worded, or irrelevant questions along with completion time by piloting the instrument with eight farm parents. Last, I used pilot data to review question coding. Because the survey instrument largely focused on actions taken and on events that happened, I did not conduct more complex validation steps such as item reduction analysis, extraction of factors, and scale evaluation. See supplemental Table 1 for full list of variables. For the purpose of this study, I defined childcare broadly as what parents normally do with their children while working on the farm operation and in any off-farm job.

### Recruitment and data collection

I recruited a convenience sample using three eligibility criteria. Parents or primary caregivers who answered the survey must (1) operate a farm or ranch; (2) have at least one child under the age of 18; and (3) live in the U.S. Parents or primary caregivers who met these requirements are hereafter referred to as farm parents. The recruitment materials were shared on the social media platform [Facebook.com](https://www.facebook.com) through two approaches. First, I purchased ads that were shown to over 438,000 individuals and resulted in 5,273 clicks on the ad. Second, I sent a request to post recruitment material on [Facebook.com](https://www.facebook.com) pages through direct messaging to 67 groups and organizations connected to farm safety, young, beginning, and women farmers. The recruitment materials were also shared through an email to the Childhood Agricultural Safety Network (approximately 60 members at the time of the study). At least 13 organizations posted the recruitment information on their Facebook page. Once fraudulent responses were removed from the dataset,<sup>2</sup> 291 individuals consented to participate in the study but 157 dropped before the end leading to an analytical sample of 134 farm parents. Respondents who provided their address received a \$10 incentive.

The research protocol was determined to be exempt from review by the Marshfield Clinic Research Institute Institutional Review Board.

### Analytical strategy

Data from closed-ended survey questions were imported into the statistical software STATA/IC 16 for univariate analysis. Data recoding included recoding “other” to existing category when relevant, recoding of missing for consistency with skip patterns, collapsing of responses into fewer categories, creating new variables based on sum of options selected and through the merging of questions. See supplemental Table 1 for recoding details. The original analysis plan was to conduct bivariate and multivariate analysis. Yet, even after recoding to collapse categories, cross-tabs for key variables did not consistently include at least five observations per cell, preventing more in-depth and consistent analysis.

Data from open-ended survey questions were imported into Microsoft Excel for inductive content analysis.<sup>39,40</sup> The three open-ended questions asked about: (1) how childcare and schooling arrangements changes affected the ability to get the farm work done (84 responses); (2) changes in the type of farm chores assigned to the children (44 responses); and (3) additional information, thoughts, or opinions including what could be done differently if the COVID-19 virus continues to lead to further school and childcare closures (49 responses). With a research assistant, I developed a codebook wherein we developed codes refined from the responses through three reads of the text. By consensus, we reached at least a 90% agreement in the use of codes for each comments. Akin to a mixed-methods “light” convergent design, the open-ended questions provide nuances and context for the findings from the closed-ended questions and enable the identification of themes not explored through the closed-ended questions.<sup>41</sup> In the results write-up, I weave together the findings from the quantitative and qualitative data.

## Results

### Sample characteristics

Sample characteristics are available in Table 1. Almost three-quarter of respondents (73.1%) identified as female and 91.5% of respondents identified as white, non-Hispanic-Latino. Respondents reported on average 4.5 household members and 34.7% had children aged 0 to 2, 38.7% had children aged 3 to 5 and 79.0% had children aged 6 to 18. Half of respondents were beginning farmers (i.e. have been operating a farm for less than 10

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<sup>2</sup>-I used several REDCap survey links to determine where survey responses were coming from (i.e. whether responses were coming from [Facebook.com](https://www.facebook.com) ads, postings on my home institution’s Facebook page, and posting on other organizations’ page) and monitored responses multiple times a day during the recruitment period. Early on, I detected fraudulent activity due to individual(s) reusing two of the links. After consulting with my institution’s IRB director and center director, I created new survey links, turned on the reCAPTCHA feature, and asked for mailing addresses (instead of email addresses) for the incentive. The goal was to prevent additional fraudulent responses without interrupting the recruitment. I then used several steps to remove suspicious answers submitted through two compromised links. I removed answers that were submitted after detection of the fraudulent activity. For the survey responses submitted before I detected fraudulent activity, I assessed the integrity of responses by inspecting the completion time to complete the survey (completion time under five minutes was deemed suspicious), the email addresses used (spammers used a distinct pattern of letters and numbers from three email domains), the age of respondents and household members (spammers used the same pattern of numbers), the acres owned and rented (spammer entered the same number for acres owned and operated), and the town, state, and zip codes provided (in some cases, spammer entered zip codes that did not match the town/state). This approach led to the removal of 1,918 likely fraudulent responses.

years) and 81.3% were first-generation farmers. Over three-quarter (78.6%) of respondents operated a hobby or small farm (i.e. value of sales under \$250,000). Most frequently produced commodities included livestock (82.7%) followed by field crops and hay (58.5%). Looking at sources of household income, 83.9% of respondents indicated that at least one household member had an off-farm job. Furthermore, 61.1% of respondents indicated that most of the household income was from off-farm sources compared to 29.8% who reported that most of the household income was from farming. Respondents lived in 38 states with Wisconsin, Utah, and Kansas leading the number of responses (respectively 17%, 11%, and 9% of respondents) (data not shown in table). Based on the Boston University COVID-19 U.S. state policy database,<sup>42</sup> respectively, 16.7% and 94.0% of respondents lived in states with COVID-19-related daycare and school closures.

### **Childcare and schooling arrangements pre- and during COVID-19**

Childcare and schooling arrangements before COVID-19 varied across age-groups and across the year (Table 2). During the school year, respondents with children 3 to 5 reported using more options (2.3 options on average out of the eight options listed) followed by those with children 6 to 18 (2.2 options on average), and with children 0 to 2 (2.1 options). During the summer, respondents with children in the two youngest age-groups were planning on using less options (respectively 2.0 and 2.1 options on average out of the seven options listed for children 0 to 2 and 3 to 5) while respondents with children 6 to 18 reported that they planned to use the same number of options.

Overall, the childcare and schooling arrangements pre-COVID-19 varied based on children's age and across the year (see Table 3 for the details of the arrangements). In the early childhood years, parental care followed by family care and informal care were most often used. As children grow older, the importance of formal care such as daycare center, prekindergarten, K-12 school, and summer programs increases. For example, during the school year, 56.0% of respondents with children 0 to 2 reported parental care at home compared to 49.2% of those with children 3 to 5 and 46.6% for those with children 6 to 18. Meanwhile 24.0% of respondents with children 0 to 2 used formal care compared to 35.6% of respondents with children 3 to 5 and 60.2% of those with children 6 to 18 reported K-12 school. Comparing the school year to the summer, all forms of parental care decreased or stayed the same for respondents with children 0 to 2 while they all increased for respondents with children 6 to 18. For example, looking at parental care on the farm with a working parent, 44.0% of respondents with children 0 to 2 and 52.4% of respondents with children 6 to 18 reported using the school year compared to respectively 40.0% and 75.5% during the summer. For respondents with children 3 to 5, parental care on the farm with a working parent increased (from 44.1% to 50.9%) while parental care at home and at the off-farm job decreased (respectively from 49.2% to 42.4% for at home care and from 10.2% to 6.8% for at the off-farm job care). All forms of non-parental care, except for K-12 school or summer programs, increased between the school year and summer for the three age-groups. For example, 32% of respondents with children 0 to 2, 27.1% of respondents with children 3 to 5, and 8.7% of respondents with children 6 to 18 used informal care during the school year compared to respectively 34.0%, 31.0%, 14.7% (Table 2).

Looking at changes due to COVID-19-related measures, respondents were more likely to report a change in schooling arrangements (81.3%) than they were to report a change in summer activities (72.5%) or childcare (55.5%) (Table 3). The most frequent change for respondents with school-age children was a move to distance learning (74.7%). For summer activities for children 6 to 18, the most frequent change was the cancellation of activities, while 16.7% of respondents indicated that summer activities were replaced with remote options. For those with children 0 to 5, the most frequent change was the closure then reopening of the childcare (28.8%). Yet, at the time of the survey 15.0% reported that their childcare option was still closed. Even if childcare did not close, respondents might have reported changes as 13.8% were not comfortable using the childcare and 5.0% reported that childcare was more difficult to use (Table 3).

### **Adaptation strategies to take care of the children during COVID-19**

Respondent's households adapted to the changes in the childcare and schooling arrangements by using on average 3.2 adaptation strategies out of the nine listed (standard deviation 1.4). By far, the most frequent strategy was to bring the children to the farm (85.8%). The next four strategies were used by half or slightly under half of the respondents: older children looking after younger siblings (52.5%), changing the farm work schedule (51.8%), asking other adults to help out (45.8%), and changing off-farm work schedule (43.8%) (Table 4). As quotes 1 and 2 illustrate (see Table 5 for all mentions of quotes), responses to open-ended questions spoke to the need to adapt due to the reduction in options available.

When asked specifically about the strategy of having the children spend more time on the farm with a parent, 60.4% of respondents indicated that their children were on the farm more during COVID-19 compared to the previous summer. Furthermore, 67.1% indicated changes in the farm tasks they assign their children. In the open-ended question about changes in farm tasks, 28 out of the 29 respondents who wrote about changes in the workload indicated that they were giving more work to the children. Quotes 3–5 illustrate three main explanations for changes in farm chores assigned to children: keeping the children busy, helping get the farm work done, and supporting children's learning.

Health considerations shaped the adaptations strategies of almost two-third (62%) of respondents who stopped asking family and friends for help with children out of concern that their or the other household were in a high-risk group for COVID-19. Responses to open-ended questions provide further insights into the interactions between health status and adaptation strategies but also points to interactions between opinions towards COVID-19 and adaptation strategies (quotes 6–8). (Table 5).

### **Challenges taking care of the children before and during COVID-19**

Two-third of respondents (63.8%) reported childcare problems before COVID-19 with affordability and availability ranking as the most frequent challenges (Table 6). In the early months of COVID-19, taking care of the children became harder for 58.2% of the respondents while 36% reported no changes. Furthermore, 57.5% respondents reported that



changes in childcare and schooling affected their ability to get the farm work done at least sometimes.

Out of the 49 respondents who gave an opinion in open-ended question about the impact of children-related changes on farm work, all but one wrote about negative impact(s). This high proportion of negative comments is in contrast to the mixed answers to the closed-ended question. Responses were largely connected to two themes. First, respondents described the amount and type of farm work they can do along with a description of their adaptation strategies. Second and less frequent, respondents touched on safety concerns associated with having the children on the farm more. Weaved through many of the responses, implicitly or explicitly, were undertones of the impacts of these changes on respondents' well-being (quotes 9, 10).

While most respondents wrote about the negative impact on farm work due to having the children around more, some respondents described positive aspects associated with COVID-19-related changes for practical and/or ideological reasons (quotes 11, 12).

In addition, 17 respondents wrote about changes that would help them navigate children and farm work. Their comments fall mainly in three categories as illustrated by the quotes 13–15: end COVID-19-related measures, provide support for virtual learning (internet service and computers), and provide childcare/schooling alternatives.

## Discussion

The goal of this study was to understand how farm parents were taking care of their children in the early months of COVID-19 and the implications for children's safety. As I summarize the findings from the survey of 134 farm parents from 38 states to answer my three research questions, I compare and contrast my findings with two long-standing bodies of literature (i.e. farm safety and farm persistence) and the new body of literature on the impact of COVID-19-related changes on parents among the general population.

The first research question aimed to assess COVID-19-related changes in childcare and schooling arrangements. Going into the pandemic, surveyed farm parents reported complex childcare and schooling arrangements that varied based on the age of children and across the year. These arrangements mirrored those found in research among farm parents pre-COVID-19.<sup>4,13,28</sup> Reflecting state-level mandates and recommendations, respondents were more likely to report changes in schools and summer activities than they were to report changes in childcare options in the early months of the pandemic.<sup>42</sup> Yet, compared to 79% of parents in the general population reporting a change in childcare,<sup>34</sup> the lower proportion of survey respondents reporting a change in childcare (45%) may be explained by farm families' greater reliance on parental and family care along with lower use of formal childcare pre-COVID-19.<sup>4</sup>

The second research question focused on strategies farm parents used to adapt to take care of the children in the midst of COVID-19-related changes. As childcare and schooling options shifted in the Spring of 2020, respondents adapted by using on average 3.2 strategies. Echoing research among the general population<sup>34,43–45</sup> and findings around parenting on

farms pre-COVID-19,<sup>28,46</sup> a range of factors shaped the strategies respondents chose: pre-disposition to severe COVID-19, ideological beliefs (i.e. COVID-19, child rearing, and religion), and availability of childcare and schooling options. Furthermore, the responses to open-ended questions illustrate the complex decision-making process farm parents engage in when deciding how to juggle childcare and school work with professional responsibilities. Respondents favored strategies that were inwardlooking (i.e. three most used strategies involved only household members) and incomepreserving (i.e. preference for changing farm and off-farm work schedule over electing to work less). The reliance on these two strategies align with the farm persistence literature.<sup>47–49</sup> Yet the lower reliance on social networks (i.e. family and friends), as indicated by two-third of respondents who ceased asking for help with the children specifically to limit exposure within the social network to COVID-19, marks an important departure from the farm persistence literature. This body of work has pointed to the key role played by social networks in navigating through challenging times.<sup>50,51</sup> As such, this finding brings up questions about farm families' ability to weather challenges when their ability to draw on key social network is limited and about the impact on farm business development. As expected by farm safety experts early on in the pandemic<sup>10,11</sup> and connecting back to the positive correlation between presence on the farm worksite (whether children are by standing or working) and risk of incident,<sup>1,5,52–54</sup> children's exposure to risk might have increased: the top two strategies were for parents to bring the children on the farm more (86% of respondents) and asking older children to look after their younger siblings (53% of respondents). Future research is needed to assess variations in strategies used and safety implications based on the age of children and the type of activities children are involved in on the farm since the risk-benefit calculus varies based on children's level of development and autonomy, commodities produced, and farm scale. However, research on the impact of COVID-19 among salaried workers also indicates that when short on options, these parents used strategies that, depending on the age of the children, may increase risk exposure to children and parent's mental load from leaving the children at home without adult supervision.<sup>55,56</sup>

The third research question aimed to assess challenges that farm parents experienced taking care of the children during COVID-19. Thus far, research among the general population has found that between one-to two-third of parents have experienced childcare challenges.<sup>57,58</sup> In addition, women have disproportionately taken on additional the childcare and homeschooling duties.<sup>45,59,60</sup> In my sample, 58% of farm parents reported that taking care of the children became harder. Challenges with childcare actually predate COVID-19: two-thirds of respondents reported existing challenges (most often due to affordability and availability) and this rate closely tracks with a 2014 survey of farm parents.<sup>13</sup> For over half of the respondents, having the children home more impacted the ability to get farm work done. The responses to the open-ended questions further illustrated the challenges respondents faced with juggling their professional responsibilities alongside increased childcare and schooling demands. Some of the respondents' comments also hinted at the negative impact of these increased demands on their well-being. From the farm persistence perspective, having to navigate the children and farm work brings up questions about how COVID-19 is impacting the farm business and farm families' livelihood.<sup>28</sup> From a farm safety perspective, findings bring up questions about the ability to adequately supervise the



children.<sup>5,54</sup> Likely reflecting the greater involvement of women with children and women having taken on additional childcare duties during COVID-19, 71% of survey respondents identified as women. As such, my findings connect back to the scholarship on women in agriculture including the triple burden (i.e. farm, off-farm, and care work), stress associated with role overload, and inadequate support for farm women.<sup>61–64</sup> Last, some respondents wrote about their worries of having children on the farm more and adjustments to workload and workflows with children's safety in mind. This finding is an important counterpoint to the prevailing farm safety field that has largely honed in on parents' lack of farm safety knowledge and inadequate behaviors as key leverage points for interventions.<sup>21,22,65,66</sup> Instead, my findings reinforce previous findings that the choice of bringing children to the worksite is likely driven at times by lack of alternative options.<sup>46,66–68</sup>

## Limitations

My findings regarding farm parents' adaptations to COVID-19-related changes and the ramifications for farm safety need to be considered in light of two main limitations. The first limitation is connected to my recruitment approach. While social media recruitment has been seen as a cost- and time-effective recruitment method including for agricultural populations,<sup>69–71</sup> this strategy was of limited efficacy for my recruitment. Despite developing my ad budget based off power calculation and studies that recruited through [Facebook.com](https://www.facebook.com),<sup>69,70,72,73</sup> my analytical sample was far off the sample size I needed to derive reliable parameter statistics for the planned multivariate modelling. Confounding factors might have also impacted recruitment (i.e. survey fatigue, summer recruitment, inadequate internet access, and COVID-19). Furthermore, my recruitment efforts were impacted by fraudulent activity, not an unfamiliar problem with online recruitment.<sup>74,75</sup> While I took several steps to ensure the integrity of my dataset, it remains possible that my analytical sample might have still included fraudulent responses and that non-fraudulent responses might have been removed. Still, my findings are overall in line with research on farm families' childcare pre-COVID-19<sup>13,28</sup> and with research on the impact of COVID-19 on parents in the general population.<sup>44,45,59,60</sup>

The second main limitation regards my sample. The small size of my sample along with the likely over-representation of respondents who identify as female, who raise livestock, and who were homeschooling their school-aged children pre-COVID-19 mean that my sample is likely not representative of the U.S. farm parent population. The over-representation of respondents who identify as women is however not surprising considering predominant gender roles in farm families<sup>61–64</sup> and the general population.<sup>45,59,60</sup> The small sample size and data structure prevented more complex analysis to assess variations in responses on the basis of household demographic and farm characteristics (e.g. number and age of children, gender of parents and children, race/ethnicity, socioeconomic status, share of income from farming, farm experience and background, farm size, and commodities produced). As such, future research on larger samples will help clarify the factors associated with families reporting more ease taking care of the children as well as childcare and schooling arrangements associated with a lower exposure to risk for farm children. The need to tease out variations across children's age to speak to developmental variations is

particularly important to develop a deeper understanding of the connections between farm parents' adaptation strategies and children's exposure to risk.

## Conclusion

Measures to contain the spread of COVID-19 in the Spring of 2020 immediately raised concerns among farm safety experts about the increase in children's risk exposure due to changes in childcare and schooling arrangements.<sup>10-12</sup> My findings overall align with farm safety experts' predictions while also illustrating a diversity of experiences and perspectives among the respondents including positive aspects. The presence of children on the farm worksite and their involvement in farm work increased for a majority of respondents as they had to contend with fewer options, including less reliance on traditionally important social networks, while taking on the additional responsibility of homeschooling for three-quarter of respondents with school-aged children. While some respondents enjoyed having the children around more, the top two adaptation strategies were both reflective of having less outside help and a concern for the preservation of household income. As a result, taking care of the children became harder for more than half of respondents with likely repercussions on the safety of children, parents' well-being, and on the farm business. These findings largely echo the challenges found among the general population during COVID-19 and point to the universality of challenges navigating children and work across occupational sectors and across geographies. From a practical standpoint, my findings, coupled with previous research on farm safety interventions, indicate that interventions encouraging parents to not bring their children to the worksite might be of limited effectiveness if not counterproductive when alternative options are sparse.<sup>22,23,66</sup> Instead, my findings highlight the need for employers, state- and federal-level governments to consider public health goals of containing COVID-19 alongside the needs of working parents and well-being of children. States that kept their childcare and schools open for essential workers such as Massachusetts provide one example. Employers that provided paid time off for employees who lost their childcare and schooling options and/or to care for a sick family members provide another example.

Besides the development of baseline and contextual insights on short-term adaptation strategies and potential increase in children's risk exposure in a context where childcare and schooling options were suddenly more limited, my findings have at least two broader conceptual implications for the farm safety and farm persistence bodies of literature. First, the consideration of what farm parents do with their children while they work needs to move beyond a focus on how parents' choices are shaped by culture, knowledge, and attitudes.<sup>76-80</sup> It ought to also integrate how external factors intersect with farm parents' decisions. Childcare and schooling remain understudied topics in both the farm safety and farm families bodies of literature.<sup>4,13,52,81</sup> Yet my findings illustrate how changes in the childcare and school "supply", changes largely outside of farm parents' control, meant that children were on the farm worksite more which, considering the dangers on the average contemporary farm worksite, likely led to an increase in children's risk exposure and decreased productivity. As such, changes in federal support to parents and childcare providers in response to COVID-19<sup>82,83</sup> and recent state-level innovations<sup>84-86</sup> provide fertile ground to understand how investments in social infrastructures could be an important leverage point to reduce farm children's exposure to risk along with supporting

farm business viability. After all, when asked about changes that would help navigate the needs of children and farm work, most respondents asked for outside intervention. A fertile research avenue includes assessing how variations in state's use of COVID-19 financial packages to increase childcare tax credits and provide financial support to the childcare sector impacted farm families' childcare arrangements and their social and economic well-being. Second, the farm children safety literature tends to solely focus on the safety and well-being of children while the farm persistence literature has long pointed to the crucial contributions of women in agriculture and the challenges that they face. My findings around the complexity of raising children and around the interactions between inadequate childcare and schooling options with farm safety and productivity all hint at negative impacts on parents' mental health of navigating work and the children. Considering that farm women still act as primary caretakers,<sup>28,61,87,88</sup> that neither the children farm safety nor the farm stress fields have adequately considered the needs and realities of farm women,<sup>89,90</sup> and that the COVID-19 crisis has disproportionately impacted women across the world,<sup>45,59,91-93</sup> future research and interventions ought to consider farm women's well-being alongside the safety and well-being of their children. Cross-national comparative research that includes a mix of countries to reflect variations in childcare cost and availability and supports to parents, including programs adapted to meet the specific needs of farm parents as is done in France,<sup>81</sup> would be particularly productive to understand how structural factors shape farm women's well-being, the safety of their children, and their contributions to the farm business.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## Acknowledgments

Just as it takes a village to raise children, it can take a village to move from a research idea to publication of the results. Thank yous are owed to Barbara Lee, Shoshanah Inwood, Andrea Rissing, and Marsha Salzwedel for feedback on the survey instrument and to Dr Lee for her feedback on the manuscript. Casper Bendixsen, Elizabeth Buchanan, and Bryan Weichelt provided feedback on the recruitment strategy. Richard Burke assisted with database creation and management as well as recruitment strategy conceptualization and implementation. Melissa Ploeckelman, Amy Marg, and Marsha Salzwedel assisted with survey recruitment, and Emily Richmond assisted with qualitative data coding. Dixie Schroeder and Kathie Smith provided administrative support. David Puthoff provided editorial support. Three anonymous reviewers provided thoughtful feedback. Thank yous are also owed to the farm parents who took time out of their busy day to participate in the study.

## Funding

This work was supported by the National Institute for Occupational Safety and Health under Grant U54 OH009568-10 and Marshfield Clinic Research Institute.

## Availability of data and material

The data presented in this study are available on request. The data are not publicly available due to questions that could identify respondents. Furthermore, the author's institution requires a data sharing agreement before research data may be shared.

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**Table 1.**

Sample characteristics (n = 134).

Characteristic	Percent	Mean (std. error)
Gender		
Female	73.1	
Male	26.9	
Race and Ethnicity		
American Indian or Alaska Native	4.6	
Black or African American	1.5	
Native Hawaiian or Other Pacific Island	0.8	
White, Hispanic/Latino	10.0	
White, non-Hispanic/Latino	91.5	
Household Composition		
Household size		4.5 (1.5)
Children age 0 to 2	34.7	
Children age 3 to 5	38.7	
Children age 6 to 18	79.0	
Farming Experience and Background		
Beginning farmer status	50.8	
First-generation farmer	81.3	
Value of Farm Sales		
Hobby (<\$10,000)	23.8	
Small (\$10,000 to \$249,999)	54.8	
Medium (\$250,000 to \$499,999)	11.1	
Large (\$500,000+)	10.3	
Commodities Produced		
Livestock	82.7	
Field crops/hay	58.5	
Fruits and vegetables	25.7	
Nursery and greenhouse	4.9	
Sources of Household Income		
At least one household member has an off-farm job	83.9	
Most of income from off-farm sources	61.1	
Most, but not all, of income from farming	29.8	
All income from farming	9.1	

**Table 2.**

Childcare and schooling arrangements pre-COVID-19 (n = 134).

	School year				Planned for summer		
	0 to 2	3 to 5	6 to 18	0 to 2	3 to 5	6 to 18	
<b>Number of options used</b>	<b>2.1 (1.6)</b>	<b>2.3 (1.5)</b>	<b>2.2 (1.2)</b>	<b>2.0 (1.4)</b>	<b>2.1 (1.3)</b>	<b>2.2 (1.2)</b>	
	Mean (std. dev.)						
	<b>Percent<sup>a</sup></b>						
Parental care at home (playing, homeschooling)	56.0	49.2	46.6	50.0	42.4	48.0	
Parental care on the farm with a working parent	44.0	44.1	52.4	40.0	50.9	75.5	
Parental care at off-farm job	10.0	10.2	13.6	10.0	6.8	14.3	
Family care (i.e. grandparent or other family member)	30.0	23.7	17.5	36.0	25.4	22.5	
Informal care (i.e. babysitter or home-based care)	32.0	27.1	8.7	34.0	31.0	14.7	
Formal care (i.e. daycare center or pre-kindergarten)	24.0	35.6	2.9	18.0	20.3	5.1	
K-12 school or summer programs (i.e. school/camp/sports)	6.0	30.5	60.2	6.4	27.6	40.2	
After school programs	8.0	6.8	14.6	N/A	N/A	N/A	

Notes.

<sup>a</sup> Adds to more than 100 because respondents could choose more than 1 answer.

**Table 3.**

COVID-19-related changes in childcare, school, and summertime activities (n = 134).

Characteristic	Percent <sup>a</sup>
Schools for children 6 to 18	
Moved to distance learning setting	74.7
No changes	18.7
Fully closed	9.9
Summer activities (Summer camps, school, and sports) for children 6 to 18	
Cancelled	59.8
No changes	27.5
Replaced with remote options	16.7
Childcare options for children 0 to 5	
No changes	45.0
Closed then reopened	28.8
Closed and has not reopened	15.0
Did not close but was not comfortable using	13.8
Did not close but was more difficult to use	5.0

Notes.

<sup>a</sup>Adds to more than 100 because respondents could choose more more than 1 answer.

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Strategies used to adapt to changes in childcare and/or school arrangements during COVID-19 (n = 134).

Table 4.

	Percent <sup>a</sup>
Children spent more time with parents on the farm	85.8
Older children looked after their younger siblings	52.5
Changed farm work schedule	51.8
Other adults helped-out (grandparents, friends, neighbors)	45.8
Changed off-farm work schedule	43.8
Chose to work less hours at off-farm job	30.5
Required by employer to work less in off-farm job	28.7
Worked less hours on farm	12.6
Hired a babysitter	8.0

Notes.

<sup>a</sup>Adds to more than 100 because respondents could choose more than 1 answer.



Table 5.

Quotes from open-ended questions and respondents' characteristics.

Quote number	Quote	Respondents' characteristics
Adaptation strategies to take care of the children during COVID-19		
1	"Had to balance field work, cleaning, maintenance and other general farm work while having all four children at home rather than at school or daycare."	Female, 4 children (2 in age-group 0 to 2 and 2 in age-group 6 to 18), Wisconsin
2	"There are some jobs that are dangerous. Prior to the pandemic, I would seek a sitter for my children during these jobs. Now, because of health concerns, I have decreased trips to the babysitter. So, when completing dangerous jobs, I take extra precautions, or ask a grandparent to help with supervision."	Female, 2 children (1 in age-group 0 to 2 and 1 in age-group 6 to 18), Utah
3	"Kids being home means they get chores. They have done more weeding, more watering, and have taken care of livestock more."	Female, 5 children (all in age-group 6 to 18), Utah
4	"Have to get them to help or won't be able to work."	Male, 2 children (1 in age-group 0 to 2 and 1 in age-group 3 to 5), Vermont
5	"Trying to give more small tasks and I'm tying these tasks with the curriculum."	Female, 1 child (in age-group 6 to 18), Georgia
6	"Luckily, we have family that offer to assist with childcare. But, I am a very high risk patient so I am particular where our daughter stays."	Female, 1 child (in age-group 6 to 18), North Carolina
7	"It would be easier if the farm side of the family believed COVID was an issue. Because of their lack of precautions, we are very limited in childcare options."	Female, 1 child (in age-group 0 to 2), Wisconsin
8	"It's ridiculous to keep masks on these children. There have been zero pediatric deaths in Arkansas."	Female, 2 children (1 in group 3 to 5 and 1 in age-group 6 to 18), Arkansas
Challenges taking care of the children before and during COVID-19		
9	"I have to help my children with distance learning as they are too young to do it themselves and therefore do not have the time to get all of my farm chores done as I normally would. Therefore decreasing the amount of hours I sleep. Add a baby with a terrible sleep habits on top and you become very stressed."	Female, 4 children (1 in age-group 0 to 2, 1 in age-group 3 to 5, 2 in age-group 6 to 18), Wisconsin
10	"How are you supposed to get jobs done with equipment with kids running around? Kid gets in blind spot can be killed."	Male, 2 children (1 in age-group 3 to 5 and 1 in age-group 6 to 18), Colorado
11	"COVID-19 has been a blessing for our family. A slowdown from all of the off farm kids activities has been wonderful, and well-accepted. Our children are learning life skills on the farm that they can use for the rest of their lives."	Female, 4 children (all in age-group 6 to 18), Wisconsin
12	"I think it is better that the school has closed down, because they aren't actually teaching them anything and can corrupt in some of their ways. COVID has given my family the chance to spend time together and focus on more important things such as our CREATOR and the farm. It's all the will of the FATHER why this is all happening so I am happy."	Female, 6 children (2 in age-group 0 to 2 and 4 in age-group 6 to 18), California
13	"It is easier to be productive when the kids are happy and safe at vbs [vacation Bible School], sports, etc. Kids are resilient to change but this is ridiculous. Farm kids have the strongest immune systems and absolutely will not get COVID ... Open up!"	Female, 3 children (1 in age-group 0 to 2, 1 in age-group 3 to 5, one in age-group 6 to 18), Virginia
14	"We also live in a technology poor area, we got internet last year. Internet should be provided and available to all families just like other utilities."	Female, 1 child (in age-group 6 to 18), Utah

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Quote number	Quote	Respondents' characteristics
15	"We need cooperative programs that connect rural families to each other to help with childcare when centers and schools close. We need community."	Female, 1 child (in age-group 0 to 2), Iowa

**Table 6.**

Challenges taking care of the children (n = 134).

Characteristic	Percent
Had childcare challenges before COVID-19	63.8
Source of childcare challenges before COVID-19 <sup>a</sup>	
Affordability of childcare	47.1
Availability of childcare	46.3
Mismatch in child rearing philosophy	36.8
Quality of childcare	32.6
Distance to childcare	30.4
Taking care of children during COVID-19	
Became harder or much harder	58.2
Stayed the same	5.7
Became much easier or easier	36.2
COVID-19 childcare and schooling changes impacted farm work	
Often or always	19.9
Sometimes	37.6
Never or rarely	42.6

Notes.

<sup>a</sup>Adds to more than 100 because respondents could choose more than 1 answer