Down on the Farm:
Rural Children's Health and Injury Prevention

An Honors Thesis (Honors 499)

By

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December 2007

Expected Date of Graduation: December 15, 2007
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ABSTRACT

According to the American Academy of Pediatrics, approximately 100 accidental deaths involving children or adolescents occur annually on farms in the United States (American Academy of Pediatrics, 2001, p. 1). Dangers that the agricultural environment poses to children are recognized; however, current efforts to reduce risk are insufficient. Children are injured and killed through falls, drownings, and most commonly, incidents involving tractors and other farm machinery. The purposes of this project were to 1) review pertinent literature, 2) identify deficits in knowledge 3) identify barriers to taking risk reducing actions, 4) identify available resources, and 5) share information through a poster presentation tailored to those at risk. An additional purpose was to identify roles and responsibilities of the nurse.

The data revealed that government regulations are not sufficient in coverage or inadequately enforced, and educational efforts, though successful in helping the target populations acquire knowledge, are not evaluated in regard to implementation of knowledge and decreased incident of injury. Nurses, as trusted health care providers, are in an excellent position to educate and advocate on behalf of their rural clientele and must become more active in the future to raise awareness about this issue. In conclusion, nurses and those in the rural community need to promote farm safety through enhanced education, evaluation, and legislative advocacy.
ACKNOWLEDGEMENTS

I would like to thank Dr. Ann Wieseke for coming to my assistance when I needed some guidance very badly. She was extremely helpful and encouraging throughout the editorial process, and this thesis made it to this point thanks to her generous assistance.

I would also like to thank Dr. Barb Stedman for her good advice.

Additionally, I would like to thank the Indiana Rural Health Association and the Northwest Indiana Area Health Education Center for their funding this project initially.
RESEARCH PAPER
Farming is an integral part of the tradition of American society and earned the United States the nickname of "the breadbasket of the world." Life on a farm is becoming more romanticized, as evidenced by old television shows such as *Green Acres* that amusingly portray the rustic aspect of agricultural living and books such as *The Grapes of Wrath* that relay an underlying message of the purity of the relationship between man and earth.

There is a dark side, unfortunately, to this cultural institution. The inherent danger involved in farming illustrates this. The danger does not seem to be unknown, or avoided, by those involved in agricultural communities, instead it seems to be taken in stride. According to the Bureau of Labor Statistics, farming is the sixth most dangerous occupation in the United States today (Christie, 2006). In 2005, for example, 341 deaths of individuals working on farms were reported. This statistic does not account for deaths of individuals present on the farm and not working.

A population omitted from the data is that of children living on or visiting a farm. According to the American Academy of Pediatrics, approximately 100 unintentional deaths involving children or adolescents occur annually on farms in the United States (American Academy of Pediatrics, 2001, p.1). Additionally, about 22,000 individuals under 20 years of age are injured on farms every year.

The available statistics are not the only evidence of the dangers of farming to everyone, especially children. Talking with people raised in an agricultural environment produces many stories confirming the reality of these statistics; a reality that may include tragic, debilitating injury and death. Dozens of individuals replied, giving their
sympathies, and sharing similar stories of tragedy, in response to a recent newspaper article about the death of a 13 year old girl in a farm accident. One respondent explained,

I grew up on the farm... At the age of 12 (in 1966) I was operating an almost 100 horse power tractor plowing the fields, nobody around either. I learned by sitting on the fender (no cab either) watching Dad, then one day it was me doing it. I think back now to how many times I was far away working; it now scares me. No 2-way radio, no cell phones; just me and God out there alone. All of us farm kids learned by watching back then, today it is different, things happen too quick. We grew up with the fear that machinery will kill you if you make a mistake, like it did my grandfather.

Because of the importance of education, prevention, and treatment, it is imperative that all health care providers, including nurses, be aware of dangers on a farm in order to educate health care consumers. The most important point to remember regarding injuries and accidental deaths on farms is that they are preventable. Nurses have a responsibility to identify and educate those at risk.

As mentioned previously, the danger is not unknown or avoided, therefore we need to ask what are the obstacles to improving farm safety for children. What can the nurse do and what resources are there for health care consumers? What are the ideological and economic factors affecting this situation? What does research say regarding this issue? What are the variables that increase risk of injury and death on a farm? The purposes of this project were to 1) review pertinent literature, 2) identify deficits in knowledge, 3) identify barriers to taking risk-reducing actions, 4) identify available resources, and 5) share information through a poster presentation tailored to those at risk.
LITERATURE REVIEW

This section presents the results of a literature search regarding farm accidents in children, beginning with types of injuries. Common types of injuries include falls, drowning, tractor mishaps and other machinery, and livestock assaults. Next we look at risk factors that make someone more likely to experience injury or death on the farm. Risk factors include age, gender, socioeconomic status, and awareness. Types of injuries and risk factors are important variables to identify to prevent additional accidents.

Types of Injury

Children are exposed to many potential dangers on farms – ponds, chemicals, livestock; however the most prevalent source of injuries across many sources is machinery, specifically tractors. In a study conducted by Cogbill, Busch, and Stiers (1985), the leading causes of injury were falls from horses (22%), and incidents involving farm machinery (20%). Tractor mishaps (16%), horse assaults (11%), wagon accidents (10%), cow assaults (8%), and falls (6%) comprised the remaining sources of injury. Dr. Rivara (1985) conducted a study comparing data from the National Center for Health Statistics, the National Electronic Injury Surveillance System, the Death Certificate Data System of the Consumer Product Safety Commission, and the 1980 Census regarding this topic. This study revealed that across all four sources, tractors were the most common cause of injury in children of all ages. Children are often additional passengers on tractors that are constructed for one rider only and they may even begin operating tractors at a young age. Other significant sources of injury mentioned in this study included drowning, suffocation, firearms, and farm animals.
Drowning is another source of injury to children playing on farms. Many farms have ponds and drainage ditches, often secluded from the eyes of adults. The Safe Kids Worldwide Organization (2004) reports that children ages three and under are more likely to drown than older children present on the farm.

Another especially tragic source of injury involves suffocation in flowing grain. According to an article published by the National Ag Safety Database, one-third of all entrapments and suffocation in grain bins involve children under the age of 14 (Lehtola, Brown, & Eversole, 2002). Grain bin entrapment occurs when an individual is in the grain bin and grain flow is begun. The unfortunate individual is submerged in seconds, essentially drowning in grain. If others are not aware that someone is in the container, hours or days may pass before anyone realizes what occurred. An individual who works for the coroner in a rural Indiana county informed the researcher that on autopsy, the victim’s lungs are often filled with grain dust.

Falls are another common source of injury, because no equipment is needed for fall injuries to occur, only sufficient height. Pickett, Dostaler, Berg, Linneman, and Marlenga (2007) conducted a retrospective case study exploring the problem of pediatric falls on farms. The researchers selected cases from American and Canadian registries and classified falls by location, hazards fallen from, and hazards fallen onto. They found that 484 out of 1193 (or 43%) of pediatric farm injuries were related to falls, and 61% of falls from heights occurred while children were not working. The most common location of falls was in a yard (30%) and the leading hazard fallen from was a tractor (50%).
Review of the literature has revealed, then, that the most common source of injury on the farm is tractors. Other common causes of injury discussed are drowning, grain bin entrapment, falls, and livestock.

**Risk Factors for Injury**

*Developmental Stage*

According to a document on farm safety released by Penn State College of Agricultural Sciences (2006), “children and adolescents account for about 20% of all farm fatalities, comprising a higher proportion of the total number of nonfatal farm injuries” (p. 3). The National Safety Council (2005) adds that farm children actually may be working in this dangerous environment as early as 10. Their work may include using equipment that is beyond their developmental capabilities. “Injuries often occur when children are doing something beyond their mental, physical, or emotional ability” (Penn State, 2006, p. 4).

Cogbill, Busch, and Stiers (1985), as mentioned previously, conducted a retrospective study that involved reviewing the charts of pediatric patients admitted with injuries related to farm trauma. The researchers found that injuries peaked at ages 4 and 14 years. These results were confirmed by the Safe Kids Worldwide Organization (2004) reporting, “Farm injuries among children peak at ages 4 and 5 and then peak again for children ages 12 and 14.”

Peak injury ages correlate with Erikson’s theory of psychosocial development. During preschool years, children are dealing with the crisis of initiative versus guilt. Exploration, discovery, and adventure are characteristics of this stage of development, therefore it comes as no surprised that a child of this age is prone to injury in an unsafe
agricultural environment. A preschooler or toddler may love to climb and exhibits a fascination with moving parts, increasing their chances for falling and other injuries, even death (Shutske, 2002).

Likewise the adolescent dealing with the crisis of identity versus confusion is trying to expand their realm of experience and be viewed as an adult. The adolescent may be exhibiting a desire to experiment and test limits, as during the preschool/toddler years (Shutske, 2002). This stage is characterized by feelings of immortality and independence; the child is more likely to take on tasks not yet suited for them. “Multiple factors may contribute to this peak [during adolescence], including the hazardous nature of the work and the use of large machinery, coupled with inexperience, and in some cases, risk-taking behaviors” (AAP, 2001, p. 2).

Gender

As the discussion on developmental stages of children demonstrated, age is a significant risk factor for tragic farm injuries in children. Another risk factor is gender. According to researchers from the American Academy of Pediatrics (2001), overall fatality rates among males were 5.6 higher than females overall. In the 15-19 age range, male fatalities are ten times higher than that for females. Rivara (1985) found that the fatality rate of boys was 26 times higher than that of girls in the 15-19 age range. The Safe Kids Worldwide Organization¹ reported that in 1998, males accounted for 80 percent of farm-related fatalities and almost 75 percent of nonfatal farm-related injury among children 15 and under (2004).

Clearly, males are at higher risk for injury and/or death than females. Males are at higher risk because of sociological influences. The traditional male role, especially in an
environment such as a farm, involves dangerous work such as operating heavy machinery, and working with tools and electrical objects. This traditional role is heavily influenced by the psychological tendency of adolescent males to engage in risk-taking behavior, borne of their need to assert independence and prove their status as a man.

Socioeconomic Status

Socioeconomic status is another risk factor that increases the likelihood of injury/death to children on farms. Upgrading equipment to meet safety standards, such as retrofitting a tractor with a roll-over protective structure or purchasing a new gate for a livestock pen, requires money. Additionally, families of a lower socioeconomic status may lack the time, money, or knowledge required to ensure children have a safe play area with age-appropriate toys. The parents may have to function with available resources out of necessity, therefore focusing primarily on getting the day’s work done to provide income for the family, and focusing secondarily on safety.

Location

Purdue University Agricultural Safety and Health Program (2006, p. 5) compiled a list of fourteen Indiana counties with twelve or more farm fatalities in the past 27 years. Nine of the fourteen counties are designated medically underserved areas (MUAs) by the Indiana State Department of Health (2006), indicating some correlation between access to health care and likelihood of fatality (see Appendix A).

This data indicates that location is an additional risk factor for injury/death. Children who live in rural areas are at higher risk for injury/death than children in suburban or urban areas. According to the Safe Kids Worldwide Organization (2004), children in rural areas have a higher mortality rate, possibly due to the fact that they do
not have close access to trauma care. Rivara (1985) provided proof of this fact when he found almost 72 percent of children who were victims of farm accidents died before reaching the hospital. Children who are injured on farms are at increased risk of fatality simply because they do not have access to timely emergency medical treatment.

Public Awareness and Action

Lack of awareness is a risk factor as well, along with inadequate implementation of safety practices. Safety practices utilized by adults on a farm might not be current. For example, in 1976, roll-over protective structures (ROPS) became available to retrofit onto tractors. In 1985, tractor manufacturers started equipping all of their newly-produced tractors with ROPS (Cotten, 1997). However, some tractors that were manufactured before 1985 have not been retrofitted with ROPS. Cotten (1997) found that 4.6 million tractors in the United State do not have these protective structures. Two factors contributing to the lack of use of ROPS are money and time.

Another factor contributing to the slow movement towards safety modifications is the belief that “this is the way we’ve always done it.” This is evident in a poll conducted by Becker (1991). Results showed that 54% of respondents believed that their child of 10-12 years of age was mature enough to operate a tractor. The average age considered mature enough was 12. Certainly part of that response is founded on the thought that “well, my dad had me on the tractor alone when I was ten, and I’m still here.”

The literature review revealed that tractors are the most common source of injury for children on farms. Factors that increase risk include developmental stage, gender, socioeconomic status, location, and awareness/knowledge level. The person at highest risk would be a male using a tractors, about age 14, in the developmental stage of identify.
versus confusion, located on a farm in a rural location. Risk increases when those who own or live on the farm are not up-to-date in safety knowledge and/or practice, potentially because of economic factors.

REGULATIONS AND PROGRAMS

In this section, we will look at programs and regulations that are in place to help reduce the incidence of pediatric injuries and fatalities on farms. First, the actions of the government and current legislation are examined and effectiveness is evaluated. Second, we look at educational initiatives that target rural communities and evaluate their success. Finally, the role of the nurse regarding education and injury/death prevention is investigated in order to emphasize the importance of the nurse in public health.

Legislation

The federal government has created regulations regarding child labor in the agricultural environment in order to improve safety practices on farms. The Secretary of Labor has declared several tasks to be hazardous for minors. According to Cotten (1997), these tasks include operating a tractor of more than 20 power-take-off horsepower, operating equipment such as corn pickers and combines, working around livestock, and working inside a manure pit.

Much of the legislation in place is not mandatory; regulations exist as guidelines only. As with any legislation, there are legal loopholes. Farms are often operated as a family enterprise, therefore the government may not enforce regulations that have been enacted. No means of accountability for farmers to maintain or follow these regulations is in place and most are not motivated to do so because they need the children to work as free help.
For example, restrictions are not applicable to minors sixteen years of age employed on the family farm. Minors participating in vocational agricultural programs or 4-H certification are exempt from some restrictions (Cotten, 1997). An interesting point is that a tractor may be driven on public roadways if it meets all standards, however the operator is not required to have a driver’s license. This despite the fact in the United States, tractors and other farm machinery are involved in approximately 30,000 highway accidents each year (Cotten, 1997).

**Education**

Legislation should not be the only means to improve farm safety for children. Parents must become more involved in the safety and well-being of their children in the agricultural environment through advocacy and education. Of course, there already are programs in place to help spread awareness and safety information regarding children on the farm.

Hartling, Brison, Crumley, Klassen, and Pickett (2004) evaluated the effectiveness of these programs through a literature review and metaanalysis of data from multiple sources. The researchers found that the primary problem with most educational interventions and outcome evaluations was that they only evaluated knowledge acquisition on a short-term basis. Few studies evaluated outcomes by looking at injury occurrence rates. Looking at injury occurrence rates is more accurate in determining effectiveness because acquisition of knowledge may not lead to changes in safety practices. The short term goal for educational programs is knowledge acquisition, but the overall goal is to improve safety practices and decrease injury/death rates. The researchers also concluded that there was a need for injury prevention programs designed
for young/pre-school aged children. There are more programs in place for adolescents such as Future Farmers of American and 4-H, than in operation for the younger age group. Educators and care providers can use this data to best tailor their efforts to the most effective means of teaching and evaluation.

Overall, the study found that interactive educational programs featuring props, activities, and games had high levels of knowledge acquisition. Children are more likely to respond to educational efforts in which they can become personally involved. It is impossible to determine if the efforts actually improve farm safety for children, and not just increase knowledge of hazards, because none of the studies included injury occurrence rates. The researchers recommended that in the future, educational programs for children on farms be evaluated using injury occurrence rates, not merely knowledge acquisition rates (Hartling, Brison, Crumley, Klassen, and Pickett, 2004). Injury/death occurrence rates indicate whether the targeted population implemented safety action, or merely learned about safety.

The Role of the Nurse

The ANA defines nursing as “the protection, promotion, and optimization of health and abilities, prevention of illness and injury, alleviation of suffering through the diagnosis and treatment of human response, and advocacy in the care of individuals, families, communities, and populations” (2004, p.1). Nurses, as educators and patient advocates, must participate in the education of the public regarding this issue. In some cases, the registered nurse or nurse practitioner may be the only contact that consumers at risk have with the health care system, and can provide required special attention. The definition of nursing practice includes advocacy in the care of communities and
populations. Therefore, if a nurse encounters health care consumers from a rural environment, they must evaluate risk and plan interventions accordingly.

Nurses are in an excellent position to positively influence healthcare consumers. According to a recent Gallup poll (1999), 73% of Americans believe that nurses have a high or very high level of honesty and ethics. Rapport and trust between the care provider and health care consumers are vital for effective teaching with subsequent behavior modification. The public health nurse in rural communities has a real advantage in assessing hazards, educating health care consumers, and evaluating outcomes because of the level of trust in place. The same is true for nurse practitioners who are rapidly becoming primary health care providers for much of the rural population. It is imperative that nurses perform their roles of health care consumer advocates and educators.

From an economic standpoint, it also is important for nurses to do their part to diminish the financial burden placed upon the health care system in the United States. As the old adage states, “an ounce of prevention is worth a pound of cure.” It is cheaper to educate someone and spend a little time informing or directing a health care consumer about available resources than to give someone urgent care for a broken leg requiring laboratory tests, radiography, and treatment.

The Purdue University Agricultural Safety and Health Program (2006) estimates the economic impact of work-related farm injuries at eight million dollars, based on a cost of $1200 per injury. This amount does not include the cost of non-work related injuries, such as a child being injured in an accident while playing on a farm. Additionally, most farmers cannot afford to provide workers compensation, so any time
lost related to injury is lost revenue. The cost of prevention education, in contrast, is lower, including time and effort on the part of the health care provider, plus the expense of educational materials. Preventing one accident could save the system a minimum of one thousand dollars.

This researcher, applying the roles of researcher, advocate, and educator, received a scholarship from the Indiana Rural Health Association to attend their annual conference in June of 2007. For the conference, a poster presentation was developed to educate the public about the dangers farming poses to children, with an emphasis on grain bin entrapment (see Appendices B and C). With assistance from a Ball State University faculty member, the researcher received a grant to fund project materials from the Northwest Indiana Area Health Education Center. The poster presentation included a lung model demonstrating grain dust present in the lung and a model grain bin showing the danger of grain bin entrapment. The poster also was available to the general population. The poster won first prize in the Undergraduate category.

After attending the conference, the researcher presented the poster at the Henry County Health Fair. Henry County, Indiana is a rural county. In 2006, Henry County had two out of the eight farm-related deaths that occurred that year in Indiana (Purdue University Agricultural Safety and Health Program, 2006, p. 6). Children were attracted to the model grain wagon, because it was a hands-on learning tool, and they responded well to the message. Adults also responded well to the presentation. The researcher encountered several individuals who related stories about those they knew who experienced tragic injury on farms. One patron at the health fair was a nurse educator who took some of the educational brochures to distribute to her clients. The response
from patrons at the health fair illustrated the need for this type of informational initiative. All who stopped by the poster were aware of the issue, and responded well to the message.

CONCLUSION

The literature search on this topic revealed variables affecting the incidence of injury/death of children on farms. The literature reported that types of farm injuries include machinery and tractors, livestock assault, drowning, grain bin entrapment, and falls. Tractors are the most common source of injury/death, and 50 percent of fall injuries involve tractors. Developmental level, gender, socioeconomic status, location, and public awareness are all variables involved in injury/death. Males ages 4 and 14 are at highest risk for injury, especially if they are from a lower socioeconomic background and are in a rural location. The Secretary of Labor has declared many tasks on a farm involving heavy machinery and livestock unfit for minors, however government legislation is not always mandatory and/or enforced because farming is often a private industry. There also are educational initiatives in place to improve public awareness; however they are only evaluated for knowledge acquisition and not a decrease in injury/death occurrence. Given all factors, the nurse is in a key position to influence both public opinion and policy.

RECOMMENDATIONS/ AVAILABLE RESOURCES

After reviewing the literature regarding farm injuries/death and children, and exploring initiatives that are in place to rectify this problem, it is clear that we must determine more effective methods to reach populations at risk. In this section, advice from experts is presented. The advice can be utilized by a nurse to identify knowledge
deficits, develop methods to assess a farm for hazards, design effective and efficient teaching plans, evaluate outcomes appropriately, and advocate for changes in legislation.

**Expert Advice**

There are many information resources available for health care consumers, health care providers, and educators (for a list of resources, please see Appendix D). Resources list three common interventions to improve farm safety for children. The first intervention, supplied by a fact sheet from the NSC, suggests that parents should not allow children to roam about the farm freely. Parents should establish a fenced-in safe zone for children to play in that is free of hazards like machinery and livestock (2004). The nurse can educate parents about the importance of establishing the safe zone for their children and also can help parents assess the area for potential hazards.

A second intervention to improve farm safety for children is careful supervision (Penn State College of Agricultural Sciences, 2006). Although parents might instruct a child to stay in a certain area or to refrain from doing a dangerous activity, the child, especially if they are a toddler, may not always follow instructions. They may see a parent working and want to help, placing themselves in danger (Penn State College of Agricultural Sciences, 2006). The nurse can help determine ways to provide stringent supervision for young children on farms by helping to identify obstacles such as time management issues. The nurse can suggest resources for the parents and strategies such as pooling childcare with other farm families.

Another basic intervention to improve safety for children in the agricultural setting is parents setting a good example. By completing tasks the correct, safe way and utilizing safety equipment such as roll-over protective structures for tractors and tethers
for grain bin work, children will learn the way the work is supposed to be done. If a parent does not include these protective measures in their daily farm duties, then the child grows up learning an unsafe manner to complete tasks. The nurse can educate parents about their influence on children and how to improve their personal safety practices. They also can provide educational materials to parents on hazards for which to assess according to their child’s developmental level.

The nurse can teach people on a farm the importance of having a CPR- and first aid- certified individual available in case of emergency and provide the adults with resources to attain the certification. Another safety suggestion the nurse can make is for every individual in rural areas to carry a two-way radio or cell phone with them in case of emergency.

An important role that the nurse has is that of policy maker. Gaps in legislation regarding farm safety include the lack of accountability or enforcement. The public health nurse can use their experience and data from encounters with individuals on farms to influence policy regarding this issue. More stringent regulations must be in effect in order to save lives. For example, ROPS on tractors should be mandated, not suggested; all tractor drivers should be licensed. The Occupational Safety and Health Administration should be given the same jurisdiction to enforce safety regulations in the farming industry that they have in other industries. The nurse should be involved in developing and instituting policies that improve farm safety.

The nurse is invaluable in her roles of researcher, advocate, and educator. She can prevent injury and death of children on farms by improving safety through assessment, planning, intervention, and evaluation at local, regional, state, and national
levels. Evidence of the impact a nurse can make was provided through this student’s project. The target population was willing to listen and discuss this issue, and expressed trust and respect towards the student, demonstrating the influence a nurse, even a student, can have.
WORKS CITED


Cotten, P. R. (1997). Improving child safety amid the farm culture. Professional Safety, 42(12)


May 7, 2007 from: http://www.nsc.org/issues/agri/farmranch.htm


APPENDICES
Appendix A
2006 Indiana Farm Fatality Summary
Purdue University Agricultural Safety and Health Program
Figure 1. Geographic Distribution by County of Indiana’s Farmwork Related Fatalities from 1980 to 2006

Total = 686
Appendix B
“Down on the Farm: Rural Children’s Health and Injury Prevention”
Poster Presentation
The Indiana Rural Health Association Annual Conference and Poster Contest
The Henry County Health Fair
An overview of the poster presentation at the IRHA Annual Conference.

Rural Children's Health and Injury Prevention.

Photo 4. Researcher presenting poster at the Henry County Health Fair

This venue provided excellent opportunities to educate the rural population.
Model grain wagon used to illustrate dangers of grain storage areas.

Lung model with grain dust to emphasize risks of suffocation.

Jennifer Wroblewski receiving award certificate for her poster presentation.
Appendix C
Down on the Farm
Powerpoint presentation
Appendix D
Resources
1. Purdue Agricultural Safety and Health Program
These links connects to the homepage of the Purdue Agricultural Safety and Health Program. The purpose of this program, directly from their website, is “to enhance the quality of life of rural residents of the state, especially farm families, through assisting them with making their homes, work places and communities the safest and healthiest possible places to live and work.” This website is also a resource for information on farm injury and fatality in Indiana, and provides educational material as well.

http://cobweb.ecn.purdue.edu/~agsafety/IRSHC/index.html

http://cobweb.ecn.purdue.edu/~agsafety/ASH/index.html

2. The National Ag Safety Database
This is the website for the National Ag Safety Database, a bank of educational material and documents on many topics pertaining to agriculture and safety. Clicking on “topic” pulls up a list of areas that the NASD provides informational factsheets on, including tips for farmers to improve safety. This is a very exhaustive educational resource.

www.cdc.gov/nasd

3. The Safe Kids Organization
The Safe Kids Organization is a global initiative whose goal is to prevent accidental injury in children. This website provides information on all aspects of childhood risks, such as poisonings, drowning, and animal safety.

www.usa.safekids.org

4. Farm Safety 4 Just Kids
Farm Safety 4 Just Kids is an organization with chapters throughout the state of Indiana to promote safety in children in an agricultural environment. The website also features a catalogue with a variety of educational materials such as coloring books featuring Cawshus the Crow.

www.fs4jk.org

The National Safety Council's site on agricultural safety provides links to more resources regarding this topic, articles, and factsheets to help educate the public on the issue of farm safety.

http://www.nsc.org/issues/agrisafe.htm
Down on the Farm
Rural Children's Health and Injury Prevention
Presented by
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Facts about Farming Risks
Farming listed as 6th most dangerous occupation
- Death rate 41.1 out of 100,000
- Total of 341 deaths, counting only those working.

- Additional 22,288 children annually injured enough to go to ED.

Who is at highest risk?

What do the numbers say about farm injuries?

- Highest number of fatalities due to machinery.
- Then falls.
- Followed by drowning.

- According to the NSC, 47% of farm fatalities result from machinery overturns (tractors).
- In one study, fall injuries accounted for 484 of 1193 farm injuries in children.
- Up to 4 in 10 of these accidents can result in asphyxiation.

What involved in these accidental deaths?

What makes farm children at high risk?
1. Farm children endangered as passengers on farm equipment
2. Risk from being innocent bystanders
3. Lack of necessary supervision
4. Emergency medical care not readily available
5. Farm children often start working as early as 7, tasks beyond developmental abilities.
What about the government?

The Secretary of Labor has declared several tasks "hazardous for minors":
- Operating a tractor of more than 20 PTO horsepower
- Operating equipment such as a combine, feed grinders, crumbers, power post-hole diggers
- Working in a livestock yard/pen with breeding or meatbreed animals
- Working near manure pit, horizontal slab, or toxic area

Minors working on parents' farms age 16 and up are exempt.
Minors with certain certification from 4H are partially exempt.
Parents are key in implementing prevention strategies.

Tips for Parents to improve safety

- Do not allow children to work unsupervised.
- Inspect farm for hazards.
- Equip barn, pens, storage areas with latches to prevent first aid and CPR.
- Always turn equipment off, lower hydraulics and
- Do not expose children to grain bins.

Assessment Information for Professionals

- Ask parents about environment, farm work
- Inform of risks
- Assess injury prevention strategies
- Encourage implementation of safety standards such as Roll Over Protective Structures for tractors.
- Encourage parents to have a separate play area away from work.
- Pool childcare with other farmers.
- Limit access to large animals.
--Prohibit extra riders on equipment.

Developmental Stage, Risk, and Safety Tips

- Toddler/Preschooler
  - Unable to understand cause and effect relationships.
  - Fascinated by movement or moving parts.
  - May love to climb or Curious.

- Early School Age (5-8)
  - Developing use of logic.
  - Wants to appear competent.
  - Wants approval.
  - Not aware of realistic dangers.

- Older School Age (9-13)
  - Strong need for peer acceptance.
  - Relies on adult authority.

Developmental Stage, Risks, and Safety Tips

- Older School Age (10-13)
  - Greater physical and mental skills.
  - Development may cut short mental or emotional maturity.
  - Wants social and peer acceptance.
  - Wishes to practice new skills without constant adult supervision.

- Adolescent (13-18)
  - Desire to experiment.
  - Strong need for peer acceptance.
  - Relies on adult authority.

- Grains Bin Entrapment

Grain bin entrapment occurs when an individual becomes submerged in grain.

There are three types:

1. Flowing grain: Grain on the surface is frozen together and forms crust that an individual can fall through.
2. Grain bridge collapse: Grain in a bin flows downward from top center, creating a funnel effect.
Grain Bin Entrapment

3. Vertical Grain Wall Avalanche:
Grain cakes against bin wall and can dislodge like an avalanche.

**Injury Prevention and Grain Bins**
- Warn others of dangers of flowing grain
- Place warning decals around grain storage
- Do not stand on grain surface
- Use a pole to free grain bridge while standing on roof
- Manage grain to avoid formation of bridges/walls of grain

If teens must work in a grain bin, they should be securely tethered and have someone strong enough standing by to help them exit.

Grain Wagon Entrapment

**MAJOR RISK** for young children
- Grain in hopper wagon looks like a fun place to play
- May even be playing 'hide & seek' in wagon so
- Once grain flow begins the child becomes trapped in seconds
- Gasping for air, grain is sucked into airway, death can result very rapidly

Two children learning the danger of flowing grain using a model wagon.

The doll in the flowing grain is quickly submerged, showing the dangers of flowing grain.

Grain Bin Entrapment

Most effective way to prevent grain bin entrapment in children is to ensure that they do not have access.
- Entrances should be locked
- Warn children of dangers of drowning in grain
- Maintain separate play area away from farm equipment such as grain bins and wagons
- Teach children about farm safety. Look into resources such as local chapters of Farm Safety 4 Just Kids (see For More Information page)
15 Steps to Improving Farm Safety

The National Ag Safety Database

1. Do not allow children as extrariders on equipment.
2. Do not permit kids to operate machinery.
3. Leave any equipment that might fall in the down position.
4. When machinery is parked, brakes should be locked and keys removed from the ignition.
5. Always leave a tractor PTO in neutral.
6. When moving machinery, know where the children are.
7. Maintain machinery in good repair.
8. Do not permit kids to operate machinery.
9. Fence farm ponds and manure pits.
10. Place fixed ladders out of reach.
11. Shield dangerous components and electrical boxes/wiring, place out of reach of children.
12. Store chemicals and pesticides in a locked area.
13. Place warning decals on all grain bins, wagons and trucks.
14. Maintain lights/reflectors for all equipment used on roads.
15. Devote a day to family safety instruction and rules.

Sources


For More Information

The Safe Kids Organization
www.safekids.org

Farm Safety 4 Just Kids
www.fs4jk.org

- Great source of educational material for kids/adults
- Local chapters in Indiana