Journal of Agromedicine
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/wagr20

Farm Safety Education in New York Mennonite Schools

James Carrabba MS [a], Sherry Wyckoff BS [a], Melissa Scribani MS [a], Paul Jenkins PhD [a] & John May MD [a]

[a] New York Center for Agricultural Medicine and Health, Cooperstown, New York, USA

Version of record first published: 25 Jun 2012.

To cite this article: James Carrabba MS, Sherry Wyckoff BS, Melissa Scribani MS, Paul Jenkins PhD & John May MD (2012): Farm Safety Education in New York Mennonite Schools, Journal of Agromedicine, 17:3, 338-344

To link to this article: http://dx.doi.org/10.1080/1059924X.2012.686387

Journal of Agromedicine, 17:338–344, 2012

ISSN: 1059-924X print/1545-0813 online
DOI: 10.1080/1059924X.2012.686387

Taylor & Francis
Taylor & Francis Group

Farm Safety Education in New York Mennonite Schools

James Carrabba, MS
Sherry Wyckoff, BS
Melissa Scribani, MS
Paul Jenkins, PhD
John May, MD

ABSTRACT. This intervention delivers agricultural safety information to Mennonite youth, grades 1 to 8 in their schools. The purpose is to reduce injuries in the Groffdale Conference, an Old Order Mennonite community in Yates County, New York. The New York Center for Agricultural Medicine and Health (NYCAMH) assisted community members to create an appropriate farm safety presentation for Mennonite children. A vital aspect of this approach is that members of the Old Order community are the educators who are delivering the information in a culturally appropriate manner. As an outside organization, it is unlikely that NYCAMH would have access to this population to directly deliver youth farm safety education.

KEYWORDS. Child safety, farm safety, Old Order Anabaptist

INTRODUCTION

Every year agriculture is ranked as one of the more dangerous industries in the United States in terms of the rate of fatalities and injuries that occur.[1] Despite significant changes in farming, family farms continue to be a large component of American agriculture. A unique aspect of these family operations that makes them different from other industries is the presence of children and families who live, work, and play in the middle of these busy worksites. Often these children perform work activities at an early age. This is particularly true in Old Order Anabaptist communities, where farming is a major component of the culture. Historically, Old Order Anabaptist communities, which include Amish and Mennonites, have been inseparably tied to agriculture.[2] The term "Old Order" generally refers to conservative Anabaptist groups that dress plainly, use horse drawn transportation, and, in some cases, may not utilize mainstream agricultural technology.

James Carrabba, Sherry Wyckoff, Melissa Scribani, Paul Jenkins, and John May are affiliated with the New York Center for Agricultural Medicine and Health, Cooperstown, New York, USA.

The authors would like to thank the Yates County Emergency Management Program and the Yates County Injury Prevention Coalition for their assistance with this work. This work was funded by the National Institute for Occupational Safety and Health, The Northeast Center for Agricultural Health, contract grant number: U50OH007542-06.

Address correspondence to: James Carrabba, MS, Agricultural Safety Specialist, New York Center for Agricultural Medicine and Health (NYCAMH), One Atwell Road, Cooperstown, NY 13326, USA (E-mail: jcarrabba@nycamh.com).

The Groffdale Conference, which migrated to New York from Pennsylvania in 1972,[3] is one of the larger Old Order Mennonite groups in New York. Currently, their population is composed of 470 households with five churches and 31 schoolhouses.[4] Primarily located in Yates County, the Groffdale conference also extends into small sections of Ontario, Steuben, and Schuyler counties.[4] The majority of the families make their living by farming, using tractors with steel wheels, and using horse drawn vehicles and bicycles for transportation. Members of the Groffdale Conference are sometimes referred to as "horse and buggy Mennonites" or "team Mennonites" because their horse and carriage form a team that provides transportation.[3] Approximately 75% to 80% of families in the Groffdale Conference operate small dairy farms, of around 100 acres with approximately 45 milk cows. Of the 225 dairy farms in Yates County, 200 of them are operated by Mennonite families.[3] There is usually no hired labor, with all farm work being performed by family members.

In recent years, several incidents have raised concern about the safety of children who live on farms in the Groffdale community. To address the concerns of the entire community and of state agencies, an intervention aimed at delivering agricultural safety education to Mennonite youth in their one-room schoolhouses was developed. Using a community participatory research model, community members and staff from the New York Center for Agricultural Medicine and Health (NYCAMH) created a culturally appropriate program for Mennonite children who attend school in the Groffdale Conference.

A prominent member of the Groffdale community joined with three other adults to form the "Yates Farm Safety Education Committee" (YFSEC). The intent of the YFSEC was to deliver farm safety education within their schools, which are one- or two-room houses attended by students in grades 1 through 8. The group wanted to deliver this safety education themselves (not have it delivered by outsiders), and they initially sought help from the Yates County Injury Prevention Coalition to create an appropriate curriculum. In turn, the Yates County Injury Prevention Coalition referred the YFSEC to NYCAMH for technical assistance in producing the educational materials that they would eventually use (personal communication; K. Swarthout, Deputy Director, Yates County Public Health Nursing Services, member, Yates County Injury Prevention Coalition, 2008).

Staff from NYCAMH began meeting with the YFSEC in November 2008 to collaboratively design the educational program. The plan that emerged included the educational program that was to be delivered by the members of the YFSEC, as well as an evaluation of this training program to be conducted by NYCAMH. Additionally, NYCAMH collaborated with members of the YFSEC to plan and deliver the first "Yates County Farm Safety Day" on August 21, 2010, which drew close to 400 participants. The YFSEC plans to hold the Yates County Farm Safety Day every other year.

METHODS

In accordance with NYCAMH's community-based approach, community members play the decisive role in framing topics and delivery of the intervention.[5] This Mennonite community and associated health agencies steered the project and administered the materials, whereas NYCAMH provided technical advice and formal evaluation strategies.

Three of the YFSEC members have an agricultural background. A fourth person, who is a non-Mennonite, assisted with the efforts by providing logistical support, but did not deliver instruction in the classrooms. The group decided that the safety education would be best delivered in the Groffdale Conference schoolhouses, each of which contains approximately 20 students. The program was presented to approximately 10 schools per year over a 3-year period, eventually reaching approximately 600 students. The educational sessions were delivered each year in the months of January and February. Before the presentations started each year, the three members of the YFSEC who presented the training session would practice delivering

it, so that they would feel comfortable with the material and ensure that the delivery was uniformly presented. The YFSEC estimates that approximately 75% to 80% of the students at their schools live on farms. The remaining students who do not live on farms will visit farms owned by relatives and neighbors farms, so the entire student population is potentially exposed to agricultural hazards.

The educational sessions were designed to be about 1 hour long and cover a variety of topics during each session. Parents and other family members were invited to the educational sessions at each school. The YFSEC kept track of the number of nonstudents (adults, older youth, youth under 5 years of age) present at each educational session. The nonstudents who were present at the training sessions were not included in the program evaluation. Topics covered included tractor safety, prevention of tractor runovers, extra riders on tractors, power-take-off (PTO) dangers, skid steer safety, playing only in safe areas, staying out of pastures and cow lots, lawn mower safety, and not riding in gravity wagons or playing in grain bins. The YFSEC selected these topics because in the past children from this community have been involved in incidents related to these topics, and also because these are common hazards found on most farms in this community. NYCAMH safety educators observed the YFSEC present selected training sessions.

The focal point of the educational sessions was a 23-page flip chart. The YFSEC chose materials that were simple and conveyed the message in an age- and culturally appropriate style. The flip chart used materials from NYCAMH safety presentations, *Careful Country* farm safety coloring book,[6] and farm safety coloring pictures that were provided by a farm safety educator from Lancaster, Pennsylvania. (NYCAMH will be making this flip chart available online through their "www.nycamh.com" Web site.) In addition to the flip chart, the YFSEC also used demonstrations with toy tractors, a tilt board, a toy skid steer, and a toy gravity wagon. They used the toy gravity wagon along with two toy figures and popcorn to demonstrate the hazards of flowing grain and grain wagons. Reaction timer cards (where students try to catch the card as it falls) were used to demonstrate normal reaction times and the hazards of rotating machinery.

Each student also received farm safety materials to take home and share with their families. The materials included a *Careful Country* coloring book, a pencil with "Think Safety" printed on it, and six NYCAMH farm safety informational brochures. The topics of the NYCAMH brochure included mechanical hazards, tractor safety, PTO safety, respiratory protection, use of personal protective equipment, and upright silo hazards. As a gift, each school received a farm safety board game called, *Amos and Sadie's Farm: A Pathway to Safety*, which is an interactive board game that teaches farm safety in a culturally acceptable way to both Old Order Mennonite and Amish populations. The game was co-created by researchers from the School of Nursing at Penn State's College of Health and Human Development, the Lancaster County Safe Kids Coalition, and staff from the Strasbourg-based Clinic for Special Children.[7]

With input from the YFSEC, NYCAMH developed a graphically based pre-/post-evaluation tool to assess the effectiveness of the program. Due to the wide range of ages present in these schools (ages 5 through 14), it was decided that the evaluation should be pictorially based. The evaluation used a separate-sample pretest-posttest design, where each year half of the participating schools were evaluated before receiving the program (pre), and the remaining schools were evaluated after the program (post).[8] This method was chosen to avoid having to administer both a pre- and post-evaluation at each session. The YFSEC was opposed to administering a pre- and post-evaluation at each training session due to time constraints.

The evaluation tool used hand-drawn pictures of farm scenes that corresponded to information that was delivered in the educational sessions. Each student was instructed to circle the safe scenes and to put an "X" on the unsafe scenes. There were also several blank lines below each picture for students in grades 3 through 8 to write a short explanation of why the scene was

safe or not safe. The student's age and gender were recorded. In the first year, the evaluation consisted of 12 pictures. In the second year, two additional pictures related to lawn mower safety were added, because the YFSEC decided to add information related to lawn mowing safety to the presentation in the second year; therefore, these two additional items were added to the evaluation tool. In the third year, the YFSEC asked for the evaluation to be shorter, so it was reduced to eight pictures. The score for a given student's evaluation consisted of the percentage of pictures correctly identified as safe or unsafe. Pictures that were left blank were scored as incorrect.

The pre- versus post-scores were compared across the 3 years using a 2 (pre vs. post) by 3 (2009–2011) by 2 (male vs. female) analysis of variance (ANOVA) model. Gender and age were compared between the pre- and post-conditions using chi-square and *t* tests, respectively. Pearson's correlation was used to test for the relationship between age and score in both the pre- and post-conditions.

In addition to the pre- and post-evaluations, NYCAMH safety educators and the YFSEC members conducted follow-up qualitative evaluations with select schools 1 year after they received the educational program. In a group setting, the students were asked the following questions:

1. How many remembered the farm safety training?
2. What do you remember about the farm safety training you received in school?
3. How many of you talked to your parents about the farm safety training?
4. What part of the training did you discuss?
5. Can someone tell me a specific example of a change that was made at your farm? (Did you or your parents make any changes to work more safely? If yes, what changes were made?)

At the conclusion of the evaluations, NYCAMH safety educators met with the YFSEC to plan for the upcoming educational presentations. Any issues that were discovered in the previous years' sessions were addressed at these meetings.

RESULTS

In the 3-year period from 2009 to 2011, a total of 659 individual students were reached in 28 different schools, with 52% males and 48% females. The mean age of the students was 9.86 years (*SD* 2.34) with an age range of 5 to 14 years. Fifteen schools with 353 students were evaluated before receiving the program (i.e., in the pre-condition). Thirteen schools ($n = 306$ students) were evaluated in the post-condition. No differences were found between the pre- and post-groups with regard to distributions of age or gender. The scores in both the pre- and post-conditions were found to not be significantly correlated with age. There were an additional 377 nonstudents who observed the educational sessions (259 adults/older children and 118 children under 5 years of age).

ANOVA Results

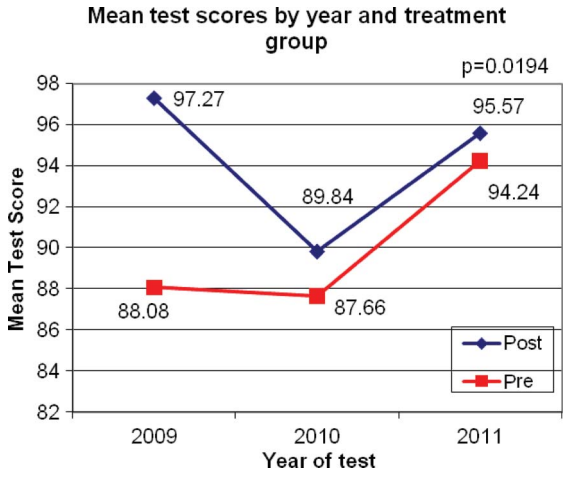
Because the three-way interaction term (pre/post by year by gender) was not significant, the dimensionality of the ANOVA model was reduced by removing the gender variable. The resulting 2 by 3 ANOVA had significant effects for year ($p = .0001$), pre versus post ($p = .0007$), and also for the interaction of these two effects ($p = .0194$). Although the significant main effect for pre versus post showed a favorable overall outcome for the intervention pooled across the 3 years (Table 1), the graphic representation of the significant interaction (Figure 1) showed that the largest difference occurred in year 1 (2009). Also, as shown, this interaction

TABLE 1. Results of 2 × 3 ANOVA for Test Score

Treatment group	Mean score	*p* value
Intervention (post)	94.23	.0007
Control (pre)	89.99	

Note. Main effect of treatment pooled over all 3 years.

FIGURE 1. Plot of mean scores demonstrating interaction between test year and treatment group (color figure available online).



term would be characterized as ordinal, in that the post-condition was favored in all 3 years.

Results of Follow-up Qualitative Evaluations

Approximately 1 year after the training sessions took place, a follow-up qualitative evaluation was conducted to determine what the students remembered from the training sessions, and if they reported any behavior change as a result of the training. YFSEC and NYCAMH staff were able to conduct follow-up evaluations with 7 of the schools from the 2009 training sessions and 12 schools from the 2010 training sessions. Through a qualitative, group discussion format, students were asked what they remembered about the training, what they talked to their parents about, and if any safety improvements were made on their family's farm. This was self-reported only; no visits were made to farms to see if changes had been made. Highlights of important safety messages recalled by students and several key changes made at various family farms are presented in Table 2. YFSEC educators observed that the children recalled more about what was visually demonstrated with the toy models than other topics that did not have an associated demonstration.

TABLE 2. Summarized Results of the Follow-up Qualitative Evaluations

Topic	What children recalled	Changes made to family farm
Tractor	1 seat, 1 rider	No extra riders allowed
	Don't ride on fender	Stopped riding on fender
	Use seatbelts	Stopped standing behind tractor
PTO shields	Don't step over PTO	Don't step over PTO
	Use shields	Added new PTO shields at home (5 responses)
Skid steer	Keep bucket down	Keep bucket down when driving
	Look before you back up	Use seatbelt
	Walk around before you drive	Don't ride in bucket
Grain	Do not ride on gravity wagon	No riding in gravity wagon
	Stay away from grain bin	
Safe places to play	Watch out for cattle	Put fence around manure pit

DISCUSSION

This educational intervention was effective at increasing farm safety knowledge. The most probable reason for this success is that the educational materials were culturally and developmentally appropriate. Another important factor that may have led to the success of this intervention is that the program was delivered by members of the Groffdale Conference community, which helped to ensure that the program was taught in a culturally appropriate manner. NYCAMH's experience with community participatory research projects has found that community member input is essential to developing successful interventions. Additionally, the community provides valuable insights into specific solutions from the design of implements to educational materials. With guidance from NYCAMH, the members of this community truly had ownership over the entire process.

An important aspect of this community participatory research has been building a trusting relationship between the community

and NYCAMH, particularly with this Old Order Mennonite group. The time taken to build that relationship has proven to be a very good investment; NYCAMH has been able to offer its agricultural safety expertise repeatedly to this community, and they continue to turn to NYCAMH for assistance with their educational efforts.

The educational delivery method used a variety of approaches that seemed to be effective. The delivery method utilized a combination of lecture presentation with the flip chart visuals, and instructors additionally used questioning and discussion with the students, and demonstrations with the toy tractors and gravity wagon. The feedback from the follow-up evaluations seemed to indicate that students remembered the most from the demonstrations. It seemed effective to utilize a variety of delivery methods in order to appeal to the different learning styles that the students may have.

Even though the students as a whole had high average scores in the pre-condition (Table 1), this analysis shows there was some knowledge gained from the intervention, which indicates that they are probably receiving some farm safety education at home. There was a varying degree of difference in the pre- and post-evaluation scores each year, with the first-year students (2009) showing the greatest amount of knowledge gain by far. The difference in knowledge gain narrowed in year 2 (2010) and year 3 (2011). In the second 2 years of this project, some of the pictures in the evaluation sheets were modified slightly to be more culturally appropriate and to better match the content of the presentation. Based on the request of the YFSEC, the evaluation tool in year 3 was reduced to eight pictures. They requested that it be made shorter so that it would take less time to administer. According to the YFSEC, in the first 2 years, on average it took approximately 15 minutes to administer the evaluation. In the last year, with the evaluation tool reduced to eight pictures, it took an average of 7 minutes to administer. It is difficult to assess what effect these changes in the evaluation tool had over the course of the 3 years; however, they may well be responsible for some of the variation in scores over the 3 years of the project.

Some changes were made to the program content in year 2 in order to cover lawn mower safety, as many Mennonite youth use walk-behind and riding lawn mowers. Three pages were added to the flip chart addressing lawn mower safety, bringing the total number to 23 pages, which was the only change made to the program content over the 3-year period. Two additional pictures related to lawn mower safety were added to the evaluation tool for year 2, in order to accommodate the change to the presentation content. These changes may also have contributed to some of the differences seen in the yearly scores on the evaluations.

Another measure of success of this project was the large number of people (1036) that received the program, which demonstrates that delivering farm safety training in schools can be an effective method for reaching large numbers of people in this community. Now that the end of the first 3-year cycle has been reached, the content will be modified, and the process will be repeated again in all the Groffdale Conference schools. NYCAMH staff and the YFSEC have already met to begin planning for the next 3 years of training and to determine what the revised curriculum will be. The fact that the YFSEC plans to continue this intervention indefinitely is another good indication of its success and acceptance by the community.

REFERENCES

1. U.S. Bureau of Labor Statistics (BLS), U.S. Department of Labor. *Census of Fatal Occupational Injuries - Hours Based Rates*. 2011. Available at: http://www.bls.gov/iif/oshnotice10.htm. Accessed February 13, 2012.

2. Jones PJ, Field WE. Farm safety issues in Old Order Anabaptist communities: unique aspects and innovative intervention strategies. *J Agric Saf Health*. 2002;8: 67–81.

3. Kraybill DB, Hurd JP. *Horse-and-Buggy Mennonites, Hoofbeats of Humility in a Postmodern World*. University Park, PA: Pennsylvania State University Press; 2007.

4. Sensenig LM. *From the Map: Groffdale Conference, Old Order Mennonites in New York State*. Penn Yan, NY: Executive printing; March 2010.

5. Hawkes L, May J, Paap K, Santiago B, Ginley B. Identifying the occupational health needs of migrant

workers: a preliminary project report. *J Community Pract.* 2007;15:57–76.

6. Indiana Rural Safety and Health Council. *Careful Country. Farm Safety Coloring and Activity Book.* West Lafayette, IN: Purdue University; 2006. Available at: http://cobweb.ecn.purdue.edu/~agsafety/IRSHC. Accessed November 19, 2008.

7. Young J. Playing for safety. *Online Research Penn State*. 2001;22(2). Available at: http://www.rps.psu.edu/0105/safety.html. Accessed February 14, 2012.

8. Campbell DT, Stanley JC. *Experimental and Quasi-Experimental Designs for Research*. Boston, MA: Houghton Mifflin Company; 1963.