

**“Safety for Agricultural Educators”:
Evaluation of an Intervention to Enhance Awareness
of Agricultural Hazards**

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ABSTRACT. Safety for Agricultural Educators (SAGE) is a two-sided fact sheet on agricultural hazards that has been distributed by the New York Center for Agricultural Medicine and Health (NYCAMH) to Northeastern high school agriculture educators over the past six years. It was intended to supplement and stimulate the teaching of safety principles in agricultural education classes and thus enhance the awareness and knowledge of young people working on farms. This paper describes an evaluation of SAGE’s success at achieving these goals. Postal surveys from 29 teachers who had not previously received SAGE gathered data on class demographics and the amount of class time devoted to a variety of agricultural topics including tractor operation and agricultural health and safety. Teachers were asked to assess their students’ awareness of safety and health issues and also to estimate the number of students working in the farm environment. Following a year of SAGE mailings, the same information was gathered from the 24/29 post-SAGE responders. Comparison of pre-post responses from the 24 matched responding educators showed: limited increase in the teachers’ knowledge of basic agricultural safety information; a decline in the amount of class time devoted to health and safety; a marginal increase in estimated student awareness of health and safety and very little evidence of teacher awareness of SAGE as a safety resource. Most notable was the fact that only 8% of all students were currently working on a farm and teachers estimated that only 6% would be working on farms in five years. [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <<http://www.HaworthPress.com>> © 2005 by The Haworth Press, Inc. All rights reserved.]

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INTRODUCTION

Injuries to children and adolescents in the agricultural workplace continue to represent a significant public health problem.^{1,2} Analysis of injury surveillance data from the New York State Occupational Health Nurse in Agricultural Communities project has recently emphasized the magnitude of this problem in NY. Over the six years studied, a total of 29 deaths and 135 non-trivial injuries were documented.³

A number of interventions aimed at either enhancing knowledge and awareness or instituting administrative controls have been attempted. Some efforts, most notably the North American Guidelines for Children's Agricultural Tasks, have been aimed primarily at the parent.⁴ Other efforts have specifically targeted the young worker or observer in the farm work site. These include farm safety day camps, tractor certification classes and others. Depending in large measure upon their stated goals, these efforts have met with varying success.^{5,6} In general, there is considerably more evidence of successful improvement in worker knowledge than actual reduction in injuries.⁷

Some of these efforts have specifically targeted adolescent workers by utilizing the high school agricultural education programs available in many rural school districts. Results of these efforts have been mixed. One such program, The Agricultural Disability Awareness and Risk Education (AgDARE) project did not actually rely upon agricultural educators, but did use their classes as a setting for training provided by public health nurses. This project significantly enhanced the students' attitude toward farm safety as it related to disability awareness, but not as it related to injury prevention. Measurable differences in students' stage of change regarding farm work practices were documented.⁸ Another project, "Partners for a Safer Community," was organized in collaboration with local agricultural education classes through the national FFA. A recent evaluation of this program found no evidence of meaningful effect.⁹ Other previous work suggests that a sizable proportion of teachers do not personally adhere to safe operating practices and that most teachers view education rather than hazard abatement as the preferred method of reducing injuries to young operators.^{10,11} Despite

these mixed results, the high school agricultural education system remains an appealing approach to this group of high-risk workers.

While the impact of increased knowledge alone on safety behaviors is likely limited,¹² we felt that an efficient, low-cost methodology capable of reaching a high concentration of youth working on farms might be justified. Safety for Ag Educators (SAGE) grew out of a series of interviews and group discussions with members of the New York State Association of Agricultural Educators. Educators expressed virtually no interest in NYCAMH-developed lesson plans addressing various farm risk and safety topics. For most teachers, course timeline and lesson plans were well established and they were unlikely to change this by insertion of entire new lessons. As has been documented in other states, these teachers did express an interest in current safety information that could be inserted into existing instructional units.¹⁰ With input from an advisory board of high school agriculture teachers, a series of 22 colorful, two-sided (part text and part outline) information sheets were developed. These were mailed quarterly to more than 700 agricultural educators in 13 Northeastern and Middle Atlantic states over a period of five years. Each illustrated sheet addressed a single topic, providing an overview of the injury epidemiology, describing the nature of the hazard, suggested approaches to hazard abatement and a list of additional resources on the topic. Mailings were often supplemented with posters or overhead transparencies. Topic selection was based upon data from NYCAMH and other sources on the leading causes of youth farm injury and upon seasonal considerations.

Feedback was scant but generally ranged from positive to enthusiastic. Most of this derived from self-addressed postcards soliciting comments and topic suggestions that intermittently accompanied the SAGE mailings. After several years, a formal evaluation of SAGE using a postal questionnaire was undertaken. The questionnaire response rate was slightly more than 20% and persistent efforts to contact a sample of non-responders by telephone were largely unsuccessful. This report describes a second effort to assess the effect of quarterly SAGE mailings upon agricultural safety instruction practices of the teachers. Addition-

ally, we gathered demographic information on their classes and asked teachers for estimates of the hazard knowledge and awareness of their high school students.

METHODS

The SAGE mailing list was assembled from the annual membership lists of the associations of agricultural educators of the various Northeastern and Middle Atlantic states. For the purposes of this study, a separate list was compiled from each state's department of education listings of teachers of agriculture. This 2002 list was reviewed, comparing it to the SAGE mailing list. One-hundred-eight educators who had not previously received SAGE were identified prior to the beginning of the school year. A one page, 20-question form was sent to each with an offer of a \$50 gift certificate for a book for the classroom. Over the ensuing school year each responder was sent the regular quarterly SAGE mailings. A second, identical questionnaire was sent to all responders at the end of the school year—again with an offer of a gift certificate for completion of the questionnaire. Those who failed to respond to the end of year survey were sought by telephone to complete the survey.

The survey questionnaires sought information on the number of students in the teachers' classes, the proportion of these currently working on a farm and the number estimated to be working in agriculture in five years. Questions assessed the teachers' knowledge of agricultural safety and explored the amount of class time devoted to key safety issues. To minimize potential for bias, an effort was made to mask the health and safety intent of the survey. To do this, questions of interest were interspersed among eight similarly structured questions about instruction on watershed management, financial issues, biological issues, etc.

RESULTS

Our review of mailing lists identified 108 educators without prior SAGE mailings. All of these were contacted for participation in the pre-school year survey. Twenty-nine teachers (24%) responded to this initial questionnaire.

Each of these responders was contacted for the end of year survey. Twenty-four of the 29 eventually responded, giving us the 24 pre-post SAGE pairs that were used for this evaluation.

There was wide variability in the total number of students per teacher, ranging from 7 to 425 with an average of 86.4 ± 100.4 students. The total number of students encompassed by the survey was 2075. Of these, an estimated 170 students (8% of total) were described by the teachers as currently working on a farm. Again, there was considerable variability (0-40 students) with each teacher having an average of 7.1 students currently working on a farm. Teachers estimated that 120—an average of 5 students per teacher (5.8% of all students)—would be working on farms in five years (Figure 1).

Prior to receiving SAGE mailings, the teachers estimated that 11% of class time was spent discussing safe tractor operation. This percent was unchanged after a year of SAGE mailings. Teachers described spending an average of 15.4% of class time on all agricultural health and safety issues. In the post-SAGE survey, this estimate had fallen to 9.6% of class time (Figure 2). Teachers rated their students' awareness of agricultural health and safety issues on a scale of 3 (quite aware) to 1 (unaware). Following a year of SAGE mailings, the teachers' estimation of their students' health and safety awareness improved from an average of 2.0 to 2.3.

FIGURE 1. Demographics of the 2075 agriculture students. Numbers of students on farm now and five years from now are estimated by their respective agriculture teachers.

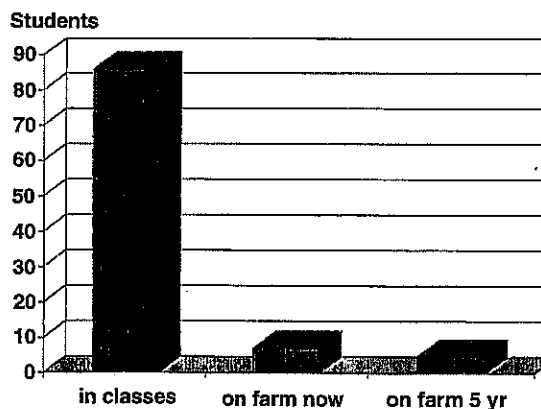
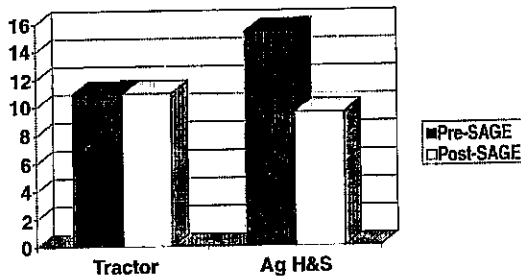


FIGURE 2. The impact of SAGE mailings for one year upon the amount of class time devoted to safety-related topics.



When asked about their usual resources for safety and health information, 20 teachers responded listing textbooks, pre-existing curricula, Internet, extension or state university sources, and other resources. None mentioned SAGE. Following a year of mailings, one specified SAGE and another mentioned "fact sheets." Otherwise, the list of resources was largely unchanged.

Only 30% of the educators knew that the farm tractor is the leading cause of occupational fatality in agriculture in the pre-test. Following a year of SAGE mailings, this had improved to 45%. Forty-one percent correctly identified the leading cause of injury with a rise to 60% by the end of the SAGE year.

DISCUSSION

The goal of this evaluation was to determine the impact of regular SAGE mailings upon the knowledge of high school agricultural educators and upon their behavior regarding safety education in their classes. The underlying assumption was that high school agriculture classes would provide efficient access to a concentration of adolescents at risk of farm-related injuries. We also assumed that agricultural educators would embrace a convenient new source of current safety information specifically designed for insertion into existing lesson plans. It appears that neither of these assumptions was justified.

This interpretation of our findings could be debated. It could be argued that the evaluation data actually reflects increased awareness of safety by the teachers. This might now be ac-

companied by heightened recognition on the part of the teachers of the limited amount of class time that they could actually devote to safety topics. In either case, there is no indication that SAGE achieved its goal of substantially enhanced hazard awareness in the young farm workers.

Possible reasons for SAGE's failure might relate to teacher behavior, quality of the SAGE material or failure to gain adequate access to the teachers. A previous study in Texas found that teachers are more likely to insert safety information in existing instruction units than devote lessons solely to health and safety.¹⁰ This was confirmed in our preliminary and subsequent discussions with individual agricultural educators, who repeatedly indicated an interest in greater availability of safety-related materials that could readily be inserted into existing lessons. Based upon the same type of discussions, we have some evidence that SAGE was generally well received by at least some teachers. As noted above, a previous effort at evaluation was frustrated by a low response rate. However, the responses that were received indicated general satisfaction with the format and quality of the SAGE. Additionally, SAGE had been picked up by another of the NIOSH agricultural centers, which found it suitable to reformat with their logo for distribution in their region. For these reasons, we believe that at least part of the problem may have related to gaining access to the teachers. Data reported above indicate that most teachers did not recognize SAGE as a safety resource even after it had been accurately mailed to them for a year. This leads us to suspect that many of the SAGE mailings either may have never reached an educator or may have been discarded without ever being opened. Finally, it must be acknowledged that other studies have found that teachers prefer other formats (video) than that selected for SAGE.¹⁰

Regardless of all these considerations, the most notable discovery in our survey data is that high school agricultural education classes—at least in rural Northeastern and Middle Atlantic school districts—may be largely populated by young people who do not work on farms. Nor, in the estimation of their teachers, are these young people likely to ever work on farms. Limited discussion of this finding elic-

ited little surprise from educators. Apparently non-farm students commonly take these classes for reasons ranging from expanding the general background training for other vocational students to discipline problems. This phenomenon has been noted to a lesser degree elsewhere. The AgDare project described above noted that only three-quarters of their students had "worked on a farm at least once."⁸ The increasing proportion of non-farm students in agricultural education classes has also been noted by the National Research Council, though this was believed to be primarily an urban phenomenon.¹³

This phenomenon may not be seen in other parts of the country. Our data suggest considerable variability in the Northeast, with a few school districts approaching 30-40% of student involvement on farms. In other districts classes tended to be smaller and student exposure to agricultural hazards was considerably less likely.

As with any such study, this evaluation effort suffers from some weaknesses. The most serious here is sampling bias. The group studied was a very small and non-random sample and the teachers (and their classes) are unlikely to be entirely representative of Northeastern agricultural educators. Thus our findings are reflective only of the 24 teachers studied. These teachers were listed with the state departments of education, but were not on the professional organization's mailing list. Clearly many had simply elected not to join the professional organization or had been missed on that mailing list for any of a variety of reasons. We suspect it is not simply that all were new teachers. In fact, the nature of many of their responses leads us to suspect that some were well-established, experienced teachers. Unfortunately our survey did not provide us with information that would indicate to what degree this sample deviates from the population of all Northeastern agricultural educators. Another weakness is that the data gathered were not directly observed and could reflect some self-reporting biases on the part of the teachers. To reduce the potential for biased reporting, we attempted to disguise the safety intent of our survey instrument with a number of similarly formatted questions unrelated to safety. The nature of the teachers' responses suggests that they did not attempt to embellish

their attention to safety and health issues. Clearly, we gathered no information on altered knowledge/awareness directly from the students themselves and thus the teachers' impressions of this issue may have been misleading to some extent.

In reporting these paired pre-post results, we have not undertaken various statistical analyses because we believe that the key findings of our evaluation are quite evident. Foremost among these is that in our region high school agricultural education classes may not be an effective way to access adolescents working on farms. Additionally, the 24 responding teachers appeared to be poorly versed in basic agricultural safety and this improved only somewhat following a year of SAGE mailings. Finally, our SAGE mailings neither increased instruction time devoted to safety issues nor substantially enhanced student awareness of agricultural hazards as perceived by their teachers.

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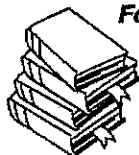
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