Journal of Extension

Volume 55 | Number 1 Article 16

2-1-2017

What Influences Farmers to Use Farm Safety and Health Information?

Shari Burgus

Ellen Duysen
University of Nebraska

Mary Wendl
University of Nebraska

Journal of Extension
www.joe.org

February 2017
Volume 55
Number 1
Article # 1RIB5
Research In Brief

What Influences Farmers to Use Farm Safety and Health Information?

Abstract

Farm safety and health outreach professionals can more effectively develop, design, package, and deliver pertinent educational messages if they understand farmers' preferences regarding how such messages are presented. Farmers were surveyed about what influences their use of safety and health educational resources. Responses indicated farmers' preferences and perceptions related to wording, images, elements that encourage or discourage use of materials, and lengths of resources. Among the significant results were findings that images reflective of farm operations similar to their own and nontechnical terminology would increase farmers' use of resources. Results provide Extension educators with research-based data that can guide their preparation of impactful farm safety and health materials.

Shari Burgus
Education Director, Farm Safety for Just Kids
Urbandale, Iowa
shari@farmsafetyforjustkids.org

Ellen Duysen
Coordinator, Central States Center for Agricultural Safety and Health
College of Public Health
University of Nebraska Medical Center
Omaha, Nebraska
ellen.duysen@unmc.edu

Mary Wendl
Evaluation Coordinator, Central States Center for Agricultural Safety and Health
College of Nursing
University of Nebraska Medical Center
Omaha, Nebraska
mary.wendl@unmc.edu

Introduction

The U.S. Cooperative Extension System has adapted to changing times and landscapes, although rural America remains a major focus of the work conducted by Extension professionals. Of course, farmers make up a large proportion of the rural population, and farming has its risks. Examples of agricultural health concerns include lung damage resulting from dust exposures and hearing loss due to exposure to noisy farm equipment. Moreover, agriculture continues to have one of the highest fatal injury rates of any U.S. industry sector, with 22.2 fatal injuries occurring per 100,000 workers in 2013 (U.S. Bureau of Labor Statistics, 2014). These high rates persist as farmer demographics continue to evolve.

As farmer demographics change so do the methods used to relay farm safety and health information. For farmers and their families to use information and adopt safe behavior and attitude changes, they must accept educational resources and materials as useful tools. Researchers have found that various farmer characteristics are associated with preferred information sources. For example, a study of the preferred information sources of cotton farmers revealed that users of Extension resources tended to be younger, have

larger farms, have higher incomes, and rent larger proportions of land as compared to other groups (Velandia et al., 2010). Other studies have shown that highly educated, younger farmers were more likely to use a variety of information sources (Jensen, English, & Menard, 2009) and that female farmers prefer interactive, hands-on education and educational opportunities in multiple formats (Barbercheck et al., 2009). Farmers' characteristics also are correlated with their perceptions of a particular information source (Ngathou, Bukenya, & Chembezi, 2006). Additionally, when addressing risk and farm injury prevention, it is important to use communication strategies that motivate people to take action (Hutcheson, 1999). For these reasons, farmer perceptions and practices need to be taken into account by those who develop, design, package, and deliver farm safety educational programs (Seiz & Downey, 2001).

We conducted a survey to determine how best to reach farmers with farm safety and health information and to determine whether farmer demographics affect preferences about and use of educational safety resources. The survey results can assist Extension staff and other educators in appropriately selecting, using, and distributing safety and health information for particular end users. Although the survey focused on farm injury prevention and farm health resources, the results may be applicable in addressing other issues with farmers.

Methodology

This article details the results from a cross-sectional study administered via a survey sent electronically and through postal mail to adult midwestern farmers. The target population was selected from the focus regions of the Central States Center for Agricultural Safety and Health (CS-CASH), a center funded by the National Institute for Occupational Safety and Health (NIOSH). Postal addresses were obtained from past program encounters. The email list was obtained from a Twitter feed of midwestern farmers and the Farm Safety for Just Kids email data bank. Several entries came from outside the Midwest. For the electronic surveys, one survey per email address was sent; for the mailed surveys, one per household was sent. The study was given a waiver of consent and exemption determination from Pearl IRB.

The survey was one part of a 5-year NIOSH-funded project that involved a variety of data collection methods comparing various farmer populations to determine what safety and health resources were needed and how best to reach different groups. In particular, the aims included identifying farmer preferences for safety and health material format, type, and length and comparing associated demographic differences. Identified educational resources were to be pilot tested and distributed to various farm audiences.

Our researcher-designed survey instrument addressed educational resource preferences among midwestern farmers. The survey was pilot tested with a small target group, and group members' suggestions were incorporated into the final survey instrument. Dillman techniques, such as including a self-addressed stamped envelope to maximize response rates, were followed (Dillman, Smyth, & Christian, 2014). The 15-question survey included demographic questions related to state of residence, gender, age, number of children in the household, farm work status (full or part time) or retirement status, percentage of income from farming, organic status, and livestock production status. Other survey questions were about preferences and perceptions related to injury prevention information delivery strategies and educational resources and addressed aspects of educational materials such as wording, visual images, presentation of injury prevention strategies, factors that encourage and discourage use of safety and health information, and preferred resource length.

Surveys were first disseminated via postal mail (*n* = 366), with a low response rate, and then electronically (*n* = 11,507). The surveys distributed via the two types of delivery modes had the same questions and format.

Data were analyzed through the use of SPSS (IBM, Armonk, NY). Descriptive statistics were used for summarizing the characteristics of respondents and examining the distribution of responses. Responses were coded, and analysis of variance was performed. Post hoc comparisons were completed for groups with significant analysis of variance *F* values.

Results

The overall survey response rate was 1.5% (178/11,873), resulting in 178 surveys with usable data. The response rates corresponding to the different delivery modes were 11.2% (41/366) for the mailed surveys and 1.2% (137/11,507) for surveys sent electronically.

Survey respondent demographic information is shown in Table 1.

Table 1.

Survey Respondent Demographics (*n* = 178)

Characteristic	No. (%)
State of residence	
Iowa	32 (18.0)
Minnesota	30 (16.9)
Nebraska	27 (15.2)
North Dakota	20 (11.2)
South Dakota	20 (11.2)
Missouri	16 (9.0)
Kansas	14 (7.9)
Non-midwestern state	19 (10.7)
Gender	
Male	83 (46.6)
Female	95 (53.4)
Age range (years)	
≤35	23 (13.0)[a]
36–55	72 (40.4)[b]
≥56	83 (46.6)[b]
At least one person with off-the-farm employment	107 (60.1)

Retired from farming	16 (9.0)
Full-time farmer	75 (42.1)
Livestock producer	117 (65.7)

Note. *a* is significantly different from *b* ($p \leq .03$).

Table 2 summarizes the responses from farmers regarding their preferences related to wording and images in safety and health educational resources, their perceptions about understandability of injury prevention strategies presented, and factors that encourage or discourage their use of safety and health educational resources.

Table 2.

Influences on Farmers' Use of Farm Safety and Health Resources (n = 178)

	Gender		Full-time or part-time farmer		Retirement status		Income % from farming			Livestock farmer	
Factor/element	**Male**	**Female**	**Full-time**	**Part-time**	**Yes**	**No**	**1%–25%**	**26%–75%**	**76%–100%**	**Yes**	**No**
What wording should be used when designing safety and health resources? (Participants were asked to mark their top choice.)											
Technical terms so it is accurate	2 (2.4%)	3 (3.2%)	2 (2.7%)	3 (2.9%)	1 (6.3%)	4 (2.5%)	2 (8.3%)	1 (1.3%)	1 (1.3%)	4 (3.4%)	1 (1.6%)
General terms so it's easy to understand	43 (51.8%)	52 (54.7%)	40 (54.8%)	58 (55.2%)	6 (37.5%)	91 (56.2%)	11 (45.8%)	48 (60.8%)	37 (49.3%)	70 (59.8%)[c]	27 (44.3%)[d]
Simple terms so even youth can understand	38 (45.8%)	40 (42.1%)	31 (42.5%)	44 (41.9%)	9 (56.3%)	67 (41.4%)	11 (45.8%)	30 (38.0%)	37 (49.3%)	43 (36.8%)	33 (54.1%)
What visual images are best when designing safety and health resources? (Participants were asked to mark all that apply.)											
Photographs	38 (29.0%)	46 (32.9%)	37 (31.6%)	45 (29.2%)	8 (29.6%)	75 (30.7%)	7 (23.3%)	36 (28.3%)	40 (35.1%)	58 (33.1%)	26 (27.1%)
Drawings	19 (14.5%)	17 (12.1%)	19 (16.2%)	19 (12.3%)	4 (14.8%)	33 (13.5%)	5 (16.7%)	19 (15.0%)	14 (12.3%)	24 (13.7%)	14 (14.6%)
Cartoons	9 (6.9%)	11 (7.9%)	11 (9.4%)	11 (7.1%)	2 (7.4%)	19 (7.8%)	1 (3.3%)	11 (8.7%)	10 (8.8%)	13 (7.4%)	7 (7.3%)
Combination of photos, drawings, and cartoons	65 (49.6%)	66 (47.1%)	50 (42.7%)	79 (51.3%)	13 (48.1%)	117 (48.0%)	17 (56.7%)	61 (48.0%)	50 (43.9%)	80 (45.7%)	49 (51.0%)

What visual images are best when designing safety and health resources? (Participants were asked to mark all that apply.)

Suggest realistic strategies	57 (27.9%)	59 (26.5%)	47 (28.0%)	70 (27.0%)	10 (23.3%)	107 (27.9%)	15 (25.4%)	54 (27.1%)	47 (27.8%)	83 (28.9%)	34 (26.4%)
Suggest easy-to-use strategies	57 (27.9%)	59 (26.5%)	42 (25.0%)	74 (28.6%)	11 (25.6%)	105 (27.3%)	15 (25.4%)	53 (26.6%)	48 (28.4%)	80 (27.9%)	36 (25.7%)
Directed toward youth and children	50 (24.5%)	58 (26.0%)	44 (26.2%)	64 (24.7%)	12 (27.9%)	96 (25.0%)	17 (28.8%)	49 (24.6%)	42 (24.8%)	68 (23.7%)	40 (28.6%)
List protective equipment related to activity	40 (19.6%)	47 (21.1%)	35 (20.8%)	51 (19.7%)	10 (23.3%)	76 (19.8%)	12 (20.3%)	43 (21.6%)	32 (18.9%)	56 (19.5%)	30 (21.4%)

What encourages you to read farm safety and health resources or recommend them to other farmers? (Participants were asked to mark all that

Graphically attractive	31 (17.7%)	47 (23.3%)	26 (18.6%)	51 (21.5%)	10 (31.3%)	69 (20.0%)	11 (23.0%)	39 (21.5%)	29 (19.6%)	53 (21.2%)	26 (20.5%)
Images similar to farming practices	59 (33.7%)	72 (35.6%)	50 (35.7%)	80 (33.8%)	12 (37.5%)	118 (34.2%)	15 (31.3%)	62 (34.3%)	54 (36.5%)	87 (34.8%)	43 (33.9%)
Credible author/sources	27 (15.4%)	26 (12.9%)	20 (14.3%)	34 (14.3%)	2 (6.3%)	51 (14.8%)	9 (18.8%)	25 (13.8%)	20 (13.5%)	37 (14.8%)	16 (12.6%)
Useful prevention strategies	58 (33.1%)	57 (28.2%)	44 (31.4%)	72 (30.4%)	8 (25.0%)	107 (31.0%)	13 (27.1%)	55 (30.4%)	45 (30.4%)	73 (29.2%)	42 (33.1%)

What reasons are most likely to discourage you from using farm safety and health resources? (Participants were asked to mark all that apply.)

Already have information	29 (14.5%)	27 (12.6%)	25 (14.4%)	31 (12.9%)	5 (14.3%)	53 (13.9%)	5 (7.9%)	32 (17.8%)	22 (12.8%)	35 (12.7%)	21 (15.1%)
Would not use information	12 (6.0%)	11 (5.1%)	14 (8.0%)	10 (4.1%)	2 (5.7%)	22 (5.8%)	5 (7.9%)	6 (3.3%)[o]	14 (8.1%)[p]	13 (4.7%)	9 (6.5%)
Too technical	54 (27.0%)	62 (28.8%)	45 (26.0%)	70 (29.0%)	13 (37.1%)	102 (26.8%)	16 (25.4%)	50 (27.8%)	50 (29.1%)	73 (26.4%)	40 (28.8%)
Not technical enough	8 (4.0%)	9 (4.2%)	9 (5.2%)	10 (4.1%)	2 (5.7%)	17 (4.5%)	3 (4.8%)	6 (3.3%)	10 (5.8%)	15 (5.4%)	4 (2.9%)
Juvenile images	24 (12.0%)	23 (10.7%)	16 (9.2%)	30 (12.4%)	3 (8.6%)	41 (10.8%)	9 (14.3%)	16 (8.9%)	18 (10.5%)	34 (12.3%)	12 (8.6%)
Offensive	24	35	22	37	4	55	9	29	20	41	20

images	(12.0%)	(16.3%)	(12.6%)	(15.4%)	(11.4%)	(14.5%)	(14.3%)	(16.1%)	(11.6%)	(14.9%)	(14.4%)
Juvenile terminology	23 (11.5%)	14 (6.5%)	16 (9.2%)	20 (8.3%)	2 (5.7%)	34 (8.9%)	6 (9.5%)	13 (7.2%)	17 (9.9%)	27 (9.8%)	11 (7.9%)
Offensive terminology	26 (13.0%)	34 (15.8%)	27 (15.5%)	33 (13.7%)	4 (11.4%)	56 (14.7%)	10 (15.9%)	28 (15.6%)	21 (12.2%)	38 (13.8%)	22 (15.8%)

Note. a is significantly different from *b* ($p < .001$); *c* is significantly different from *d* ($p = .03$); *e* is significantly different from *f*, *g* ($p \leq .001$); significantly different from *e*, *f*, *g* ($p \leq .01$); *i* is significantly different from *j* ($p = .02$); *k* is significantly different from *l*, *m*, *n* ($p \leq .01$); *l* is si different from *m* ($p < .001$); *m* is significantly different from *n* ($p < .001$); *o* is significantly different from *p* ($p = .01$); *q* is significantly differe *t*, *w* ($p \leq .01$); *r* is significantly different from *u*, *w*, *x*, *y*, *z* ($p \leq .04$); *u* is significantly different from *v*, *w*, *x*, *y*, *z* ($p < .001$); *v* is significantl from *w*, *x*, *y*, *z* ($p \leq .02$); *x* is significantly different from *w* ($p = .01$).

Table 2 indicates that very few significant differences were found when the demographic categories were compared for preferences or perceptions related to wording, images, understandability of strategies presented, and reasons for using or not using educational materials. Among others, the following statistically significant differences were found:

- Livestock farmers were significantly more likely to want materials that were produced using general terms as compared to those who were not livestock farmers.
- Farmers who received 76%–100% of their incomes from farming were more likely not to use information from the educational resources as compared to farmers who received 26%–75% of their incomes from farming.

A number of significant differences were observed when the aggregate (all group) data were analyzed by individual question. When farmers were asked about using farm safety and health educational resources, they expressed the following preferences and perceptions:

- Materials that contained general or simple terminology were preferred over those that contained technical terms.
- Photographs or a combination of photos, drawings, and cartoons were preferred visual images.
- Materials suggesting realistic, easy-to-use strategies and materials directed at youths and children were preferred over materials listing appropriate protective equipment.
- Images depicting familiar farming practices and useful prevention strategies encourage use of resources.
- Content that is too technical, information farmers have received previously, offensive images, and offensive terminology discourage use of resources.

Table 3 shows preferences regarding the lengths of educational materials.

Table 3.

Farmer Preferences Regarding Lengths of Farm Safety and Health Resources

Length of resource	No. (%)
Fact sheet	
1 page or less	117 (65.7%)[a]
1–2 pages	54 (30.3%)[b]
3–4 pages	5 (2.8%)[c]
5 pages or more	2 (1.1%)[c]
Written article or publication	
1 page or less	75 (42.1%)[d]
1–2 pages	83 (46.6%)[d]
3–4 pages	14 (7.9%)[e]
5 pages or more	6 (3.4%)[e]
Videos	
Less than 5 min	85 (47.7%)[f]
Less than 10 min	74 (41.6%)[f]
Any length	19 (10.7%)[g]

Note. a is significantly different from *b* ($p = .01$); *a* and *b* are significantly different from *c* ($p \leq .001$); *d* is significantly different from *e* ($p \leq .01$); *f* is significantly different from *g* ($p \leq .02$).

Table 3 indicates the following preferences related to lengths of educational materials:

- One-page fact sheets were preferred, although two-page fact sheets were also acceptable.
- One- to two-page articles and publications were preferred.
- Videos lasting less than 5 or 10 min were preferred.

Discussion / Recommendations

Our mixed-collection-method study of primarily midwestern farmers yielded a response rate of 11.2% for mailed surveys and 1.2% for emailed surveys. Response rates from electronic surveys are typically quite low as a result of survey fatigue caused by competitive uses of the Internet, possible low interest in a topic, and technology knowledge levels of the recipients (Couper, 2000; Dillman et al., 2014; Petchenik & Watermolen, 2011). Although the overall response rate for our survey was low, results were beneficial in meeting the goal of determining ways to reach farmers in general.

The data indicated that images in resources are better accepted if they portray farming practices typical of a

region and useful prevention strategies. This finding is corroborated by results of a study examining the effectiveness of education directed at a medical intervention, which suggested that the most effective visual images are designed in collaboration with the target population and take into consideration the audience's literacy skills and culture (Dowse, Ramela, Barford, & Browne, 2010). A surprising finding in our study was that few farmers were concerned with the credibility of the author of educational resources, indicating that the characteristics of the message were more important than the authority of the messenger.

The results clearly indicated respondents' preference for nontechnical farm safety and health resources. This is a salient point for safety and health professionals to consider as they produce educational materials. Literacy levels and educationally appropriate communication schemes should be considered when producing materials for a wide range of recipients. A fifth- to sixth-grade reading comprehension level is recommended for health-care patient education materials (Cotugna, Vickery, & Carpenter-Haefele, 2005). Testing to ensure that materials are produced at appropriate comprehension levels for the majority of recipients will result in the greatest usage and acceptance.

Pictures can markedly increase attention paid to health education information, and emotional responses to the pictures affect whether targeted health behavior is increased or decreased (Houts, Doak, Doak, & Loscalzo, 2006). Communicating health literacy information, which has become an important mission, must involve including meaningful visuals and clear actionable messages (Niebaum, Cunningham-Sabo, & Bellows, 2015). One survey question asked about elements or factors that discouraged respondents from using farm safety and health resources. Response options included "offensive images" and "offensive terminology." "Offensive images" referred to negative depictions or stereotypical images. "Offensive terminology" referred to wording that was demeaning or condescending. Effective delivery of safety and health information can require a delicate balance of producing a message that will resonate with the intended audience and not offend any segment of that audience. Additional pilot testing of materials with a target audience could alleviate some of the concern about what is or is not offensive messaging.

Nearly a third of survey respondents indicated that they already had the farm safety and health information they needed. Given this finding, highlighting new concepts and emerging issues may be one way to encourage farmers to use a resource.

Understanding the likes and dislikes of farmers will assist Extension personnel and other injury prevention professionals by increasing their effectiveness in reaching intended farmer audiences. Results from our survey clearly indicated that farmers prefer to receive short and concise written resources and videos. These are important factors to consider when developing educational resources for farmers.

Conclusion

Farmers' opinions related to reading and using farm safety and health resources should be taken into account when producing educational materials. Ways of motivating farmers to use educational resources include using images that closely resemble a target group's farming practices, avoiding terminology that is overly technical, and keeping resources short and concise. Such strategies may work with varied farmer populations as we found few significant differences associated with respondents' preferences when we examined the demographic characteristics of gender, part-time/full-time farmer status, retirement status, percentage of income from farming, and having livestock as a commodity.

References

Barbercheck, M., Braiser, K. J., Kiernan, N. E., Sachs C., Trauger, A., Findeis, J., . . . Moist, L. S. (2009). Meeting the Extension needs of women farmers: A perspective from Pennsylvania. *Journal of Extension*, *47*(3) Article 3FEA8. Available at: https://www.joe.org/joe/2009june/a8.php

Cotugna, N., Vickery C. E., & Carpenter-Haefele, K. M. (2005). Evaluation of literacy level of patient education pages in health-related journals. *Journal of Community Health*, *30*(3), 213–219.

Couper, M. P. (2000). Review: Web surveys: A review of issues and approaches. *The Public Opinion Quarterly*, *64*(4), 464–494. Retrieved from http://www.jstor.org/stable/3078739

Dillman, D., Smyth, J., & Christian, L. (2014). *Internet, mail, and mixed-mode surveys: The tailored design method* (3rd ed.). Hoboken, NJ: John Wiley & Sons.

Dowse R., Ramela T., Barford K. L., & Browne S. (2010). Developing visual images for communicating information about antiretroviral side effects to a low-literate population. *African Journal of AIDS Research*, *9*(3), 213–224.

Houts, P., Doak, C., Doak, L., & Loscalzo, M. (2006).Erratum to 'The role of pictures in improving health communication: A review of research on attention, comprehension, recall, and adherence'. *Patient Education and Counseling* [serial online], *64*(1–3), 393–394. Retrieved from PsycINFO, Ipswich, MA.

Hutcheson, S. (1999). Effective use of risk communication strategies for health & safety educational materials. *Journal of Extension*, *37*(5) Article 5FEA1. Available at: https://www.joe.org/joe/1999october/a1.php

Jensen, K. L., English, B. C., & Menard, R. J. (2009). Livestock farmers' use of animal or herd health information sources. *Journal of Extension*, *47*(1) Article 1FEA7. Available at: https://www.joe.org/joe/2009february/a7.php

Ngathou, I. N., Bukenya, J. O., & Chembezi D. M. (2006). Managing agricultural risk: Examining information sources preferred by limited resource farmers. *Journal of Extension*, *44*(6) Article 6FEA2. Available at: https://www.joe.org/joe/2006december/a2.php

Niebaum, K., Cunningham-Sabo, L., & Bellows, L. (2015). Developing effective educational materials using best practices in health literacy. *Journal of Extension*, *53*(4) Article 4TOT2. Available at: https://www.joe.org/joe/2015august/tt2.php

Petchenik, J., & Watermolen, D. J. (2011). A cautionary note on using the Internet to survey recent hunter education graduates. *Human Dimensions of Wildlife*, *16*(3), 216–218.

Seiz, R. C., & Downey, E. P. (2001). What farm families tell us that can be useful in educating for health and safety. *Journal of Extension*, *39*(6) Article 6FEA5. Available at: https://www.joe.org/joe/2001december/a5.php

U.S. Bureau of Labor Statistics. (2014). *National census of fatal occupational injuries in 2013 (preliminary results).* Retrieved from http://www.bls.gov/news.release/cfoi.nr0.htm

Velandia, M., Roberts, R. K., Martin, S. W., Lambert, D. M., Larson, J. A., Jenkins, A., & English, B. C.

(2010). Precision farming information sources used by cotton farmers and implications for Extension. *Journal of Extension*, *48*(5) Article 5RIB6. Available at: https://www.joe.org/joe/2010october/rb6.php