

Spanish-Speaking Dairy Workers in New York, Pennsylvania, and Vermont: Results from a Survey of Farm Owners

Suzanne G. Stack, BA

Paul L. Jenkins, PhD

Giulia Earle-Richardson, MPH

Susan Ackerman, BS

John J. May, MD

ABSTRACT. A New York Center for Agricultural Medicine and Health (NYCAMH) study surveyed 294 dairy farms in New York, Pennsylvania, and Vermont. The study utilized a quarterly telephone survey to assess the proportion of Spanish-speaking workers on these farms, and also to contrast the hazard level of work tasks and prevalence of lost work time between Spanish- and English-speaking workers.

The total workforce followed in the study was comprised of 14.4 percent Spanish-speaking workers, with larger farms having a higher proportion than smaller farms (19.9% versus 4.6%, respectively). Of the 294 farms, 22.5 percent had at least one Spanish-speaking worker, which differed, greatly between larger and smaller farms (51.5% versus 7.3%).

Spanish workers were significantly younger, worked significantly longer hours and had significantly fewer years of employment than their English-speaking counterparts. Work hour differences were more pronounced on the larger farms. Lost work time, due to on-farm injuries, did not differ between the Hispanic workers and the non-Hispanic workers. After correcting for both age and length of farm employment, Spanish-speaking workers were far less likely to perform managerial functions than their English-speaking counterparts (OR = .22 p < .01). doi:10.1300/J096v11n02_07
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INTRODUCTION

There is a demographic shift occurring across the United States. Currently, approxi-

mately 13.3 percent of the total population, or 37.4 million individuals, are of Hispanic origin.¹ This represents an increase of 4.3 percent over the 1990 level.² Similarly, labor statistics

Suzanne G. Stack, Giulia Earle-Richardson, Susan Ackerman, and John J. May are affiliated with New York Center for Agricultural Medicine and Health, Cooperstown, New York.

Paul L. Jenkins is affiliated with the Bassett Research Institute, Bassett Healthcare, Cooperstown, New York.

Address correspondence to: Suzanne G. Stack, New York Center for Agricultural Medicine & Health, One Atwell Road, Cooperstown, NY 13326 (E-mail: sstack@nycamh.com).

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also indicate that the workforce of the United States is becoming increasingly comprised of people of Hispanic origin, which is attributable to this national demographic shift.^{3,4} As a result Spanish-speaking workers are increasingly seen in jobs traditionally held by individuals whose first language is English.

Evidence, both anecdotal and factual, suggests that the dairy industry workforce is undergoing an analogous shift.⁵⁻⁸ This evidence recognizes that some Spanish-speaking dairy workers remain in the United States year-round, while many return to their native countries annually for a period of months.

Agricultural workers face a number of job hazards in their work, including machinery and animal hazards, as well as general fatigue due to the long hours and physical demands of the work.⁹⁻¹¹ It has been reported that Spanish-speaking dairy workers may be at higher risk for injury than their English-speaking counterparts due to this language barrier, lack of knowledge of dairy work and other social factors related to being foreign workers.¹²⁻¹⁴

Various agricultural agencies and land grant universities have developed culturally sensitive education, translation and training tools for farm owners on how to successfully manage a Spanish-speaking dairy workforce.^{15,16} These resources on improving management practices are in response to the recognized demographic shift in the workforce.

In addition to the creation of materials and trainings, two qualitative surveys were conducted by Cornell University. Combined, these surveys describe the experiences and employment practices of roughly 80 New York dairy farms that employ native Spanish-speaking workers.^{17,18} More specifically, the latter survey¹⁸ subjectively interviewed 111 Spanish-speaking dairy workers on their work experience. However, little data exist on how many native Spanish-speaking workers there are in the dairy industry in the Northeast, how quickly this population is growing and how frequently these individuals are injured. Therefore, from a health and safety standpoint, good reason was recognized for further research on the subject of Spanish-speaking workers in the dairy industry.

The purpose of this study is threefold: to report the proportion of native Spanish-speaking workers employed in the dairy workforce in

New York, Vermont, and Pennsylvania; to contrast the amount of lost work time due to on-farm injury among the Spanish-speaking workers to that of their English-speaking counterparts; and lastly to assess the hazard level of the tasks performed by these two groups are compared and contrasted. These three endpoints are contrasted for both small and large farms.

METHODS

Eligibility Criteria

Dairy farms in New York, Vermont, and Pennsylvania with 60 or more milking stock and at least 30 hours per week (considered to be 1 FTE) of paid dairy labor beyond the owner/operator were eligible for the study. These 30 work hours could be spread over several employees. A farm that did not meet this employment level, but stated an intention to do so, was followed for one year at quarterly intervals. If at any time during those four quarters it was found that the employment criteria were met, the farm was surveyed.

Two strata were identified: small to medium-sized operations (60-299 milking stock) and large operations (300 or more). These strata were established in order to permit contrasts to be made between small and large farms on hiring practices with regard to Spanish-speaking workers. Farms with 60 to 299 milking stock, although considered to be small, were thought to be large enough to require additional FTEs beyond the owner operator that may be filled by Spanish-speaking workers.

Recruitment

The recruitment of farms and administration of the baseline questionnaire occurred throughout 2003 and 2004. An initial mailing was sent to 1,816 farmers in New York and 886 in Pennsylvania via their respective Agriculture and Markets Bureaus. A total of 1,500 Vermont farmers were initially contacted in a similar manner through the Vermont Department of Agriculture. This mailing contained a cover letter from the state's agricultural statistician, a NYCAMH recruitment letter, two letters of

support from state officials, a duplicate consent form and a self-addressed, stamped envelope. Consent forms of participating farmers were returned to NYCAMH through each of these state agencies.

Second and third reminder mailings were sent within each of these three states. The NYCAMH recruitment letters contained in these reminder mailings were revised to reflect feedback from the previous ones. The changes were designed to emphasize that the study concerned both Hispanic and non-Hispanic employees and that employment of a Spanish-speaking worker was not an eligibility requirement.

In order to supplement the sample of farms obtained via the three state agencies, a mailing list of dairy farmers in New York, Pennsylvania, and Vermont was purchased from Northeast Dairy Business. Using this list, recruitment packets were sent to 4,040 farmers. A random sample of 275 non-responders to this mailing received follow-up phone calls, which concentrated on Vermont and Pennsylvania, where the least number of farmers had been enrolled via the state agencies.

After receipt of the consent form, the farm's eligibility was assessed via telephone interview with the farm owner and NYCAMH staff. In addition, farm spouses or administrative staff could also answer the survey questions as long as the person signing the consent form granted them permission to do so. The baseline survey was then administered to all eligible farmers on this same phone call. Study participants were sent a Barlow pocketknife as an incentive for participation.

Survey Instrument

The survey instrument covered four general farm domains: demographics, milking stock, number of employees and hiring practices. In addition, six employee domains were covered: age, average work hours per week, native language, length of employment, main farm tasks, and lost work days due to an on job injury within the past three months.

Job Task Hazard Rating

A panel of four experienced farmers was formed to determine the degree of hazard pre-

sented by each of the main farm tasks. Each farmer rated the task by assigning it one of three (1—not hazardous, 2—moderately hazardous, and 3—extremely hazardous) values. The mean of the four individuals' rating scores was the task's hazard rating used in the analysis (Appendix).

Job Classification

For comparison purposes, the 15 job categories were aggregated into managerial versus non-managerial classifications. The managerial level included management, herdsmen, breeding and computer work. Non-managerial levels included, cleaning, construction, cow care, equipment operator, feeding, field work, general chores, machinery repair, milking cows, raising calves and working with manure.

Statistical Analyses

All statistical analyses were performed using SAS. Categorical variables, such as employing at least one Spanish-speaking worker, were compared between small and large farms using chi-square.

Continuous variables, such as worker age, work hours, and length of farm employment, were found to be approximately normally distributed and were therefore compared between the two ethnic groups using t-tests. In addition, the significance of the inter-ethnic differences in these continuous endpoints was tested between large and small farms using two-by-two analysis of variance.

Categorical variables, such as losing at least one work day due to injury and job classification, were compared between the two ethnic groups using chi-square. Age was controlled for in this comparison by including both age and ethnicity in a multiple logistic regression model to predict loss of at least one work day. In a similar way, both age and length of farm employment were included along with ethnicity in a logistic model to predict managerial job status in order to identify the independent effect of each of these variables.

The mean task hazard rating and the mean number of tasks performed were compared between the two ethnic groups using independent samples t-tests.

RESULTS

The overall response rates to the two recruitment methods (Agriculture and Markets mailings and Northeast Dairy Business mailing plus phone follow-up) differed considerably. The Agriculture and Markets mailings produced only 107 participants from the total of 4,202 letters mailed, a response rate of 2.5 percent. NYCAMH did not have this list of potential study subjects as these were contacted directly by Agriculture and Markets. Therefore, it was not possible to use double sampling methodology, in which a random sample of non-responders would be contacted, in order to increase the representativeness of the sample.

In contrast, the list of potential study subjects for the Northeast Dairy Business mailing was provided to NYCAMH. This permitted a double sampling method to be used. There were 132 affirmative responses from the initial Northeast Dairy Business mailing of 4,040 letters. A random sample of 275 subjects was then taken from the remaining 3,908 non-responders. These 275 non-responders were contacted by telephone resulting in 60 agreeing to participate in the study. Thus, while the overall response rate was low, it is estimated that the double sampling methodology employed for the Northeast Dairy Business subjects provided representation of: $[(132/4040) + (60/275)] \times 100\% = 24.57\%$ of this population.

A total of 101 large and 193 small farms were recruited. The average number of milking stock for the combined sample of 294 farms was 282. This distribution showed strong right skew, with a median of 180. The farms employed an average of 5.1 workers with a median of 3.5. Table 1 shows these study endpoints contrasted between large and small farms.

A total of 66 farms (22.5%) reported employing at least one Spanish-speaking worker. Altogether, these farms employed a total of 217 Spanish-speaking workers, which comprised 14.4 percent of the total study work force of 1,507.

The proportion of farms reporting employing at least one Spanish-speaking worker differed significantly between large (51.5%) and small (7.3%) farms ($p < 0.01$). Similarly, the overall proportion of Spanish-speaking workers differed significantly, with large farms em-

ploying a greater proportion than small farms at 19.9 percent versus 4.6 percent, respectively ($p < 0.01$).

Table 2 contrasts various study endpoints between English and Spanish-speaking workers on smaller farms. As shown, English-speaking workers were significantly older (35.1 versus 26.2, $p < 0.01$), had significantly longer farm employment (8.4 years versus 1.8 years, $p < 0.01$) and worked significantly fewer hours (47.1 versus 52.6 hours, $p = 0.06$) than their Spanish-speaking counterparts.

The direction of the differences for these three endpoints for the large farms, as shown in Table 3, were the same as for the small farms. The age difference was smaller (English = 35.9 years, Spanish = 29.0 years, $p < 0.01$). Tenure differences were very similar to those seen for

TABLE 1. Comparison of milking stock and number of employees on large and small farms

	Large (n = 101)	Small (n = 193)
Milking stock	Mean = 540.8	Mean = 146.7
	Sd = 241.5	Sd = 52.4
	Median = 460	Median = 135
Number of employees	Mean = 9.5	Mean = 2.8
	Sd = 5.2	Sd = 1.7
	Median = 8	Median = 2

TABLE 2. Comparison of English and Spanish-speaking employees on small farms

	Spanish (n = 25)	English (n = 516)	Probability (p)
Age (years)	Mean = 26.2	Mean = 35.1	< .01
	Sd = 8.5	Sd = 13.35	
	Median = 22	Median = 33	
Tenure on farms (years)	Mean = 1.8	Mean = 8.4	< .01
	Sd = 2.7	Sd = 9.8	
	Median = 1	Median = 5	
Hours in work week	Mean = 52.6	Mean = 47.1	
	Sd = 13.0	Sd = 19.9	.06
	Median = 50	Median = 50	

TABLE 3. Comparison of Spanish and English-speaking employees on large farms

	Spanish (n = 192)	English (n = 770)	Probability (p)
Age (years)	Mean = 29.0	Mean = 35.9	< .01
	Sd = 8.9	Sd = 12.6	
	Median = 27	Median = 35	
Tenure on farms (years)	Mean = 1.1	Mean = 5.8	< .01
	Sd = 0.98	Sd = 7.53	
	Median = 1	Median = 3	
Hours in work week	Mean = 61.3	Mean = 47.6	< .01
	Sd = 8.9	Sd = 14.5	
	Median = 60	Median = 50	

the small farms (English = 5.8 years, Spanish = 1.1 years, $p < 0.01$). The difference in weekly hours on large farms (English = 47.6 hours, Spanish = 61.3 hours, $p < 0.01$) was much larger than that seen on small farms.

There was a significant interaction effect for ethnicity by farm-size ($F = 5.37$, $p = 0.02$) indicating that the ethnic difference in weekly work hours differs significantly by farm size.

The rate of workers losing time on the job due to injury for the last three months was higher for English-speaking workers than Spanish-speaking workers on large farms (English = 23.3/1000 versus Spanish = 5.1/1000). This difference approached, but did not reach statistical significance ($p = 0.10$). A smaller difference favoring the English workers (English = 32.9/1000 versus Spanish = 38.5/1000), which was also not significant, was seen on the small farms. Age was not found to be significantly related to the prevalence of lost work time.

Due to the fact that only one Spanish-speaking worker lost time on both the large and small farms, it was not possible to statistically compare the duration of lost time per episode between the two ethnic groups.

Although there was a statistically significant difference in the mean number of tasks performed between English- and Spanish-speaking workers on large farms, this difference was extremely small (English = 1.3 tasks, Spanish = 1.2 tasks, $p < 0.01$). For small farms the number

of tasks performed by each ethnic group was virtually identical at 1.7 tasks.

For both small and large farms, the mean hazard ratings for the tasks performed by the Spanish-speaking workers was significantly higher than the mean for the English-speaking workers, although in both cases, these differences were extremely small. For small farms this difference was Spanish = 2.2 and English = 2.1, $p = 0.02$. Large farms had an identical difference for the two ethnic groups with $p < 0.01$.

None of the 25 Spanish-speaking workers were involved in managerial tasks on small farms versus 14 percent of their English-speaking counterparts. This difference approached significance by Fisher's exact test ($p = .06$). Similarly, on large farms 19.6 percent of English speaking workers were involved in managerial tasks versus only 4.2 percent of Spanish speaking workers. This negative association between managerial status and Spanish ethnicity (OR = .22, $p < .01$) was shown to persist in a logistic regression model (pooled across farm size) that controlled for both age and length of farm employment.

Limitations

The relatively low response rate seen for the study may be a limiting factor in its generalizability. A survey related to hiring and employment practices of persons who may be unauthorized to work would be expected to make some potential subjects uncomfortable and, therefore, the low response rate is not unexpected. The low rate is also not surprising in that other agricultural surveys have experienced similar poor response.¹⁹

Despite this low response rate, the sample covers a wide range of milking stock (62-1500). The average number of employees on the larger farms ($> = 300$ milking stock) was 9.5, which was slightly higher than the New York average for farms with greater than 250 milking stock (6.1).²⁰ This same value was also slightly higher for the sample of farms with less than 300 milking stock (2.8 versus New York average for farms less than 250 milking stock = 2.0). In terms of milking stock, the average value of the sample (283) was comparable to the New York State value of 254.²⁰ While this does not guarantee the representativeness of the sample,

the relatively close correspondence of these demographics is encouraging.

It is also noteworthy that the study includes a wide range in terms of number of employees (1-30). The Census of Agriculture reports that the average number of employees on New York dairy farms is 6.47.²⁰ This number shows reasonable concordance with the mean of 5.1 seen in this study.

It is likely that the low response rate would tend to lead to an underestimate of the proportion of Hispanic workers given that farms with Hispanic employees are more reluctant to participate than those without. Therefore, the estimated proportions of large (51.5%) and small (7.3%) farms employing at least one Hispanic worker are in all likelihood biased downward.

Also of concern is the fact that employers may not be entirely forthcoming with their responses or may be unaware of injury events due to a reluctance on the part of employees to report them. In addition, it is also possible that the employer's knowledge of the employee's age and work experience may be limited and that the employers responses may represent approximations or "best guesses." These problems may be compounded in cases where the employer and employee do not speak the same language.

DISCUSSION

These data show that Hispanic workers now comprise a significant proportion of the dairy workforce in New York, Pennsylvania, and Vermont. This phenomenon is mainly attributable to the larger farms. Therefore, if the trend towards larger farms continues, this overall proportion of Spanish-speaking workers is likely to increase (USDA, 2005).²¹

The significantly longer tenure of the English-speaking workers seen on both the smaller and larger farms may also be an indication that the proportion of Spanish-speaking workers is on the rise. However, this could also be a reflection of increased employee turnover among this ethnic group. A longitudinal study involving these same farms that is currently under way will quantify both the turnover rate and the growth rate.

The younger age of the Spanish-speaking workers may be reflective of the increased need for mobility of individuals who are required to leave their native land for extended periods. This age differential, combined with their significantly shorter farm tenure, clearly shows that they are less experienced than their English-speaking counterparts. These two factors could also be related to the tendency of Spanish-speaking workers to work more hours per week than English-speaking workers.

The minimal difference in the number of tasks performed, and the similarity of the mean hazards ratings shows that the task exposure of the two ethnic groups are similar.

The significantly longer work week of Spanish-speaking workers, combined with their relative lack of experience, suggests that they may be at greater risk for injury than their English-speaking counterparts. This, however, was not borne out by the data in that significant differences in injury rates were not seen.

CONCLUSIONS

Spanish-speaking workers represent a significant proportion of the dairy workforce of New York, Pennsylvania, and Vermont, and this proportion is likely to increase. Although these workers are younger, work longer hours, and are less experienced than English-speaking workers, they do not appear to be at greater risk for injury.

If these English-speaking dairy workers that are being replaced by Spanish-speaking workers are the heirs of the farm property itself (children of the owner/operator), this process could be major contributing factor to the loss of the small family farm.

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APPENDIX

Task	Mean hazard rating
Breeding	1.75
Cleaning	1.75
Computer work	1
Construction	2
Cow care	2.25
Equipment operator	2.5
Feeding	1.75
Field work	2.5
General chores	2
Herdsman	1.75
Machinery repair	2.5
Management	1.5
Milking cows	2.25
Raising calves	1.5
Working with manure	2.25