

FARM WORKER HEALTH AND HYGIENE

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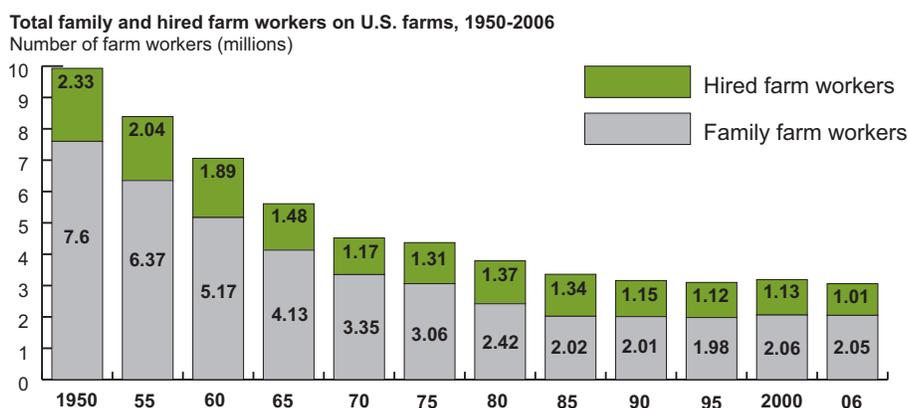
Introduction

In the United States, the abundant and affordable supply of fresh fruits and vegetables we enjoy is due in large part to the critical role that farm workers play in the planting, cultivating, harvesting, packing and processing of these important foods. Farm workers have been a vital part of agriculture for centuries especially in the production of labor intensive crops. As farming became a large-scale industry in California in the 1860s, Native Americans and later Chinese immigrants were recruited to work on farms to meet the growing demand for fruit. Later, workers from Japan, Pakistan, India, the Philippines and Mexico were recruited for agricultural activities (Kandel, 2008a). Since then, farm workers have played a crucial role in the history of agricultural development in the U.S.

In the last century hired farm workers have declined from ~3.4 million to just over a million in 2006 and currently make up less than 1% of all U.S. workers (ERS, USDA, 2008). Advances in technological innovation, changing production methods and mechanization have brought about increased productivity while reducing the agricultural labor force and the

number of hired farm workers within it (Kandel, 2008a). It is estimated that the more than 1.01 million hired farm workers employed in U.S. agriculture (Kandel, 2008b) make up a third of the estimated three million people employed in the agricultural labor force. The other 2.05 million people include self-employed farmers and their unpaid family members (Kandel, 2008a). A profile of hired and family farm workers on U.S. farms from 1950 to 2006 is shown in Figure 1 (Kandel, 2008a). While there has been a steady decline of hired farm workers, family farm workers have decreased by over 5.5 million people. According to the National Agricultural Workers Survey, between 1989 and 2006, children under age 18 made up 5.5% of the hired crop farm worker labor force (Kandel, 2008a). In the past decade, an increasing U.S. population, a growing demand for year-round fresh fruits and vegetables, and a farm sector that is consolidating have stabilized the demand for farm labor. However, non-farm employment opportunities for farmers have increased their reliance on hired farm workers as agricultural production is now concentrated on fewer, larger farms.

Figure 1. A profile of farm workers on U.S. farms from 1950 to 2006 *



Notes: Family farm workers include self-employed farmers and unpaid family members. Hired farm workers include direct hires and agricultural service workers who are often hired through labor contractors. The 2006 family farm workers figure of 2.05 million is estimated from a simple linear extrapolation from the last available annual figures for self-employed and nonpaid family farm workers collected by NASS from 2000 to 2002.
Source: Farm Labor Survey, National Agricultural Statistics Service, USDA.

*Kandel, W. 2008a. Profile of Hired Farm Workers, A 2008 Update. Economic Research Report No. 60. ERS, USDA, July, 2008

Demographic Characteristics of Farm Workers

Since farm labor is physically demanding, hired farm workers are usually younger, less educated, white, Hispanic, male, married and more likely to be foreign born. The term “Hispanic” encompasses people whose origins include Mexico, Central America, South America and the Caribbean. People of Hispanic origin may be of any race. Selected demographic characteristics of hired farm workers are shown in Table 1 (Kandel, 2008a; Kandel, 2008b, Kandel, 2008c).

Some important information to be noted in Table 1 is that almost 81% of hired farm workers are male, nearly three quarters of them are less than 44 years of age (median age of 34 years), 50% have not graduated from high school and over half are married. More than a third of farm workers had children under 18 years of age in their households.

Migration of Farm Labor

The popular perception of hired farm workers, who provide labor for fruit and vegetable operations, is that they are follow-the-crop migrants, but this group actually comprises less than 12% of the crop farm work force. They travel to multiple work locations in consistent geographic patterns that vary with the agricultural season requirements (Kandel, 2008a; Kandel, 2008b). Migrant workers are permanently settling in places where they previously worked temporarily and perform multiple tasks on the same farm or hold other local jobs throughout the year (Kandel, 2008b). Since the mid-1990s, the increasing use of year-round production techniques, as well as a greater enforcement of border regulations, have increased the proportion of settled farm workers, now more than 50% of hired farm workers in the U.S. Another major category of hired farm workers is those who travel between a single work location and their U.S. or foreign homes and are known as “shuttler” migrants. They currently make up about 20% of

Table 1. Demographic Characteristics of hired farm workers in 2006 *

Category	Percent
Gender	
Male	80.9
Female	19.1
Age Distribution	
Under age 21	15.1
Between ages 21-44	56.4
Over age 44	28.1
Median age = 34 years	
Race	
White	91.7
Black	4.0
Native American	1.4
Asian	2.9
Hispanic ethnicity	
43.0	
Country of Birth	
Mexico	37.3
U.S.	57.8
All other countries	4.9
Education	
Less than 9th grade	30.0
Grades 9-12, no diploma	21.1
High school graduate	28.2
Some college	20.7
Marital Status	
Married	52.7
Div./wid./sep.	9.1
Never Married	38.1
Children under 18 in household	35.8

**Adapted from ERS analysis of Annual Averages from 2006 Current Population Survey Earnings File Data. In Kandel, W. 2008. Profile of Hired Farm Workers, A 2008 Update. Economic Research Report No. 60. ERS, USDA, July, 2008*

hired farm labor. The last category of hired farm workers are considered “newcomers” who are foreign-born and have lived in the U.S. less than a year. This group, whose work patterns were not determined during worker surveys, comprise ~15% of hired farm workers (Kandel, 2008a).

According to information from the 2006 Current Population Survey (CPS), approximately 25% of all hired crop farm workers live in the Southwest, while 12% live in the South, 8% in the Midwest, 7% in the West and 3% in the Northeast. Almost half of all hired farm workers live in five states: California, Texas, North Carolina, Washington and Oregon (Kandel, 2008a).

Health Status of Farm Workers

Although research on the health status of hired farm workers is increasing, the overall health of this population is not well understood (Villarejo, 2003). Their economic status, lack of health insurance, as well as cultural and language barriers, prevent large numbers of these workers from obtaining the health care services that they need. Reports in the literature confirm a higher than average prevalence of several infectious diseases among these workers including parasitic infections and tuberculosis (Villarejo, 2003). Most farm workers access health care services only when it is absolutely essential and then visit hospital emergency rooms or community clinics.

Fruit and Vegetable Production

Today, U.S. consumers have a wide variety of fresh fruits and vegetables to choose from with over 345 different produce items that come from over 130 countries around the world, many of them being available year-round (Rangarajan, et al. 1999). Since 1970, per capita consumption of fresh vegetables increased from 154 pounds to 202 pounds in 2007, while fresh fruit consumption during the same time period increased from 101

pounds to 126 pounds. According to the U.S.D.A., in 2007 the overall per capita availability of fresh fruits and vegetables in the U.S. was 328 pounds per person (ERS, USDA, 2009). As the per capita consumption of fresh fruits and vegetables was increasing, epidemiologists at the Centers for Disease Control and Prevention noticed another trend developing. From the early 1970s to the present, the number of foodborne outbreaks associated with fresh produce increased steadily and more than doubled, along with the number of people affected also doubling (Gravani, 2009). Bacteria, viruses and parasites were identified as causative agents and a wide variety of fresh fruits and vegetables were associated with these outbreaks. Since many fruits and vegetables are often eaten raw, they never receive heat treatments to kill pathogenic organisms that may be present. According to statistics compiled by the U.S. Food and Drug Administration (FDA), Center for Food Safety and Applied Nutrition (CFSAN), there were 82 produce-associated outbreaks from 1996 through 2008, associated with more than 20 commodities (Vierk, et. al.; 2008, Vierk, 2009).

Produce Contamination by Workers

Fresh produce can become contaminated from contact with soil; manure; improperly composted manure; irrigation water; fecal material from wild and domestic animals; farm, packinghouse and terminal market workers; contaminated equipment in the fields, packinghouse and distribution system; wash rinse and flume water; ice; cooling equipment and transportation vehicles; cross-contamination from other foods; and improper storage, packaging, display and preparation (Gravani, 2009; Bihn and Gravani, 2006, FDA, USDA, & CDC, 1998). As mentioned, there are numerous ways for produce to be contaminated, but investigations of farms and packing houses that had been incriminated in produce-associated outbreaks, revealed that infected workers and poor worker hygiene were often implicated (Michaels and Todd, 2006).

Farm workers have intimate contact with the fruits and vegetables as they harvest, sort and pack these foods, and so worker health and hygiene becomes a matter of concern, especially for commodities that require extensive manipulation and handling during harvesting, preparation for packing and processing. Pathogenic organisms of human health significance—including *Salmonella* species, *E.coli* O157:H7, *Shigella*, *Cryptosporidium*, *Cyclospora*, Hepatitis A, and Norovirus—associated with infected farm workers, have been implicated in outbreaks involving strawberries, green onions (scallions), raspberries, tomatoes, leaf lettuce, basil, parsley and other produce items (Bihn and Gravani, 2006; Gravani, 2009; Michaels and Todd, 2006). A detailed list of selected produce outbreaks from 1987-2003, associated with infected workers is shown in Table 2 (Michaels and Todd, 2006).

Infected workers who contaminate produce are likely working when they are ill and do not follow proper hygiene steps such as effective hand washing. Transmission of human pathogens can occur via the fecal-oral route either by direct contact with a person who is infected or by ingesting food or water that has been contaminated with the pathogen. Infected farm workers may be asymptomatic, but will shed the organisms in their

feces, depending on the agent, from periods as short as a few hours to years and be capable of causing an outbreak (Michaels and Todd, 2006). Some of the factors contributing to outbreaks associated with produce caused by infected workers include lack of adequate water supply, workers with limited hygiene education, poor or no toilet facilities, bare hand contact with produce items, lack of food contact surface sanitation and lack of childcare for workers (Michaels and Todd, 2006).

Strategies for preventing contamination by workers involve well-designed and effectively delivered education and training programs that include information on the importance of good health and hygiene to produce safety, proper use of field and packinghouse toilets, effective hand washing practices and appropriate use of gloves. Even though discussing urination and defecation are difficult topics to address, it is vital that workers understand their role in preventing the contamination of the produce they handle (Bihn and Gravani, 2006). Since many commodities are hand-harvested and packed directly into consumer-ready containers in the field, it is also important for workers to be reminded that they are handling ready-to-eat products and are considered food handlers (Gravani, 2009; Bihn and Gravani, 2006).

Table 2. Produce Outbreaks Associated with Infected Workers*

Date	Produce	Infectious Agent	Number of Cases	Produce Origin	Reference
1987	Raspberries (frozen)	Hepatitis A Virus	92	United Kingdom	Reid and Robinson, 1987
1989	Canned mushrooms	<i>Staphylococcus aureus</i>	99	China	Levine et al., 1996
1990	Strawberries	Hepatitis A Virus	53	United States	Niu et al., 1992
1991	Frozen coconut milk	<i>Vibrio Cholera O1</i>	3	Thailand	Taylor et al., 1993
1994	Green onions (scallions)	<i>Shigella flexneri</i>	72	California	Cook et al., 1995
1996	Leaf lettuce	<i>E. coli</i> O157:H7	49	United States	Hilborn et al., 1999
1997	Strawberries (frozen)	Hepatitis A virus	250	California	CDC, 1997
1997	Green onions (scallions)	<i>Cryptosporidium parvum</i>	55	United States	CDC, 1998
1997	Basil	<i>Cyclospora cayetanensis</i>	341	United States	Pritchett et al., 1997
1998	Green onions (scallions)	Hepatitis A virus	43	United States/California	Dentinger et al., 2001
1998	Mamey (sapote fruit pulp)	<i>Salmonella typhi</i>	13	Guatemala	Katz et al., 2002
1999	Parsley (chopped)	<i>Shigella sonnei</i>	486	United States	CDC, 1999
2003	Parsley (chopped)	Enterohemorrhagic <i>E. coli</i>	77	United States	Naimi et al., 2003

* From: Michaels, B. and E. Todd. 2006. Farm Worker Personal Hygiene Requirements During Harvesting, Processing and Packaging of Plant Products. In: Microbial Hazard Identification in Fresh Fruits and Vegetables, J. James, Editor. John Wiley & Sons, Inc. pps.115-153.

Effective Worker Education and Training Programs

Preventing contamination by workers involves the total commitment and leadership of top management in a produce company. Management needs to believe in the importance of produce safety and in building a culture of food safety within the organization. Management must also provide the necessary resources to achieve these goals and to develop and deliver an effective worker education and training program. Every employee working on the farm and in the packinghouse, including newly hired employees, seasonal or part-time workers, family members, and others need to know the basics of food sanitation and their important role in assuring the safety of the produce that they harvest, sort and pack. They need to understand why good health and hygiene is important and the reasons that they are being asked to follow these rules. They should understand the consequences of poor health and hygiene and how that affects them, their families (especially their children) and friends and the safety of all who consume the fresh fruits and vegetables that they handle. Knowledgeable workers who consistently perform appropriate tasks correctly will reduce microbial risks (Bihn and Gravani, 2006).

Training programs should be practical, meaningful, aimed at the appropriate education level for the workers being trained and delivered by knowledgeable individuals who speak the language of the employees that they are addressing. In a 2002 survey of 450 fruit and vegetable growers in New York State, it was learned that many growers did not have a worker training program related to worker health and hygiene. This survey was conducted before farm safety audits were commonly used to determine compliance with Good Agricultural Practices (GAPs) guidelines. When asked, “Do you offer worker training that

specifically addresses the importance of hand washing and personal hygiene?”, 57.1% of the respondents said no. When they were asked why they had not implemented such a program and were given a list of eight optional responses, the most frequent response (29.8%) was “the workers are not interested.” This response was not supported by a parallel survey of 680 New York State farm workers. When farm workers were asked, “Would you be interested in receiving more information and training on proper hand washing for your own protection and to protect the fruits and vegetables you harvest and pack?”, 73.7% of the respondents said yes. Growers were given the option to provide their own response to why they didn’t offer training and many did. Some of the responses included comments such as “not needed at my operation,” “common sense information,” “family workers,” “not my job to raise workers,” “not a high priority,” and “I’m not in the hygiene business.” These responses indicated that many growers did not understand the link between produce safety and worker health and hygiene or that they were not concerned with this link (Bihn and Gravani, 2006). Today, with GAPs audits of farm operations being required by produce buyers, there is a section in most audit checklists, including the USDA GAPs and Good Handling Practices (GHPs) Audit Verification Checklist (USDA, 2009) that addresses worker health and hygiene. Growers must conduct worker training programs related to these important issues and document them or risk losing audit points in this audit category.

The National Good Agricultural Practices (GAPs) program in the Department of Food Science at Cornell University has developed some practical education educational materials in English and Spanish that can be used in farm worker produce safety education and training programs (www.gaps.cornell.edu) (Bihn and Gravani, 2006).

Worker Health and Hygiene

First, workers must recognize that when they are sick, they should, ideally, not report to work, or alternatively, report their illness to a supervisor who can assign them to a job where they will not handle produce. Workers displaying symptoms such as nausea, vomiting, diarrhea, severe abdominal pain, exposed cuts, sores or open wounds, Hepatitis A or yellow jaundiced skin and eyes should not have direct contact with food. In addition, workers with upper respiratory infections should also be assigned duties not involving food handling. Workers who have been removed from contact with produce should only be returned to these jobs when cleared by a licensed health care professional, stating that they are no longer infectious (Michaels and Todd, 2006).

Personal Cleanliness

Worker hygiene begins with instruction on the importance of personal cleanliness so that workers know how to prepare for their work day and what is expected of them on the job. Important good hygiene habits include tasks such as taking a shower every day, wearing task-appropriate, clean clothes to work, keeping fingernails trimmed short and clean, using only designated toilet facilities at all times (either field toilets, toilets in the packing-house, or other appropriate facilities), washing hands thoroughly and often, using appropriate head gear, and not eating food or candy, chewing gum or using tobacco products while on the job working with produce (Michaels and Todd, 2006). In addition, instruction on the prompt and proper treatment (first aid) for cuts, abrasions and other injuries, as well as policies and procedures on the specific handling and disposition of produce and food contact surfaces that come in contact with blood and other body fluids are also vital.

Water

The availability of clean, potable water from a sanitary source for farm workers is needed for consumption and hand washing and reduces the likelihood of enteric organisms contaminating the hands of workers. Drinking water should be provided to ensure that workers do not get dehydrated and ill while working. The water supply should be in good working order and be monitored on a daily basis. Water should be stored in clean and previously sanitized containers and tanks that are cleaned and sanitized daily. The containers should be covered, kept away from sun and excessive heat and single-use, disposable cups should be provided (Michaels and Todd, 2006).

Jewelry and Personal Adornments

Every produce company should have a policy on the use of jewelry and personal adornments and clearly communicate this information when new workers are hired and to long-time employees during refresher training. Jewelry of all kinds including rings, bracelets, earrings, necklaces, piercings, as well as false finger nails and other personal adornments such as badges, buttons, etc. can create a physical hazard if they should break or become dislodged and fall into the product. These items can also be a personal safety risk to employees who may be working on or near moving equipment. In addition, when working in packaging or processing areas, workers must also be aware that pens, pencils, thermometers, and other small items should not be kept in coat or shirt pockets as they might fall into the product. Rules on the use of jewelry and other adornments should be strictly enforced to prevent physical hazards from entering product. Appropriate head gear should be worn when workers are handling product and facial hair must also be covered (Michaels and Todd, 2006).

Proper Toilet Use

The proper use of toilet facilities should also be addressed in worker health and hygiene training programs. Many growers have noticed that workers do not always put used toilet paper into the toilet. In the survey of more than 680 farm workers in New York cited above, when asked, “When you use the toilet, where do you put the toilet paper?” 46.6% of the respondents said in the toilet, 44.8% said in a trash can, 1.6% said next to the toilet, 0.9% said on the ground and 6.2% provided their own responses which included “in a bag to throw away later,” “in the woods,” “I go in the field and leave the paper there,” and “I can’t answer—there are no toilets.” The belief that toilet paper belongs in the garbage likely originates from the fact that many farm workers immigrate from countries where the plumbing systems cannot tolerate the disposition of the toilet paper directly into the toilet. It is common in those countries to dispose of used toilet paper in a can near the toilet and not directly in the toilet. There is a need to clearly communicate how toilets in the U.S. work and clarify the expectations for sanitary practices (Bihn and Gravani, 2006).

It is vital that growers provide clean and sanitary toilets and hand washing facilities that are properly stocked with soap, water and single-use paper towels in the field as well as in packinghouse operations. OSHA field sanitation regulations state that field toilets be within one quarter mile walk of where employees are working and one toilet and one hand washing facility is required for each 20 employees (29 CFR 1928.110). Providing these facilities at this distance, or closer (depending on the terrain), to where people are working and enforcing their proper use, will promote good health and hygiene, reinforcing the farm’s commitment to produce safety (Bihn and Gravani, 2006).

Hand Washing

Hand washing is the single most important way to prevent the transmission of infectious diseases and should be practiced by all workers who handle food (Michaels and Todd, 2006).

Although most people think they know how to properly wash their hands, it is important to provide instruction about the correct procedure. Effective hand washing procedure includes the following steps:

1. Allow enough time to wash hands properly.
2. Wet the hands and exposed areas of the arm with warm water
3. Apply an adequate amount of soap to the hands and soap thoroughly
4. Rub lathered hands together for at least 20 seconds (sing “Happy Birthday” twice or the alphabet song once)
5. Pay particular attention to the areas around and underneath the fingernails, palms, the top of the hands, between the fingers, and exposed areas of the wrists and forearms
6. Rinse thoroughly with running water
7. Dry the hands with a single service, disposable paper towel
8. Properly dispose of the used towel into a container designed for this purpose

Hand washing is an activity that should always be done before beginning work and should be repeated frequently throughout the day.

It is especially critical after performing any of the following activities (Bihn and Gravani, 2006; Michaels and Todd, 2006):

- Using the toilet
- Eating foods or drinking beverages
- Returning to work after a break
- Coughing, sneezing or blowing the nose
- Touching or scratching the face, mouth, nose, skin, hair, or ears
- Smoking or using chewing tobacco
- Touching dirty surfaces, equipment or utensils
- Handling dirty raw materials, trash, garbage, or waste
- Handling contaminated or potentially contaminated materials
- Performing maintenance on any equipment
- Touching or handling agricultural chemicals including fertilizers, pesticides, and cleaning materials
- Any other situation that may lead to contamination of the hands

Gloves

Since bare hand contact with ready to eat foods has often been linked to foodborne illness outbreaks, it is important that workers wear gloves when handling produce. Clean, intact gloves can provide an effective barrier between hands and produce. Sometimes, workers can forget that gloves can become soiled and dirty, just like their hands, and contaminate the produce that they are harvesting, sorting, grading or packing. Disposable gloves should be changed frequently, especially when they are worn for long period of time; get ripped, damaged or soiled; or used for tasks other than product contact. Once disposable gloves are removed, they should be discarded and not reused (Bihn and Gravani, 2006). Reusable gloves should be washed and sanitized frequently and thrown away when they become old, soiled, torn or uncleanable. Gloves are not a substitute for proper hand washing. The proper procedure for glove use is to wash hands thoroughly and then put on clean, intact gloves. For some workers, the use of gloves inhibits their job performance due to lack of tactile sensitivity. In these instances, frequent and proper hand washing followed by the use of a sanitizer hand dip is the best way to reduce microbial risks (Bihn and Gravani, 2006).

It is very clear that people who work on farms and in packinghouses play a key role in assuring the safety of fresh fruits and vegetables that they harvest, sort, and pack. Top management commitment to food safety, a well designed and implemented farm worker education and training program, clear and enforced rules for food safety and sanitation, as well as attention to details, will reduce the risk of produce associated foodborne illnesses linked to workers.

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