Pandemic Influenza and Farmworkers: The Effects of Employment, Social, and Economic Factors

Employment, social, and economic factors have the potential to affect the magnitude of an influenza pandemic among farmworkers.

Prevention efforts targeted toward livestock farmworkers, including increased access to seasonal influenza vaccine, risk reduction training, various forms of personal protection, and workplace sanitation, are needed. Crop and livestock farmworkers are at increased risk of exposure to influenza A viruses because of limited resources, substandard housing, immigration status, communication and cultural barriers, and discrimination.

Recommendations were gathered from migrant clinicians, farmworker advocates, state and federal government agencies, industry stakeholders, and researchers to overcome these barriers, including surveillance of livestock farmworkers, inclusion of farmworker service organizations in planning efforts, and separation of immigration enforcement from emergency assistance. (*Am J Public Health*. 2009; 99:S308–S315. doi:10.2105/AJPH.2009.161091)

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FARMWORKERS WHO WORK with livestock such as swine and poultry are potentially at risk for exposure to influenza A viruses that originate in birds, pigs, or other species; are novel to humans; and may pose a pandemic threat.[1–3] Whether working with livestock or crops, farmworkers may also be more vulnerable than the general population to human influenza pandemics as a result of living conditions, suboptimal access to health services, and potential communication barriers resulting from language and culture.[4]

In 1990, the National Institute for Occupational Safety and Health (NIOSH) implemented a safety and health research agenda dedicated to agricultural workers. Recognizing that hired farmworkers have unique characteristics and exposures that might pose different risks than those faced by farm owners, NIOSH convened a work group of advocates, policy experts, farmworker health experts, government partners, and researchers to identify priorities for surveillance of and research involving hired farmworkers.[5] Although this agenda influenced the direction of research, not anticipated were needs related to emergency preparedness and pandemic influenza.

Recognizing this gap, NIOSH, through a pair of efforts (one in 2007 and one in 2008), solicited input from a variety of stakeholders to identify issues and generate recommendations regarding pandemic influenza preparedness for farmworkers. In 2007, with input from industry, labor union, and public health stakeholders, NIOSH identified gaps and made recommendations to protect poultry workers, including farmworkers, from avian influenza.[6]

In another effort in May 2008, NIOSH and Farmworker Justice, a not-for-profit advocacy and educational organization concerned about farmworker pandemic influenza preparedness,[7] gathered input on farmworkers from the Farmworker Health Committee at the National Farmworker Health Conference in San Juan, Puerto Rico, with e-mail follow-ups to committee members. The committee's 44 members included representatives of migrant health clinics and farmworker service organizations from 18 states and Puerto Rico. In addition, input was solicited from the planning committee for the Western Migrant Stream Forum organized by the Northwest Regional Primary Care Association; that committee consisted of national and regional farmworker advocates, clinicians, clinic administrators, and researchers. Members of the Farmworker Health Committee as well as the Western Migrant Stream Forum organizing committee offered input for the initial recommendations and then were provided with subsequent drafts for further comment.

In this article, we summarize farmworkers' potential risk for exposure to animal influenza viruses with pandemic potential, the factors associated with a possible elevated impact of a human influenza pandemic among farmworkers (see the box on the next page), innovative approaches to reducing the burden of pandemic influenza among farmworkers, and recommendations to reduce the impact of a pandemic on farmworkers. The box on page S310 presents a summary of recommendations on avian influenza preparedness from the NIOSH report *Protecting Poultry Workers from Avian Influenza*.[6] The box on page S311 offers a summary of recommendations on pandemic influenza preparedness gathered in May 2008 from National Farmworker Health Conference participants and Western Migrant Stream Forum organizers. These recommendations are described in the final section of the article.

WHO ARE FARMWORKERS?

There are an estimated 2.5 million hired farmworkers in the United States,[8] along with 4.2 million seasonal and migrant workers and their dependents.[9] In 1999, migrant education programs served an estimated 664 000 school-aged children of migrant farmworkers.[10]

Although these estimates include both crop and livestock farmworkers, more is known about the approximately 1.8 million individuals working in crop agriculture according to the Department of Labor's National Agricultural Workers Survey

Socioeconomic Factors Potentially Associated With Elevated Risk of a Human Influenza Pandemic Among Farmworkers

Factors Affecting Exposure
- Language barriers/low literacy
- Fear of job loss
- Inability to prepare owing to lack of resources
- Crowded housing
- Lack of transportation/need for public transportation
- Limited access to television, radio, telephones, and the Internet
- Temporary employment, potential unfamiliarity with surroundings

Factors Affecting Timeliness and Adequacy of Treatment
- Lack access to care (insurance status, lack of transportation, migratory practices)
- Cultural barriers
- Fear of authorities
- Discrimination and profiling

(NAWS), an ongoing nationally representative survey of employed crop farmworkers. The most recent NAWS data available (2001–2002) indicate that crop farmworkers are young (median age: 31 years), predominantly male (79%), and predominantly Hispanic (83%). Only 23% are US born; the majority (75%) are Mexico born. More than half (53%) of farmworkers lack US work authorization.

Migrant farmworkers, who relocate for work both internationally and domestically, constitute 42% of the population. Most speak Spanish as their primary language (81%), with a few Creole, Kanjobal, or Mixteco speakers (2%); 44% report speaking no English. Farmworkers on average have completed 7th grade, and very few (6%) have completed 12th grade. Although more than half (58%) of farmworkers are married and half (51%) have children, a large percentage (57%) live apart from all nuclear family members. Almost 40% of farmworkers who are parents live apart from their minor children.[11]

NAWS data also show that crop farmworkers earned an average of $7.25 per hour in 2001–2002, with average annual family earnings between $15 000 and $17 499. After adjustment for family size, 30% of families fell below the federal poverty line. Their most common asset was a vehicle; however, only half (49%) of farmworkers owned one. Fewer than one fifth (19%) lived in a self- or family-owned house. Most (58%) lived in non-employer-owned rented housing; 21% lived in employer-owned housing. Health insurance coverage was uncommon, with fewer than one fourth (23%) of farmworkers covered.

In addition, NAWS results showed that the majority (90%) of farmworkers worked for 1 or 2 US employers per year. Most worked directly for a farm owner, but a substantial percentage (21%) worked for farm labor contractors (and this percentage is rising).[11] By hiring farmworkers through these contractors, farm owners can avoid some of the regulatory and immigration responsibilities associated with being an "employer."[12] Farm labor contractors often pay lower wages than farm owners hiring directly, and they may add illegal fees for rides, drinking water, lunches, and tools.[12]

Little information exists on livestock farmworkers in the United States. In 2000, the Bureau of Labor Statistics estimated that 36 270 farmworkers worked in the "farm and ranch animal" category, which includes poultry, cattle, sheep, swine, goats, horses, other equine, finfish, shellfish, and bees. The duties of such workers include animal feeding, watering, herding, branding, weighing, and loading.[13]

RISK OF EXPOSURE TO ANIMAL INFLUENZA VIRUSES

In the United States, surveillance for avian influenza in livestock, including data on the presence of confirmed reportable diseases in specific commercial livestock and poultry, is coordinated by the US Department of Agriculture in partnership with other federal and state agencies and the agriculture industry.[14] Worker health and exposure surveillance for these diseases and other potential zoonotic agents is not as extensive. Health surveillance targeting poultry and other livestock workers during recognized outbreaks of avian influenza or other influenza A viruses with pandemic potential is important given that influenza viruses with pandemic potential may be transmitted directly from animals to people.

Mathematical model simulations have demonstrated that when 15% to 45% of a local community works in confined animal feeding operations, human influenza cases can increase by as much as 45% to 86% as a result of animals, workers, and other community members infecting each other.[15] Influenza viruses with pandemic potential may also result after coinfection of a person with both an avian influenza virus and a human seasonal influenza virus through generation of a reassortment influenza virus capable of human transmission.[16,17] Interactions between hired farmworkers and farm owners and their families may also be a factor in the dynamics of an outbreak.

International, national, and state government and nongovernment organizations have recognized the vulnerability of poultry workers to avian influenza viruses with pandemic potential. The World Health Organization has recommended "targeted administration of seasonal influenza vaccine to high-risk groups, such as cullers and poultry workers," to reduce opportunities for the simultaneous infection of humans with avian and human influenza viruses. Reduced opportunities for dual infections decrease the chances of reassortment and the eventual emergence of a novel influenza virus with pandemic potential.[18]

The United Kingdom Department of Health Services has offered seasonal flu vaccinations to those who work in close contact with poultry as a precautionary public health measure given that the country has experienced outbreaks of influenza A(H5N1) in both domestic poultry and wild birds.[19] Guidelines of the Occupational Safety and Health Administration of the US Department of Labor and the Centers for Disease Control and Prevention for protecting poultry workers address personal protective equipment and

Stakeholder Recommendations on Preparedness for Avian Influenza Outbreaks Among Farmworkers

Occupational Factors That Affect Exposure

- Livestock and poultry farmworkers are exposed to respiratory secretions, blood, intestines, or droppings of livestock and poultry in which influenza outbreaks may occur. The extent to which personal protective equipment is available and used correctly is unknown.

Stakeholder Recommendations

- Federal, state, and local public and animal health and agriculture authorities should collaborate with farm employers, farmworker health and social service organizations, agricultural extension agencies, and farmworker advocacy groups to protect poultry and other livestock workers from infection and disease in the event that influenza outbreaks occur in domestic animal populations. These protective measures include the following:
- Seasonal influenza vaccine (and linguistically/culturally appropriate educational materials on the vaccine)
- Training on reduction of the risk of infection from animal influenza viruses
- Sufficient personal protective equipment and training on its correct use (respirators, goggles, gloves, aprons)
- Sanitary facilities, including hand-washing facilities
- Surveillance and early detection of disease in workers as well as animals, including consideration of incorporating financial protections to encourage early reporting

training on its correct use, sanitation, and recognition of influenza in birds and humans in the event of an avian influenza outbreak in poultry.[6,20,21] These guidelines also recommend that individuals involved in culling be vaccinated with the seasonal influenza vaccine. At present, the decision of whether or not to implement these recommendations is at the employer's or state's discretion.

Early identification and culling of poultry infected with avian influenza are critical to prevent larger outbreaks among poultry but could also create severe financial setbacks among farm owners and workers. The threat of lost income may deter farmworkers from reporting ill poultry to supervisors and animal health authorities, leading to further viral spread.[22,23] A regulation (71 CFR 56323) exists for compensating farm owners and growers for costs associated with culling of poultry for detection of subtypes H5 and H7 of the avian influenza virus, although protection of workers' wages is not required.[24]

Swine farmworkers also may be at increased risk of exposure to novel influenza A viruses with pandemic potential. Swine influenza viruses are transmissible to people (zoonotic infections), and human influenza viruses are transmissible to swine (reverse zoonotic infections).[25] The National Pork Board currently recommends that workers receive seasonal influenza vaccines, which provide some level of protection against infection with swine viruses of the same hemagglutinin subtype and may limit the potential for human influenza virus infection of pigs.[26]

POTENTIAL CONSEQUENCES OF AN INFLUENZA PANDEMIC

Both crop and livestock farmworkers may be at increased risk of morbidity and mortality from a human influenza pandemic owing to several factors, including language and literacy barriers and limited economic resources.

Language and Literacy

The low English proficiency and literacy level of the majority of farmworkers will impede the effectiveness of mainstream preparedness messages and communications not specifically targeted to this population. Often, farmworkers are not fully literate in their native language.[12] Increasing numbers of immigrant farmworkers migrate from predominantly indigenous Mexican states (e.g., Guerrero, Oaxaca, and Chiapas) where Spanish is their second language, and they speak little or no Spanish or English.[11]

Although Spanish-language radio is more extensive and accessible than other Spanish-language media (e.g., Spanish-language television), its level of saturation throughout the United States is unknown. Radio programming in indigenous languages is probably rare. To our knowledge, no data have been collected on farmworkers' access to telephones, whether land based or mobile, and no determinations have been made as to the extent to which wireless telephone networks are available in rural areas where farmworkers live. Farmworkers may not receive important public health messages or notices of emergency actions. According to a US Government Accountability Office report published in March 2007, the Emergency Alert System does not issue alerts in languages other than English.[27]

Limited Resources

Although the Community Strategy for Pandemic Influenza Mitigation[28] is a key resource for state and local communities and individuals, its recommendations may be especially difficult to implement for individuals who lack critical resources such as savings, food supply, housing, and transportation.[28] A Harvard School of Public Health survey examining the public's response to community mitigation interventions for a severe outbreak of pandemic influenza indicated that, owing to a lack of resources, certain interventions are difficult or impossible to implement among people at lower income levels and members of racial/ethnic minority groups. For example, these individuals' workplaces may not allow for telecommuting or may not provide sick leave to care for family members. In addition, low-income populations may not be able to stockpile items so that they can remain in their homes if necessary.[23]

Low-wage farmworkers may be reluctant to forgo wages, or possibly forfeit their jobs altogether, to stay home during a health emergency in which the community is requested to "shelter-in-place" (i.e., take

Stakeholder Recommendations on Pandemic Influenza Preparedness Among Farmworkers

State and local authorities, in collaboration with farm owners and agricultural extension agents, should include farmworker service organizations such as migrant clinics, unions, and other sources trusted by farmworkers in planning for a pandemic influenza event. Such planning should include the following:

- Emergency warnings and public health messages disseminated via multiple media and taking culture, educational level, and language (Spanish and indigenous languages) into consideration
- Provision of food and supplies during emergencies
- Two-way information network (radio, telephone, or trusted messengers) to reach farmworkers in remote rural areas and camps
- Transportation during medical emergencies
- Alternative housing for those living in communal arrangements to prevent spread of infection
- Differentiation of public health and emergency response activities from those of immigration enforcement to promote cooperation of the farmworker community

refuge in a small, interior room with no or few windows).[28] During the 2007 southern California wildfires, farmworkers had the choice to leave or continue working in or adjacent to evacuation zones. The majority chose to stay and not risk losing scarce jobs.[29] Research also indicates that, as a result of fear of job loss, injuries or illnesses must be severe before farmworkers will forgo work to seek care.[30,31]

Low wages are a major deterrent to assembling an emergency kit with sufficient food, water, and supplies to participate in voluntary isolation. Studies of 12-month food insecurity (a family's inability to afford enough food to meet its members' hunger needs) among farmworkers have been conducted over the past several years in North Carolina, on the Texas–Mexico border, and in California. In 2 of these studies, almost half of the farmworkers were food insecure; in the third study, 82% were food insecure.[32–34] Inability to feed their families on a day-to-day basis has implications for farmworkers' ability to accumulate even short-term excess emergency supplies.

Care and isolation of ill farmworkers may be difficult given their widely varied housing situations[35] (e.g., tents, houses, garages, apartments, motel rooms).[36,37] According to a 2001 report of the Housing Assistance Council, 52% of farmworkers' living units are considered crowded (defined as more than one person per room); this figure does not include workers living in dormitories or barracks, which average 4.8 people per room.[38] A 1997 study showed that, among very-low-income rural households, 46% of farmworkers' households but only 3% of other types of households were crowded.[39] These crowded conditions and inability to isolate ill individuals could facilitate transmission of influenza, increasing morbidity.

As mentioned, only about half of farmworkers possess their own vehicles,[11] and those who do not own vehicles must rely on public transportation to obtain supplies or services. Traveling on public transportation would potentially mean contact with more people and could result in a higher potential for exposure to a person infected with influenza.[40]

During a pandemic, employers may provide supplies, advice, and instructions to workers, but no such resource exists for workers in unstable employment situations. More than one quarter (28%) of all farmworkers have 2 or more employers in a given year, and approximately two fifths (42%) of crop farmworkers migrate during the year to seek employment.[11] Farmworkers who have recently relocated for employment reasons may be unfamiliar with locally available services.

Inadequate Access to Health Services

As a result of lack of health insurance coverage, poverty, and inadequate geographically and culturally accessible health services, few farmworkers have regular medical providers.[12] Migrant health centers serve an estimated 13% of migrant and seasonal farmworkers and their families.[12] Without access to regular primary care, farmworkers are less likely to obtain educational materials regarding preparedness and may postpone care until their illness is too severe to treat effectively. When seeking treatment, farmworkers may be more likely to go to emergency rooms, where levels of exposure to infectious agents are high[40] and cultural, language, and literacy barriers may hamper adequate treatment.

Cultural Barriers to Adequate Care

Cultural factors such as communication style, time orientation, nutritional beliefs, family relationships, health beliefs, education, and religion may be impediments to adequate care.[41] Understanding how farmworkers perceive illnesses, along with their causes and effects, can aid clinicians in making diagnoses and developing culturally acceptable treatment plans.[30]

Immigration Status May Limit Health Care Access

According to NAWS estimates, 56% of male and 39% of female farmworkers are unauthorized to work in the United States.[11] Highly publicized immigration raids have heightened distrust of authorities among immigrant workers.[42]

Studies of undocumented immigrants have shown that they are reluctant to seek health care services. Thirty-nine percent of immigrants surveyed in Houston, Texas; El Paso, Texas; Fresno, California; and Los Angeles, California, reported fear of seeking health services as a result of their immigration status. Those reporting fear were also likely to report actual difficulty in acquiring needed services.[43] Another study reported anxiety associated with parents seeking care for their children (who were citizens) when they or other family members were not documented.[44] A study examining legal status and well-being showed that "a day-to-day feeling of vulnerability to immigration laws" and the sense of "being hunted" by law enforcement officials may never dissipate.[45]

Discrimination and Profiling

In previous emergencies, the federal government has provided clear guidance that immigration

control actions would be suspended for the duration of the crisis. During the September 11, 2001, attacks on New York and the Pentagon, and after Hurricane Charley hit Florida in 2004, statements were issued indicating that those in need should come forward and that immigration status would not be a condition for receiving assistance.[29]

In recent emergencies, guidance has been less clear. During the October 2007 San Diego, California, fires, there were reports of identity checks at entrances to evacuation facilities, deportation of some evacuees, expulsion of evacuees during the night, and accusations of evacuees looting supplies distributed to them by volunteers.[46] Also, during Hurricane Katrina in August 2005 in Louisiana, some Latinos were assumed to be undocumented and were not included in federal assistance prioritization efforts. Mixed immigration families were unsure how to proceed. Two incidents occurred in which US marshals raided Red Cross shelters and asked Latino individuals for identification and then asked those without documentation to leave the shelter.[47] In a disaster documentation may be lost, perhaps resulting in denied services or mistreatment.

OUTREACH STRATEGIES FOR FARMWORKERS

Overcoming these many barriers to successfully prepare and protect farmworkers in times of health crisis will be challenging. However, national and local programs with long-term involvement in farmworker issues can provide valuable assistance and should be included in planning and executing emergency activities. Pioneering approaches developed through migrant health programs can contribute to improving education, outreach, and treatment before and during a pandemic. Some of these approaches are described in the sections to follow.

Migrant Health Clinics

Many of the innovations discussed here were developed at migrant health clinics, as part of the Migrant Health Program funded through the Bureau of Primary Health Care. Migrant health clinics have been overcoming health care access barriers since 1962, when the program was established after passage of the Migrant Health Act (Pub L No. 87-692).[48] The program currently includes 153 migrant health centers and complementary outreach programs in rural areas nationwide with a culturally sensitive focus. Many involve outreach workers, bilingual and bicultural health personnel, and culturally appropriate protocols.

Lay Health Advisors

Lay health advisor (*promotora*) programs have been widely used in migrant health organizations. In fact, their role has expanded, and *promotoras* now serve as referral sources, assistants in participant recruitment and data collection, material distributors, role models, community advocates, and collaborators in participatory research.[49] They bridge cultural gaps in addition to assuming their traditional role of providing health care services.

Innovations in Treatment

Farmworker health organizations have successfully implemented use of electronic medical records and telemedicine technology. "MiVia," a Web-based, patient-driven electronic record, allows health workers located within migrant camps to access patients' medical histories. Using telemedicine cameras and digital instruments, trained nurses working in camps communicate with off-site specialists to provide treatment. These technological innovations allow farmworkers to obtain care despite lack of transportation and without exposing others during a pandemic. Camp-based health care providers are also likely to possess language skills and cultural competencies encouraging early diagnosis and treatment.[50]

Building Trusting Relationships to Promote Outreach

Many public health workers do not recognize the diversity of cultures and languages existing among Latino immigrants, who represent the largest group of farmworkers. Identifying trusted community leaders is central to reaching Latino subpopulations. Several projects targeting the growing Mixteco indigenous farmworker population illustrate successful outreach methods.[51] In one project in a California county involving 20 000 Mixteco farmworkers, Mixtec-speaking *promotoras* organized monthly community health assistance and education meetings (generally attended by more than 200 families). In a similar project, public health workers collaborated with local farmworker labor unions to convene monthly forums followed by one-on-one and small-group education programs provided by Spanish- and Mixtec-speaking health workers.[50]

One effective approach to reaching farmworkers is through their children. Health programs targeting children (e.g., school-based migrant safety and health fairs teaching them how to respond during an emergency[50]) communicate important information to children while also developing effective partnerships with community leaders.[52] Parents may be more motivated to participate in health programs aimed at their children than in those that focus on their own health.

Outreach Methods for Improving Health Communication

Innovative modes of communication can complement community forums by reinforcing messages and reaching wider audiences. Spanish-language radio stations provide a wide audience with easily accessible, low-cost entertainment and information in a linguistically and culturally competent manner. Close to 700 Spanish or bilingual radio stations exist in 46 states, with the greatest numbers in California, Texas, and Florida.[53] Radio Bilingüe (Salinas, CA) conducts research to determine the most important issues and effective messaging within farmworker communities. Adopting the "participatory communication for social change" concept, in which the beneficiaries of a message are involved in all levels of the planning and implementation of the message,[54] community representatives collaborate with public health experts to communicate key health messages on a weekly live call-in Spanish-language radio program.[50]

The Mexican Ministry of Foreign Affairs has developed partnerships with public health workers to provide health information as a component of its services for Mexican nationals

living in the United States. Health displays (*ventanillas de salud*) at 22 consulates offer information to visiting individuals on obtaining important documents such as passports, birth certificates, and identification cards. Mobile consulates traveling to outlying areas provide similar services to nonmetropolitan centers.[55]

CONCLUSIONS AND STAKEHOLDERS RECOMMENDATIONS

Generic plans for pandemic influenza preparedness are unlikely to encompass farmworkers or address their vulnerabilities. As described earlier, stakeholders' recommendations for evaluating and protecting farmworkers in the event of exposure to novel influenza A virus outbreaks of pandemic potential and lessening the impact of human influenza pandemics on farmworkers are elaborated in the boxes on page S310 and page S311.

Avian Influenza A Virus Exposures

Detailed guidance for protecting farmworkers is available from governmental agencies, including

TABLE 1—Resources for Federal, State, and Local Health Departments: Farmworker Service Organizations

Organization	Web Address	Avian Influenza/Pandemic Influenza Specialty
	Nongovernmental organizations	
American Meat Industry	www.meatami.com/ht/d/sp/i/278/pid/278	Resources for those working in the meat and poultry industry
Farmworker Health Services Inc.	www.farmworkerhealth.org	Maintains database of innovative outreach approaches
Farmworker Justice	www.fwjustice.org/Health&Safety/resources1.htm	Avian flu fact sheet for farmworker health professionals as well as a patient/farmworker education brochure (in both English and Spanish); pamphlet on disaster relief programs available to farmworkers (in English and Spanish)
Migrant Clinicians Network	www.migrantclinician.org	Provides training and technical assistance to migrant health centers on emergency preparedness and avian flu; also includes map of community and migrant health centers in each state as well as contact information for each center
Migrant Health Promotion	www.migranthealth.org/	Has prepared a curriculum for training lay health educators to educate the community about emergency preparedness, including avian flu prevention
National Association of Community Health Centers	www.nachc.com/	Provides emergency preparedness training and technical assistance for community health centers; offers many documents and links for additional information
National Center for Farmworker Health	www.ncfh.org/	Provides information services and products to a network of more than 500 migrant health center service sites in the United States as well as other organizations and individuals serving the farmworker population; maintains a library of resources for those serving migrant workers
National Pork Board	www.pork.org/PorkScience/Documents/PUBLICHEALTH%20influenza.pdf	Resources and recommendations for swine and swine worker health
	US government and international organizations	
National Institute for Occupational Safety and Health	www.cdc.gov/niosh/docs/2008-128/	Includes information on protecting poultry workers from avian influenza
Education and Training Administration, Department of Labor	www.doleta.gov/agworker/naws.cfm	General information on hired crop farmworkers
Occupational Safety and Health Administration, Department of Labor	www.osha.gov/dts/shib/shib121304.html; www.osha.gov/Publications/3307-10-06-english-06-27-2007.html	Information on protecting poultry workers at risk for avian influenza (in both English and Spanish)
US Department of Agriculture (USDA) and USDA Extension Service	www.usda.gov/wps/portal/!ut/p/_s.7_0_A/7_0_10B?navid = AVIAN_INFLUENZA&navtype = SU; www.csrees.usda.gov/Extension/index.html	Information on keeping animals healthy, animal testing, reporting sick/dead birds; state-specific resources are available through USDA's Extension Service
Food and Agriculture Organization of the United Nations	www.fao.org/avianflu/en/index.html	International perspective on the pandemic and information resources

NIOSH.[6] Recommendations from the NIOSH document *Protecting Poultry Workers from Avian Influenza*, summarized in the box on page S310, include early detection through disease surveillance targeting both animals and workers, reassuring workers that they will not lose income if they report illness in their flocks; availability of appropriate personal protective equipment and seasonal influenza vaccines; and effective training that overcomes language and literacy barriers. For example, Maryland has developed interim guidelines for implementation of national recommendations in conjunction with a task force of public health and industry stakeholders.[56]

Human Influenza Pandemics

As described earlier, we asked National Farmworker Health Committee members and Western Migrant Stream Forum organizers to provide input into recommendations to lessen the impact of a human influenza pandemic on crop and livestock farmworkers. Their recommendations, summarized in the box on page S311, include collaborations among federal, state, and local health and agriculture authorities; farm employers; farmworker health and social service organizations; agricultural extension agencies; and farmworker advocacy groups to develop preparedness plans that protect farmworkers from influenza pandemics and retain the workforce needed to maintain food supply chains.

State and local authorities, in developing their human pandemic influenza plans, should seek advice and assistance from organizations trusted by farmworkers to ensure the acceptance and cooperation of the farmworker community. Table 1 describes some of these organizations and other international, national, and regional resources. Planning should include audience-appropriate emergency and public health communications, transportation, alternative housing, and adaptation of community mitigation interventions to the circumstances of farmworkers' lives. Emergency assistance must be distinguished from immigration enforcement to encourage farmworkers' trust in and compliance with emergency response directives. ■

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Contributors

A.L. Steege and S. Baron originated the project and wrote and revised the article. A.L. Steege and S. Davis communicated with stakeholders to gather input on relevant issues. S. Davis, J. Torres-Kilgore, and M.H. Sweeney assisted with writing and reviewing drafts of the article.

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