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Acute Pesticide-Related Illness Among Farmworkers: Barriers to Reporting to Public Health Authorities

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Abstract

Farmworkers are at high risk of acute occupational pesticide-related illness (AOPI) and AOPI surveillance is vital to preventing these illnesses. Data on such illnesses are collected and analyzed to identify high-risk groups, high-risk pesticides, and root causes. Interventions to address these risks and root causes include farmworker outreach, education, and regulation. Unfortunately, it is well known that AOPI is underreported, meaning that the true burden of this condition remains unknown. This article reviews the barriers to reporting of farmworker AOPI to public health authorities and provides some practical solutions. Information is presented using the social-ecological model spheres of influence. Factors that contribute to farmworker AOPI underreporting include fear of job loss or deportation, limited English proficiency (LEP), limited access to health care, lack of clinician recognition of AOPI, farmworker ineligibility for workers' compensation (WC) benefits in many states, insufficient resources to conduct AOPI surveillance, and constraints in coordinating AOPI investigations across state agencies. Solutions to address these barriers include: emphasizing that employers encourage farmworkers to report safety concerns; raising farmworker awareness of federally qualified health centers (FQHCs) and increasing the availability of these clinics; improving environmental toxicology training to health-care students and professionals; encouraging government agencies to investigate pesticide complaints and provide easy-to-read reports of investigation findings; fostering public health reporting from electronic medical records, poison control centers (PCCs), and WC; expanding and strengthening AOPI state-based surveillance programs; and developing interagency agreements to outline the roles and responsibilities of each state agency involved with pesticide safety.

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Keywords

Agriculture; farmworker; occupational; pesticides; poisoning; surveillance; underreporting

Introduction

Farmworkers are at high risk of acute occupational pesticide-related illness (AOPI) and AOPI surveillance is vital to preventing these illnesses. Data on such illnesses are collected and analyzed by public health authorities at the local, state, and federal levels. Surveillance findings are used to identify high-risk groups, high-risk pesticides, and root causes. Interventions to address root causes and reduce risks include stakeholder outreach, education, and regulation.

The problem of underreporting of AOPI to public health authorities is well-known,[1] and this hampers the effective operation of AOPI surveillance. Farmworkers are vulnerable and economically disadvantaged and this compounds the underreporting of farmworker AOPI. Farm work is among the lowest paid jobs in the United States,[2] is physically laborious, and offers little job security. Many jobs in agriculture are temporary, and farmworker unemployment is double that of all other wage and salary workers.[3] Among farmworkers employed in the United States, approximately 68% were born in Mexico, 27% in the United States, 4% in Central American countries, and 1% elsewhere.[4] About half of all agricultural workers lack proper documentation to legally reside and work in the United States, and these workers have a strong fear of deportation.[5] Many farmworkers also have limited English proficiency (LEP), and 70% speak little or no English.[6] Approximately 72% of farmworkers did not complete twelfth grade, including 36% of them who completed sixth grade or less, and 3% having no formal schooling.[4]

It is estimated that as many as 88% of AOPI cases among farmworkers are not reported to the public health authorities.[1] Factors that contribute to the underreporting of work-related conditions of public health significance, such as AOPI, include the following: a person fails to perceive that they have a treatable condition, the affected person doesn't seek care, the person is misdiagnosed, the clinician fails to take an occupational history and fails to recognize that the condition is work-related, and the clinician fails to comply with the legal requirements to report the illness to public health authorities.[7] These factors may be more prevalent among farmworkers compared to other US workers due to farmworkers often having lower levels of formal education, LEP, and undocumented immigration status.[8] An additional factor in underreporting is the lack of a national mandatory requirement to report acute pesticide-related illness to public health authorities, although such a requirement exits in 30 states.[9]

This article reviews the barriers to public health reporting of farmworker AOPI and provides some practical solutions. Information is presented using the social-ecological model spheres of influence.

Methods

The findings in this article are based on the authors' decades of experience in AOPI surveillance, and on supporting documentation found in the literature. The supporting literature was identified by one or more of the authors being aware of it or by searching PubMed using search terms relevant for the specific documentation being pursued. Examples of the search terms used are 'limited English proficiency, agricultural worker, language barrier, rural, health care, and underreporting'.

Results

Reporting barriers due to fear

Farmworkers have identified fear of job loss, demotion, and the reduced chance of being rehired in subsequent seasons as barriers to reporting both unsafe work conditions and AOPI.[10] Farmworkers are aware of the precarious nature of their jobs and understandably do not want to appear to their boss as 'complainers' and so may refrain from bringing up concerns about unsafe conditions and illness. Poverty and job insecurity are strong motivators for farmworkers to retain their employment, even when the job presents unreasonable health and safety risks.

Although the H-2A temporary agricultural workers program, where US employers can bring non-immigrant foreign workers to the United States to work for that US employer only, mitigates deportation fears, it may not address other fears.[11] Guest workers who hold H-2A visas are considered legal residents and therefore are at low risk of deportation. However, because H-2A workers may desire to participate in the H-2A program in subsequent years, and because they may have LEP, these guest workers are also unlikely to complain about unsafe working conditions, ill health, or low pay.

Some of the described fears are not unfounded. Although laws exist to protect 'whistleblowers' (i.e., those who report employer wrongdoing) from unfair firing, they are often difficult to enforce.[12] Furthermore, farmworkers are excluded from the right to engage in union activity without retaliation from their employers (National Labor Relations Act 1935, 29 USC § 151), but some states have laws to provide this right (e.g., WA).[13] Because federal law does not protect farmworkers' right to join a union or engage in collective bargaining, they may be unable to use collective action to raise wages or to improve unsafe working conditions.

Reporting barriers due to LEP and lack of formal education

When AOPI occurs, LEP and lack of formal education limit not only how a farmworker can get help, but also how much help clinicians and state agencies can provide.

Farmworkers unable to get help—Language barriers present obstacles to effective pesticide safety training and to adequate medical care after a pesticide exposure. Even when training is in a farmworker's primary language, he or she might have difficulty understanding the content.[14,15] For example, a silent video that conveys information using bulleted statements may be difficult for individuals with poor reading proficiency to

comprehend, especially if technical language is used. LEP patients have indicated that language can be problematic when making an appointment, discussing ailments at a doctor's visit, and following post-appointment instructions.[16] These problems are compounded by the seasonality of work, which often forces farmworkers to be migratory.[17–19] This compromises continuity of care because with each change of address, the farmworker must find a new health-care provider, quite possibly in an area where the individual is unfamiliar with local healthcare resources.

Providers unable to help—As for health-care providers, many clinics or hospitals do not meet the National Standards for Culturally and Linguistically Appropriate Services (CLAS standards) in health care.[20,21] Federal CLAS standards mandate health-care organizations to make timely language assistance available to LEP patients at no cost, inform LEP patients of their right to receive language services, have patient information written in languages commonly seen and served, and avoid using family and friends as interpreters (i.e., reliance on family members as interpreters should be avoided because it can increase the risk of medical errors, the patient may not want to share sensitive health information with a family member, and the interpreter may not understand medical terminology).[21] A provider might prefer to avoid using time-consuming interpreter services so he or she can maintain tight patient visit schedules. Even when interpreter services are provided, interpreted sessions between clinicians and patients can be awkward and prolonged.[22]

Reporting barriers related to access to health care

Health-care access for farmworkers is a major problem.[23] Factors affecting agricultural workers' access to health care are complex, but can include the role of a supervisor, long distances to the nearest clinic, high cost, worker mistrust of health-care providers, and ineligibility for workers' compensation (WC).

Role of a supervisor—A farm owner or crew supervisor can impede or facilitate worker access to health care after a worksite injury. Anecdotal evidence from state surveillance agencies indicate some supervisors have provided or secured transportation for injured workers and assured that health-care providers had pesticide name information necessary to treat, and others have not.[24]

Distance to the nearest clinic—Primary-care provider shortage and remote locations compound the problem of health-care access.[25,26] Given the low density of clinics in US rural areas, farmworkers must sometimes travel great distances to obtain health care. Covering these long distances to reach a clinic is especially problematic because few farmworkers have access to personal automobiles.[27]

In addition to distance and transportation difficulties, clinics being closed during the farmworkers' off-duty hours present practical barriers to care. Farmworkers have long and irregular working hours, while clinics often have an 8 AM to 5 PM schedule. Hospital emergency rooms may be an option, but risk becoming overburdened by the demands of nonemergency patient care.

High cost of care and lack of insurance—According to the 2009 California Health Interview Survey, 67% of documented immigrants and 82% of undocumented immigrants delayed getting needed medical care in the 12 months preceding the interview because of cost or lack of insurance.[28] Furthermore, noncitizens and their children are less likely to have health insurance[29], and among those with health insurance, it is often a high-deductible health plan requiring at least $1000 of out-of-pocket expenses before insurance coverage commences.[30]

Federally qualified health centers (FQHCs) have sliding-scale fees, which makes health care more affordable for farmworkers.[31] Unfortunately, farmworkers may not be aware of FQHCs or there may not be a nearby FQHC.

Mistrust of health-care providers—Although honesty, communication, and competence are important characteristics of high-quality medical care, such traits are difficult to measure.[32] Mistrust of the health-care system, which appears to be higher among individuals who are uninsured or between 31 and 60 years old, may lead to poor health and reduced or delayed utilization of medical services.[33] In a systematic review of access to health-care services, clinicians perceived that patient mistrust was especially high when patients were unfamiliar with the local health-care system.[34] Among undocumented workers, fear of being reported to government authorities may contribute to patient mistrust; however, such reporting by clinicians is uncommon.[34]

Reporting barriers due to clinicians not recognizing and reporting AOPI

Clinicians often do not correctly diagnose AOPI, leading to underreporting to public health authorities.[35] There are several reasons for this. First, health-care professionals rarely receive training in collecting environmental and occupational histories, and it is uncommon for them to receive instruction on environmental and pesticide toxicology.[36] As such, clinicians may not collect the environmental and occupational history needed to determine the causal agent of a patient's illness. Other reasons that AOPI is rarely recognized are because pesticide poisoning is relatively rare in developed countries, and its signs and symptoms often resemble those of more common conditions. Often these common conditions (e.g., upper airway irritation or gastroenteritis) may be preferentially diagnosed. Furthermore, laboratory tests to confirm an AOPI diagnosis are rarely available. Clinicians often prefer that their suspicions of an occupational illness be confirmed by a laboratory test. When such tests are unavailable, it weakens the clinician's resolve to report the case to public health authorities. In addition, clinicians may be concerned about potential Health Insurance Portability and Accountability Act (HIPAA) violations if they report an illness to public health authorities, and may not be familiar with the HIPAA exceptions (described later in this article).[37] Primary-care providers and their staff may also be too busy to report an illness to public health authorities; they may see their priority as providing medical care, with public health prevention being of secondary importance. Finally, even when correctly diagnosed, some patients may not be reported to public health authorities because of a lack of understanding of the requirement or because the clinicians fear that they or their patients may be subject to retaliation. A type of retaliation that a clinician can experience is loss of business. If an employer is unhappy that a clinician submitted an illness report to public

health authorities, the employer might cease sending its employees to the clinician who had been providing acute care and medical clearance evaluations.

Barriers to use of WC

WC is a type of insurance that provides wage replacement and medical benefits to employees who are injured or become ill at work. WC filing requirements vary by state and industry sector, which limits the usefulness of these data for occupational health research and surveillance.[38,39] For example, at least 18 states do not require agricultural employers to have WC coverage (Table 1). Although the H-2A temporary foreign agricultural worker visa requires employers to provide WC to these workers, it covers only approximately 150,000 of the estimated 1–2 million seasonal and migrant farmworkers.[23] The number of agricultural workers with an H-2A visa doubled between 2012 and 2016, reflecting a positive trend in the numbers of agricultural workers with WC coverage.

WC awareness and low-severity illness

In Washington, it has been estimated that 16% of the workers were unaware of WC coverage and 8% of the workers feared employer retaliation and therefore did not file WC claims.[43] Compared to other occupations, those who worked in agriculture, forestry, or fishing ranked higher in work-related injury or illness reporting but lower in WC claims filing.[43] Low illness severity, as measured by time spent away from work or site-specific disability, has also been linked to patients not filing WC claims.[44–46] Although AOPI was not included in those studies, a majority of known cases are classified as low severity.[47]

Barriers to provider use of the WC system

A survey of 62 medical directors and administrators in Massachusetts revealed that more than 60% identified uncertainty about work-relatedness and lack of familiarity with WC system as factors that ‘somewhat’ or ‘very much’ discouraged use of WC at community health centers.[48] In addition, delayed reimbursement either ‘somewhat’ or ‘very much’ discouraged use of WC by 54% of administrators and 22% of medical directors.[48] Another important source of WC underreporting is that the clinician must recognize a condition as being work-related and document this in the medical record.[48,49] As explained earlier, an occupational etiology is often unrecognized because an occupational history is not collected. Such documentation is also important for billing. The billing staff is required to be sure that the work-relatedness of the condition is reflected in the medical record before they can justify invoicing WC for medical services.

Reporting barriers related to state agencies

In at least 13 states, the state health department conducts pesticide poisoning surveillance activities, which are performed in collaboration with other state agencies. State interagency coordination is necessary for the identification and efficient investigation of pesticide poisoning case reports, and also for appropriate follow-back to responsible parties for prevention. These other state agencies often include state agriculture departments, state environmental protection departments, and state labor departments.

Although each of these agencies serves an important role in protecting farmworkers from pesticide exposure and pesticide-related illnesses, there are constraints that hamper state interagency coordination. For example, although the HIPAA privacy rule under the public health exception permits health-care providers to disclose personal identifiers without individual authorization to public health authorities, this exemption doesn't apply to health departments interested in sharing those personal identifiers with other state agencies. That is, state health departments are prohibited from sharing personal identifiers (e.g., name, address, phone number) with other state agencies unless there is permissible state law, a memorandum or interagency agreement between the two agencies, or the exposed/ill person has provided consent either verbally or in writing.[37] The dueling responsibilities of protecting public health and protecting a farmworker's identity must be carefully considered. It is important to protect the farmworker's identity from being divulged to the employer, thereby preventing retaliation against the employee, but it is also important to avoid impeding efficient and effective public health collaboration across state agencies. When state health departments share identifiers with other state agencies, appropriate safeguards are needed to prevent disclosures inconsistent with the interagency agreement and to minimize the possibility of retaliation against the farmworker.

Staff shortages and lack of resources also limit the scope of state-based surveillance activities. For example, among the 13 states that support pesticide-related illness surveillance programs, at least three exclude nonoccupational cases of pesticide-related illness and injury from their surveillance activities (i.e., Iowa, Nebraska, and Texas). In the other 10 states, resources are conserved by excluding some low-severity cases from follow-up activities or excluding disinfectants from surveillance. In addition, because of inadequate staffing and resources, agreements that are needed for interagency collaboration are often never developed.

Occupational safety and health administration—OSHA, an agency of the US Department of Labor, ensures safe working conditions by setting and enforcing standards and by providing training and assistance to workers and employers. In 28 states, OSHA directly covers workers, while in the other 22 states, workers are covered through an OSHA-approved State Plan.[50] In the agricultural industry, OSHA and OSHA-approved State Plans regulate hazard communication, farm labor housing, and field sanitation. In most states, OSHA and OSHA-approved State Plans are prohibited from enforcing these regulations on farms with 11 or fewer employees. Because most agricultural workplaces have 11 employees or less, many farmworkers are not afforded OSHA protections. Washington State and California are exceptions, as all farmworkers in those states are protected by OSHA regulations, regardless of employer size.[51]

Practical solutions

Each step in the sequence from farmworker pesticide exposure to successful classification of a confirmed AOPI case by public health authorities is beset with barriers. Practical solutions to address many of these barriers are provided in Table 2, sorted by the levels of the social-ecological model of change.[52] Below we elaborate on some of the more important solutions,

which are organized along a continuum ranging from public health policy promulgated at the federal level to actions undertaken by individuals.

Policy-level interventions (i.e., federal and state regulations) can involve expanding WC coverage to include all farmworkers and expanding farmworkers' rights to engage in union activity to protect these workers against retaliation. Surveillance systems that track AOPI (e.g., the SENSOR-Pesticides program) can be expanded to new states and strengthened in currently participating states.[53] Better collaborations between state health departments and other relevant state agencies (e.g., poison control centers [PCCs], WC agencies, and state departments of agriculture) can improve the success of surveillance systems. To establish these collaborations, these other state agencies also need expanded resources and staffing. Multiagency coordinating boards and advisory committees could be fostered that function to coordinate investigations and report findings of AOPI investigations. An example is the Pesticide Analytical and Response Center Panel in Oregon.[54] Measures can also be taken to automate prompt reporting to state health departments from PCCs and WC insurers. This could increase the volume and timeliness of reports, allowing state agencies to more quickly initiate investigations and interventions.

State agriculture departments are often the lead agency in a state that regulates pesticides, functioning as the Environmental Protection Agency designee for enforcement of the Federal Insecticide Fungicide and Rodenticide Act (FIFRA). They conduct inspections and investigate pesticide-related complaints, interpret pesticide compliance requirements, issue penalties when violations are identified, and enforce the Federal Worker Protection Standards (WPS). Given their important role in ensuring safe pesticide use, state agriculture department staff should be trained on the value of AOPI reporting to recognize how their actions can contribute to successful reporting, improved surveillance, and illness prevention.

The WPS is a regulation under FIFRA that is aimed at reducing the risk of pesticide poisoning and injury among agricultural workers and pesticide handlers. Revisions to the WPS were finalized in 2015 to address the root causes for the persistently elevated farmworker AOPI rates.[55] Among the many WPS enhancements adopted in 2015 was an increased training frequency (i.e., annually instead of every 5 years) and expanded training content that should help prevent acute pesticide-related illness.[56] When such illnesses occur, the training should also help farmworkers recognize AOPI and seek treatment more quickly. In addition to the *policy* level, smooth adoption of the revised WPS will also influence other levels within the social-ecological model of change framework. For example, ensuring that workers are effectively trained on how to prevent pesticide exposure, and how to recognize and appropriately respond when they may have a pesticide-related illness, will influence the *organizational* and *individual* levels.

At the *organizational level* (e.g., health-care systems and farmworker employers), employers are responsible for maintaining a safe worksite. Enlightened employers can encourage, empower, and reward workers who report safety concerns to their supervisors. Employers may be perceived as more supportive and trustworthy when they encourage their workers to report safety problems and work-related illness and injury. Farmworkers may need transportation to medical care after a work-site injury. Supervisors are uniquely positioned to

facilitate that transportation and to ensure emergency medical staff are provided with the information about the pesticide involved and the exposure scenario. Transportation issues can be reduced for ongoing and preventive care through more mobile clinics and community health fairs.

Interpersonal-level interventions (e.g., those involving clinicians, family, and peer groups) include providing enhanced interpreter services and training to overcome language barriers in health-care settings. Telephone interpreters can be used when in-person interpreters are unavailable, and providers can be encouraged to spend more time with patients during interpreted encounters.[21,57] Another solution to overcome long distances to the nearest clinic is the use of telemedicine, which allows clinicians to provide remote diagnosis and treatment through telecommunications technology.

Individual-level interventions (e.g., farmworker knowledge, skills, beliefs) can include having government authorities investigate all pesticide-related complaints made by farmworkers, and when an investigation is completed, farmworkers should be provided with an easy-to-read report that summarizes the investigation findings. These can serve as an important visible outcome for workers (and clinicians) to demonstrate that their complaints aren't being ignored and that action was taken. The near-ubiquitous use of cell phones, with their capacity for real-time streaming and video recording, is an empowering tool that may encourage expanded reporting to government agencies. Video recording and photos can provide objective evidence that a farmworker was exposed to pesticides (e.g., recording an off-target pesticide drift event), and this evidence may fortify the resolve of a worker to move forward with a complaint.

Conclusion

Improved public health reporting of farmworker AOPI is vital to the accurate determination of the magnitude, characteristics, and root causes of this condition. Once the root causes have been ascertained, interventions can be targeted toward their mitigation. This article reviews the many barriers that hamper reporting of farmworker AOPI to public health authorities and suggests some practical solutions. Implementing these solutions should result in a safer and healthier agricultural workforce.

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Table 1

Workers' Compensation (WC) coverage requirements for farmworkers by state, 2016.

Agricultural Employer WC Coverage Requirements[a]	**Conditions for Agricultural Employer Exclusion**[a,b]	**States**														
Voluntary	Not applicable	AL	AR	DE	IN	KS	KY	MS	NE	NV		NM	ND	RI	SC	TN
Elective	Not applicable	MI	NJ	TX	WY											
Compulsory	None	AZ	CA	CT	DC	HI	ID	MA	NH	OR						
Compulsory	Unspecified	UT														
		1 Exclusion						2 Exclusions[c]							3 Exclusions[c]	
Compulsory	Earnings or payroll threshold	CO	IA	NY	OK	VT		AK	PA	MN	LA				MD	
	Number of employees threshold	VA	WV	NC								FL	ME		MD	WI
	Part-time or temporary work	IL	MI	MT					PA			FL	ME			WI
	Nature of work[d]	SD	GA					AK			LA				MD	
	Family farm	OH	WA							MN						WI

[a]Coverage requirements include: compulsory – agricultural workers are covered the same as all other employees; elective – agricultural employers may accept or reject the statutory provisions, but if rejected, the employer loses the three common-law defenses: contributory negligence, assumption of risk, and negligence of fellow employees. Given the risks of not being covered by these three common-law defenses, agricultural employers generally accept the statutory provisions; voluntary – agricultural employers are permitted to secure coverage voluntarily, even though no statutory provisions are prescribed. In states with voluntary requirements, employers who reject workers' compensation choose between personal liability and purchasing general liability insurance.[40,41] The WC coverage requirement categorizations reflect a review of two national reports with listings by state.[40,42] A more detailed and in-depth state-by-state analysis of WC laws may produce slightly different findings.

[b]Some states that have compulsory requirements provide exclusions whereby some farmworkers are not required to be covered by workers' compensation. This column provides details on those exclusions.[42]

[c]State names listed more than once in a column reflect multiple exclusions for that state.

[d]For example, conditions for agricultural employer exclusions in South Dakota are 'based on the predominant nature of the employee's work, and the employer's business. No exclusion if primarily in the business of operating threshing machines, grain combines, corn shellers, cornhuskers, shredders, silage cutters, and seed hurlers for profit'.[42]

Table 2

The social-ecological model for barriers to reporting of acute farmworker pesticide-related illness to public health authorities.

Sphere of influence	Reporting barriers	Recommendations for improvement
Policy (e.g., local, state, and federal laws and regulations)	1. Immigration status: undocumented and H-2A temporary agricultural workers' fear of deportation	1. Farmworkers can be better protected by whistleblower laws
	2. Difficulty in enforcing laws protecting farmworkers from unfair job termination	2. Expansion of workers' compensation coverage to include farmworkers
	3. Farmworkers ineligible for workers' compensation in many states	3. Expansion of farmworkers' rights to engage in union activity
	4. Federal law does not protect farmworkers' rights to join a union or engage in collective bargaining	4. Surveillance systems that track acute pesticide-related illness (e.g., the SENSOR-Pesticides program) can be expanded to new states and strengthened in currently participating states
	5. State AOPI reporting requirement in 29 states, of which only 13 are part of the national surveillance program (i.e., SENSOR-Pesticides)	
Organizational (e.g., local health departments, health-care systems, and farmworker employers)	1. Fear of job loss and demotion	1. Employers can encourage, empower, and reward workers who report safety concerns
	2. Underreporting of pesticide poisonings by clinicians	2. Clinicians and patients can be encouraged to contact their PCC to report AOPI
	3. Constraints in interagency collaboration among state agencies	3. Adoption of electronic medical records, PCC data, and workers' compensation data to improve reporting
	4. Limited resources and expertise to conduct surveillance and reporting	4. Ensure adequate staffing of state government agencies, some of whom are bilingual
	5. Limited access to health care due to high cost, lack of insurance, remote location, and unavailability of transportation	5. Establish interagency agreements that outline the specific roles and responsibilities of each state agency
		6. Provide mobile clinics at farmworker labor camps, or transportation can be provided to the clinic.
		7. Raise awareness of federally funded community and migrant health centers, and increase the availability of such clinics
		8. Promote use of telemedicine, which allows clinicians to provide remote diagnosis and treatment through telecommunications technology
Community (e.g., schools, community advocacy groups, media, faith-based organizations)	1. Limited access to community resources, e.g., migrant workers are unfamiliar with local health-care resources	1. Remote deployment of teams made up of nonphysician and lay health workers (promotores de salud) to provide supportive services
Interpersonal (e.g., health-care providers, community health workers, or promoters)	1. Clinician failure to obtain a relevant occupational and environmental history and difficulty in recognizing AOPI	1. Provide greater access to in-person and online training about pesticide-related illness to health-care students and professionals
	2. Clinician failure to report AOPI to public health authorities	2. Periodically send physicians a reminder on the legal obligation to report AOPI
	3. Limited English proficiency	3. Enhanced interpreter services and training to overcome language barriers and increasing pesticide-related illness reporting in health-care settings
Individual (e.g., knowledge, skills, beliefs, attitude, developmental history)	1. Fear of retaliation (e.g., job loss, demotion)	1. Enlightened employers can encourage, empower, and reward workers who report safety concerns
	2. Lack of education and job skills	2. Effective implementation of revised Worker Protection Standard (WPS) with its expanded training requirements

Sphere of influence	Reporting barriers	Recommendations for improvement
	3. Lack of farmworker understanding of pesticide toxicity and their civil rights	3. Farmworkers can obtain objective evidence (video recording or photos) about pesticide exposure, which helps them move forward with a complaint.
	4. Acceptance of unsafe working conditions due to poverty and job insecurity	4. Government agencies might investigate all pesticide-related complaints and provide easy-to-read reports of investigation findings
	5. Distrust towards health-care providers and government officials	

AOPI = acute occupational pesticide-related illness

Migrant health centers are a special type of Health Resources and Services Administration (HRSA)-funded health center. Migrant health centers work to mitigate challenges to health care faced by many migrant workers, such as transportation, language access, cost, and clinic operating hours. There are currently 174 migrant health centers nationwide that serve 891,000 farmworkers and their families.[51] Additionally, because most farmworkers lack health insurance and their average wages are near the federal poverty line, migrant health centers offer care on a sliding fee scale.[52]