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What 30 Years of Research Tells Us About Farmworker Protections, and What It Means in the Exam Room

By **Joseph G. Grzywacz**, PhD, Associate Dean for Research, College of Health and Human Sciences, San José State University, California

During a visit to a clinic, a farmworker reports to their clinician, "The farm gave a training." The clinician may wonder: did it cover what protects them? Were water and soap available in the field? Did they feel free to stop and use them? A new review of three decades of research suggests clinicians should ask, because no one has systematically checked whether federal protections work as intended.[1]

Two rules, one gap

Two federal standards are meant to protect agricultural workers. The EPA's Worker Protection Standard (WPS), in place since 1992 and revised in 2015, covers pesticide safety training, notification of applications, protective equipment, and emergency aid.[1] The Field Sanitation Standard (FSS), in place since 1987, requires employers with 11 or more hired workers to provide drinking water, toilets, and handwashing facilities.[1]

Northeastern University and San José State University researchers searched five databases and identified 40 empirical studies published from 1990 to 2024 that evaluated at least one element of either standard.[1] Their main conclusion is that the evidence is piecemeal. In 2018, the EPA Office of Inspector General recommended a systematic evaluation of the WPS.[2] The review found that this has not happened.[1]

Key findings

Training dominates the evidence.

Of the 40 studies, 26 focused on receipt of WPS worker training. Notification of applications, restricted-entry intervals, and buffer zones were each studied once.[1]

The FSS is barely studied.

Only nine studies examined it, and only one looked at it alone. Seven of the eight FSS studies were cross-sectional, so they cannot show impact.[1]

The evidence is geographically narrow.

Fifteen studies came from North Carolina and 24 from the Atlantic Southeast. California and Texas, which have the largest farmworker populations, contributed very few.[1]

Most studies are old.

Twenty-seven of 40 were published before the 2015 revision, so provisions such as the application exclusion zone and annual training are largely unevaluated.[1]

Training evidence is weak.

The authors cite the finding that the evidence base on training effectiveness is limited.[1,3]

Many workers are missing from the evidence.

About one quarter of study samples included H-2A guestworkers. Only 15% of studies distinguished seasonal, migrant, and year-round workers. Two studies focused on adolescents.[1]

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Why this matters clinically

Dermal exposure is the main route, so washing matters. Pesticide absorbed through the skin contributes heavily to dose.[4] Farmworkers are exposed to multiple pesticides throughout a season.[5] One study in the review found that handwashing and protective behaviors were linked to lower exposure, but only when workplaces supplied essentials such as warm water.[1] Counseling a patient to "wash up" is hollow if the field has no water or soap.

Some patients are less visible in the evidence. Women and pregnant workers were framed as needing enhanced protections in only 7 of 40 studies.[1] Guestworkers, adolescents, and workers in California and Texas are thinly represented. Do not assume that research conducted elsewhere describes your patient's workplace.

"Did you get trained?" is a start, not an answer. Most research asks whether workers received training. It rarely asks whether training led to changed behavior to potentially reduce exposure or illness.[1] A patient who says "yes" may have received a brief session with unclear content (usually a video). Ask what they remember, in what language they received it, and whether they could act on it.

Behavior is shaped by pay and power. The review describes how piece-rate pay creates conflict between earning and protecting oneself. Workers may skip protective equipment when pressed to work fast, and discomfort from gear can mask heat distress and dehydration.[1,6] Authors also note that the rules largely place responsibility on workers to adopt protective behaviors, and on employers to provide resources, without testing whether that is enough.[1,7] Counseling that ignores these constraints may not help and can feel like blame.

Plain-language glossary for community health workers

WPS (Worker Protection Standard): The EPA rule on pesticide safety for farmworkers and pesticide handlers. It includes training, warnings about treated fields, protective equipment, and washing supplies.

FSS (Field Sanitation Standard): The OSHA rule requiring drinking water, toilets, and handwashing stations in the field for employers with 11 or more hand laborers.

Dermal exposure: Pesticide absorbed through the skin, the main route of exposure for farmworkers.[4]

Take-home exposure: Pesticide residue carried home on clothing, shoes, or skin, which can reach family members.

H-2A: A temporary agricultural guestworker visa. Workers are tied to one employer.





Questions to consider adding to your occupational history

Migrant Clinicians Network has a short Environmental and Occupational Health Screening Questions for Primary Care handout. The handout features just three questions in English and Spanish:

1) Describe what you do for work.
Describa lo que hace en su trabajo.

2) Are there any physical activities that you do – at work or away from work – that you feel are harmful to you?
¿Hay alguna actividad física - en el trabajo o en otro lugar - que crea usted es dañina para usted?

3) Are you exposed to chemicals, fumes, dusts, noise, and/or high heat at your work or away from work? Do you think these are harming you?
¿Está usted expuesto a químicos, gases, polvo, ruido y/o altas temperaturas en su trabajo o en otro lugar? ¿Piensa usted que estas cosas lo pueden dañar?

Additional recommended questions:

- What do you do on the farm, and what crops do you work with? Are you paid by the hour or by the piece?
- Do you worry about what happens if you raise a concern?
- Where do you wash and store work clothes? Who else at home might be exposed?
- When did you last receive pesticide training? Was it in a language you understand?
- Is there clean drinking water, a toilet, and soap and water where you work? Can you use them when you need to?
- Do you know when fields have been sprayed, and how long to stay out?

Practical steps for clinics



Take an exposure history. Add work tasks, pay structure, and access to water and sanitation to routine visits.



Teach take-home precautions realistically. Discuss changing clothes, washing work clothes separately, and showering. Ask what is feasible at home or in employer housing.



Recognize heat illness and pesticide illness as overlapping. Both can present with nonspecific symptoms. Consider both when a worker presents after a shift.



Know your reporting pathway. Pesticide illness reporting requirements vary by state. Confirm yours with your state health department. MCN's Pesticide Reporting Map provides contact information by state.



Give community health workers a role. *Promotoras* and community health workers can reinforce training content in Spanish and other languages and help patients name barriers they face at work.



Document. Clinic records may be among the few sources of data on workplace conditions, in a literature the authors describe as geographically and temporally sporadic.[1]

The bottom line

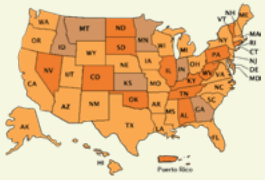
The review does not show that these standards fail. It shows that we cannot tell whether they succeed.[1] Until systematic evaluation occurs, clinicians and community health workers see the effects of workplace conditions firsthand.

Ask, document, and report.

Resources

Migrant Clinicians Network pesticide and WPS resources, including Juan Abre los Ojos comic book and other patient and worker education materials and Spanish-language videos, are available at www.migrantclinician.org/resources/235/pesticides/index.html

MCN's Pesticide Reporting Map: www.migrantclinician.org/pesticides



EPA, Agricultural Worker Protection Standard information and "How to Comply" materials.[8]

MCN's Environmental and Occupational Health Screening Questions for Primary Care handout: www.migrantclinician.org/resource/environmental-and-occupational-health-screening-questions-primary-care

National Pesticide Information Center, for clinician and patient questions.[9]

Materials from the La Familia Sana Promotora Program of Wake Forest School of Medicine available at school.wakehealth.edu/departments/family-and-community-medicine/research/la-familia-sana-promotora-program

Poison Control, 1-800-222-1222, for suspected pesticide poisoning.

OSHA, Field Sanitation Standard requirements.[10]

Association of Occupational and Environmental Clinics (AOEC) - The Association of Occupational and Environmental Clinics: https://aoec.org/

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Disclosure

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El Niño and Its Impact on Community Health Centers

By **Marysel Pagán Santana**, DrPH, MS , Director of Environmental & Occupational Health, Migrant Clinicians Network

This summer was one of extremes due to the El Niño phenomenon. El Niño is the periodic warming of waters in the eastern and central Pacific Ocean near the equator. This phenomenon affects global weather patterns for months at a time, influencing hurricane activity, temperatures, and precipitation.

Often, when disasters in the United States are tallied, hurricanes are one of the most frequent and devastating emergencies that communities experience. This year, for the first time in more than 100 years, the Atlantic region had not experienced a named hurricane throughout the season. It was not until early October that the first hurricane, Isaias, developed and affected Florida. However, the absence of hurricanes did not mean an absence of weather-related emergencies and disasters.

During July, record-breaking temperatures made July 2026 the hottest month globally, resulting in multiple prolonged heat waves across regions of Europe, North America, Africa, and Asia. In Europe, these heat waves resulted in more than 35,000 excess deaths. Meanwhile, monsoon rains affected South Asia, causing catastrophic flooding, particularly along the Nepal-China border, where flooding and an avalanche of ice and rock resulted in more than 1,300 deaths. Although the Caribbean did not experience hurricanes, it was affected by prolonged periods of drought, particularly in Jamaica, Puerto Rico, and the U.S. Virgin Islands. In Puerto Rico, these conditions resulted in a USDA disaster declaration and a State of Emergency, leading to periods of water rationing in several regions of the Island. For now, rationing has concluded, but dry conditions are expected through February, and the Island remains on watch.

These events not only cause direct deaths but also affect the health of individuals and communities in multiple ways, including creating challenges in managing infectious and chronic diseases due to disruptions in access to safe drinking water and electricity. These challenges can also be compounded by public policies that may limit access to health services among the most vulnerable populations. **At the same time, these events highlighted remaining gaps in emergency response plans and prompted the review of systems that had not been reassessed or maintained following the major events that originally led to their creation.** This year's weather events are not over, and regions that could experience extreme cold and freezing conditions should begin preparing.

A particularly rainy winter is expected in southern areas, along with extreme snowfall in some locations. Pacific regions could experience periods of extreme rainfall before transitioning into periods of drought. For northern regions of the United States, this could mean a dry winter, affecting regional activities associated with the season, while lower energy consumption for heating may be expected. Further, incidences of extreme weather are becoming more frequent and more extreme. Previous approaches to prepare for extreme weather may no longer be sufficient.

What does this mean for regions that will experience atypical temperatures?

For individuals, it means updating family emergency plans to anticipate longer and more severe weather than in previous years, and ensuring that alternatives are in place to maintain reliable access to water, electricity, and heating. **For people living with chronic conditions, it also means speaking with their health care providers about how these events could affect their treatment.** For health care teams and health service providers, it is essential to review emergency preparedness and response plans with these new, even more extreme weather patterns in mind, to ensure continuity of care throughout this period.

Emergency plans for weather-related events should be integrated, comprehensive, and connected to the community. By integrated plans, we mean considering all aspects of a community that could affect health care operations and the ways in which community members access health services. Comprehensive plans should identify and assign clear roles to the entire health care team before and during an emergency. These plans should take an all-hazards approach while considering the specific risks associated with a particular event, such as extreme snowfall. They should also identify the infrastructure needed to maintain services and determine which care modalities, such as telemedicine or home visits, can be used to preserve access to care. It is essential that these plans go beyond maintaining emergency services and consider how preventive and chronic care services can continue operating, since these services represent a significant portion of patients' long-term health needs. This includes plans to maintain cancer screening programs and seasonal immunizations. Finally, it is critical that emergency plans be connected to the community. **This means understanding the risks, needs, and resources of the communities served by health care organizations.** This can be achieved by developing community engagement and collaboration programs that build mutually beneficial relationships between health care organizations and communities, with the shared goal of protecting health and preventing or reducing the health impacts of weather-related events.

Migrant Clinicians Network's emergency preparedness curriculum, developed as part of our USDA program, is a valuable resource for supporting work with communities and developing integrated emergency plans that recognize communities as essential partners and additional sources of support in preparing for, responding to, mitigating, and recovering from emergencies while protecting patients' health.

Preparing For Weather Patterns that Previously Didn't Exist

The hurricane season and drought conditions provided a preliminary glimpse of what this year's extreme "Super El Niño" may mean for our environment. We should not let our guard down during the winter months. **Health care institutions should review, update, and expand their preparedness and response plans** for the supercharged weather disasters the community is at risk of experiencing; ensure that they are grounded in community collaboration; and include the continuity of preventive health services as a key priority.

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Should Sunglasses Be Considered Personal Protective Equipment?

By Migrant Clinicians Network's **Rebekah Stewart**, PhD, MPH, FNP-C, Clinical Nurse Educator, with support from **Nilsa Padilla**, MPA, Senior Manager of Health Network and Research; **Yamile Arango Coquand**, Communications Coordinator; and **Claire Hutkins Seda**, Director of Communications

[Editor's Note: This article first appeared on MCN's two Substacks, On the Move with MCN, our English Substack, and Cosechando Salud con MCN, in Spanish. Subscribe to hear migrant clinicians' perspectives on emerging health concerns: **migrantcliniciansnetwork.substack.com** for English and **cosechandosalud.substack.com** for Spanish.]

Enedelia Basurto, one of MCN's Community Health Navigators for Health Network, used to be a farmworker, so she understands firsthand the long hours spent under the sun and the health risks associated with outdoor work – including risks to the eye. When Migrant Clinicians Network received a donation of 1500 UV-protective sunglasses for outdoor workers from ESP Eyewear, Basurto called her sister – still a crew leader for a vineyard in California.

On the day of the distribution, workers were spread out across long rows of grapevines under the intense sun in the middle of grape harvest season. Harvest stations with umbrellas for shade, grape boxes, and crews in hats and long sleeves filled the fields.

The team from Quality Farm Labor Services, the farm contractor that headed up the distribution, handed out the new UV-protective sunglasses along with Migrant Clinicians Network's new one-page eye health education flyer, designed in English and Spanish to help workers protect their vision and better understand the long-term effects of sun exposure.[1]

"Workers were very interested in the sunglasses because they provide immediate protection from glare and sun exposure during long hours outdoors," noted Nilsa Padilla Elías, MPA, Senior Manager of Health Network and Research for Migrant Clinicians Network. "Many workers tried them on right away and appreciated receiving practical equipment they could use on the job that same day."

The Reality of Eye Trouble

But are sunglasses so critical? For Yamile Arango Coquand, communications coordinator at Migrant Clinicians Network, the answer is clear. Arango suffers from a common eye condition called pterygium. About a year ago, she began noticing a small growth near her cornea, accompanied by intermittent pain, significant dryness, and the sensation that something was stuck in her eye, almost like having an eyelash caught in it. Over time, the pain became more persistent and started interfering with ordinary parts of her day, including driving, looking at screens at work, or enjoying a movie, where she struggles with the pain.

The condition has also meant making time for repeated medical appointments, follow-ups, and new treatments. What might sound like a relatively small eye problem can quickly become disruptive, taking time away from work, family routines, and the moments that are supposed to feel restful.

At one of her many appointments as she treated her condition, Arango Coquand's provider explained that pterygium is associated with cumulative UV exposure and that sun, wind, dust, and dryness can contribute to irritation and inflammation. That realization has changed the way Arango Coquand thinks about eye protection. Wearing UV-protective sunglasses is no longer just about comfort or style; it has become part of protecting her health.

"I never thought something in my eye could affect so many little parts of my day," Arango said. "It affects how long I can work at the computer, whether I feel comfortable driving, and even whether I can sit down and watch a movie with my family without pain."

Outdoor Workers, Including Farmworkers, Are Most at Risk

Outdoor workers may experience double the UV exposure of indoor workers, increasing their probability of cataracts at a younger age and greatly raising the risk for painful eye growths like pterygium. Because farmworkers and construction workers usually work very long days, they are often outside during the most dangerous hours of UV exposure, from 10 am to 4 pm. Construction workers and certain other outdoor workers face an additional risk of UV exposure from the sun reflecting off surfaces. Concrete, lawns, and surface water all reflect at least 10% of UV radiation back up. Other surfaces, such as new snow, can reflect up to 80% of solar radiation.

Additionally, these workers face numerous and overlapping barriers to accessing health care. Migration, lack of insurance, transportation challenges, inflexible and demanding work schedules, language barriers, and even fear or anxiety over interacting with institutions can make getting the doctor nearly impossible. When getting care is so difficult, preventative measures like sunglasses become critical pieces of protective equipment.







How the Twin Crises of Climate Change and Environmental Degradation Are Making It Worse

Outdoor workers' exposure to UV radiation is not just problematic: it's increasing. Climate change, environmental damage, and even ozone layer damage in certain regions and seasons causes higher potential UV exposure. Global warming makes summers and heat waves longer and more intense, causing higher UV radiation exposure potential for weeks or months more by driving more seasonable weather days that allow for outside activity. Even climate-driven changes in cloud patterns have led to longer periods of unblocked radiation from the sun. Traditional agricultural systems often included forested or wooded areas, where workers could enjoy shade for part of the day; modern agriculture relies on industrial-scale planting, weeding, and harvesting which requires tree-free farms. Indeed, industrial agriculture is a leading cause of deforestation – and when those trees have been removed, the workers on those farms are exposed to greater UV than if the forest remained.

How the Right Sunglasses Help

Anything that blocks or reduces UV light from the eyes will help reduce these risks. Sunglasses and hats are the simplest and safest way to protect the eyes. The UV coating on lenses absorbs and reflects harmful light. An anti-reflective coating on the inside of the lenses prevents light from bouncing back into the eyes. Polarized lenses help reduce glare from flat surfaces like water, snow, sand, and plastic covers on farming rows. Sunglasses should have lenses that provide 99 to 100 percent protection from UV-A and UV-B. These are usually marked as having a UV400 rating.

Sunglasses and hats are critical pieces of personal protective equipment for people who work outside. Many workers utilize both, but some outdoor workers do not wear UV-protective sunglasses consistently during their work shifts. MCN has also witnessed farmworkers forgo sunglasses when working. Although the reasons may be many, difficulties accessing high-quality, comfortable, work-appropriate, UV-protective sunglasses may be part of the barrier along with cost and lack of education about the risk of UV radiation.

What Migrant Clinicians Network is Doing

Migrant Clinicians Network, thanks to the generous donation from ESP Eyewear, is currently distributing 1,500 UV-blocking high-quality sunglasses and educational flyer to farmworkers, construction workers, and other outdoor workers most at risk all across the US and Puerto Rico. MCN is working closely with a few of our partners, including Grupo de Organizaciones de Trabajadores Agrícolas (GOTA), Ventanilla de Salud, and Health Network, to maximize our distribution, but our entire clinical network has access to download and print the new educational flyer in English and Spanish to assist their own communities in avoiding UV-related eye conditions: **migrantclinician.org/resource/sunglasses-protect-your-vision**.

We hope to develop a robust eye health program to address this overlooked health issue among outdoor workers and invite you to join us in protecting this critical workforce.

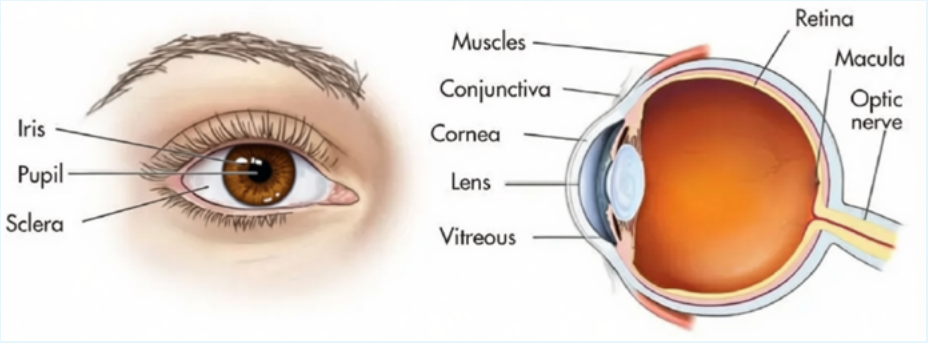


How to get involved:

Donate to MCN!
migrantclinician.org/donate

Donate sunglasses, hats, or other protective equipment for MCN to distribute.

Share your ideas for addressing this and other health issues among outdoor workers: migrantclinician.org/about/staff



Brief Overview of Eye Anatomy and UV-Associated Eye Conditions

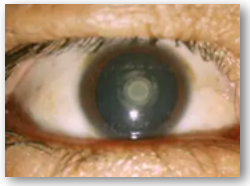
The Basics: Ultraviolet Light and the Eye

UV light is a form of electromagnetic radiation from the sun that is invisible because of its short wavelength. It enters eye tissues more easily than visible light. Within UV light, there are three types: UV-A, UV-B, and UV-C. UV-C is mostly blocked by the Earth's ozone layer. UV-A and UV-B penetrate the eye to different depths. UV-B radiation is completely absorbed by the front structures of the eye, whereas UV-A can reach through these to the very back of the eye. The radiation from UV-B and to some degree UV-A contributes to a wide range of acute and chronic eye conditions, from photokeratitis(sunburn of the cornea) to cataracts, to pterygium, and other conditions. Because UV exposure accumulates over a lifetime of work outdoors, protecting eyes from UV radiation is an important part of occupational health.

Eyes are complex sensory organs with multiple parts that all must work together perfectly to make it possible for people to see. The parts of the eye that are most impacted by eye problems caused by UV light are the following.

- **Sclera:** a tough, white, outer layer that creates the shape of the eye and protects it.
- **Conjunctiva:** a clear, thin layer that covers the sclera and lines the inside of the eyelids.
- **Pupil:** the dark hole in the middle of the iris that looks black.
- **Cornea:** a clear, dome-shaped window at the front of the eye that bends incoming light and protects the lens and iris behind it.
- **Iris:** the colorful, muscular ring that determines eye color and opens and closes to let light into the pupil.
- **Lens:** a transparent structure behind the iris and pupil that works with both to determine how much light enters the eye and directs it to the innermost back section of the eyeball.
- **Retina, macula, and optic nerve:** structures at the back of the eye that are responsible for sending signals to the brain to build an image of what is being seen.

Cataracts: Cataracts are the most common cause of blindness and visual problems worldwide.

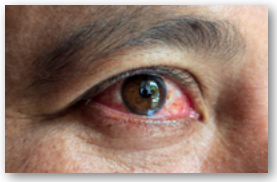


As a person ages, the proteins in their eye's lenses change and develop pigmentation, or color, that clouds the lens. Continuous exposure to UV rays speeds up this process. Many studies demonstrate a strong association between increased UV radiation, particularly UV-B, and cataract formation. Treatment requires surgical removal and replacement of the lens.

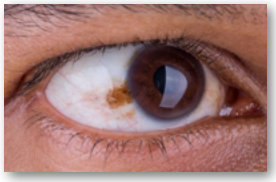
Pinguecula: This is another type of growth of the conjunctiva caused by UV exposure. It is usually smaller and less likely to affect vision than a pterygium. In severe cases, it can interfere with the way the tears cover the eye, causing dryness, redness, and inflammation.

Pterygium: This fleshy growth of the conjunctiva is a very common eye problem caused by too much UV exposure. When small, they cause irritation, redness, and a sensation of something in the eye. However, they can grow to cover the cornea and reduce vision. Workers who spend more than six hours daily in direct sunlight without eye protection have a three times higher risk of developing pterygium growths. While surgery can remove them, they often grow back.

Photokeratitis: Like a "sunburn" of the eye, photokeratitis is a very painful eye condition that results from unprotected eye exposure to UV rays. Symptoms include pain, redness, a gritty feeling in the eye, and distorted vision. It usually gets better without treatment within a few days.



Macular Degeneration: The macula at the back of the eye can break down as a person ages and can blur vision. Studies have found that outdoor workers have three times the chances of developing age-related macular degeneration.



Cancer of the Eye: UV exposure may increase the risk of certain eye cancers such as melanoma of the eye, which can be deadly, and basal cell and squamous cell cancers of the eyelid.

Resources

Here is MCN's new one-page full-color handout to download and share with outdoor workers: **www.migrantclinician.org/resource/sunglasses-protect-your-vision**



Learn about MCN programs and partners who received the sunglasses:

- **Grupo de Organizaciones de Trabajadores Agrícolas (GOTA):** www.youtube.com/@GOTA_2026
- **Ventanilla de Salud:** www.migrantclinician.org/ventanilla-de-salud
- **Health Network:** www.migrantclinician.org/our-work/health-network.html

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