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Protecting Migratory and Seasonal Agricultural Workers from Chronic Kidney Disease (CKD): The Impact of Working in Extreme Heat

National Center for Farmworker Health
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Today's Speakers




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Learning Objectives

- Understand Chronic Kidney Disease (CKD) and why MSAWs may be at higher risk for developing this condition.
- Learn how to recognize the early signs and symptoms of CKD to ensure timely intervention and support for MSAWs.
- Learn effective best practices and strategies to help educate MSAWs about protecting their kidney health.



Objectives Will Target:

- Heat stress
- Hydration and electrolytes
- Chronic kidney disease symptoms + screening
- Prevention measures
- Practical issues in the field



Heat Stress & Heat-Related Illnesses



Heat Related Fatalities at Work

- Agriculture, forestry, and fishing workers are 35x more likely to die from heat than other workers.
- Men are 32x more likely to die from heat than women.
- Age is NOT a significant risk factor - young men can also die
- 34% of heat related deaths occur during July.
- Most workers fall ill between 12 PM and 6 PM.
- 71% of workers who die from heat exposure die on the day they got sick - these are fast-moving emergencies.

Source: Gubernot (2015). See <https://pmc.ncbi.nlm.nih.gov/articles/PMC4657558/>



What is Heat Stress?

Heat stress happens when your body has excess heat it can't get rid of.

Normal body temperature is around 97-99 degrees Fahrenheit.



Relationship Among Heat Stress, Dehydration, and Heat-Related Illnesses

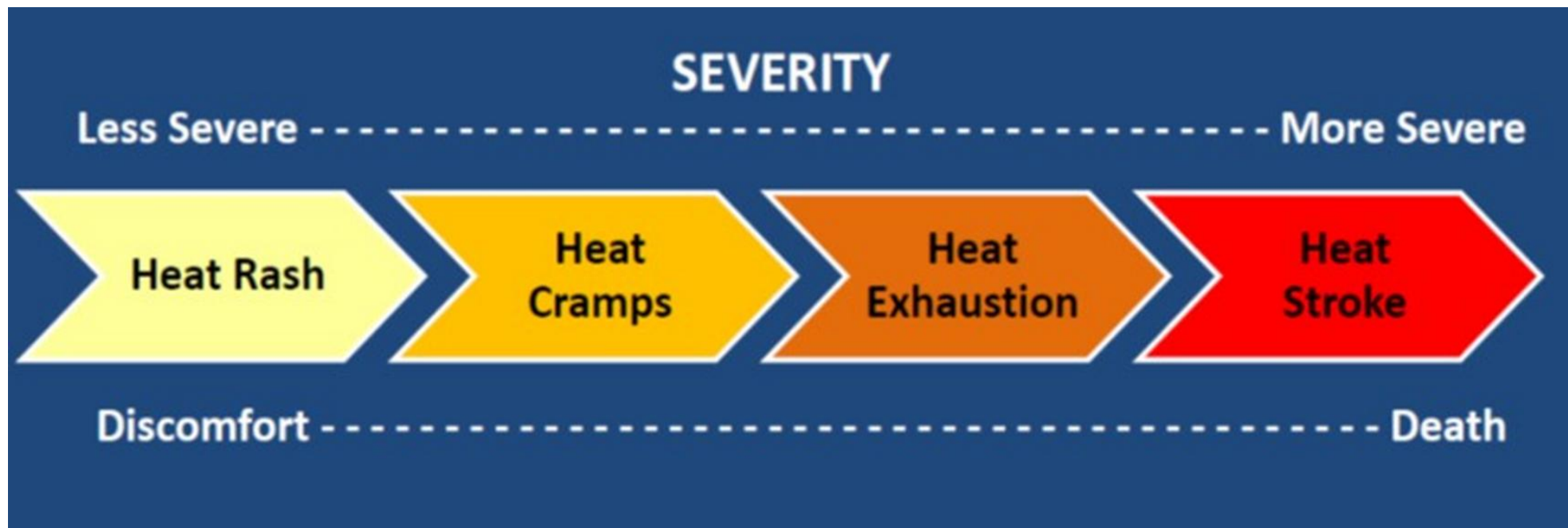
Worker begins day dehydrated = less able to tolerate heat

Worker is acclimatized to heat = increased sweating = more likely to become dehydrated

Dehydration can cause electrolyte (mineral) imbalance & vice-versa



Heat-Related Illnesses: Phases



[University of Houston at Clear Lake Heat Stress Training](#) (English and Spanish)

[Full list of signs & symptoms](#)



Hydration & Electrolytes



Dehydration and Urine

Workers can be dehydrated without experiencing a heat-related illness.

Urine color is an important indicator:





Dehydration

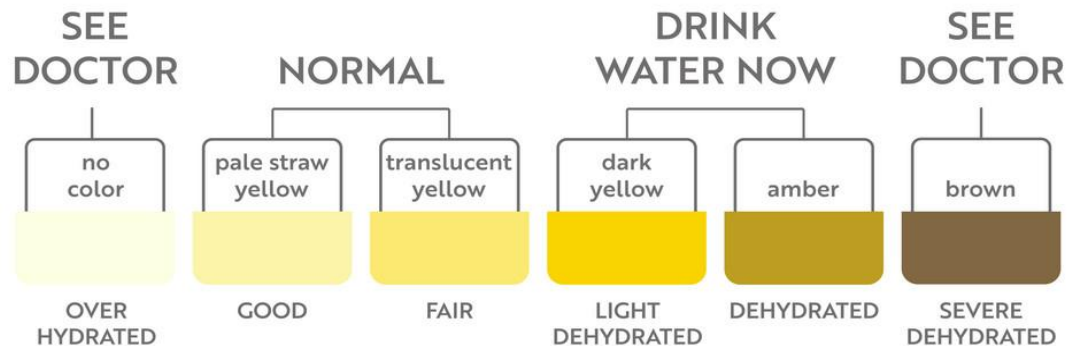
Which urine sample do you think indicates that the worker is severely dehydrated?





Urine Color & Hydration

URINE COLOR CHART



Can also indicate severe condition called rhabdomyolysis

URINE COLOR CHART



clear

You've been drinking too much water. Cut back.

yellowish to amber

Typical, healthy urine.

red or pink

You ate red/dyed things, OR enlarged prostate, kidney stones, or tumors in the bladder. Speak with a doctor.

orange

It could be dehydration, but if combined with light-colored stool, it could mean issues with your bile duct.

blue or green

Very rare. Most likely connected to something you ate. In rare cases, it could mean a bacterial infection.

dark brown

Dehydration, diet-related, OR a side effect of certain medications, porphyria, or liver disease.

cloudy

Dehydration, urinary tract infection (UTI), or a symptom of chronic disease or kidney conditions. Cloudy urine with foam can be serious.



Severe Dehydration & Kidney Injury

- Acute kidney injury
 - If occurs repeatedly, may develop into chronic kidney disease.
- Rhabdomyolysis "rhabdo"= occurs when your muscles release protein into the blood (result of extreme exertion combined with dehydration and heat stress).



Hydration Tips

- Drink at least half a liter of water before starting work,
- Drink around 1 liter per hour but will depend on worker, work, and climate—may be between 500 mL to 2-3 L per hour).
- Drink watered down Gatorade (2 parts water, 1 part Gatorade) or homemade Gatorade "suero":
 - 1/4 to 1/2 teaspoon salt
 - 1 tablespoon sugar
 - Stir into 1 liter of water




Salt Intake

- People need salt if they are sweating a lot.
- Many workers may also have hypertension, diabetes, and other chronic conditions.
- Work with healthcare staff such as doctors, nurses, and nutritionists to identify best advice for workers with chronic diseases.



Common Sources of Electrolytes

- "*Suero*"= watered down Gatorade, homemade Gatorade, and/or coconut water
- Bananas
- Watermelon
- Avocado
- *Queso fresco* (farmer's cheese)
- Yogurt
- Bone broth



Chronic Kidney Disease Symptoms + Screening



Chronic Kidney Disease of Non-Traditional Causes (CKDnT)

- Chronic kidney disease can have traditional causes, like diabetes and high blood pressure.
- Recent studies indicate that MSAWs are at an increased risk of developing CKD from non-traditional causes.
- [CKDnT is found in workers](#) engaged in high-intensity agriculture and other labor intensive occupations, such as construction.
 - Primarily related to workload and heat/core body temperature.





CKDnT, Continued

- A leading cause of death among men in Central American Countries is being identified throughout Central America, North America, and other continents.
- There is strong evidence that it is linked to physically demanding outdoor work with limited opportunities for rest or rehydration.
- Develops over years of exposure and can lead to different phases of chronic kidney disease, including dialysis, kidney failure, and death.

Source: Pan. (2019). See <https://iris.paho.org/handle/10665.2/51835>



Educate about Physical Demands of Farm Labor

- An adult doing 8 hours of farm work per day will burn upwards of 2,500 calories, which is about the same as an adult who runs a marathon.
- Corn detassellers in the midwestern US were found to burn 350-540 calories per hour (2,800-5,400 per day).
- If you burn 3,000 calories per day, you need to eat about 5,000 calories per day, and get enough rest.



CKDnT Stages

- CKD of all causes has 5 stages:
 - Stages 1-2 kidneys still function well; Stage 3 is moderate, Stage 4 is severe, Stage 5 is kidney failure.
 - Stage progression is measured by the estimated glomerular filtration rate (eGFR) of kidneys.



CKDnT Signs and Symptoms

- Few signs or symptoms in earlier stages of CKD, generally do not appear until disease has progressed.
- Earlier signs include:
 - Fatigue and weakness
 - Changes in urine frequency, color, or quantity
 - Swelling in hands, feet, face




End-Stage Renal Disease Signs and Symptoms

- Stages 4 and 5 have very noticeable signs and symptoms:
 - Nausea and vomiting
 - Swelling
 - Cramps
 - Dry or itchy skin
 - Low appetite
 - Extreme fatigue
 - Changes to urination (decreases)



CKDnT Screening

- Currently, there are no medical protocols in U.S. specific to screening high-risk workers for CKDnT.
- Clinicians who serve workers doing high-intensity agriculture (e.g., most planting and harvesting activities, milking cows, poultry depopulation) may want to implement regular eGFR screening.
- Testing for CKD usually consists of a blood test (assess eGFR) and a urine test (assess protein in urine).



Evidence-Based Prevention Measures



Water | Rest | Shade: Access!

It may be on the farm but can workers access it?

- How far do they have to walk to reach shade or water?
- Can they stop working to get there if needed?
- Is crew leader encouraging workers to drink water?
- Will workers lose pay if they rest or drink water?
- Will workers be teased or retaliated against if they rest or stop to drink water?



Prevention Measures

- Making water and shade ***easy to access*** in the field
 - If above a certain temperature, mandatory rest breaks throughout the day are necessary.
- Buddy system (*we'll learn more on the next slide*).
- All levels of human resources must be trained on recognizing and responding to heat-related illnesses (HR staff, foreman, supervisors, workers).



Buddy System

- All workers are paired up so that someone else is checking on them.
- Stay with same partner throughout the season if possible.
- That person can recognize when their partner is acting strange.
- The partners feel comfortable telling each other when they feel sick, need a break, etc.
- Row Marking System
 - If workers are spread out and cannot see each other, rows with workers are marked to keep track of their locations.



More Water and Rest, Better *Machete*=More Productive

Investigators provided 3-liter Camelbacks to sugarcane workers in Nicaragua, set up shade tents, implemented frequent rest breaks (resting 25% of workday), and supplied workers with improved machetes.

- Symptoms of heat stress decreased, especially serious ones like dizziness and decreased urine output.
- Water intake increased 25%.
- Workers went from harvesting about 5 tons to 7 tons of sugarcane per day/per worker post-intervention.



MSAWs Are Like Athletes!

- Showing the similarities between MSAW work and professional sports can help MSAWs and employers understand the importance of rest and hydration.
 - "Would your favorite soccer player practice for hours at a time without breaks? Don't teams take timeouts when players are tired?"



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What Can Outreach Staff Do?

- Offer to help farms develop a heat emergency plan.
- Encourage farms/supervisors to make water, rest, and shade more accessible.
- Provide motivational/educational talks with workers.





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NCFH Resource Showcase!

Coming Soon: NCFH Chronic Kidney Disease Patient Resource

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Coming Soon: NCFH Chronic Kidney Disease Patient Resource



Protect Your Kidneys While Working in the Heat

**Define Dehydration
& its Effect on Kidneys**

How to Protect Kidneys

Drinking Enough Water?

CKD Signs and Symptoms

Coming Soon: NCFH Chronic Kidney Disease Patient Resource



Signs and Symptoms

- Dry, itchy skin
- Feeling tired or you can't think
- Having trouble sleeping
- Urinating more or less than usual
- Urine looks different in color or has bubbles
- Not feeling hungry
- Losing weight without trying
- Upset stomach or throwing up
- Swelling around eyes or in arms, ankles, and feet





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Heat Safety Resources

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Heat Safety Resources



Heat Stress

Heat-related Illnesses Flyer ([English](#) | [Spanish](#))

Do I need to drink more water? Flyer ([English](#) | [Spanish](#))

Stay Hydrated in the Heat Flyer ([English](#) | [Spanish](#) | [Tagalog](#))

Heat Illness Prevention Flyer ([English](#) | [Spanish](#))

Heat Stress Prevention Pocket Size Brochure ([English](#) | [Spanish](#))

Health Effects of Heat Poster ([English](#) | [Spanish](#))

Prevent Heat Illness at Work Poster ([English](#) | [Spanish](#) | [Tagalog](#))



Heat Safety Resources



NIOSH (Occupational Safety-Health branch of CDC) Heat Guidance



Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

NIOSH ▾ 🔍

The National Institute for Occupational Safety and Health (NIOSH)

NIOSH Publications & Products > NIOSH-Issued Publications

🏠 NIOSH Publications & Products

NIOSH-Issued Publications

Criteria for a Recommended Standard: Occupational Exposure to Heat and Hot

Criteria for a Recommended Standard: Occupational Exposure to Heat and Hot Environments

[Print](#)

Promoting productive workplaces through safety and health research **NIOSH**

Source: Occupational Exposure to Heat and Hot Environments (2016). See https://archive.cdc.gov/www_cdc.gov/niosh/docs/2016-106/pdfs/2016-106.pdf



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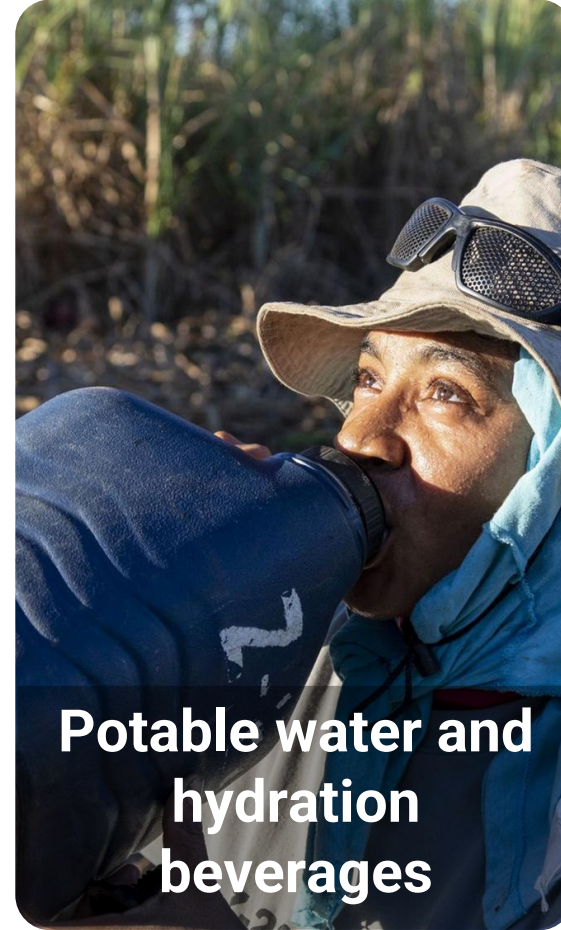
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Program Implementation Spotlight

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Adelante Initiative: Core Elements for Success

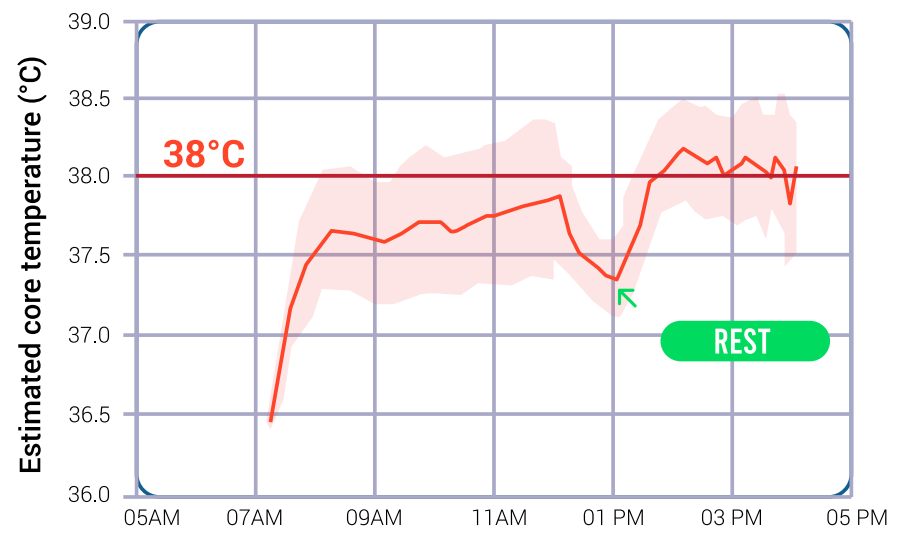
Cooling Rest | Hydration + Sanitation



Sources: [Slide credit: La Isla Network, See <https://laislanetwork.org/>] [Prince, H. (2020). See <https://sites.utexas.edu/raymarshallcenter/files/2020/05/Report-ROI-on-WRS-Intervention.pdf>]

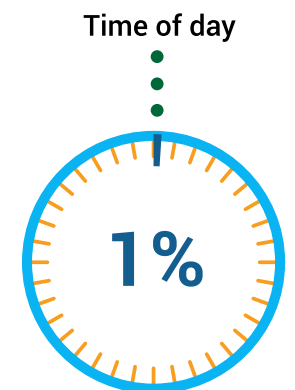
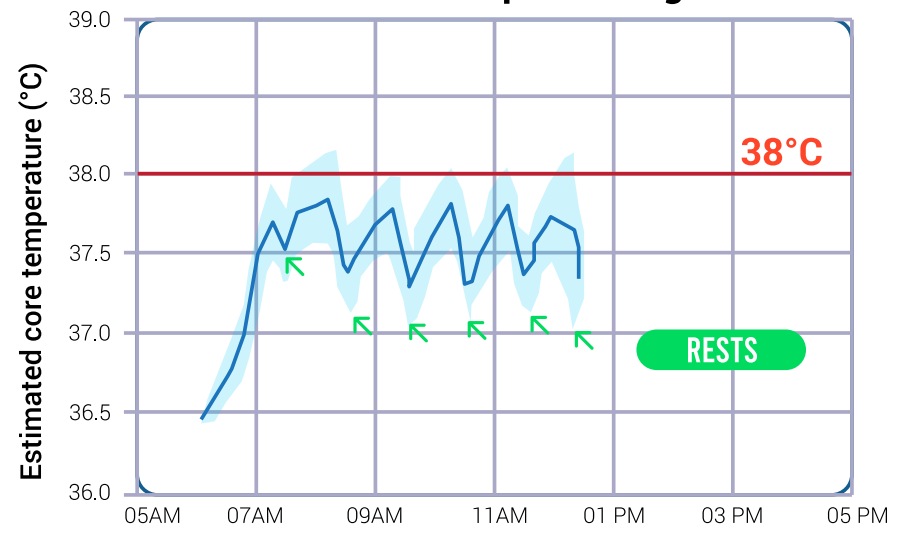
Good Practices Have Incredible Impacts that Save Lives

Site 1, No Workplace Improvements

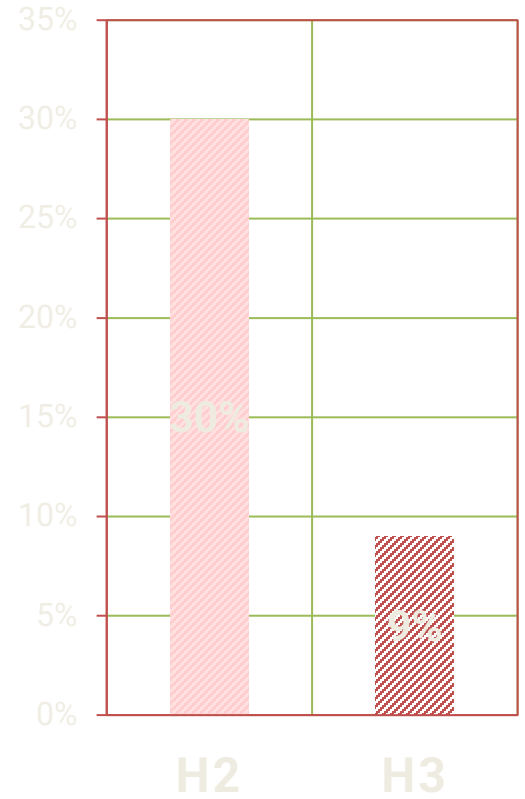


Incident kidney injury

Site 2: PREP Workplace Program



Incident kidney injury



Percentage of time working over 38°C

Source: Slide credit: La Isla Network, See <https://laislanetwork.org/>



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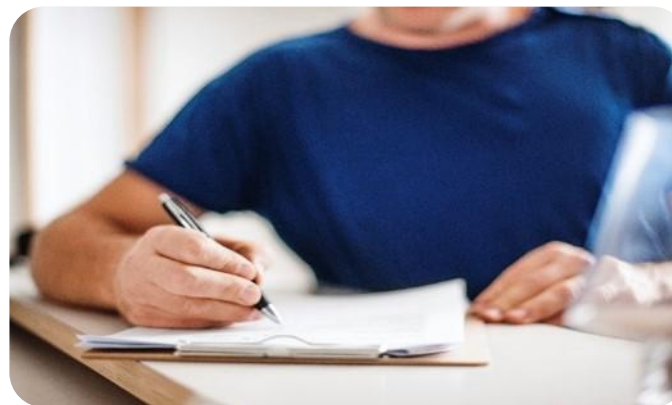
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Learning Session Evaluation



Questions & Answers





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Helpline for MSAWs and their families

- Connects MSAWs to healthcare and social services
- Assists with limited financial resources for health services



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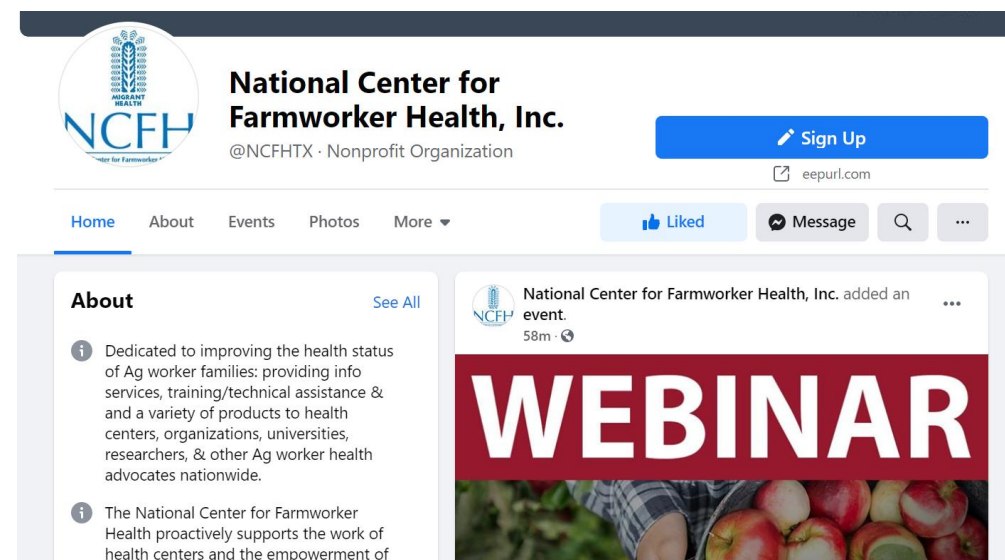
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