

Recommended Practices

Green Tobacco Sickness

Workers who plant, cultivate and harvest tobacco are at risk of suffering from a form of nicotine poisoning known as “Green Tobacco Sickness”. This illness causes nausea and vomiting that can lead to hospitalization and lost work time. Tobacco workers suffering from Green Tobacco Sickness are at greater risk for heat illness—a potentially deadly condition.

What is Green Tobacco Sickness?

Nicotine exposure from handling tobacco leaves may cause nicotine poisoning, also called Green Tobacco Sickness (GTS), with symptoms including nausea and vomiting. Risk of nicotine poisoning increases when the nicotine contained in the tobacco leaves mixes with rain, dew, or sweat, allowing nicotine to get onto the skin and pass into the bloodstream more easily. Workers may experience GTS symptoms while at work or several hours after the workday ends. About one quarter of workers harvesting tobacco in fields located in North Carolina suffered from GTS in a single season, according to a National Institute for Occupational Safety and Health (NIOSH)-funded study.¹ Although GTS symptoms normally do not last more than 24 hours after workers stop handling tobacco leaves, there are currently no comprehensive studies evaluating long-term effects.

Some Workers are More Susceptible to Green Tobacco Sickness

Workers new to handling and harvesting tobacco are at increased risk for GTS. New workers may have a lower tolerance to nicotine exposure than previously exposed workers. New workers are also less likely to know about GTS and protection methods, emphasizing the need for their employer to provide adequate training. Additionally, children and adolescents may be more sensitive to chemical exposures, more likely to suffer from GTS, and may suffer more serious health effects than adults.^{2,3,4,5}



Tobacco Plants

Health Hazards

Employers who employ tobacco workers must provide a workplace free from recognized hazards that are likely to cause death or serious harm to their workers. Nicotine and dehydration are recognized hazards in tobacco fields.

Nicotine is a hazard present in workplaces that require workers to handle tobacco leaves.

- Nicotine is a chemical that is able to pass through the skin and enter the bloodstream causing GTS, a form of nicotine poisoning.
- Nicotine absorption is more likely when it dissolves into rainwater, dew and sweat.
- GTS symptoms include nausea and vomiting. Additional symptoms include dizziness, headaches and cramps.
- Symptoms might not occur for several hours after nicotine overexposure.

Dehydration and Heat: Vomiting, a common GTS symptom, leads to dehydration, making tobacco workers more susceptible to heat illnesses. See the section on “[Heat Illness](#)” at the end of this guidance document for important information about preventing heat illnesses.

- Continuing to work while vomiting may lead to significant water loss that can cause body temperature to rise to dangerous levels, especially when working in a hot and humid environment.
- If precautions such as drinking water frequently and resting in the shade are not taken, the risk for heat illness increases and symptoms can range from heat rash and heat cramps to heat exhaustion and heat stroke.
- Heat stroke requires immediate medical attention and can result in death.

How to Reduce Nicotine Exposure

Employers should provide workers with information and training about nicotine hazards, GTS prevention, and appropriate personal protective equipment (PPE) before letting the workers handle tobacco leaves. Employers should provide workers with effective training in a language and vocabulary that workers can understand.

Employers should:

- Provide training to each worker on how to use PPE. Training should include information about how clothing can be used as PPE and how some clothing may no longer provide adequate protection if it becomes wet.
- Train workers to recognize GTS signs and symptoms and to alert supervisors if they develop symptoms or notice any other workers exhibiting symptoms.
- Train supervisors to ensure that any worker with GTS symptoms immediately drinks water and rests in the shade, in addition to receiving medical attention if necessary.

Employers should also provide these recommended practices and other applicable information to workers and encourage them to share it with healthcare providers to avoid

misdiagnosis if symptoms occur. Nicotine poisoning, heat-related illnesses and pesticide poisoning share similar symptoms. When seeking medical care, it is important to give doctors and other medical staff complete information about the patients’ job activities and the crops they work with, so that patients receive the correct treatment.

Gloves, long sleeve shirts, long pants and water-resistant clothing are recommended to prevent exposure to nicotine from tobacco leaves. Employers should train workers on how to care for and clean their clothing to ensure that it protects them from nicotine exposures. Employers are required to provide laundry facilities if workers are housed at a temporary labor camp ([29 CFR 1910.142](#)).

- *Gloves* will protect workers handling tobacco leaves from nicotine absorption through their hands. If gloves are wet, they become less protective.
- *Long Sleeve Shirts and Pants* protect workers from nicotine absorption if tobacco leaves come into contact with their arms or legs. However, once the clothing becomes wet with rainwater, dew, or sweat, it no longer provides adequate protection and may increase absorption risk. Employers should ensure that worker-owned clothing, used to protect against nicotine exposure through tobacco leaves, is dry. For example, employers should allow workers to change out of wet clothing and into dry clothing, as needed, throughout the workday.
- *Water-Resistant Clothing* (e.g., rain suits) keeps dew or rain, which had contact with tobacco leaves, from contact with skin and clothing to protect workers from exposure to nicotine contained in the water. Water-resistant clothing is considered defective or damaged when dew or rain containing nicotine is able to reach the skin through tears or openings and should not be used. If working in the heat with water-resistant clothing, employers must provide additional opportunities for water, rest and shade due to increased heat illness risk. Additional guidance on working in the heat can be found at: www.osha.gov/heat.

Washing with soap and water immediately after working is recommended to reduce exposure to nicotine. Washing can reduce the amount of nicotine that is on skin by 96%.⁶

Employers must provide handwashing facilities to workers (29 CFR 1928.110(c)) and, if housed in a temporary labor camp, showering facilities in that camp (29 CFR 1910.142(f)).

Heat Illness

Vomiting, a common GTS symptom, can cause significant water loss and adds to the risk of heat illness. Thousands of workers are affected by heat illness each year. Environmental heat is a recognized hazard. Workers have the right to receive information and training about heat hazards and prevention, and it is the employer's responsibility to provide this training.

Employers should establish a complete heat illness prevention program to prevent heat illness. This includes: provide workers with water, rest and shade; gradually increase workloads and allow more frequent breaks for new workers or workers who have been away for a week or more to build a tolerance for working in the heat (acclimatization); modify work schedules as necessary; plan for emergencies and train workers about the symptoms of heat-related illnesses and their prevention; and monitor workers for signs of illness. Workers new to the heat or those that have been away from work and are returning can be most vulnerable to heat stress and they must be acclimatized.

A heat illness prevention program includes:

- Opportunity for workers to drink water (provided by the employer) every 15 minutes, even if they are not thirsty.
- Shaded areas for workers to rest and cool down.
- Recommendations to workers to wear hats and light colored clothing.
- Training workers to recognize the signs of heat illness and what to do in an emergency.
- Taking steps to help workers acclimatize to the heat if they are new to working in the heat or are returning after time away from work.

Remember these three simple words: Water, Rest, Shade. Taking these precautions can mean the difference between life and death.

Symptoms of Heat Exhaustion

- Headache, dizziness, or fainting
- Weakness and wet skin
- Irritability or confusion
- Thirst, nausea, or vomiting

Symptoms of Heat Stroke

- May be confused, unable to think clearly, pass out, collapse, or have seizures (fits)
- Increased sweating or may stop sweating

What to Do When a Worker is Ill from the Heat

- Call a supervisor for help; if the supervisor is not available, call 911.
- Have someone stay with the worker until help arrives.
- Move the worker to a cooler/shaded area.
- Remove outer clothing.
- Fan and mist the worker with water; apply ice (ice bags or ice towels).
- Provide cool drinking water, if able to drink.

For more information on heat illness, please visit the Occupational Safety and Health Administration's (OSHA's) Campaign to Prevent Heat Illness in Outdoor Workers at www.osha.gov/heat.

IF THE WORKER IS NOT ALERT or seems confused, this may be a heat stroke. CALL 911 IMMEDIATELY and apply ice as soon as possible.

Federal OSHA Standards

Section 5(a)(1) of the *Occupational Safety and Health Act* requires employers to “furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees.”

[29 CFR 1928 Agriculture Standards](#)
[29 CFR 1910.142 Temporary Labor Camps](#)

State Plans

Twenty-five states, Puerto Rico and the Virgin Islands have OSHA-approved state plans, which are required to be at least as effective as Federal OSHA, but may adopt their own standards and enforcement policies.

Additional Resources for Green Tobacco Sickness

Brochure on Green Tobacco Sickness – North Carolina Department of Labor
www.nclabor.com/ash/publications/green_tobacco_sickness.pdf

Health Education on Green Tobacco Sickness – North Carolina Department of Health and Human Services
qa.ncfhp.org/Data/Sites/1/documents/healthedmodules/gts_72dpi.pdf

NIOSH website on Green Tobacco Sickness which includes links to materials for supervisors and workers
www.cdc.gov/niosh/topics/GreenTobaccoSickness

Help for Employers

OSHA provides a free On-site Consultation for small businesses with fewer than 250 workers at a site (and no more than 500 employees nationwide). On-site consultation services are separate from enforcement and do not result in penalties or citations. To locate the OSHA Consultation Office nearest you, visit OSHA's website at www.osha.gov, or call 1-800-321-OSHA (6742).

OSHA also has Compliance Assistance Specialists throughout the nation who can provide general information about OSHA standards and compliance assistance resources. Contact your local OSHA office for more information.

NIOSH is the federal agency that conducts research and makes recommendations to prevent worker injury and illness.

The NIOSH Health Hazard Evaluation (HHE) Program provides advice and assistance regarding work-related health hazards. NIOSH may provide assistance and information by phone, in writing, or may visit the workplace. The HHE program can be reached at www.cdc.gov/NIOSH/HHE or 513-841-4382.

Recommendations specific to agricultural work are available through a NIOSH website focused on the Agriculture, Forestry and Fishing Sectors (www.cdc.gov/niosh/agforfish).

Workers' Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For additional information on Workers' Rights, Employer Responsibilities, and other services OSHA offers, visit www.osha.gov.

Contact OSHA

For questions or to get information or advice, to report an emergency, report a fatality or catastrophe, order products, or to file a complaint, contact your nearest OSHA office, visit OSHA's website at www.osha.gov, or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627. We will keep your information confidential. We are here to help you.

Many states operate their own OSHA-approved safety and health program. For further information, please visit OSHA's State

Occupational Safety and Health Plans page at www.osha.gov/dcsp/osp, or call 1-800-321-OSHA (6742).

Contact NIOSH

To receive documents or more information about occupational safety and health topics, please contact NIOSH at 1-800 CDC-INFO (1-800-232-4636), TTY 1-888-232-6348, email: cdcinfo@cdc.gov or visit the NIOSH website, www.cdc.gov/niosh.

References

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- ² Ballard T., J. Ehlers, E. Freund, M. Auslander, V. Brandt, W. Halperin. 1995. Green Tobacco Sickness: occupational nicotine poisoning in tobacco workers. *Archives of Environmental Health* 50(5) 384-389.
- ³ Weaver V.M., T.J. Buckley, J.D. Groopman. 1998. Approaches to environmental exposure assessment in children. *Environmental Health Perspectives* 106(3) 827-832.
- ⁴ Ginsberg G., W. Slikker Jr., J. Bruckner, B. Sonawane. 2003. Incorporating children's toxicokinetics into a risk framework. *Environmental Health Perspectives* 112(2) 272-283.
- ⁵ Landrigan P.J., C.A. Kimmel, A. Correa, B. Eskenazi. 2004. Children's health and the environment: public health issues and challenges for risk assessment. *Environmental Health Perspectives* 112(2) 257-265.
- ⁶ Curwin B.D., M.J. Hein, W.T. Sanderson, M.G. Nishioka, W. Buhler. 2005. Nicotine exposure and decontamination on tobacco harvesters' hands. *Annual of Occupational Hygiene* 49(5) 407-413.

Disclaimer: This document is not a standard or regulation, and it creates no new legal obligations. It contains recommendations as well as descriptions of mandatory safety and health standards. The recommendations are advisory in nature, informational in content, and are intended to assist employers in providing a safe and healthful workplace. The *Occupational Safety and Health Act* requires employers to comply with safety and health standards and regulations promulgated by OSHA or by a state with an OSHA-approved state plan. In addition, the Act's General Duty Clause, Section 5(a)(1), requires employers to provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm.

