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## Working Well

The “Time for Ticks” article personally affected me. Growing up in Charleston and being an outdoorsman, I had many tick bites. My brothers and I didn’t pay much attention to the pests — except to pull them off and scratch the site for the few days after removing them. Unfortunately, one of my brothers fell seriously ill many years ago with ehrlichiosis from a tick bite. After arduous blood tests, lumbar punctures and painful days in the hospital, he recovered. Now that I am older and, of course, wiser, I try to prevent tick bites and meticulously inspect for the critters after my outings.

Whether you believe global warming exists or not, it’s still hot in South Carolina, and heat exposure is a major cause of work injuries. “What’s Too Hot” emphasizes the need for employers to have and implement a heat illness prevention program. Employees’ lives may depend on it. Check out the Heat Safety Tool mobile app from the Centers for Disease Control and Prevention. It’s an easy reference source for heat stress prevention.

The article about hepatitis B addresses true blood-borne exposure and the recent guidelines for post-exposure treatment, as well as the importance of a BBP exposure plan. The exposed patient is the main concern for contracting disease, but do not neglect evaluation of the source patient.

Questions regarding when and why to get a pulmonary function test for respirator evaluations are addressed in the article “Pulmonary Function Tests.” These tests may not be required for a basic respiratory program, but they are essential in the clinical evaluation of workers found to have respiratory risk.

The “Nurse Practitioner Pearls” submission from Donna Padgett, ACNP, on opioid use for chronic pain highlights opioid use risks and looks at alternative treatments recommended by current studies and the American Medical Association.

Presenting usable information for our readers, employers and workers to improve health, wellness and safety is the goal for *Working Well*. We welcome any feedback, suggestions and articles that will enhance our purpose. Submit your comments to me at [darawl@lexhealth.org](mailto:darawl@lexhealth.org). It is our pleasure to present *Working Well* and advocate for health, wellness and safety in the workplace and our community. Enjoy!

— Dana Rawl, MD, MPH

# Time for Ticks

By Dana Rawl, MD, MPH



With the long warm seasons, spring, summer and fall are active times for ticks in the Southeast. For workers and people who spend time outdoors, there is risk for tick bites and possible contraction of a significant disease.

Infected ticks can transmit bacteria, viruses or parasites with their bite. Certain types of ticks may harbor specific pathogens that can inoculate the victim and cause disease. These ticks and diseases may be clustered geographically. For example, Colorado tick fever transmitted by the “wood tick” (*D. Andersoni*) is found predominantly in the Rocky Mountain region. Other common ticks that can be vectors for disease are the “dog tick” (*D. variabilis*), the “black-legged” or “deer tick” (*Ixodes scapularis*), and the “Lone Star tick” (*A. americanum*). These tick species may be vectors for more recognized diseases, such as Rocky Mountain spotted fever, Lyme disease and ehrlichiosis.

Rocky Mountain spotted fever is more common from April through September in the Southeast with the principle vector being the dog tick in this region. Symptoms usually occur five to seven days after the bite and include sudden onset of headaches, fever, muscle aches, nausea and vomiting with a pink to red, blanching rash that develops in the first few days and involves the palms, wrists, soles of the feet and ankles. The rash may extend to the buttocks, trunk and face, and become non-blanching, petechiae.

Lyme disease can be transmitted through the deer tick, but it is more geographically common in the northeastern United States. Most cases in the Southeast are persons who contracted their disease from a tick bite while in an endemic area. The disease begins seven to 10 days after the bite and typically (in 75 percent of cases) presents with a target rash at the bite site. There are also flu-like symptoms with fever, joint pain, headaches and cough.

Ehrlichiosis is transmitted by the dog tick and Lone Star tick with the white-tailed deer as the principle animal reservoir. Symptoms begin about seven days after the tick bite and include fever, chills, cough,



fatigue, headaches and muscle pain. There can be a rash that involves the trunk and upper extremities, but it rarely involves the palms and soles. The rash can be red and generalized or petechial. It can be confused with Rocky Mountain spotted fever.

Most tick-borne diseases are treated empirically from the patient's history of a tick bite, the circumstances of the environment or geographic location, and the symptoms. Laboratory testing may be performed, but clinical assessment usually dictates treatment. It is generally not recommended that prophylactic antibiotic treatment be instituted without symptoms of a tick-borne disease.

The best treatment for tick-borne disease is prevention. Recommendations for employers are to educate workers at higher risk on disease awareness and protection. Provide insect repellents containing 20 to 30 percent DEET to be used on skin and clothing. Provide repellents like permethrin to use on clothing to kill ticks. Workers can help protect themselves by wearing protective clothing, such as hats, long-sleeve shirts and pants tucked into socks. Workers should use repellents and re-apply repellents as recommended. They should check their skin and clothing daily, bathe as soon as possible after working in the field, and learn how to properly remove an attached tick. Infections from tick bites are almost non-existent if the tick is removed within 24 hours of attachment to the skin. Protect employees and yourself. Enjoy the outdoors, but be safe! 🍃

## References

<https://www.CDC.gov/niosh/topics/tick-borne/recommendation.html>

<https://www.AAFP.org/afp/2005/0615/p2323.html>



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# What's Too Hot?

By Dana Rawl, MD, MPH

In 2010, records showed 4,190 environmental heat-related injuries or illnesses. A study of Occupational Safety and Health Administration citations issued between 2012 and 2013 revealed 20 cases of heat-related illness and worker death. Most of these cases found that employers had no program or had a deficient program to prevent heat illness. Acclimatization was the most common element missing from the programs and the factor most associated with worker death.

Studies have shown that temperature conditions do not have to be extremely hot to cause a work-related heat death. Death can occur when the heat index is less than 90°F, and hospitalizations for dehydration and acute renal failure from heat injury can occur with heat indexes lower than 80°F.

New workers seem to be at the highest risk for heat injury or death. Lack of acclimatization is the greatest risk factor as 70 percent of the deaths from work-related heat deaths occur within the first week of a new job. New workers need to physiologically acclimatize to a hot environment. A heat tolerance level for an existing worker may be fatal for a new worker.

Another contributing issue for a new worker is his or her behavior starting a new job. The new worker may want to impress his or her employer and co-workers, and perform at a high pace. In turn, the new worker's exuberance increases his or her internal metabolic rate and core temperature, creating greater risk for heat injury.

## NOAA's National Weather Service Heat Index

Relative Humidity (%)	Temperature °F (°C)															
	80(27)	82(28)	84(29)	86(30)	88(31)	90(32)	92(34)	94(34)	96(36)	98(37)	100(38)	102(39)	104(40)	106(41)	108(43)	110(47)
40	80(27)	81(27)	83(28)	85(29)	88(31)	91(33)	94(34)	97(36)	101(38)	105(41)	109(43)	114(46)	119(48)	124(51)	130(54)	136(58)
45	80(27)	82(28)	84(29)	87(31)	89(32)	93(34)	96(36)	100(38)	104(40)	109(43)	114(46)	119(48)	124(51)	130(50)	137(58)	
50	80(27)	83(28)	85(29)	88(31)	91(33)	95(35)	99(37)	103(39)	108(42)	113(45)	118(48)	124(51)	131(55)	137(58)		
55	80(27)	84(29)	86(30)	89(32)	93(34)	97(36)	101(38)	106(41)	112(44)	117(47)	124(51)	130(54)	137(58)			
60	82(28)	84(29)	88(31)	91(33)	95(35)	100(38)	105(41)	110(43)	116(47)	123(51)	129(54)	137(58)				
65	82(28)	85(29)	89(32)	93(34)	98(37)	103(39)	108(43)	114(46)	121(49)	128(53)	136(58)					
70	82(28)	86(30)	90(32)	95(35)	100(38)	105(41)	112(46)	119(48)	126(52)	134(57)						
75	84(29)	88(31)	92(33)	97(36)	103(39)	109(43)	116(47)	124(51)	132(56)							
80	84(29)	89(32)	94(34)	100(38)	106(41)	113(45)	121(49)	129(54)								
85	84(29)	90(32)	96(36)	102(39)	110(43)	117(47)	126(52)	135(57)								
90	86(30)	91(33)	98(37)	105(41)	113(45)	122(50)	131(55)									
95	86(30)	93(34)	100(38)	108(42)	117(47)	127(53)										
100	87(31)	95(35)	103(39)	112(44)	121(49)	132(56)										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity



Adapted from NOAA [2012].

The Association Advancing Occupational and Environmental Health and the National Institute for Occupational Safety and Health guidelines for workplace heat stress are based on wet bulb globe temperature (WBGT) and workload. Safe workplace WBGT recommendations are lowered in those guidelines for new, unacclimatized workers. Most employers do not monitor WBGT — even though work-rest cycles based on WBGT recommendations are thought to be standard.



New workers seem to be at the highest risk for heat injury or death. Lack of acclimatization is the greatest risk factor as 70 percent of the deaths from work-related heat deaths occur within the first week of a new job.

Following heat index charts, which are based on temperature and humidity, may be an alternative measure in providing some heat stress protection. A handy reference for heat stress is a mobile app from the Centers for Disease Control and Prevention called OSHA-NIOSH Heat Safety Tool. It provides local heat index information and precautions, signs and symptoms of heat illness, and treatment suggestions.

In any event, a program to prevent heat illness or injury should be a vital part of overall company safety and should be meticulously followed for employee protection. Education of supervisors and employees on signs and symptoms of

heat-related illness and protocols for treatment should be mandatory in those companies at risk for indoor or outdoor environmental heat exposure. Following heat stress guidelines as a management tool and recognizing new, unacclimatized workers as a higher heat injury risk could be lifesaving. 🌿

### References

[CDC.gov/niosh/docs/2016-106/pdfs/2016-106.pdf](https://www.cdc.gov/niosh/docs/2016-106/pdfs/2016-106.pdf)

Tustin et al. "Evaluation of Occupational Exposure Limits for Heat Stress – United States," 2011-2016. Draft manuscript.

# Hepatitis B Exposure – What’s Your Plan?

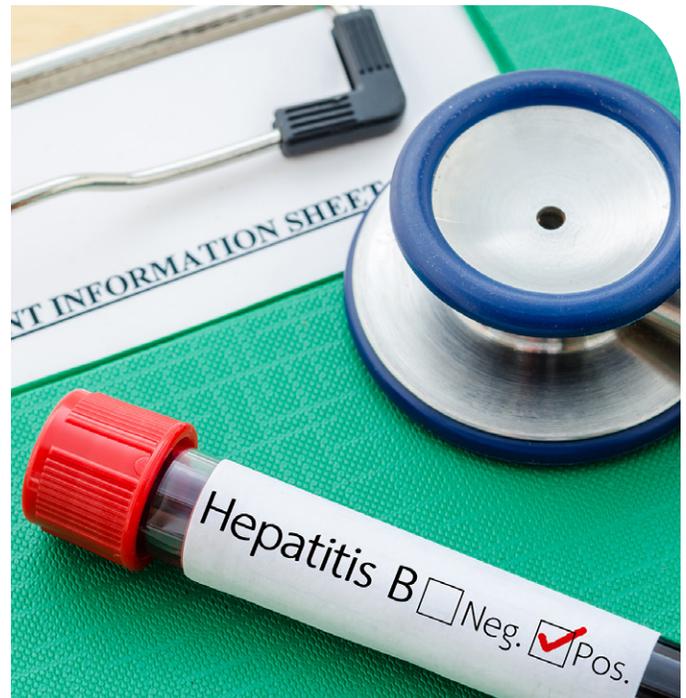
By Dana Rawl, MD, MPH

**H**epatitis B is a viral pathogen that can be transmitted from infectious material from one person to another person through a portal of entry. Thereby, two factors must occur before exposure is possible. One: there must be infectious material from the source patient, which includes blood, any substance with visible blood, and any other body fluid except saliva, tears, sweat, vomit, urine, or respiratory secretions, unless there is visible blood. Two: there must be a portal of entry into the exposed patient, such as a puncture through the skin, exposure to non-intact skin (an abrasion or dermatitis), or an exposure to a mucous membrane. Potentially infectious material contacting intact skin is not exposure.

Medical protocols on assessing potential bloodborne pathogen exposure can be in-depth and confusing, but evaluation of the source patient and the exposed patient provides the most information for the best course of action. If the source patient is known, available and provides informed consent to blood testing, much anxiety for the exposed patient can be alleviated. If the source patient is unknown or does not provide consent for blood testing, the exposed patient may need prophylactic treatment to prevent or reduce the risk of contracting a BBP disease.

With a known positive source patient or an unknown hepatitis B exposure source, an exposed patient unvaccinated for hepatitis B may need prophylactic treatment with hepatitis B immune globulin and may be started on the hepatitis B vaccination series. HBIG provides immediate protection for the exposed patient against hepatitis B, and the hepatitis B vaccination series should provide ongoing immunity. If the source patient is proven to have no BBP component, the exposed patient will not require any further testing or treatment. There are many more convolutions and combinations of factors that can influence the treatment determinations for exposed patients. Further information can be found at [www.CDC.gov/mmwr/preview/mmwrhtml/rr6210a1.htm](http://www.CDC.gov/mmwr/preview/mmwrhtml/rr6210a1.htm).

Companies should develop an exposure control plan for handling occurrences that involve potential exposure to infectious materials to protect their employees. As a recommendation to expedite medical evaluation and treatment for those patients with potential BBP exposures and to help reduce costs, employers should incorporate procedures that address the exposed patient evaluation



**Companies should develop an exposure control plan for handling occurrences that involve potential exposure to infectious materials to protect their employees.**

as well as the source patient evaluation. The exposure plan should include source patient informed consent to blood testing, guidance on logistics and location for BBP testing, emphasis on timely testing, assurance of private health information protection, and direction on follow-up care. Occupational Safety and Health Administration guidance on exposure control plans can be found at [www.OSHA.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=10051](http://www.OSHA.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051).

As an employer or supervisor confronted with a potentially infectious exposure from an accident on the job, the best course of action is to immediately send the employee for medical evaluation and arrange for source patient testing. Treatment options are time sensitive. Allow the occupational provider or emergency physician to determine if a true exposure to a BBP has occurred. The medical team can guide the exposed patient through the BBP exposure protocol and provide the best treatment and preventive care. 🌿

# Pulmonary Function Tests

By Dana Rawl, MD, MPH

Many respiratory hazards complicate the industrial environment. The Occupational Safety and Health Administration standards regulate some of them, such as the cotton dust standard and the new silica rule that mandates respiratory protection. In accordance with OSHA 29 CFR 1910.134 for general industry, “a respirator shall be provided to each employee when such equipment is necessary to protect the health of such employee.” If a respirator is warranted, the employee should be in a respiratory program managed by the employer.

Lexington Medical Center Occupational Health receives many questions regarding respiratory programs, including what requirements satisfy the minimal medical recommendations, who needs a pulmonary function test and what does a pulmonary function test do.

The minimum medical requirement for an employee to enter a respiratory program is to complete an OSHA respiratory questionnaire and have it reviewed by a physician or licensed health care professional (PLHCP). If the employee has no significant medical conditions and has no “yes” answers to questions 1 through 8, Section 2, Part A of the questionnaire, the PLHCP should be able to approve the employee to wear a respirator and, thereby, undergo fit testing. If the respiratory questionnaire identifies medical issues, the PLHCP will request the employee undergo a hands-on physical examination to determine the employee’s health and respiratory ability. Depending on the clinical evaluation, the PLHCP may request a pulmonary function test.

In healthy individuals in hazardous atmospheric environments, breathing through a negative pressure respirator and working under heavier loads can drastically raise stress on the cardiopulmonary system and, in turn, increase risk for system collapse. Therefore, any adverse baseline medical conditions in the cardiopulmonary system will accentuate risk.

Pulmonary function tests provide information about a patient’s lung ability. Providers generally evaluate two components of the pulmonary function test: forced expiratory volume at 1 second (FEV1) and forced vital capacity (FVC). FEV1 is how much air can be forced out of the lungs in one second, and FVC is the total volume of air exhaled. Both are

measured in liters of air. A computer program analyzes and compares these measurements to statistically known values, along with individual variables such as gender, height, weight and race. This comparison is reported as a percentage of what computer-generated PFT values should be, or a percentage of predicted value. With this information, the provider can determine if there is dysfunction in lung ability or if lung function is normal. For example, if FEV1 is low and FVC is normal, the patient has an obstructive lung function pattern indicative of diseases like asthma or chronic obstructive pulmonary disease. Other patterns can indicate other lung diseases.

The pulmonary function test is a useful tool for providers in identifying employees at higher risk of injury if placed under increased cardiopulmonary stress while wearing a respirator. Not all individuals need a pulmonary function test; however, if someone has a significant medical or respiratory history or finding, this test is a valuable screen in preventing placement of individuals in positions where physical and environmental stressors could trigger a fatal event. 🌿





## Nurse Practitioner Pearls

By Donna Padgett, NP

# Are Opioids for Chronic Pain Worth the Risk?

Every day, people pick up a newspaper or turn on the evening news and hear about the current opioid crisis in America. More than 115 people die from opioid overdoses in the United States each day. Approximately 21 to 29 percent of patients misuse opioids prescribed for chronic pain, and the crisis is getting worse. The Centers for Disease Control and Prevention is urging physicians to only use opioids for chronic pain management as a last resort. So, what are the current recommendations?

A recent study in the Journal of the American Medical Association published on March 6, 2018 states that acetaminophen (Tylenol®), ibuprofen (Advil®, Motrin®) and other nonsteroidal anti-inflammatory drugs are better than opioids in relieving the severity of chronic pain in the back, knees and hips. The study also states that opioids are no better than over-the-counter medications in reducing the extent to which pain interferes with activities of daily living, such as walking, working, sleeping and enjoying life.

While NSAIDs and acetaminophen do have medical risks, especially at high doses, they are usually safe when taken as directed, and they are not addictive. Opioid pain medications are inherently more dangerous because of the risk for addiction and accidental death from overdose. The study

shows that “extra risk doesn’t come with any extra benefits,” according to Dr. Erik Kerbs of the Minneapolis VA Health Care System and the University of Minnesota. In addition to over-the-counter medications, other options, including exercise and physical therapy, have been found helpful in treating chronic pain.

The report concludes that physicians and their patients should only consider opioid treatment if alternatives like exercise, physical therapy or other medications have not been effective. It also recommended patients not responding to those conservative management options be evaluated by a pain specialist, when possible, before starting chronic opioid medications. 🌿

## References:

Opioids No Better Than NSAIDs for Chronic Back or Arthritis Pain/JAMA, March 6, 2018: [www.reuters.com/article/us-health-opioids-backpain-arthritis/opioids-no-better-than-...](http://www.reuters.com/article/us-health-opioids-backpain-arthritis/opioids-no-better-than-...)

Opioid Overdose Crisis/National Institute of Drug Abuse (NIDA): [www.drugabuse.gov/drugs-abuse/opioids/opioid-overdose-crisis](http://www.drugabuse.gov/drugs-abuse/opioids/opioid-overdose-crisis)