



Investigation of Ultraviolet Exposure from Metal Mercury Halide Lamp in a High School Gymnasium, Kentucky, November 2004

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Introduction

Ultraviolet (UV) radiation is naturally produced by the sun and is invisible to the human eye. This is the type of radiation that causes sunburns or gives patrons suntans at tanning salons. However, with unfiltered or long exposures UV radiation will damage tissue and can lead to other health effects, such as eye damage, temporary or permanent blindness, skin aging or skin cancer.

UV radiation is also used to produce visible light through different lighting mechanisms. In mercury vapor lamps, which are commonly used in gymnasiums across the country, UV radiation is produced in an inner bulb (arc discharge tube), but is changed to visible light as it passes through a second glass envelope where virtually all of the remaining UV radiation is blocked and visible light emanates (1).

This report details an investigation in which unfiltered UV exposure caused sunburn-like conditions to attendants of a high school basketball game.

Investigation

At 1:20 a.m. on November 22, 2004 a patient (Patient 1) entered the emergency room (ER) in a county hospital with symptoms of conjunctivitis, lacrimating profusely, and an inability to close his eyes due to pain. The patient was treated with Corticosteroid eye suspension and Tetracaine. The patient stated that his daughter had similar symptoms, but refused to come into the ER. The patient returned to the ER later that morning (time not identified) because of the continued pain, lacrimation and redness.

At 3:20 a.m. on the same morning, a second patient (Patient 2) came into the same county emergency room. This patient had identical symptoms as Patient 1. Patient 2 stated her husband had the same symptoms, but had to go home and take care of the children.

Finally, a third patient (Patient 3) came to the ER at 5:45 a.m. with facial erythema, but no conjunctivitis and had white rings around her eyes. It was noted in the ER medical notes that the patient wore sunglasses at all times and was the wife of Patient 1.

The attending nurse who questioned the patients as they presented found that they had all attended a basketball game at a local school. They did not all sit together, but were in close proximity. The at-

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tending nurse further inquired on the location of vehicles and other avenues of exposure such as air contamination or chemical exposure, but nothing arose that correlated between patients. Patient 1 stated he did smell a chemical in the air at the basketball game, but no others noted any chemical smells. The patients subsequently saw an ophthalmologist whose opinion was that the patients had symptoms consistent with extreme UV radiation exposure. The patients did not report any known UV ray exposure.

Hospital personnel notified the local health department on the following day and public health nurses and an environmentalist were sent to investigate. They visited the school and discovered that one Phillips® Metal Mercury Halide Lamp bulb in the school gymnasium where the patients attended the basketball game had a broken shroud, but the discharge tube continued to burn. They also received anecdotal reports from school officials of other attendees to the game experiencing symptoms similar to, but less severe, than those of the three case patients. Concerned about the potential for a mercury exposure from the broken shroud, the local health department contacted the Division of Public Protection and Safety at the Kentucky Department for Public Health (KY DPH). The Division of Epidemiology and Health Planning was consulted shortly afterward. In coordination, it was determined that ultraviolet rays from the broken lamp were the likely exposure of the patients and that mercury was not a risk in this situation.

KY DPH requested that local health department staff contact school officials to remove the suspect lamp and keep it for further examination. However, by the time this hypothesis had been formulated and the request made, the suspect lamp had been removed and discarded by school maintenance staff. Thus, it was not possible to examine the lamp directly, after it was taken down from the ceiling of the gymnasium.

Conclusion

Mercury halide lamps produce some visible light, but also produce large quantities of ultraviolet rays. The ultraviolet rays are converted to visible light by a mercury-coated shroud or lens, which reduces the

UV emitted from the 1500-watt light to 4%. If the shroud is broken but the discharge tube continues to burn, UV rays are emitted unfiltered from the lamp at high levels.

Other reports of similar exposures have surfaced recently in Middle Tennessee (3 incidents), North Carolina (4 incidents), and Florida (personal communication with CDC MMWR editor), raising the possibility that as the existing cohort of mercury halide and mercury vapor lamps ages, an increasing incidence of cases such as this will occur.

Ultraviolet radiation exposure from a mercury halide lamp is an unusual but potentially dangerous situation given the intensity of the exposure in isolated cases such as this and the extensive use of mercury halide lamps in school gymnasiums across the nation. Warning information supplied with the lamps clearly specifies this risk and the related need for periodic inspections. However, whether these types of inspections occur with regularity is not known.

Three facts are of importance in considering the public health implications of UV radiation exposure from mercury halide and mercury vapor lamps: 1) Sensations of pain usually do not occur with UV radiation exposure until significant damage is done. 2) UV radiation-generating lamps are used commonly throughout the Commonwealth of Kentucky in school gymnasiums, factories, workshops, and other high ceiling venues. 3) Damage to these lamps, which could allow direct radiation of UV rays, especially as the lamps age, should be expected and anticipated. In light of these issues, education of school inspectors and maintenance personnel at institutions using UV radiation-generating lamps is advised. Maintenance staff should institute a regular program of inspection and replacement to avoid exposure situations. Additionally, use of cages that automatically switch off once the glass is cracked might be considered.

Finally, clinicians and local health department epidemiologists should be aware of the symptoms of extreme UV radiation exposure in order to

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identify the problem and ask the correct questions about possible exposure sources. Clinicians should notify their local health departments of any potential UV radiation exposure situations so that it can be investigated and any potential exposure sources eliminated for the protection of those who might be unknowingly exposed in the future.

References

1. New Jersey Department of Environmental Protection. Mercury Vapor Lamps. Available at <http://www.nj.gov/dep/rpp/nrs/mercvapr.htm>.
2. Vanderbilt University Medical Center. Broken Halide Lamps Could Cause Sunburn. Available at <http://www.sciencedaily.com/releases/2004/05/040520062755.htm>.

TRAIN Update

Advancements enhance public health learning system

David Knapp, TRAIN Administrator, Training, Kentucky Department for Public Health

The training needs for the public health workforce, first responders and medical community at large are growing significantly. Increasing workloads and decreased downtime have been driving factors pushing training needs and technology advancements. In September 2005, the TrainingFinder Realtime Affiliate Integrated Network (TRAIN) Learning Management System's enrollment of registered users surpassed 6,500. The majority of Kentucky's public health workforce is currently registered in the TRAIN learning management system and regularly participates in training programs. Kentucky's first responders have found their way into TRAIN, in addition to medical community partners. Over 350 programs were made available through TRAIN this year, which included classroom courses, conferences, online modules, satellites, datacasts and videoconferences.

TRAIN is a national learning resource for professionals who protect the public's health. Kentucky's TRAIN program (www.ky.train.org) is a participating affiliate site that allows users to access information about state, local, national or international training available through any participating TRAIN

site.

Major TRAIN enhancements for 2005 were unveiled monthly. A major enhancement was electronic course management. Training programs are now being managed electronically from beginning to end entirely by computer, freeing up significant time in the workday for personnel responsible for managing such programs. Registrations that took up weeks of staff time in the past were reduced to hours, according to a number of TRAIN course providers. Course providers can now obtain web-based reports ensuring target audiences are registering for courses and if not, corrective measures are taken early on in the registration process. Never before has the amount of detailed registration information been available through Internet access to those responsible for marketing training programs.

Learners registering for courses have also noticed subtle changes to the TRAIN learning management system. The ability to click on a calendar icon when registering for a course has been found to be a convenient enhancement. The TRAIN system will send an electronic confirmation by email when learners register for a program and place the learner's registered courses in a learning folder for future reference. Additionally, the registered courses will be placed into the learner's personal calendar (such as the Outlook calendar) by clicking on the calendar icon.

Two of this year's most anticipated enhancements to the TRAIN learning management system occurred in October: the electronic administration of pre- and post tests for courses of all types and an electronic evaluation. The first enhancement allows course providers to build pre- and posttests online utilizing built-in wizards, which can create multiple format questions such as true/false, multiple choice, matching, fill in the blank or short answer/essay type questions. Easily obtained reports are then generated online and available to the course provider for instant analysis. The second enhancement, online evaluation data (with similar type question options and easy accessible reports), allows the opportunity for course providers to tweak course content, format or presentation based upon data pro-

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vided. Assessments will allow course providers to determine if desired learning outcomes are being met. These features should enhance the learner's experiences and fulfill the goal of providing effective, efficient training.

Since implementation of the TRAIN learning management system, an additional outcome is slowly being realized: electronic training can take the place of face-to-face training opportunities. This past year has been a difficult year for training with a shrinking workforce taking on additional job responsibilities. Our workforce is finding it increasingly difficult to attend day-long training sessions, but today's training needs are increasing. Also, increasing gasoline prices and subsequent travel restrictions have made face-to-face trainings difficult to fulfill. Part of the solution can be found in the TRAIN learning management system. Face-to-face programs have been and are continuing to be reengineered into blended learning experiences to include some online training component being supplemented with the introduction of a teleconference, videoconference, datacast event or a satellite program. Additionally, a number of training programs are being partially delivered through online training modules available through TRAIN.

The acceptance of training that utilizes a number of these modalities in a blended approach has allowed for increased participation in programs offered through TRAIN. Participation in courses allows the student to fit valuable learning sessions into busy work schedules. The blended approach saves local health departments and the Department for Public Health money. It has been demonstrated by the Lincoln Trail District Health Department that the local health department may save approximately \$613.00 if a nurse obtains training via an online experience versus attending an all-day event off-site. Courses available through TRAIN are evaluated, assessed and adjusted in order to provide effective, efficient experiences for learners who will want to return. In addition, the TRAIN learning management system is free to access and free to manage unlimited courses and an unlimited number of registered learners.

Learners may access TRAIN by logging onto www.ky.train.org. First time users will need to create a personal account. Anyone with Internet access may register and utilize TRAIN. Some offerings are not free and public health employees are encouraged to follow their office policies when participating in these types of training programs.

For additional information on the TRAIN learning management system, contact David Knapp at (502) 564- 564-4990 or email David.Knapp@ky.gov.

Kentucky Women's Cancer Screening Program

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The Kentucky Women's Cancer Screening Program of the Kentucky Department for Public Health (KDPH) is a comprehensive cancer screening program which provides breast and cervical screening and follow-up services, professional education, public education, outreach, quality assurance and surveillance.

Breast cancer is currently the second leading cause of cancer death among women in Kentucky. In 2002, Kentucky ranked seventh in the nation in annual death rate at 27.6% deaths per 100,000 women. Kentucky and West Virginia have invasive cervical cancer incidence and mortality rates that are significantly higher than the U.S. rates. Appalachian regions of Kentucky have higher total cancer mortality rates than the national average, with breast cancer mortality rates in several rural counties exceeding the national rate by more than 50%.

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All women may receive screening services for cervical and breast cancer, diagnostics, and referrals for follow-up through programs administered by KDPH. An estimated 82,411 Pap tests were performed from July 1, 2004 to June 30, 2005 in all local health departments across the state. One KDPH program which provides cervical and breast cancer screening services is the Kentucky Women's Cancer Screening Program (KWCSPP).

KWCSPP's primary goal is to reduce cervical and breast cancer morbidity and mortality among women throughout Kentucky by early detection and prompt referral for treatment. Women are eligible for cancer screening, treatment, diagnostic and case management services through KWCSPP if they are 21-64 years of age, have a household income of less than 250% of the federal poverty guidelines and are not enrolled in Medicare, Medicaid, private insurance or other third party payer programs.

Women who are screened through the KWCSPP and are determined to need treatment for breast or cervical cancer or precancerous conditions of the breast or cervix may be eligible for coverage of cancer treatment services through the Breast and Cervical Cancer Treatment Program (BCCTP). The BCCTP is administered through all local health departments and the Kentucky Department for Medicaid Services. **It is important to note that women must be screened through the Kentucky Women's Cancer Screening Program to be eligible for this program.**

Cancer screening services are provided by a physician, nurse practitioner or a specially-trained certified registered nurse at a local health department or by one of the KWCSPP's 600 contracted healthcare providers. A cancer screening visit includes: a health history; a physical examination including Pap test and clinical breast exam; laboratory tests; a referral for an annual mammogram for women ages 40 and over; and risk reduction counseling. Patients are encouraged to receive all services, but the patient retains the right to refuse any part of the examination.

KWCSPP assures quality of services through compliance with the Centers for Disease Control and

Prevention (CDC) core performance indicators. All four assessed quality of care indicators for cervical cancer met or exceeded the CDC standards for the most recent reporting period.

In September 2003, KWCSPP began working with state and national partners in the TEAM UP: Cancer Screening Saves Lives project to address the challenges of high cervical cancer mortality and low cervical cancer screening rates in targeted areas of Kentucky. Health care providers can support the TEAM UP and KWCSPP efforts by referring eligible women to local health departments for cervical and breast cancer screenings.

The TEAM UP project originated as part of a national effort to reduce mortality from cervical and breast cancer. Kentucky's TEAM UP partners include the Appalachia Cancer Research Center, Cancer Information Services, the University of Kentucky Cooperative Extension Service, Health Care Excel, the Kentucky Cancer Program, and the Kentucky River Health Network, as well as the KWCSPP. Kentucky's TEAM UP: Cancer Screening Saves Lives partnership identified the following nine eastern Kentucky counties with high cervical cancer mortality rates: Breathitt, Elliott, Floyd, Johnson, Lawrence, Magoffin, Martin, Powell and Wolfe. The partners determined baseline screening rates in these counties, researched model cancer control programs on the Cancer Control PLANET Web site, and developed the "Wise Eastern Kentucky Women Take Care of Themselves" campaign to promote mammograms and Pap tests.

Campaign materials were distributed to University of Kentucky County Extension agents in the nine identified counties in February of 2005. Currently, the agents are training community leaders to conduct special initiatives to increase awareness of the importance and availability of cervical and breast cancer screenings in the nine identified eastern Kentucky counties. TEAM UP anticipates the campaign will increase the number of women seeking cancer screening services. In addition, the partners hope to expand the campaign statewide by March 2006.

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To lay the groundwork for the statewide expansion of the project, KWCSPP and the Kentucky Cancer Program (KCP) are encouraging 52 statewide community coalitions to focus this year's outreach initiatives to recruit never and rarely screened women. Healthcare providers can partner with TEAM UP to help serve women who inquire about screening services by referring women who may be eligible for cervical and breast cancer screenings through KWCSPP to their local health department. Contact the Cancer Program Coordinator at the local health department to find out if a patient is eligible for the KWCSPP.

In 2005, KDPH and the KCP produced and distributed the "Quick Reference Guide for Health Care Providers: Breast and Cervical Cancer Screening and Treatment in Kentucky." For copies of this free guide or for further information about TEAM UP, contact Brenda Combs, Recruitment Coordinator, at (502) 564-2154 ext. 3822. For more information concerning the KWCSPP, contact Catherann Key, Program Director at (502) 564-2154 ext. 3821 or online at <http://chfs.ky.gov/dph/ach/cancerscreening.htm>.

References

References are available upon request.