

# ***Safe Science: Be Protected!***

## **A regular column on safety in school science**

### **Revisiting Bloodborne Pathogens in the Laboratory!**

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#### **I. In The News - Unfortunately!**

A city newspaper in the States recently reported a story about two sets of parents who were intending on suing a town's board of education, a teacher, and other school officials. The intent to sue resulted from a safety incident, which took place in the town's Alternative Middle and High School science laboratory. The teacher was having students do an experiment in which blood was viewed under a microscope. During the activity, several students shared the same safety pin to draw the blood sample. The teacher was quoted as saying she had students clean the pin with alcohol between sticks. The town health director was also quoted by the same newspaper noting, "Wiping the pin with alcohol was a good move, but that a different pin should have been used for each child."

The intent to sue was based on the fact that the blood test was conducted without proper parental notification or consent, proper safety procedures were not used, and that the potential risks of the experiment were not disclosed. The students were reported as suffering from anxiety resulting from the fear of contracting a bloodborne illness. The students have been forced to undergo testing for HIV, hepatitis, and other diseases.

#### **II. Why Is This Incident So Serious?**

Bloodborne pathogens are bacteria, viruses, and parasites found in human blood and other body fluids. They can infect and cause disease in humans. The two pathogens recently receiving the greatest attention are the Hepatitis B virus (HBV) and Human Immunodeficiency Virus (HIV). Other pathogens, which can also be of

concern, are Herpes, Meningitis, Tuberculosis, Epstein-Barr Virus, Lyme Disease, Malaria, and Syphilis, to name a few.

Bloodborne pathogens can be transferred by four different ways – direct, indirect, airborne, and vector-borne. In this case, direct and indirect proved to be the biggest threat:

- A. Direct – by touching body fluids from an infected person. This includes contact with lesions, open wounds, or sores on the skin. Skin lining of the mouth, nose or throat, and eye contact/invasion, are additional avenues.
- B. Indirect – by touching objects that have touched the blood or another body fluid of an infected person.

Allowing students at the middle school level to do blood work alone, never mind using the same needle, is not a prudent laboratory practice, given the risks involved. In addition, the strategy of using alcohol to render all Bloodborne pathogens harmless is faulted and ineffective. Regulatory agencies for health and safety have clear prudent practices for this purpose.

#### **III. Should Blood Work Be Done In Middle and High School Science Laboratories?**

Based on the means of transmission, life threatening implications and an individual's right to confidentiality, the potential for bloodborne pathogen infection raises several issues for science teachers in laboratory situations. Although health and safety regulatory agencies often protect employees and not students, students involved in blood work create an unsafe working environment for employees. In the United States,

the Occupational Safety and Health Administration (OSHA) has a Bloodborne Pathogen Standard [29 CFR 1910.1030(d)(1) – available at [www.osha.gov](http://www.osha.gov)]. It states the following: “Universal (Standard) precautions shall be observed to prevent contact with blood or other potentially infectious materials.” Teachers as employees can just as easily be exposed to Bloodborne pathogens from students as they can from other employees. Bloodborne pathogens do not discriminate!

OSHA’s Bloodborne Pathogens Standard addresses the blood hazards in the workplace. This standard covers all employees, who can “reasonably be anticipated” to have contact with blood and other potentially infectious materials. Science teachers certainly fall under this category and are therefore covered under the Bloodborne Pathogens Standard.

Science teachers, supervisors, and their employers need to secure safe alternatives to laboratory activities, such as human blood typing, cheek cell sampling, and urinalysis. The risk of unknown exposure is too high!

#### **IV. Where Does The Buck Stop?**

Based on the Bloodborne Pathogen Standard, employers are required to identify in writing, tasks and procedures, and job classifications where occupational exposure to blood occurs. OSHA requires a written plan, which is reviewed annually, in addition to training for this program.

OSHA mandates “universal precautions,” in other words, treating any body fluids or materials as if they were infectious. The employer is to provide facilities and to make sure employees use them following an exposure.

In summary, the employer is to:

- A. Develop an exposure control plan (ECP);
- B. Provide annual Bloodborne Pathogen training;
- C. Implement engineering, work practice controls, and housekeeping practices;
- D. Provide and enforce use of personal protective equipment;
- E. Offer hepatitis B vaccine, exposure evaluation, and follow-up;

- F. Use signs and labels to warn of potential hazards and exposure.

#### **V. Was The Teacher Trained?**

In the States, within 90 days of implementation, when hired before work and whenever the hazard changes, Bloodborne Pathogen Standard training is mandated. Minimally thereafter, annual training is required. Training must include access of the regulatory text, explanation of its contents, general discussion of bloodborne diseases, exposure control plan, engineering and work practice controls, personal protective equipment, Hepatitis B vaccine, response to emergencies involving blood, handling exposure incidents, post-exposure evaluation and signage. A question and answer opportunity must be provided by a trainer knowledgeable in the subject matter

#### **VI. What Should Be The Responsibility of Science Teachers In An Incident?**

In most school systems, the science teacher’s responsibility in an incident is to keep students away from any exposure/contact to bodily fluids; e.g., blood, vomit, etc. Employer trained custodial or maintenance workers should be responsible for cleaning up the bodily fluids using appropriate techniques. Science teachers should keep a bloodborne pathogens kit in their laboratory and classrooms at all times. The kit should include latex gloves, plastic bags, and other appropriate materials. The school system’s Bloodborne Pathogen Plan should be consulted for specific practices and policies.

Given this noted law suites and others already in progress, science teachers need to be trained in Bloodborne Pathogens and, again, find safe alternatives. The quick knee jerk reaction on the part of administrators is to do away with the laboratory activities. If that was a logic resolution, there would be no cars on the road or airplanes in the air. Awareness, training, and appropriate alternatives are the answer. Students need to learn about science by doing it through appropriate hands-on, process and inquiry based activities. Do the right thing: be informed, be prudent, and plan ahead! If you do, the headlines hopefully will not come your way.

Bloodborne Pathogen standards, and practices



similar to OSHA in the States, can be found for other countries, such as Australia, Canada, England, etc., at a number of websites on the Internet.

### LIVE LONG AND PROSPER SAFELY!

#### RESOURCES:

<http://hsc.virginia.edu/epinet/aboutthecenter.pdf> - International Healthcare Workers Safety Center

<http://www.cdc.gov/niosh/homepage.html> - National Institute of Occupational Safety and Health

#### Website

<http://www.osha.gov> - Occupational Safety and Health Administration Website

<http://www.med.virginia.edu/medcntr/centers/epinet/links.html> - University of Virginia Bloodborne Pathogen Safety Links

***Author's Note:** Special thanks by the author goes to John F. Able, CSP, Occupational Safety Training Specialist CONN-OSHA, for his review of this article.*



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