Pregnant and safe in the lab

by Ken Roy

Not to worry?

Does being pregnant and working in a middle school science laboratory present any hazards? This is a question usually raised by female science teachers who have recently found out they are having a baby. Unfortunately, middle schools rarely, if ever, address this issue in their safety protocols and policies.

Many college and university websites address the issue of pregnant students and faculty members working in academic laboratories. Protocols and policies are established to make it safer for the pregnant student or employee and the developing fetus. For example, the Department of Chemistry at Purdue University has a rigorous policy statement for pregnant lab students. A section of the policy states the following: “Pregnant lab students who do not wish to risk any possibility of exposure to chemicals in the lab are encouraged to consider withdrawing or taking an incomplete, because the only way to come anywhere close to avoiding that risk is to not be in the lab” (2010).

Why are such policies in place at the university level and not in the middle school laboratory? The usual rationale, resulting from a lack of information, from administrators and teachers is that there is nothing to be concerned about (few to no specific lab studies have been done). After all, they aren’t dealing with carcinogens, mutagens, or reproductive toxins found at the university level—or are they? Complicating this lack of awareness is the fact that teachers and administrators are not always made aware of the pregnancy, especially if the individual is in her first trimester. Middle school employees and staff might not be concerned about student pregnancies, but as statistics from the Centers for Disease Control and Prevention show, although the number of pregnancies in women ages 15–19 years old is declining each year, there are a relatively large number of teenage students who are pregnant and attending classes, including science laboratories (2012).

Potential hazards and alternatives (Texley, Kwan, and Summers 2004)

<table>
<thead>
<tr>
<th>Potential hazard</th>
<th>Better alternative</th>
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</thead>
<tbody>
<tr>
<td>Dissecting preserved specimens (formalin)</td>
<td>Examining muscles, bones, and cartilage in chicken wings or dissecting squid and fish in a sanitary way</td>
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<tr>
<td>Culturing environmental bacteria</td>
<td>Culturing yeast, surveying water for plankton to monitor water quality</td>
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<td>Using Van de Graaff generators</td>
<td>Using batteries and bulbs</td>
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<td>Testing pond water with strong reagents</td>
<td>Testing pond water with probeware</td>
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<td>Killing insects with chloroform</td>
<td>Making field observations of insects</td>
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Pregnancy policy—Just to be safer

Given the fact that there are potential physical, biological, and chemical health hazards in middle school science labs that could adversely affect both the pregnant mother—teacher or student—and the fetus, “prudent avoidance” needs to be embraced.

A good place for the science teacher to start is to determine if there are potential hazards in each lab activity before students perform the lab. Teachers should check the safety data sheets (SDSs) for any chemicals being considered for laboratory work. They should also contact custodial
services and ask for SDSs on cleaning chemicals. Additional areas to explore are noted below. All of this information can be helpful in determining potential hazards for each activity and if alternatives need to be found. Keep in mind, however, that there is limited knowledge about how a developing fetus can be affected by a mother’s exposure to small quantities of hazardous chemicals through breathing, skin contact, or ingestion. It would be wise for the pregnant person to share the results of the hazard assessment with her doctor.

Once a hazard assessment is done, a list of alternative lab activities should be developed. An excellent resource is the NSTA publication Investigating Safely: A Guide for High School Teachers (Texley, Kwan, and Summers 2004). This book cites potential sources of teratogens, or substances that can be harmful to a developing fetus, used in middle and high school labs, such as biological stains and preservatives, solvents, and organic compounds; several of them are listed in Figure 1. The authors also recommend specific alternative activities to potential hazards (see Figure 1).

Additional areas to explore include the following:

- Biological stains and indicators often used in middle school labs can be potentially unsafe for women of child-bearing age. For example, continued exposure to indicators such as Benedict’s reagent qualitative solution and stains (methylene blue, methyl orange, methyl red, and safranin) can cause target organ damage or adverse reproductive effects, according to their safety data sheets.

- Some general aspects of metallic elements such as beryllium, cadmium, chromium, cobalt, lead, lithium, manganese, and nickel can be considered carcinogenic or affect reproductive systems.

- Many biological agents, such as certain bacteria, viruses, and zoonoses, are also associated with an increased risk of reproductive disorders.

- Organic solvents are commonly found in paint thinners, cleaners, and adhesives. Organic solvents include alcohols, toluene, benzene, xylene, and ethers. Pregnant women should avoid these substances.

- The reproductive hazards of ionizing radiation, which can be released from certain rock samples, are now well established. Potential sources of radiation should be avoided.

**Question of the month**

If I transfer a chemical from its original container to a secondary container, what information do I need on the label of the new container?

**Answer**

When moving any chemical to another container, at a minimum, the following information must appear on the new label: chemical name, concentration, date prepared, and hazard information.

**Do you have a safety question?**

If you have questions or an issue dealing with safety that a future column might help address, send an e-mail to Ken Roy at Royk@glastonburyus.org.

- Proactive behaviors to avoid or reduce exposure include wearing gloves, goggles, and aprons; using fume hoods; and washing hands.

Given that some middle-school-level girls do become pregnant, it would be a good idea to have the nurse provide training for science teachers on how to recognize signs and symptoms of illness due to pregnancy so that teachers can refer these students to school counselors or nursing staff. Student pregnancy is often considered confidential information; therefore, the science teacher may not be aware of the situation, especially in the early stages of the pregnancy. In case of a teacher’s or another employee’s pregnancy, a physician’s recommendation may also have administrators consider reassignment, especially in a science lab situation. The Occupational Safety and Health Administration requires employers to provide a safe working environment for employees. Their Hazard Communication Standard requires special training and also personal protective equipment, engineering controls, and more to protect employees. Employers are required to accommodate employees if there are health and safety issues. The easy solution is to use safe chemicals from the start.

**Final safety thought**

There can be potential known and unknown hazards in the middle school science laboratory for pregnant employees and students. Several important factors determine whether exposure to a substance or work situ-
atation will have negative effects on an employee’s or a student’s health. These factors are length of exposure, dosage, synergism, and individual variation. Science teachers need to be advocates in helping develop policies and procedures to address this issue and make it safer for both the mother and the developing fetus.

References
Department of Chemistry, Purdue University. 2010. Pregnant students in undergraduate chemistry labs. www.chem.purdue.edu/chemsafety/PregnantStudents.htm.

Resources
Carcinogen list—www.cdc.gov/niosh/topics/cancer/npotocca.html
The effects of workplace hazards on female reproductive health—www.cdc.gov/niosh/docs/99-104
Male and female reproductive health hazards in the workplace—http://actrav.itcilo.org/actrav-english/telearn/osh/rep/remain.htm

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