

Intercollegiate Chemistry Ethics Bowl

Ethics Cases – Set 1

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Case 1-1: Cleaning Products Labeling

As of July 1, 2019, all companies selling cleaning products sold in the state of New York will be required to post online a list of ingredients, by-products, and contaminants in their cleaning solutions, along with the percentage by volume of each substance. The New York State Department of Environmental Conservation issued a statement that the policy "will help the state better understand what chemical hazards the public is exposed to, especially from products made in countries with less protective environmental laws than the United States, and reduce exposure to chemicals of concern."

The American Cleaning Institute (ACI), a trade group of cleaning product manufacturers, have pushed back against the policy. They argue that manufacturers who are members of the ACI already comply with a voluntary ingredient disclosure program, and creating new websites for their products is an unnecessary burden. Additionally, the state requirement of listing percentages of each ingredient will give away information of the companies' proprietary formulas in their products. Revealing this information will allow cheaper formulations to be made available from other companies, increasing competition and reducing sales for the companies that comply.

Case 1-2: Lethal Injection Drugs

A three-drug protocol for execution by lethal injection was adopted by the state of Oklahoma in 1977, and subsequently became the legally mandated method of execution in many other states. This protocol generally includes three compounds: sodium thiopental, pancuronium bromide, and potassium chloride. Sodium thiopental is used first as a general anesthetic rendering the inmate unconscious; pancuronium bromide is administered as a paralytic to stop skeletal muscle movement and breathing; and finally potassium chloride induces cardiac arrest.

Hospira Pharmaceuticals was the only US producer of sodium thiopental in 2011 when it announced that it planned to cease production of the drug. The drug was to be manufactured at a plant in Italy, but the Italian government demanded a guarantee that the drug not be used for lethal injection, only as a general anesthetic. Due to its inability to control how the drug would be used, Hospira decided to cease production altogether.

Hospira was acquired by Pfizer in 2015, which resumed production sodium thiopental. However, in 2016, Pfizer became the last FDA-approved manufacturer of sodium thiopental to block the sale of that drug for use in executions. This was done by restricting the sale of all pharmaceuticals used in lethal injections to selected wholesalers who would certify they would not resell the drugs to corrections departments. With this move, access to sodium thiopental for the 32 states who used it in executions was limited to the gray market or non-FDA approved sources.

Due to lack of access to the drugs typically used in the lethal injection protocol, states have tried new drug combinations in lethal injections which are untested and less effective (with some inmates regaining consciousness during the procedure). Some states have returned to using older methods of execution, such as the electric chair or firing squad, which are widely considered to be less humane.

Case 1-3: Professor Smith

Professor Smith is a successful faculty member in the Chemistry Department at Northern University with an active research program. Recently, he has been traveling regularly to give talks about his research at other institutions - and leaving his laboratory under the direction of a new post-doctoral researcher, Deborah.

James, a graduate student in his lab, overheard Deborah's conversations with Dr. Smith regarding his trips, in which he communicated to her about his research talks and interviews for other faculty positions. James is concerned with his research mentor moving for multiple reasons. He is getting settled in at Northern University and has made good friends in the Chemistry Department there, and moving would likely set back his research by a significant amount of time, with having to relocate the lab to a new institution and work on getting the lab set back up in a new place.

James approaches Dr. Smith about the move, to talk about his concerns with moving the lab if Dr. Smith was to take a new position elsewhere. Dr. Smith tells James that he is traveling to talk about his research with Deborah, to generate interest and so that she may be better positioned to find a faculty position, as he is promoting her research work. Dr. Smith also tells James that he has applied for other faculty positions and is interviewing for them on several of these trips, but does not plan to leave Northern University. He is interested in applying for these positions to obtain offer letters from other institutions for faculty positions. This will allow him to obtain counter-offers from Northern University, which allows him to increase his salary to fair market value and equal what he would be earning at other institutions.

Case 1-4: Fraternal Birth Order Effect

Fraternal birth order effect refers to an observation first noted in a 1996 Canadian study that the greater number of older brothers a man has, the more likely he will be homosexual. In a recent study published in Proceedings of the National Institute of Science (<https://doi.org/10.1073/pnas.1705895114>), evidence is presented which supports the hypothesis that a mother's immune response to proteins in male fetuses may influence fetal development. This response may impact the sexual orientation of males from later pregnancies.

In a study with a small sample size (fewer than 150 participants), the research indicated that mothers of gay sons had higher levels of antibodies for the Y-linked protein neurologin 4, which is believed to be involved in directing development of connections between brain cells. It is hypothesized that these antibodies may be produced by the mother in pregnancies with a male fetus, which may impact the development of male fetuses in later pregnancies. The antibodies present in the mother's blood may enter the fetal compartment and pass the blood/brain barrier. The antibodies then may influence brain structures in the later fetus which are involved in the development of sexual orientation.

Case 1-5: Genetically Modified ... or not?

The US Department of Agriculture will soon require manufacturers to use symbols indicating that a genetically modified ingredient is present in a food product. The term used for these products will be “bioengineered”, rather than “genetically modified”, and will contain a label containing the letters “be”, as shown below.



For the purposes of labeling, bioengineered food is defined as food “(A) that contains genetic material that has been modified through in vitro recombinant deoxyribonucleic acid (DNA) techniques; and (B) for which the modification could not otherwise be obtained through conventional breeding or found in nature.” Examples of this may be herbicide-resistant crops in which a gene for resistance not naturally found in the plant has been added, or crops which produce a vitamin or nutrient that is not naturally found in that organism.

(https://www.regulations.gov/document?D=AMS_FRDOC_0001-1709)

Although bioengineered products must be labeled, other foods that have been genetically modified may be exempt from labeling. The USDA has stated that gene editing is equivalent to traditional plant breeding techniques, so it does not pose additional risks as bioengineered products may. The USDA states that DNA deletions of any size, single-base-pair substitutions, and insertions of DNA sequences from plant relatives give similar changes as would occur naturally from traditional plant breeding. Although the DNA has been altered, a "foreign" gene from another species has not been added as in bioengineered foods.