sumers/users to comply with the supplied information.

Safety assessment and risk communication is a dynamic process. Our knowledge base is constantly increasing, and society's interpretation of what constitutes safety is an evolving process. As newer technology becomes available to better qualify and quantify the potential adverse effects of materials, safe and acceptable conditions for use become available and affordable for artists, whether their studios are located at homes, schools, or workplaces. Further, as toxicologists who certify compliance with LHAMA, we must reassess and recertify each unchanged art material every five years. Any changes that may have occurred in the product formulation or the state of knowledge since the initial certification are revisited. In this way, new information and concerns for safety are added to our knowledge base and to the label.

Arlene L. Weiss
Board Certified Toxicologist
Pharm-Tox, Inc.
Mahwah, New Jersey

Rudolph J. Jaeger
Board Certified Toxicologist
Environmental Medicine, Inc.
Westwood, New Jersey

Safe Use of Art Materials: Who Is Responsible?

I believe there are serious problems with fairness and incomplete reporting in the Focus article "Exposing Ourselves to Art," by Scott Fields [*EHP* 105:284–289 (1997)].

I have three points to make. First, in this article, Fields did not adequately explore the artist's or the art faculty's responsibility for learning to use materials properly, let alone safely. His and his sources' implications are clear: there should be more regulation, and the manufacturers should be held accountable, even liable, for labeling. In fact, the American Society for Testing and Materials' *Standard Practice for Labeling Art Materials for Chronic Health Hazards* (ASTM D 4236) is codified as part of the Labeling of Hazardous Art Materials Act of 1988 (LHAMA). That's plenty of regulation, but both Monona Rossol and Michael McCann would have us believe that it's not sufficient. Rossol is a member of ASTM Subcommittee D01.57, Artists' Paints and Related Materials, which wrote the standard; both she and McCann were present during discussions leading to its publication. Moreover, Rossol has had every opportunity to comment and vote on subsequent revisions of D 4236. D 4236 labeling is quite sufficient, it is continually updated (unlike any law), and its success as hazard communication rests entirely in the hands of the artist or other user, whose responsibility it is to read the labels.

My second point is that neither the Consumer Product Safety Commission (CPSC) nor the ASTM have the budget to publicize the law or the standard incorporated into it. One of the ASTM's mantras is "We only write standards," as I am continually reminded by the staff manager. The ASTM does not enforce standards. The CPSC is charged with enforcing LHAMA, but has few resources to do that, let alone publicize it. The news media, including publications such as *EHP*, can help in publicizing the good labeling practices promulgated by the ASTM—but only if they get the complete story through thorough reporting. Again, the user of art materials must be made aware that labels on their products carry good information and that if they choose to use materials that are not marketed as art materials, it is their responsibility to find out about safe use—and not blame someone else when an adverse health effect arises from willful ignorance.

Finally, Rossol and McCann place the blame for all this in the laps of the manufacturers of art materials or consulting toxicologists. In fact, manufacturers of art materials have been bending over backwards since 1981 to deal in a scientific, timely, and accurate manner with ASTM recommendations and medical advice, to say nothing of moral or ethical issues. Furthermore, the toxicologists and other scientists who have worked with the ASTM, including numerous state departments of public health, representatives of the EPA, and the Society of Toxicologists, have all acted in the most responsible manner possible. For Fields to suggest otherwise ("Manufacturers could be compelled to test products more extensively and label them more accurately") is, I think, simply unfair.

Mark Gottsegen
Department of Art
The University of North Carolina
Greensboro
Greensboro, North Carolina

Response: Labeling and LHAMA

I am surprised that Mark Gottsegen thinks that I should be satisfied with the art materials labeling law (LHAMA) because I have had "every opportunity to comment and vote on subsequent revisions of D 4236" and that "it [D 4236] is continually updated." He knows that no matter how we revise this standard, only the 1988 version is referenced in LHAMA. Subsequent versions have no affect on the law.

In addition, the only major revision of D 4236 that I remember was proposed a year or two after the law became effective. The manufacturers mistakenly thought they could weaken the law by removing the requirement to include their phone numbers on the label from the revised D 4236. Once it was clearly understood that the law would be unaffected by this change, the revision was easily voted down.

Gottsegen also argues that I should be satisfied with the labeling law because I was involved in its passage. He has my permission to be even more critical of me than that: I enthusiastically supported the law at that time. This was before I learned how many ways there were around, under, and through the law. And my support of the law in 1988 is proof of my good will, trust of manufacturers and toxicologists, and outright naivete at that time.

Since then I have learned. For instance:

- Products containing untested chemicals for which there is no chronic data can be labeled nontoxic even if the chemicals are closely related to known toxic or carcinogenic chemicals.
- Products containing highly toxic chemicals including lead and cadmium were labeled nontoxic if they did not leach in an ASTM acid test, despite the fact that there were no *in vivo* studies demonstrating that this test was valid. Only after a nursing home resident's blood showed high lead levels after she accidentally ingested one of these nontoxic ceramic glazes did some certifying toxicologists reject this test for ceramic products.
- Another version of this unvalidated acid test for art paints (D 5517) was rammed though in 1995. I did assist in getting wording into the standard indicating that it was not a substitute for animal testing. But I am no longer naive enough to assume that this acid test is not being used at this moment somewhere to justify labeling language on paints.

As Gottsegen knows, I have many other complaints about labeling, but not many complaints about Gottsegen himself. I appreciate how hard it is to chair that ASTM committee, especially with me on it.

Monona Rossol
Arts, Crafts and Theater Safety
New York, New York

Response: Education and Responsibility

I would like to correct several misimpressions in Mark Gottsegen's letter. Gottsegen

stated that the Focus article did not "adequately explore the artist's or art faculty responsibility for learning to use art materials properly," and that Monona Rossol and I didn't believe that the hazard labeling regulations for art materials were adequate. Gottsegen also states that Rossol and I "place the blame for all this in the laps of the manufacturers of art materials or consulting toxicologists."

Speaking for myself, I said in the Focus article that the Labeling of Hazardous Art Materials Act of 1988 improved labeling. My comments related to enforcement of labeling of imported art materials and the labeling of products from small companies. I agree with Gottsegen that the Consumer Product Safety Commission does not have an adequate budget for enforcement and education. However, that is not the fault of the users of art materials and does not take away from manufacturers the responsibility to follow existing regulations and to manufacture the safest possible art materials. Without adequate labeling, artists cannot know the hazards and needed precautions.

Concerning the responsibility of artists and faculty to use materials properly, an extensive part of the article deals with the responsibility of the art schools to provide a safe environment, a point ignored by Gottsegen. In addition, Gottsegen well knows that education of artists and art teachers has been the major thrust of my more than 20 years of experience in this field, as illustrated by the several books and hundreds of lectures I have done on art hazards. I agree with his statement that it is the responsibility of artists to find out about the safe use of materials that are not marketed as art materials. That is why I emphasize the need for education of art students and teachers about art hazards and the need to change existing attitudes.

Michael McCann
Industrial Hygiene Consultant
New York, New York

The NIEHS Predictive-Toxicology Evaluation Project: The Need to Distinguish Informed Uncertainty from Ignorant Equivocation

During the public meeting that followed the first phase of the NIEHS Predictive-Toxicology Evaluation Project (*1*), a discussion took place regarding the status of equivocal predictions of carcinogenicity in relation to equivocal classifications of carcinogenicity. The matter was not resolved at that time. The same question resurfaced in the recent letter by Bristol et al. (*2*) in relation to the second (current) collaborative study. Given that the public meeting that will follow the present study will have many issues to debate (*2,3*) it seems worth discussing in advance how equivocal predictions should be handled.

In situations where a predictive technique has been established as providing reliable indications of the carcinogenicity of chemicals, the mechanistic basis for that success will probably be apparent. That will elevate the technique from being empirical to rational. Such a technique may sometimes make an equivocal prediction of carcinogenicity that will reflect the true situation, i.e., after balancing the evidence used by the technique, the carcinogenicity of the agent under study will be considered uncertain and an equivocal prediction will be made. If it transpires that the agent is classified as equivocal for carcinogenicity, it could be accepted that the predictive technique had correctly anticipated that outcome, equivocal being snynonymous with ambiguous, uncertain, indeterminate, puzzling, obscure. Even in that optimum situation, a generally reliable technique may be requested to venture into an area of chemistry for which it is untrained, and an equivocal prediction made under such circumstances would simply reflect the ignorance of the technique in that area, as opposed to its genuine inability to come to a firm conclusion when faced with conflicting evidence. For example, the technique may be capable of making sound predictions of carcinogenicity for organic chemicals (some of which predictions may be genuinely equivocal), but be unable to predict the carcinogenicity of, for example, inorganic chemicals or organic arsenicals. In such situations the challenge will be to distinuish informed uncertainty from ignorant equivocation.

The techniques being evaluated in the present study (*1*) are probably best regarded, at least initially, as being both equal and only partially validated. That will enhance their objective evaluation. In that situation the optimum conditions outlined in the above paragraph will not hold, and a healthy skepticism will be in order. Thus, to polarize the issue, it will be inappropriate to classify a technique as 100% predictive of carcinogenicity should it transpire that all of the chemicals under study are equivocal for carcinogenicity, and all of the predictions made by the technique are equivocal.

The need for this discussion is illustrated by the 17% incidence of equivocal and/or no-predictions made in the current study [87 of the toal of 510 predictions made for the 30 chemicals (*3*)]. Over half of this equivocal predictions emanate from 5 of the 17 techniques used, and 36% of them are associated with the four inorganic chemicals included in the study (*3*). Such nonrandom groupings indicate that some of the predictive techniques presently under evaluation are either under-developed, invalid, or are not generally applicable.

John Ashby
Zeneca Central Toxicology Laboratory
Alderley Park, Cheshire, United Kingdom

References

1. Bristol DW, Wachsman JT, Greenwell A. The NIEHS Predictive-Toxicology Evaluation Project. Environ Health Perspect 104(suppl 5):1001–1010.
2. Bristol DW, Wachsman JT, Greenwell A. Response. Environ Health Perspect 105:467 (1997).
3. Ashby J. Comparison of 17 methods of predicting the carcinogenicity of 30 chemicals. Environ Health Perspect 105:466–467 (1997).

ehis
Environmental Health Information Service
http://ehis.niehs.nih.gov
Visit us on the web today!