

Formaldehyde and the FEMA Fiasco

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The recent publicity regarding the formaldehyde in the FEMA trailers is not old news. It seems to me that communications between Housing and Urban Development (HUD) and FEMA are absent. This is not surprising. Most federal agencies have their head in the ground like ostriches. I also saw a memo from FEMA attorneys that clearly indicated they wanted to keep this situation quiet, lest someone find out about it and files a law suit.

In 1985 HUD stepped in and set emission standards for formaldehyde release from hardwood plywood and particle board. I have some questions to ask FEMA. Are you aware of these emission standards and regulations surrounding them? Or have you simply made a decision that travel trailers and trailers in general do not fall under these regulations? You are playing with the health of people in the Katrina aftermath and basically have ignored the health implications of your actions.

Law suits regarding the adverse health effects of exposure to formaldehyde are not old hat. I was involved in cases in the mid 1980's regarding the elderly, mobile homes and adverse health effects. While participating as a consultant as well as an expert I was involved in some basic research involving the health of the elderly as well as younger individuals. I will get more into the health problems that we observed and published in peer reviewed journals. At this time I would like to briefly describe some history of the problem.

I was consulting to a law firm in Pasadena California in 1985. The firm had several plaintiff actions against various mobile home manufacturers. The cases were not going well for two reasons. First, we needed to demonstrate that formaldehyde at low concentrations was deleterious to the health of the occupants (see below). The other was we needed a smoking gun. The smoking gun was found indirectly and at the ignorance of the mobile home manufacturing industry.

The law firm issued interrogatories against one of the defendant mobile home manufacturers. The headquarters was located in Chicago area. The defendant told us that they did not have time to answer the interrogatories and invited us to Chicago to search through their archives. The attorney, Chris

Gardner, flew to Chicago and returned as one of the most excited individuals I have ever met. What he found were memos between the National Particle Board Association and the Mobile Home Manufacturers Association. All of the major producers of mobile homes were cc'd on the memos. The memos dated from 1956 through 1959. The memos clearly stated that they (both associations) knew that they had a formaldehyde problem causing ill effects in occupants. However, they stated that they will take the legal cases on a one at a time basis. Does this sound similar to the FEMA situation? These memos are in the safe custody of another attorney who will remain anonymous at this time.

The other issue regarding adverse health effects was also solved shortly after the discovery of the memos. I was researching the literature on formaldehyde and its adverse health effects when I came upon a paper published by R. Patterson, et al titled "Canine Antibodies against formaldehyde-dog serum albumin conjugates: Induction, measurement and specificity." J Lab Clin Med 206:93-100, 1985. The paper demonstrated that antibodies to formaldehyde-albumin (F-albumin) conjugates were present in the serum of dogs exposed to the chemical. My thought was that if it can happen in dogs it can happen in humans. I took the idea to Ari Vojdani, Ph.D. and he developed an assay for F-albumin. We tested eight individuals known to be exposed to formaldehyde in mobile homes and compared the to 8 laboratory technicians as controls.

The following significant observations were found: 1) IgG antibodies to F-albumin were detected in the sera of the 8 subjects vs none in the controls; 2) T lymphocytes were significantly decreased in the 8 subjects; 3) B cells were significantly decreased in the subjects and 4) The ability of T and B cells to divide was greatly reduced. The formaldehyde concentrations inside of these mobile homes ranged from 0.07 to 0.55 ppm. This paper is published in the Archives of Environmental Health 1987, 42:347-50.

Additional studies were then carried out in conjunction with Alan Broughton, M.D., Ph.D. and Roberta A. Madison, Dr.P.H. We tested residents of mobile homes, sick building syndrome patients, arc welders and a community of individuals in the Kenai Peninsula in Alaska. These studies were published from approximately 1988 through 2001 in the following journals: Clinical Gerontology, Archives of Environmental Health, Environmental Health Perspectives, American Journal of Industrial Medicine and Comments in Toxicology. In brief, the subjects had multiple organ symptoms suggestive of MCS, they had evidence of an activated immune system (elevated CD 26 T cells), increased levels of F-albumin antibodies and increased odds ratios for various autoantibodies (antismooth muscle, ANA, antimitochondrial, antibrushboarder, and antiparietal cell). Based upon current knowledge of the immune system, it now seems appropriate to state that these individuals were suffering from the ill effects of a pro-inflammatory condition. The increased autoantibodies and CD26 cells support this conclusion.

Since 2001 ample evidence has been published by others in the peer reviewed literature. These publications show several adverse effects resulting from formaldehyde exposure, including increased rate of DNA mutation in peripheral blood cells. Currently, it is recognized that formaldehyde is a carcinogen. It has embryo and fetal toxicity, neurotoxicity and is injurious to other organs (lungs, eyes, immune system).

The question now is then why has FEMA allowed the current situation to happen? We have known since approximately 1956 that particle board, dense fiber board, luan paneling and interior grade plywood emit formaldehyde. This occurs because the resin (ureaformaldehyde) that is the glue binding the wood particles is unstable. U-F (ureaformaldehyde) undergoes hydrolysis at room temperature and humidity. Raise one or both and the decomposition of the resin is accelerated. Also, during the manufacturing process excess formaldehyde is added to polymerize the U-F. Thus the decay curve is

two fold. There is an initial release for formaldehyde because of the excess used along with hydrolysis. Occurring over a time of several years is the hydrolysis of U-F. This process varies from one part of the U.S to another, depending upon ambient temperatures and humidity. New Orleans, as a recall is both hot and very humid.

Finally, the question must be asked, is there a threshold limit to the adverse effects of formaldehyde? This question has not been fully answered. It is my professional opinion that the threshold limit is well below 0.1 ppm, which is the OSHA workplace standard for healthy adult males. If this is the workplace recommendation where men spend approximately 40 hours per week, then what should the home environment be? Women and children spend a greater amount of time in the home than men do at work. Secondly, it is well recognized that children are far more sensitive to toxic effects of chemicals than are adults. What is the recommended standard for women as well as children? This question is still open. There is one thing for sure, occupational concentrations cannot be applied to women and children, particularly new born and infants. FEMA, are you really going to give these trailers and homes to American Indians?