

Summary of Expert Panel's Report to CDC on Health Issues and Temporary Housing

September 18–19, 2007

In collaboration with the Federal Emergency Management Agency (FEMA), the Centers for Disease Control and Prevention (CDC) convened a panel of experts to seek their individual opinions on the health issues related to living in temporary housing (i.e., travel trailers, mobile homes) for an extended period of time. Their opinions were sought with particular regard to more than 55,000 families who were victims of Hurricane Katrina living in Louisiana and Mississippi.

The panel convened in Boulder, Colorado on September 18 and 19, 2007. The five panel members are nationally recognized experts in such areas as environmental health, public health policy, exposure assessment, environmental epidemiology, occupational epidemiology, pediatrics, asthma, chronic obstructive pulmonary disease (COPD), allergies, population exposures to environmental pollutants, and indoor environmental quality (IEQ). CDC representatives briefed the panel members on the travel trailer/formaldehyde situation in Louisiana and Mississippi, and the ways in which CDC assessed the health effects of prolonged formaldehyde exposure. Although the panel members were not asked to provide consensus recommendations, they were asked to respond individually to four questions:

1. Given the current information, what are the potential public health issues associated with living in travel trailers?
2. Is the CDC approach (children's health study, unoccupied and occupied trailer formaldehyde assessment, and communication plan) sufficient to address the public health issues? If not, are there additional actions you would recommend?
3. Understanding that formaldehyde is just one component of indoor air quality, it is the component that has attracted the most public and political attention in relation to this current issue, and therefore must be addressed directly; given that, is it possible, with what we know of the science of formaldehyde to come up with reasonable target maximum levels for residential indoor air in either the short term (an "emergency" target

level) and in the long term (through a rule making process)? If so, what is the best approach to arriving at these levels; if not, is that implicitly saying that the target level is whatever level does not exceed the outdoor ambient level in the surrounding environment?

4. In what situations, if any, can these trailers be used as temporary housing after evacuation? Is it possible to set time limits for occupancy to provide shelter and a healthy environment?

The following is a summary of individual panel members' observations and conclusions.

- Each of the panel members recognized that the close quarters and the potential exposures involved in long-term travel trailer living created a broad range of potential health effects. The trailers were not designed to provide long-term housing for families. Panel members acknowledged the need for emergency housing but suggested that authorities limit the use of existing travel trailers to short-term emergencies.
- Panel members agreed on the immediate need to improve indoor air quality of both existing and future temporary housing through improved materials, ventilation, and resident education.
- Panel members supported the proposed air quality evaluation in both unoccupied and occupied trailers and, for baseline and comparative exposure measures, recommended evaluation of additional housing types as well. Panel members also suggested that CDC combine the in-use trailer exposure study with the health study. The results from the study of unused mobile homes can identify which chemical exposures to examine in the exposure study. The air quality studies should include evaluation of potential exposures to CO, to flame retardants, to phthalates, and to other VOCs.
- The children's health study presented a number of challenging design issues. These issues included sample size, control selection, comparative housing types, and temporal and geographic variability. Panel members proposed an increased study sample size over that originally contemplated by CDC, and further proposed expanding the study to include a longitudinal component. The full report contains a number of other specific suggestions by the panel members related to the children's health study.

- Because early childhood exposures may be important to overall health and to long-term risks, panel members suggested expansion of the children’s study group to include children below the age of 3. Panel members also suggested consideration of a separate study to evaluate children born to families who have lived in travel trailers for the past 2 years.
- None of the panel members offered a specific target level for indoor formaldehyde exposure. In that regard, however, the State of California’s extensive evaluations of indoor air quality do provide sound public health guidance regarding both short-term and potentially chronic formaldehyde risks. Thus the panel members submitted that this work can provide a starting point for future decisions concerning indoor air quality in temporary housing. CDC should work with FEMA, HUD, EPA and CPSC to develop policies for acceptable concentrations in indoor air. CDC should similarly work with any other regulatory agencies experienced in risk-based standard-setting.
- Panel members said that FEMA should adopt a continuous mechanical ventilation standard for temporary housing units (THUs) at rates which, during occupancy, are protective of occupants’ health. In that regard, the panel members referred FEMA to ANSI/ASHRAE Standard 62.2-2007 (Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings, American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Atlanta GA) as a model for this requirement. An alternative is the U.S Department of Housing and Urban Development’s (HUD) ventilation standard found in 24 CFR.3280.103-07 (Manufactured Home Construction and Safety Standards). The panel members cautioned, however, against FEMA’s wholesale adoption of any standard; FEMA should assess whatever standard it adopts in light of emerging data CDC is now collecting. These data evaluate sources of indoor pollutant emission, whether from materials in the current THUs or from occupants.
- Finally, for each study—from design and implementation to result reporting—each panel member encouraged ongoing peer review. As far the case-series investigation was concerned, however, the panel members argued against the use of local physicians’ reports of illnesses to conduct a case-control study. The potential for bias in the identification of these illnesses was too great to conduct a reliable etiologic-factors study.

Rather, the panel members advocated focusing attention on the health hazard evaluation of these illnesses through a review of medical records and through environmental studies of the homes of ill children. The panel members said these are better tools with which to identify possible etiologic factors and to provide consultation to the families on possible ways to reduce exposures that may have caused diagnosed illnesses.