



**Testimony  
Before the Committee on Oversight and  
Government Reform  
United States House of Representatives**

**CDC Reports on Levels of Formaldehyde  
in FEMA Temporary Housing Units  
Supplied to Katrina Victims in the Gulf  
Coast**

*Statement of*

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Good morning Chairman Waxman, Mr. Davis, and other distinguished Members of the Committee. Thank you for the opportunity to be here today. I am Dr. Michael McGeehin, Director of the Centers for Disease Control and Prevention's (CDC's) Division of Environmental Hazards and Health Effects within the National Center for Environmental Health (NCEH).

My testimony today will focus on the results of three CDC investigations related to FEMA-supplied temporary housing units and health following Hurricane Katrina:

- I. Final Report on Formaldehyde Levels in FEMA-Supplied Travel Trailers, Park Models, and Mobile Homes ("Occupied Trailer Study"), released July 2, 2008;*
- II. Lawrence Berkeley National Laboratory Interim Volatile Organic Compounds (VOC) Report ("Travel Trailer Structural Report"), released July 2, 2008; and*
- III. Assessment of Health Complaints Among Children Living in FEMA Temporary Housing Units in Hancock County, Mississippi ("Hancock County Child Health Record Review"), released April 24, 2008.*

## **I. Final Occupied Trailer Study**

Background. From December 21, 2007, to January 23, 2008, CDC conducted testing to assess levels of formaldehyde in occupied FEMA-supplied travel

trailers and mobile homes in Louisiana and Mississippi. CDC randomly selected 519 travel trailers and mobile homes for testing. These units represented a cross-section of the trailer types and manufacturers most frequently used by FEMA in the Gulf Coast. Interim results were announced in February 2008, and a final report was released on July 2, 2008. The final report included additional analyses of data, such as temperature, humidity and ventilation, but did not change the conclusions and recommendations from those in the interim report.

Results. Average levels of formaldehyde in all FEMA-supplied travel trailers and mobile homes tested were about 77 parts per billion (ppb). CDC concluded that:

1. formaldehyde levels found in some travel trailers and mobile homes were higher than typical U.S. indoor levels, and at levels found in some trailers and mobile homes, formaldehyde exposure could affect health.;
2. travel trailers had significantly higher average formaldehyde levels than park models and mobile homes;
3. higher indoor temperature and humidity, and closed windows, each was associated with increased formaldehyde levels, and formaldehyde levels were associated with the presence of mold and were higher for certain travel trailer types and brands than for others; and
4. the levels measured probably under-represented long-term exposures since levels tend to be higher in newly constructed travel trailers and during warmer weather.

Recommendations. CDC recommended that FEMA relocate residents before the temperatures in the region increased, with priority given to occupants suffering symptoms potentially attributable to formaldehyde exposure, and to vulnerable populations such as children, elderly persons, and persons with chronic respiratory illnesses, and persons living in trailer types that have higher formaldehyde levels. CDC also recommended that while residents await relocation they take certain steps to reduce exposure, such as spending time outdoors and maintaining indoor temperature at the lowest comfortable level.

## **II. Interim Lawrence Berkeley National Laboratory Volatile Organic Compounds (VOC) Report**

Background. CDC contracted with Lawrence Berkeley National Laboratories (LBNL), part of the Department of Energy, to study indoor emissions of volatile organic compounds (VOCs), including formaldehyde, in four vacant FEMA-supplied travel trailers. These four travel trailers were on average two years old. The study looked at air levels for the whole trailer and at gases released from specific parts of the trailer, such as walls, floors, ceilings, tables, and cabinets. After LBNL and CDC took measurements of air inside these trailers at FEMA's Purvis, Mississippi, storage yard, CDC staff took each trailer apart, then collected, packaged, and shipped the parts to Lawrence Berkeley National Laboratories, where laboratory staff tested the parts in small chambers to determine the type and extent of VOCs each part emitted. The four travel trailers

tested were: Pilgrim International, Gulfstream Coach Cavalier, Thor Industries Dutchmen, and Coachmen's Spirit of America.

### Results.

Analysis at LBNL found volatile organic compounds in the air of the travel trailers. Of those, only formaldehyde, phenol, and TMPD-DIB (a substance used to make plastic) were found at levels higher in trailers than commonly found in site-built or manufactured homes. Formaldehyde was the only compound considered to be of possible human health significance at the observed concentrations (range: 310 ppb to 780 ppb).

The major findings from the LBNL investigation are that whole-trailer formaldehyde air levels are high, ventilation rates are low, and the emissions from the tested wood products appear to be consistent with those found commonly in the building industry. These findings indicate that differences in the construction/design of trailers may lead to elevated formaldehyde concentrations and whole trailer emission rates (i.e. the cumulative effect of too much formaldehyde-emitting material in too small a space with insufficient ventilation, even though construction materials individually meet standards generally used in the building industry). Differences between these trailers and other housing, which may contribute to the elevated formaldehyde concentrations, include an extensive wood surface area in a relatively small space with low ventilation rates bringing less fresh air into the travel trailers. This investigation was limited to four

travel trailers and was designed to assess indoor emissions of VOCs and aldehydes. These findings do not represent all of the FEMA-supplied travel trailers used during the Hurricane Katrina response, and cannot be used to draw conclusions about travel trailer manufacturers or brands.

CDC Recommendations. We recognize that the results from this study cannot be generalized to the entire fleet of FEMA-supplied travel trailers because of the small sample size. However, CDC's study of four travel trailers provides information to help guide future research to understand the effectiveness of using materials that emit lower levels of formaldehyde during construction and increasing the ventilation rates in the trailers. A systematic assessment of different makes and models of travel trailers in various scenarios is needed to more fully understand the impact these factors may have on formaldehyde levels.

### **III. Hancock County Child Health Record Review**

Background. After Hancock County physicians reported an increase in breathing problems among children living in FEMA-supplied trailers and mobile homes following Hurricane Katrina, officials with the Mississippi Department of Health requested CDC assistance. CDC conducted a review of pre- and post- Katrina records of health care visits by children in Hancock County for conditions potentially related to indoor air. The investigation was developed as quick response epidemic aid assistance ("Epi-Aid"), which provides a rapid, though

limited, assessment to assist health officials in identifying potential health problems and is conducted by an officer in CDC's Epidemic Intelligence Service training program. CDC scientists reviewed 934 records, and selected the medical records of the 144 children who met the eligibility criteria established for the assessment -- that a child visited one of five health care facilities in Hancock County during the year prior to and two years following Hurricane Katrina, for any of a variety of common illnesses. These conditions included many of the common health complaints experienced by children that are likely to result in visits to a physician. Follow-up interviews were conducted with parents or guardians by telephone. During the time that the assessment was done, two-thirds of the children lived in or had lived in FEMA-supplied trailers or mobile homes.

Results. Hurricane Katrina destroyed thousands of electronic and print medical records, thus limiting CDC's data collection. This made it impossible to estimate rates for children's health-care visits for all of Hancock County. However, CDC did find that the patterns of health care visits for respiratory illness after Hurricane Katrina were similar for children who lived in FEMA-supplied trailers and mobile homes and those who did not. For the records that were available for review, the proportion of visits for upper respiratory illnesses decreased and the proportion of lower respiratory illnesses increased in the second year following Hurricane Katrina. This was true both for children who lived in trailers and mobile homes and for children who had not.

Recommendations. CDC recommended that health care providers continue to follow existing guidelines during the evaluation and treatment of children with symptoms potentially related to indoor air quality.

CDC currently is planning a long-term study of children who resided in FEMA trailers and mobile homes in Mississippi and Louisiana, to better determine if there is an association between living in a FEMA-provided travel trailer or mobile home in a storm damaged region of the U.S. Gulf Coast, and adverse health effects such as respiratory illness in children.

Thank you for the opportunity to present this information to you today. I would be happy to answer any questions.