Current Indoor Air Quality Research
By Joe Laquatra

I was a participant in the Ninth International Conference on Indoor Air Quality and Climate, which was held in Monterey, California, from June 30 till July 5, 2002. 1,100 researchers and practitioners from 43 countries took part in this event at which 726 papers were presented.

I presented a paper that Lorraine Maxwell, Mark Pierce and I wrote: “Indoor Air Pollutants, Limited Resource Households and Childcare Facilities.” We reported on findings from the Healthy Living and Learning Environments project, in which we focused on homes and childcare facilities in New York State’s rural counties. Following is a synopsis of our paper.

Disproportionate exposures to indoor air pollutants by limited resource households in their homes have been observed for reasons that are likely related to housing quality and socioeconomic status. Older homes characterized by accelerated deterioration resulting from deferred maintenance are more likely than newer homes to exhibit chipping lead paint, friable asbestos, cracked foundations, and leaking combustion equipment. These features contribute to lead, asbestos, radon, mold, and combustion products as air pollutants, some of which are known asthma triggers. This situation creates problematic issues for public policy. While environmental and health officials engage in campaigns to raise awareness among the general public about residential indoor air quality, pollutant abatement remains a private responsibility. A systematic approach to assist limited resource households assess and address indoor air pollutant risks is missing from policy discussions about these issues. Housing tenure status of these households, who are more likely than those with more resources to be renters rather than owners, further complicates the problem. Whose responsibility is it to abate indoor air pollutants, and where will the resources to carry out these tasks come from without exacerbating problems of housing affordability?

A number of studies that have documented the incidence of indoor air pollution and its negative impacts on children, including lead poisoning, leukemia, and allergies. For physiological and behavioral reasons, children are at higher risks than adults for adverse health effects from environmental toxicants. A strong need currently exists for a plan to reduce risks of exposure to these pollutants; and these risk reduction efforts should focus not just on the home environment, but also on childcare settings. Community educators, physicians, and parents can play important roles in increasing awareness of indoor environmental risks and effectively managing them. But to get to that point, a greater understanding of the extent of potential risks is necessary.

Following a two-stage, random sampling procedure, telephone surveys of 328 adult heads of households and 75 childcare facility administrators were conducted. Each respondent was offered free tests for radon, lead, asbestos, mold, pesticides, and combustion pollutants, including carbon monoxide. 132 respondents in the housing sample and 24 in the childcare facility sample agreed to have these tests conducted.

A significant and negative relationship between household income and radon was observed in a regression analysis and is likely due to lower quality housing among lower income groups and housing deficiencies that create radon pathways, such as foundation cracks and dirt basement floors. General structural condition of the homes was seen to have a significant and negative

1 This article originally appeared in the Summer 2002 issue of Housing and Home Environment News
relationship with income. A significant and negative correlation between income and carbon monoxide level at oven temperature was observed.

Sixty percent of the homes were without operating exhaust fans in kitchens. The significant and negative relationship between income and carbon monoxide is likely due to this lack of operating exhaust fans, with lower income households more likely to be in that category. Lower income households are also more likely to have older cooking appliances which have not been maintained.

High levels of radon and lead, as well as and the presence of asbestos and mold, were observed in childcare facilities and are reasons for serious concern. The highest lead and radon levels observed were in two different facilities. Asbestos was seen in six facilities, and basement mold was observed in six.

The findings reported in this paper contribute to the growing discussion about indoor air quality in lower income households and childcare facilities. Health officials and policy makers agree that indoor air pollutants pose serious health risks; and they expend considerable resources to raise public awareness of these risks. But the fact that pollutant mitigation in privately owned homes remains a personal responsibility creates a policy dilemma. Rural areas of New York State have been characterized for years as being in a state of economic decline, which has negative impacts on household income and housing quality. For low income households, resources for pollutant abatement are nonexistent. A companion study currently underway at Cornell University, “Practical Management Strategies for Reducing Risks of Exposure to Indoor Air Pollutants,” is examining the effectiveness of teaching low income households strategies to minimize their risks of exposure to indoor air pollutants.

The issue of indoor air quality in childcare facilities should be an important concern of facility owners and the parents who send their children to them. A three-pronged approach may be necessary to bring public attention to this. At the policy level, indoor air quality standards could become a part of facility license granting and license renewals. Facility owners and directors could become educated about the issues now and thereby keep themselves ahead of the policy curve. At the same time, parents could be educated about the issues so that they can ask questions about indoor air quality before enrolling their children in childcare facilities.

Should public resources be made available, as low interest loans or grants, to low income households and childcare facilities for indoor air pollutant mitigation? In evaluating this question, the issue of overall cost to society should be examined. Lead poisoning in children leads to lowered intelligence and behavioral problems. Mold is a trigger for allergies and asthma, both of which lead to school and work absences, productivity losses, and increased health costs. Exposures to asbestos, carbon monoxide, and radon lead to early death. An analysis of benefits and costs to society from improving indoor air quality for low income households and childcare facilities would be useful for providing guidance to policy makers about this issue.

Reference: