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EPA Scientists Develop Research Methods for Studying Mold

In 2002, U.S. Environmental Protection Agency researchers developed a DNA-based Mold Specific Quantitative Polymerase Chain Reaction method (MSQPCR) for identifying and quantifying over 100 common molds and fungi. EPA, in conjunction with the U.S. Department of Housing and Urban Development, developed the Environmental Relative Moldiness Index scale (known as ERMI).[1]

The MSQPCR method of mold analysis and the ERMI scale for estimating mold contamination have been developed for use in research studies related to mold exposure and health impacts.[2] These tools have been peer reviewed for research purposes, but they have not been validated for non-research purposes.

Research studies that used ERMI to quantify mold & the relationship to Asthma:

Asthma afflicts about 9 percent of school-age children in the U.S. and about 300 million people worldwide. The World Health Organization's 2009 *WHO Guidelines for Indoor Air Quality: Dampness and Mould* (www.euro.who) recommends that mold exposures be minimized. Since most everyone is exposed to mold at some level, EPA and academic researchers have conducted a variety of studies to determine if ERMI values are associated with childhood asthma. Major research findings are in two general areas –

- **Comparison between ERMI values in asthmatic childrens' homes vs. controls:**
  The ERMI values were found to be significantly higher in asthmatic childrens' homes in Detroit, Boston, Kansas City, and San Diego compared to control homes. In fact, ERMI values were significantly higher in Kansas City homes of severely asthmatic children compared to those living in homes with moderate asthma.[3, 4]
- **Prospective study of asthma development in young children:**
  ERMI assessments were applied to a prospective study of asthma development. Researchers and physicians monitored the environment and health of infants until the age of seven. The only exposure predictive of the development of asthma for these infants was living in high ERMI homes.[5] These infants' were often from poor, urban families living in old homes.[6] The risk of an infant developing asthma was nearly doubled for each 10 units on the ERMI scale.[7] These and additional studies[8] have demonstrated the correlation of ERMI values in homes with asthma in children.

Published papers:

1. *Journal of Occupational and Environmental Medicine*. 2007;49:829-833.
2. *Critical Reviews in Microbiology*. 2011;37:15-24.
3. *Science of the Total Environment*. 2008:394:192-196.
4. *Journal of Asthma*. 2013;50:155-61. 2012;55:844-854.
5. *Annals of Allergy, Asthma and Immunology*. 2011;107:120-126.
6. *Environmental Research* 2013;124:67-70.
7. *Journal of Allergy and Clinical Immunology*. 2012;130:639-644.

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