

**Memo: The health threat posed by unwanted moisture, building dampness, and mold**

From Alameda County Health Officer, Muntu Davis, M.D., M.P.H.

To City of Oakland Building Official, Ray Derania

The Alameda County Public Health Department and the City of Oakland Building Service Division are collaborating on efforts to ensure healthy housing in Oakland. According to the municipal code, the Alameda County Health Officer can cite health hazards that should be addressed by the City of Oakland Building Official.<sup>i</sup> City of Oakland staff requested that the Alameda County Health Officer review the potential health threat posed by unwanted moisture, building dampness, and mold. After a careful review of research on the origins of mold and the impact on human health, I make the following recommendations to the City of Oakland Building Official:

*Moisture is necessary for mold to grow, and mold is a health hazard threatening Alameda County residents. As a result, I strongly recommend that the City of Oakland Building Official consider the presence of mold – either visible mold or a mold odor – a sign of unwanted moisture that triggers further investigation into the source of the moisture. All mold, no matter what kind, is a health hazard. Unwanted moisture is a result of water intrusion related to leaks or ventilation issues, both of which are structural issues covered in the current code. Further, I strongly recommend that the Building Official direct code enforcement inspectors to use their knowledge, training, and best judgment to identify and assess the presence of moisture and building dampness, using available instruments simply as supplements to inspectors' best judgment as there are too many variables for a reading to be definitive, and to use their authority to require the rapid drying or removal of damp materials, to clean up or remove mold and moldy material as quickly and safely as possible, and address underlying causes of unwanted moisture.*

**Your Housing, Your Health**

It is estimated that most Americans spend nearly 90% of their time indoors, with two-thirds of that time spent inside their home.<sup>ii</sup> Given its relative importance to our lives, it is not surprising that housing conditions hold the potential to significantly impact our physical and mental health. The homes we inhabit should protect us from harmful conditions, provide us with stability and privacy, and promote overall health and well-being. It is precisely for this reason that the public health discipline is concerned with the state of our housing stock.

**The Health Impacts of Mold Exposure**

There is consensus among scientists and medical experts that the presence of damp materials, visible mold, or mold odor in buildings indicates an increased risk of illness to occupants. Indoor dampness and mold exposure promote the development of asthma, allergies, and respiratory infections; trigger asthma attacks; and increase wheeze, cough, and difficulty breathing. Asthma is only one potential biological response to mold exposure, but it is among the most serious and prevalent: exposure to mold in homes is estimated to contribute to approximately 21% of current asthma cases in the United States, at an annual cost of \$3.5 billion.<sup>iii</sup> Additionally, asthma is the most common chronic disease among American children. This is particularly alarming because asthma, in particular, when it is uncontrolled or difficult to control due to a consistent exposure to triggers, can lead to irreversible changes in the lungs, leading to lifelong problems. Additionally, asthma places a burden on the heart, potentially placing the person, especially those who have suffered from asthma since childhood, at increased risk for heart disease and heart attacks.

It is important to note that the health impact of exposure to mold varies depending on factors such as an individual's age, immune system, and sensitivity.<sup>iv</sup> As a result, according to the Centers for Disease Control and Prevention, exposure to any mold is cause for concern, making the testing and differentiation of molds unnecessary and unadvised. All mold should be treated as a sign of moisture/dampness and a potential health hazards, and the unwanted moisture should be eliminated.

### **Mold Growth as a Symptom of Moisture**

There is no practical way to eliminate all molds or all mold spores in the indoor environment. The most effective way to prevent and control indoor mold growth is to control the moisture/dampness necessary for and conducive to its growth. Unwanted moisture degrades indoor environmental quality in many ways, and mold growth is perhaps the most common and noticeable result of excessive or chronic indoor moisture/dampness. The presence of unwanted moisture or dampness in the structure of a building, either the result of intrusion (leaks) from outside, or condensation from within the structure, must be recognized for its potential to seriously harm human health and must be eliminated.

There is no widely-accepted threshold for acceptable levels of moisture and dampness.<sup>v</sup> Relative humidity levels between 20% and 50% can be safe, but a relative humidity level in an indoor environment that falls within this range is not a definitive indication that there is not an unwanted moisture problem potentially causing harm to human health.<sup>vi</sup> This range does not take into account certain factors such as the time of year – in Alameda County, moisture levels decrease dramatically even in the presence of a problem – or the type of material (wood vs. dry wall, etc.), to mention two variables.

### **The Problem in a Local Context**

The appropriate mitigation and eradication of unwanted moisture, building dampness, and mold is of particular concern in Alameda County. According to data available for 2010, Alameda County has the third highest asthma hospitalization rate among all 58 California counties.<sup>vii</sup> The asthma hospitalization rate among African Americans is particularly concerning given both the health disparities and health inequities in Alameda County – there is a 15-year life expectancy gap between a African American child from West Oakland and a White person from the Oakland Hills. West Oakland residents are more typically renters, while Oakland Hills residents are typically homeowners. Between 2006 and 2008, African American asthma hospitalization rates were three to seven times the rates among other racial/ethnic groups. For Oakland, the rate of asthma hospitalization among residents is 55% higher than the county rate and nearly two and a half times the California rate. Asthma hospitalization is highest among groups with the most vulnerable respiratory systems – seniors, children, and those with depressed immune systems. Oakland children under age 15 bear an exceedingly high burden of asthma morbidity, with a hospitalization rate over 5 times that of the California rate. When considering the health care costs of asthma, it is important to note that asthma is the single largest contributor to preventable hospital admission among children.

Data is limited about the connection between asthma rates in Alameda County and housing conditions overall, nevertheless existing evidence suggests a link. Alameda County's Asthma Start program, which provides in-home case management services to families of children who have asthma, reported that for a recent 12-month period, of 370 in-home consultations, over 40% of homes visited contained some signs of the presence of mold.

Exposure to substandard housing conditions, such as moisture and mold, is linked to a lack of access to affordable housing. Roughly 31% of Oakland renters devote at least *half* of their income to housing costs.<sup>viii</sup> Additionally, the most recent studies show Oakland rents are increasing. When housing costs are unaffordable, tenants are left with few options and often face health-negating living conditions, like the presence of unwanted moisture, building dampness, and mold. Oakland is not an exception. The National Center for Healthy Housing's 2009 study of health-related housing problems in the nation's largest Metropolitan Statistical Areas ranked the City of Oakland the 39th least healthy central city out of 44 jurisdictions surveyed, with nearly 60% of housing units showing one or more health-related problems.<sup>ix</sup>

### **Recommended Actions and Conclusion**

The Alameda County Public Health Department concludes that the presence of moisture, dampness, visible mold, or mold odor in schools, workplaces, residences, and other indoor environments is unhealthy. The magnitude of the unhealthy housing problem in Alameda County requires increased attention to eliminating mold and the most effective way to do so is to eradicate unwanted moisture. In many cases, staff within the City of Oakland's Code Enforcement division may be the first, or even the only, responders to cases of unhealthy housing conditions. As such, we strongly recommend addressing mold and moisture concerns by identifying and correcting the source of moisture, rapidly drying or removing damp materials, and cleaning or removing mold and moldy material as quickly and safely as possible.

Because there is no widely-accepted threshold for acceptable levels of moisture and dampness, the Alameda County Public Health Department has concluded that it cannot recommend a specific moisture level that should trigger a specific code enforcement response. As a result, while we support the use of certain technologies (such as thermocameras and moisture meters) that help code enforcement inspectors precisely determine moisture levels and locate the sources of moisture, we strongly recommend against sole reliance on these instruments but rather supplementing them with professional judgment based on best available information.

Considering the fact that moisture is necessary for mold to grow, and mold is a human health hazard, I strongly recommend that the City of Oakland Building Official consider the presence of mold – either visible mold or a mold odor – a sign of unwanted moisture that triggers further investigation into the source of the moisture. All mold, no matter what kind, is a health hazard. Unwanted moisture is a result of water intrusion related to leaks or ventilation issues, both of which are structural issues currently covered in the current code. Further, I strongly recommend that the Building Official direct code enforcement inspectors use their knowledge, training, and best judgment to identify and assess the presence of moisture and building dampness, using available instruments simply as supplements to inspectors' best judgment as there are too many variables for a reading to be definitive, and to use their authority to require the rapid drying or removal of damp materials, to clean up or remove mold and moldy material as quickly and safely as possible, and address underlying causes of unwanted moisture. Just as inspectors must exercise discretion in determining the risk associated with other hazards, such as trip hazards, and in identifying proper mitigations, inspectors should be allowed similar discretion in cases of unwanted moisture, building dampness, and/or-mold. If there is visible mold or a mold odor, but the source of mold is not readily identifiable, or a moisture reader does not indicate a moisture problem because it is a dry day or because of any other uncontrollable variable, the inspector should be empowered to take all steps necessary to locate and address the source of the moisture or dampness. In order to prepare inspectors and those answering code complaint calls to address moisture and therefore respond to mold issues in a more comprehensive and consistent

manner, I recommend a series of trainings from other jurisdictions that have implemented similar responses. Furthermore, I recommend an examination of the full process for responding to complaints related to unwanted moisture, building dampness, and mold (both visible and mold odor) – from initial intake through issue resolution – to ensure that all points within the system allow for an effective response to all moisture, building dampness and/or mold complaints.

This document is a call to action, to protect the health and well-being of all building occupants in Alameda County, especially those carrying a disproportionate burden of poor health outcomes associated with housing quality. This not only includes children, seniors, and the immune-compromised, but all renters who are in need of healthy, affordable housing.

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<sup>i</sup> Oakland Municipal Code. Available at: <http://library.municode.com/index.aspx?clientId=16308> under chapter 15.08

<sup>ii</sup> U.S. Environmental Protection Agency. *A Brief Guide to Mold, Moisture and Your Home*. Available at: <http://www.epa.gov/mold/pdfs/moldguide.pdf>

California Department of Public Health: Indoor Air Quality Program. Available at: <http://www.cal-iaq.org/about-us/about-cal-iaq>

U.S. Department of Health and Human Services. The Surgeon General's Call to Action to Promote Healthy Homes. 2009. Available at: <http://www.surgeongeneral.gov/library/calls/healthyhomes/calltoactiontopromotehealthyhomes.pdf>

<sup>iii</sup> Mudarri D, and Fisk W. Public Health and Economic Impact of Dampness and Mold. *Indoor Air Journal*, vol. 17, p 226-235, 2007. Available at: <http://www.iaqscience.lbl.gov/pdfs/mold-2.pdf>

California Department of Public Health. *Statement on Building Dampness, Mold and Health*. 2011. Available at: [http://www.cal-iaq.org/phocadownload/statement\\_on\\_building\\_dampness\\_mold\\_and%20health2011.pdf](http://www.cal-iaq.org/phocadownload/statement_on_building_dampness_mold_and%20health2011.pdf)

World Health Organization. WHO Guidelines for Indoor Air Quality: Dampness and Mould. 2009. Available at: [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0017/43325/E92645.pdf](http://www.euro.who.int/__data/assets/pdf_file/0017/43325/E92645.pdf)

<sup>iv</sup> Alameda County Public Health Department. *Life and Death from Unnatural Causes: Health and Social Inequity in Alameda County*. 2008. Available at: <http://www.acphd.org/media/144763/lduc-housing.pdf>

<sup>v</sup> U.S. Environmental Protection Agency. Mold and Moisture. Available at: <http://www.epa.gov/mold/moldresources.html>

Mendell M, et al. Respiratory and Allergic Health Effects of Dampness, Mold, and Dampness-Related Agents: A Review of the Epidemiologic Evidence. *Environmental Health Perspectives*, vol. 119, no. 6, 2011. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3114807/pdf/ehp-119-748.pdf>

<sup>vi</sup> CenterPoint Energy. Humidity and the Indoor Environment. Available at: [http://www.centerpointenergy.com/staticfiles/CNP/Common/SiteAssets/doc/Humidity\\_indoor\\_environ\[1\].pdf](http://www.centerpointenergy.com/staticfiles/CNP/Common/SiteAssets/doc/Humidity_indoor_environ[1].pdf)

<sup>vii</sup> CAPE Unit with Patient Discharge Data from Office of Statewide Health Planning and Development (OSHPD), 2008-2010.

<sup>viii</sup> FILES: 2008-2010 American Community Survey [California], prepared by the U.S. Census Bureau, 2011.

<sup>ix</sup> National Center for Healthy Housing. State of Healthy Housing. 2009. Available at: <http://www.nchh.org/Policy/State-of-Healthy-Housing/Executive-Summary.aspx>. Note: This study relies on American Community Survey data, for which the latest available for Oakland is from 1998. The study calculates its rankings by metropolitan survey area and also by city. If evaluated using the MSA method, Oakland ranks last.

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