

Cross Section of Legislative Approaches to Reducing Indoor Dampness and Mold

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ABSTRACT

Exposure to indoor dampness and mold is associated with numerous adverse respiratory conditions, including asthma. While no quantitative health-based threshold currently exists for mold, the conditions that support excessive dampness and mold are known and preventable; experts agree that controlling these conditions could lead to substantial savings in health care costs and improvement in public health. This article reviews a sample of state and local policies to limit potentially harmful exposures. Adoption of laws to strengthen building codes, specify dampness and mold in habitability laws, regulate mold contractors, and other legislative approaches are discussed, as are key factors supporting successful implementation. Communicating these lessons learned could accelerate the process for other jurisdictions considering similar approaches. Information about effectiveness of legislation as prevention is lacking; thus, evaluation could yield important information to inform the development of model state or local laws that significantly address mold as a public health concern.

KEY WORDS: asthma, dampness, health policy, indoor environments, legislation, mold, prevention, respiratory health

Indoor dampness and mold are associated with multiple adverse respiratory health conditions, including asthma, respiratory tract infections, bronchitis, wheezing, dyspnea, and others.¹ Asthma is of primary concern because mold exposure is linked to asthma exacerbation among people who already have asthma, and there is some evidence that the presence of dampness and mold may increase the risk of developing new-onset asthma.^{1,2} The total cost of asthma attributable to exposure to dampness and mold in homes has been estimated to be approximately \$3.5 billion annually.³ Indoor dampness and mold

are preventable conditions; reducing these conditions could lead to substantial savings in health care costs and improvement in public health.^{1,3-5}

Currently, there are no federal health-based exposure limits for mold. Several factors make development of a threshold difficult. Mold exists both indoors and outdoors and consists of thousands of species of fungi that thrive in damp or water-damaged building materials. Each varies in its ability to produce airborne spores, allergens, or mycotoxins depending on environmental conditions. Dampness, in addition to promoting mold growth, is closely associated with other asthma triggers such as bacteria, dust mites, and cockroaches.⁶ Because multiple agents may be present in damp buildings simultaneously, accurately attributing specific health effects to one particular exposure source, such as mold growth, can be difficult.⁷ Another important factor limiting development of a health-based standard for mold is the lack of widely accepted, standardized, and validated field sampling methods, laboratory analysis methods, and sampling strategies (ie, where, when, what, and how frequently to sample) to characterize building conditions for molds.⁶ Overall, current data are insufficient to support quantitative recommendations for a level of exposure to indoor mold or dampness that poses no threat to human health.^{1,3,8}

In the absence of an exposure standard, it is nonetheless well known that the key to reducing indoor dampness and mold growth is controlling

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moisture.⁵⁻⁷ The buildup of moisture indoors can be controlled through a building's design, construction, operation, and maintenance, and the actions of its occupants.⁹

The purpose of this article was to assist state and local policy makers who are considering various approaches to reducing indoor dampness and mold to improve public health by examining a cross section of legislative actions aimed at 1 or more known contributors of excessive dampness in buildings. Key findings and themes were informed by a review of the literature on mold and health: mold- and dampness-related legislation identified through the Environmental Law Institute's Database of State Indoor Air Quality Laws, the National Conference of State Legislatures' database on Environmental Health Legislation, and individual state legislatures' Web sites. Findings are not meant to represent a comprehensive review but rather a distillation of themes and lessons learned that emerged from our review and analysis. Moreover, while this article describes a cross section of policies aimed at reducing indoor dampness and mold, and underscores key factors that support successful implementation, information is lacking in the literature about the effectiveness of the policies in achieving their stated goals. Among the lessons learned from our review is the need to evaluate adopted policies for effectiveness to better inform future policy making.

Basic Occupant Information and Protections Exist, But Critical Challenges Leave Many Residents With Recurring Mold Problems

Individuals concerned about indoor dampness and mold can readily access online mold abatement educational materials offered by many public health agencies. Equipped with such information, motivated individuals will take the recommended steps to improve their home environments. Steps might include changing behaviors in the home to reduce indoor humidity or requesting an inspection from the local code enforcement authority.

Tenants and landlords concerned about mold and dampness can look to their state or local habitability law(s). Habitability laws describe basic landlord and tenant rights and responsibilities, and, while specific statutory language and case law vary widely by jurisdiction, the "implied warranty of habitability" means that the property owner must provide a safe and livable home.¹⁰ While these basic provisions are helpful to a degree, a number of potential barriers prevent their optimal utility in reducing or preventing indoor mold growth.

- Language barriers, lack of access to the Internet, and, in some jurisdictions, potentially confusing

processes for requesting inspections or reporting violations can make it difficult for tenants to initiate the process of addressing mold-related concerns.

- Habitability laws rarely mention mold or dampness specifically, leaving terms such as *clean*, *safe*, and *habitable* open to interpretation and laws potentially difficult to enforce. If excessive indoor dampness and mold are not identified as potential health hazards, a property owner or landlord may be unaware that dampness and mold constitute unsafe living conditions for tenants and may not be driven to address the problem.
- Tenants may be hesitant to file a complaint regarding housing conditions, as fear of landlord retaliation or eviction can overwhelm a tenant's concerns about mold and any possible health consequences.
- Code enforcement officials must be sufficiently trained to recognize not only visible mold but also its actual cause(s), such as factors resulting in condensation and patterns of plumbing leaks.⁸

In the case of inspections by code enforcement authorities, a proper inspection does not necessarily guarantee a solution to a dampness or mold problem. Even if an inspection uncovers a code violation, the landlord or remediation contractor hired by a landlord may not know how to correct the cause properly such that mold growth does not recur (ie, by correcting the underlying moisture problem instead of choosing a cosmetic but ineffective repair such as painting over the mold). While model guidelines for mold remediation exist, such as the New York City (NYC) Department of Health and Mental Hygiene's *Guidelines on Assessment and Remediation of Fungi in Indoor Environments*, they are not legally enforceable. Unless the root cause of a moisture problem is addressed, mold is likely to return and inspectors could be sent repeatedly to the same housing units to issue new violations for the same conditions. In such circumstances, many tenants become frustrated and stop requesting inspections. Buildings deteriorate even as they are eliminated from the city's inspection list because they have low violation counts.¹¹

State and Local Policy Options to Reduce Indoor Dampness and Mold

State and local legislative bodies have a range of options to take a more direct approach to reducing indoor dampness and mold at the population level by targeting the factors that can contribute to indoor mold growth—the building's design, construction, operation, maintenance, and the actions of its occupants.⁹ The following section presents several

types of approaches intended to reduce indoor dampness. Each approach is followed by specific examples from a cross section of states and municipalities that established policies and practices intended to improve public health, consumer protection, or both.

Adopt building codes that curb excess dampness

Building construction in the United States is generally regulated at the state and local levels and is based on a set of interrelated codes, each addressing a specific building system or attribute, such as ventilation, drainage, or weatherproofing elements. A building code is a collection of laws, regulations, ordinances, or other statutory requirements adopted by a government legislative authority; they are designed to regulate the building's physical structure and support healthful conditions for building occupants.¹² All 50 states and the District of Columbia have adopted the International Codes ("I-codes") at the state or jurisdictional level.^{13,14} Jurisdictions typically blend these codes into their own body of statutes, and each jurisdiction has the option to modify code provisions to best meet local needs and contexts.¹⁵

Establish building codes to prevent water intrusion: Maine

Legislation passed in 2006 directed the Maine Department of Health and Human Services and Maine Department of Environmental Protection to convene a task force to explore the issue of mold in buildings in Maine.¹⁶ The task force examined the science of mold testing and removal, cleanup standards for mold, and building standards to minimize the risk of moisture problems in newly constructed buildings. The task force made a number of recommendations, all of which were adopted by the Maine Legislature in 2007. These included 3 mandatory moisture control provisions that were added to the state's building and residential codes: placement of flashing around all doors and windows in accordance with the door and window manufacturer's installation instructions; insulating and waterproofing of basement concrete; and placement of vapor diffusion retarders.¹⁷

Use of mold-resistant building materials: New York City

NYC enacted Local Law 13 of 2014 to amend the city's code to require the use of mold-resistant gypsum board or cement board for walls in specified locations that are typically exposed to moist conditions.¹⁸ This proposal was one of 111 recommendations by the NYC Green Codes Task Force, commissioned by the Mayor's Office in 2010.¹⁹

Specify the presence of mold and the sources of mold as conditions for mitigation

Statutory language that specifically defines mold, dampness, or the underlying conditions that lead to indoor mold growth as unacceptable can speed the process for getting mold problems corrected. Specificity in law also removes the subjectivity and inconsistency of the code enforcement process and promotes greater accountability. Code enforcement is typically carried out by local agencies through a process of inspections and issuance of orders requiring property owners to address code violations. Habitability requirements are generally codified in a state's landlord-tenant laws but, in many cases, are vague. For example, many landlord-tenant laws currently include highly subjective requirements that property owners "must make all repairs and do whatever is necessary to put and keep the premises in a fit and habitable condition."²⁰

Designate mold as a substandard housing condition: California

Following the city of San Francisco's lead in specifying mold as a code violation,²¹ California passed statewide legislation in 2015 to designate mold as a substandard housing condition, giving code enforcement officials clearer authority to require property owners to address indoor mold growth and its underlying causes.²² The law also includes language that provides property owners with a number of protections from false claims of mold contamination. The cosponsors of the new legislation sought input and support from a broad range of stakeholders, ensuring that the language of the law was clear and actionable.²³

Include dampness in health and safety codes: Massachusetts

In Massachusetts, a chapter of the state Sanitary Code establishes *Minimum Standards of Fitness for Human Habitation* that apply to all dwelling units, including leased units. Consistent with other states' habitability laws, it requires property owners to maintain structural elements in good repair but goes further to require that the property be kept free from chronic dampness and, notably, defines chronic dampness as "the regular and/or periodic appearance of moisture, water, mold or fungi."²⁴

Correct underlying conditions in buildings with water leaks and mold violations: New York City

In 2013, the NYC Council enacted Local Law 6, which authorizes the local code enforcement entity

to issue orders requiring residential property owners to correct underlying conditions when they have failed to address impaired building systems that are causing repeated water leak and mold violations. The legislation affects buildings where an owner repeatedly makes cosmetic repairs, such as painting over the mold, without addressing the underlying cause and stipulates that the owner must address the order within 4 months of issuance.²⁵

Strengthen landlord-tenant laws: Virginia

In 2015, the Virginia Legislature passed a bill to provide additional specificity to the state’s existing landlord-tenant law. The new law requires the landlord to promptly remediate visible mold problems in accordance with specified guidelines and reinspects the residence to confirm that there is no longer visible evidence of mold postremediation.²⁶

Enact mandatory regulatory programs or standards for remediation contractors

Professionals who conduct mold assessments or remediation can play an important role in public health and consumer protection. Work that is not conducted in accordance with established guidelines can put mold workers at risk and, if the mold recurs, increases the risk of adverse health conditions to indoor occupants. A number of states have established legislation to address these concerns. Regulatory programs have included licensure, certification, or registration of mold remediation contractors, often with requirements for training, insurance, and disclosure of conflicts of interest.^{27,28}

License mold contractors: New York

In 2015, the state of New York enacted a mold licensure law that requires mold contractors doing business in the state to be licensed by the State Department of Labor. The law’s stated purposes are to minimize public health risk and to protect consumers from fraudulent contractors. The latter purpose derives from many complaints of unscrupulous contractors in the aftermath of Hurricane Sandy. The law prescribes a detailed series of steps for mold remediation, generally requiring a written mold remediation plan, a detailed work plan that includes standard operating procedures, and a postremediation assessment report. The law does not contemplate procedural waivers to this series of steps following emergencies such as hurricanes or floods.²⁹

Establish comprehensive rules for the regulated community: Texas

The current Texas Mold Assessment and Remediation Rules (TMARR) are a part of the Texas Administrative Code and have been in effect since 2007. The TMARR stipulate a broad range of requirements for mold assessors and remediators, including licensing and registration, accreditation of mold training providers, minimum work standards for the conduct of mold assessments and remediation by licensed and registered persons, a code of ethics, and penalties.³⁰

Provide disclosure of the presence of mold upon sale or rental of property

Disclosures can make buyers aware of potential mold problems that would not otherwise be apparent and thereby allow them to make better informed decisions. For sellers, disclosure laws may provide protection from subsequent mold-related liability claims if the seller discloses all known mold-related problems. Disclosure laws vary widely by state, with some placing responsibility on either the seller or the landlord (Table 1).

State laws such as those enacted in Louisiana and Mississippi can also potentially improve homeowner awareness by requiring insurance providers to prominently disclose whether the policy covers mold damage to the property.^{37,38}

Commission experts to study evidence-based and contextually relevant mold concerns and propose solutions

A number of task forces, advisory committees, and other expert panels (“task forces”) have undertaken

TABLE 1
Examples of Laws Pertaining to Property Condition Disclosure

Responsible Entity	Requirement	Examples of States With Disclosure Laws
		Laws
Seller	Must make potential buyers aware of preexisting mold or moisture problems.	Montana ³¹ New Jersey ³² Ohio ³³
Landlord	Must alert potential renters to preexisting mold problems or provide information/ educational material about mold to tenants.	Virginia ³⁴ Washington, District of Columbia ³⁵ Washington State ³⁶

work to research mold and make recommendations to legislative bodies regarding potential actions to take (Table 2). In several cases, recommendations have directly led to the passage of new laws intended to reduce indoor mold.^{17,39,40} In other cases, the connection between recommendations and new legislation is less clear, but task force reports nonetheless present current and useful information to decision makers concerned about mold. For example, responding to a 2001 statutory directive, the California Department of Health Services reported in 2005 that “sound, science-based permissible exposure limits (PELs) for indoor molds cannot be established at this time” due to the lack of adequate exposure-response data, differences in susceptibilities to mold, and the ubiquitous nature of mold.”⁴¹ Report updates in 2011 and 2016 found that estimating PELs was still not considered feasible but acknowledged the mounting scientific evidence supporting the relationship between damp and moldy materials and increased respiratory risks for indoor occupants.^{42,43} A 2010 report by New York’s task force—frequently cited in other task force reports—is perhaps most comprehensive in depth and scope. In addition to recommended actions, it presents the feasibility of implementation, including cost estimates where applicable.⁸

Enhancing the Likelihood That Implemented Policies Have an Impact

The observations and takeaways from jurisdictions’ experience with establishing mold laws as a means of disease prevention may be helpful to legislative bodies and policy makers as they consider similar approaches.

Be clear and specific

Building and other codes affecting habitability can be made less ambiguous by listing both mold and dampness as conditions affecting public health. Including definitions for both terms will also promote consistency of interpretation among officials involved with inspection and enforcement activities. One potentially useful resource is the National Healthy Housing Standard, published in 2014 by the American Public Health Association and the National Center for Healthy Housing. To ease adoption, the Standard, which frequently mentions mold and dampness together, is written in housing code language to be consistent with other housing policies already in use by local and state governments and federal agencies. For each requirement in the Standard, the suggested code

TABLE 2
Selected Recommendations From Recent Mold Task Forces

State	Report Year	Recommendations
Arkansas	2012	Recommended no new legislation or enforceable regulations but developed a mold fact sheet and guidance document for abatement contractors. ⁴⁴
New Hampshire	2012	Recommended adoption of legislation that outlines the standards, guidelines, and certification requirements for mold professionals; adoption of moisture control provisions to building codes; and development of educational materials to inform citizens about indoor mold, health effects, rights, and resources. ³⁹
New York	2010	Made numerous recommendations including building code revisions to improve moisture control; training of code enforcement officials to recognize underlying causes of mold growth; provision of guidance about recommended work practices for assessment and remediation; development and dissemination of educational materials; and additional research on mold and health effects, mold-resistant building materials, and effectiveness of different remediation approaches. ⁸
Maine	2007	Recommended legislation addressing several topics: moisture control provisions to building codes; a mold dispute resolution program; 2 funded staff positions to investigate complaints and educate the public about mold; disclosure of potential conflict of interest for professionals providing both mold assessment and remediation services; publication of guidelines and standards for mold assessment, remediation, and certification of mold professionals and for worker protection. ¹⁷
Pennsylvania	2006	Recommended development of various public education materials including a mold Web site and printed brochures; adoption of NYC guidelines as minimum standards for remediation; liability insurance coverage for mold remediation contractors. ⁴⁵
California	2005	Determined that no sound, science-based permissible exposure limits for indoor molds could be established at the time but recommended that indoor dampness, water intrusion, or fungal growth should always be eliminated in a safe and efficient manner to protect public health. ⁴¹

language is accompanied by a public health rationale and supporting references and resources.⁴⁶

Clarity and specificity are also important in raising public awareness of dampness and mold as conditions affecting consumer protection. Disclosure laws protect buyers and sellers during real estate transactions, and disclosure of mold coverage in homeowner insurance policies further promotes transparency and awareness, as many homeowner policies limit or exclude damages caused by mold. Some states require that buyers receive information on how to avoid indoor mold growth as part of a real estate transaction³⁷ or recommendations to have the home inspected for indoor air quality and allergens, including mold.⁴⁷

Invite stakeholder input

Whether drafting language for new or revised codes or legislation, input from a diverse range of stakeholders can help ensure that newly proposed language is clear, broadly supported, and actionable. At least one state has chosen to repeal its mold law, as it found the specifics of the law to be vague and difficult to interpret.⁴⁴ In contrast, mold legislation passed in California and Maine was based on input from numerous stakeholders including asthma advocacy groups, housing coalitions, tenants' unions, environmental justice organizations, apartment associations, physicians, lawyers, and local government agencies.^{17,22,23}

Consider disaster scenarios

Because of the high risk of mold occurrence following floods and hurricanes, policy makers may want to consider mechanisms to expedite remediation in disaster response situations, with appropriate controls to protect human health and consumer protection. Following natural disasters, time is critical to dry out buildings and minimize mold growth; demand for qualified mold professionals will likely exceed capacity. The option of waiving certain time-consuming procedures, such as requiring detailed written work plans, while still requiring general compliance with evidence-based cleanup guidance,^{48,49} could help deploy assessment and remediation professionals in a timely manner and also protect the health and safety of workers and residents.

Streamline inspection, enforcement, and remediation

There are several opportunities to create efficiencies during the process of inspection, enforcement, and remediation that, when consistently applied, decrease the likelihood of mold recurrence. Code enforcement

Implications for Policy & Practice

- Indoor mold and dampness are preventable conditions that negatively impact public health and the nation's economic and health care systems.
- The causes of indoor mold growth are known, and the principles of moisture management—the primary mechanism for controlling mold growth—are widely endorsed by experts.
- While more than one type of law or policy may be necessary to substantially reduce the burden of indoor mold in any given jurisdiction, learning from the experience of state and local governments in adopting mold-targeted laws and policies could inform and accelerate the process for others considering similar approaches.
- Information about the real-world effectiveness of current approaches is lacking; evaluation of these approaches could yield important information for development of model state or local laws that substantively address mold as a public health concern.

officials with specific training to recognize both obvious and subtle signs of water intrusion and mold growth may be more likely to catch a potential violation the first time they are called to inspect a property. Enforcement officials can also help educate landlords and tenants about occupant behaviors that contribute to indoor mold growth and promote recommended mold abatement guidelines to property owners or hired remediation professionals.^{48,50,51} Documentation of the remediation work, including photographs taken during and after the process, may further protect the property owner, remediation firm, and ultimately the occupant, from real or perceived claims of recurring mold due to inadequate (or unscrupulous) abatement procedures.

Couple indoor air quality with climate resilience and energy efficiency efforts

Increasingly, government and nongovernment entities are taking steps to improve energy efficiency and create healthy, resilient communities.⁵² For example, elevation of buildings in flood zones and use of flood-resistant building materials contribute to both climate resilience and decreased risk of mold growth, particularly after extreme weather events. Adoption of commercial and residential building energy codes that also take into account moisture management will help avoid damp conditions that would allow mold and other allergens to flourish indoors.^{19,53,54} Programs that integrate affordability with resilient design and indoor air quality, such as

Enterprise Green Communities Criteria, may have an even greater impact on public health and well-being.⁵⁵

Evaluate for effectiveness

As with other public health policies and initiatives, an assessment taken postimplementation may help public health practitioners, policy makers, and other stakeholders determine whether various approaches to reduce indoor mold and dampness are actually working. Metrics could include increased knowledge and awareness of mold and health issues, number of code violations (or repeat violations) for dampness or mold, use of mold-resistant building materials, use of recommended mold abatement guidelines, or asthma-related emergency department visits. Robust studies would necessarily follow epidemiologic criteria to rule out confounding factors and avoid false conclusions regarding effectiveness.

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