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Reducing Exposure to Asthmagens: Lessons from Primary Prevention Efforts in Massachusetts

Massachusetts has a higher asthma prevalence rate than the national average (Bureau of Climate and Environmental Health, 2024). One of the key triggers of asthma episodes is exposure to fine particulate pollutants, which originate from many sources, such as consumer products and building and household materials, as well as pet and other natural sources, and also from mobile air pollution sources, such as trucks, and stationary air pollution sources, such as power plants: sources that still emit such particles even though they are covered by the federal Clean Air Act. Although Massachusetts meets federal clean air standards and air pollution in the U.S. has declined by 70% since the passage of the Clean Air Act in the 1970s, current pollution levels continue to pose significant health risks – not only for individuals with preexisting conditions but for the general population as well (Hayward, 2022).

While the effort to reduce ambient air pollution continues, to address asthma incidence, Massachusetts has also implemented various initiatives and programs, such as the Boston Children's Hospital Community Asthma Initiative, the MABetterBreathing Collaborative, the Massachusetts Asthma Action Partnership, and the Asthma Prevention and Control Program. This project set out to assess the progress of these efforts through desk research and an interview with Molly Jacobs, Director of Applied Research at the Lowell Center for Sustainable Production. Working with Polly Hoppin, Director of the Environmental Health Program at the Center, her early advocacy helped shape the development of primary prevention components in

Massachusetts' strategic asthma plans from 2009 to 2020, which in turn informed concrete strategies to reduce exposure to respiratory irritants across the state. The question of how to address systemic obstacles preventing a stronger focus on primary prevention became the focus of the effort: the Roadmap that they worked on sought to understand these challenges and identify actionable steps. It is hoped that reviewing again these original, essential aims, can advance this conversation today, so that primary prevention receives the priority status it should have, in asthma policy and public health efforts.

Structural Barriers

1. Departmental Silos

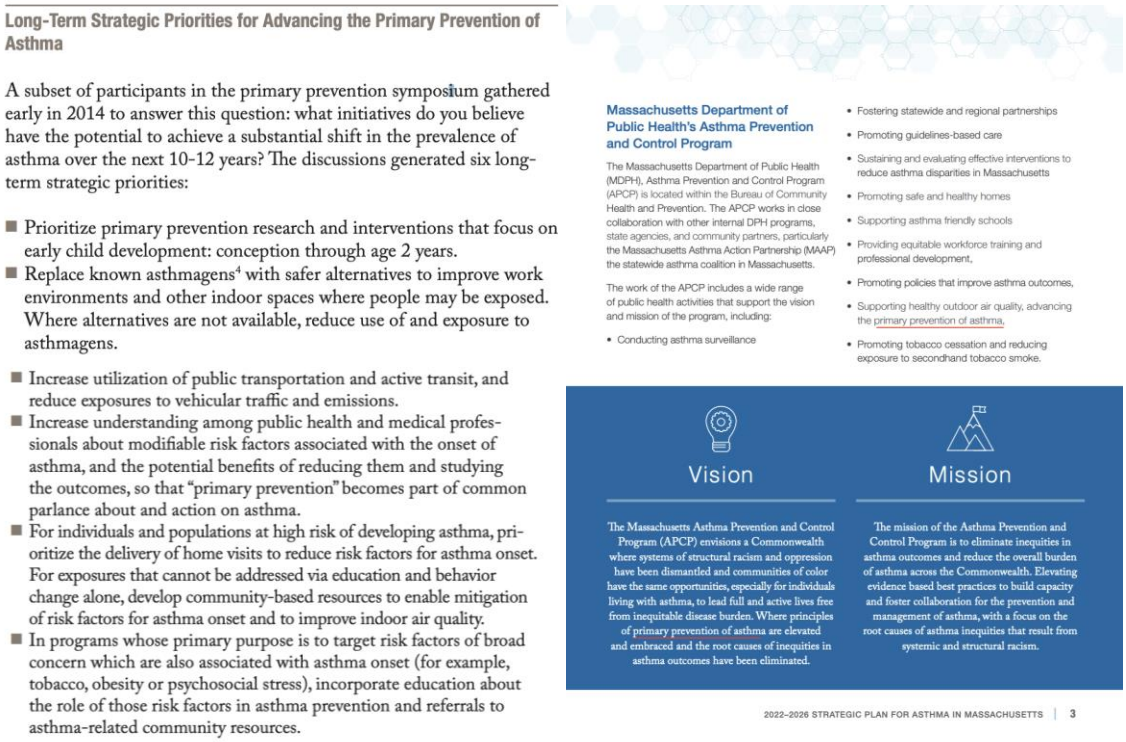
   Environmental and occupational health policy researchers have documented how the environment and public health are often managed by separate institutions that operate in isolation from each other. The resulting departmental silos serve as a major structural barrier to holistic, effective, and equitable public decisions (Leiren and Jacobsen, 2018). In particular, Korfmacher (2020) underscored how environmental, public health, and decision makers in other sectors (e.g., transportation, land use) each focus on their own priorities – regulatory standards, disease monitoring, or policy development – without cross-sector collaboration.

   In Massachusetts, similar efforts have faced challenges due to a fragmented infrastructure that often separates environmental risk factors and concerns from public health priorities. As Jacobs observed, "[Traditional public health approaches] think that this is not [their] responsibility…we'll talk about smoking, we'll talk about diet…but anything environmental? That's the Department of Environmental Protection's domain." While the Massachusetts strategic plans for asthma from 2009 to 2020 outlined long-term strategies

for reducing exposure to respiratory irritants (see Figure 1), the bold language of the previous programs has faded: primary prevention is rarely mentioned in the current 2022-2026 plan.

Figure 1.

A comparison of long-term asthma strategies reveals a shift in focus: the 2015-2020 plan (left) places primary prevention at the forefront, with targeted strategies focused on early childhood and modifiable environmental factors. In contrast, the 2022-2026 plan (right) frames primary prevention as a guiding principle early in the document but offers few concrete strategies or actions explicitly dedicated to it.



Long-Term Strategic Priorities for Advancing the Primary Prevention of Asthma

A subset of participants in the primary prevention symposium gathered early in 2014 to answer this question: what initiatives do you believe have the potential to achieve a substantial shift in the prevalence of asthma over the next 10-12 years? The discussions generated six long-term strategic priorities:

- Prioritize primary prevention research and interventions that focus on early child development: conception through age 2 years.
- Replace known asthmagens[4] with safer alternatives to improve work environments and other indoor spaces where people may be exposed. Where alternatives are not available, reduce use of and exposure to asthmagens.
- Increase utilization of public transportation and active transit, and reduce exposures to vehicular traffic and emissions.
- Increase understanding among public health and medical professionals about modifiable risk factors associated with the onset of asthma, and the potential benefits of reducing them and studying the outcomes, so that "primary prevention" becomes part of common parlance about and action on asthma.
- For individuals and populations at high risk of developing asthma, prioritize the delivery of home visits to reduce risk factors for asthma onset. For exposures that cannot be addressed via education and behavior change alone, develop community-based resources to enable mitigation of risk factors for asthma onset and to improve indoor air quality.
- In programs whose primary purpose is to target risk factors of broad concern which are also associated with asthma onset (for example, tobacco, obesity or psychosocial stress), incorporate education about the role of those risk factors in asthma prevention and referrals to asthma-related community resources.

Massachusetts Department of Public Health's Asthma Prevention and Control Program

The Massachusetts Department of Public Health (MDPH), Asthma Prevention and Control Program (APCP) is located within the Bureau of Community Health and Prevention. The APCP works in close collaboration with other internal DPH programs, state agencies, and community partners, particularly the Massachusetts Asthma Action Partnership (MAAP) the statewide asthma coalition in Massachusetts.

The work of the APCP includes a wide range of public health activities that support the vision and mission of the program, including:

- Conducting asthma surveillance
- Fostering statewide and regional partnerships
- Promoting guidelines-based care
- Sustaining and evaluating effective interventions to reduce asthma disparities in Massachusetts
- Promoting safe and healthy homes
- Supporting asthma friendly schools
- Providing equitable workforce training and professional development,
- Promoting policies that improve asthma outcomes,
- Supporting healthy outdoor air quality, advancing the primary prevention of asthma,
- Promoting tobacco cessation and reducing exposure to secondhand tobacco smoke.

Vision

The Massachusetts Asthma Prevention and Control Program (APCP) envisions a Commonwealth where systems of structural racism and oppression have been dismantled and communities of color have the same opportunities, especially for individuals living with asthma, to lead full and active lives free from inequitable disease burden. Where principles of primary prevention of asthma are elevated and embraced and the root causes of inequities in asthma outcomes have been eliminated.

Mission

The mission of the Asthma Prevention and Control Program is to eliminate inequities in asthma outcomes and reduce the overall burden of asthma across the Commonwealth. Elevating evidence based best practices to build capacity and foster collaboration for the prevention and management of asthma, with a focus on the root causes of asthma inequities that result from systemic and structural racism.

2022-2026 STRATEGIC PLAN FOR ASTHMA IN MASSACHUSETTS | 3

Although significant financial, institutional, and disciplinary barriers may hinder progress at the state and national levels, there are promising opportunities for change through local, collaborative efforts. Korfmacher (2020) developed a research agenda emphasizing

the potential of community-driven environmental health initiatives to break down institutional silos. Case studies from areas like the ports of Los Angeles and Long Beach, California, reveal how partnerships among community organizations, public health departments, and environmental agencies have led to meaningful interventions. These include community-led air monitoring, stricter emissions regulations, and protections for vulnerable sites like schools and workplaces. These examples show that local collaborations can redefine problems, shift priorities, and spark systemic change, even within constrained institutional and financial contexts. Importantly, these efforts to overcome institutional silos offer scalable models for advancing upstream prevention and managing cross-sector divides. Similarly, Jacobs underscored the "integral" role of community-based groups like Alternatives for Community and Environment (ACE), along with educators and community health workers. Their inclusion in government planning is not only a matter of equity, but also essential for effectively engaging with communities and gaining an accurate understanding of on-the-ground realities.

2. Emphasis on Individual Workarounds Rather than Systemic Mitigation

   While a more robust public health approach could emphasize systemic mitigation – tackling the sources of harm directly through policy and environmental interventions – many current strategies continue to rely heavily on individual-level guidance. Public health recommendations such as checking air quality maps before going outdoors aim to help individuals make informed decisions. However, without upstream solutions, this approach places the burden on those most vulnerable, diverting attention from more effective long-term strategies that target the hazard itself.

Massachusetts has made progress in expanding air quality monitoring. In July 2024, the Healey-Driscoll administration announced a broadened air sensor network across the Commonwealth. Officials from the Department of Environmental Protection and the Executive Office of Energy and Environmental Affairs emphasized that these sensors would provide more localized data – especially in environmental justice communities – intended to guide future policy (Wycoff, 2024). While this expansion marks an important step forward, just collecting data without committing to prioritizing primary prevention, is insufficient. It is not necessary to wait for the data to come in to also immediately begin resourcing communities to employ already known techniques for preventing use of asthmagens, for reducing contaminants in indoor air, as well as for filtering ambient air pollution.

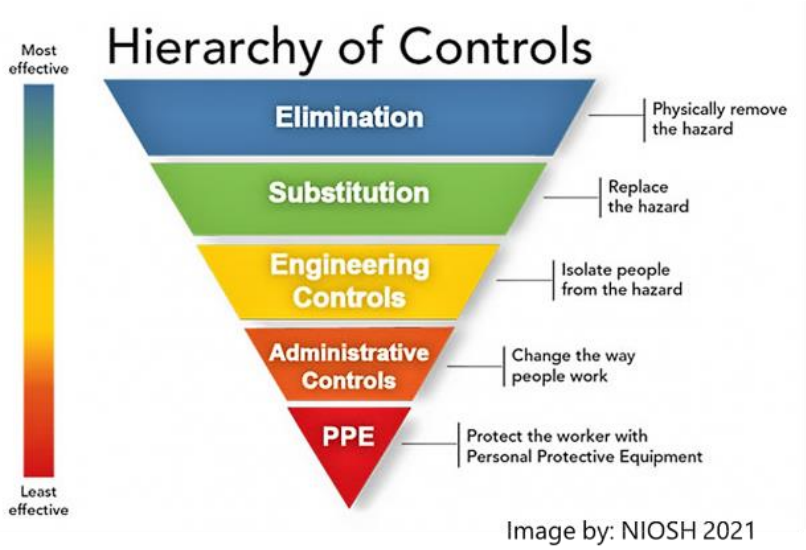
Inattention and failure to prioritize primary prevention is also reflected in public health research, where scholars have highlighted how this can lead to interventions that rely on individual-level workarounds due to the focus on identifying problems rather than implementing solutions (Alvidrez and Stinson Jr, 2019; Huang et al., 2024). As Jacobs explained, officials are often hesitant to promote preventative interventions without rigorous proof of effectiveness. But this caution isn’t solely theirs -- it's driven by external resistance. Industries that profit from the status quo, such as those producing or relying on asthmagens, along with stakeholders wary of regulation, often demand excessive evidence before any preventive action is taken. This dynamic creates a policy paradox: while the public health system is expected to justify prevention with evidence, it is rarely supported or funded to produce that evidence. The burden falls on officials, who face competing demands, political pushback, and limited resources. The result is a system

constrained and lacking the adequate tools to confront entrenched opposition and evolve accordingly.

An individual-centric model is also reflected in the Massachusetts 2022–2026 Strategic Plan for Asthma, and like a focus on evidence without action, this can also serve to divert attention from the public actions, subsidies, research, education and regulations that would have a direct impact, and which would make primary prevention effectively the priority. One key objective is to empower individuals disproportionately burdened by asthma to take personal actions to avoid unhealthy outdoor air. Strategies include educational materials on self-protection during pollution spikes and resources to reduce indoor exposures – such as mattress covers, HEPA vacuums, and patient education. While these interventions can offer temporary relief, they largely focus on helping individuals adapt to persistent hazards, rather than altering the conditions that produce those hazards in the first place.

Jacobs pointed to occupational health as a discipline that might offer useful lessons for environmental health. Despite their conceptual overlap, the two fields operate under different principles. In occupational health, the National Institute for Occupational Safety and Health (NIOSH) promotes the "Hierarchy of Controls," a framework that ranks interventions from most to least effective. At the top of the hierarchy is eliminating the hazard entirely – removing the risk before it can impact people. At the bottom are personal protective measures, such as masks and gloves, which place responsibility on the individual. Applying this framework to environmental health could help shift policy focus from individual adaptation to systemic prevention, prioritizing structural interventions over personal coping strategies.

Figure 2.



(The National Institute for Occupational Safety and Health, 2023)

3. Lack of Federal Funding

Despite growing awareness of the need for upstream, systemic approaches to asthma prevention, structural and financial barriers continue to shape what is possible in public health policy. In Massachusetts, approximately 80% of asthma prevention and control efforts are funded by the Centers for Disease Control and Prevention (2024). Jacobs noted that, while the CDC permitted the inclusion of primary prevention language in strategic planning, it simultaneously clarified that no funding would support those components. Although states have the autonomy to pursue proactive, long-term solutions, they still stand to benefit significantly from federal support in the form of resources, research, and shared information.

Within this constrained landscape, Massachusetts took an important step by choosing to elevate conversations around primary prevention, even without dedicated funding. The state became one of the first to question the narrow federal framework and push for

upstream interventions, such as promoting asthma-safe housing and replacing hazardous substances with safer alternatives. These efforts signaled a bold attempt to expand the public health conversation beyond reactive solutions and toward primary prevention.

However, the direction has since shifted. While the 2015-2020 Strategic Plan for Asthma emphasized primary prevention as a top priority, the current 2022-2026 plan mentions it only twice across the entire document. This decline reflects a broader de-prioritization of proactive strategies, replaced instead by a continued focus on managing asthma after onset. The absence of a clear, well-resourced commitment to upstream approaches illustrates how the structural limits of funding and federal guidance can stall momentum – even when the vision is in place.

Ultimately, Massachusetts' earlier efforts to advance primary prevention highlight what is possible when states push boundaries. Yet, without the financial and institutional backing to sustain those innovations, progress risks fading. The current silence around upstream strategies is less a reflection of changing priorities within the state, and more a reminder of how systemic barriers continue to shape the scope of what public health can do.

Opportunities

In the absence of strong federal support and regulatory frameworks for primary asthma prevention, there are still meaningful strategies that can be pursued to address asthma onset in the meantime. As Director Jacobs noted, "We have to rethink our ways of doing this." One key avenue involves shifting how research is conducted, how alternative solutions are promoted and adopted, and how systems are created to support safer practices – particularly when it comes to

air pollution. For instance, the vehicle sector remains a major contributor to air pollution and respiratory illness, and legal and advocacy efforts, such as the lawsuits targeting excessive vehicle idling (Conservation Law Foundation, 2024), illustrate how policy enforcement and legal tools can be leveraged to reduce exposure to known asthma triggers.

Another promising strategy lies in looking to examples from adjacent fields, particularly in consumer products, where innovation and pressure have led to tangible changes. Despite the lack of comprehensive regulation – especially from federal agencies like the FDA – consumer demand and retailer initiatives have catalyzed reformulation efforts to remove harmful substances from everyday products. Retailers such as Walmart, Target, and CVS have introduced lists of restricted chemicals in products. Additionally, consumer pressure has also influenced the probability of product reformulation. Subject to customers increasingly asking questions about chemicals and when Johnson & Johnson's baby shampoo created formaldehyde as a byproduct, the company pledged to eliminate the formaldehyde precursors, and other harmful chemicals such as parabens, triclosan, and phthalates (Thomas, 2014). The Toxics Use Reduction Institute in Massachusetts has led efforts to substitute asthmagens and respiratory irritants with safer alternatives in various industrial and commercial products. These efforts demonstrate that meaningful change can occur through alternative pathways, even when regulatory mechanisms lag behind.

Key Takeaway

"It's politically hard, process heavy, [and] resource heavy."

Advancing the primary prevention of asthma requires a broad cultural shift – one that spans multiple departments, including public health, environmental protection, transportation, and urban planning. As Director Jacobs emphasized, moving upstream is inherently challenging

because it intersects so many different domains, each with its own priorities, structures, and constraints. Yet, identifying and illuminating these systemic obstacles is a critical step toward change. By understanding the barriers and highlighting actionable strategies we can pursue in the meantime, we create space to sustain and grow the conversation around primary prevention. This approach not only keeps prevention on the agenda but also lays the groundwork for more coordinated, cross-sector solutions in the future.

Resources for Asthma

1. Massachusetts Asthma Action Partnership Asthma Toolkit https://www.maasthma.org/resources-tools
2. Boston Urban Asthma Coalition (BUAC) advocates for healthy and affordable housing units, healthy cleaners and environmental inspections in public schools, and 'Breathe Easy' – a city program working with health professionals and code enforcement officers to improve the housing of children with asthma. https://www.asthmacommunitynetwork.org/programs/boston-urban-asthma-coalition-buac
3. Green & Healthy Homes Initiative Offers technical support and advocacy for improving housing to address housing-based causes of asthma. https://www.greenandhealthyhomes.org/
4. THE Impact Project: Trade, Health, and Environment around Southern California's Ports serves as an example of managing institutional silos at the local level, with collaborative efforts by academic and local environmental justice groups elevating health equity as a central concern in goods management decisions.

https://www.movingforwardnetwork.com/wp-content/uploads/2024/02/THE-Impact-Project_Making-the-Case-for-Change_June2009.pdf

5. Toxics Use Reduction Institute fact sheet provides a brief summary of the links between chemicals and asthma, as well as options for safer alternatives.
   https://www.turi.org/publications/asthma-and-chemicals/
6. Toxic-Free Future's Retailer Report Card ranks retailers on their chemical safety policies, including those affecting respiratory health.
   https://toxicfreefuture.org/retailer-report-card/
7. Campaign for Safe Cosmetics Contains fact sheets and reports on harmful ingredients in personal care products and safer alternatives.
   https://www.safecosmetics.org/

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