



Managing Asthma in the School Environment

Indoor Air Quality Tools for Schools





Take Action to Manage Asthma in the School Environment

1. Establish and Continuously Evaluate an Indoor Air Quality – IAQ – Management Program in Your School or District.

- Use the *IAQ Tools for Schools* Action Kit and “Framework for Effective School IAQ Management” and implement the IAQ practices outlined in this booklet to improve the school environment, support children’s health and reduce exposure to environmental asthma triggers.

2. Develop an Asthma Management Plan in Your School or District.

- Adopt school policies to support Asthma Action Plans, student access to inhalers and other asthma medications, and emergency procedures for school staff to use when a student has an asthma attack.
- Use the Centers for Disease Control and Prevention’s – CDC – “Strategies for Addressing Asthma within a Coordinated School Health Program” to guide the development of your Asthma Management Plan. Follow national guidelines to administer high-quality asthma care in schools.
- Evaluate and monitor program effectiveness by using CDC’s evaluation guidance designed specifically for asthma programs.
- Identify all students with asthma. Focus resources, in particular, on students whose asthma is not well controlled.

3. Reduce Environmental Asthma Triggers.

- Recommended actions to reduce these triggers include:
 - Control animal allergens.
 - Control cockroach and pest allergens.
 - Clean up mold and control moisture.
 - Control sources of indoor air pollutants.
 - Reduce exposure to dust mites.

Visit <http://www.epa.gov/asthma> for information on common asthma triggers and how to manage them; asthma education programs available in your community; and no-cost resources that schools can use to educate students and staff about asthma.

The Asthma Epidemic



Asthma has reached epidemic proportions in the United States, affecting millions of people of all ages and races. An average of one out of every 10 school-age children now has asthma, and the percentage of children with asthma is rising more rapidly in preschool-age children than in any other age group. Asthma is a leading cause of school absenteeism due to a chronic condition, accounting for nearly 13 million missed school days per year.

Asthma also accounts for many nights of interrupted sleep, limits activity and disrupts family and caregiver routines.

Asthma symptoms that are not severe enough to require a visit to an emergency room or to a physician can still be serious enough to prevent a child with asthma from living a fully active life.

Asthma is a long-term, inflammatory disease that causes the airways of the lungs to tighten and constrict, leading to wheezing, breathlessness, chest tightness and coughing. The inflammation also causes the airways of the lungs to become especially sensitive to a variety of asthma triggers. The particular trigger or triggers and the severity of symptoms can differ for each person with asthma.

Because Americans spend up to 90 percent of their time indoors, exposure to indoor allergens and irritants may play a significant role in triggering asthma episodes. Some of the most common asthma triggers found in schools, as well as techniques to mitigate them, are addressed in the Reduce Environmental Asthma Triggers section on page 7.

Asthma is a leading cause of school absenteeism due to a chronic condition, accounting for nearly

**13
million**
missed school
days per year.

Asthma in Schools

Each day, one in five Americans occupies a school building. The majority of these occupants are children. Environmental asthma triggers commonly found in school buildings include respiratory viruses; cockroaches and other pests; mold resulting from excess moisture in the building; dander from animals in the classroom; and dander brought in on clothing from animals at home. Secondhand smoke and dust mites are other known environmental asthma triggers found in schools. Children with asthma may be affected by other pollutants from sources found inside schools, such as unvented stoves or heaters and common products including chemicals, cleaning agents, perfumes, pesticides and sprays. In addition, outdoor environmental asthma triggers, like ozone and particle pollution, or bus exhaust, can affect children with asthma while at school.

Students with uncontrolled asthma often miss more school and have poorer academic performance than healthy students. With the help of strong school asthma management programs, students with asthma can have equally good school attendance. When asthma is well controlled, students are ready to learn.

Effectively managing a child's asthma is best accomplished through a comprehensive plan that addresses both the medical management of the disease and the avoidance of environmental triggers. Because children spend most of their time in schools, day care facilities or at home, it is important to reduce their exposure to environmental asthma triggers as much as possible in each of these environments. This publication focuses on steps that schools can take to help children breathe easier.



Establish and Evaluate an IAQ Management Program in Your School or District



Many IAQ problems in schools can impact the health of students and staff, including those with asthma. In order to help improve IAQ, school districts all across the country have successfully adopted the *IAQ Tools for Schools* Program. The *IAQ Tools for Schools* Program is a comprehensive set of resources that is helping school officials safeguard and improve school occupant health, comfort, attendance and performance.

The *IAQ Tools for Schools* Program provides programmatic guidance through the “Framework for Effective School IAQ Management” to help schools develop sustainable, effective IAQ management programs using proven strategies, organizational approaches and leadership styles that are fundamental to program effectiveness. The “Framework for Effective School IAQ Management” helps schools develop and sustain a clear vision of the pathway to school IAQ excellence.

In addition, the *IAQ Tools for Schools* Action Kit provides technical guidance and straightforward checklists to help school personnel identify, resolve and prevent IAQ problems. Using an IAQ management plan that includes checklists for the entire building can lower student and staff exposure to asthma triggers and a range of other harmful exposures. The checklists available in the *IAQ*

Tools for Schools Action Kit help schools implement consistent, appropriate practices for a variety of school maintenance issues, classroom policies and practices, and much more. See page 9 for a list of all the checklists contained in the Action Kit.

Most schools form a multi-disciplinary IAQ coordinating team to implement the guidance in the *IAQ Tools for Schools* Action Kit. Because IAQ problems can originate anywhere in the school building, the entire staff should be informed about and participate in improving IAQ. Students also can be involved in the process. Thousands of schools across the country are doing it just this way.

- For more information about EPA’s *IAQ Tools for Schools* Program and the “Framework for Effective School IAQ Management,” visit the Program’s website at <http://www.epa.gov/iaq/schools>.
- Download the *IAQ Tools for Schools* Action Kit at <http://www.epa.gov/iaq/schools/actionkit.html>.
- Information about K-12 lesson plans on IAQ can be found on the *IAQ Tools for Schools* Program website at <http://www.epa.gov/iaq/schools/curricula.html>.

When asthma is well controlled, students are ready to learn.

Effectively managing a child’s asthma is best accomplished through a comprehensive plan that addresses both the medical management of the disease and the avoidance of environmental triggers.



Case Study: Broward County Public Schools

Prior to 2002, Broward County Public Schools did not have an integrated system to manage its IAQ. But when a building audit revealed that seven elementary schools had moisture problems, the district knew it needed to act quickly to protect the buildings and their occupants. School district officials turned to the *IAQ Tools for Schools* Program to address the immediate issues, and then develop a comprehensive, integrated approach to proactively manage indoor environments and indoor environmental health.

Clean Up Mold and Control Moisture: School district personnel immediately investigated and attacked moisture and mold problems. Mitigating a serious public outcry and wanting to communicate well with the community, school district personnel provided public access to IAQ reports and the district's IAQ management plan. The district's quick actions – supported by *IAQ Tools for Schools* Program guidance – helped repair the district's image and secured the integrity of the buildings' structures. With the immediate problem under control, the district used the crisis as a springboard to launch a permanent IAQ program that addressed indoor environmental quality and health comprehensively.

Develop and Evaluate a District- or School-Wide Asthma Management Plan: In an effort to focus more specific attention on asthma, in 2008, the school district established the Asthma Improvement and Management Program. The district uses school-level data to address asthma in a culturally competent manner with students, parents and faculty. With the program growing in popularity, the demand for asthma education in schools is increasing and those involved report fewer days missed from school and fewer visits to the health room for asthma-related issues. The program is a complement to the technical IAQ work the district is already doing to reduce asthma triggers and maintain quality indoor air for all students.

Conclusion: While a crisis is often the initial reason for swift action, successful districts leverage crises to improve community relations, decrease student absences and ensure quality, long-term facilities maintenance. An asthma management plan complements an IAQ management plan and is a natural extension of environmental management and efforts to improve environmental health.

Develop an Asthma Management Plan in Your School or District

An IAQ management program that does not address asthma will not be able to address environmental health risks comprehensively, because IAQ and asthma are inextricably linked. By managing IAQ, you are already taking an important first step to managing asthma in your school or district. However, IAQ is only one component of effective asthma management. To address asthma on all fronts, it is important to have an asthma management plan. If you are using the *IAQ Tools for Schools* Program and “Framework for Effective School IAQ Management,” you most likely have the sustainable programmatic infrastructure in place to address this critical need in a more measurable, targeted and intentional way.

The components of “CDC’s Strategies for Addressing Asthma within a Coordinated School Health Program,” described below, form the foundation for an effective asthma management plan.

1. Establish **management and support systems** for asthma-friendly schools.
2. Provide appropriate school **health and mental health services** for students with asthma.
3. Provide **asthma education** and awareness programs for students and school staff.
4. Provide a safe and **healthy school environment** to reduce asthma triggers.
5. Provide safe, enjoyable **physical education and activity** opportunities for students with asthma.

6. Coordinate **school, family and community efforts** to better manage asthma symptoms and reduce school absences among students with asthma.

For more information, download the following guidance documents:

- “CDC’s Strategies for Addressing Asthma within a Coordinated School Health Program,” at: <http://www.cdc.gov/healthyyouth/asthma/strategies.htm>.
- “Managing Asthma: A Guide for Schools,” at: http://www.nhlbi.nih.gov/health/prof/lung/asthma/asth_sch.htm.

It is important to identify all students with asthma through monitoring morbidity associated with asthma, for example, frequent episodes at school, health room visits, limited physical activity, needing to leave school early or absenteeism. This can help to assess which programs or monitoring activities your school or district should implement. Focus resources on students whose asthma is not well controlled in order to promote improved school attendance and performance.

In order to identify what works and how you can improve the design and delivery of your school asthma management plan, it is essential to monitor program effectiveness. CDC and EPA offer resources on evaluation guidance specifically for asthma programs. To view a webinar entitled “Evaluating School-based Asthma Programs,” visit http://www.asthmacommunitynetwork.org/webinars/program_evaluation_basics.aspx.

As you develop your district’s or school’s Asthma Management Plan, consider incorporating the following activities for quality asthma management:

- Use the *IAQ Tools for Schools* Action Kit
- Identify all students with asthma
- Provide school-based asthma education programs
- Communicate with parents



Case Study: Charlotte-Mecklenburg Schools

Prior to 2002, Charlotte-Mecklenburg Schools, an urban district in North Carolina, had little knowledge of which students had asthma. However, school health officials realized that asthma was a growing problem in the community and that nationwide, asthma absences represented a heavy burden to students and school systems. They set out to better understand the impact that asthma was having on their district.

Identify All Students with Asthma: School health leaders began by talking with students and parents to determine if students had ever been diagnosed with asthma or if they currently had asthma symptoms. These data formed the baseline for a compelling case made to the superintendent and school board for increased funding and programming for asthma education and management. Once they began moving forward with their plan, these data also helped school district leaders prioritize their efforts. By comparing asthma rates to absentee data, they were able to identify schools with the greatest needs for increased school health presence, allowing them to immediately establish asthma-focused school health teams where they were needed most.

Develop and Evaluate a District- or School-Wide Asthma Management Plan: The district established a plan to manage asthma based on CDC's "Strategies for Addressing Asthma within a Coordinated School Health Program." (See page 5 for more information on this guidance document.) At the heart of their plan was the Asthma Education Program, which is founded and structured around two core goals. The first goal is to create healthy, safe learning environments for students with asthma by institutionalizing asthma education and awareness through student, staff and family learning opportunities. The second is to provide in-depth case management to students with poorly-managed asthma through a partnership with the local health department and a respiratory care program.

Conclusion: School officials created a realistic, district-wide asthma management plan that spanned departments and multiple levels of management to establish a coordinated school health program. Working step by step, the district evolved and adapted their program and its strategies to find what worked and what did not work in helping students better manage their asthma.

Reduce Environmental Asthma Triggers

Help manage asthma in your school with the following tips for controlling environmental asthma triggers.

Control Animal Allergens:

Classrooms often adopt animals as classroom pets or science projects. Any warm-blooded animals, including gerbils, birds, cats, dogs, mice and rats, may trigger asthma. Proteins, which act as allergens in the dander, urine or saliva of warm-blooded animals, can cause allergic reactions or trigger asthma episodes in people sensitive to animal allergens.

The most common sources of animal allergens in schools are in the air and on the clothing of staff and children who handle pets. If an animal is present in the school, there is a possibility of direct, daily exposure to the animal's dander and bodily fluids. It is important to realize that, even after extensive cleaning, pet allergens may stay in the indoor environment for several months after the animal is removed. In addition, animal allergens can readily migrate to other areas of the school environment through the air and on the clothing of staff and children who handle pets.

The most effective method to control exposure to animal allergens in schools is to keep your school free of warm-blooded animals.

Control Cockroach and Pest Allergens:

Cockroaches and other pests, such as rats and mice, are often found in the school setting. Certain proteins that act as allergens in the waste products and saliva of pests can cause allergic reactions or trigger asthma symptoms in some individuals.

Pest problems in schools may be caused or worsened by a variety of conditions, such as plumbing leaks, moisture problems, and improper food handling and storage practices. To manage and avoid pest problems, it is important to control water and food sources. Integrated pest management – IPM – is composed of commonsense practices that should be used throughout the entire school.

There are four key IPM methods for reducing exposure to pests in the school setting:

- Look for signs of pests.
- Do not leave food, water or garbage exposed.
- Remove pest pathways and shelters.
- Use pest control products such as poison baits, traps and pesticide sprays, as needed and as allowed by state law.



However, do not rely on widespread, indiscriminate use of pesticides to control pests.

- Track cockroach populations by using small sticky traps or monitoring traps that contain no pesticide.
- Rather than using bait, trap rats and mice.
- Use pesticide sprays in classrooms only as a last resort.

Clean Up Mold and Control Moisture:

Molds can be found almost anywhere; they can grow on virtually any substance if moisture is present. Molds produce tiny reproductive spores that travel through the indoor and outdoor air continually. When mold spores land on a damp spot indoors, they digest available material to survive and grow. When mold growth occurs in buildings, it may be followed by reports of health symptoms from some building occupants, particularly those with allergies or respiratory problems. Potential health effects and symptoms associated with mold exposures include allergic reactions, asthma exacerbations and other respiratory complaints.

If excessive moisture or water accumulates indoors, mold growth may occur, particularly if the moisture problem remains undiscovered or unaddressed. Moisture problems in school buildings can be caused by a variety of problems, including roof and plumbing leaks, condensation and excess humidity. Some moisture problems in schools have been linked to changes in building construction practices. For example, tightly sealed buildings may not allow moisture to escape as easily. Moisture problems in schools also are associated with delayed or insufficient maintenance, sometimes due to budget constraints. Temporary structures in schools, such as trailers and portable classrooms, have also frequently been associated with moisture and mold problems.

To prevent mold from being a problem in your school, take the following actions:

- Eliminate sources of moisture by reducing indoor humidity.
- Prevent moisture condensation through the proper use of insulation.
- Inspect the building for signs of mold, moisture, leaks or spills.
- Respond promptly when you see signs of moisture and/or mold or when leaks or spills occur.

Because moisture is the key to mold control, it is essential to clean up the mold AND get rid of excess water or moisture. If the excess water or moisture problem is not fixed, mold will most likely grow again, even if the area was completely cleaned. Clean hard surfaces with water and detergent and dry quickly and completely. Absorbent materials such as ceiling tiles may have to be discarded.

For more information on mold clean-up and moisture control in schools, go to <http://www.epa.gov/iaq/schools/tfs/guideh.html>.

Control Sources of Indoor Air Pollutants:

Usually the most effective way to improve IAQ is to eliminate individual sources of pollution or to reduce their emissions. Common sources of indoor pollution include secondhand smoke, school bus diesel exhaust coming into the school building, the off-gassing of furnishings and flooring, and chemicals from cleaning products. The following pollutant sources are especially important to control:

- **Secondhand Smoke.** Secondhand smoke is an irritant that may trigger an asthma episode, and evidence suggests that secondhand smoke may cause asthma in children. EPA estimates that exposure to secondhand smoke exacerbates asthma symptoms in 200,000 to 1,000,000 children. It is imperative for school districts to develop and pass

comprehensive tobacco-free school policies, and then enforce these policies at all times. In addition, it is recommended that schools educate staff, students and the community on the effects of secondhand smoke and its relation to asthma.

- **School Bus Exhaust.** Passing no-idling policies near the school building can reduce the indoor air pollution from school bus exhaust. Learn more about the Clean School Bus USA program at <http://www.epa.gov/cleanschoolbus>.
- **Cleaning Products.** Choosing the least-toxic cleaning methods and selecting appropriate products are important components of pollutant control. Fumes from cleaning products can linger long after they have been applied, which can exacerbate asthma symptoms and expose students and staff to potentially harmful substances. Learn more about environmentally preferable purchasing at <http://www.epa.gov/epp/>.
- **Chemical Management.** The School Chemical Cleanout Campaign gives K-12 schools information and tools to responsibly manage chemicals. A successful chemical management program meets the unique needs of each school and ensures that all schools are free from hazards associated with mismanaged chemicals. Learn more about the School Chemical Cleanout Campaign at <http://www.epa.gov/wastes/partnerships/sc3/index.htm>.

Reduce Exposure to Dust Mites:

Dust mite allergens play a significant role in triggering asthma. They may cause an allergic reaction or trigger an asthma episode in sensitive individuals. In addition, there is evidence that dust mites cause new cases of asthma in susceptible children.

Dust mites are too small to be seen but are found in schools in carpeting, upholstered furniture, stuffed animals or toys, and pillows. Their food source is dead skin flakes and these tend to accumulate in porous fabric materials.

It is important to keep classrooms free of clutter, to dust regularly and to wash items frequently that attract dust. When using pillows, cover them with dust-proof, allergen-impermeable, zipped covers. If stuffed toys are necessary, choose ones that can be washed in hot water. People with asthma or dust mite allergies should leave any area while it is being vacuumed. Vacuums with high efficiency filters or central vacuums may be helpful.

Conclusion

Maintaining good IAQ practices, as seen in the *IAQ Tools for Schools* Program and Action Kit, can significantly reduce the presence of environmental asthma triggers and set the framework for establishing an asthma management plan in your school.

Specific action items can be found on the **11** checklists in the *IAQ Tools for Schools* Action Kit:

- Administrative Staff Checklist
- Building and Grounds Maintenance Checklist
- Food Service Checklist
- Health Officer/School Nurse Checklist
- Integrated Pest Management Checklist
- Renovation and Repairs Checklist
- School Officials Checklist
- Teacher's Classroom Checklist
- Ventilation Checklist
- Walkthrough Inspection Checklist
- Waste Management Checklist

Start improving indoor air quality today by visiting <http://www.epa.gov/iaq/schools/actionkit.html#Checklists> to download these helpful checklists, which are also available in Spanish.



Case Study: Hartford Public Schools

In 2001, a study of Medicaid-eligible, school-aged children in Hartford revealed an asthma prevalence of 19 percent, nearly double the national average. The city council quickly declared an asthma emergency and, in partnership with Hartford Public Schools, established goals to manage asthma throughout the community. Heeding the call, the school district identified existing assets to leverage their limited resources into gains for the health and well-being of students with asthma.

Use the *IAQ Tools for Schools* Action Kit and Framework to Develop an IAQ Management Plan: Two school district employees were identified to lead the district's response to the problem. They knew that to create an effective wellness program, they needed to forge connections and develop a unified response to asthma among different departments, schools and layers of management. They used the *IAQ Tools for Schools* "Framework for Effective School IAQ Management" as a blueprint for building a wellness program and leveraged a partnership with the city to recruit collaborators from across the community to support their efforts, including the health department and the local American Lung Association chapter. Together, they established a network of Health and Safety Teams in individual schools that linked back and reported to the nursing and facilities staff to inform and guide the newly-created district-wide wellness program. Bundling *IAQ Tools for Schools* with the Health and Safety teams has maintained a sustainable system to address school wellness.

Conclusion: The *IAQ Tools for Schools* Program provided a framework for action that allowed school district leaders to implement a comprehensive solution to manage asthma.

Additional Resources

U.S. Environmental Protection Agency

- <http://www.epa.gov/iaq/schools>

Download the *IAQ Tools for Schools* Action Kit and learn about the “Framework for Effective School IAQ Management.”

- The *IAQ Tools for Schools* Update e-mail newsletters bring hot topics, emerging research and best practices directly to your inbox. To subscribe, please send an e-mail to IAQTfSConnector@cadmusgroup.com with “Subscribe” in the subject line.
- The *IAQ Tools for Schools* Connector e-mail discussion list allows you to connect directly with your peers in the *IAQ Tools for Schools* National Network. Through the Connector, you can share information and resources, as well as communicate by e-mail and on the Web. Join today by sending a blank e-mail message to schools_iaq_connector-subscribe@lists.epa.gov. Then, check your e-mail inbox for your confirmation and membership details.

- <http://www.epa.gov/asthma>

Find asthma resources on EPA’s website.

- <http://www.asthmacommunitynetwork.org/>

AsthmaCommunityNetwork.org serves as a year-round resource for mentoring and collaboration. It’s designed to provide the tools, information and partners to support asthma management programs to communities and schools.

Centers for Disease Control and Prevention

- <http://www.cdc.gov/asthma>

Find more asthma resources on CDC’s website.

- <http://www.cdc.gov/healthyyouth/asthma>

Find asthma data and resources, including the “Initiating Change: Creating an Asthma-Friendly School” toolkit and “Strategies for Addressing Asthma Within a Coordinated School Health Program.”

National Heart, Lung and Blood Institutes

- <http://www.nhlbi.nih.gov/health/prof/lung/asthma/naci/audiences/schools-childcare.htm>

Find the National Asthma Control Initiative’s 10 tips and more to assist children and youth and their families to keep asthma under control, both in and out of the classroom.

- <http://www.nhlbi.nih.gov/health/prof/lung/>

Download “Managing Asthma: A Guide for Schools,” “Asthma and Physical Activity in School,” “How Asthma Friendly is your School?,” “Asthma Awareness Curriculum,” and many other school related resources.

Regional EPA Resources on IAQ

To obtain information about your EPA Regional Office, visit www.epa.gov/iaq/wherelive.html.

EPA Regional Offices

US EPA/Region 1 (CAP)

(CT, ME, MA, NH, RI, VT)
5 Office Post Square
Suite 100
Boston, MA 02109-3912
(617) 918-1639
(617) 918-1505 fax

US EPA/Region 2 (DEPP-RIAB)

(NJ, NY, PR, VI)
290 Broadway
25th Floor
New York, NY 10007-1866
(212) 637-4013
(212) 637-4942 fax

US EPA/Region 3 (3PM52)

(DC, DE, MD, PA, VA, WV)
1650 Arch Street
Philadelphia, PA 19103-2029
(215) 814-2086
(215) 814-2101 fax

US EPA/Region 4

(AL, FL, GA, KY, MS, NC, SC, TN)
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-3104
(404) 562-9143
(404) 562-9095 fax

US EPA/Region 5 (AE-17J)

(IL, IN, MI, MN, OH, WI)
77 West Jackson Boulevard
Chicago, IL 60604-3590
(312) 353-2000
(312) 353-0617 fax

US EPA/Region 6 (6PD-T)

(AR, LA, NM, OK, TX)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733
(214) 665-7547
(214) 665-6762 fax

US EPA/Region 7 (ARTD/RALI)

(IA, KS, MO, NE)
901 North 5th Street
Kansas City, KS 66101-2907
(913) 551-7020
(913) 551-7065 fax

US EPA/Region 8 (8P-AR)

(CO, MT, ND, SD, UT, WY)
1595 Wynkoop Street
Denver, CO 80202-2466
(303) 312-6031
(303) 312-6044 fax

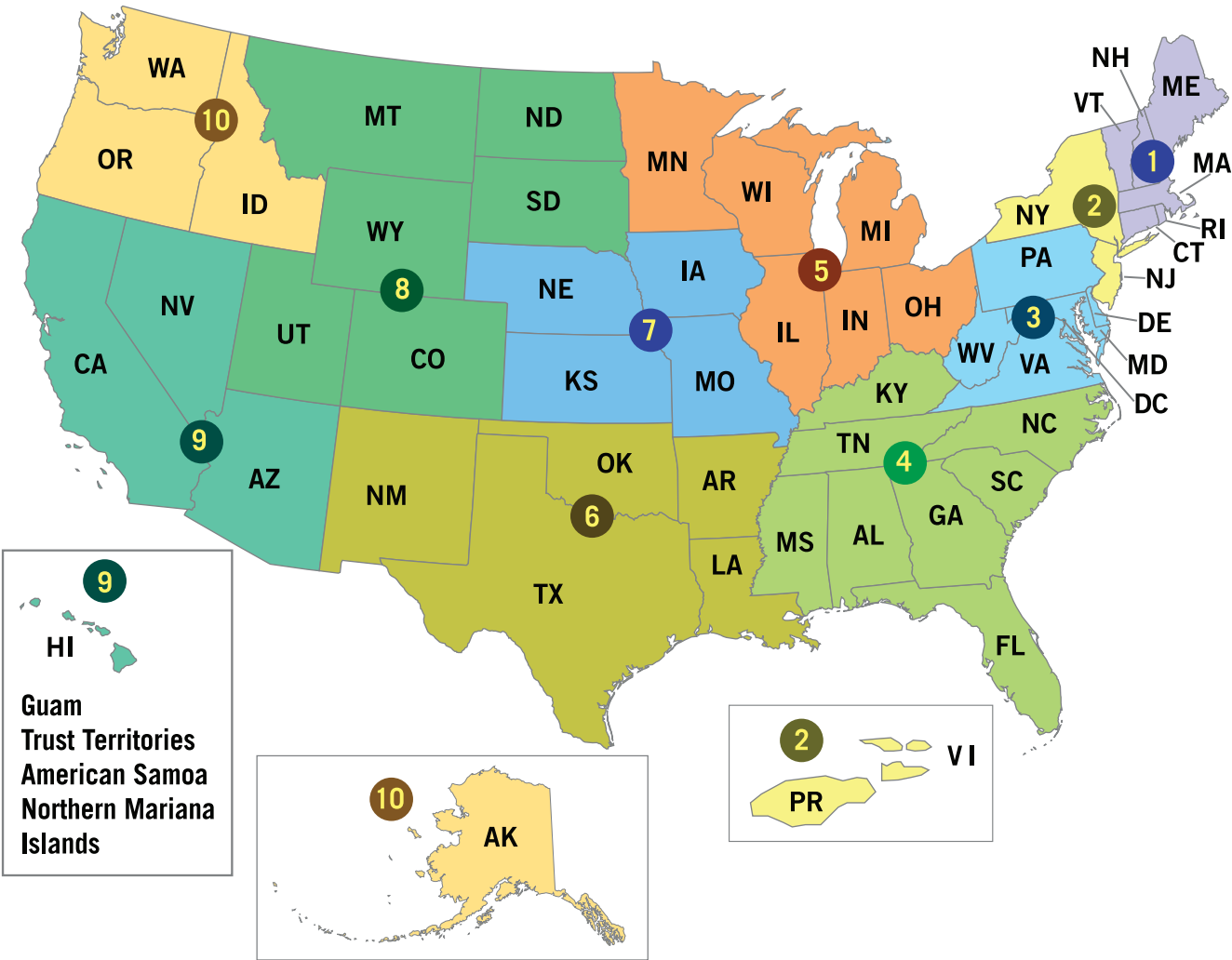
US EPA/Region 9 (Air-6)

(AZ, CA, HI, NV, AS, GU)
75 Hawthorne Street
San Francisco, CA 94105-3922
(415) 947-4193
(415) 947-3583 fax

US EPA/Region 10 (OAQ-107)

(AK, ID, OR, WA)
1200 Sixth Avenue
Suite 900
Seattle, WA 98101-9797
(206) 553-4273
(206) 553-0110 fax

EPA Regional Offices Map



Indoor Air Quality



Tools for Schools

<http://www.epa.gov/iaq/schools>