

## Indoor Air Quality

### An Issue For Parents, Employees and Building Occupants

The 1997 Omnibus Education Act required school districts to develop and implement Indoor Air Quality (IAQ) Management Plans and to monitor and improve indoor air. Per the Act, the DCFL has established guidelines for indoor air quality management in public schools, including guidelines for ventilation and indoor air pollution. The intent is to provide schools with the guidance for the majority of conditions that affect schools.

These statutory changes came about as a result of calls by parents, employees and citizens to improve the quality of air in schools. Parents and employees wanted school districts to develop capacity to answer the following questions:

1. Where can a parent go to find answers to their IAQ questions and concerns?
2. Where can a parent obtain checklists or other self-help information so they can properly evaluate their child's home or other out-of-school situation, including information provided by their child's physician? Parents want to do their part in working toward solutions.
3. How can a parent obtain information about school facility construction, maintenance and housekeeping practices, chemicals used, mold and HVAC-related information, chemical-producing academic subjects, pesticides and herbicides, and the like to determine the extent to which school activities contribute to a child's symptoms?
4. What can a parent do--how can a parent effect change--upon discovering questionable activities occurring within schools? Examples might be poor ventilation in the auto maintenance shop resulting in exhaust fumes or construction fumes leaking into the occupied portion of a building.

It is well-documented that common indoor air contaminants that may be found in public schools, (e.g., biological agents (molds, animal dander, dust mites), volatile organic compounds (VOCs) as in solvents and cleaning agents, formaldehyde, pesticides and combustion products) can cause chronic health effects. In addition, exposure to conditions conducive to biological contamination (e.g., dampness, water damage) has been related to nonspecific upper and lower respiratory symptoms. A major concern associated with exposure to biological pollutants is allergic reactions, which include rhinitis, nasal congestion, conjunctival inflammation, urticaria, and asthma.

Some of the documented health effects from VOCs and formaldehyde exposure include eye and upper respiratory irritation, rhinitis, nasal congestion, rash, pruritus, headache, nausea, vomiting, and dyspnea. The health effects from pesticide exposure include headache, dizziness, nausea, vomiting, and muscle weakness. Exposure to combustion products can cause headache, dizziness, nausea, emesis, tachycardia, wheezing and bronchial constriction.

It is important to realize that many health effects associated with indoor air quality problems are often non-specific symptoms, such as headaches, fatigue, allergy

symptoms, and dizziness, rather than clearly defined illnesses. People with allergies, asthma, or damaged immune systems may be more susceptible to certain indoor contaminants. This is noteworthy, since there has been a significant increase in the prevalence of asthma in children over the past decade. There are also some people who appear to be more susceptible to indoor air contaminants, yet have no known underlying health condition.

Ventilation is the process of supplying and removing air by natural or mechanical means to and from any space. The air may or may not be conditioned. Insufficient ventilation means inadequate circulated air and/or outside fresh air in an occupied building. Acceptable indoor air quality is achieved within an occupied space by controlling known and specific contaminants. One of the least expensive but effective means of lowering the concentration of indoor air contaminants from non-localized sources, (such as the occupants themselves, building products and materials), is by dilution ventilation, i.e., adding outside fresh air to the recirculated building air. The lower the concentration of air contaminants, the less likely the chance that the occupants will experience adverse health effects. A study of student performance and carbon dioxide (CO<sub>2</sub>) levels showed a correlation between high CO<sub>2</sub> levels and lower student performance on tests, including simple reaction time and choice reaction time on multiple choice tests. CO<sub>2</sub> levels can build up quickly in a crowded classroom with insufficient ventilation. Infectious diseases are more likely to be spread in indoor environments that are overcrowded and inadequately ventilated.

The Minnesota planning model for schools to follow for proper Indoor Air Quality management is as follows:

- *IAQ Coordinator* - An IAQ coordinator should be appointed to manage the IAQ program, should be an employee.
- *IAQ Assessment* - An IAQ assessment of all facilities should be performed to identify and document problem areas. EPA "Tools For Schools" is available for this purpose.
- *Development of Goals* - Based on the results of the IAQ assessment and resources available, each district should develop goals which must be achieved for the implementation of an effective IAQ program.
- *Public School Board/Administrative Support for Stated Goals* - Administrative support from the highest level of the organization and a written commitment from the school board, superintendent, and other key personnel to the goals is necessary for an effective IAQ program.
- *Funding* - Adequate budgets are necessary for IAQ staff to meet the stated goals. The amounts of funding will vary based on the scope of each public school district's program.
- *Staff* - An IAQ support team should be developed as necessary to achieve the district's goals. The team may include administrators, health officials, custodians and maintenance personnel, energy manager, design and construction staff, teachers, parents, students and others.
- *IAQ Management Plan* - A written IAQ management plan should be developed and maintained. The plan should include the following.
- *Training* - Education and training of the IAQ coordinator and support team, teachers, staff and students on the recognition, prevention and resolution of IAQ problems.

- *Communication* - A procedure for communicating with students, parents, faculty, and staff regarding IAQ issues.
- *Complaint Response* - A written procedure for documenting and responding to IAQ complaints and problems.
- *Record Keeping* - An IAQ complaint collection, resolution, and records retention program.
- *Maintenance and Operation Plan* - A written building maintenance and operation plan containing: a written description of the building systems and building functions and occupancy, schematics and/or as-built drawings with equipment locations and performance criteria, outside air requirements, sequences of operation, daily building and system operation schedules, test and balance reports, maintenance schedules, building inspection checklists and maintenance equipment checklists.
- *Implementation Schedule* - A schedule to implement the management plan.
- *Annual Review* - Annual IAQ inspection/review of facilities including a walk through by the IAQ coordinator or designee.
- *School Board Review* - A review of the IAQ program status and future needs should be presented annually to the School Board by the IAQ coordinator.

Indoor Air Quality in schools is an issue that reaches into every classroom in Minnesota. Proper operation and enforcement of each district's Indoor Air Quality Management Plan relies on the vigilance and collaboration of administration, staff and parents.

It is incumbent on all Minnesotans participating in this important endeavor to bring a sense of thoughtfulness and reasonableness when they are confronted with human suffering as a possible result of improper indoor air quality. The issues may be complex, involving allocation of scarce resources and working with imperfect medical data. A sense of collaboration and the desire to provide a healthy environment in which children can learn can serve to bring together differing viewpoints into a common purpose.

An excellent website which includes references, web links and FAQs (frequently asked questions) has been developed by the University of Minnesota:

- [www.dehs.umn.edu/iaq/school/homepg.html](http://www.dehs.umn.edu/iaq/school/homepg.html) (for schools)
- [www.dehs.umn.edu/homeiaq/homeiaq.html](http://www.dehs.umn.edu/homeiaq/homeiaq.html) (for residences)