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Keeping Connecticut Healthy

## **WHITE PAPER**

# **Evaluation of the Effectiveness of using “Tools for Schools” to improve Indoor Air Quality in Connecticut Schools**

**August 2005**

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Keeping Connecticut Healthy

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## PURPOSE

This White Paper presents the results of a survey of 177 schools in Connecticut that have implemented the Environmental Protection Agency's Tools for Schools Program (TfS) to improve school indoor air quality. This survey was conducted by the Connecticut Department of Public Health (CTDPH) with the primary objective being to evaluate whether the TfS program has been successful in documenting and correcting indoor air quality (IAQ) problems and if so, whether IAQ-related health symptoms have decreased among students and staff. CTDPH plans to use the information contained in this White Paper to leverage resources to support: (1) implementing TfS in additional schools,(2) sustaining TfS in schools that have already implemented the program and (3) conducting broader training for school custodians and facilities maintenance staff. CTDPH also plans to use the survey results to advocate for increased health data collection capabilities in schools.

## BACKGROUND

There has been a growing concern regarding health problems linked to poor indoor air quality (IAQ) in buildings, including school facilities. Students and staff are exposed to poor IAQ from a wide range of sources in schools, including inadequate ventilation, moisture intrusion, and poor maintenance and operation of heating, ventilation and air conditioning (HVAC) systems. Moisture intrusion can result in the growth of mold and other microorganisms. Other exposures include air pollutants related to laboratories, machine and wood working shops, kitchens, and copy and printing shops. The most important direct cause of poor indoor air quality is inadequate fresh air ventilation, regardless of what other factors may contribute to this condition.

The two terms people use to describe health effects experienced indoors are *Sick Building Syndrome* and *Building Related Illness*. Sick Building Syndrome tends to cause a range of symptoms such as eye, nose and throat irritation, headaches, and feelings of lethargy. With Building Related Illness, there is a clear-cut relationship between symptoms and exposure to one or more infectious, toxic or immunological agents in an indoor environment. Agents in the indoor environment can cause and/or exacerbate serious immunological diseases such as asthma and hypersensitivity pneumonitis. Children and teachers with these ailments may experience chronic, even life threatening disease, if problems creating them are not recognized and corrected at an early stage (CASE 2000). Addressing school indoor air quality issues is an important part of the overall strategy to reduce the impact of asthma in Connecticut. Reducing asthma triggers in schools is part of Connecticut's coordinated asthma management program.

Like many states, Connecticut has a variety of agencies and organizations that have some responsibility for school IAQ. Because there are no IAQ standards, local, state and federal agencies are limited in their response to school IAQ complaints. In addition, virtually all school districts have funding issues that have limited their response. The U.S. Environmental Protection Agency (EPA) has developed an effective program to assist schools in identifying and addressing IAQ problems. The EPA Tools For Schools program (TfS) is based on an action kit that provides materials necessary to promote a low-cost, preventive, problem-solving team approach to improving IAQ. A committee or "building team" made up of administrators, teachers, maintenance staff, school nurses and parents uses the kit to investigate and prioritize

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indoor air hazards. Short and long-term strategies are then developed to assist the schools in solving IAQ problems.

In the late 1990s, several Connecticut agencies, along with staff from EPA New England regional office, made efforts to promote the TfS program in Connecticut, with limited success. With a fragmented system of responsibility for IAQ in schools, there was a strong need to develop a comprehensive and coordinated statewide strategy to promote EPA's TfS kit and program as a viable, pro-active intervention to address IAQ problems in Connecticut schools. In January 1999, staff from the Connecticut Department of Public Health (CT DPH), the Connecticut Council for Occupational Safety and Health (CTCOSH) - an advocacy organization, and EPA Region I created the idea of pooling resources and developing a coordinated response. The team or consortium – the Connecticut School Indoor Environment Resource Team (CSIERT) – has grown to include 22 agencies and organizations (see Attachment A). The overall goal of CSIERT is to improve indoor air quality in Connecticut schools, principally by implementing the TfS program in every Connecticut public school building. CSIERT's main objectives are: 1) to develop and execute a more systematic outreach program to promote TfS, and 2) to provide training and other technical assistance to schools to implement the TfS program. A two-session training program for TfS building teams has been developed by CSIERT. Since 2000, CSIERT has trained over 2,200 school staff and parents in over 470 schools in 73 school districts in Connecticut.

The Connecticut General Assembly sought to address school IAQ problems in 2003 by enacting Public Act No. 03-220, An Act Concerning Indoor Air Quality In Schools. The bill includes several provisions, including a requirement that all schools adopt an IAQ program. The CT DPH and CSIERT support the TfS program as a primary way for schools to meet this requirement of the Act. Since this Act was enacted, there has been a steady increase in school districts electing to implement the TfS program.

In 2002, a graduate student conducted an initial evaluation, designed to document impacts and outcomes from implementing TfS in a number of Connecticut schools. This evaluation found that schools implementing the TfS program were able to identify and repair important IAQ problems. More importantly, 41% of the responding schools noted a decrease in IAQ-related symptoms among students and staff. In 2003, a new evaluation project was undertaken to survey a larger sample of schools and attempt to collect more robust data on exposures and health outcomes. This white paper summarizes the 2003 evaluation project.

## Demographics

There is a large population of children and adults potentially exposed to IAQ hazards in schools. A study done in 2000 found that 68 percent of Connecticut schools report the existence of indoor environmental problems (CASE 2000). This means that students and staff have potential exposures to IAQ hazards in a majority of schools in CT. This is an important finding because there are over 600,000 students enrolled in public, non-public, and vocational technical schools in Connecticut and almost 86,000 employees working in public schools in Connecticut (CT Department of Education; <http://www.csde.state.ct.us/public/der/edfacts/index.htm>).

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## DISCUSSION

### 1. Environmental Data

For this white paper, environmental sampling data was not collected in schools. Instead, we used results from a TfS evaluation questionnaire to provide data about IAQ problems/hazards in schools that could present an potential exposure and could lead to adverse health effects. The survey methodology and results are presented in this section of the white paper.

#### a. Survey Methodology

As mentioned in the Background section, a questionnaire was developed in 2002 as part of the initial impact/outcome evaluation of TfS. The 2003 evaluation that is the subject of this white paper used the same questionnaire, with some modifications. The primary modification was the addition of questions for each school nurse to answer pertaining to health changes among students and staff. The objectives of the 2003 survey are summarized in the bullets listed below. Both the 2002 and the 2003 questionnaires were prepared according to existing state requirements and guidelines.

- Documentation of IAQ problems and potential exposures.
- Use of TfS to make changes to correct IAQ problems.
- Identification of barriers the TFS implementation teams may have encountered.
- Whether implementation of TfS has had an impact on reducing potential exposures to IAQ hazards in schools.
- Whether implementation of TfS has had an impact on improving health in schools.

The survey questionnaire (included as Attachment B) was mailed to TfS building team coordinators at all 177 schools that had implemented the program at the time of the mailing (May 2003). The 177 schools were chosen because they had completed the 2-session training described above and had at least 6 months to implement the program. The TfS coordinators were asked to answer all questions except those pertaining to health. The school nurse was asked to answer the health questions. Follow-up phone calls were made to increase participation from schools that did not initially respond. A total of 77 schools (44%) responded.

#### b. Survey Results

In this section, results of the TfS survey questionnaire are summarized. A comprehensive summary of the results is provided in Attachment C.

##### *Respondents*

As stated above, 77 schools responded to the survey. The majority of the responding schools (71%) were elementary schools. The remaining respondents were equally divided between high schools and middle schools.

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## *Implementing and Sustaining the TFS Process*

Several survey questions sought to collect information on the TFS implementation process. Of interest were the responses for motivating factors for TFS implementation. The most frequent responses were that: (1) the school district mandates that all schools implement TFS and; (2) there are general health concerns in the school related to improving IAQ. The survey also found that the majority of responding schools had completed the most critical components of the TFS implementation process (Prioritizing Repairs and Upgrades and Developing and Distributing a Summary Report). Another important part of the TFS process relates to whether the school or school district has developed a long-term system for supporting and sustaining the TFS program over time. A district-wide TFS coordinating committee is considered critical to being able to support the TFS program, and over 87% of schools surveyed reported that their district has a TFS coordinating committee. Parental involvement is another important component of successful implementation of TFS. The most commonly reported reason for the lack of parental involvement was the school district not making parental involvement a priority. However, it should be noted that overall, there was a relatively low number of schools reporting *no* parental involvement. Although most schools had a district-wide coordinating committee and parental involvement in the TFS program, the survey found that most IAQ teams within schools are not continuing to meet regularly after completion of TFS training. Regular IAQ team meetings are critical for the school to sustain the TFS program over the long-term.

## *Outcome of TFS Program*

Several survey questions collected information on one of the most important questions of the survey: were schools that implemented TFS able to use the program to identify IAQ problems and rectify them, thereby reducing potential IAQ exposures.

Schools responding to the survey used the TFS program to identify a number of IAQ problems. The most common problems identified were: ventilation problems, general cleaning improvements needed, carpet cleaning/removal needed, and water problems. Table 1 provides a list of the IAQ problems identified by survey respondents. For each problem, the Table shows the number of schools reporting that problem and the number of students and staff in those schools. The numbers of students and staff represent how many people could be exposed to IAQ hazards from each particular IAQ problem. As Table 1 shows, these populations numbers are very large.

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**TABLE 1: IAQ Problems identified by TfS Survey Respondents and Population Potentially Exposed to IAQ Hazards.**

IAQ PROBLEM	No. of Schools Reporting the IAQ Problem	Potentially Exposed Population	
		No. of Students	No. of Staff
<b>Ventilation Problems</b>			
Air vents obstructed	35	22,134	1,621
Filters need upgrading or replacing	36	20,914	2,041
HVAC units & ventilators need cleaning	29	17,788	1,646
Temperature/dryness/humidity need improving	45	26,504	2,330
Arts/sciences room needs ventilating	16	11,281	897
Outdoor air intakes need improving	24	14,191	1,255
<b>Source Reduction Problems</b>			
Radon remediation needed	3	1,132	121
Asbestos remediation needed	12	6,999	505
Cleaning products need replacing with “greener products”	14	16,395	1,182
General Cleaning Improvement Needed	46	26,726	2,302
Carpet cleaning or removal needed	47	26,318	2,445
Overuse of pesticides	19	11,239	899
Arts/science materials need replacing with “greener products”	10	8,495	541
Classroom animal dander exposure	13	8,423	944
Bus idling policies lacking	26	15,773	1,455
<b>Water Identification Problems</b>			
Inspections of leaks, spills, moisture	56	31,891	2,828
Plumbing problems	33	21,003	1,812
Roof problems	41	23,703	2,211
Basement or crawlspace needs upgrading	11	8,060	583
Removal of water-damaged materials needed	46	26,614	2,393
<b>Other Problems</b>			
Renovations to classrooms, buildings	18	9,879	872

An important finding of the survey was that a high percentage of schools with IAQ problems reported that through the TfS program, they have made progress rectifying their IAQ problems. Table 2 lists the IAQ problems reported by survey respondents along with IAQ exposure hazards that could be associated with each problem. The list of hazards in Table 2 was not obtained through the questionnaire but was developed by CT DPH. The list consists of IAQ pollutants that the scientific literature commonly associates with the IAQ sources/problems identified by schools (CASE 2000, CSIERT 2002). Also included in Table 2 are the number of schools (with their student and staff population) that have repaired (or scheduled for repair) each IAQ problem. Table 2 illustrates that TfS programs have reduced actual or potential exposures to IAQ pollutants to a huge number of adults and children in CT schools.

The survey also asked schools to report any new policies or innovative interventions that resulted from implementing the TfS program. In addition, schools were asked about funding sources for needed IAQ-related repairs and upgrades identified through the TfS program. The two most frequently mentioned new policies were the establishment of IAQ Health and Safety Committees and bus idling policies. With respect to innovative interventions, the results were unremarkable. Most schools reported that it was too soon to report about innovative interventions. As for funding to cover IAQ repairs, most schools were able to secure funding from their maintenance or general education budget.

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**TABLE 2: IAQ Problems identified by TfS Survey Respondents, Associated IAQ Hazards, Schools Reporting IAQ Interventions and Population with Reduced or Eliminated Exposures.**

IAQ PROBLEM	POTENTIAL IAQ EXPOSURE HAZARD	No. Schools Reporting Intervention <sup>§</sup> of IAQ Problem	Potential Exposures that have been/will be Reduced or Eliminated Through Intervention	
			No. Students	No. Staff
<b>Ventilation Problems</b>				
Air vents obstructed	CO <sub>2</sub> <sup>ψ</sup> , temperature too hot/cold, humidity too high/low	28	18,622	1,249
Filters need upgrading or replacing	particulate matter, CO <sub>2</sub> , bioaerosols <sup>+</sup>	29	17,204	1,682
HVAC units & ventilators need cleaning	particulate matter, CO <sub>2</sub> , bioaerosols,	22	13,639	1,245
Temperature/dryness/humidity need improving	temperature too hot/cold, humidity too high/low	24	15,022	1,134
Arts/sciences room needs ventilating	paints, glues, solvents, other lab chemicals and arts supplies	11	8,674	674
Outdoor air intakes need improving	mold, car/bus exhaust, tobacco smoke	13	8,891	739
<b>Source Reduction Problems</b>				
Radon remediation needed	radon	1	366	39
Asbestos remediation needed	Asbestos	9	5,985	413
Cleaning products need replacing with "greener products"	various VOCs <sup>^</sup>	7	12,238	839
General Cleaning Improvement Needed	particulate matter, bioaerosols,	25	14,568	1,178
Carpet cleaning or removal needed	Particulate matter, bioaerosols	31	17,758	1,570
Overuse of pesticides	Pesticides	16	9,338	749
Arts/science materials need replacing with "greener products"	Paints, glues, solvents, other lab chemicals and arts supplies	5	5,430	275
Classroom animal dander exposure	animal dander	7	3,647	430
Bus idling policies lacking	diesel exhaust (includes nitrogen dioxide, CO <sup>*</sup> and particulate matter)	17	10,730	975
<b>Water Identification Problems</b>				
Inspections of leaks, spills, moisture	Mold	37	19,965	1,641
Plumbing problems	Mold	20	11,631	938
Roof problems	Mold	30	16,382	1,477
Basement or crawlspace needs upgrading	Mold	7	5,958	387
Removal of water-damaged materials needed	Mold	33	17,661	1,538
<b>Other Problems</b>				
Renovations to classrooms, buildings	Paints, roofing tars, solvents, particulate matter.	14	8,311	716

<sup>§</sup> Intervention means that a school has repaired the IAQ Problem or scheduled it for repair.

CO<sub>2</sub><sup>ψ</sup> - carbon dioxide

bioaerosols<sup>+</sup> - products that become airborne that are produced by living organisms; includes mold, bacteria, viruses, dust mites and cockroach excretions, animal antigens, pollens.

VOCs<sup>^</sup> - volatile organic compounds. Includes organic solvents used in paints, glues, other art supplies, cleaning products, carpet adhesives, copy machines, formaldehyde released from resins in building materials.

CO<sup>\*</sup> - carbon monoxide

## *Health Changes among student and staff*

The survey questionnaire asked the school nurse to report information that could be used to document health changes among students and staff in schools that implemented TfS. Responses to the qualitative questions indicate that most school nurses did not perceive (or were not sure about) a decrease in general IAQ-related health complaints (including asthma symptoms). However, most school nurses also reported that they did not systematically collect data that could be used to document health changes among students or staff.

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A point of clarification is needed regarding this finding. As stated earlier in this white paper, the 2002 survey found that 41% of schools noticed a decrease in IAQ-related symptoms after TfS Program implementation. This raises the question why the 2003 survey failed to document health changes. The likely explanation is that the 2002 survey did not specifically ask school nurses about health symptoms. The 2002 survey results reflect administrative personnel perceptions about health changes and are not based on any quantitative data. In contrast, school nurses responding to health-related questions on the 2003 survey were likely to be more cautious about reporting health changes without data to support the claims.

## *Barriers and Resources Needed*

Two questions on the survey asked about what barriers exist to full TfS implementation and what resources are needed. As might be expected, the highest number of responses relate to the need for more funding. Although many schools reported the ability to secure some funding to cover IAQ repairs from maintenance or general education budgets, there are large differences across school districts in terms of the district's willingness to commit funds, especially for larger repair expenses.

## 2. Exposure Pathway Analysis

In order for exposure to occur, a hazardous substance or pollutant must be present, there must be a way for people to come into direct contact with the hazard and a way for the hazardous substance to enter the body. If there is no exposure, there is no risk of adverse health effects. Students and staff are potentially exposed to IAQ hazards in many schools throughout Connecticut. Table 2 lists some of the hazards associated with IAQ problems identified in schools. Inhalation of indoor air is the pathway of concern and any children or adults who attend school or work in the school could be exposed to various IAQ hazards by breathing indoor air.

## 3. Public Health Implications for Adults and Children

There is a great deal of scientific literature about the adverse health impacts of indoor air pollution on humans. As mentioned in the Background section, health effects experienced indoors are generally described by either *Sick Building Syndrome* or *Building-Related Illness*. Sick Building Syndrome describes a range of symptoms such as lethargy, eye, nose and throat irritation, and headache. In most cases, no specific indoor pollutant can be identified as causing the symptoms. Poor ventilation in combination with the presence of irritating substances are usually cited as the causes of the symptoms. Although not considered a serious medical threat, the symptoms of sick building syndromes in a school may be severe enough to cause students and staff to work inefficiently and contribute to absenteeism (CASE 2000, US DOE 2004).

Building Related Illness, on the other hand, is a more serious situation than Sick Building Syndrome. Building Related Illness accounts for symptoms that are clearly associated with exposure to one or more infectious, toxic or immunological agents that trigger or exacerbate disease. Such diseases include asthma and hypersensitivity pneumonitis. Numerous studies have investigated the increasing prevalence of asthma in school children. Many have explored environmental factors, particularly indoor air contamination, in search of a reason for the steady

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increase in asthma prevalence. Most studies identify family history and sensitization to indoor allergens as the strongest risk factors for asthma in children. Some studies have associated specific IAQ factors in school such as humidity, VOCs, molds, and bacteria, with asthma and other respiratory diseases in school children (CASE 2000, US DOE 2004).

The TfS survey results indicate that many schools in CT have IAQ problems and sources of IAQ pollutants. Although we do not have environmental data to document the presence of IAQ pollutants in schools, we know from the scientific literature that many pollutants are associated with the IAQ problems that the survey has shown to exist in CT schools (Shendell et al. 2004; EPA 2000). Therefore, we can be reasonably certain that exposures to some IAQ pollutants are occurring in many CT schools. Also important is the finding that the population of children and adults with potential exposures is very large. We also know from the scientific literature that exposures to these IAQ pollutants can cause adverse health effects (Shendell et al. 2004; EPA 2000). With regard to the documentation of health effects among school children and staff, the TfS survey was designed to collect information that would allow an evaluation of health impacts in schools. Unfortunately, the study found that school nurses do not systematically collect the information needed to quantitatively evaluate IAQ health impacts. Although we were not able to document that TfS programs are reducing IAQ-related health symptoms, we know from the survey results that schools are making progress correcting IAQ problems, using the TfS program. Addressing these problems will lead to a reduction in potential exposures and health impacts.

## CONCLUSIONS

Overall, the results of the survey show that schools using the TfS program have been successful in systematically documenting IAQ problems. As might be expected, the survey found that there are some barriers to full implementation of the TfS program. The key barrier is the need for increased funding resources. Although TfS can address many school IAQ problems, school districts may need funding to address higher cost interventions. In addition, approximately 25% of responding schools reported having no parental involvement on the TfS teams. Parental involvement is a key component to effective implementation of the TfS program and should be present at all schools with TfS programs in place.

As a result of the TfS program, a large majority of schools have either corrected IAQ problems or have them scheduled for repair. There are a wide variety of pollutants that are associated with the IAQ problems identified by schools. These pollutants have been documented to cause adverse health impacts ranging from headache and eye, nose and throat irritation to asthma and hypersensitivity pneumonitis. The numbers of school staff and students potentially exposed to poor IAQ is very large. The fact that schools are successfully using the TfS program to reduce potential IAQ exposures is significant in terms of the large numbers of students and school staff who are now benefiting (or will benefit) from improved IAQ and reduced exposures to potentially harmful IAQ pollutants.

The survey attempted to collect data to document whether implementation of the TfS program resulted in a net health benefit to students and staff. Because school nurses do not systematically collect health information, this was not possible. However, even though changes in health symptom could not be documented, it is important to recognize that the survey presents positive

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results showing that IAQ problems in schools are being identified and remediated as a direct result of TfS implementation. Literature studies show the link between these same IAQ problems and health problems (sick building syndrome, asthma episodes, etc.). Therefore we can reasonably infer that correcting IAQ problems will reduce exposures and prevent or reduce health symptoms.

## RECOMMENDATIONS

1. CSIERT should ensure that the results of this survey are made known to Connecticut school administrators and staff, federal, state and local policy makers, and parents.
2. CSIERT should work to enable all schools in Connecticut to adopt and maintain EPA's Tools for Schools program. The findings of CT's survey indicate that TfS is an effective intervention for identifying and correcting IAQ problems. The TfS program can result in improved IAQ in schools and fewer IAQ-related health impacts. The program also addresses part of the requirements of the 2003 School IAQ Act (Public Act No. 03-220).
3. CSIERT should provide support to ensure that schools that have adopted TfS are able to actively maintain their program after the initial year of implementation.
4. CSIERT should advocate for all Connecticut school districts making sure adequate resources are available to provide regular maintenance in their schools. There is a direct connection between poor maintenance and poor IAQ in schools.
5. CSIERT should work with the CT Department of Education, the CT School Nurses Association and other agencies to increase the capabilities of school nurses and other school medical staff to collect relevant health data for assessing IAQ problems and improvements. These data might include student and staff absences, number of school nurse visits, nebulizer use, and specific complaints about IAQ.
6. Parental involvement in the Tools for Schools process is very important to the success of the program. CSIERT should work with school districts to make parental involvement in TfS a priority and should work to ensure that all TfS building teams have at least one parent member. CSIERT should also ensure that the local PTA organization is regularly informed about TfS assessments and recommendations.

## PUBLIC HEALTH ACTION PLAN

### Actions Completed

1. The CT DPH prepared a final report in October 2004, summarizing the 2003 survey results and has distributed it to EPA, CSIERT, schools participating in the survey, and participating school district superintendents.
2. Since 2000, CT DPH, through CSIERT, has trained over 2,200 school staff and parents in over 470 schools in 73 school districts in Connecticut.

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3. CT DPH, through CSIERT, has developed a training curriculum for school custodians and facilities maintenance staff. The objectives of the training are to further integrate the Tfs program into the facilities maintenance system, and to provide training and technical information about ventilation, cleaning and other custodial/maintenance issues. Two Connecticut school districts have received training at this time.

## Actions Planned

1. CT DPH plans to distribute the October 2004 report to all local health departments.
2. CT DPH will offer its custodian and facilities maintenance training program to all school districts participating in the Tools for Schools program.
3. CT DPH plans to continue to evaluate the effectiveness of Tfs Trainings in Connecticut. We will seek to survey participating schools on an ongoing annual basis.
4. CT DPH, in conjunction with other members of CSIERT, will work with state and federal agencies to secure additional funding and resources to support the implementation and sustaining of the Tools for Schools program.
5. CT DPH will work with the CT Department of Education, the CT School Nurses Association and other agencies to increase the data collection capacities of public school nurse programs.

## References:

CT Academy of Science and Industry (CASE), Indoor Air Quality in Schools, July 25, 2000

CT School Indoor Environment Resource Team (CSIERT), Tools for Schools Building Team Training – A Guide for Trainers, 2002.

Shendell, DG, CBarnett, SBoese, Science-Based Recommendations to Prevent or Reduce Potential Exposure to Biological, Chemical, and Physical Agents in Schools, Journal of School Health, Vol. 74, No. 10, December 2004.

U.S. EPA, U.S. Environmental Protection Agency IAQ Coordinator's Guide, EPA 402-K-95-001 (second edition), August 2000.

US DOE. A Summary of Scientific Findings on Adverse Effects of Indoor Environments on Students' Health, Academic Performance and Attendance, US Department of Education, Document #2004-06, 2004

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## ATTACHMENT A CONNECTICUT SCHOOL INDOOR ENVIRONMENT RESOURCE TEAM PARTICIPATING AGENCIES AND ORGANIZATIONS

### AFT-CT

American Institute of Architecture – CT  
American Lung Association of Connecticut  
CT Association of Boards of Education  
CT Association of Local Health Directors  
CT Association of Public School Superintendents  
CT School Building and Grounds Association  
CT Council for Occupational Safety and Health  
CT Department of Environmental Protection  
CT Department of Education  
CT Department of Labor, Division of Occupational Safety and Health  
CT Department of Public Health  
CT Education Association  
CT Federation of School Administrators, AFL-CIO  
CT School Nurses Association  
CT Interlocal Risk Management Agency  
CT Parent and Teacher Association  
Southeast CT Indoor Air Quality Coalition  
UConn Health Center – Division of Occupational and Environmental Medicine Program  
U.S. Environmental Protection Agency – Region 1  
U.S. Department of Education, Office for Civil Rights  
Yale Occupational and Environmental Medicine Program

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ATTACHMENT B  
TOOLS FOR SCHOOLS SURVEY QUESTIONNAIRE



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Other (specify) \_\_\_\_\_      
Other (specify) \_\_\_\_\_      
Other (specify) \_\_\_\_\_

6. If **funds** are or were required for **repairs/upgrades**, how will/were they obtained?
7. Have any **new policies** or **committees** resulted from implementing *IAQ Tools for Schools*?  
 YES (Please note type of policies/committees)  NO
8. How often has your **IAQ team** met since training took place?  
 Monthly since training  Have not met more than a few times  Never  
 Other \_\_\_\_\_  
\_\_\_\_\_
9. Has the *IAQ Tools for Schools* process continued beyond the initial year of implementation?  
 YES  NO (Please note reasons why not)
10. CSIERT recommends that each school system set up a system or committee to coordinate Tools for Schools efforts for their district. Does such an entity exist in your school system?  
 YES  NO
11. Please check ANY of the following that **participated** in your *IAQ Tools for Schools* process:  
 School nurses  School Health Advisory Board  Teachers  
 Parents  School Principal/Admin  Custodial staff  
 Facility managers  School Board of Education  Central School Administration  
 Students  Parent Organization (PTO)  Other \_\_\_\_\_  
(Please specify)
12. EPA and CSIERT believe it is important to have **parents** involved in the *IAQ Tools for Schools* process. If parents were not involved at your school, please list the reasons you believe they were not involved.
13. What **major barriers** to fully implementing *IAQ Tools for Schools* still exist?
14. What **additional resources** could CSIERT and/or EPA provide?
15. CSIERT is interested in learning about innovative interventions that have been implemented as a result of the *IAQ Tools for Schools* process. Please list below any **noteworthy interventions or funding sources** your school has used to improve IAQ.
16. How **satisfied are you** with the overall implementation of *IAQ Tools for Schools* so far?  
1 2 3 4 5  
(Not at all) (Completely)
17. Please feel free to offer **comments** or **suggestions** about *IAQ Tools for Schools* on the back of this form.

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## THE FOLLOWING QUESTIONS SHOULD BE ANSWERED BY THE SCHOOL NURSE.

As you know, common symptoms that can be related to IAQ include headaches, stuffy/runny nose, lethargy, dizziness, nausea, and breathing difficulties. Please keep these symptoms in mind as you answer the following questions.

18. In your opinion, has there been a decrease in the number of IAQ-related symptom complaints since *IAQ Tools for Schools* was implemented?  
 YES       NO       Don't Know/Not Sure
19. In your opinion, what, if any, change has occurred in the reporting of asthma symptoms for those students with a **known asthma diagnosis** since the implementation of *IAQ Tools for Schools*?  
 Increase       Decrease       No Change       Don't Know/Not Sure
20. Please provide as complete information as possible for each of the areas identified below. If data are not available for your school, provide your opinion as to whether there has been an increase, decrease or no change in each of these areas since the implementation of *IAQ Tools for Schools*.

	Year Prior to <i>IAQ Tools for Schools</i>	Year After <i>IAQ Tools for Schools</i>
Number of student absences		
Number of missed staff work days		
Number of trips to school nurse		
Number of times medication dispensed		
- # of times asthma medication dispensed		
- # times aspirin dispensed		
Number of students with a known asthma diagnosis		

21. Please list any additional comments.

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ATTACHMENT C

TOOLS FOR SCHOOLS SURVEY QUESTIONNAIRE RESULTS

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## Indoor Air Quality (IAQ) Tools for Schools Evaluation Connecticut School Indoor Environment Resource Team (CSIERT)

### SCHOOL

Elementary: 71.4% (55)

Middle School: 14.3% (11)

High School: 14.3% (11)

### IAQ COORDINATOR

School Nurse: 48.0% (36)	Facility Mgr: 2.7% (2)	Administrator: 30.7% (23)	Teacher: 17.3% (13)	Parent: 1.3% (1)
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22. Did your school complete **both** of the *IAQ Tools for Schools* trainings (Introductory 3hrs & Walkthrough with Industrial Hygienist)?  
 YES: 89.5% (68)  
 NO: 10.5% (8)
23. Did your school have an **IAQ management plan** or **health and safety team** that addressed IAQ **prior** to *IAQ Tools for Schools* trainings?  
 YES: 26.3% (20) NO: 73.7% (56)
24. What were the **motivating factors** to implementing *IAQ Tools for Schools* at your school?
25. Which **IAQ Coordinator Checklist steps** have been **completed** to date? *(Please check)*  
**All Steps Completed: 33.8% (26)**  
 Distribution of Action Packets: 94.8% (77) Assess Asbestos Status: 62.3% (48)  
 Checklist Log: 96.1% (74) Assess Radon Status: 49.4% (38)  
 Checklists Collected & Summarized: 94.8% (73) Assess Lead Status: 45.5% (35)  
 Review School Blueprint: 80.5% (62) Prioritize Repairs & Upgrades: 72.7% (56)  
 Assess Pest/Pesticide Status: 70.1% (54) Develop & Distribute Summary Report: 61.0% (47)  
 Establish or Update School IAQ Policy: 44.2% (34)
26. Which **IAQ problems** have been identified, repaired, or scheduled for repair? *(Please check all that apply)*

	NO PROBLEM IDENTIFIED	PROBLEM IDENTIFIED	SCHEDULED FOR REPAIR or REPAIRED (Percent of identified)
<b>VENTILATION PROBLEMS</b>	<b>18.6% (13)</b>	<b>81.4% (57)</b>	<b>75.4% (43)</b>
Obstructions from air vents	47.8% (32)	52.2% (35)	80.0% (28)
Filters need upgrading or replacing	44.6% (29)	55.4% (36)	80.6% (29)
HVAC units & ventilators need cleaning	55.4% (36)	44.6% (29)	75.9% (22)
Temperature/dryness/humidity need improving	34.8% (24)	65.2% (45)	53.3% (24)
Arts/sciences room needs ventilating	75.0% (48)	25.0% (16)	68.8% (11)
Outdoor air intakes need improving	62.5% (40)	37.5% (24)	54.2% (13)
<b>SOURCE REDUCTION PROBLEMS</b>			
Radon remediation needed	94.6% (53)	5.4% (3)	33.3% (1)
Asbestos remediation needed	79.3% (46)	20.7% (12)	75.0% (9)
Cleaning products need replacing with “greener products”	77.8% (49)	22.2% (14)	50.0% (7)
General cleaning improvement needed	31.3% (21)	68.7% (46)	54.3% (25)
Carpet cleaning or removal needed	29.9% (20)	70.1% (47)	66.0% (31)
Pests or pesticide use remediation needed	69.8% (44)	30.2% (19)	84.2% (16)
Arts/science materials need replacing with “greener products”	82.8% (48)	17.2% (10)	50.0% (5)
Classroom animal dander exposure	80.3% (53)	24.5% (13)	53.8% (7)
Bus idling policies lacking	61.8% (42)	61.9% (26)	65.4% (17)

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<b>WATER IDENTIFICATION PROBLEMS</b>	<b>7.4% (5)</b>	<b>92.6% (63)</b>	<b>77.8% (49)</b>
Inspections of leaks, spills, moisture	17.7% (12)	82.4% (56)	66.1% (37)
Plumbing problems	50.8% (34)	49.3% (33)	60.6% (20)
Roof problems	38.8% (26)	61.2% (41)	73.2% (30)
Basement or crawlspace needs upgrading	82.5% (52)	17.5% (11)	63.6% (7)
Removal of water-damaged materials needed	32.4% (22)	67.6% (46)	71.7% (33)
<b>OTHER PROBLEMS</b>			
Renovations to classrooms, buildings	60.0% (27)	40.0% (18)	77.8% (14)

27. If **funds** are or were required for **repairs/upgrades**, how will/were they obtained?

28. Have any **new policies** or **committees** resulted from implementing *IAQ Tools for Schools*?

YES: 45.1% (32)      NO: 54.9% (39)

Two most frequently mentioned: Establishment of IAQ/Health and Safety committee and development of bus idling policies

29. How often has your **IAQ team** met since training took place?

Monthly since training: 17.1% (13)	Have not met more than a few times: 46.1% (35)	Never: 6.6% (5)
1-2 Times: 5.3% (4)	3-5 Times: 6.6% (5)	6-10 Times: 5.3% (4)

30. Has the *IAQ Tools for Schools* process continued beyond the initial year of implementation?

YES: 11.1% (8)	NO: 51.4% (37)	In first year: 37.5% (27)
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31. CSIERT recommends that each school system set up a system or committee to coordinate Tools for Schools efforts for their district. Does such an entity exist in your school system?

YES: 87.5% (76)	NO: 12.5% (8)
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32. Please check ANY of the following that **participated** in your *IAQ Tools for Schools* process:

School nurses: 98.7% (76)	School Health Advisory Board: 7.8% (6)	Teachers: 84.4% (65)
Parents: 75.3% (58)	School Principal/Admin: 98.7% (76)	Custodial staff: 92.2% (71)
Facility managers: 63.6% (49)	School Board of Education: 13.0% (10)	Central School Administration: 46.8% (36)
Students: 5.2% (4)	Parent Organization (PTO): 28.6% (22)	

33. EPA and CSIERT believe it is important to have **parents** involved in the *IAQ Tools for Schools* process. If parents were not involved at your school, please list the reasons you believe they were not involved.

Administrative/Superintendent decision: 40.0% (6)	No interest/not available: 26.7% (4)
Plan to involve parents in the future: 6.7% (1)	

34. What **major barriers** to fully implementing *IAQ Tools for Schools* still exist?

Budget/funding: 76.1% (35)	Time/competing priorities: 10.9% (5)
Lack of commitment/support: 4.3% (2)	

35. What **additional resources** could CSIERT and/or EPA provide?

Funding: 48.1% (13)

Additional follow-up and technical assistance: 29.6% (8)

Updated materials: 7.4% (2)

36. CSIERT is interested in learning about innovative interventions that have been implemented as a result of the *IAQ Tools for Schools* process. Please list below any **noteworthy interventions or funding sources** your school has used to improve IAQ.

37. How **satisfied are you** with the overall implementation of *IAQ Tools for Schools* so far?

<b>1 (Not at all)</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5 (Completely)</b>
4.2% (3)	4.2% (3)	31.9% (23)	45.8% (33)	13.9% (10)

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38. Please feel free to offer **comments** or **suggestions** about *IAQ Tools for Schools* on the back of this form.

## THE FOLLOWING QUESTIONS SHOULD BE ANSWERED BY THE SCHOOL NURSE.

As you know, common symptoms that can be related to IAQ include headaches, stuffy/runny nose, lethargy, dizziness, nausea, and breathing difficulties. Please keep these symptoms in mind as you answer the following questions.

39. In your opinion, has there been a decrease in the number of IAQ-related symptom complaints since *IAQ Tools for Schools* was implemented?

YES: 22.7% (15) NO: 33.3% (22) Don't Know/Not Sure: 43.9% (29)

40. In your opinion, what, if any, change has occurred in the reporting of asthma symptoms for those students with a **known asthma diagnosis** since the implementation of *IAQ Tools for Schools*?

Increase: 1.5% (1) Decrease: 11.9% (8) No Change: 59.7% (40) Don't Know/Not Sure: 26.9% (18)

41. Please provide as complete information as possible for each of the areas identified below. If data are not available for your school, provide your opinion as to whether there has been an increase, decrease or no change in each of these areas since the implementation of *IAQ Tools for Schools*.

	Year Prior to <i>IAQ Tools for Schools</i>	Year After <i>IAQ Tools for Schools</i>
Number of student absences		
Number of missed staff work days		
Number of trips to school nurse		
Number of times medication dispensed		
- # of times asthma medication dispensed		
- # times aspirin dispensed		
Number of students with a known asthma diagnosis		

42. Please list any additional comments.

Please enclose survey with copies of TFS Committee **reports** to:

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