



Envisioning Excellence: ***Lessons from Effective*** ***School Indoor Air*** ***Quality (IAQ) Programs***

**Improving Student and Staff
Health, Attendance, Satisfaction,
and Performance**



A Framework for IAQ Program Success: Six Key Drivers—

- ▶ **Organize for Success**
- ▶ **Assess Your Environments Continuously**
- ▶ **Plan Your Short and Long-Term Activities**
- ▶ **Act to Address Structural, Institutional, and Behavioral Issues**
- ▶ **Evaluate Your Results for Continuous Improvement**
- ▶ **Communicate with Everyone, All the Time**

Getting the Most Out of Envisioning Excellence: Lessons from Effective School IAQ Programs

This document profiles five highly effective school IAQ programs. Each program is presented through the lens of the Framework for Effective School IAQ Programs: Six Key Drivers and demonstrates how these school districts created successful IAQ programs by adapting this Framework to their unique conditions.

You will learn something new in each story and can glean a comprehensive understanding of how the Framework helps schools achieve IAQ success by reading this document from cover to cover. Whatever your needs, this document can serve as a reference guide and implementation tool to help you develop and sustain a successful IAQ program.

To get the most from this document, we suggest that you:

- ▶ Read the Introduction that begins on page 4 to familiarize yourself with the purpose of this document and the Framework and Key Drivers.
 - ▶ Throughout the document, you will see call-out boxes that contain illustrative vignettes designed to show how different school districts apply the Key Drivers to support effective IAQ programs. If, for example, you are interested in how to organize an effective school IAQ management program, you can scan the document for the call out boxes labeled “Organize for Success,” to find information on organizational approaches that have worked for many different school districts.
- ▶ Review the brief synopses of the school districts on pages 5-6 to learn about their demographics and the circumstances that led them to develop IAQ programs.
 - ▶ At the end of each profile, you will find a Lessons Table that summarizes the effective activities and strategies that each school district employed to put the Framework for Effective School IAQ Programs into practice.

Envisioning Excellence:

Lessons from Effective School IAQ Programs

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This document shares the experience of five school districts with IAQ management programs in place. It is intended to provide schools with general guidance—based on the experience of other schools—on how to establish and maintain effective IAQ management programs. The content of this document does not represent official EPA policy.

Envisioning Excellence:

Lessons from Effective School IAQ Programs

Today, nearly 30,000 schools are taking effective actions to safeguard indoor air quality (IAQ) and promote the health and performance of the estimated 15 million students in their facilities. Still, there is much work to be done to ensure good IAQ management practices in our nation's schools. Although the evidence showing that poor IAQ in schools harms students and staff continues to mount, and more schools are beginning to proactively address IAQ, approximately 75% of schools in the U.S. still do not have sound IAQ management programs in place.

We can do more to help our children thrive

The schools community must join together to accelerate effective action by sharing learning and identifying activities, behaviors, and organizational approaches fundamental to successful IAQ management. A committed network of school leaders can double the number of schools with sound IAQ management programs to 60,000 schools by 2010, ensuring that 30 million children learn in school environments that promote their health, development, and success.

Healthy Learning Environments: A Framework for Effective School IAQ Programs

Envisioning Excellence: Lessons from Effective School IAQ Programs presents the Framework for creating and sustaining IAQ initiatives that achieve results. It features five different school districts that applied the Framework to create effective IAQ programs and improve their student and staff health, attendance, satisfaction, and performance. In their diversity, these profiles demonstrate the flexibility and adaptability of the Framework, making clear that any school, regardless of location, size, budget, or facility conditions, can utilize the Framework to launch and sustain an effective IAQ program.

The Framework for Effective School IAQ Programs: Six Key Drivers (see Figure 1 on page 5) synthesizes the accumulated learning of more than 800 schools involved in a national survey of IAQ management practices; 200 applicants for *Indoor Air Quality Tools for Schools (IAQ TFS)* awards; and in-depth interviews and site visits with five school districts that have effective and enduring IAQ management programs in place. This evidence reveals that a clear program Framework comprised of six Key Drivers underlies effective school IAQ programs; and school districts with highly effective IAQ programs have validated this Framework and confirmed that it is an accurate representation of the building blocks of their success.

The Framework for Effective School IAQ Programs provides a common language for thinking about the critical practices and activities that lead to program success. As you learn how five school districts created successful IAQ initiatives, you will encounter common elements—the Key Drivers—in their stories and will see the Framework in action. The profiles in IAQ excellence presented here include Blue Valley School District (Overland Park, KS), West Carrollton School District (West Carrollton, OH), Hartford Public Schools (Hartford, CT), Katy Independent School District (Katy, TX), and The School Board of Broward County, Florida (Fort Lauderdale, FL).

Figure 1 - The Framework for Effective School IAQ Programs: Six Key Drivers



“I love these Key Drivers. Everything here is key and a lot of what we did in the last four years really fits in this Framework.”

– Pam Clark, Clinical Nursing and Support Supervisor, Hartford Public Schools

“These Key Drivers are very familiar to me and I think they capture the main components of a successful program well.”

– Jeff Moquin, Director of Risk Management, The School Board of Broward County, Florida

“I think you were looking at our story when you developed this Key Driver list.”

– Dana Green, Director of Business Services, West Carrollton School District

“Originally, IAQ was a big problem for us. But once we started addressing it by following these Key Drivers, we went from an IAQ crisis to IAQ being a non-issue.”

– Peter McElwain, District Architect and Planner, Katy Independent School District

To make this document user-friendly, we present the powerful stories of five school districts that embody the Framework and at the end of each story, summarize key leadership moments and effective actions in the language of the Framework.

You will learn how **Blue Valley School District** used the *IAQ TFS* model to integrate its facilities maintenance, management, and investment strategies into a single, systematic approach to providing students with the healthiest and most productive learning environments. It didn’t take an IAQ crisis to motivate Blue Valley; it was a logical extension of the district’s mission to provide outstanding learning environments that facilitate personalized student learning. When the district learned that making IAQ management a central organizing principle for facilities management could enhance the learning environment, adopting *IAQ TFS* was a natural next step.

You will discover **West Carrollton School District’s** leadership lessons for establishing an IAQ program that delivers results. West Carrollton encountered an IAQ crisis, but used the district’s values-based management approach, open communication strategy, and the *IAQ TFS* Program to rebound. West Carrollton’s collaborative approach to management and communications permeates every part of the IAQ program: how it’s organized, the assessment and response process, the long-range plan, and the evaluation system. The district’s honest and thorough communication about its program has allowed West Carrollton to build a strong base of trust, both internally and externally, and to create a strategic plan that ensures the sustainability of the IAQ program.

Blue Valley School District.....Page 7
Building Momentum – Linking IAQ Management to Student Success

- Suburban District in Overland Park, KS
- 35 facilities ranging from 0-87 years old; 3,500,000 ft.²
- 21,000 students & 2,650 staff

West Carrollton School District.....Page 14
Communicating to Build Trust, Conduct Effective Assessments, and Deliver IAQ Results

- Suburban District near Dayton, OH
- 7 facilities ranging from 40-90 years old; 614,901 ft.²
- 3,800 students & 485 staff

The story of **Hartford Public Schools** (HPS) reveals how an urban school district in a low-income community used the *IAQ TFS* model to respond to an asthma crisis and in the process, established a comprehensive school wellness program. HPS’s experience demonstrates how a community can improve children’s health by supporting school wellness initiatives. The committed champions from community organizations and within the school district who care deeply about children’s asthma found innovative and low-cost ways to manage their indoor environments and improve asthma outcomes.

Hartford Public Schools.....Page 21
Using IAQ Management to Address Asthma in an Urban District

- Urban District in Connecticut (sixth highest poverty rate of any large U.S. city)
- 48 facilities ranging from 0-127 years old; 5,003,644 ft.²
- 24,500 students & 4,300 staff

In 2002, while school was in session, the **Katy Independent School District** (KISD) had a mold outbreak that led to the closure of a school, the relocation of 700 students, and community anger and mistrust. But, in just four years, the Maintenance and Operations Department transformed itself. KISD created a team dedicated to environmental management led by a new assistant director. Today, KISD has a district-wide *IAQ TFS* program coordinated by district staff and school nurses, baseline assessment data on all schools and follow-up assessment data that shows improvement, an IAQ response protocol that ensures cooperative problem solving, and a robust preventative maintenance practice. Perhaps most importantly, the community now sees KISD as a trusted partner in the effort to safeguard their children.

Katy Independent School District...Page 29
Turning Crisis into Opportunity...and Thriving

- Rapidly growing suburban District outside of Houston, TX
- 59 facilities ranging from 0-40 years old; 10,122,661 ft.²
- 53,588 students & 6,513 staff

The School Board of Broward County, Florida, had to close sections of its schools to remediate mold and faced a loss of community and staff trust. In an effort to regain its credibility and create a preventative IAQ management program, Broward discovered several fundamental truths about IAQ program success: “It is a lot more work to deal with angry parents, teachers, and unions, than it is to involve them proactively; *IAQ TFS* can work even in a very large organization; a problem we know about is a problem we can fix; we want to publicize our problems because we know that fixing them requires everyone’s involvement.”

The School Board of Broward County, Florida.....Page 38
The More Open and Collaborative the Program, the Better the IAQ Outcomes

- Urban District in the Fort Lauderdale, FL area
- 253 facilities ranging from 0-80 years old; 35,600,000 ft.²
- 258,905 students & 38,833 staff

Envisioning Excellence: Lessons from Effective School IAQ Programs is a work in progress. It tells the stories of five school districts with effective IAQ management programs, but we know that there is more valuable learning to share. Over time, the network of school leaders committed to accelerating IAQ management programs will contribute to this knowledge base and help to continually update *Envisioning Excellence* in a real-time learning exchange that drives the ongoing improvement of school IAQ management.

Blue Valley School District

Building Momentum – Linking IAQ Management to Student Success

Blue Valley School District (BVSD) in Overland Park, Kansas, is one of the fastest growing districts in the Midwest serving more than 21,000 students and 2,650 staff in 35 facilities. The district is well-known in school facility management circles for its remarkably effective use of the *IAQ TFS* model to “create outstanding learning environments for students.”

Dave Hill, a senior manager in BVSD who is responsible for launching the district’s IAQ initiative, uses a concept from the best selling management book, *Good to Great*, to describe his district’s single-minded focus on “creating outstanding learning environments.” He calls it Blue Valley’s “Hedgehog Concept.” The ‘Hedgehog Concept’ refers to a management style exemplified by highly effective organizations that “simplify complexity into a single organizing idea... that unifies, organizes, and guides all decisions.”¹ Blue Valley’s hedgehog is summed up in their mission statement, “to provide personalized student learning.” To fulfill this mission, the district believes it needs “outstanding learning environments” to facilitate student success. And that’s where *IAQ TFS* comes in.

“Before adopting *IAQ TFS*, we had a lot of successful but seemingly unrelated pieces in place for managing our school environments. Our capital, building envelope, custodial management, and major mechanical replacement programs operated in isolation from one another. *IAQ TFS* gave us a framework for organizing; it provided the comprehensive approach we needed to systematize those disparate pieces...to pull it all together, strengthen our existing practices, share learning across the program, and get more out of our work.” The team members in Blue Valley applied the *IAQ TFS* approach to facilities management and leveraged the knowledge, skills, and capacity of their different functional groups. In the process, they radically accelerated their progress toward “creating outstanding learning environments.”

ORGANIZE

ORGANIZE for SUCCESS: Build on What Works

“Adopting *IAQ TFS* didn’t change our programs; it strengthened them.”

The Hedgehog Concept

The Greek poet Archilochus wrote, “The fox knows many things but the hedgehog knows one great thing.” In his groundbreaking research on the world’s most successful companies, Jim Collins discovered that great organizations act like hedgehogs. They embody a single, central vision and align all of their thoughts, decisions, and actions accordingly. In Blue Valley’s case, their Hedgehog Concept, providing personalized student learning, helped them to recognize the importance of IAQ management and sustain their IAQ program. Everyone in the district understands that healthy IAQ is a critical component of outstanding learning environments that facilitate student success.

Getting Started in Blue Valley

In the late 1990s, several factors led Blue Valley to explore IAQ issues: a marked increase in parent interest in school environments, a public relations disaster for a neighboring school district over the closing of an elementary school for IAQ problems, and a scholarship from the Council of Educational Facility Planners International (CEFPI) to attend EPA’s *IAQ TFS* National Symposium. After the Symposium, Dave Hill wondered “where do we fit on the

¹ From an interview with Jim Collins - <http://www.fastcompany.com/online/51/goodtogreat.html>.

continuum of environmental excellence?” After reviewing the *IAQ TFS* Kit, Dave saw that the leading edge of IAQ management consisted of some fairly straightforward organizational strategies. He shared the Kit with his colleagues and they agreed: “We can do this.”

“The first thing we did was to identify the responsible party. We chose Sid Cumberland, the Safety Manager, to coordinate our IAQ initiative and oversee all projects, including complaint response, preventive maintenance for IAQ, and system upgrades.” Sid’s job as the BVSD Safety Manager had him regularly engaged in issues such as worker compensation and workplace accidents so Sid already had experience as a responder to and investigator of staff concerns. Dave and the BVSD Director of Safety and Security, Dennis McCarthy, trained Sid for success. They encouraged him to be empathetic in his interactions, to treat all reported concerns as valid issues, and to act quickly to respond to issues raised by the staff. “Sid became the face of our program...and having a designated coordinator has been critical to our success. Sid is the first to respond to a concern or complaint and the last to follow up to make sure customers are satisfied. Everyone knows that Sid is the go-to guy for IAQ.”

Dave and Sid knew that “You can’t manage IAQ in one building, much less across an entire district, with just one person. You need a group of champions,” so they moved quickly to convene an IAQ team. They followed the *IAQ TFS* Kit’s guidance on drawing together people whose job responsibilities and technical experience made them good candidates. “We included people who take care of the building on a regular basis—custodial and maintenance—as well as the people who design the learning environments—architects, engineers, and planners—and executive-level leaders who have access to resources and can influence the board and the superintendent.” Over time, Blue Valley also learned “that it may sometimes be necessary to bring in certain people to attend meetings that require their expertise, such as the school nurse, the energy manager, or even the president of the teacher’s union. We recognize that we have to approach IAQ team membership in a dynamic way because roles and responsibilities may change.”

Dave and Sid taught the team how their participation in the IAQ initiative could support the district’s overarching goal: “Everyone soon knew exactly how their role...contributes to creating outstanding learning environments for the kids.” By tying the IAQ team’s work to a goal about which people care deeply, the Blue Valley team was able to build the depth of commitment the IAQ initiative needed right from the start. The group was soon ready to dig into the work of organizing their processes and protocols, determining how to tackle and track IAQ issues, and

setting their short-term and long-term goals.

Blue Valley School District’s IAQ Team (2006-07)	
Design and Construction Manager	Jeff Christian
Safety Manager	Sid Cumberland
Executive Director of Facilities and Operations	Dave Hill
Energy Manager	Greg Fink
Maintenance Coordinator	Rich Heusman
Director of Maintenance and Operations	Dave Peterson
Custodial Services Coordinator	Paul Sharp
Director of Design and Construction Management	Monte Soukup
Manager, Design and Construction	Griffin Weyforth
Design and Construction Coordinator	Jessica Zinggeler

The members began reviewing the Kit and used its guidance on IAQ management protocols to assemble new processes and strengthen existing practices. “We adapted our standard operating procedures (SOPs) for our facility design and capital construction projects, building envelope, and major mechanical replacement programs to establish a response protocol for IAQ, and we organized our resources in a way we hadn’t done before.” As Dave Peterson,

Director of Maintenance and Operations put it, this exercise “helped us to understand how our different functions interact and that we can draw on any number of resources to solve problems. Because we have a system, responding to IAQ issues is not overwhelming for any one group, and the intensive resources we apply help people throughout the district see that we take their concerns seriously.”

Institutionalizing the Program – Ensuring Success

Early on, the IAQ team recognized that to entrench their new facilities management approach, they needed school board and executive-level buy-in. Dave Hill had learned the “flywheel approach” for building momentum from his study of *Good to Great*. He knew that a small push on the proverbial flywheel could move the program forward and that “quick demonstrations of small successes that have a positive impact on student achievement could build executive support for our IAQ initiative.”

Dave worked with the team to identify “quick wins” to improve IAQ. The team quickly developed a new approach to cleaning woodshop, ceramics, and art areas; introduced a regular “high dusting” program in gymnasiums, and other areas, and increased regular classroom dusting to three times per week; increased the frequency of classroom and high traffic area vacuuming; and developed new procedures for chemical and pesticide use. At each step, team members recorded their goals, shared them with the people who could affect change, and communicated broadly about IAQ upgrades. And Dave leveraged his unique position as a member of both the IAQ team and the district’s strategic planning committee to report on the IAQ program’s successes to executive staff. He shared the IAQ team’s news at every strategic planning meeting to “show the small successes and incremental progress being made daily, weekly, and monthly.”

ORGANIZE

ORGANIZE for SUCCESS: Secure Senior Level Buy-In

“The School Board has a sense of pride when they travel to statewide conferences and hear about significant problems that our District simply does not have. They know how important IAQ issues are and that we have things under control.”

board knows that if the department suggests a course of action, it’s because department leaders have analyzed its potential and believe it will contribute to student success. “Our board is very aware that we’re cutting edge on this and we get the resources we need to meet our goals.”

Setting the Plan – The Course for the Future

The Blue Valley School Board’s support for the team’s IAQ initiative was demonstrated by the inclusion of IAQ issues in the district-wide strategic plan. “We felt so strongly about the need to ensure excellent IAQ that... we put target goals and institutional supports in our strategic plan that focus on maintaining and improving IAQ.”

ORGANIZE

ORGANIZE for SUCCESS: Build an Effective Team

The IAQ team members in Blue Valley noticed that when they came together to work and plan jointly, the group became ‘greater than the sum of its parts.’ “When we discuss problems or strategy, there is an amazing synergy between us...you can draw on the resolve of the whole team and, regardless of the problem, we know we can meet it.”

In all communications, the IAQ team reiterates the connection between their approach to facilities management and the achievement of personalized learning for all students. Making the strategic connection between proposed activities and the overarching goal is just the way Blue Valley does business. If it doesn’t fit with the hedgehog, it’s not moving the district in the right direction, but if an activity does fit, it receives the institutional and financial support required to make it work. Because the facilities department at Blue Valley has consistently demonstrated a commitment to the hedgehog, the

COMMUNICATE

COMMUNICATE with EVERYONE, ALL the TIME: Share Your Goals

The team engaged the community early on by sending out newsletters to all 36,000 households in the district that contained a clear message: Healthy IAQ is vital to student success and “each day we wait to improve IAQ, money is lost.” Now, the public understands that delayed action can lead to higher costs and increased risks and they support the team’s activities whether through bond initiatives or volunteer support.

Blue Valley's Strategic IAQ Management Plan

- (1) Conduct at least two IAQ training sessions per year for district staff to increase awareness and understanding of IAQ issues and behaviors that promote healthy IAQ.
- (2) Double the number of school districts Blue Valley's IAQ team mentors in the Kansas City area.
- (3) Achieve a rating of 4 or higher (on a 5 point scale) from 100% of staff respondents to annual facilities survey.
- (4) Meet the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) standards for IAQ in all facilities by following the specified minimum ventilation rates for healthy IAQ.

To ensure the district achieves their IAQ goals, Blue Valley budgets operating dollars carefully and raises money through bond issues for major improvement projects. In Kansas, the state distributes operating dollars evenly to all school districts. Sometimes, the BVSD finds its facility management options somewhat restricted by available funds. Operating dollars support everyday purchases, so when the district does not have the budget to support purchases that promote healthy IAQ, such as green cleaning products, it must make purchases driven solely by cost. To overcome this challenge, Blue Valley has found a way to augment their operating budget for IAQ upgrades by capturing cost savings that result from major improvement projects financed through bond issues. BVSD has been very successful at raising needed funds to make major improvements because of its reputation for excellence; the community appreciates the district's commitment to taking action to promote student success so it approves most bond requests. When Blue Valley uses bond money to replace old ventilation systems and subsequently accrues energy savings, for example, they can direct those savings into the operating budget which provides more flexibility for day-to-day purchases. In one building, after replacing a heat pump with a replacement ventilation system, Blue Valley saw a 30% drop in energy consumption at the same time that fresh air intake rates increased. The district was able to demonstrate and capture those savings and the difference was funneled into the operating budget.

Getting It Done – Response

Everyone in the district will tell you that the IAQ team “gets out to test and evaluate complaints within 24 hours of their receipt...that’s the policy.” The team has learned that a focus on customer service and satisfaction drives trust and is the best public relations strategy. “We empathize with people and respond with seriousness to every complaint.” According to Sid, “The first thing we do after a visual investigation is to put our Aircuity machine in the area in question to monitor for mold, relative humidity, temperature, CO₂, CO, etc. The Aircuity machine allows us to download the data and quickly email it to a lab for analysis; the lab sends us our results within about three days. Our culture is very data-driven and we find that providing objective data in response to complaints is an effective way to... communicate about issues that can sometimes be emotionally charged.”

This approach to customer service and thorough response, like the focus on quick wins to build executive-level support, is an example of the Blue Valley IAQ team's commitment to moving the flywheel forward. By taking every communication from staff seriously, the team builds little successes every day and contributes to the broader culture of trust and shared stewardship. Another way that the team has successfully employed the flywheel approach is by focusing systems renovation efforts on lower-performing buildings first. They have improved heating, ventilation, and air conditioning (HVAC) and other mechanical systems in older buildings thereby decreasing the number of per capita IAQ complaints. According to the BVSD Director of Design and Construction Management, “In those buildings where we have completely gutted a 20-30 year old heat pump,

ACT

ACT to ADDRESS STRUCTURAL, INSTITUTIONAL, and BEHAVIORAL ISSUES: Education Changes Culture & Behavior

“We have been able to sustain the excellence of our District's IAQ management program because we have cultivated an atmosphere of program ownership and building stewardship among all of the employees who are responsible for maintaining excellent IAQ.”

for example, we see objective improvements in student and staff attitude, productivity, and absenteeism. The staff, parents, School Board, and others see the impact of our work and are motivated to support us on major jobs in any of our buildings.”

Getting It Done – Prevention

Blue Valley understands that effective IAQ management requires preventive maintenance, and they have a range of standard operating procedures for detecting potential problems early. For example, when developing the IAQ management plan, the team prioritized training for custodial staff. “[The custodial team] is our eyes and ears. They are in the buildings every day and can let us know what’s happening so we can act to prevent IAQ problems.” The custodial training teaches staff “to identify and report moisture leaks and mold growth and to take pictures and map leaks.” Sid described the sense of pride the custodial staff now has about finding problems before anyone else. “The custodians know to report all leaks so they can be investigated thoroughly.” Paul Sharp, the Custodial Services Coordinator, has reinforced this message with his staff, emphasizing the need to avoid the quick fixes and follow the leak protocol. As Paul explains, “The worst thing you can do is replace a stained ceiling tile with a new one. We need to see the stained ones so we can address the problem immediately rather than papering over it with a new tile. The tiles are our road map for identifying the root of the problem.” To make sure that the “root of the problem” policy sticks, Sid trains all lead custodians turning them into moisture control champions in the process. The lead custodians periodically walk the buildings and, if they identify a problem another custodian missed, report back to their staff to help everyone continuously improve.

ACT

ACT to ADDRESS STRUCTURAL, INSTITUTIONAL, and BEHAVIORAL ISSUES: Education Changes Culture & Behavior

“Our leak protocol actually extends to all school occupants. Everyone knows how to map a leak to make it easier for our investigators to identify a plumbing versus mechanical leak.”

ASSESS

ASSESS YOUR ENVIRONMENTS CONTINUOUSLY: Use Technology to Make It Easier

“With regular inspections, we can detect potential problems before [they] become larger IAQ issues that require expensive repairs. By demonstrating the cost savings that such preventive maintenance can deliver, we convinced the decision-makers that up-front investigative technology investments made sense.”

The team members also prevent problems by using monitoring equipment to literally inspect inside walls and across facilities in real time. They use a forward-looking infrared (FLIR) camera to look inside walls and ceilings for moisture and HVAC-related problems so that they can head off major damage or systems failure. They also use Aircurity machines to benchmark zones throughout all facilities. The benchmarking data allows them to spot variations from the norm and “to move quickly to respond to any issues we identify from the tests.” The energy management team uses an electronic environmental management system (EMS) to monitor all of the HVAC systems in the district. On an hourly basis, the team observes filtration, air flow, temperature, and humidity. Over a two-to-three-day period, the team members monitor all of the district’s facilities; if any concerns arise, they contact the maintenance team “whose response time is incredible. If we need a part and it’s in stock, it is usually installed the same day.”

Finally, the IAQ team prevents problems by prioritizing education for the school community, particularly the principals. “Each year we meet with all principals and all new principals attend a six-month long academy to learn all about our facilities program. Our superintendent gave us some very good advice on cultivating allies and advocates among the principal pool by telling them *what we can do for them*. We provide a cheat sheet that lists out the roles, responsibilities, and telephone numbers of everyone in our department. Most principals pin it to their walls and become active site managers who serve as one more node in our communications network.”

Capturing Success

Blue Valley has found that since 2001, the scope of IAQ complaints has become less serious, complaints per capita have declined, and costs of addressing concerns have decreased. The district has seen “significant and measurable improvements resulting from the program. At one high school alone, a new mechanical system designed to increase fresh air exchange and reduce carbon monoxide build-up resulted in an annual energy cost-savings of about \$23,000.” By measuring the energy costs per day before and after the mechanical upgrade (and normalizing the data for outdoor temperature differences), the facilities staff determined that the cost of ventilating the facility decreased with the installation of the new system while the fresh air rates increased: lower costs for better IAQ! BVSD has also seen test scores rise every year since the program began and the district’s managers are convinced that the comprehensive approach to facilities management played a role.

EVALUATE

EVALUATE YOUR RESULTS for CONTINUOUS IMPROVEMENT: Capture Your Return on Investment

After renovating their HVAC systems in several schools, the district saw a 17-20% reduction in gas and electrical costs.

On the Horizon

In addition to the IAQ goals outlined in Blue Valley’s strategic plan, the district is committed to a building envelope plan and to upgrading major mechanical systems in 100% of its facilities by 2011 to capture energy savings and improve IAQ.

Table 1 - Lessons from Blue Valley School District

Organize for Success	
Systems Matter	The IAQ TFS Program helped Blue Valley by providing a simple framework for organizing their existing but disparate efforts into a coherent whole. The framework was critical because it helped BVSD leverage nascent capacity and create a systematic management approach that connects facilities management activities across functional areas.
Create Your Own Champions	BVSD recruited a committed team and enlisted broad support for their IAQ program by tying everything back to their core mission. “Everyone knew how they could contribute to healthy school environments that lead to student success.” The Board knew that efforts were targeted toward improved student learning; principals could see how the program could help keep their students healthy and in school; and the custodial staff developed a sense of pride about being the first line of IAQ defense.
Process, Process, Process	By introducing IAQ management into existing procedures, the district ensured their IAQ program’s success. They used their existing policies and the IAQ TFS Kit’s guidance as a starting point and communicated continuously about what worked to refine their approach over time. One impact of their process upgrades has been the sense of confidence among the staff that they have the know-how and resources to address any IAQ issues they may face.
Assess Your Environments Continuously	
Use Technology to Make It Easier	Blue Valley invested in environmental monitoring technologies to simplify the process and improve the outcomes of their preventive monitoring program. This approach helps the team to stay ahead of IAQ problems. Though they required an upfront investment, the savings in avoided IAQ crises, community relations problems, and facility repairs have more than paid for the technology.
Keep the Customers Satisfied	The team learned that focusing on customer service and satisfaction drives trust and is the best PR strategy. Building occupants saw that the IAQ team took their concerns seriously and would thoroughly address registered complaints. This cycle helped occupants believe IAQ team members when they said a concern was addressed and helped to create a sense of joint responsibility for monitoring facility health and taking fast action to address potential problems.
Plan Your Short and Long-Term Activities	
Start Small to Get Big	The team continually pursued small wins to keep the program moving forward and to create the momentum and support needed to sustain excellence over time. By demonstrating that there were some simple procedural upgrades that could improve IAQ and contribute to student learning, the team garnered executive-level and community support for larger actions that required major investments or bond support.
Communicate with Everyone, All the Time	
Share Your Goals	The team recorded Blue Valley’s goals in the strategic plan, communicated them to people across the district, and explained the rationale behind them. They also shared information on progress, demonstrating daily, weekly, and monthly improvements.
Act to Address Structural, Institutional, and Behavioral Issues	
Education Changes Culture & Behavior	Blue Valley trains people on the ground so they know what to look for and how to report what they find. They turn the local staff into site managers who can proactively manage IAQ. “We have been successful in cultivating an atmosphere within the organization of program ownership and building stewardship among all of the employees responsible for maintaining excellent indoor air quality for our students.”
Root Cause Analysis Works	Training for all lead custodians focuses on “the root of the problem” rather than cosmetic solutions. Lead custodians learn to conduct regular walkthroughs, effectively report potential problems (see it, map it, report it), and train their colleagues how to do the same.
Evaluate Your Results for Continuous Improvement	
Survey Your Customers	Blue Valley plans to survey building occupants annually. Their goal is to receive scores of at least 4 out of 5 on the status of the learning environment from 100% of their respondents.

West Carrollton School District

Communicating to Build Trust, Conduct Effective Assessments, and Deliver IAQ Results

West Carrollton School District (WCSD) is a mid-sized district located in the small city of West Carrollton, near Dayton, Ohio, with seven facilities that serve almost 4,000 students and more than 485 staff. Beginning in 1999 with the arrival of the new superintendent, Dr. Rusty Clifford, the district embraced a values-based management philosophy and began to create a truly remarkable culture that prizes daily excellence and continuous improvement for students, teachers, and *all* staff.

The district has seen across-the-board improvement over the past eight years earning accolades for academic performance, teacher and staff satisfaction, student development, and facility and occupant health and wellness because every member of the school community embraces a clear set of core values that governs their work: improvement, learning, leadership, value, and results. These values feed directly into the district's core mission: "To be the school district of choice in Ohio." The degree to which this value-set governs daily action is obvious as you travel the district and meet students, teachers, custodial staff, administrators, and others. You see West Carrollton's signature yellow arrows everywhere pointing towards constant improvement and reaffirming the district's goals and always hear someone in the hallway, classroom, or athletic field using values-based language to communicate. As Jack Haag, the Operations Supervisor of Maintenance and Facilities, describes it, "Dr. Clifford introduced the concepts and method, and as time passed, we saw results... Now, it's a way of life; we're always focused on assessment, measurement, and realignment."

LIVING the CORE VALUES

You see them on the walls, on lanyards, on student posters, and hear about them from teachers, students, and staff... everywhere you go in West Carrollton, you encounter their clear call to action—"plan, do, study, act"—that ensures their core values are embedded in everyone's daily activities.

BALDRIGE CRITERIA for EDUCATION

- Leadership
- Strategic Planning
- Student, Stakeholder, & Market Focus
- Measurement, Analysis, & Knowledge Management
- Faculty & Staff Focus
- Process Management
- Results

Key leaders within the district point to the Malcolm Baldrige criteria for performance excellence as a reference point for their management model.² The Baldrige criteria are named for a former Secretary of Commerce who was committed to managerial excellence and long-term improvement in the efficiency and effectiveness of business. The criteria were originally developed to drive American business competitiveness, but over time, became an international standard for performance excellence in many fields, including health care and education. The commitment to the Baldrige criteria and core values is palpable in West Carrollton.

Getting Started in West Carrollton

Like many districts, West Carrollton first began thinking seriously about IAQ issues in the wake of a very public mold, moisture, and ventilation problem brought to light in fall 2001 when teachers and students complained that they felt sick in the middle and high schools. Suddenly, the district faced a lawsuit and a lot of media attention. Dr. Clifford, the district's Superintendent and

media spokesperson, remembers "spending a lot of time on TV trying to provide timely sound bites. We monitored and responded to the news each day. We were at least able to diffuse some problems, though we had a long, long way yet to go to rebuild a sense of trust."

²Learn more about the Baldrige Model at http://www.quality.nist.gov/PDF_files/2006_Education_Criteria.pdf.

Dr. Clifford and Dana Green, Director of Business Services, went much further with their communications strategy than simply responding to reporters. First, they communicated their intention to conduct a major clean-up over the holiday vacation and to install carbon dioxide sensors, among other improvements. At the same time, they began a comprehensive public education program by sharing the results of their environmental tests, organizing an event featuring outside experts to describe the situation and answer questions, and securing help from the Ohio Department of Health to launch a district-wide IAQ management program. “We organized an information night with a representative from the state Department of Health, industrial hygienists...and professors from Ball State and Wright State— everyone who could provide credible information to our public—and held an open question-and-answer period to address audience concerns. We held this panel in January 2002 and our media explosion had occurred in late November 2001.” Dana now believes that “taking problems head-on instead of hiding from them...and our ability to take the bad news and act on it quickly was a great way to begin rebuilding trust.”

Even before they held their first public event to respond to the situation, WCSD had started to establish a systematic approach for managing IAQ. As Dana puts it, “We knew we had to quickly move from the testing to the preventive mode.” The district’s leaders created an IAQ team and started to develop IAQ management policies. “Because of our background with the Baldrige model, we already had the practice of goal-setting and action-planning, had a process for doing it, and knew that this approach to problem-solving achieves results.” Dana Green, Dr. Clifford, and others knew how to take action so they were able to adapt quickly, but they did not yet know what actions to take.

COMMUNICATE

COMMUNICATE with EVERYONE, ALL the TIME: Be Transparent and Inclusive

“We knew we had to have an approach that involved the public and the staff. Involving everyone helped to convince the community of our sincere commitment to protecting their health and safety.”

process to ensure that they could contribute,” and “put vocal parents who were detractors at the time on our committee.” They also made sure “the IAQ initiative would have a lot of validity by putting people who touch every part of the district in charge....What’s most important to us is that the membership is engaged in the issues.”

Institutionalizing the Program: Ensuring Success

“One of the keys to our IAQ organizing scheme was to ensure top-down involvement” to secure the buy-in and support needed to effect policies and investments. The district’s original strategic plan did not address environmental issues; it focused on curriculum. But after the

COMMUNICATE

COMMUNICATE with EVERYONE, ALL the TIME: Be Transparent and Inclusive

“We invited every state and Federal agency we could think of to come into the schools. When NIOSH* heard from a concerned parent and called us to investigate, we pleaded with them to come out here and see for themselves. We insisted that interested stakeholders do walkthroughs with us.”

*The National Institutes of Occupational Safety & Health

Dana Green brought in John Gayetsky from the Ohio Department of Health to help WCSD understand the connections between IAQ, ventilation, and facility operations. John recommended the *IAQ TFS* model and brought a Kit for the West Carrollton team’s review. After reading the guidance, Dana and Dr. Clifford decided to convene an Environmental Health & Safety Committee consisting of “a cross section of teachers, school board members, parents, and facilities folks.” Dana described their intention to make “nay-sayers a part of the

ORGANIZE

ORGANIZE for SUCCESS: Build on What Works

“IAQ TFS gave us the guidance we needed to form our original committee and assess our facilities and it gave us an organizational framework and the credibility we needed in the wake of our crisis.”

crisis, the Environmental Health & Safety Committee made sure to communicate with the board about the importance of healthy IAQ for productive learning environments. Environmental issues have been included in the district-wide strategic plan every year since, demonstrating the importance West Carrollton places on facility health and IAQ program sustainability.

Each year, the school board identifies five critical action areas that form the center of the strategic plan for the coming year. Dr. Clifford and other senior staff then set their personal leadership goals to align with those priority areas. Each building’s management team uses the board-level goals as a guide to develop an action plan, and every month, one building team presents their plan to the board. Jack Haag describes the philosophy behind facility action planning. “We are non-prescriptive about achieving results: we want to create clock-builders not time-tellers.” In other words, they are tight about the goals, but loose about the pathway to achieving them. And as Dana explains, the teams across the district “have learned how to develop good action plans and to track them, categorizing planned activities as red, yellow, or green priorities.”

WCSD has instilled a culture that empowers leaders throughout the district to develop their own goals while ensuring they are all moving in the same strategic direction. Part of the success of WCSD’s IAQ program is rooted in the district’s leadership development program. “Prior to Dr. Clifford’s arrival, mid-level administrators weren’t really included as part of the management team and classified employees weren’t involved at all, but he made clear that real leadership means getting everyone personally involved.” All staff, including classified employees, have opportunities for leadership training. This

West Carrollton’s Environmental Health & Safety Committee (2006-07)	
Superintendent	Dr. Rusty Clifford
Director of Business Services & Committee Chair	Dana Green
Operations Supervisor, Maintenance and Facilities	Jack Haag
Maintenance Staff and President, Classified Employees Association	Jimmie Tipton
Union Representation from Teachers and Classified Workers Unions	Changes over time
One representative from each building selected by the building (“secretaries, teachers, principals, anyone”)	Changes over time
Board representation	Same member since 2001
Montgomery County Health Department Representative	Changes over time

COMMUNICATE

COMMUNICATE with EVERYONE, ALL the TIME: Share Your Goals

“We said what we were going to do, did it, and followed up to communicate about what we had done and what we were going to do next.”

approach, which flows from the Baldrige model, has created a district full of leaders, each ready to take responsibility for ensuring performance improvement. One such person is Jimmie Tipton. As the liaison between the IAQ Team and the custodial and maintenance staff, Jimmie is a linchpin in the successful IAQ management program in West Carrollton; he credits the leadership development program for his success as the leader of the IAQ Program’s maintenance activities: “I felt included and like my contribution really mattered.”

And Jimmie’s involvement and sense of ownership has made a difference. “Every person we have on maintenance now takes personal responsibility for IAQ because Jimmie has been there to tell all the employees the story of IAQ management, its benefits, and the district’s

PLAN

PLAN YOUR SHORT and LONG-TERM ACTIVITIES: Put It in Writing

“Our IAQ program will stay in place because it will always be in the plan. Because of the impact the board has seen, the program has shifted from under the environmental heading to the broader category of wellness because we recognize that student and staff wellness is largely influenced by IAQ. IAQ issues will always stay in the strategic plan though our approach will continue to evolve.”

commitment to working with the facility occupants to manage IAQ. Rather than receiving grievances, we receive communications, and we sit down to talk about any issues that teachers, staff, or students are concerned about. We find a cooperative way to work things out.”

Getting it Done – Assessment

Another component of West Carrollton’s strategy for success is their robust facility assessment program. Not only does the district have a systematic process in place to assess their facilities, but they have also used the annual survey process to ensure regular communication between facility occupants, district administrators, and facility, operations, and maintenance staff. This is one more way they have rebuilt a sense of trust and empowered everyone in the district to take responsibility for school IAQ.

“Every year, during the last week in February, building occupants receive a 12 to 16-page survey asking questions about everything from chemical usage to cleanliness. Everyone on the staff receives the survey and it gives them a chance to communicate any concerns.” In April, the Environmental Health & Safety Committee “compiles and analyzes all the surveys from each site, and we set anything that is a clear concern on a priority list for that building. We then take 7 days during May, when the buildings are occupied, to conduct walkthroughs, and those priority lists guide our assessments. Representatives from the Montgomery County Health Department, a representative from the building, and district-level maintenance staff join us. Sometimes, teachers, union representatives, or parents join our walkthroughs, too. We ask folks who reported priority concerns to show us [and describe] the issue. . . .Folks participate because they . . . see that we listen to them.” Dana Green emphasizes the importance of staff surveys to the success of any assessment process: “How can you know where your staff is and what they feel if you don’t ask them? You will be surprised by what the staff can and will tell you if you just ask.”

ASSESS

ASSESS YOUR ENVIRONMENTS CONTINUOUSLY: Survey Occupants and Keep an Ear to the Ground

“We would not have thought of doing walkthroughs the way we now do them—with thorough input from staff and reviewing each facility with a fine-toothed comb—if we hadn’t learned to do so from the *IAQ TfS Kit*.”

Environmental Health & Safety Committees, so the same people who lead the walkthroughs are responsible for responding to any IAQ concerns identified, whether those concerns are classified as quick repairs, major repairs, or wellness issues. “We aren’t building any new buildings; we’re maintaining the ones we have.”

Finally, the team makes sure to report back to everyone in the district about their walkthrough findings and planned response activities. They also take the time for follow-up communication once a response activity is complete so that everyone can see the results of the program. Dana described

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ORGANIZE for SUCCESS: Create Your Own Champions

West Carrollton’s Jimmie Tipton, a linchpin in the district’s IAQ program who ensures effective communication between the administration and facilities staff, was named Ohio Educational Support Professional of the Year in 2005.

The team records any action items and gets to work right away. “We have a capital improvements list for our major projects and items stay on that list until we get them done.” Jimmie, Jack, and Dana are on the Capital Improvements and Beautification Committees, as well as the

ACT

ACT to ADDRESS STRUCTURAL, INSTITUTIONAL, and BEHAVIORAL ISSUES: Education Changes Culture & Behavior

“In the beginning, we used to receive surveys without names or room numbers. Now that we have increased trust and our own credibility, the staff puts detailed information on the surveys because they know they will be heard, we will examine their concerns, and that we will take action. Quick action is a huge part of building trust.”

the importance of this step to building ongoing support and understanding: “It’s about sharing the positive news with your community. Once you get the results, you need to go out and tell everybody about it. For example, we have signs posted at the entrance to our city that say ‘West Carrollton City Schools–Winner–Ohio Award for Excellence.’”

Getting it Done – Prevention

To supplement the work that is driven by the goals in the strategic plan and the activities identified in the annual assessments, the district has prioritized certain IAQ issues for immediate action as soon as they are found: broken windows, moisture control, and HVAC issues. These standard operating procedures (SOPs), which every principal, maintenance worker, and operations employee knows, helps to ensure that little problems don’t become big IAQ crises due to lack of attention.

To prevent and detect problems throughout the year, “We do random checks of each room at least once per month to measure thermal comfort and CO₂, to establish a baseline of normal functioning, and to make sure each room continues to function as it should. Because we monitor our progress throughout the year, we are heading off major problems.” The Environmental Health & Safety Committee has also established a protocol for registering and responding to concerns at any time throughout the year. “We let people know how to report IAQ issues and complaints about certain health problems. We have educated the teachers over time about what types of health or comfort issues may be IAQ-related. If there is a student or teacher health complaint, we immediately get into the school building and monitor temperature, humidity, CO, and CO₂.”

West Carrollton undertakes major preventative maintenance tasks as often as possible. For example, the district received \$1 million when their insurer restructured its business. The district took advantage of the windfall by spending part of the money to replace carpet in the middle school. They had found it was too difficult to ensure that the carpets were not harboring dust mites, particulate matter, mold, or other allergens, so they took up the carpet and laid new tile. “In the next year, that school

ACT

ACT to ADDRESS STRUCTURAL, INSTITUTIONAL, and BEHAVIORAL ISSUES: Education Changes Culture & Behavior

IAQ team members in West Carrollton took advantage of the opportunity to improve their school environments by replacing carpet with tile as soon as they saw the chance. Though there was some resistance at first, the demonstrated effectiveness of the upgrade encouraged staff throughout the district to change their opinions and behaviors.

saw a 9% improvement in attendance rates. The teachers had been fighting the carpet removal, but once they saw the outcomes—less coughing, less wheezing, less distraction—they were convinced. Suddenly all the schools wanted tile instead of carpet.”

Finally, West Carrollton uses their active committee system to educate the school community about IAQ issues. The Environmental Health & Safety Committee periodically invites selected groups to attend their meetings. “At a recent meeting, we told the principals about 12 unit ventilators that we discovered were shut off in classrooms across the district and we explained why that is a problem. After we reminded them of the importance of ensuring adequate fresh air flow to maintaining healthy IAQ, we asked them to ensure that the ventilators in their schools stayed on.” The team effectively deputized the principals to act as fresh air guardians in their buildings.

ASSESS

ASSESS YOUR ENVIRONMENTS CONTINUOUSLY: Use Technology to Make It Easier

Dana Green said, “The purchase of the Q-track thermal comfort measurement machine was the best \$2,000 we ever spent. So many districts only deal with the fires and that’s a mistake. Of course you address the fires, but you can still make time for prevention.”

Capturing Success

West Carrollton is particularly dedicated to measuring their program's effectiveness, analyzing their results, and realigning the program to improve performance, because their culture prizes data-driven improvement. "Every year, after our surveys come in, we have a list of priority items that need to be addressed during the walkthroughs. We have been able to track the severity of our problems and the length of time it takes to solve them based on those priority lists. Initially it took us well into the next year to finish the list, but now we're finishing the list by summer [even though we] only conduct the walkthroughs in May. Also, because we monitor our progress throughout the year with monthly assessments, we . . . head off major problems so they never end up on our list."

Dr. Clifford has noticed "results like better relationships, improved attendance, and increased levels of trust and satisfaction." He also notes that through fast action and thorough communication to rebuild the community's trust after their 2000 mold problems, West Carrollton has convinced their voters to provide ongoing support for facility maintenance and improvement efforts. The community voted to renew three levy issues in 2005, converting what had been fixed-term to continuing levies for capital improvements and operations. This status change allows the district to plan for long-term facility management for their aging buildings.

On the Horizon

Much of West Carrollton's planned work focuses on renovations and replacements to maintain healthy IAQ and safeguard student and staff health. Their planned activities for the next ten years include replacing carpet with tile at all the schools, installing ceiling fans and window blinds, replacing the gym ceiling at one elementary school, repairing or replacing boilers, and major roof replacement work at several schools. Overall, Dana Green anticipates spending \$8.7 million on capital improvements between 2005 and 2015, with more than 30 percent going to building renovations and another 19 percent to roofs.

The district has made phenomenal progress in the six years since they found themselves on TV explaining their IAQ and ventilation problems. West Carrollton now has a clear and actionable plan and a strategic commitment to safeguarding IAQ and promoting student health and wellness. And they have an educated and empowered community ready to make it happen.

West Carrollton is "wellness country" now. "Our commitment to school, student, and staff health far transcends IAQ issues now. We want our entire school community to foster student success." The district uses environmental and physical tools, institutional methods, and behavioral approaches to foster wellness. And their commitment doesn't stop at the school building door. West Carrollton also passed a smoke-free district policy that makes every inch of the district smoke-free for students, staff, and parents. No one can smoke at a sporting event, outside a PTA meeting, or outside administrative buildings. West Carrollton sees the health of their community as a key to student success. Their IAQ experience, in part, has helped the district develop this perspective because they have seen so clearly that students are influenced and affected by everything in their learning environment. The better the environment, the healthier and higher performing the student.

EVALUATE

EVALUATE YOUR RESULTS for CONTINUOUS IMPROVEMENT: Capture Your Return on Investment

"IAQ TfS is not a stand alone. It's a seamless part of our larger process. It's how we do things here. We're all about setting goals, measuring our progress, and continually improving."

Table 2 - Lessons from West Carrollton School District

Organize for Success	
Systems Matter	West Carrollton included a diverse group of people on their IAQ management team. Once-skeptical parents and concerned board members, the superintendent, and decision-makers from facilities and maintenance and operations all participate to ensure the team has the buy-in, know how, functional breadth, and communication outlets they need to ensure success.
Create Your Own Champions	West Carrollton is a district full of heroes. Their commitment to performance excellence means they are always focused on providing the knowledge, resources, and support that everyone in their district needs to lead. As Dr. Clifford says, “leadership is not a person, it is personally involved.”
Build on What Works	As in Blue Valley, the West Carrollton team said the IAQ TFS model provided a framework for getting started. They took the IAQ TFS Kit and made it their own, and WCSD’s program continues to evolve. Significantly, the district has moved from viewing IAQ issues as part of the environmental component of their strategic plan to thinking of IAQ as a wellness issue.
Secure Senior Level Buy-In	“To sustain an IAQ program, you have to have total commitment from the Board and the Superintendent.”
Assess Your Environments Continuously	
Use Technology to Make It Easier	The IAQ team conducts preventative assessments by benchmarking all classrooms and offices periodically throughout the year. The team uses that data along with data collected in annual surveys to establish a picture of the normal functioning of every location in every facility. The tools allow WCSD to prevent problems, saving the district countless man hours and dollars.
Survey Occupants and Keep An Ear to the Ground	The survey process in West Carrollton provides a mechanism to not only collect thorough information about the facilities, but also to hear directly from the people who spend every day in the schools. The WCSD team has found a way to ensure regular and thorough communication with their customers while benefiting from the detailed environmental knowledge that occupants can provide.
Plan Your Short and Long-Term Activities	
Put it in Writing	Including IAQ issues in West Carrollton’s strategic plan ensures that the district remains committed to improving IAQ, because IAQ is linked to the most important goal of all: “being the school district of choice in Ohio.” In addition, educating the community and displaying IAQ-related goals on the big yellow arrows that point towards success ensures that people understand and support the program.
Communicate with Everyone, All the Time	
Share Your Goals	In addition to the goals in the strategic plan, West Carrollton sets environmental health and wellness goals, and broadcasts their plans, rationale, process, and results.
Be Transparent and Inclusive	One of the earliest lessons the team in West Carrollton learned in the wake of their IAQ crisis was the importance of being absolutely open. WCSD invited every agency, parent, reporter, and concerned citizen into the buildings. The public learned everything the district knew about the problems, the planned next steps, and the progress so far. And the district’s efforts paid off. Internally and externally, WCSD now enjoys much greater trust in their commitment to protecting school health.
Communicate Your Results	Taking action to address IAQ problems and maintain healthy IAQ is not enough. You have to communicate about what you find and what you do about it to make a program truly effective. As Dana Green describes it, “You need to be honest about everything...good and bad...and you need to share your plan for addressing your problems. Then, you need to let people know what you have done. In many districts, items end up on work orders but never get addressed. In our district, folks know that the little things get done because we make sure to follow every issue and we communicate what we’re doing, why and how we’re doing it, and what to expect next.”
Act to Address Structural, Institutional, and Behavioral Issues	
Training Can Change Institutions	West Carrollton’s IAQ training is one component of their effort to empower people and continuously improve environmental and health outcomes. By embedding a culture of leadership, ownership, and stewardship, West Carrollton has created a district ripe for IAQ success.

Hartford Public Schools

Using IAQ Management to Address Asthma in an Urban District

Hartford Public Schools (HPS) is a mid-sized urban school district in Connecticut. In early 2000, an analysis of school-aged children covered by Medicaid in Hartford revealed that *19 percent of the children had asthma*.³ The Hartford Health Survey identified asthma as a major concern and the Hartford City Council declared an asthma emergency. With this backdrop, HPS initiated a focused program to take action to address asthma.

HPS faced very real challenges: high asthma rates, old buildings, and limited resources. Still, in 2001, two dedicated champions, Pam Clark, the district's Clinical Nursing and Support Supervisor, and Dr. Al Hinds, the Chief of Building Operations, found a way to make their district's program work. They recruited collaborators from across the community who were willing to devote time and energy to help HPS launch and sustain their IAQ initiative. One of their community partners even became a member of the district's Indoor Air Quality leadership team. When describing her extensive involvement and dedication to HPS's IAQ program, the University of Connecticut Health Center's Paula Schenck explained that "a focus on school health and safety in Hartford is a natural extension of our long-term commitment to improving urban health and addressing the role of environmental quality in preventing illness. It just made sense to do everything possible to support HPS."

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ORGANIZE for SUCCESS: Systems Matter

"From our very first pilot project...we were driven by the question, 'what are we going to do about asthma?' The fact that *IAQ TFS* provides a framework for reducing asthma triggers was a major selling point for us and our administrators."

The district-level Indoor Air Quality Leadership Team members, who oversee the IAQ program, credit a number of factors with their success: committed champions, highly effective partnerships, and multi-disciplinary staff training. And when they reflect on how they figured out that these were the right components for their program, Pam, Paula, and Al point to the *IAQ TFS* Kit as their roadmap for action. The Kit helped them envision a program, provided the information they needed to engage the right people, and suggested the tools needed to implement an IAQ initiative district-wide. "*IAQ TFS* provided the structure for addressing our broad health and safety needs. Schools in Connecticut are required to have IAQ programs and *IAQ TFS* was a great springboard for creating our comprehensive plan."

Getting Started in Hartford

The *IAQ TFS* program at HPS has always been a part of asthma management in the district. In 2001, Dr. Eileen Storey (of the University of Connecticut Health Center) and Paula received a small grant from EPA to evaluate the effectiveness of IAQ management in schools. They partnered with Dwight Elementary School, housed in the oldest building in HPS. Paula connected with the principal, Kathy Greider, to propose an *IAQ TFS* program for Dwight and a respiratory health monitoring program to assess the program's impact on student health. Kathy agreed.

Learning about IAQ issues quickly led Dwight's maintenance staff to make some simple upgrades, such as repairing leaks, improving cleaning and maintenance protocols, addressing drainage issues, removing old carpet, and adding window screens. Soon, the school nurse noticed a reduction in the number of asthma visits. This early experience convinced the Dwight team to continue the IAQ work.

³ *Childhood Asthma in an Urban Community, Prevalence, Care System, and Treatment*. Cloutier, M.M., MD., Wakefield, D.B., MS, Hall, C.B., PhD and Bailit, H.L., DMD, PhD. *Chest* 2002, 122:1571-1579. Note: overall childhood asthma prevalence in Hartford is estimated at about 19 percent.

The pilot project at Dwight demonstrated the effectiveness of school IAQ management and enlisted a powerful champion for spreading the program district-wide. Kathy Greider had seen firsthand what *IAQ TFS* could do to enhance student well-being. She shared her enthusiasm with her colleagues and soon, other principals across the district wanted to know more about managing IAQ and asthma in their schools. Pam, Paula, and Al saw the opportunity to build on the momentum to establish a district-wide IAQ management initiative.

The team's first step was to convene the people who could make a district-wide program a reality. "There are three critical links in the organization of an effective school IAQ program: facilities, health, and administration." Al and Pam had already created the synergy between their responsibility areas. The next step

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ORGANIZE for SUCCESS: Build an Effective Team

According to Pam Clark, "Every district needs someone to advocate for the IAQ and staff and student wellness movement. I was willing to put in a lot of time to really coordinate it. I believe in what we're doing. You need someone who is really going to put the time in—you need a champion."

at more than forty facilities. They knew that they needed help. Luckily, Pam had experience recruiting support from across the community. "I'm used to convening people who have never sat down together before...I'm not afraid to ask people who can affect things to pitch in and I made sure that the people who had to be involved were bought-in." With Pam's leadership, HPS engaged a wide range of community actors to support their work. "Pam is marvelous at bringing a diverse group together and getting everyone focused on the same agenda while bringing our different strengths to bear." And Pam's persistence has paid off. The district has taken steps to create a central Health and Safety Team that will ensure that IAQ issues, emergency preparedness, and OSHA-mandated programs are met throughout the district in a consistent fashion. All involved agree that the broad and ongoing collaboration has been a key to HPS's success.

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ORGANIZE for SUCCESS: Secure Senior Level Buy-In

"Successful IAQ management requires a tight link between the health and buildings functions. To formalize the link between health and facilities and extend it across the district ...you have to engage the administrators. You need their buy-in to make it all happen."

was to institutionalize the relationship at all levels by securing administrative support and engaging facility-based staff. Pam, Paula, and Al started at the top. They met with the Superintendent who had heard positive things about the work at Dwight. They closed the deal by "using the crisis [to our] advantage: the asthma epidemic gave us a trigger for action. By tying IAQ to asthma, we got attention; by describing *IAQ TFS* within the framework of educational priorities, we got support... We talked about the program in terms of asthma and attendance, showed statistics that proved the link, and described steps that could limit missed school days and avoid children being taken out of school by ambulance."

Planning for Success

Pam, Paula, and Al needed to market the program broadly, train staff, recruit school-based teams, create policies, and begin work

Hartford Public School's Indoor Air Quality Leadership Team (2006-07)	
HPS Clinical Nursing and Support Supervisor	Pam Clark
Division of Occupational and Environmental Medicine, University of Connecticut Health Center	Paula Schenck Anne Bracker
HPS Chief of Building Operations	Al Hinds
American Lung Association of Connecticut	Angie Testa
City of Hartford Department of Public Health	Rita Kornblum Kevin Mattia
Connecticut Children's Medical Center-Asthma Center	Varies
City of Hartford Health Department's Asthma Call to Action and Pediatric Asthma Coalition	Varies
Connecticut School Indoor Environment Resource Team	Kenny Foscue

Getting It Done – Training to Educate and Inspire

After securing the Superintendent’s support and engaging community organizations, the core group—Pam, Paula, and Al—discussed how to expand the individual school *IAQ TFS* programs that existed in about half a dozen schools to the whole district. They knew they needed a systematic approach; Pam, and Al could not possibly manage IAQ programs for every building in the district by themselves.

They referred to the *IAQ TFS* Kit’s guidance on assembling a team as they considered who they should involve from each school. Pam believed that school nurse involvement was critical because nurses are on the front lines of health and safety every day; Al wanted to engage custodians because of the central role they play in maintaining facilities and identifying problems; and they all understood the need to reach the principals and teachers. Pam, Paula, and Al decided to educate and nurture a select group from each school. “There weren’t [school-based] Health and Safety Teams at the beginning, we had to cultivate them.” The goal was to create a system where each school would have its own team to implement *IAQ TFS* and each school’s team would work cooperatively with the district-level Health and Safety Team. The district-level group would focus on major facility investments, prevention, education, and partner recruitment; the school-based teams would focus on facility assessments and site-specific response and prevention.

But first, Pam, Paula, and Al needed to educate and motivate the staff. The first training they conducted targeted the nurses. Pam convened all of the nurses in the district to attend multiple training sessions on indoor environmental quality, asthma, and the nurses’ roles in *IAQ TFS* implementation. “We realized we couldn’t train everyone by ourselves, so we asked the Connecticut Children’s Health Center’s Asthma Center, the American Lung Association of Connecticut, the American Heart Association, the State Department of Health, and the University of Connecticut Health Center to help train the nurses.” And each group brought their own knowledge, materials, and resources to the trainings. HPS’s very public commitment to applying *IAQ TFS* to address asthma allowed the district to engage health-focused community organizations that may not have recognized the strategic alignment of their missions with HPS’s *IAQ TFS* endeavor if not for the focus on asthma management.

ORGANIZE

ORGANIZE for SUCCESS: Create Your Own Champions

“We recruited nurses, custodians, and principals on purpose. You need champions in the custodial, facilities, and health departments because those functions are critical. The head custodian has to buy in; the nurses and custodians need to work together; and administrators must be engaged to make sure the health and safety activities get high-level support.”

ORGANIZE

ORGANIZE for SUCCESS: Systems Matter

Paula: “The only way a large urban school district that has challenges will effectively address IAQ issues is by making *IAQ TFS* part of its infrastructure. You need district-wide leadership; you need to establish a Health and Safety Team within each school and make sure that *IAQ TFS* becomes the established program that dictates that team’s activities.”

Pam then proposed a train-the-trainer approach for educating teams from each school. In partnership with the University of Connecticut Health Center and the Connecticut School Indoor Environment Resource Team (CSIERT), Pam, Paula, and Al created HPS’s *IAQ Tools for Schools* Train-the-Trainer Program. CSIERT, a statewide network of IAQ specialists, trainers and health experts that helps Connecticut schools implement *IAQ TFS*, developed HPS’s comprehensive *IAQ TFS* train-the-trainer curriculum. To recruit the first round of trainees, they drew on the pre-existing structure that organized all schools in the district into “catchments.” Pam worked with principals from each catchment to select the group of trainees who would, ultimately, become the *IAQ TFS* trainers for their catchments. Pam sent a letter that included Kathy Greider’s endorsement for the program to the

principals and invited them to identify two to three interested people from their schools to receive in-depth training. Pam also offered support for hiring substitutes during the trainings utilizing resources from a modest grant she had secured from the regional EPA office. Pam suggested that each school's team should include the custodian, nurse, and principal and suggested that the principals consider involving parents, family resource aids, teachers, union members, and high school students.

Because the trainees were selected for their interest in health and safety issues, they were motivated to learn and take action. In the first year, representatives from 15 schools attended a day-long training on IAQ, how to use the *IAQ TFS* Kit, steps to take to get started, and how to coordinate with the district-level staff. The team focused the trainings on the need to combat asthma in the district, the benefits a comprehensive approach to IAQ management could provide, and the long-term goal the school teams could advance of helping to keep more healthy students at schools and in their chairs more of the time.

The trainings also addressed operational issues. Each school's team was trained to use the *IAQ TFS* Kit checklists to conduct occupant surveys, compile the surveys into one overall facility assessment, and prioritize a list of requested actions. Al Hinds promised the trainees that his facilities team would work closely with the site-based team members to address as many of their priorities as possible. Al knew it was important for the facilities staff to address the priorities identified by the site-based teams to demonstrate that what mattered to the teams, mattered to the Facilities Department, too. He made sure that

as assessment reports started to come in, his staff followed through on his commitment to the trainees by quickly addressing their requests in the order that the teams had prioritized them. By doing this, Al established trust between the school-based teams and the district-level staff and created an IAQ partnership that stretched across the district.

The training programs focused on the links between IAQ and health and safety. As Al and Pam put it, "you always focus on safe, clean, and healthy and then you get to academics next... and repetition is very helpful. You need to sow the seeds of excitement and intent by communicating in terms that are meaningful to each person." Their strategy for creating a district-wide health and safety program through extensive training has led to the emergence of school-based champions. Since beginning the training program, Pam and Al have seen the benefits as individual schools take increasing responsibility for maintaining healthy environments.

ACT

ACT to ADDRESS STRUCTURAL, INSTITUTIONAL, and BEHAVIORAL ISSUES: Education Changes Culture & Behavior

Al said that "nurturing the committed people who showed interest was very important to sustaining the program. Resources are always a problem and if you can target your limited resources toward the issues the school-based teams prioritize, [team members] can see the power of their labors and will be inspired to keep working."

COMMUNICATE

COMMUNICATE with EVERYONE, ALL the TIME: Make It Meaningful to Your Audience

The HPS team focused on their audience's interest in every conversation. They were marketing a program and they knew it. When talking to principals, they talked about student attendance, performance, and community relations. When motivating the school-based teams to implement *IAQ TFS* and take ownership of school wellness, Paula and Al focused on safety, cleanliness, and health; issues that all building occupants care about.

Getting It Done – Assessment & Response

After the trainings, the school-based IAQ team members returned to their sites to train their colleagues. They convened staff meetings to describe IAQ, the *IAQ TFS* model, and the survey and assessment process. Then they used the assessment checklists from the *IAQ TFS* Kit to gather information from building occupants on facility conditions. The teams collated the information they received and prepared lists of reported issues to guide their

building walkthroughs. Many of the school teams also collected information about the facilities including floor plans, building renovation histories, and heating and plumbing system designs to inform their walkthrough assessments.

The first year's trainees conducted walkthrough assessments of their buildings with the help of CSIERT's walkthrough training. (Al Hinds' staff has always been available to join school teams for walkthroughs, if requested.) During the assessment walkthroughs, the school teams followed the *IAQ TFS* guidance to examine classrooms and other areas, looking particularly for water damage, floor conditions, dust and dirt, fumes, animals and pests, mold and mildew, thermal comfort, air flow, ceiling conditions, and potentially hazardous materials. In some instances, the school-based teams could link IAQ issues in particular rooms to health effects. For example, during their assessments, Milner and Burr Elementary Schools collected information from staff about health symptoms reported at school. They learned of headaches, coughing, sinus infections, asthma attacks, shortness of breath, and persistent hoarseness in certain areas of the buildings. The Milner and Burr Health and Safety Teams investigated the complaints and found that concentrated vehicle fumes and a concrete curing compound used on the exterior of the buildings had contributed to the health effects. The teams promptly reported the problem to Al and Pam who helped the schools establish anti-idling policies and made sure the use of the compound was discontinued.

Following the assessments, the school teams sent their prioritized reports to Pam and Al. Some schools requested actions that required little investment, such as moving the dumpsters, changing the school bus drop-off location, cleaning rugs, placing floor mats in doorways, asking students to clean their desks, storing food in metal containers, and cleaning vents. When activities could be addressed locally, Pam and Al coordinated with their counterparts in the schools to ensure they took effective action promptly. Other reported priorities required more substantial investments, such as replacing broken windows, repairing leaky roofs, repairing the HVAC system, replacing carpet, testing the building for radon, or addressing pest problems. In these cases, Al made resources available to address as many items on the prioritized list as his department could afford. Over time, the site-based teams and occupants have seen that the facility assessment reports lead to action. This experience has created a "virtuous circle" whereby the school-based teams continue to assess their environments thoroughly, taking action locally whenever possible, and reporting to Pam and Al when needed. Other schools across the district have also seen that the sites with active assessment programs are steadily improving their facility conditions. And, from year to year, the list of priority actions from each site has diminished. "Most schools report between three to eight projects in their first year and as they continue their work, because we have already addressed their top priority issues, there are fewer items added to the list each year."

Getting It Done – Prevention

Much of the work done in response to the assessments was preventive. For example, when a school's assessment indicated that classrooms were not clean enough, it opened the door for the custodial staff and teachers to talk about what it takes to keep a room clean. It may be a lack of effective cleaning or that the custodians can't reach around piles of the teacher's material to clean. Either way, the assessment process created the space for a dialogue that helped to change behavior and prevent IAQ problems. In addition, HPS has generated an annual list of work orders for every school which ensures that routine maintenance tasks to safeguard IAQ, such as HVAC servicing, were addressed.

ORGANIZE

ORGANIZE for SUCCESS: Create Your Own Champions

"The people involved in the trainings have increased awareness of IAQ problems, and they know what to look for in their schools. They are paying much closer attention to symptoms that may be clues of an issue and facility characteristics that merit attention. The tie-back to health and wellness has been critical to motivating people to pay attention to IAQ. Once they understand the issues, the site teams really take ownership of their buildings and become our eyes and ears on the ground."

Al had one pot of money to cover IAQ work and other school repairs, be it responses to concerns generated at the school level or the standard preventative maintenance steps implemented at the district level. To ensure that preventative steps occurred, Al took money for prevention off the top of his budget before addressing the priority lists he received from the school teams that included a variety of requested mitigation and prevention activities. Besides the grant money that HPS had generated for their IAQ program, Al had about \$3,000 to \$5,000 to spend per school per year. “I could usually do about six things from each school’s list and that’s where we allocated the money. It’s the most effective way to disperse the funds. I made sure we took the necessary steps to prevent major problems and then addressed the top six or so concerns registered by each school’s team. That way, I knew I was getting the most important stuff done and the school teams could see that we took their priorities seriously.”

ACT

ACT to ADDRESS STRUCTURAL, INSTITUTIONAL, and BEHAVIORAL ISSUES: Education Changes Culture & Behavior

“We have noticed great pride that the custodial staff and others take in their work after they have been trained on IAQ issues.” The maintenance department looks beyond the assigned jobs and takes extra steps to investigate the facility conditions.

HPS also used their extensive training programs as a prevention tool. In addition to the nurse, custodian, and train-the-trainer programs, Pam, Paula, and Al also brought in speakers from the community to educate school stakeholders. For example, the City of Hartford Department of Health and Human Services invited custodians to periodic trainings and Kenny Foscue, from the Connecticut Department of Public Health, conducted outreach to parent groups, the Parent Teacher Organizations, and grandparent groups.

Institutionalizing the Program – Ensuring Success

Pam and Al were themselves institutional supports for HPS’s program. Paula Schenck explains that “the dual leadership of Health Services (Pam Clark) and Buildings and Grounds (Al Hinds) was the major reason for HPS’s success... Pam was able to facilitate school nurse participation and leadership, and motivated the principals to get involved. And Al made *IAQ TFS* a priority for his staff. He required special IAQ training of all custodial staff and developed policies for IAQ planning for school construction and renovation.” The approach that Pam and Al took has ensured that it’s not just two individuals joining together to address IAQ; it’s the way both of their functional areas do business. Both Pam and Al trained their staffs at the district and school levels and secured administrative support for the linking of their functions around facility health and wellness issues. They laid the groundwork for success with individual behaviors, but they institutionalized success as they rolled the program out district-wide.

Because HPS’s program relied on individuals at each school site, Pam and Al had to consider the possibility of employee turnover or burnout. To address the risk, Al included *IAQ TFS* on the yearly agenda for meetings with the administrators and Pam offers (with Paula’s and CSIERT’s assistance) specialized *IAQ TFS* training and refresher courses for staff. “We reach out to the principals every year to get their buy-in. We have an in-service day where we talk about *IAQ TFS* and the road map for program implementation. Kathy Greider provides a peer endorsement and reminds the administrators how they can benefit from the program.” CSIERT also offers annual custodial trainings on managing cleaning practices and supplies in a manner that safeguards IAQ. And to support program expansion, Paula began an in-service segment on asthma, the environment, and *IAQ TFS* for pre-school staff.

Finally, the district-level team took time to recognize and reward the behaviors that lead to improved IAQ. For example, when HPS won EPA’s *IAQ TFS* Excellence Award, Pam and Al made t-shirts and tote bags that carried the message, “HPS’s schools are safe, clean, and healthy.” They gave shirts to the building and grounds crews as a way of recognizing all of the staff’s contributions and to advertise the district’s activities. Pam and Al continued to reinforce the staff’s sense of personal pride by regularly presenting awards to nurses and maintenance staff from schools across the district.

Capturing Success – Evaluating Results

HPS has worked hard to measure the impact of their IAQ management program, particularly its impact on students' asthma. Pam has seen “a decrease in visits to the school nurse for asthma.” Many people who know about the district's approach to IAQ are convinced that the *IAQ TFS* program is contributing to these results. HPS Nursing Services continues to work to improve collection of asthma data to better clarify the relationship between respiratory illness and IAQ.

So far, HPS has conducted train-the-trainer programs with leadership teams from 30 schools, initiated and sustained *IAQ TFS* Programs in the majority of facilities, and completed at least one survey, assessment, and response cycle at 24 schools. Operations staff has made facility improvements to improve IAQ throughout the district, including replacing carpet with tile and eliminating area rugs, repairing leaking pipes, building new roofs and conducting roof repairs, cleaning up boiler rooms at all facilities, and establishing an improved maintenance protocol for HVAC systems.

Perhaps the most significant accomplishment in Hartford since the launch of the district-wide IAQ initiative is the increased knowledge that each school's Health and Safety Team members have accrued. Their new understanding of the links between facility conditions and health effects has led to a new sense of ownership and care for the district's buildings. Some school districts worry that educating their school community about IAQ issues and related health outcomes might lead to sky-rocketing complaints and liability issues. But, in Hartford, key leaders have actually seen their jobs get easier since they educated staff across the district. Instead of increasing complaints, they have seen an increase in occupant responsibility and stewardship for their buildings.

On the Horizon

A small group of dedicated people at HPS has accomplished an enormous amount in the past five years. In the next five years, the team is focused on a series of interrelated goals. Pam wants to make sure that messages about IAQ

and asthma are reaching parents groups, pre-kindergarten staff, and young mothers. Paula says that, “the first phase was really about getting used to *IAQ TFS* and introducing it to the district. The second phase will require that we continually identify ways to keep the model alive. It's really about creating the infrastructure that builds buy-in by demonstrating program effectiveness and making the IAQ initiative sustainable by ensuring that it gets incorporated into the district's culture.” And HPS Operations wants to reach a plateau where the basic facility conditions have improved enough that the focus can shift to maintenance and small improvements at each site. HPS plans to take small steps each year at every facility to demonstrate a cycle of constant improvement.

PLAN

PLAN YOUR SHORT and LONG-TERM ACTIVITIES: Work in Stages

HPS has always thought of their IAQ program in phases. First, get buy-in; then train-the-trainers; then address priority facility issues and take preventative action; continue the process to add more sites and work on each site's priority list; and eventually, achieve guaranteed program sustainability by incorporating the *IAQ TFS* approach to health and safety in all aspects of the district's culture.

ACT

ACT to ADDRESS STRUCTURAL, INSTITUTIONAL, and BEHAVIORAL ISSUES: Education Changes Culture & Behavior

One of the great lessons HPS's story offers is that awareness is empowering, and if you educate school occupants to control their own environments, they will work hard to know their buildings and improve their facilities.

Table 3 - Lessons from Hartford Public Schools

Organize for Success	
Systems Matter	HPS applied the IAQ TFS framework to create a district-wide IAQ program and address a critical problem: rising rates of asthma. The HPS team didn't add IAQ activities to a to-do list; they used IAQ TFS to create a systemic solution to a pressing challenge. They knew that a few individuals operating at the district-level, no matter how committed, could not get the job done by themselves. They needed a system-wide approach that pulled together resources from each school site and from across the community.
Build an Effective Team	HPS's district-level IAQ TFS Team knew how to augment resources by pulling in personnel, materials, and financial support from the community. Pam Clark engaged city, state, non-profit organizations, and the university to help sustain HPS's program. Leaders from outside groups provided training, led walkthroughs, and provided grant support to make sure HPS would succeed.
Create Your Own Champions	The HPS team needed to engage nurses, custodians, and principals and that they needed more than involvement; they needed commitment. To get the right people to take ownership, they trained extensively, provided tools and resources, and committed to always being available to provide support. And AI ensured that the facilities department took quick action to respond to the schools' priorities to demonstrate that schools' local efforts were taken seriously.
Secure Senior Level Buy-In	HPS's team secured the necessary buy-in to launch an ambitious program in a resource-challenged district. They knew that linking the facilities and health functions, though critical, was not enough. They needed senior-level support. So they presented their program as the solution to a serious problem, asthma, and described to administrators exactly how IAQ TFS could improve what mattered to them most: health, attendance, and performance.
Assess Your Environments Continuously	
Survey Occupants and Keep An Ear to the Ground	HPS trained the site-based Health and Safety Teams with the tools and information they needed to thoroughly assess their facilities. The teams gathered detailed information from occupants about facility history, health trends, and comfort issues and used that in-depth information to determine the best priorities. Each school's team was empowered to become its facility's experts and stewards.
Plan Your Short and Long-Term Activities	
Work in Stages	HPS worked in phases and put together the components of success over time. At first, there was a single pilot project. But, the IAQ team used that example to build support; used the support to build a training program; used the training to create school-based teams; used the teams to assess the facilities, and so on. And now, they look toward the future: creating sustainability through acculturation.
Communicate with Everyone, All the Time	
Make It Meaningful to Your Audience	When marketing the program to administrators, staff, collaborators, and parents, HPS's core team always described their goals in the terms most relevant to their audience. The program was right for HPS administrators because it addressed asthma and attendance; it motivated school-based teams because everyone wants "safe, clean, and healthy" schools; and their messages sunk in because they were repeated in non-verbal communications, such as their t-shirts and awards programs.
Act to Address Structural, Institutional, and Behavioral Issues	
Education Changes Culture & Behavior	HPS's training program and assessment response approach has been remarkably effective at creating champions, educating the community, deputizing stewards, and changing occupant behaviors. Staff noticed time and again that since the assessment program began, the school-based teams have seen the fruits of their labor and have developed a sense of pride in their buildings and their activities to protect them.
Training Can Change Institutions	By responding to the priorities set by each school's team, rather than dictating the course of action, AI Hinds empowered building occupants to be the stewards for their own environments. This means that the onus and authority for action has been dispersed across the district. No one is singly responsible for all facilities due to the creation of facility deputies at every site.

Katy Independent School District

Turning Crisis into Opportunity...and Thriving

The Katy Independent School District (KISD) is a rapidly growing district outside of Houston, Texas. KISD's Maintenance and Operations Department includes 514 full-time employees who work at the district office, in Katy's 59 existing facilities, or on one of the building projects for the 23 new schools Katy expects to build over the next ten years. This busy department is regarded so highly by administrators, principals, teachers, staff, and parents, that Greg Carver, the Department's Executive Director, regularly receives letters praising him and his staff. Throughout the Katy community, people boast that the Maintenance and Operations Department truly lives by its motto, "Whatever It Takes." And Peter McElwain, the district's Architect and Planner, says, "IAQ is a 'non-issue' in Katy... IAQ management has been so thoroughly incorporated into our culture and has such broad support throughout that we don't even think about it as a separate issue. It's just part of our schools."

But, the atmosphere in Katy has not always been so bright. In fact, just five years ago, instead of receiving praise, Greg Carver walked into a room full of angry parents and had a moldy book thrown across the room at him. Clearly, a radical change has occurred in Katy.

Before 2002, students and staff in some Katy schools reported frequent asthma attacks, nosebleeds, headaches, respiratory infections, nausea, and skin rashes, and many parents and teachers believed that conditions in the schools were to blame. In the spring of 2002, the volume of health complaints at West Memorial Elementary School led the district to conduct air quality testing and to the discovery of a mold infestation in the school. It was the week before Spring Break when Dr. Leonard Merrell, the Superintendent, heard the news. "It was one of those moments, quite seriously, where you remember exactly where you were, where you were sitting, and what the day was like. It was a major shock...Over the next week, I had many conversations with the Board President who was very clear about what he expected from us: safe schools...I said that I thought we needed to close that school, completely renovate the campus, and determine the root cause of the IAQ problems. That meant moving 700 students somewhere else in less than one week. And he said to me, 'Then, do it'."

Dr. Merrell described scrambling with his staff to find a solution. "Our leadership team met constantly to discuss where we were going to move all of those kids. We knew we had to find a place, but had no idea where that was going to be. We drove around town looking for a spot that might work. We even considered a large church that probably had more IAQ problems than our building. Finally, Peter had an idea. He thought we could get one of the high schools we were building ready ahead of schedule and that we might be able to move the students and teachers over there."

The district had to keep the students from West Memorial out of school for an extra week as they hurried to prepare a building that was still under construction. In the meantime, they had to communicate their plan. Three days after Dr. Merrell made the decision to close the school, the KISD team convened a meeting with parents and the community. "We walked into a performing arts center and found 900 parents, teachers, community activists, and staff yelling about the school closing, calling out medical problems, and claiming that every kind of health issue you can think of was suddenly linked to our IAQ problems. All of these folks were blaming the district for everything and didn't believe a word we said."

Getting Started in Katy

People who study peace-making between warring factions often say that, "In every crisis, there is opportunity." What they mean is that by recognizing a crisis for what it truly is, and assigning the issue at hand the priority it deserves,

a crisis moment can present the opportunity for radical change. KISD found the opportunity in their crisis. First they had to move through it, but on the other side, once the storm of anger lifted, the district's leaders stayed focused on the issue—IAQ management. They did not stop work once West Memorial Elementary was reopened. Quite the opposite; they began the creation of an entirely new culture, organization, and leadership approach that has resulted in a community where people can no longer imagine screaming and throwing books at staff.

For five months after finding the mold, the facilities team and Dr. Merrell held community meetings every week. They described the steps they were taking to remediate the mold at West Memorial, their plan for establishing a district-wide IAQ management program, and their commitment to communicating everything they knew to the public. “By the end of that process, we really had them turned around.”

The crisis taught the district several key lessons. The group now knew that a comprehensive school IAQ program was essential; that it cost less to prevent IAQ problems than to fix them; that IAQ management had to be integrated into the district's culture to be successful; that continuous improvement, not just remediation, was the goal; and that open and honest communication with the public was essential.

Getting Started in Katy

When Greg Carver was interviewing for his job at KISD in 2002, many people asked him how he would have handled the mold crisis that the district had just experienced. He answered, “*IAQ TFS*.” After joining the team, Greg explained that to effectively manage environmental health and safety, the district needed a systematic approach like the one that *IAQ TFS* provides. At the time of the crisis, IAQ had been handled by local maintenance personnel who did not have the support or the training to make IAQ activities a major focus of their jobs. Greg believed that the district needed an environmental division within the Maintenance and Operations Department. He talked with Peter and they “agreed that to carry the authority required, whoever we brought in to lead our IAQ program had to be an Assistant Director.”

KISD was looking for somebody who embodied specific values—a commitment to children's health and the belief

ORGANIZE

ORGANIZE for SUCCESS: Create Your Own Champions

“There is a difference between someone in Peggy's position doing the job and someone in the position living the job. You can tell the difference. Providing healthy school environments so that students succeed is part of Peggy's value base and you feel that when you're with her.”

that school environments should be places that nurture students' minds and bodies. And, as Peter put it, “We got so very lucky to find Peggy.” When Greg reflects back on hiring Peggy Caruso, he now recognizes that the traits he saw in her at her interview have turned out to be key characteristics of the district's successful IAQ program. “I took some notes when we interviewed Peggy, and I looked back at them the other day and realized that everyone in her department has these same traits: energy, a self-starter, team-focused, a risk-taker, a model of exemplary behavior, an effective communicator, and a passionate IAQ champion.”

Two factors have made Peggy such a remarkably effective environmental team leader: personality and position. Peggy had experience implementing *IAQ TFS* at another Texas school and she believed in it. “When she joined, everyone in the district could see her commitment to IAQ management. Her energy affected the whole community—parents,

PLAN

PLAN YOUR SHORT and LONG-TERM ACTIVITIES: Prioritize Your Activities

Greg Carver, Executive Director of Maintenance and Operations, decided that he was going to “take charge, know more than anyone else about the facilities, and instigate action rather than being reactive.” After he arrived at the District in the wake of the crisis, he set out to secure the personnel and resources he needed to achieve his goal.

administrators, the whole maintenance and operations team...literally, everyone.” The force of her personality and her persistence has helped Peggy to secure leadership buy-in and community trust, and it has motivated colleagues. And, because she is an Assistant Director within the Maintenance and Operations Department, she has the authority to prioritize IAQ activities, assign personnel, and allocate funds to IAQ issues. “Being under the Maintenance and Operations Department has been great,” according to Peggy, “because we work next to and communicate easily with the folks that directly impact IAQ.”

Almost as soon as she started, Peggy requested support for investments in IAQ. Specifically, she needed a team. Peggy and Greg worked together to hire personnel, including an environmental coordinator, Oscar Gonzales, who is 100% dedicated to environmental management issues. “She started with two people and, over time, Peggy has expanded the team to six district-level staff,” including Oscar, inventory support staff, landscaping specialists, and staff who oversee pest management, pools and sewers, and roofing. In most districts, the search probably would have focused on finding people with specific technical experience, “but we prioritized finding people with a different skill set. We wanted more people like Peggy with drive, commitment, and communications skills.” Peggy’s environmental team has made great strides in improving

Katy Independent School District’s Environmental Services Team (2006-07)	
Assistant Director of Maintenance & Operations, Environmental and IAQ Coordinator	Peggy Caruso
Environmental Coordinator, AHERA, IAQ, and IPM	Oscar Gonzales
Executive Director of Maintenance & Operations	Greg Carver
District Architect & Planner	Peter McElwain
Operations Director	Kathy McDonald
Assistant Director of Maintenance & Operations	Ron Chandler
Energy Conservation Manager	Mike Matej

Setting the Plan

Peggy knew that to succeed, KISD’s IAQ program needed a system that linked activities at all school facilities to district-level activities. She set out to recruit school nurses to serve as on-site IAQ coordinators. Peggy had seen this tactic, an approach she learned from the *IAQ TFS* Kit, work before. “Nurses are effective on-site IAQ coordinators because they are the first people to see health effects that might be related to IAQ issues, they have relationships with all of the students and their parents, and they are credible sources of information.” The Instructional Officer for Health Services, Dianne Klam, who is in charge of KISD’s nursing staff, supported district-wide *IAQ TFS* implementation. She was familiar with the *IAQ TFS* program and ready to help Peggy engage the nurses. At first, some nurses wondered whether the time commitment required to serve as IAQ Coordinators for their campuses would be overwhelming. Peggy and Dianne recognized their concern and sought to reassure them that they would not be solely responsible for the program, but would have a team of partners to make it work. To build

ORGANIZE

ORGANIZE for SUCCESS: Designate and Empower a Leader

Peggy Caruso describes a moment when she was meeting with IAQ professionals from neighboring school districts. “I suddenly recognized that inside my district, I was being mentored not as an IAQ professional, but a leader among regional maintenance and operations personnel. I saw it was my mission to connect with others...and I began mentoring those people. This was an important realization for me and reminded me of the story about the flight of geese, each helping the others move toward their goal together.”

the district’s IAQ and establishing a preventive maintenance program. They take their mission statement seriously: “Good indoor air quality is an important component of a healthy indoor environment and is necessary for schools to reach their primary goal of educating students.” Peggy has helped each member of her team to become a leader in the district, and the team members, in turn, have reached out to make sure that everyone in the Maintenance and Operations Department and across the district understands the program’s mission and how to safeguard school IAQ.

COMMUNICATE

COMMUNICATE with EVERYONE, ALL the TIME: Make It Meaningful to Your Audience

“I promised the nurses that ‘I will be here to help...I know that this is the right thing to do and if you get involved, you will be doing the right thing, too.’ I explained why the *IAQ TFS* program was so important and how the nurses could help it succeed district-wide...I demonstrated that I was dedicated to helping them, not just to getting their help.

understanding of the *IAQ TFS* model and a strong base of trust, Diane invited Peggy to meet with the nursing staff as a group to explain how a district-wide *IAQ TFS* program would work and how it could improve school health. Peggy stressed that she and the rest of the district-level team would help the nurses implement the program making their management burden as small as possible. The nurses were already members of each school’s safety committee so when Peggy and Dianne secured the nurses’ involvement, the district-wide communications and action network for *IAQ TFS* was activated. The nurses relayed messages about the new environmental team inside the district’s Maintenance and Operations Department, the *IAQ TFS* program, and how members of the safety committees could contact the district about any IAQ issues they encountered.

Assessing Your Environments

Within the first year of the launch of KISD’s IAQ management program, Peggy made sure that walkthrough inspections were conducted at all 44 of the district’s educational facilities. She established baseline IAQ measurements and two years later, with Oscar’s help, Peggy repeated the walkthrough process at all of the schools to see if IAQ had improved and what still needed attention. In KISD, Peggy and Oscar conduct all of the facility walkthroughs because they are well-trained on how to identify IAQ risks and how to measure temperature, humidity, CO₂, CO, ozone, particulates, and other environmental parameters. After their walkthroughs, Peggy and Oscar produce detailed reports that they share with everyone who can respond to an issue. district-level staff receive the reports and take fast action. Principals also receive reports so that they are aware of any issues in their facilities and know whether to expect maintenance activity in their buildings. The school safety teams receive the reports so they know what they should be on the lookout for and how they can act locally to improve maintenance and occupant behaviors that affect IAQ.

“What’s amazing is the difference in the principals’ reactions to the reports between the first assessment and the second. At first, their reactions were somewhat mixed and confused. But by the second year, when they received their assessment reports, they reviewed them very carefully.” The reason Peggy attributed to the change: the first reports led to fast response from the district team and that activity opened the principals’ eyes to IAQ—what it is and how it’s related to facilities, health, and performance.

Getting It Done – Response

After the assessment reports arrive, the Maintenance and Operations Department moves quickly to address issues. Peggy and Oscar make sure that items from the reports end up on specific work orders that are routed to the appropriate section of the Department or school site. When describing how the district responds to IAQ issues, Peter, Greg, Peggy, and others repeat that “everyone in the Maintenance and Operations Department takes IAQ very seriously.” Responding promptly and thoroughly to potential problems is how the Department does business. Again, the location of the environmental

ACT

ACT to ADDRESS STRUCTURAL, INSTITUTIONAL, and BEHAVIORAL ISSUES: Training Can Change Institutions

“When helping faculty and staff through an indoor environment concern, two pluses are on our side. One is our success stories. When you are successful, people place more confidence in you. The second is the length of the program. Your program is more credible the longer it has existed because you have shown your commitment is real.”

function and the place that Peggy fills in the hierarchy, along with the culture that leaders across the district have engendered, has resulted in “strong relationships and a synergy across functional areas that is very important.” Peggy has cultivated close relationships with maintenance, operations, construction, health services, food services, and the science and art programs, so that when she sends a work order, they respond because they understand exactly how IAQ affects school performance.

When they receive the assessment reports, many district team members consider not just what they can do today to fix issues, but how they can affect long-term environmental outcomes by taking preventive actions. For example, Kathy McDonald, the Operations Director, once received an assessment report that indicated carpets at one site were not being thoroughly cleaned. Not only did Kathy make sure that site’s carpets were cleaned well, but she also brought in an expert to train all custodians on effective carpet cleaning techniques.

Getting It Done – Prevention

The assessment reports generated during routine walkthroughs point out issues for preventive maintenance. In addition to the routine assessments, KISD has a protocol for quickly responding to impromptu concerns to prevent major problems from emerging. When a Safety Team member, school administrator, or teacher reports a potential IAQ concern, Assistant Principals are trained to review reports and request a response using a Web-based program to send requests to the Maintenance and Operations Department. Issues handled through the system include a wide variety of response tasks related to ensuring healthy IAQ, including equipment repair, grounds maintenance, painting requests, roofing repairs, and safety issues. Maintenance work orders are also put through the system to maintain equipment and prevent breakdowns.

The response protocol ensures that on a daily basis, each of the twelve Maintenance and Operations Department maintenance supervisors approves and prioritizes work to be done by trade specialty. Peggy’s team responds to IAQ concerns immediately (within 24 hours). Their first step is to investigate the complaint, such as a strange odor, geographically concentrated health effects, or water intrusion. To identify the source of the problem, the team discusses the potential issue with building occupants, looks at the facility records to see if the problem is a recurring issue, and conducts a close inspection of the equipment and the environment in the area of the complaint. Once a source is identified, the team generates a work order to address any issues, follows-up with the people who reported the concern and those responsible for responding to it, records the incident, and captures any lessons learned to share their learning with their Departmental colleagues and school staff.

There is also a building renovation and upgrade program for building investments that prevent IAQ problems, such as mold growth. Because of their history and the Houston area’s vulnerability to mold-growth, KISD addresses their building envelopes by waterproofing doors and windows before undertaking any other renovations.

ACT

ACT to ADDRESS STRUCTURAL, INSTITUTIONAL, and BEHAVIORAL ISSUES: Training Can Change Institutions

“Management and unions have to work together to make IAQ programs succeed. Open communication and trust are so crucial to ensuring that potential IAQ threats are identified and addressed.” People must feel safe expressing their concerns and need to believe that their concerns will be taken seriously. Otherwise, the adversarial relationship that can pit staff against managers creates obstacles, and communications between people on the ground and people with the power to address IAQ issues doesn’t happen.

Institutionalizing the Program – Ensuring Success

What the team in KISD has accomplished since their IAQ crisis is truly amazing. The words of a parent who was once a vocal critic of the district describe it well. In a letter to Greg Carver, Linda Peavy wrote, “It wasn’t too many years ago that I’d lost faith in KISD’s ability to take care of our campuses. Our school had become run down and filled with mold due to lack of maintenance... [But] under your leadership, the team has really shaped up and learned to work together in an efficient manner. You have put us all at ease. When I hear of problems on the campuses now, I know that they won’t remain problems for long. Now, we know the problems will be fixed and they will be fixed correctly.”

KISD has not simply taken the steps to address a one-time problem. The district has created a culture and organizational approach that guarantees proactive environmental management in all of their facilities. There are many reasons Katy was successful in institutionalizing their IAQ management program. The district designated roles to ensure responsibility for critical activities, created policies that govern the IAQ program’s long-term operation, restructured their institutions to acknowledge the critical role that the Maintenance and Operations Department plays in creating an effective school district, established strong relationships with external organizations, and engaged the community of school stakeholders at every opportunity.

COMMUNICATE

COMMUNICATE with EVERYONE, ALL the TIME: Share Your Goals

“The whole district; from students, to staff, to administrators, and even parents...are well informed about IAQ and its effects on health. The Maintenance Department, New Building Department, and Administrators take a proactive approach to maintaining our buildings. Yes, we still have to be aware that keeping a building in top shape costs a lot of money, but we know that it saves so much money in the long run.”

– Pam Nielsen, self-described proud KISD Parent

COMMUNICATE

COMMUNICATE with EVERYONE, ALL the TIME: Make It Meaningful to Your Audience

KISD’s Web site makes clear just how important the District feels environmental management is: “This component [of our Maintenance Department] is very important because a healthy indoor environment creates favorable learning for our students and high performance of teachers and staff.”

Peggy, her staff, IAQ coordinators at each school, and the Assistant Principals have very specific responsibilities for IAQ management. By associating individuals and their functions with specific roles, and providing the resources and training needed so that everyone can meet their responsibilities, the district has both ensured that critical activities are accomplished and established “IAQ go-to people.” Parents, students, teachers, and staff have a way to access the *IAQ TFS* program at all levels within the district.

There are program protocols that also help to ensure success. For example, all of the Maintenance and Operations supervisors have a standing weekly meeting where they discuss and resolve issues, communicate with the Directors, and develop team-based approaches for managing IAQ. These meetings ensure that the entire Maintenance and Operations Department is aware of and active on IAQ issues and provides an opportunity for department heads to share critical information with the campuses. According to

Ron Chandler, the Assistant Director of Maintenance, “Peggy...created this great line of communication between the Department and each school and that connection made a huge difference in how [Department-level staff] think about and address individual facility issues.”

Dr. Merrell also contributes to the effective culture within the Maintenance and Operations Department. Greg Carver explains that, “Dr. Merrell is very caring for staff’s lives. He makes it clear in his actions that he sees

Maintenance and Operations not as an afterthought, or just some service center, but as a critical and valued component of the team that delivers excellent learning for Katy's students. I've been in districts where maintenance is treated like a necessary evil. But here, everyone knows and believes that maintenance is an integral part of achieving our education mission."

Peggy, Greg, Dr. Merrell, and others also created program sustainability by developing strong and supportive relationships with external organizations, such as the U.S. EPA Region 6, the Texas Association of School Business Officials (TASBO), the Council of Educational Facility Planners International, local health departments, and the Southwest Technical Resource Center, among others. These organizations provide materials, technical assistance, resources, and opportunities that not only help Katy to continuously improve, but also give Katy staff an opportunity to mentor their colleagues at other schools. For example, Kathy McDonald, the Director of Operations, coordinates a training program with TASBO to teach her counterparts at other Texas schools what she has learned about managing an effective custodial department that contributes to healthy IAQ.

Finally, KISD has worked hard to stay close to their parents and community stakeholders since the IAQ crisis. Greg says that his Department makes community education a priority "by doing lots of presentations, sending newsletters, mail, and visiting school sites with people from the community." KISD's Web site even has a page devoted to explaining IAQ issues, the *IAQ TFS* Program, and KISD's Environmental Department. Peggy describes how "the language of indoor air quality has become a standard part of our community's lexicon... I used to have to work so hard to get people to pay attention to or think about IAQ issues, but when I came to Katy, after they had their mold crisis, everyone—parents, teachers, administrators, students, staff—knew exactly what IAQ was." And, in Katy, even after the crisis abated, the district staff kept using the IAQ language and the concept became thoroughly integrated in the district's culture. "We grew accustomed to thinking about IAQ whenever we think about anything facility- or construction-related. IAQ is always a heading on any building evaluation documents, facility discussions, etc. We're never comfortable with the status-quo; we're always looking for a way to improve."

ORGANIZE

ORGANIZE for SUCCESS: Secure Senior Level Buy-In

"I've worked in literally hundreds of school districts in my career and I have never encountered a place like Katy where the community is so involved. The Board is so active; they pick up the phone and call us directly all the time. Peggy had a call just last week from a Board member who asked her for an environmental tour. She picked him up in her truck and drove around the site. At one point, he asked her to stop so he could get out of the car to investigate a mold remediation project. Now that's hands on."

EVALUATE

EVALUATE YOUR RESULTS for CONTINUOUS IMPROVEMENT: Capture Your Return on Investment (ROI)

"Between our excellent teachers and healthy IAQ, KISD is now a recognized district. Currently, we are very close to being an exemplary school district. Our IAQ efforts have made an impact with the kids...The kids are the brain of the school and they are directly impacted by the body of the school, the building. We've improved the body and the brain is thriving."

Capturing Success

The KISD team tracks success in a number of ways. First, Peggy and Oscar have established environmental baselines for every facility so they know when they are making progress. They have seen a decrease in phone calls regarding IAQ concerns and, as Oscar puts it, "A lack of communication from our stakeholders lets us know we're achieving our desired results." The team has also seen a link between their proactive approach to improving IAQ and improved student, teacher, and staff comfort; a decrease in absenteeism; and reduction in clinic visits for asthma and asthma treatments

Peter McElwain uses another metric for measuring

success. He describes how the involvement of the community in the development of the district's IAQ management plan has created an active, educated, and supportive community. "During our bond hearing process, when we're talking to the parents and community about new schools and renovation projects, we have parents saying that we have to spend the money to secure our building envelope and prevent water intrusion to maintain our healthy IAQ. They use those terms; the parents really understand the link between IAQ and facility maintenance, and they push us to make the investments required to keep the schools safe and healthy. Now how many districts are there where the parents stand up to demand that you spend the money on IAQ issues?" Greg Carver says, "When our patrons support rather than criticize our facilities maintenance and operations program, our health inspectors compliment our facilities and our work, and when the maintenance staff on the ground works to uncover rather than cover up problems, you know you're doing something right."

And Katy's parents have their own ways of measuring the program's success. Linda Peavy described the change she has observed.

"My son used to have severe asthma and nosebleeds on a weekly basis when he was in school. Our elementary school was in really bad shape. He was using two inhalers and spending lots of time in the nurse's office. We knew it was the campus that was making him ill since he was healthy while he was at home during breaks...But you stepped in and cleaned up the school. Now he only has an emergency inhaler on campus and has been released from the care of the pulmonologist! I used to dread sending my children to school. Now I know they are in a safer place because of you and your staff. That tells me you're doing something right!"

On the Horizon

"Our key challenge is to continue our momentum as our district grows and our staffing lags behind." KISD is adding 2,500 to 3,000 students each year, and the Maintenance and Operations Department faces a major challenge in keeping up with that growth while providing the healthy spaces the students, teachers, and staff need. Greg and Peggy feel that continuous training of their current staff is the most important investment the team can make at this time to ensure that as the district expands, their department has more and more trained IAQ champions to send out into the new schools, to oversee building and renovation projects, and to educate their incoming colleagues. Peggy's team is also committed to continuing walkthroughs at all facilities every two years irrespective of other IAQ issues or complaints. No matter how many facilities are built, Peggy and Oscar will continue walking them to conduct IAQ assessments.

Table 4 - Lessons from Katy Independent School District

Organize for Success	
Designate and Empower a Leader	One of the most effective aspects of KISD's IAQ Program is the placement of environmental management under an Assistant Director-level person inside the Maintenance and Operations Department. The level of authority this placement provides lets Peggy Caruso hire staff, set policies, and apply funds as required to meet the IAQ challenges in Katy.
Create Your Own Champions	Peggy Caruso is an IAQ champion who transformed KISD. She is energetic, passionate, and a risk-taker who is not satisfied with the status-quo. But Peggy is not the only champion. Greg, Peter, and the Superintendent are champions who took a crisis and turned it into an opportunity. And, KISD hired a team of champions when they staffed Peggy's team.
Secure Senior Level Buy-In	Greg Carver came to the district at a time when it was ready for solutions. He seized the moment to build the buy-in the program needed to succeed. It was Greg who created the structure that gives Peggy and her team the authority to make IAQ TFS a reality.
Assess Your Environments Continuously	
Walk the Grounds	Peggy knows how to conduct a walkthrough, and when Oscar joined her environmental division, Peggy trained him by assessing more than 20 building with him. Now, they conduct all assessments. They know what's happening in every school and what responses are required. They can oversee every facility environment because they know the buildings well and spend their days with the people who are responsible for assessment response.
Establish Your Baseline	The IAQ team recorded baseline environmental conditions in all school facilities when they conducted assessments in the first year of the IAQ TFS Program (e.g., ventilation rates, thermal conditions, particulates, etc.) These numbers provide helpful data and, more importantly, a way to measure progress. This motivates district and site-based staff to take actions that affect those numbers.
Plan Your Short and Long-Term Activities	
Prioritize Your Activities	KISD prioritizes IAQ activities in at least two ways: after the assessments, each supervisor in the Maintenance and Operations Department reviews their list and ranks priorities according to risk; and before any money is spent on any other major upgrades, the Department seals the building envelope, windows, and doors because they know that mold is a major IAQ risk factor in Katy.
Plan for the Future	KISD is challenged by rapid population growth. But the district is ensuring that growth will not compromise their IAQ success. The facilities team has a plan for renovating their existing buildings to guard against mold and an IAQ plan for all new building work.
Communicate with Everyone, All the Time	
Be Transparent and Inclusive	KISD began its successful communications campaign as soon as its crisis hit and they never stopped talking to their community. The district communicated its plan, updated the community on its progress, and was always willing to take community members on facility tours. This openness and the team's follow-through on their commitments built trust and support in a once doubting community.
Make It Meaningful to Your Audience	Peggy successfully recruited school nurses to join the IAQ initiative by speaking with passion about the importance of IAQ management, the links between IAQ and student health, and the natural synergies between managing IAQ and promoting school health and wellness.
Act to Address Structural, Institutional, and Behavioral Issues	
Education Changes Culture & Behavior	KISD's team saw a change in the principals' reactions from year 1 to 2 of the assessment program. At first, the principals hardly noticed their reports, but by year 2, they paid close attention. Facility staff's reactions to the report findings demonstrated that "this IAQ stuff" must be important. When the assessments were quickly followed by activity in their schools, the principals took notice.
Training Can Change Institutions	The KISD team learned that open communication is critical to IAQ program success. They took steps to ensure communication happened—establishing school-based IAQ coordinators and an online work order system—and made sure that management heard from people on the ground, and building occupants looked out for IAQ issues.

The School Board of Broward County, Florida

The More Open and Collaborative the Program, the Better the IAQ Outcomes

The School Board of Broward County, Florida (Broward) is the nation's sixth largest district serving almost 260,000 students and more than 38,000 staff in 253 facilities. The district serves a diverse population from urban and suburban communities in greater Fort Lauderdale. Like most districts in Florida where humidity and moisture create considerable IAQ management challenges, Broward has worked to promote healthy IAQ since at least the early

ACT

ACT to ADDRESS STRUCTURAL, INSTITUTIONAL, and BEHAVIORAL ISSUES: Training Can Change Institutions

The Superintendent at Broward, Jim Notter, said, "We're awfully proud of where we ended up. We just wish it hadn't taken a crisis to get us here."

1990s. But, the people who run Broward's IAQ management program today will tell you that it took a mold crisis in 2002 to lead to true IAQ program effectiveness. "Before 2002, while we were taking some action to address IAQ, our activities were not systematic, and they were not undertaken in a spirit of collaboration...Our crisis caused a paradigm shift in our approach to IAQ management. Now, we're so much more focused on involvement, communications, and collaboration with the community, the unions, and all of the disciplines throughout the district. Before, we worked behind the scenes...in a veiled way...but now, everyone in the district understands IAQ and knows they have a role to play in promoting healthy school environments."

In 2002, public pressure led to air quality sampling in several Broward schools. The tests detected mold and moisture problems in two elementary schools and led to the closure of sections of two schools for several months because of health risks to students and staff. A grand jury

investigated the construction of Broward's schools and found that some of those built in the late 1980s and early 1990s to accommodate the district's very rapid growth were not properly sealed and had allowed moisture intrusion leading to mold and mildew problems. Broward suddenly faced workers compensation lawsuits, angry parents, and potential school closures. In response, the district overhauled their existing approach to IAQ and created a comprehensive program and a proactive IAQ management plan.

Getting Started in Broward

At a series of town hall meetings in early 2002, angry parents and staff levied criticism against the district for what they perceived as its failure to investigate mold concerns adequately and to take fast action to safeguard occupant health. The facilities, maintenance, and operations teams involved in the IAQ investigations and response had lost their credibility with the public. The district needed a way to demonstrate their seriousness about protecting student and staff health in school facilities to begin to regain community trust. Jim Notter and a group of leaders from the Divisions of Facilities and Operations—Jeff Moquin, the district's Director of Risk Management, Mark Dorsett, the Manager of the Physical Plant, and Bob Krickovich, the district's Environmental Coordinator—made a strategic decision to reach out to the district's Facilities Task Force to support the implementation of a district-wide IAQ TFS Program.

ORGANIZE

ORGANIZE for SUCCESS: Build on What Works

"We had to find something in the district that was actually working...that had some credibility because we had lost ours. The Facilities Task Force was already in place and had a reputation as an effective change agent for issues involving facilities and construction. The Task Force regularly presented to the school board and its recommendations were usually accepted. We realized that the Task Force was the ideal group to manage our IAQ TFS program."

The Facilities Task Force was created as a governing body to oversee the district’s rapid growth and in 2002, the Task Force’s credibility was intact. The Task Force’s membership already included many of the key interest groups concerned about IAQ issues, such as School Board members, parents, and industry groups. It was the perfect body to oversee the implementation of a new, more robust IAQ management program. Jeff and Jim invited Terese Nipon, the Board Chair of the Facilities Task Force and an active member of the Parent Teacher Association, to dinner. They described their vision for an *IAQ TFS* program, what full implementation could do to help the district improve, and how their departments and functions would support the program. They said, “We need you to champion this program...we need your help.” She accepted.

Terese led the Facilities Task Force’s presentation of the *IAQ TFS* program proposal to the School Board. The School Board signed off on the proposal and the Facilities Task Force moved quickly to create an IAQ Subcommittee. The Subcommittee included people from the unions, community activists, and staff from the facilities, operations, and maintenance functions at the district level.

During this time, the IAQ Subcommittee members in Broward County learned valuable lessons on what it takes to build an effective team. They looked for people who were interested in taking charge and never ruled out anyone as a possible member. Their crisis had taught Broward that “anyone who wanted a voice on IAQ issues needed to be invited to become an active member of the committee, to be involved in addressing IAQ issues, and to be a voice

The School Board of Broward County, Florida’s IAQ Subcommittee of the Facilities Task Force (2006-07)

Manager I, Physical Plant Operations	Mark Dorsett
Executive Vice-President of Falkanger Snyder Martineau & Yates, Architects Engineers	Doug Snyder
Deputy Superintendent, Chief of Staff	James Notter
Director, Risk Management	Jeff Moquin
Coordinator, LEA, Facilities & Construction Management	Robert Krickovich
Facilities Task Force Chair	Marvin Quittner
Broward Teachers Union	Steve Feldman
Broward Teachers Union	Ralph Eckhardt
Supervisor I, Physical Plant Operations	Jim Bass
Representative – Plantation Zone	Sally Flur
Deputy Superintendent, Facilities & Construction Management	Michael Garretson
Supervisor, Risk Management	Aston Henry
Supervisor I, Physical Plant Operations	Richard Lees
Representative - PTA	Denise Loglia
Representative – Stoneman Douglas Zone	Dr. Pat Maslin-Ostrowski
Representative – Nova Zone	Marge Morgenstern
Representative – PTA	Terese Nipon
Manager I, Physical Plant Operations	Roy Norton
Federation of Public Employees	Mike Prevatt
Representative – South Area/Miramar Zone	Bob Rubin
Federation of Public Employees	Jim Silvernale
Representative – South Area/Everglades Zone	Laura Simon
	Franklin Sands
	Donna Korn

COMMUNICATE**COMMUNICATE with EVERYONE, ALL the TIME: Be Transparent and Inclusive**

“We used to have town hall style meetings with parents and teachers screaming...we never used to be able to accomplish anything. But now we invite everyone in as a problem-solver...we seek out people who have to be there and go beyond just announcing a meeting to make sure the right folks are with us...The PTA is involved and they are the voice of the parents...the unions are involved and that makes the teachers feel heard...It’s a lot more work to deal with angry parents and teachers than it is to proactively involve them.”

for the program in the community. By design, our IAQ Subcommittee crossed over all divisional lines.” The team also recognized the importance of having senior district leadership involved in the program. “We had learned...the importance of having someone high up in the pecking order on the team. Jim Notter, the second in command in this district, joined us and he can make things happen.”

Some districts hide their facility problems because they worry that if teachers, parents, or unions know there are issues, they will attack the district. The group in Broward learned that trying to hide issues was no solution. Steve Feldman, a representative from the teachers’ union who today is an active member of the IAQ Subcommittee explains: “The unions and teachers need to be a part of the solution. They have to have a way to work within the system to address problems. Teachers are first degree IAQ stakeholders, and they will be skeptical of any program that they weren’t included in planning. The district benefits

by getting teachers’ buy-in for their activities because it means that teachers will help to implement solutions. Teacher and union representation in an IAQ program is a win-win for any school.”

Jeff Moquin points out that the IAQ Subcommittee has stayed open to new members. “As we see the need for particular expertise, we pull it in...When the site-based assessments began, we realized the importance of custodians and brought the maintenance supervisor for the custodian function into our group. The same goes for the HVAC Senior Supervisor, who we brought into the committee when it became clear we needed his input on ventilation management. Over time, we have engaged a lot of people and sought their input...It’s all about bringing the right people to the table.”

Jeff stressed that the focus on engagement, open communication, and broad involvement was probably the biggest change in Broward’s approach to IAQ management since the crisis and that it was critically important to the program’s success. “The largest paradigm shift I have experienced since we started this program is the shift towards collaboration...and it was a crisis that made us make this shift...You can’t put a price tag on the impact of this change...We invited all the schools, all the parents, the unions, teachers, everyone to participate and suddenly created a common ground where we could tackle problems together...We don’t have to agree all the time, but by working collaboratively, we have found a way to move forward.”

Planning for Success

After they formed their team, the IAQ Subcommittee met regularly, usually at night when everyone could attend, to develop their implementation plan. “We agreed that a pilot program made the most sense because we couldn’t provide the depth of attention to all schools at once if we started with a district-wide roll out...We didn’t have the resources or funding for the whole district.” Before launching the pilot, the IAQ Subcommittee brought their proposal to the School Board to get their support. The Board agreed that the program could begin as a voluntary activity, but that

ORGANIZE**ORGANIZE for SUCCESS: Create Your Own Champions**

“Unions, PTAs, and other interest group organizations are your friends. A major component of our recent success has been the positive relationships we have garnered with the district’s unions and alliance groups. It is important to develop a true partnership with these groups when investigating IAQ issues and developing your overall IAQ plans and goals.”

eventually, the *IAQ TFS* model should be applied in all Broward schools.

Jeff Moquin began the *IAQ TFS* program roll-out by attending a principals' meeting where he sought a group of volunteers. "I was thinking of a group of 10 to 12 schools, hopefully with a mix of geographic locations and elementary, middle, and high schools. But, 35 principals wanted to participate in the first year." In the second year, Broward added another 50 schools to the *IAQ TFS* implementation because so many people in the district recognized that participation was a great way to make rapid improvement in their facilities. By the beginning of the third year of program implementation, the team knew that they needed to add smaller groups during each new phase to ensure the program's effectiveness. Now, they work with 20 new schools per year and the Teachers Union has codified the plan to involve 20 new schools in the *IAQ TFS* program every year in their contract with the district.

Institutionalizing the Program – Ensuring Success

To launch programs at new schools, Jeff sends a letter to the principals requesting that they select their IAQ Committees. "We suggest that they include an administrator, usually the Assistant Principals who are in charge of submitting work orders, union representatives, facilities staff, parents, and students." Once the principals have their IAQ Committees in place, the school-based teams attend a mandatory training at the beginning of each school year. Jeff also brings the IAQ Committees from schools that are already implementing the program back every couple of years for a refresher course to ensure consistent implementation and to address staff turnover issues.

The Broward IAQ trainings last for half a day and consist of three sessions: IAQ 101 ("the science on pollutants and pathways to dispel the myths"), *IAQ TFS*, and the survey and facility assessment process. The core IAQ Assessment Team from the district—Jeff, Mark Dorsett, and Bob Krickovich—are the trainers. They develop training packets that include copies of all the presentations, contact information for the district-level IAQ team, and addresses for Web sites, like the Centers for Disease Control and Prevention and EPA, where the IAQ Committees can learn more.

The newly minted IAQ Committees become trainers for their schools' staff. They take the materials packet and the presentations from the kick-off training and use them to train their colleagues. They explain the survey and assessment process, provide a cheat sheet to help people complete the online survey, and request that all occupants complete their surveys by the winter break. The district has made it as easy as possible for occupants to complete the facility surveys because district-level staff knows how important it is to hear from the people on the ground. The Subcommittee used the *IAQ TFS* Kit's checklists as a starting point for creating one standard occupant survey form and then put the survey online. At

first, the surveys requested room numbers and names but over time, the IAQ Subcommittee heard from their union members that it would be better to make the surveys anonymous to encourage a higher completion rate.

PLAN

PLAN YOUR SHORT and LONG-TERM ACTIVITIES: Work in Stages

"*IAQ Tools for Schools* can work even in a large organization. Don't let the size of your organization be an obstacle to effective *IAQ TFS* implementation. Broward has garnered success through a phased implementation strategy, and we've used technology to streamline our processes."

ASSESS

ASSESS YOUR ENVIRONMENTS CONTINUOUSLY: Survey Occupants and Keep An Ear to the Ground

By making it easy and comfortable for occupants to complete facility surveys, the district has been able to collect high-quality information from their building occupants. The information the district collects at the beginning of each year from the occupants forms the basis for IAQ action throughout the year. The survey process is one more way that Broward has learned to be open and collaborative to achieve IAQ results.

Getting It Done – Assessment, Response, Prevention

Once the surveys are complete, the district Assessment Team has a powerful tool for planning their IAQ response and prevention activities. Several years ago, the team in Broward conducted all surveys and compiled their reports on paper, but this took an incredible amount of time for so many facilities. The IAQ Subcommittee lobbied for technology investments to help manage the process and they were able to find effective technology solutions. The online surveys are now automatically compiled into a central database that maps survey responses onto a complete picture of each facility. In this way, they can tell what percentage of each facility has been surveyed by its occupants and they can get a clear idea of how much more information they should try to collect from occupants while conducting walkthroughs.

After a quick quality check to make sure that survey data is slotted under the correct heading and that responses make sense, the district Assessment Team runs reports for each facility to prepare for their validation walkthroughs. Validation walkthroughs occur every spring for the new facilities that have joined the program that year. Walkthrough teams include the school IAQ Committees, union representatives, and the district Assessment Team. The Assessment Team downloads data from the surveys onto handheld PDAs (personal digital assistants) that allow the team to walk through a facility reviewing the occupant reports as they move from room to room and entering data on what they see, smell, and hear. For example, if an occupant has reported that a classroom is very dirty, during the validation walkthrough, the team will examine the room and use a drop-down menu pre-loaded on the PDAs to validate the occupant's report by registering the room's conditions as "normal," "dusty," or "excessively dusty." The Assessment Team also takes readings during walkthroughs to check thermal comfort parameters and CO₂.

Jeff Moquin raves about the improvement in the survey and walkthrough process that the technology tools have provided. He says "we get much better data from the occupants and have expedited the walkthrough process so we can get much more done in response to our findings. All we have to do is cradle our PDAs when we return from our walkthroughs." The validation results the team enters into the PDAs provide a head start on the Assessment Team's work to prioritize their response activities.

COMMUNICATE

COMMUNICATE with EVERYONE, ALL the TIME: Share Your Results

"Before our IAQ crisis, we used to have an industrial hygienist survey every school, and we kept the information from those surveys in a drawer where no one every really looked at it. Now, it's really about getting our information out there into the hands of our stakeholders. A problem we know about is a problem we can fix, and we want to publicize our problems because we know that fixing them requires everyone's involvement."

ACT

ACT to ADDRESS STRUCTURAL, INSTITUTIONAL, and BEHAVIORAL ISSUES: Root Cause Analysis Works

"We spend as much time as it takes to identify the root cause of every concern by addressing every item on the occupant surveys and meeting with occupants to explore their reported concerns."

The district manages its IAQ response and prevention plan using a set of pre-assigned prefixes for all work orders. The validation reports are used to drive work orders that identify site-based responsibilities, such as behavioral or education needs like training to reduce classroom clutter; preventive maintenance or repair issues, which are sent directly to the Physical Plant Operations Department; and facilities department issues. In addition to assigning responsibility, the prefixes used on the work orders are coded for priority: "action within 24 hours required for visible microbial activity or moisture intrusion; education required to change behavior; or preventive maintenance action required." The findings, their priority, the action plan, and responsible party are all listed on a facility report that is sent back to the IAQ Committee, presented on

the district's Web site, and logged with the IAQ Subcommittee at the district level.

Broward's IAQ Subcommittee has established IAQ protocols for investigating impromptu concerns that are not captured by the annual surveys at the participating schools. Any IAQ-related concerns generated by the schools are sent to the district by the Assistant Principals who have access to the work order system. Again, a prefix indicating that the issue is related to IAQ is attached to the work orders so that response activities can be tracked by the IAQ Subcommittee and the public can see the IAQ issues and activities in progress.

Finally, the IAQ Subcommittee has established policies that make it simple for the Assessment Team to determine what activities should be taken by which group and what can be done without senior-level approval. It's simple: the operations team can take any action that will cost less than \$180,000. Anything estimated to require more is Bob Krickovich's Facilities and Construction team's responsibility.

The advanced survey, assessment, and response plan Broward uses has a benefit beyond the efficiency it provides for action-planning and progress-tracking. It facilitates effective communication with all of the district's stakeholders. "All of that information we collect about the facilities, during surveys and from individual work orders, is put into a matrix that we post on our public Web site so that everyone can see our issues. We compile comprehensive reports on each facility that make clear who is responsible for every item on the report, what the planned response is, and when the response is scheduled to be complete. These tools provide community stakeholders with unparalleled access to information on IAQ activities at each school, as well as excellent records of IAQ reports and responses.

Capturing Success

Broward has seen its hard work pay off. "We have seen a correlation between the number of IAQ complaints, workers-compensation claims, and schools implementing the *IAQ TFS* program. Schools in the program have fewer complaints and fewer claims."

Members of the union also report improvements since the *IAQ TFS* program was implemented. The union used to receive grievances about IAQ issues and requests to sue the district for workers-compensation. But now, the teachers pursue institutional solutions that support the program, such as the inclusion of a commitment to *IAQ TFS* implementation in 20 schools per year in their latest contract.

Broward has also seen increased interest in the program and engagement in IAQ issues on the part of the staff. The word-of-mouth buzz about the *IAQ TFS* program's effectiveness is creating a positive impression of the condition of facilities in the *IAQ TFS* program and the district's commitment to addressing IAQ. "The word is out in the schools that if you want to have healthy facilities, get involved with the *IAQ TFS* program." To date, the program is active in 108 schools across the district.

On the Horizon

Broward will continue to add 20 schools per year to the *IAQ TFS* program. Once every school is participating, the Assessment Team plans to survey all schools every year, to prioritize the order of validation walkthroughs based on the number and type of concerns registered by occupants, and to take action based on the priority ranking of validated issues. Despite the huge size of the Broward district, its number of facilities, and the rapid and ongoing population growth, the team in Broward has a plan for managing IAQ in a systematic way that involves all of their stakeholders and a process in place to ensure their long-term success.

COMMUNICATE

COMMUNICATE with EVERYONE, ALL the TIME: Be Transparent and Inclusive

"The way we see it, it makes sense to share all of the information, even the 'bad' stuff. It is so important to develop a good communication process and to recognize that there is a psycho-social component to IAQ issues. We have found that there is great value in communicating through all phases of an IAQ issue."

Table 5 - Lessons from the School Board of Broward County, Florida

Organize for Success	
Build on What Works	When the district was hit with a crisis, they looked for an internal organization that was viewed as effective and trust-worthy to carry their IAQ messages and plans forward. By engaging the Facilities Task Force, the Operations and Facilities Department leaders found a way to move their program forward and to engage the very people who mistrusted them for their perceived lack of action.
Create Your Own Champions	One of the greatest lessons Broward recounts about its IAQ crisis was how it changed their approach to facilities management. The groups the facilities staff had avoided before became their greatest allies. By engaging the unions, teachers, and parents as true partners, Broward engaged the best possible champions for their programs.
Secure Senior Level Buy-In	Broward's IAQ Subcommittee includes the district's Chief of Staff. The team does not run into institutional obstacles or bureaucratic barriers because when something needs to happen or someone needs to participate, the Chief of Staff can make it happen.
Build an Effective Team	Broward not only engaged all possible stakeholders for the IAQ Subcommittee, but also recruited an IAQ Committee in each school to serve as trainers, survey administrators, and communications channels to the community. By collaborating with groups across divisional lines and across the district's vast space, the IAQ program has created the network of committed actors it takes to succeed.
Assess Your Environments Continuously	
Survey Occupants and Keep an Ear to the Ground	Broward has developed a highly effective and efficient technology solution that allows them to hear from their building occupants despite the district's large size. The online survey is designed to be simple to encourage its use and comfortable for building occupants to use (it's largely anonymous). And, the district's assessment process completes the circle by giving occupants a chance to discuss their IAQ concerns, comfort issues, etc., with a highly trained Assessment Team that walks every IAQ TFS school.
Use Technology to Make It Easier	Broward is a large district that uses technology solutions to simplify their facility assessment process. The same technology tools that make it easy for occupants to report on their facility conditions, help to organize effective walkthroughs, and to manage corrective actions and preventive maintenance plans for IAQ.
Plan Your Short and Long-Term Activities	
Prioritize Your Activities	Broward has a system for naming its work orders that clearly designates those that are IAQ-related, assigns a priority ranking to IAQ actions based on their seriousness and the nature of the required action (e.g., behavioral change versus equipment repair), and indicates which department or individual is responsible for seeing the required action completed.
Plan for the Future	Broward has a plan for rolling-out IAQ TFS to every school in the district and prioritizing assessment walkthroughs and response activities to ensure that, despite the size of the district, their system for IAQ management can safeguard all 250+ schools.
Communicate with Everyone, All the Time	
Be Transparent and Inclusive	The lessons Broward learned from its mold crisis changed everything about how it approaches IAQ issues, particularly how it shares IAQ information. Where once IAQ issues were addressed quietly and privately, now the district broadcasts issues about all of its facilities—problems and all—on its public Web site, on its cable access television station, and through the parents groups and unions.
Act to Address Structural, Institutional, and Behavioral Issues	
Education Changes Culture & Behavior	When the Assessment Team identifies an issue during a walkthrough, a priority action request is sent back to the school IAQ Committee. For example, if an occupant has complained about a dusty room and the walkthrough reveals that the room is indeed dusty because it's not possible to clean around all the clutter, the Assessment Team suggests that the local IAQ Committee bring the custodial staff and teachers together to talk about what it takes to keep a room clean while meeting the teacher's space use needs. In this way, Broward extends their model of open communication and collaboration throughout the district.
Training Can Change Institutions	By engaging the unions and parent groups, the IAQ Subcommittee changed the way the Facilities, Maintenance, and Operations Departments did business. They helped staff turn into collaborative problem-solvers rather than the keepers of secrets.