

INDOOR AIR QUALITY IN CANADIAN SCHOOLS
SUMMARY REPORT

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Executive Summary

The purpose of this project was to explore the need for a consistent approach to the management of indoor air quality (IAQ) in schools and to develop and/or test a set of practical strategies for the implementation of IAQ guidelines in Canadian schools.

Children, along with teachers, administrators, custodians, and other school staff, spend an inordinate amount of time in schools in Canada. It is, therefore, critical that schools provide a healthy environment for learning, of which good indoor air quality is an essential element. Air quality directly affects the capacity of students to concentrate and learn, the propensity for the spread of viral and bacterial infections and mould growth, and the prevalence of chronic health conditions such as asthma, allergies and environmental sensitivities. Indirect negative effects on students also result from teachers and other staff whose well-being and work quality is compromised by poor IAQ.

Some schools have devised strategies for addressing air quality issues as problems have arisen, but these efforts have largely been driven by grass roots or voluntary organizations. At the outset of this project, there had been no systematic investigation related to policy and practices, no comprehensive guideline development, and no outcome research to examine the efficacy of strategies to improve IAQ in schools. This study sought to address that situation.

This report gathered data on IAQ perspectives and experiences from a variety of key stakeholders – parents, students, teachers, school administrative staff, custodian/maintenance staff, Teachers Federations/Unions, IAQ consultants, community-based advocacy groups, school boards/districts (both staff and elected officials), government policy makers and deputy ministers – from most jurisdictions across Canada. It includes a discussion of perceptions, issues, views, and experiences associated with IAQ; problems experienced with IAQ across the country; current policies or practices in place at the school board/district levels; an overview of current funding programs, policies and practices by federal, provincial, and territorial government jurisdictions as it relates to IAQ; a description of best practices and keys to successful IAQ management; barriers and contributing factors to good IAQ management; suggestions for implementation of good IAQ management practice and/or guidelines, and the respective roles and mandates of stakeholders; and current and proposed communication practices.

It also tested the USA Environmental Protection Agency's *Tools for Schools Kit* as a model for managing IAQ in schools. The critical success factors that need to be in place to make implementation of this tool or any other set of IAQ management guidelines are documented herein. Through qualitative data, the report captures the voices and experiences of those working or learning with the school system and strategies suggested come from the voice of experience.

The report provides a useful insight into the issues many departments and schools are grappling with as they attempt to respond to IAQ concerns in their respective jurisdictions, as well as the perspectives of key stakeholders involved. Recommendations

are made based on participant suggestions to ensure the maintenance of good IAQ in school environments.

Through four primary data collection methods – an on-line internet based survey, focus groups, key informant interviews, and pilot testing of a set of IAQ management practices (the *US Tools for Schools Kit* in eight pilot schools) – this project explored existing resources, knowledge, and experiences. The findings from the four primary data sets are remarkably similar. There appears to be greater awareness of this issue – the importance of IAQ and its impact on individuals – and this awareness continues to grow. All share the goal that schools should be healthy learning and working environments for children/youth and staff.

Although there is some concern regarding the inadequacy of science in measuring and diagnosing IAQ problems, and the absence of a cause and effect relationship between poor IAQ and poor health, particularly among health officers, by and large, IAQ is a genuine concern among government policy-makers. There is agreement as well, in principle, on the value of a preventive approach and support for an emphasis on preventive maintenance and good cleaning practices. Some jurisdictions have earmarked funds for capital (renovation, repair, and new construction) and operations (maintenance) to support this approach and one has introduced a compliant investigation protocol. While other jurisdictions have these protocols and procedures, they have been developed at the school board level and contents vary within a jurisdiction. The most significant issues identified in the interviews were the uncertainty and inexact nature of the science supporting IAQ, and therefore the resultant difficulty with problem definition, measurement, and response; the degree of fairness and objectivity of the process to address IAQ problems; the nature of the relationships among stakeholders and the degree of trust among those partners; and the (in)adequacy of communication mechanisms among stakeholders.

The challenge for governments is to ensure value for money to deliver cost-effective solutions for IAQ problems, fairness in the identification and response to needs, and balancing IAQ issues among the other priorities of the day. Managing public opinion and expectations and communicating knowledge about IAQ issues is also a challenge. This report demonstrates the value of open communication and the importance of acknowledging a problem where one exists. Enhancing communication between school boards, schools, and the Department of Education on the one hand and their constituents on the other is necessary, as are mechanisms by which to build public trust in these institutions. While school boards have responsibility for maintaining school buildings and therefore good IAQ within these structures, they are essentially entities created by provincial statute and delegated authority for management of schools. They also exercise their functions within the parameters of the budgets provided to them by the province, making IAQ essentially a shared responsibility.

The degree of success in achieving change in IAQ management practice at the school board level appears to hinge on leadership within and external to the district – leadership of the provincial government in encouraging the adoption of such practices (and perhaps

providing a model set) and providing the funds to so; leadership at the board level to approve funds for such activities; leadership of the district facility managers in supporting such practices and ensuring the work gets done; and leadership at the school level (principal) to support IAQ initiatives. Changes in preventive maintenance – a key contributor to good IAQ – can largely be influenced by facility managers and their understanding of the value of these activities so training and sufficient funds to carry out the work at this level appear to be critical success factors. A shift in thinking needs to take place at the school board level – indeed at all levels – which places value on good IAQ and good IAQ management practices.

Governments need to be prepared to invest in both infrastructure (to repair and remediate structural problems, and ensure preventive maintenance) and staff (for preventive maintenance) to prevent IAQ problems. In order to implement good IAQ management practices, the necessary will, education/awareness about IAQ, training in how to identify and respond to IAQ problems as appropriate to individual roles, development of an IAQ management plan, involvement of all key stakeholders, preventive maintenance and structural remediation, and funding to support these efforts is required.

There are so, so many players in this arena, emphasizing the need for a coordinated effort. This report outlines the sheer difficulties of this task. It also supports the introduction of policies and management guidelines or practices to promote good IAQ and healthy learning environments, particularly for children who have greater sensitivity to poor IAQ; the input of stakeholders into the development and implementation of such practice guidelines; the delivery of IAQ training based on the roles of the various players/target audiences; the provision of access to resources and to expert consultation and advice both in IAQ and in the health profession; the adoption of a team approach to identification and resolution of IAQ problems; the adoption of explicit complaint investigation procedures and communication protocols; the promotion of relationship building efforts; the use of conferences to share learnings, update findings, and promote cross fertilization of perspectives; the provision of funding to fix the problems; and the development of long term IAQ management plans. There is some interest in the development of improved IAQ standards in the interests of objectivity but this is not universal; nor is this approach without its shortcomings.

The suggestions for implementation are similar – and could apply to any set of guidelines including *Tools for Schools*. The routes of influence and leadership may differ among provinces/jurisdictions but the players who need to be involved are essentially representative of the same stakeholders. A flexible application of guidelines is necessary among jurisdictions. The time it takes to implement such guidelines (for IAQ management practice, for complaint investigation and response, and for communication) and the level of effort required, will be influenced by the nature of the relationship already existing among parties and by the type of policies, practices employed, and guidelines already in place.

Certainly low cost strategies that empower schools at the local level to act on their own initiative to solve their IAQ problems, provided the necessary supports are in place, are welcomed by all stakeholders.

There must be a supportive climate at the school board level for this type of initiative and the departments of Education can be influential in that regard. However, if *Tools for Schools* or IAQ management practices are to be changed/enhanced to support good IAQ, then the building maintenance staff need to be on side and the /school based administration must exercise leadership. As demonstrated by the *Tools for Schools* pilot project, the principal or some such “champion” was the real driver of the process.

While there is disagreement on the need for and value of improved testing and standards for IAQ, there is a greater, although not unanimous, agreement about guidelines for management practice, and compliant investigation protocols, and communication strategies that inform the community about IAQ efforts.

Tools for Schools was tested as a model for diagnosing and solving problems, within the limits of their own knowledge and resources, as well preventing IAQ problems. The tool:

- encourages local ownership of the issue
- empowers schools to take action to promote healthy IAQ in their environment
- involves all stakeholders (potentially)
- encourages collective action and the adoption of a team approach to IAQ problem identification and resolution which both increases the sense of shared responsibility and increases communication
- offers practical, low cost strategies to address IAQ problems
- encourages routine visual inspection as means of initial problem diagnosis and prevention
- gives the school some capacity for problem diagnosis; avoids having to call a specialist at the outset, potentially saving costs

It also, and perhaps most importantly, provides a focal point of responsibility for acknowledging and acting on IAQ issues. The primary difficulty is the time required to invest in such an approach. However, pilot school sites found unique ways to lessen the burden, on teaching staff in particular, and more fully utilize the expertise of the building manager/custodian to implement this *Kit* – key factors contributing to success. The report identifies critical success factors associated with positive outcomes achieved in the pilot, as well as factors which contributed to poor implementation at other sites. In particular, the merits of a “hands off” and “hands on” approach (with training and support) were explored. Training, school-based leadership, and school board support were critical success factors. Prospects for sustainability of such an initiative are discussed, as are the supports required to implement such a tool on a long term basis.

Recommendations appear at the end of this report. Readers are encouraged to refer to the full report for a complete account of project activities, the literature review, Appendices and findings; this is but a summary.

1. INTRODUCTION/BACKGROUND

Children, along with teachers, administrators, custodians, and other school staff, spend an inordinate amount of time in schools in Canada. Students spend approximately six hours per day for 40 weeks per year in primary and secondary schools. It is therefore critical that schools provide a healthy environment for learning.

An essential element of a healthy environment is good indoor air quality. Air quality directly affects not only the level of health of school occupants – as it influences the spread of communicable diseases such as viral and bacterial infections and the prevalence of chronic health conditions such as asthma, allergies and other sensitivities – but also the capacity to concentrate and learn. Indirect negative effects on students also result from teachers and other staff whose well-being and work quality is compromised by poor IAQ.

The Atlantic Health Promotion Research Centre (AHPRC) at Dalhousie University in Halifax, Nova Scotia has long recognized that promoting good health and preventing illness must start an early age. Environmental health in schools and the need for healthy indoor air quality is a particular area of concern, given the amount of time children and staff spend in schools over the course of their lifetime and the greater susceptibility of children to the effects of poor air quality. The Centre, in association with a number of other partners (see list of collaborating organizations at the foregoing of this report), applied for, and received, funding from Health Canada to further explore indoor air quality in Canadian schools.

2. PROJECT GOALS, OBJECTIVES, and ACTIVITIES

2.1 Goals and Objectives

The overall goal of the project was to provide a consistent, national approach to indoor air quality (IAQ) in schools by developing and testing a set of practical strategies for the implementation of IAQ guidelines in Canadian schools.

More precisely, the objectives of the project were as follows:

1. to expand the knowledge and resource base regarding implementation of IAQ guidelines in schools
2. to identify and understand the factors that facilitate or hinder the use of existing knowledge about IAQ issues and the implementation of existing guidelines
3. to develop guidelines and implementation strategies for use in the pilot testing of IAQ guidelines and implementation strategies that allow buy-in from current infrastructure
4. to pilot test the implementation of IAQ guidelines

5. to conduct a global evaluation of the project and evaluate process and outcomes of pilot testing of guidelines and implementation strategies in at least four sites.

The project's long term goal was to explore current practices related to the maintenance of healthy IAQ in schools; introduce policies and practices that support good IAQ; and modify the roles that students, teachers, administrators, maintenance staff, and school boards play in maintaining healthy IAQ in schools.

2.2 Activities

A number of activities were undertaken by the project an environmental scan of relevant tools and materials, a literature review, review and testing of the United States Environmental Protection Agency's *Tools for Schools Kit*, development of a Supplementary Guide to engage stakeholders in the process of addressing IAQ issues, evaluation of the project, communications and dissemination plan, and four research streams.

2.3 Research Design and Methodology

Four primary research activities were undertaken by the Project a web site survey, focus groups, individual interviews, and pilot testing of the *Tools for Schools Kit* and Project Supplementary Guide. This is explained in the Methodology section of this report.

Web Site Survey

In 2001, a web site survey, in both English and French, was developed to capture information across the country on the existence, type, and frequency of IAQ issues in Canadian schools in an attempt to determine whether IAQ issues were indeed of national concern and to assess whether these issues were similar in nature across the country. Information on facilitators and barriers to implementing strategies to improve IAQ in schools were also a focus of inquiry. The survey was targeted to school occupants and other stakeholders such as teachers, administrators, school boards, students, parents, Department of Education staff, and others with an interest.

A web site was constructed for the IAQ project which had, as a secondary objective, increasing knowledge and awareness of IAQ issues in school environments. Information about the IAQ project itself was also contained on the web site, along with contact information for those wishing to learn more about the project, a list of references and other information, and hot links to other relevant sites.

The web site and survey was on line for an approximate three month period from April 4/2001 to June/July of 2001 during which time it could be accessed via the search engine by anyone searching for key words similar to the project's subject (indoor air quality,

schools, etc.). Responses were received from 88 individuals representing a variety of school stakeholders.

Focus Groups

In order to get a diverse range of opinion and broad representation of views and experience about indoor air quality within schools, a series of focus groups were conducted with five key stakeholder groups – parents; teachers; administrative staff; custodial staff, maintenance or facility managers; and students. These were conducted in both British Columbia and Nova Scotia.

A total of 25 focus groups were conducted in seven different schools. Although separate focus groups were expected to be conducted in each school comprised of the five stakeholder groups, in some locations, focus groups were combined at the schools' request, for reasons of time and convenience. Specifically, there were combined focus groups of teaching and administrative staff in Windsor, NS, Pleasant Valley, BC, and Middleton, NS.

In Nova Scotia, focus groups were conducted from November 2000 until June 2001. All BC focus groups were conducted in June 2001.

Individual Stakeholder Interviews

One-on-one interviews were also conducted with individuals to capture a broad range of opinion and knowledge about IAQ from key informants. These included:

- experts on the subject who work on IAQ issues in a variety of environments, either in building design and construction or environmental issues as it relates to schools or air quality, for which an Expert Interview Guide was prepared (see Appendix D for interview guides);
- key stakeholders such as staff in provincial Departments of Education, Health, Environment, or Labor; advocacy groups with an interest in this subject area (e.g. CASLE); and others for which a "General Interview Guide" was developed (See Appendix C); and,
- individuals who were thought to have differing or opposing views to those of the Project Advisory Committee about the importance of indoor air quality and the significance of the problem in schools.

The intent of these interviews was to capture as broad a range of opinion, experience, expertise, and viewpoint as possible in order to identify key issues and concerns and develop strategies for resolution.

Pilot Test of Tools for Schools Kit

A pilot test was designed to test the utility of the *Tools for Schools Kit*, along with the Supplementary Guide produced by the Project. Eight pilot sites were based in Nova Scotia within the jurisdiction of two different regional school boards.

In order to test the likelihood of implementation and sustainability, a model was designed which incorporated two approaches -- a "hands on" versus "hands off" approach. The "hands on" approach provided a one day training workshop to orient IAQ Teams to the *Tools for Schools Kit* and begin the process of developing a work plan while the hands off approach consisted of mailing out the *Kit* to the school with notice that staff were available for support upon request (to be initiated by the school itself). There were four hands on and four hands off school test sites.

The pilot phase began in April of 2002 in Yarmouth and New Germany (with training occurring for Yarmouth April 9) and May for Strait school sites, (with training for three hands on schools occurring May 22). The project concluded November 1, 2002, although schools were encouraged to continue using the *Kit* on an ongoing basis integrating it into the regular school process. Interviews were conducted through the month of November according to participant availability. Given the summer break, this meant an active pilot test period of about 4-6 months.

The pilot was comprised of:

- pre-interviews with the IAQ team in each school
- delivery of training (for "hands on " schools only)
- support of the Project research staff via telephone upon request
- post-interviews

The intent of the pre and post tests was to identify changes in knowledge and awareness of issues, current practices, and policies related to IAQ as a result of their participation in the pilot. The interviews focused on the factors influencing the implementation process, its successes and failures, as well as its prospects for sustainability.

As well, key informant interviews with school board officials were conducted at the end of the pilot period, again to focus on the factors influencing the implementation and prospects for sustainability.

3. FINDINGS

3.1 Web Site Survey Summary

Participant Representation

There were a total of 88 participants in the online survey. By far the majority of participants were teachers (60%), followed by parents (15%), and administrative staff (9%), with further representation coming from other stakeholder groups within the school system.

Given the number of potential respondents (as notice of this survey was provided to all schools across Canada), the response to this survey was very low and certainly could not be said to be representative of opinion of school stakeholders. It should be noted that those who responded to the survey heard about it most often from a Teachers Association newsletter or notice.

It appears, for the most part, that individuals who had particular concerns about indoor air quality in their school environments were motivated to respond. The response from others with no particular personal experience with air quality appears low. Students had very low participation rates which may be a function of their awareness of the survey.

School Location, Age, Renovation, Size

Survey respondents were all associated with schools in Canada, two thirds of which were located in Ontario (37.5%) and Manitoba (25%). The majority of respondents are associated with schools located either in cities (40%) or towns (37.5%) with 20% coming from rural areas.

Schools are, for the most part, over 25 years old over 80% of the schools were built on or before 1975. The average year of construction for schools in the survey was 1966.

Over half (57%) of the schools had undergone major renovations although 28% (25) had not been renovated.

With respect to the size of the school population, schools in this survey house a median number of 600 students/staff.

Presence, Number, Duration, and Type of IAQ Concerns

The majority of survey respondents (87.5%) said that their school has or has had IAQ concerns. The reader is cautioned that this is not representative of schools in Canada; rather, indicative of the experiences of survey respondents.

The number of IAQ concerns reported by survey participants ranged widely but the median response was five concerns. Indeed, half of the respondents experienced between

one and five concerns. Nine percent experienced as many as 20 concerns indicating a few schools had a wealth of presenting problems.

Most (75%) reported IAQ concerns as being continuous.

The type of concerns reported included:

- maintenance of the building – temperature(too hot/too cold or no temperature control at all); humidity/dryness; mould (particularly in portable classrooms); inadequate air circulation and improper ventilation; roof leaks; pollutants in carpets; diesel fumes through the intake air system; unidentified strong odours; inadequate dusting and cleaning; pesticide use; fumes from chemical cleaning agents; carbon dioxide levels in excess of acceptable limits; scents; fumes from industrial arts/science laboratories/arts, smoke, and printing inks; and flooding
- new construction, repairs, and renovation – paint fumes, off gassing from new cabinets and carpets, air pollutants /dust produced by construction or repair, and occupancy during construction, asbestos tiles, construction dust and glues,
- health symptoms – headaches, nausea, asthma, allergies, chronic throat problems, severe sinus infections, respiratory illness, skin rashes, eye infections, and the like.

Who Reports and Receives IAQ Concerns

About 40% of the time (n=34 of 88), respondents stated they themselves reported IAQ concerns.

IAQ concerns were usually reported by teachers (40%) and administrative staff (21%). Parents and maintenance staff were equally likely to report concerns 14% of the time. This may or may not be typical of the average school environment.

IAQ concerns are most often reported to school administration (42%) and maintenance staff (26%). Teachers also received complaints regarding air quality 14% of the time and Occupational Health and Safety Committees/representatives 7% of the time. Some spoke about a process where a work order or report was completed and forwarded to the appropriate officials (OH&S Committee, custodial or School Board administrative staff).

Immediacy of Reporting and Reasons for not Reporting

56% (49) said that problems were reported immediately, 32% (28) said they were not, and 11 gave no answer. Issues such as poor communication and relationships among stakeholders; lack of knowledge and awareness about the importance of IAQ; lack of knowledge of reporting procedures (or the absence of same); slow response time to complaints; attitudinal barriers; and a deep sense of fatigue and frustration are evident in many of the responses. The primary reason identified for not reporting is an expectation that nothing will be done.

There is an expectation of little or no response because of lack of support, usually from administration, school boards, and others who, it appeared, failed to recognize IAQ as a concern or viewed it as a low priority. Respondents also cited reason like: not sure anything can be done, vague symptoms which could not be directly attributable to poor IAQ, personnel change in schools which affect reporting practices, uncertainty about to whom IAQ concerns should be addressed and how to report those problems, and a lack of immediacy in responding to complaints.

Response to Reports of IAQ Concerns

Insufficient action (51%) or no action (33%) were reported as the most common ways of handling IAQ concerns in schools, followed by actions which addressed only the symptoms (27%) rather than the root causes of the problems. In only 24% of the cases did respondents believe that the root cause of the problem was identified and remedial action taken. In a few instances, successes were reported – such as a change in procedure or management strategies for dealing with IAQ concerns.

Many of the respondents described, in narrative text, that IAQ problems continued to be ongoing and a lack of funding for remedial action was raised repeatedly. No testing for IAQ, perceived lack of concern on the part of Board administration, poor communication, and concerns about the reliability of test readings suggesting a lack of confidence or trust among stakeholders were also mentioned.

Reasons for Inadequate Action to IAQ Issues

Some participants commented that procedures and management strategies changed in order to address IAQ concerns and referred to initiatives such as the development of an environment committee through school councils, efforts to educate school stakeholders, the development of an Indoor Air Quality protocol for schools, and the use of the EPA *Tools for Schools* Kit in schools.

Overwhelmingly, respondents believed a lack of financial resources contributed to an inadequate response to IAQ.

In addition to funding issues, respondents offered the following reasons why IAQ problems were dealt with inadequately:

- concern job would be at risk if reported concerns
- lack of knowledge/awareness of IAQ issues
- disbelief/denial of impact of IAQ concerns
- lack of procedures for appropriate handling of IAQ complaints
- lack of education/information on the part of custodians regarding the proper operation of ventilation systems
- inadequate or unsupportive administration

Strategies to Prevent IAQ Problems

Building structure (78%), good maintenance (76%), and regular monitoring (67%) were identified as the primary ways of preventing IAQ concerns. Half of the participants identified administrative support as critical, and almost as many defined parental action along with education and training as important elements of an effective response.

As acknowledged by survey participants, no one factor alone can prevent IAQ concerns but rather many factors together must be in place to adequately address IAQ issues. No one or two item(s) can individually take care of all types of problems. Constant vigilance, monitoring, education, money, and assigned and voluntary responsibility were identified.

Some respondents were unsure as to the types of policies and guidelines that should be implemented. Also important to note was that there was little general awareness of the presence of policies or guidelines within their environments, or of the contents of such documents, suggesting improved information exchange about these policies is necessary.

Facilitators to Good IAQ Practice

Many factors working together were identified as helpful to facilitate good IAQ management:

- open communication and trust between all stakeholders
- availability of funds to address IAQ concerns
- support from administration, school boards, and maintenance personnel
- good leadership, particularly by the principal
- training and education to increase knowledge about proper IAQ management
- prompt reporting of problems, in writing if possible so as to create a record of IAQ concerns
- immediate response to reported problems
- regular IAQ monitoring
- regular preventative maintenance and cleaning, including proper use of cleaning agents
- development of, and adherence to, proper policies and procedures
- access to qualified professionals as needed
- use of the *Tools for Schools Action Kit*
- presence of a health and safety committee
- involvement of parents
- press coverage
- teacher complaints
- the availability of qualified professionals as an important third party opinion

Some respondents did not know what would help to facilitate IAQ management and others believed that there was nothing that could help ensure good IAQ management practices.

Barriers to Managing IAQ Concerns

The most significant barrier mentioned by survey respondents is the absence of sufficient funding to adequately address IAQ concerns in schools. Other barriers to good IAQ management include the following:

- lack of awareness, concern, and support from both administration and school boards
- scaling back of custodial and maintenance staff that leads to insufficient cleaning and maintenance procedures
- lack of training and education on IAQ issues
- lack of interest stemming from a disbelief that IAQ is a problem
- poor building construction
- poor air circulation
- the age of the building
- lack of communication and trust
- lack of parent involvement
- the fact that nobody is willing to take responsibility for the issue
- IAQ a low priority issue
- lack of IAQ standards, policies, and testing
- limited time to deal with the issue

Ways to Maintain Good IAQ

On average, administrative commitment, maintenance, and funding were the three highest rated actions believed to help maintain good IAQ. Having an IAQ coordinator in place was rated the lowest.

Respondents spoke a great deal about struggle and frustration at the lack of response to indoor air quality concerns, and cited personal examples of the impact of poor IAQ on themselves and their families. These ranged from extended absences from work due to ill health and reports of children experiencing extreme adverse reactions to their school environment. They also offered further suggestions on good management practices and ways to promote healthy IAQ.

The concerns identified are well expressed in the following poignant comments:

“IAQ in schools must be monitored regularly. Somebody has to care. As long as it is dealt with as just another thing to spend money on there will be a lack of political will, a lack of funding, and a serious lack of knowledge about the sad state of many of our schools...”

“The kids and teachers are the monitors ...believe and listen to them.”

3.2 Summary of Focus Groups

Perceptions and Experiences Related to IAQ

- Many people believe that IAQ is taken for granted and that it is only thought about when it becomes a problem. Most participants believe that this issue is becoming more common as schools age and maintenance needs increase. However, IAQ is generally viewed as a low priority amongst the range of other issues facing schools.
- Awareness of IAQ issues in schools is increasing due to increased media coverage of schools and other public sites experiencing IAQ or other environmental health problems and to the recent introduction of changes to occupational health and safety legislation.
- Indoor air quality is a subject that appears to not concern many people unless they are personally affected by it or they know someone who has suffered ill health as a result of poor IAQ, or the school has had a problem with poor IAQ. This generally holds true regardless of stakeholder type and is more a function of school site.

Symptoms

- Some of the symptoms participants identified as related to poor IAQ included: allergy and asthma-like symptoms; headaches and dizziness; fatigue; mental confusion; lowered immune systems; dry eyes, mouth, and nose; temperature-related discomfort; and difficulty learning and teaching in the school environment.

Contributing Factors and Responses to IAQ Problems

- Contributing factors to poor IAQ include: the design of the building; building materials; inadequate ventilation systems; cleanliness of the school; presence of carpet in the school; materials found/used in the school (furniture, teaching materials etc.); and scents.
- There are also those who believe not enough is being done to fix IAQ problems in schools. Some reasons for the lack of action include: lack of funds to fix the problem properly; IAQ is a low priority when compared to other school issues; lack of support from school boards and administration; only a minority of people become ill or attribute their illness to IAQ; and the difficulty of pinpointing the cause of someone's illness, which may be IAQ related.
- Communication of IAQ issues was identified as another area of concern, in particular, the communication process involved in reporting a problem through to its resolution. Complaints about the absence of feedback or inadequate feedback

were common. Teachers, students, parents, and administration report problems most often, while principals, administration, the school board, and Occupational Health and Safety Committees most often receive reports of problems.

- Trust and disclosure of information were also concerns with regard to IAQ testing. Often school occupants were unaware of what is being tested, when it is being tested, what the results are, and what, if any, health effects the air quality may be causing.

Roles of Stakeholders

- Everyone who contributes to IAQ in schools must be involved in a cooperative effort and take on various roles and responsibilities. The following roles and responsibilities were identified: teachers, students, and administration should create more awareness of IAQ issues; parents and school committees should advocate for safe indoor air; teachers, students, parents, and administration should report IAQ problems; OHS committees, school boards, and maintenance personnel must ensure the health and safety of workers; administration, maintenance personnel, school boards, and government must ensure the health and safety of students; maintenance personnel, school boards, and government must fix IAQ problems; government must provide funds; and teachers, principals, and administration must act as champions for safe IAQ in schools.

Suggested Solutions

- Solutions for IAQ problems suggested by participants include: more money; a commitment from administration, school boards, and government to make IAQ a priority; a champion in the school to move IAQ issues forward; regular IAQ testing and monitoring; reduced scents; removal of carpets; increased emphasis on clean schools; creating more awareness of IAQ; incorporating IAQ into the curriculum; tighter IAQ regulations; regular preventative maintenance; proper design of (new) schools; keeping a log of IAQ issues/ complaints and their solutions; keeping a log of health issues; and the successful implementation of IAQ guidelines.

Implementation Ideas

- A trained IAQ coordinator is needed at each school to champion IAQ management. The coordinator should assume certain roles and responsibilities:
 - to collaborate with the principal and school board representatives on the implementation of guidelines
 - to provide staff with background information on *Tools for Schools* to ensure buy-in
 - to involve students in the process by initiating awareness activities, involving the student council and other such activities

- suggest ways of finding teaching opportunities to encourage teachers to address the issue in the classroom
 - to create awareness of IAQ through education, having IAQ experts talk to the school occupants, arranging an IAQ day or week, or conducting a school wide survey on IAQ
 - to involve custodial and maintenance staff who are key in developing an IAQ management plan
 - to prioritize IAQ issues, train school occupants on IAQ checklist use and implementation
- Participants have suggested several keys to successful implementation of IAQ guidelines:
 - The entire school system must be prepared and committed to implement an IAQ management plan.
 - There must be support at the government and school board level. This includes not only a financial commitment but also direct contact with a school board representative who can ensure a prompt response to IAQ management issues.
 - Constructive communication must occur at all levels that includes an efficient reporting system of IAQ issues.
 - Setting goals to ensure early successes is helpful; a positive feeling about the program will help to ensure sustainability.
 - The IAQ management program should be implemented through existing mechanisms such as Occupational Health and Safety Committees.
 - Participants have also suggested barriers to successful implementation which include:
 - the number of hours involved in IAQ coordinator role
 - the need for financial commitment to solving potential IAQ management issues

3.3 Summary of Individual Interviews

A total of 25 responses were gathered, 24 by telephone interview. The bulk of the interviews occurred between April and December of 2001 with one taking place in January of 2002.

Interviews were conducted with representatives of the federal (Health Canada) and provincial governments at very senior levels, including staff of the departments of Education, Environment, Labour, Infrastructure, and Health. Respondents interviewed included senior education policy and planning officers, staff responsible for capital planning for school facilities, deputy ministers, provincial Medical Officers of Health, physicians in charge of Environmental Officers of Health, and others. Interviews were conducted with at least one, and sometimes more, government representative in each province, with the exception of Quebec, New Brunswick, PEI, the Northwest Territories,

and Nunavut, to get a sense of policy approaches to the issue in each jurisdiction. This was largely dependent upon the availability of potential respondents at the time.

IAQ consultants, who were experts in the field of indoor air quality or environmental health in the private sector or in university-based settings, were consulted. Representatives of school boards/districts Trustees/Councillors, administration, and facility managers/staff were consulted, as were a Provincial Public School Employers Association and a Provincial Teachers Federation. Interviews were conducted with school staff at a more local level as well, including a high school teacher who had with experience with the issue and with the *Tools for Schools Kit*. The objective was to get as broad a base of policy approaches, views, and experiences as possible from experts, federal and provincial government staff, and provincial associations representing the key stakeholder groups. There was also an attempt to seek out those with differing views about the issue to ensure a divergence of opinion was captured. Various interview guides were developed for this project component, all of which had similar content but were modified slightly to suit the specific target group/respondent.

Interviewees were asked about the following:

- perceptions and significant issues associated with IAQ
- problems experienced with IAQ
- current policies or practices
- best practices, keys to successful IAQ management
- barriers and contributing factors to good IAQ management
- recommended process to implement good IAQ management practice and/or guidelines, and the respective roles and mandates of stakeholders
- communication – current and proposed practices
- comments on Tools for School for those familiar with the *Kit*

The full report presents data in the following way:

- a discussion of perceptions, issues, views, and experiences provided by all respondents regardless of jurisdiction or stakeholder group they represent
- an overview of current funding programs, policies and practices by federal, provincial, and territorial government jurisdiction as it relates to IAQ
- unique perspectives of other stakeholders school boards/districts, Teachers Federation, IAQ consultants, and a community-based advocacy group

Perceptions and Issues

The most significant IAQ problems experienced by schools across the country are ventilation and mould. The primary contributor to ventilation problems is that many schools across the country do not have ventilation systems. This is particularly pronounced in buildings which have been constructed to be airtight. Mould issues arise

mostly from aging buildings that have not been well maintained; the building envelope has been compromised and remedial steps, where taken, have not been adequate to address the problem. Portables also have significant mould issues.

Jurisdictions are grappling with the same issues associated with IAQ across the country at the provincial and school board levels. The most significant issues identified in the interviews were:

- the uncertainty and inexact nature of the science supporting IAQ, and therefore the resultant difficulty with problem definition, measurement, and response
- the degree of fairness and objectivity of the process to address IAQ problems
- the nature of the relationships among stakeholders and the degree of trust among those partners

The degree of cooperation, or conversely hostility, among stakeholders varies from province to province. In some provinces, relationships appear to be positive between the provincial Departments of Education and school board/divisions (administration and board members) where in others they appear to be quite strained. Relationships between school boards (administration and trustees) and teachers are also poor in some areas.

Further, the relationship of school boards with parents is extremely sensitive. The nature of this pre-existing relationship – its patterns of communication and decision-making and past behaviour – influences how contentious issues such as IAQ are addressed. The absence of a common understanding of the problem contributes to the difficulty of the working relationship. Because all stakeholders do not share the same level of awareness, knowledge, and understanding of the problem, even defining the existence of problem is difficult, let alone reaching agreement on a solution. This is further complicated by the inadequacy of science to determine by some objective measurement or standard the presence of a problem. While there are *indicators* and tests which help with this task, the diagnosis of a problem must be based on a broad investigatory approach which acknowledges school occupants' health symptoms as legitimate, and examines, from a practical point of view, the school building itself and it's the functioning of its operational systems. As with so many other health issues, because one cannot identify what the source of the problem is or label the problem, this does not mean a problem does not exist.

Relationships

The depth of trust that exists, or not, among parties colours their ability to work together and their confidence in the identification of the IAQ problem, including interpretation of test results, and the proposed solutions to mitigate the problem. Where problems have been identified and acted upon quickly and satisfactorily, relationships tend to be generally positive. Where the response to a problem is characterized by denial or an inability to respond because of resource constraints, relationships are not positive. However, in some cases, the cause is not known and ill will on anyone's part does not help the situation. It is imperative that ways be found to work together in a constructive

manner and that time be spent on relationship building. Building partnerships and collaborative relationships are time consuming, but no less so than the time it takes to do “damage control” usually in the press later, and to deal with the resultant ill will created that permeates the various other issues of concern. However, it is also just as important to respond with action that is appropriate and sufficient to address the problem itself, rather than with a politically expedient solution. Resources do need to be spent wisely and the process of decision-making with respect to allocation of resources should be fair and based on the area of greatest need.

Communication

Communication is a critical component of any positive working relationship. It takes time to build trust and credibility among stakeholders and open communication is a basic cornerstone of trust. Attempts to hide IAQ problems or test results will be interpreted as denial of the problem and malevolent motives will be attributed to those in authority. This will undermine any ability to achieve a satisfactory solution to the problem. A communication plan is needed as part of a broader IAQ management plan that involves key stakeholders. Complaint investigation procedures and communication protocols (which specify the steps for identifying and responding to a problem, for sharing and interpreting test results, and for informing wider community) can help clarify expectations in this regard and improve communication, and hence relationships among parties.

Some attitudinal and knowledge barriers can be addressed by education and awareness efforts, which will improve relationships.

Policies, Practices, and Funding Approaches

Some governments have set aside designated funds for remedial repair and for emergencies. The amount of funding available for this purpose, however, differs among jurisdictions. As well, some provinces have developed complaint investigation procedures and protocols. School boards/districts have developed their own such protocols, as and some have also developed IAQ management guidelines as a set of best practices which, among other things, encourage preventive maintenance, outline regular inspection and cleaning regimens, and other practices. The presence or absence of such protocols or policies and guidelines and their scope differs among jurisdictions as well. There is much more emphasis in BC, for example, on WCB regulations and their impact in ensuring good IAQ.

School boards/districts/divisions, as they are variously known, have direct responsibility for the maintenance of good IAQ in schools but the responsibility to provide adequate funds to do so resides with the provincial government (Department of Education or equivalent). School boards have suffered from budget reductions in maintenance personnel with an increase in contracting out (which was said to compromise preventive maintenance and cleaning practices) and in capital funding for repair. Most, in the last decade of budget reductions, have chosen to protect the allocation of funding to “the

classroom” and reduce capital and maintenance budgets (and perhaps rightly so) in the difficult juggling exercise of balancing their budgets. However, the result has had an impact on the level IAQ in schools. Of late, the thinking appears to be to place priority on budget items which have an impact on health and safety, as compared to other repairs

Best Practices/Keys to Successful IAQ Management

The degree of success in achieving change in IAQ management practice at the school board level appears to hinge on leadership within and external to the district – leadership of the provincial government in encouraging the adoption of such practices (and perhaps providing a model set) and providing the funds to do so; leadership at the board level to approve funds for such activities; leadership of the district facility managers in supporting such practices and ensuring the work gets done; and leadership at the school level (principal) to support IAQ initiatives. Changes in preventive maintenance – a key contributor to good IAQ – can largely be influenced by facility managers and their understanding of the value of these activities so training and sufficient funds to carry out the work at this level appear to be critical success factors. A shift in thinking needs to take place at the school board level – indeed at all levels – which places value on good IAQ and good IAQ management practices.

Governments need to be prepared to invest in both infrastructure (to repair and remediate structural problems, and ensure preventive maintenance) and staff (for preventive maintenance) to prevent IAQ problems. In order to implement good IAQ management practices, the necessary will, education/awareness about IAQ, training in how to identify and respond to IAQ problems as appropriate to individual roles, development of an IAQ management plan, involvement of all key stakeholders, preventive maintenance and structural remediation, and funding to support these efforts is required.

There are so, so many players in this arena, emphasizing the need for a coordinated effort. This section of the report outlines the sheer difficulties of this task. It also supports the introduction of policies and management guidelines or practices to promote good IAQ and healthy learning environments, particularly for children who have greater sensitivity to poor IAQ; the input of stakeholders into the development and implementation of such practice guidelines; the delivery of IAQ training based on the roles of the various players/target audiences; the provision of access to resources and to expert consultation and advice both in IAQ and in the health profession; the adoption of a team approach to identification and resolution of IAQ problems; the adoption of explicit complaint investigation procedures and communication protocols; the promotion of relationship building efforts; the use of conferences to share learnings, update findings, and promote cross fertilization of perspectives; the provision of funding to fix the problems; and the development of long term IAQ management plans. There is some interest in the development of improved IAQ standards in the interests of objectivity but this is not universal; nor is this approach without its shortcomings.

The difference one individual can make – positively or negatively – is striking. A champion willing to action on the matter can influence the outcome in significant ways.

Attitudes and beliefs also shape problem resolution: a response of denial changes the tone of the conversation and relationship immediately, and this is difficult to overcome making it difficult to work in a positive, pragmatic way toward solutions.

Implementation Strategies

The suggestions for implementation are similar – and could apply to any set of guidelines, including *Tools for Schools*. The routes of influence and leadership may differ among provinces/jurisdictions but the players who need to be involved are essentially representative of the same stakeholders. A flexible application of guidelines is necessary among jurisdictions. The time it takes to implement such guidelines (for IAQ management practice, for complaint investigation and response, and for communication) and the level of effort required, will be influenced by the nature of the relationship already existing among parties and by the type of policies, practices employed, and guidelines already in place.

3.4 Summary of Pilot Test Results

A pilot test of the USA EPA *Tools for Schools Kit* was implemented from the spring of 2002 (April/May) to October/November 2002. Pre and post pilot interviews were conducted with 40 participants (the 5 IAQ team members from all 8 pilot sites), the purpose of which was to get a baseline of knowledge and practices concerning IAQ at the school, to determine if the project achieved its objectives, and to identify the critical success factors and prospects for sustainability.

Schools Not Implementing the Project

While all school formed their IAQ teams, as requested by the project before commencement in order to conduct pre-interviews, the extent of their activities varied and some teams did not even meet. Of the eight pilot schools, two were not able to implement the project at all. These, perhaps not surprisingly, were hands off schools. Their efforts were limited to a review of the *Kit* and video or a meeting of principal, vice principal and maintenance staff in another. The *Kit* was not used nor was the Supplementary Guide in either of these cases and no plan was developed or tasks identified. Both felt IAQ was not a priority because the school was considered to have good IAQ. One said that the pilot project helped to highlight or bring to the forefront for presentation to the board tasks or problems identified prior to the pilot. Increased awareness was still seen in one school as positive outcome. There was increased awareness about individual roles and responsibilities for maintaining good IAQ. It also reaffirmed for one school that the school had good IAQ enhancing the comfort level of occupants.

A negative outcome was the frustration experienced at not having sufficient time to get the team together to work on the initiative. The biggest barrier for these schools (as well

for those who did take action) was time. Training was the necessary “jump start” to the project that these schools said they needed.

Changes to IAQ or IAQ Management Practices

All schools reported an increase in awareness about indoor air quality (although the two that did not implement the project said this was confined to the IAQ Team or fewer people only). Most respondents said that people were more aware, became more vigilant, more people became involved in maintaining good IAQ, and there were more open discussions and greater communication about the issue. Most reported no change to IAQ (with the exception of one as a result of cleaning of the vents) or to IAQ management practices, largely because they said they were engaging in the appropriate practices already, though this was not independently verified.

Use of the Tools for Schools Kit

Most did not use the *Tools for Schools Kit* in its entirety. Some used it primarily as a reference document, some used or adapted its contents specifically the checklists, one created a survey for distribution to staff, and one distributed the backgrounder to students, staff, and parents on the Home and School Association. In over half of the sites, teachers and staff (i.e. the stakeholders as identified in the *Kit* checklists) were asked to complete the checklists as prescribed in the *Kit* or an abbreviated or modified survey. Responses to the *Kits* checklists varied: sometimes it was welcomed as a means of identifying concerns and/or supporting prior IAQ complaints and sometimes it was seen as unnecessary, either because staff had no faith in the outcome (i.e. that any action would be taken), or because it was time consuming and “better left to the experts”, or there was not an IAQ problem.

In about half the sites, staff and teachers contributed to identification of problems by completing a checklist or abbreviated survey designed to reduce the data collection burden on teachers. In others, only the “core team” comprised typically of the principal, teacher, and custodian/chief caretaker/building manager, did a walk through of the school and used the checklists to denote problem areas for follow-up. Generally, participants found the *Kit* to be helpful. It was useful in making people aware of the many things factors contribute to good IAQ.

Use of the Supplementary Guide

The Supplementary Guide developed by the project was used a reference document only, if at all, although the concepts were described as helpful, generally little use was made of the document. However, this may be more a function of time available to execute the pilot as well as the fact that school board support was already obtained by the project prior to school involvement. There were no negative comments on the contents or suggestions for revision.

Development of an IAQ Management Plan and Outcomes Achieved

Most did not develop an IAQ management plan per se (with activities to be undertaken and timelines for completion), although some identified activities they wished to undertake as a result of the visual inspection of the school.

Six schools conducted a walkthrough of the school building. Tasks completed and positive outcomes achieved during the process varied from increased awareness and visual inspection to identify problem to the introduction of IAQ sensitive policies to redesign of a building to relocate the industrial arts shop room to an exterior building to reduce dust and airborne contaminants. Some only got to the point of distributing checklists and did not tabulate the results to identify concerns, let alone complete any tasks. Some reached the stage of documenting the results of the visual inspection. Others did achieve significant results.

Where outcomes were achieved, they were as follows:

- cleaning of the ventilation system and ductwork which hadn't been done since the school was built 15 years ago
- changes in cleaning practices and enhanced or more rigorous cleaning (tiles, carpets; vents in classrooms cleaned on a regular basis)
- painting of the walls
- increased awareness of IAQ issues
- replacing of gyprock damaged by water which caused mold to form
- one teacher an IAQ Team member had his class develop posters promoting good IAQ.
- introduction or revisiting of policies regarding new construction, off gassing, scents

One school implemented new policies:

- requiring new furniture to be aired prior to placement in the school
- sufficient time for fumes arising from materials used in construction to dissipate prior to occupation (e.g. gym)
- construction and repair activities under warranty were required to take place after school hours
- a zero tolerance policy for scents was introduced/revisited
- cleaning supplies were examined and replaced with environmentally friendly and less chemically sensitive materials
- the school was redesigned to locate the Industrial Arts (Technical Education) room to an external on-site building eliminating odour, sawdust and other particles from circulating in the main building of the school.
- a laminating policy was implemented to minimize odour and IA issues.
- more emphasis was placed on the no-smoking (near the school) policy.
- considered purchase of IAQ testing equipment
- used an existing community-based Committee to support IAQ efforts

Because this school was completing construction at the time of the pilot, the school had the opportunity to introduce new policies concerning IAQ that they might otherwise had not had.

For those who were involved in the team, ventilation and temperature remained concerns identified in the visual inspection of the school. In some cases, it was not clear what policies and practices pre-dated the pilot and which were solely outcomes of the project as similar items are cited in both the pre and post pilot stages. It seems they may simply be more educated in identifying good IAQ management practices heightened awareness and knowledge of practices was an outcome of the project.

Comparison between Hands on and Hands off Schools

The primary differences between “hands on” and “hands off” schools were:

- training – this was, with the exception of one respondent, universally identified as beneficial to both recipients and non-recipients of training. Training served as a catalyst to get the project going and provided an opportunity for participants to ask questions, learn from each others’ experiences both from the perspective of other stakeholders within their own school and from other schools; review the contents of the *Kit*, clarify expectations of schools for the project, and begin the process of development of an IAQ management plan. Schools which received training this identified this as a critical success factor and those who did not said this was a major stumbling block. Sometimes they were unclear of the expectations, unsure how to proceed, lacked motivation, and had a more difficult time creating opportunities to even meet, let alone develop a plan of action. This was clearly reflected in their relative progress: those with training achieved more outcomes than those which did not.
- outcomes were significantly different. Those without the orientation session achieved little more than increased awareness about IAQ while those with training reported other outcomes in addition to increased awareness. Two hands off schools did not implement the project at all while the other two reached the visual inspection stage but their IAQ teams did not meet, problems were not identified, and no follow-up corrective actions were taken.

Barriers and Success Factors

While school board support was important, the real driver was the Principal.

Critical Success factors supporting their efforts were identified as:

- training
- leadership of the Principal/Vice Principal and secondarily the IAQ Coordinator, although these roles were often shared by the same person
- school board support

- active core group on the team

Other secondary factors identified were:

- funds from the school board (in one case)
- janitorial/custodian/maintenance support
- knowledge and expertise provided by the building operator
- changes did not cost a lot of money

It was suggested that what was needed were the following:

- a “champion” with the time and interest to take charge of the initiative
- a group of two or three others to work with the person to share responsibilities
- the Principal and custodian need to work closely together
- designated time to implement the program
- orientation and training on the *Kit* and the management plan

Although funds were provided by the project and the Department of Education for minor remediation efforts, both the existence of these funds and the process for accessing these funds from the school board was not clear to most of the IAQ teams. Only one school accessed funds from the school board for cleaning of the ventilation system.

Barriers were:

- time – some IAQ teams were unable to devote the time necessary to completing the tasks
- funds where money as insufficient to complete a task to remediate a problem; more funding was needed to complete ductwork cleaning, replacing the drapes could not be done because of funding constraints; funds were not used, with the exception of the training session, to free up time for staff to work on the project
- timing of the project – it began at the end of the school year and while motivation may have been initially high following training, this was lost over the summer months and teams had difficulty starting up again in the fall. The project did initiate contact with all schools as a reminder to start their teams again but the process was sluggish and some never did begin again. It is important to capitalize on initial momentum offered by training and to use the training session to begin development of plans. As well, from an IAQ perspective, some IAQ problems appear only in the winter months.
- staffing The fact that custodial and maintenance staff are off over the summer means that very little work gets done with respect to IAQ.

Suggestions to enhance implementation and improve outcomes were:

- increase involvement of parents and wider community
- increase communication between parents and the school about initiatives like IAQ and what is being done to enhance success
- increase involvement of students (especially regarding the observance of scent policies, storage of food in lockers, etc.); poster campaigns would increase awareness and change behaviour; involve student council; stage a student-sponsored IAQ Awareness Week
- incorporate this into curriculum
- provide teaching opportunities in the classroom to address IAQ issues (classroom project in science for example) develop an actual IAQ management plan as a tool to track IAQ Team progress and create a sense of shared accomplishment as tasks are completed
- ensure items receive a quick response to ensure credibility of the initiative
- conduct walkthroughs with someone knowledgeable about the building admits operating systems

Prevention Approach

Most thought that the *Kit* was effective in promoting the adoption of a preventive approach to IAQ management but worried it would lapse once the initiative was over to one which was simply reactive to problems. Maintenance and janitorial staff were seen as key players to have on side in this effort.

Team Approach

The team approach was universally welcomed. This was seen as recognition that promoting and maintaining good IAQ was a shared responsibility; everyone had a role to play and resolution of problems did not weigh heavily on the shoulders of one person.

Participants appreciated the opportunity to dialogue with each other and it helped to break down barriers with each other particularly with custodian/building managers. For others on the team, this presented a chance to learn how the building and its systems function and to understand the difficulties facing building managers. It became clear that this person played a key role in good IAQ and was an integral part of the success of the project. It became as much a relationship building exercise as a chance to take corrective procedures. There was a real sense of support and the airing of different opinions was useful. Some said parents provided a useful and different perspective. One mentioned the team approach was useful in swaying negative attitudes and opinions of IAQ issues.

The project brought together stakeholders who do not usually work together. It had much more potential than what was actually accomplished. The team approach also brought together people with different expertise which proved helpful in looking at the problem from different perspectives – the building operator knows how the ventilation system works, teachers know about their individual classroom environment, administration

knows the ins and outs of operating the school, and this contributed to problem identification and resolution.

Overall, there was little parent and student involvement, although these stakeholders were represented on the IAQ team. It seemed that most schools/IAQ coordinators found it simply more expedient to meet without these stakeholders. This seemed to be both a function of expediency/pragmatism (it was easier to get staff at the school together, both formally and informally, to conduct walkthroughs and discuss action) and of wariness of parental involvement (potentially complicating the process and exposing the school to external criticism). Students were not seen as particularly relevant by most teams, except one who actively involved students in a classroom activity to increase awareness. However, it seemed this was also a function of the stage of the effort.

Training Workshop

Training, with the exception of two respondents from one site, universally identified as beneficial to both recipients and non-recipients of training. Training served as a catalyst to get the project going and provided an opportunity for participants to ask questions, learn from each others' experiences both from the perspective of other stakeholders within their own school and from other schools; review the contents of the *Kit*, clarify expectations of schools for the project, and begin the process of development of an IAQ management plan. Schools which received training this identified this as a critical success factor and those who did not said this was a major stumbling block. Some said without the training workshop, and the project for that matter, none of the outcomes would have been achieved.

Sustainability

Some sites planned to incorporate the responsibilities of the IAQ committee into the OH&S Committee. The IAQ team whose members have joint membership with the OH&S Committee intend to also continue active involvement.

Participants made a number of suggestions to enhance the possibility for sustainability of the initiative:

- Link the IAQ initiative and the implementation of *Tools for Schools* with existing structures and mandates, specifically OH&S Committees. This would enhance the likelihood of sustainability. IAQ teams could operate functionally as subcommittees or separate committees with close links the OH&S Committee. OH&S Committees are mandated by law in this province and therefore have a sustainability that does not exist with the IAQ teams.
- Provide ongoing in-service orientation and training workshops.
- Incorporate the project into new school at the outset to enhance the notion of a prevention approach; involve school representatives in design and construction phases).

- Implement *Tools for Schools* through the OH&S Officers at the school board level who can then support schools with implementation on an individual basis.
- Conduct walkthroughs on a semi-annual basis.
- Incorporate tasks into the daily activities of the custodian.
- Involve both OH&S Officers and Building operators in the implementation process. These two groups meet regularly with their provincial counterparts to discuss issues of mutual concern. This presents a great opportunity to secure their support of the initiative, standardize good IAQ management practices (preventive maintenance, cleaning) around the province, and share concerns and solutions on a peer-based level.
- Institute mandatory regular inspections of schools conducted by government.
- Free up time for IAQ team members to participate in such an endeavour (time for meetings and inspections and other activities) similar to the OH&S Committee.
- Make the IAQ Committee a more recognizable group within the school so occupants know about the initiative.

Post Pilot Interviews with School Board Staff

Four interviews were conducted with representatives of the two school boards in the pilot to determine their views about the relative success of the pilot project.

Critical Success Factors

Critical factors to ensure successful implementation of *Tools for Schools* were considered by board representatives to be:

- Cost effectiveness costs must be feasible.
- Involvement of teachers a core staff willing to work on such an initiative is necessary.
- Training followed by periodic in-servicing to address any problems that may arise.
- The tool has to achieve some success.
- A resource person tasked with assisting schools to implement the *Kit* and providing support as needed in order to quickly address problems.
- Effective selling of the product is necessary it cannot be imposed by the school board; one must demonstrate benefit of using the *Kit* to schools.
- Support from the Department of Education both to promote the *Kit* and provide funds to assist with implementation.
- School boards (administration and operations staff) must endorse the product.

Respondents were not sure about the extent to which the provision of additional funding and the support of project staff or specifically designated person were essential ingredients to implementation, given that funds had not been accessed for the pilot. However, it was thought that some funds would be necessary.

Prospects for Sustainability

The practices proposed by the *Tools for Schools Kit* and were seen as consistent with the practices of the OH&S Committees and with complaint reporting at the schools and therefore could dovetail nicely. It was felt that working through the OH&S Committees and the Facilities operations managers would be the most effective route of implementation and would enhance the likelihood of sustainability of the initiative. Links with maintenance are critical to ensure immediate action is taken in response to identified problems.

Other Comments

In terms of introducing this *Kit* to schools, it is suggested that a brief outline of the *Kit*'s contents, its purpose, general instructions for its use (complete a visual inspection, develop an IAQ management plan, determine a means of identifying problems and communicating information) and considerations for establishment of the IAQ Team (either as a Subcommittee of the OH&S or separately), be outlined, and its relationship to other policies and complaint protocols that may exist. This may well supplement other components already developed or might trigger a need for such policies, complaint investigation protocols, and communication plans. There needs to be an ongoing mechanism of surveillance of problems/complaints identified, monitoring of ventilation and temperature and other operating systems, routine maintenance practices, and a clear mechanism for identifying and reporting back on complaints. Mechanisms for increasing parental and student involvement need to be implemented, and many good suggestions for doing so can be found within this section.

Length of the checklists and their appropriateness for teaching staff was a concern. They were seen as potentially laborious and, in some cases, too technical for teaching staff to complaint (e.g. checking air vents and air flow). Pilot sites found ways to get around this by creating abbreviated lists or surveys and essentially shifted the burden for the physical building inspection from teachers to maintenance and administrative staff/IAQ team members themselves. In this way, staff could still have input into identifying concerns (too stuffy, hot, etc.), but diagnosis and checking of the air vents and operating systems were left, and perhaps more appropriately to, maintenance staff who had knowledge of the systems.

It seems unrealistic to expect, from this experience, that the *Kit* would be implemented in its entirety as laid out. It is a useful resource but a simplified means of execution is needed. Schools must be able to implement the *Kit* with flexibility, adapting it to their needs. The danger in this approach is, of course, that something may be overlooked but from a pragmatic point of view, in order to ensure implementation, a flexible approach is necessary. This approach must be supported with initial orientation/training, followed by regular in-service opportunities to share updated information, knowledge in the field, and experiences. Building operations staff may need more technical training to supplement the general overview provided to other IAQ team members. The format of bringing different stakeholders from different schools together was a positive and useful experience where they both work in their own school-based teams to develop their IAQ

plan and in a large group forum to have the opportunity for discussion of common concerns.

A few schools were clearly not that interested in participation usually because IAQ was not seen to be an issue or because of time constraints. They appeared not to have a particularly supportive attitude by the end of the process, which may have been a function of feeling a sense of failure. There were sites in which morale appeared to be low, there was a sense of frustration, and there was not interest or support or leadership locally in devoting the time to the project. In others, time was a barrier and the priorities of the day took precedence. This was particularly true in schools that did not have a perceived IAQ problem or did not have the opportunity, as with new construction for instance, to implement new policies or practices. As indicated earlier, while school board support was important, the real driver was local leadership, usually by the principal and IAQ Coordinator.

The timing of the project was not ideal: the break in the summer served to reduce initial motivation gained from the training session and the duration of the pilot was too short. A school year would have been preferable. However, while the project sites may have made more progress, it is unlikely that the issues of concern would be any different. The barriers identified herein would still be a concern: time constraints, interest, local leadership, the length of the *Kit* and mode of use of checklists, for example. The critical success factors are also likely to be similar: training, local leadership/a “champion” for example.

Some attention should be devoted to an accountability framework and motivators to encourage schools to continue with such an effort should it be started. A follow-up workshop to report on progress and discuss challenges may help in this regard, as well as some encouragement from the school board. Surprisingly, funding was not sufficient to do so. Building a network of IAQ friendly schools might be helpful. Although all schools were encouraged to continue with the initiative after expiration of the pilot, it is unlikely many will do so without follow-up. Some have indicated they would continue with the work, although some by placing responsibility for IAQ with the OH&S Committee. Some mentioned they would continue with the effort until June on their own. However, there was a distinct feeling by project staff that recent efforts (made in the fall) were more driven by the fact that post-pilot interviews were going to be conducted and a report on progress made would be required than any intrinsic motivation internal to the school. Training also served as motivator.

4. SUMMARY, RECOMMENDATIONS, and CONCLUSION

4.1 Summary

The findings from the four primary data sets are remarkably similar, although each provides a different focus on the issue from different perspectives. It has resulted in a full, frank and wide-ranging discourse about the issue of IAQ.

Those concerned with IAQ in schools responded to the web site survey. The data demonstrates both the depth of their concern and their sense that little is being done to either acknowledge or correct the problem, which has resulted in a great deal of frustration.

These sentiments were also apparent in the focus groups and, to a lesser degree, in the individual interviews and pilot test results. The focus groups, in particular, provided a sense of multiple perspectives within a school site. The individual interviews illuminated the positions of the various government departments and school boards as decision-making authorities in IAQ issues and the difficulties and complexities of dealing with this matter as a public policy issue. Associations and advocacy groups were also able to identify unique concerns from their perspective.

It seems all are agreed on the value of prevention and have identified preventive maintenance and good cleaning practices, as well as ensuring major structural repairs to ensure a secure building envelope, as key actions required to ensure the maintenance of good IAQ. Most IAQ related problems across the country are related to inadequate ventilation and mould. Health issues perceived to be associated or attributable to poor IAQ are: headaches, lethargy, confusion, respiratory difficulties, exacerbation of asthma and allergy-like conditions, and in some cases, more severe reactions. The use of scented products was also mentioned to a lesser extent, primarily by students and some teachers, with respect to the degree of understanding and acceptance of limits on behaviour concerning personal choice, as well as the degree or limits of the policy (no scents, reduced scents) and the means of affecting and ensuring observance of these policies. While enforcement was mentioned, most preferred an education and awareness approach with constant reminders rather a punitive response to enforce compliance.

There appears to be greater awareness of this issue the importance of IAQ and its impact on individuals and this awareness continues to grow. All share the goal that school should be healthy learning and working environments for children/youth and staff.

Although there is some concern the inadequacies of science in measuring and diagnosing IAQ problems, and the absence of a cause and effect relationship between poor IAQ and poor health, particularly among health officers, by and large, IAQ is a genuine concern among government policy-makers. There is agreement as well, in principle, on the value of a preventive approach and support for an emphasis on preventive maintenance and good cleaning practices. Some jurisdictions have earmarked funds for capital (renovation, repair, and new construction) and operations (maintenance) to support this

approach and one has introduced a compliant investigation protocol. While other jurisdictions have these protocols and procedures, they have been developed at the school board level and contents vary within a jurisdiction. The most significant issues identified in the interviews were the uncertainty and inexact nature of the science supporting IAQ, and therefore the resultant difficulty with problem definition, measurement, and response; the degree of fairness and objectivity of the process to address IAQ problems; the nature of the relationships among stakeholders and the degree of trust among those partners; and the (in)adequacy of communication mechanisms among stakeholders.

The challenge for governments is to ensure value for money to deliver cost-effective solutions for IAQ problems, fairness in the identification and response to needs, and balancing IAQ issues among the other priorities of the day. Managing public opinion and expectations and communicating knowledge about IAQ issues is also a challenge. This report demonstrates the value of open communication and the importance of acknowledging a problem where one exists. Enhancing communication between school boards, schools, and the Department of Education on the one hand and their constituents on the other is necessary, as are mechanisms by which to build public trust in these institutions. While school boards have responsibility for maintaining school buildings and therefore good IAQ within these structures, they are essentially entities created by provincial statute and delegated authority for management of schools. They also exercise their functions within the parameters of the budgets provided to them by the province, making IAQ essentially a shared responsibility.

*IAQ is
a
shared
responsibility*

The degree of success in achieving change in IAQ management practice at the school and school board levels appears to hinge on leadership within and external to the district leadership of the provincial government in encouraging the adoption of such practices (and perhaps providing a model set) and providing the funds to so; leadership at the board level to approve funds for such activities; leadership of the district facility managers in supporting such practices and ensuring the work gets done; and leadership at the school level (principal) to support IAQ initiatives. Changes in preventive maintenance a key contributor to good IAQ can largely be influenced by facility managers and their understanding of the value of these activities so training and sufficient funds to carry out the work at this level appear to be critical success factors. A shift in thinking needs to take place at the school board level indeed at all levels which places value on good IAQ and good IAQ management practices.

Governments need to be prepared to invest in both infrastructure (to repair and remediate structural problems, and ensure preventive maintenance) and staff (for preventive maintenance) to prevent IAQ problems. In order to implement good IAQ management practices, the necessary will, education/awareness about IAQ, training in how to identify and respond to IAQ problems as appropriate to individual roles, development of an IAQ management plan, involvement of all key stakeholders, preventive maintenance and structural remediation, and funding to support these efforts is required.

There are so, so many players in this arena, emphasizing the need for a coordinated effort. This report outlines the sheer difficulties of this task. It also supports the

introduction of policies and management guidelines or practices to promote good IAQ and healthy learning environments, particularly for children who have greater sensitivity to poor IAQ; the input of stakeholders into the development and implementation of such practice guidelines; the delivery of IAQ training based on the roles of the various players/target audiences; the provision of access to resources and to expert consultation and advice both in IAQ and in the health profession; the adoption of a team approach to identification and resolution of IAQ problems; the adoption of explicit complaint investigation procedures and communication protocols; the promotion of relationship building efforts; the use of conferences to share learnings, update findings, and promote cross fertilization of perspectives; the provision of funding to fix the problems; and the development of long term IAQ management plans. There is some interest in the development of improved IAQ standards in the interests of objectivity but this is not universal; nor is this approach without its shortcomings.

The suggestions for implementation are similar – and could apply to any set of guidelines including *Tools for Schools*. The routes of influence and leadership may differ among provinces/jurisdictions but the players who need to be involved are essentially representative of the same stakeholders. A flexible application of guidelines is necessary among jurisdictions. The time it takes to implement such guidelines (for IAQ management practice, for complaint investigation and response, and for communication) and the level of effort required, will be influenced by the nature of the relationship already existing among parties and by the type of policies, practices employed, and guidelines already in place.

Certainly low cost strategies that empower schools at the local level to act on their own initiative to solve their IAQ problems, provided the necessary supports are in place, are welcomed by all stakeholders.

There must be a supportive climate at the school board level for this type of initiative and the departments of Education can be influential in that regard. However, if *Tools for Schools* or IAQ management practices are to be changed/enhanced to support good IAQ, then the building maintenance staff need to be on side and the school-based administration must exercise leadership. As demonstrated by the *Tools for Schools* pilot project, the principal or some such “champion” was the real driver of the process. It also demonstrated the need for a range of supports to be in place to sustain the effort.

While there is disagreement on the need for and value of improved testing and standards for IAQ, there is a greater, although not unanimous, agreement about guidelines for management practice, and compliant investigation protocols, and communication strategies that inform the community about IAQ efforts.

Tools for Schools was tested as a model for diagnosing and solving problems, within the limits of their own knowledge and resources, as well preventing IAQ problems. The tool:

- encourages local ownership of the issue
- empowers schools to take action to promote healthy IAQ in their environment

- involves all stakeholders (potentially)
- encourages collective action and the adoption of a team approach to IAQ problem identification and resolution which both increases the sense of shared responsibility (and reduces the potential for blaming) and increases communication
- offers practical, low cost strategies to address IAQ problems
- encourages routine visual inspection as means of initial problem diagnosis and prevention
- gives the school some capacity for problem diagnosis; avoids having to call a specialist at the outset, potentially saving costs

It also and perhaps most importantly, provides a focal point of responsibility for acknowledging and acting on IAQ issues. More effort appears to be required at the beginning to launch the program, coordinate a team, identify a an IAQ Coordinator, conduct a walkthrough, complete checklists, develop an IAQ management plan, and undertake identified activities. Once this work has been done, routine inspection at key intervals and observance of new practices may be all that is required, along with awareness activities.

The primary difficulty is the time required to invest in such an approach. However, pilot school sites found unique ways to lessen the burden, on teaching staff in particular, and more fully utilize the expertise of the building manager/custodian to implement this *Kit* – key factors contributing to success. This also counters some concerns expressed about the use of the tool by study respondents. If *Tools for Schools* is offered, then a flexible approach to implementation will be necessary. The *Kit* was generally seen as a useful and practical tool. Checklists may require amendment to remove the technical aspects of ventilation workings and the like from the teachers list and place them on the maintenance or walkthrough list as this is how they were implemented in many school sites. There was less emphasis placed on changes to the *Kit* as there was on the need for accompanying supports.

The *Kit* also should be accompanied by a short overview in essence a briefing note describing the purpose of the *Kit*, its contents, the process by which it encourages action on IAQ issues, the role of the school board and school in providing leadership in implementation, and the supports that should accompany the *Kit* (funds and a process for assessing funding for mitigation efforts, if required; training and on-going in-service opportunities; technical assistance at the board staff level; etc.), the need for a communication strategy and the involvement of other stakeholders. Part of the great difficulty in addressing this issue stems from lack of a common understanding and the lack of mechanisms to work together for solutions in a positive and supportive climate. While schools are highly reluctant to involve external players in initiatives, this division contributes to a lack of public understanding and the potential for poor relations with the community. Work needs to be undertaken in this regard and *Tools for Schools* is one method for doing so. It should also be placed in the context of an IAQ management plan; this *Tool* might assist in that development. Complaint investigation protocols are also a part of the range of tools needed to address the issue; *Tools for Schools* is but one

component piece an integrated management strategy required to properly address this issue.

Because the management of many issues, including IAQ, flounder on the nature of the relationships among stakeholders, the degree of trust or mistrust, and the quality of communication, time was spent developing a Guide for use as a supplement to the *Tools for School Kit*. The Guide was intended as a means of garnering stakeholder support, enhancing communication and understanding about IAQ, and encouraging a collaborative approach. It was intended to assist in breaking down some of the barriers identified in earlier phases of the project by study respondents.

Time was limited in which to implement the pilot project and therefore opportunity to test the Guide was limited. Little time was devoted to the tool in the training session as well. While it was not used extensively in the pilot test, this may have been an unfair assessment of its value, particularly since it was used as a means of securing stakeholder support on another issue and the Project had already secured Dept of Education and school board support prior to the execution of the pilot test. Although designed around IAQ issues, it does have general applicability to other school and non-school based issues where enlisting stakeholder support is important to the success of the endeavour. It should be offered as an additional resource to both accompany *Tools for Schools* or any other IAQ management guidelines that may be implemented, as well as a general resource for building stakeholder support for initiatives and collaborative relationships.

The basic ingredients for successful implementation of this policy approach are the same as for any other and are identified in the following set of recommendations, supported by the suggestions of study participants.

4.2 Recommendations

This report supports the introduction of policies and management guidelines or practices to promote good IAQ and healthy learning environments, particularly for children who have greater sensitivity to poor IAQ; the input of stakeholders into the development and implementation of such practice guidelines; the delivery of IAQ training based on the roles of the various players/target audiences; the provision of access to resources and to expert consultation and advice both in IAQ and in the health profession; the adoption of a team approach to identification and resolution of IAQ problems; the adoption of explicit complaint investigation procedures and communication protocols; the promotion of relationship building efforts; the use of conferences and other opportunities to share learnings, update findings, and promote cross fertilization of perspectives; the provision of funding to remediate IAQ problems and coordinate implementation of IAQ guidelines/base practices, including *Tools for Schools*; and the development of long term IAQ management plans. There is some interest in the development of improved IAQ standards in the interests of objectivity but this is not universal; nor is this approach without its shortcomings.

Many ideas have been suggested to facilitate implementation of good IAQ in school environments within each section of the foregoing report. The following set of recommendations does not list each idea offered but rather, attempts to summarize, in a global way, the key recommendations made. Readers are directed to the suggestions and recommendations contained within the report for more detailed examples. The following are recommendations based on the study results.

1. **Coordinated IAQ Management Strategy** It is recommended that each provincial/territorial jurisdiction implement a coordinated and integrated IAQ management strategy at multiple levels of governance. There are a range of efforts that need to be undertaken as part of an integrated and coordinated management strategy required to properly address IAQ in Canadian schools, the components of which should include, at minimum:

- policies and practice guidelines
- complaint investigation protocols and procedures
- communication plans and protocols
- methods to involve and build positive working relationships among all stakeholders to share ownership of the problem and responsibility for solutions
- planning, management, monitoring and accountability measures
- training and education
- funding
- leadership and coordination

This includes development and implementation of IAQ management practice guidelines, development of an IAQ management plans at the school level, and an approach to monitoring to ensure implementation. Each school should be required to develop an IAQ management plan that incorporates good IAQ management practices and guidelines and ensures observance of same. Each school should be required to demonstrate how they will ensure the maintenance of good IAQ in their property.

Provincial/territorial governments should identify a model set of guidelines and practices (see recommendation #3) they strongly encourage school boards to follow and supply funding in support of implementation. School boards and schools should work with their regional/local stakeholders to refine these guidelines with respect to implementation, ensure they have the necessary expertise to diagnose and address IAQ problems as much as possible, implement an IAQ program and ensure training is delivered. Preventive approaches such as *Tools for Schools* should be considered as part an overall IAQ management strategy or program. It is one program which school boards may wish to examine to determine if it is an approach they wish to use to implement good IAQ in schools. Reporting, monitoring and accountability measures need to be put in place to ensure implementation. An accountability framework should be

developed describing how implementation of IAQ management practices and plans will be monitored and to gauge progress in implementing the elements of the IAQ management strategy. This may involve various mechanisms such as audit; regular reporting to the school occupants, IAQ teams/OH&S Committees, the public, and the school board; reporting by the school board to Department of Education; and others.

2. **Education and Awareness** – Enhance opportunities to increase awareness and knowledge about the importance of healthy indoor air quality, the potential effects of poor IAQ, the possible sources of poor IAQ, the types of steps (policies, practices, complaint protocols, and tools) that can be taken to ensure the maintenance of healthy IAQ in schools, the roles of stakeholders in supporting good IAQ, the value of open communication and shared understanding about the problem, and vehicles to support communication about this issue.

Education and awareness must take place at all levels with multiple stakeholders. It is recommended that an initiative to educate all stakeholders about IAQ be undertaken and an education and training strategy developed. This includes target audiences of the parents, students, teachers, custodians and maintenance managers, Occupational Health and Safety staff, school board representatives, unions, government staff in the relevant departments affected by IAQ issues (Education, Public Works/Infrastructure, Labour, Environment, and Health), health professionals, and others with an interest in this area. General awareness and education initiatives should also involve community-based interest groups and IAQ consultants where appropriate or those with expertise in the IAQ issues, and should be multi-disciplinary in nature. Training should be targeted by stakeholder, should focus on the specific roles of parties in responding to the problem, and be tied to policies and practices they are expected to follow to ensure good IAQ.

Seize opportunities at the local school level to increase awareness, knowledge and understanding among all stakeholders of the importance of healthy IAQ and good IAQ management practices, and the roles of stakeholders in addressing the problem. Activities and forums such as school assemblies, school newsletters, student council activities, staff meetings, memos, and presentations to the school board are suggested.

Incorporating the issue into the curriculum in formal and informal ways is suggested by using teaching opportunities in the classroom and through project assignments or other IAQ focused activities. Making the *Tools for Schools Kit* available as a formally acknowledged resource endorsed by the Department of Education is also recommended

3. **Develop IAQ Management Guidelines** – Develop a set of policies and best practices for IAQ management which apply to both the design and new construction of school buildings and the maintenance of existing buildings. This

could be developed with the leadership of the federal government (Health Canada) in cooperation with the provinces and other key stakeholders, or at the provincial level with the collaboration of other key departments (although this seems a duplication of effort). Most practice guidelines should have standard applicability across the country, with some flexibility for application at the regional, provincial, and local level. Once developed they can be adapted with local stakeholders for local use.

Guidelines should cover topics such as: scented products, smoking, carpet removal, use of environmentally friendly cleaning products, cleaning schedules, replacement of air filters, inspection schedules of school ventilation and other operating equipment, temperature control and the like, preventive maintenance steps, design considerations and materials for new construction, renovation or repair guidelines (materials, off gassing and time required prior to occupancy) and other areas.

These guidelines should reflect the importance of undertaking preventive maintenance and remedial measures early. It is critical to ensure sufficient routine monitoring systems are in place to enable early detection and repair of problems, engage in preventive maintenance practices, and undertake activities to remediate problems and improve IAQ through the observance of good management practices. Some examples include:

- Employ a rigorous and continual cleaning regimen.
- Use environmentally friendly cleaning products.
- Conduct routine monitoring and inspection, including air and mould checks.
- Remove carpets.
- Replace chalkboards with white boards.
- Adopt reduced or no scent policies.
- Improve air circulation; install proper functioning, well regulated and well maintained air exchange systems.
- Arrange for painting, repairs, new construction and renovations to be done when the school is not occupied and allow sufficient time for off gassing of new products.
- Ensure regular cleaning of ducts and filters.
- Train custodians on proper procedures to identify potential IAQ problems or increase inspections by trained staff to ensure proper vigilance in detecting and responding to problems early.

Involve key stakeholders in the process of development as well as implementation of guidelines so stakeholders do not see them as an imposition but rather as an opportunity to build or re-build trust relationships among partners.

4. **Training** – Accompany any guidelines, practices, policies, or tools introduced with general IAQ education and specific training including initial orientation and on-going in-service opportunities for those involved with implementation; and

more advanced or specific technical training for maintenance staff or others where needed. Increase awareness about any existing guidelines, policies, practices, regulations and protocols as part of this process.

5. **IAQ Standards** - Explore development, at the national level, of IAQ standards for non-industrialized settings tailored to children which accounts for, or uses as its test standard, a typical six year old child rather than a 40 year old adult male to determine sensitivity and acceptable limits for the school population, recognizing the increased sensitivity levels of children. The intent is to reduce subjectivity in the application of standards, and implement more refined and appropriate, if possible, standards for school settings. If developed, these standards should be accompanied by information and education as to their appropriate use, and the limits of their use, as well as how to interpret results. These should not be viewed as “stand alone” measures, but rather, be accompanied by other diagnostic steps (including visual inspection). Continue to undertake scientific effort to search for a cause-effect relationship between air quality and health.
6. **Build Collaborative Relationships** Develop/enhance mechanism to build positive working relationships among stakeholders at various levels in this area. Seek out opportunities to build partnerships to increase understanding of IAQ issues and problems, share perspectives and concerns, build trust and credibility among stakeholders, and seek solutions together. *Tools for Schools* and the Supplemental Guide developed by this Project are models of such an approach at the local level. However, a collaborative approach is also required at other levels of effort, influence, and decision-making. As policies and practices are developed and implemented and other elements of a coordinated strategy are executed (as identified in recommendation #1), processes for involvement and meaningful input of stakeholders ought to be developed.
7. **Leadership, Coordination, and Responsibility** – Assign a focal point of responsibility for IAQ issues at various levels of influence and authority. It is critical that leadership be exercised to coordinate and implement the components of the management strategy or it is likely the effort will falter.

Each level of governance should take a leadership role and identify a focal point of coordination for management of IAQ issues and implementation of healthy IAQ in schools. Each provincial/territorial jurisdiction should take a leadership role, in collaboration with other relevant departments, to formalize an IAQ program in schools. It is important to assign a coordinator to take the lead role at the school board and school levels as well.

It is also suggested that any new practices or guidelines be incorporated into already existing procedures, structures, Committee mandates, and staff roles to the degree possible to increase likelihood of sustainability. At the school level, many saw the Occupational Health and Safety Committees as being the most appropriate vehicles to assume responsibility for implementation of the *Kit* or

guidelines as it was consistent with their current mandate. Others preferred a separate IAQ Committee with links to the OH&S Committee to retain the element of community participation and not dilute the focus on IAQ.

This is to also recognize the value of a team approach in terms of creating a sense of shared responsibility for IAQ, bringing the necessary expertise to bear on the problem, building credibility, and promoting joint problem solving. Whichever method is chosen, it is critical a point person be identified as coordinator to assume leadership of the effort.

Ensure the support and involvement of those strategically positioned to have a significant influence on implementation such as Principals, Facilities Operation personnel (who have knowledge of the building envelope) and the OH&S Committees (who have knowledge of industrial hygiene matters) at the school/school board levels.

8. **Complaint investigation protocol** Develop and implement, for those jurisdictions or school boards/districts which have not done so already, a complaint investigation protocol which details, at minimum, how and to whom an IAQ complaint is to be made; what steps will be taken, and how individuals will be informed of the results or the outcome. As well, it identifies a process which helps to create a safe environment for a person to report a complaint without fear of retribution.
9. **Tools for Schools Kit** Offer the *Tools for Schools Kit* as a resource to schools as a practical, low cost strategy for implementing IAQ sensitive practices, along with the Supplementary Guide, but adopt a flexible approach to implementation. Particular attention should be paid to addressing the time constraint issue either by amending the checklists prior to distribution or suggesting this or other approaches to participants to minimize the burden on staff, and to including a cover briefing about the Kit and its placement within an integrated IAQ management strategy, and the requisite components of the strategy. The necessary supports – endorsement by the school board and Departments of Education, a “champion” to lead the effort at each school, training (initial orientation and on-going in-servicing), funding for coordination and for remediation associated with implementation, access to expertise at the school board level, prompt response to concerns, a planning and accountability framework, and others identified within this report must be in place. Particular attention must be paid to how the Kit is introduced. The potential benefits, how to address barriers identified in this report such as time (e.g. reduction of checklists, that staff time be made available to conduct this work based on the OH&S model, and other measures), the critical success factors, and supports that will be provided.

It is recommended that the results of this project and pilot test of *Tools for Schools* be made available (via print, presentations, and the like) to school boards and principals throughout the Nova Scotia and across the country, and to the

Departments of Education in the various jurisdictions, to identify the merits of such an approach. Each jurisdiction/ province should assume a leadership role in doing so. Health Canada might also assist in this regard. It is recommended that each school board consider implementing the *Tools for Schools Kit* along with a set of management practices, complaint investigation protocols, communications and partnership initiatives, and other elements of an effective response to manage IAQ as per recommendation #1.

10. **Planning, Monitoring, and Accountability Framework – Develop IAQ management plans (as per recommendation #1) and implement monitoring and accountability mechanisms to ensure not only adequate identification, reporting, and follow-up of problems but also monitor progress in implementing the elements of the IAQ management strategy.** Various mechanisms are necessary complaint investigation protocols, communication plans, reporting of repairs made and budgets spent to school boards and provincial departments to improve planning, the development of IAQ plans, and mechanisms to report and track progress for example.

Undertake periodic monitoring and testing to ensure the maintenance of good IAQ and gather sufficient data to determine scope and depth of IAQ problems through monitoring the occurrence of poor health symptoms and the functioning of school building systems.

Activities such as conducting periodic air quality testing, surveying school occupants to identify the number of people with poor health symptoms potentially attributable to IAQ, and keeping an IAQ health log to enable identification of types of illnesses that may be associated with IAQ are suggested, as was development of baseline surveillance data to monitor the occurrence of illness and its patterns against the baseline rate of occurrence to detect any deviance from the norm. This would provide supporting data to indicate the types of problems that may exist in order to develop plans of action to address IAQ concerns in the school. An incident-based reporting system (of IAQ complaints) would provide a centralized mechanism of reporting to monitor trends and determine whether the problem is improving.

Develop a plan of action to ensure the implementation of good IAQ management practices and regularly track and report progress. Inform stakeholders about IAQ issues and concerns as they arise, the nature and cause of problems identified, the results of any testing done, the status of plans and actions taken or required to ameliorate the problem, and the results. Schools should inform their local stakeholders, and the school board, who should inform the province. Suggestions were made that this type of information is needed to improve planning at the school board and provincial levels with respect to the implantation of guidelines, the state of the asset stock, and funding allocations that may be needed. Mechanisms to regularly track and report progress toward achievement of IAQ goals and implementation of plans is needed. One suggestion was to implement

an automated maintenance management system that would allow the department to monitor the quality of buildings on an annual basis, the amount of money put in to building repair and maintenance, and the overall condition of the asset base. Better planning tools would assist in identifying and justifying need based on hard evidence which, in many cases, is absent.

Consider integrating adoption and compliance with IAQ guidelines into the accreditation process to enhance accountability and ensure implementation.

11. **Communication and Participation** Enhance communication among stakeholders and implement mechanisms to ensure broad-based participation and involvement of all stakeholders. Develop a communications plan at the school level which identifies what information should be shared with stakeholders (e.g. the status of current IAQ management initiatives, why IAQ is important, etc.) how they will be informed (periodic newsletters or bulletins, memos, public forums, committees, etc.), when (quarterly intervals?) and by whom. It identifies the goals of the plan, the intended audiences, and the various mechanisms by which information will be communicated to them. This is related to the complaint protocol, in that the investigation protocol should specify how complaints will be acted upon and communication mechanisms associated with the complaint (e.g. the process for making complaints, how and what information about the complaint will be shared and with whom, etc.). However, this is much broader than simply a complaint process.

Communication was universally identified as both an issue and a recommended solution to correct misinformation, promote trust among stakeholders, and a critical component of good IAQ management practice. A preventive pro-active approach includes both shaping public opinion through the promotion of education and awareness initiatives and open communication with stakeholders and mechanisms to encourage their involvement. This is a highly charged and emotional environment and improving trust relationships among parties will improve the outcome for all concerned. Governments, schools, and school boards need to learn how to work with each other internally, and with community externally, and do a better job of sharing responsibility for solutions.

Some suggested examples of a participatory approach at the school board/school level included:

- Involve everyone in the development of policy, approaches, and plans, including students, to encourage buy-in from all stakeholders. Students in particular emphasized the need for inclusion on committees and in efforts undertaken to ensure the voice of students is heard and to shape peer attitudes and behaviour.
- Ensure student, parent, and teacher participation on IAQ committees or Occupational Health and Safety Committees; form a student-based IAQ Committee.

- Encourage adoption of a policy of open communication, transparency of decision-making, and feedback from the school board.
 - Use memos in mailboxes to facilitate communication as well as a health and safety bulletin board to communicate IAQ issues; add IAQ information to the school newsletter.
 - Encourage joint decision-making between OH&S Committee/IAQ Committee and School board.
12. **Funding and Support** – Ensure the necessary funding and support is in place to prevent and respond to IAQ problems in schools to ensure the maintenance of good IAQ in all schools.

All participants stated that, without funding to ameliorate IAQ problems and the support and willingness of the school board and others in authority to support healthy IAQ, efforts to improve IAQ would be compromised and would have little impact.

4.3 Conclusion

This report gathered data on IAQ perspectives, experiences, and views from a variety of key stakeholders – parents, students, teachers/school staff, administration, school boards (both staff and elected officials), government policy makers and deputy ministers – from most jurisdictions across Canada. It also tested the USA Environmental Protection Agency's *Tools for Schools* as a model for managing IAQ in schools. The critical success factors that need to be in place to make implementation of this tool or any other set of IAQ management guidelines are documented herein. Through qualitative data, the report captures the voices and experiences of those working or learning with the school system and strategies suggested come from the voice of experience. It identifies IAQ problems most common across Canada and the health symptoms related to these IAQ problems. Both current and best practices for managing IAQ are described, including, legislative and regulatory regimes, funding allocated by jurisdictions, and protocols or procedures for proactive or reactive response. Current and proposed roles of stakeholders in supporting good IAQ are outlined. Barriers and contributing factors to good IAQ management practice are identified, along with communication barriers and facilitators. The *Tools for Schools Kit* was tested as a model for good IAQ practice and suggestions are made both about this tool and about ways to support implementation of such practices.

The report includes perceptions and significant issues associated with IAQ; problems experienced with IAQ; current policies or practices; best practices, keys to successful IAQ management; barriers and contributing factors to good IAQ management; recommended process to implement good IAQ management practice and/or guidelines, and the respective roles and mandates of stakeholders; communication – current and proposed practices; and comments on *Tools for Schools*.

The report includes a discussion of perceptions, issues, views, and experiences provided by all respondents regardless of jurisdiction or stakeholder group they represent; an overview of current funding programs, policies and practices by federal, provincial, and territorial government jurisdiction as it relates to IAQ; unique perspectives of other stakeholders school boards/districts, Teachers Federation, IAQ consultants, and a community-based advocacy group, as well as parents, students, school administrative staff, and custodian/maintenance staff.

Because of its qualitative nature, the project was able to explore the range of views and experience in this field, examine the many difficult issues facing stakeholders involved in IAQ management, and provide a depth of analysis that is not otherwise apparent in quantitative data reports alone. It also provides a “first voice” perspective, that is, the views experiences, opinions, and suggestions of those directly involved in the issue.

The report provides a useful insight into the issues many departments and schools are grappling with as they attempt to respond to IAQ concerns in their respective jurisdictions, as well as the perspectives of key stakeholders involved. Recommendations are made based on participant suggestions to ensure the maintenance of good IAQ in school environments.

All stakeholders share the common goal of ensuring a positive, healthy, learning and teaching environment in schools across the country. As one respondent said,

“I look forward to seeing a good and comprehensive program in place to deal with this so that parents are comfortable that their concerns are being addressed and so that kids are not at risk, so that we get to the majority of problems before they become problems, [and] so that we have good facilities and facilities that run properly.”

1 C M H

1 Birth

~~Edna~~

1 Fox (Horton)

1 { Korman

{ Kim

{ Alison

1 A. Schuman

