FINAL REPORT

2003 Project Abstract
For the Period Ending June 30, 2005

TITLE: Healthy Schools: Indoor Air Quality and Asthma
PROJECT MANAGER: Dale Dorschner
ADDRESS: Minnesota Department of Health, PO Box 64975, St. Paul, MN 55164-0975
WEB SITE ADDRESS: www.health.state.mn.us/divs/eh/indoorair/schools/index.html
FUND:
LEGAL CITATION: ML 2003, Ch. 128, Art. 1, Sec. 9, Subd. 12(a)

APPROPRIATION AMOUNT: $168,000

Overall Project Outcome and Results

The Minnesota Department of Health (MDH) completed a project to determine whether a school indoor air quality (IAQ) asthma management plan could be implemented in schools that resulted in measurable improvements. A Model School Environmental Asthma Management Plan (MSEAMP) was developed as a new tool to evaluate and improve school IAQ and its impact on asthma. The MSEAMP was implemented in 10 schools, six of which were re-evaluated after implementation. Improvements were observed in these schools.

Overall, 89 problem issues were identified at baseline 2004 compared to 62 at post-implementation in 2005. Specifically, in 2004, an average of 46 problem issues were observed during walk-through inspections in 187 location, which decreased to 35 problem issues in 141 locations in 2005. Also, pet allergen levels declined significantly: 70% of the areas sampled had lower levels in 2005. Moreover, staff perception of air quality improved in five schools, and to a significant extent in three schools where the proportion of staff rating air quality as average or good increased from 54% to 83%. In addition, ventilation rates improved in these schools, reflected in an average carbon dioxide level that was 159 parts per million lower in 2005. The findings indicate that school officials in Minnesota can implement IAQ asthma management plans that yield measurable improvements. Students and staff in the project schools now benefit from cleaner air. A summary report was completed and posted to the MDH website, which contains the same information described in the final work program report.

Project Results Use and Dissemination

MDH is currently promoting the MSEAMP and the summary report, which are available on request and at the MDH website. Email announcements and presentations will be completed, targeting building operators, IAQ Coordinators, administrators, and school board members. This information will also be presented to and shared with local, state, and federal agencies that have a stake in school environmental health. Findings of this project were published in the *Clinical and Experimental Allergy*, volume 35, pages126-136, and a case study was also submitted for publication in the *Journal of School Health*.

July 1, 2005
"LCMR Final Work Program Report"

LCMR 2004 Work Program

Date of Next Status Report: Final Report – August 3, 2005

Date of Work program Approval: June 26, 2003

Project Completion Date: June 30, 2005

I. PROJECT TITLE: Healthy Schools: Indoor Air Quality and Asthma Management

Project Manager: Dale Dorschner

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Total Biennial LCMR Project Budget:

LCMR Appropriation: $168,000
Minus Amount Spent: $168,000
Equal Balance: $0

Legal Citation: ML 2003, Chap.128, Article 1, Sec. 9 Subd 12(a)

Appropriation Language: 12 (a) Healthy Schools: Indoor Air Quality and Asthma Management $84,000 the first year and $84,000 the second year are from the trust fund to the commissioner of health to assist school districts with developing and implementing effective indoor air quality and asthma management plans.

II. and III. FINAL PROJECT SUMMARY.

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IV. OUTLINE OF PROJECT REPORT

Summary of Final Results:

Result 1: Develop Model School Asthma Management Plan and Asthma Education/Training Materials.

Description: Research and identify existing tools to develop a model Asthma Management Plan and educational materials to be posted on the MDH website for continued and expanded use for schools throughout the state. Research and

develop an effective environmental assessment tool and procedure to evaluate school buildings for IAQ related problems and to help identify potential environmental asthma triggers. The focus of environmental asthma trigger management will include pest control, dust mites, mold and moisture, and other indoor air contaminants that contribute to allergy, asthma and other respiratory problems among children and staff. A minimum of one training session will be held for interested districts to educate district staff on the importance of reducing or eliminating environmental asthma triggers.

Summary Budget Information for Result 1: LCMR Budget $84,000

Balance $0

Completion Date: July 1, 2005

Result 1: Develop Model School Asthma Management Plan and Asthma Education/Training Materials

The model school environmental asthma management plan (MSEAMP) has been completed. The MSEAMP consists of evaluation tools, recommended interventions, and explanations providing details and justification. In addition, step-by-step directions are included that guide the user through the MSEAMP. Complex items that would typically need to be completed by a trained environmental professional are excluded from the MSEAMP.

The MSEAMP was created for school officials who want to evaluate and address existing and potential IAQ-related asthma triggers in their schools. It is ideal for school staff that have already used basic IAQ assessment and intervention methods, and are interested in utilizing a detailed and prescriptive tool. Moreover, it is most effective in schools where the administration is motivated to make some substantial changes in school policies and practices. This motivation may be a result of staff or parent comfort or health complaints. Some editing of the checklists and interventions is necessary, to customize the tool to the specific features of the school and priorities of the school administration.

The MSEAMP environmental evaluation tools are used to identify asthma triggers and underlying building, behavioral, administrative, and maintenance factors in the school environment. The evaluation tools consist of the following:

1. An IAQ management plan questionnaire, completed by school administration and maintenance staff, used to identify problem issues in policies and practices in the school's IAQ management plan.
2. Walk-through checklists used to inspect the school building for visible and apparent problems in classrooms and non-classroom areas (the ventilation system, bathrooms, hallways, exterior, rooftop, storage closets, kitchen and cafeteria).
3. A brief staff perception survey used to rate air quality in classrooms and the overall school environment.
4. A nurse office visit-tracking log for asthma-specific symptoms.

Each potential problem is linked to a recommended intervention and an explanation section. The interventions are mostly low in cost. They are prescriptive

and detailed to an extent that should minimize any need for additional research. The explanation section provides background information and justification of the intervention, and it is designed to persuade decision makers to change existing practices and policies.

MDH staff developed the MSEAMP using a variety of resources. First, the staff's previous experience with school indoor air quality and its management was used to outline the MSEAMP. Second, the relevant literature was reviewed, including journal articles, books, and government guidance documents. Third, staff discussed school environmental assessment and management with experts in the field, including government officials, university researchers, non-governmental organizations, private sector environmental scientists, and product vendors. A library was compiled consisting of over 200 journal and conference proceedings, government reports and best practices documents, and various books. A literature review paper was written that summarizes research studies of allergens in settled school dust. The primary thesis of this paper is that dust mite, cat, dog, cockroach, and fungal allergens are present in many schools across the world at levels that exceed thresholds of concern. This supports the hypothesis that Minnesota schools have significant levels of asthma triggers and problems with building factors. The review paper was published in the peer-reviewed journal *Clinical and Experimental Allergy*, and it is enclosed with this report.

The MSEAMP was 'field-tested' in schools to evaluate its validity and practicality. The schools were evaluated and provided the model recommendations and explanations from the MSEAMP. In addition, the school district staff completed an extensive 'Implementation Log' explaining which recommendations from the MSEAMP were successfully implemented, which were not implemented, the costs and labor time incurred, and why recommendations were not implemented. These comments and findings were used to revise and improve the MSEAMP and create a final version. See Result 2 for details.

To date, one training was held to present preliminary findings and the MSEAMP. Seven more trainings are scheduled for August and September of 2005, and several more presentations will be completed during the next year.

Result 2: Provide consultative services for up to 10 Schools to provide assistance in developing and implementing IAQ/Asthma management plans.

Description: MDH will recruit schools that are committed to reducing environmental asthma triggers and improving IAQ. Schools will be selected on their level of commitment to implement the recommendations provided by MDH and on their identified limited resources to effectively develop an IAQ management plan on their own. There will be a preliminary and post IAQ/asthma management plan implementation assessment performed on the schools to evaluate the effectiveness of the IAQ/asthma management plan. Environmental testing will be performed to help demonstrate the effectiveness of implementation of an IAQ/asthma management plan and to help establish measurable outcomes for reducing environmental asthma triggers and improved IAQ. MDH will coordinate through school nurses of Minnesota (SNOM) to track the number of student visits to the nurses office to determine if there is a correlation between improved IAQ and the

number of nurses office visits for asthma related symptoms and to establish if there are any health based outcomes that can be reliably reported.

Summary Budget Information for Result 2:	**LCMR Budget**	**$84,000**
	Balance	**$0**

Completion Date: July 1, 2005

Result 2: Provide Consultative Services for up to 10 Schools to Provide Assistance in Developing and Implementing IAQ/Asthma Management Plans

MDH completed ten consultations, referred to as "school environmental asthma consultations" (SEAC). All the consultations consisted of thorough environmental evaluations, which were used to present detailed reports of findings and recommendations to the school staff. The findings from the SEAC indicate that the MSEAMP is an effective and practical tool to improve the school environment. Further details of the consultation, including figures and additional details can be found in the enclosed public report.

Recruitment (Fall 2003)

We decided to perform extensive environmental sampling for indoor allergens beyond what was initially conceived and described in the "LCMR 2003 Work Program". Due to the expense of purchasing equipment and the laboratory costs, six schools could be budgeted for the comprehensive SEAC, while four schools participated in a standard SEAC.

MDH recruited schools in the following manner. First, letters were sent in early September to superintendents and indoor air quality coordinators at all Minnesota public school districts. The letters announced the project and included a letter of interest to be returned by 10/15/03. Thirty-six school districts returned letters of interest. These school districts were asked to review an outline of the project and invited to send representatives to a statewide videoconference. In addition, the school officials were asked to complete an application consisting of a questionnaire and letter of intent and submit it by 12/5/03.

On 11/14/03 and 11/20/03 MDH hosted the videoconferences for school officials. School officials chose from seven satellite locations (in addition to St. Paul Metro Square Annex). Locations were selected based on availability and proximity to school districts. These locations were MDH Bemidji, Olmsted County (Rochester), Stearns County (St. Cloud), Nobles County (Worthington), Chippewa County (Montevideo), Wilkin County (Breckenridge), and Cook County (Grand Marais). A total of 52 individuals registered from 23 districts. Most of these districts were in the metro, central or northwestern regions of the state. About 42 individuals actually attended, probably because some districts decided not to send all the people they had registered. The first videoconference had four satellite locations and was attended by about 16 people. The second videoconference had six satellite locations and was attended by about 26 people. Also in attendance was John Velin

with the LCMR. One school district interested could not attend either day, and we completed a phone conference call with the school official.

Fourteen school districts submitted applications. The primary selection criteria were: 1) availability of elementary school; 2) commitment from superintendent, principal, buildings and grounds director, and business manager; 3) financial and staffing flexibility to accommodate school evaluations and implement recommended interventions; 4) geographic distribution; and 5) the presence of specific surfaces needed for sampling.

Six schools were selected to participate in the comprehensive consultation. These were: Underwood Schools (Underwood), Basswood Elementary (Osseo), Cass Lake Elementary (Cass Lake-Bena), Lake Ripley Elementary (Litchfield), Evergreen Elementary (Anoka-Hennepin), and Prairie Elementary (Worthington). Four schools participated in the standard consultation, which were the Valley Crossing Community School (Northeast Metro 916 Intermediate School District), Plymouth Creek Elementary (Wayzata School District), Watertown High School (Watertown-Mayer School District), and the Zachary Lane Elementary School (Robbinsdale School District).

School Baseline Evaluations (Winter & Fall 2004)

MDH staff first performed standard SEAC baseline evaluations in two schools. These evaluations also served as 'pilot' evaluations and served to improve the evaluation procedure. Next, comprehensive SEAC baseline evaluations were completed in six schools between January and March of 2004. Two more standard SEAC baseline evaluations were completed in fall 2004.

The standard and comprehensive consultations involved:

- evaluating policies and procedures using the IAQ management plan questionnaire;
- assessing the building using the walk-though inspection checklists;
- sampling for particulates, moisture, and ventilation; and
- providing a report with findings and recommended interventions.

The comprehensive consultation also included:

- sampling for specific indoor allergens;
- administering teacher perception surveys;
- tracking asthma related office visits;
- tracking the implementation of the recommendations; and
- completing a follow-up evaluation one year after the baseline evaluation.

Sampling for allergens, particulates, and ventilation parameters was performed to quantify changes in the school environment and evaluate the scientific validity of the MSEAMP. Allergen sampling is not recommended for most IAQ or environmental investigations, and is not considered a part of the MSEAMP. Sampling is expensive, technically challenging, and results can be difficult to interpret. School staff should typically rely on the observational checklists, questionnaires, and surveys.

Implementation of Plan (Summer 2004 – Winter 2005)

Each school was provided an IAQ asthma management plan tailored to the findings in the school. The plans were written and provided to school officials in spring or early summer. This gave the school staff 8-10 months to implement the plan.

MDH staff assist with the implementation of recommendations. Questions were answered by phone and email. Also, MDH staff met with each school's administration and explained findings and recommendations, clarified issues, emphasized the highest priority items, and described how to complete the 'Implementation Log'. In addition, MDH met with teachers at three schools. At the teacher meetings MDH presented general findings and focused on the recommendations that directly impact the teachers' activities (e.g., chemicals, art supplies, food use, fleecy items, plants, animals). Teachers were asked to comment on the recommendations and their feasibility. The feedback received from the teachers indicated they considered most of our recommendations to be reasonable, but some were impractical and could not be implemented. Based on this feedback and comments from the administration meeting, MDH developed 'Teacher's Actions Fact Sheets' that tailored the MSEAMP recommendation to each school. This was further revised by the school administration and distributed to school staff. MDH did not provide funds to cover the expenses of implementing the plan.

School staff tracked the implementation of the plan using an 'Implementation Log'. They noted whether recommendations were fully, partially, or not implemented. Also, they estimated the approximate financial costs and labor time devoted to the recommendation for the fiscal year, beyond what would have normally been expended on such activities (e.g., cleaning floors).

School Post-implementation Evaluations (Winter 2005)

Post-implementation school environmental asthma evaluations of the six schools were performed in winter 2005. The evaluations determined the extent of MSEAMP implementation and changes in environmental levels of contaminants, observations, policies, and perceptions. The evaluations included the following:

- reviewing with school staff the extent of plan implementation tracked on the 'Implementation Log':
- evaluating policies and procedures using the IAQ management plan questionnaire;
- assessing the building using the walk-though inspection checklists;
- sampling for particulates, moisture, ventilation, and allergens
- administering teacher perception surveys; and
- tracking asthma related office visits.

Findings:

The six schools that participated in the comprehensive consultations were generally in good condition. There were, however, a variety of minor problems observed in 2004 related to maintenance, building structure, staff behavior, and administrative policies. At baseline, on average 71% (222/311) of all the issues evaluated were classified as preferable.

To address the identified issues, MDH presented a variety of recommendations to the school staff. Each school was presented between 89 and 123 recommendations, with an average of 102 recommendations. The school staff reported an average of 76 recommendations were fully or partially implemented by 2005.

Fewer problem issues were observed in the 2005 post-implementation evaluations. In 2005, 80% (249/311) of all the issues evaluated were classified as preferable. On average, there were 27 fewer problem issues identified in the schools in 2005, compared to 2004.

The problem issues included inadequate policies and problem observations in classrooms and non-classroom areas. In 2004, on average each school reported 37 problem policies not favorable to IAQ, while in 2005, on average each school reported 22 problem policies.

While most problem issues persisted in classrooms, they were less prevalent or severe in 2005. In 2004, an average of 24 problem issues were identified in 142 classrooms in each building. In 2005, an average of 19 problem issues were identified in 110 classrooms in each building. The greatest improvements identified in classrooms were fewer problem art supplies, maintenance chemicals, stained surfaces and water leaks, and odors.

The non-classroom area evaluation included the ventilation system, exterior, bathroom, hallways, entrances, supply rooms, boiler room, kitchen, and cafeteria. In 2004, an average of 22 problem issues were identified in a total of 45 areas in each building. In 2005, an average of 16 problem issues were identified in a total of 31 areas. The greatest improvements identified in non-classroom areas were regarding better ventilation in bathrooms and storage closets, fewer particulate sources, cleaner building entrance mats, cleaner ventilation filters, and cleaner ventilation system components.

Allergen sampling was performed to determine whether observed and reported improvements were correlated with objective measures. A total of 72 samples were collected in each year from carpeting and vinyl tile floor coverings. The same areas were sampled in both years. Cat and dog allergen levels were significantly lower in 2005. Approximately 70% of areas that were sampled had lower levels of these pet allergens in 2005, which is a statistically significant change. In addition, there were fewer pet allergen levels in the moderate and high ranges. A survey of students and staff, in the classrooms where dust samples were collected, showed no significant overall change in the number of pet owners. Mold and total dust levels in floor coverings did not change to a statistically significant extent. Dust mite levels were low, with these allergens detected in 8 samples in 2004 and 6 samples in 2005. Three samples were above 2 mcg/g in each year. Cockroach allergen was never detected.

Ventilation was evaluated by measuring carbon dioxide levels in every classroom. In 2004, five of the six schools had at least one room in which carbon dioxide exceeded the outdoor level by 700 parts per million (a threshold for comfort). Two of the schools had many rooms with elevated carbon dioxide levels. The five schools were given recommendations to consult a professional engineer and attempt to increase outdoor ventilation rates. Three schools completed upgrades and repairs in the ventilation systems that improved outdoor ventilation rates. These three schools also had a history of previous IAQ complaints, problems, and

environmental investigations. In 2005, these three schools' classrooms had a statistically significant decline in carbon dioxide levels, by an average of 159 parts per million. The three other schools showed no significant change.

The staff perception surveys were completed in both years. Five of the six schools showed some improvement in staff perception. The three schools that had ventilation improvements also had a statistically significant improvement in staff perception: in 2004, 54% of staff rated air "average" or "good" compared to 83% in 2005.

Two schools reported asthma office visits, while four reported no visits. The office visits did not correlate with the observed and measured environmental improvements. In one of the schools, about 50 office visits were noted in 2004 compared to 116 in 2005. However, in 2005, some of the visits recorded included pre-exercise preventive treatment, which was supposed to be excluded.

Each school's staff reported redirected labor hours and the total cost of materials and contracted services associated with implementing the recommendations for the period of June 2004 to June 2005. These estimates differed considerably between schools. The reported redirected annual labor hours ranged from only 22 hours to 3,230 hours. Most of the labor hours were associated with the time-consuming recommendations, such as those related to cleaning, maintenance, and inspections. Yet one school reported that they were able to make many improvements in these areas without redirecting labor hours from other existing maintenance work. Instead, they motivated staff, improved work efficiency, and solicited simple assistance from teachers.

The total annual material and contracted service costs ranged from as little as $1,700 to as much as $173,400. These material costs reflected only a few costly actions taken in each school, such as replacing floor coverings, purchasing new building entrance mats, purchasing ventilation filters, purchasing whiteboards, contracting ventilation system repairs and upgrades, and purchasing cleaning supplies. The vast majority of actions had no or very low costs, and two of the schools did not spend more than $1,000 on any individual action item.

About a quarter of the recommendations presented to the school staff were not implemented. The top two barriers to implementation were the costs associated with the recommendations and not having enough time to address the issue. Considering the school staff were given about 8 months to address about 100 issues, it is not surprising that some issues would not be given attention by the post-implementation evaluation. Maintenance, cleaning, and ventilation improvements were the least implemented due to the costs and labor hours associated with these recommendations. Another important barrier was administrative prerogative, which refers to the judgment of the school administration to not pursue an action because it conflicts with other priorities. Examples of this barrier included choosing not to prohibit all food from classrooms and not prohibiting personal items such as hair sprays.

Conclusions

Implementing an asthma oriented IAQ management plan can improve the school environment. Each of the six schools that participated in the consultation had a wide variety of minor problems that could negatively impact the school environment. These schools were presented an IAQ asthma management plan with

about 100 specific recommendations. All the schools that participated in the school environmental asthma consultation showed improvements. Implementing the recommendations were associated with a wide variety of improvements, including superior practices and policies incorporated into the school IAQ plan, fewer observed problems, lower contaminant levels, higher ventilation rates, and improved staff perception of air quality. While each individual action may have a small impact on the school environment, the findings suggest that their cumulative effect is associated with positive measurable outcomes. Overall, 89 problem issues were identified on average in 2004, compared to 62 in 2005. The problem issues were less prevalent in 2005, and the number of problems declined by 23% in classrooms, 31% in non-classroom areas, and 41% in IAQ-related policies. Moreover, pet allergen levels declined significantly. Outdoor ventilation rates improved in the three schools, including the two schools where this was a widespread problem. Also, staff perception improved in five of the six schools, and to a statistically significant extent in the schools with the ventilation problems. The improvements, while modest, should be considered a success since school staff had only 8 months to implement the recommendations, and they had no special funds to cover labor and material costs. With more flexible budgets, greater funding, and more time to implement changes, even greater improvements are expected.

The school environmental asthma consultations demonstrated that the MSEAMP is an effective tool to monitor and improve indoor air quality problems and associated environmental asthma risks in schools. The MSEAMP was used to evaluate the schools and provide recommendations to address identified problems. School staff implemented three-quarters of the recommendations. The recommendations in the MSEAMP were effective in directing maintenance, administrative, and teaching staff to take specific actions to improve IAQ. On average, fewer than 4 of the 102 recommendations made to each school were not implemented due to school staff not understanding the recommendation or due to the technical incompatibility of the recommendation with existing equipment. Most recommendations involved minimal time, material cost and inconvenience to staff, and the school succeeded with their implementation. Teachers' behaviors improved, especially related to art supplies, cleaning chemicals, controlling moisture problems, and limiting odor-generating activities. The administration adopted policies that will protect IAQ during future renovations, aggressively address moisture problems, and utilize integrated pest management to control pests. Maintenance, cleaning, and ventilation improvements were the most difficult to implement, and some schools implemented just a few of these recommendations while others made sweeping changes.

The asthma office-visit tracking yielded inconclusive findings. In some schools there was no full time nurse at the building and various clerical staff attempted to record visits. As a result, visits may not have not properly recognized as asthma related. In addition, staff may not have understood the directions or simply forgot to record visits due to the long time frame and busy schedules. In the two schools with data, it is dubious whether the visits were logged in a consistent manner in both years. In 2005, there were several visits related to preventive administration of medication, which were supposed to be excluded. Moreover, there may have been differences in the asthmatic student population that could account for the difference in the number of visits. Nevertheless, the asthma office-visit

tracking log will remain in the MSEAMP. The log can help to characterize trends and asthma triggers for specific students. It may still serve as a tool to evaluate environmental improvement in schools with a large number of asthmatic office visits where an individual full-time and motivated nurse is present.

School officials who want a detailed and prescriptive tool are encouraged to use the MSEAMP. It is available as compact disc and at **www.health.state.mn.us/divs/eh/air/index.htm**. It is more detailed and prescriptive than other guidance documents and it exceeds Minnesota Department of Education's requirements for an IAQ management plan. The implementation of the MSEAMP will take time, some money, and dedication. It is best suited for use by school staff that have already used more basic assessment tools and intervention strategies. Moreover, schools that are motivated by a history of asthma or other related IAQ problems are most willing to fully implement this type of plan. A project coordinator with strong organizational, problem-solving, and communication skills should implement the MSEAMP. This person should be responsible for the bulk of the data collection, analysis, and coordinating interventions. The MSEAMP can be trimmed down, especially in areas that rely on significant cooperation from others, are costly, and beyond the capabilities of the assessor (e.g., the ventilation inspection). It can also be tailored to accommodate differing environmental and building characteristics.

MDH will promote the MSEAMP and the findings from this project. One thousand paper copies of the summary report were printed, which include a compact disc with the MSEAMP. Emails will be distributed to school health and safety coordinators announcing the MSEAMP and the report. Presentations will be completed to a variety of school audiences such as building operators, IAQ Coordinators, administrators, and school board members. In addition, this information will be presented to and shared with local, state, and federal agencies that have a stake in school environmental health.

V. TOTAL LCMR PROJECT BUDGET:

All Results: Personnel: $115,000
All Results: Equipment, Tools and Supplies: $ 15,600
All Results: Acquisition: $0
All Results: Other: 30,200 (Sample analysis for allergens)
All Results: Other: $7,200 (Travel expenses)

TOTAL LCMR PROJECT BUDGET: $168,000

Explanation of Capital Expenditures Greater Than $3,500: No Capital expenditures greater than $3500

VI. PAST, PRESENT AND FUTURE SPENDING:

A. Past Spending:

The US EPA provided three $40,000 Tools for Schools Cooperative Agreement grants to MDH during FY01, 02 and 03. These have allowed MDH to assist DCFL with establishing criteria for evaluating schools' progress in meeting requirements under M.S.123B.57, providing training, surveying/auditing schools, and developing the Model Management Plan and introductory trainings. MDH provided a significant in-kind match to this money. MDH also devoted approximately 15 percent of an FTE in all grant cycles to provide technical guidance for schools on mold and moisture.

B. Current Spending:

The Environmental Health Divisions Indoor Air Unit has been researching information related to potential asthma triggers and how best to reduce or eliminate them from indoor environments.

As a complement to this work, the CDC statewide asthma grant, will fund measures and evaluation measurements and evaluation of the effect of implementing an effective IAQ/Asthma management plan by tracking students absence from school and visits to the nurses office for asthma related illnesses. Environmental sampling is in part covered through this partnership with the division of Chronic Disease & Environmental Epidemiology within our Department. This project is also collaborating with School Nurses of Minnesota to provide coordination of school nurses to help in reporting student illnesses associated with asthma in the schools this pilot project will cover to help measure the effectiveness of school implementation.

C. Required Match (if applicable)*:* Not applicable

D. Future Spending: MDH Environmental Health Division will continue to apply for EPA funding to manage the statewide school IAQ database and fund a position to answer school staff's questions relating to IAQ. A web site will continue to be managed and updated to provide a resource for schools to get updated information on IAQ and provide a resource to keep key staff persons in schools abreast of new and developing issues. MDH will continue to collaborate with the Department of Education to provide IAQ trainings to the district appointed IAQ coordinators.

VII. PROJECT PARTNERS

A. Partners Receiving LCMR Funds: N/A

B. Project Cooperators*:* Department of Education – Phil Allmon, MDH Division of Chronic Disease and Environmental Epidemiology – Andrea Todd, School Nurses Organization of Minnesota – Cecelia Erickson.

VIII. DISSEMINATION: Resources and tools developed in this pilot project will be made available to the general public on MDH web site. The web address is **www.health.state.mn.us/divs/eh/indoorair/schools** . In addition to having it

posted on the MDH website staff will announce the availability of these to schools through our statewide school database to IAQ coordinators as well as at the annual Minnesota Department of Education required IAQ Coordinator certification trainings that MDH holds annually around the state. Findings will be presented by MDH to interested educational organizations per request.

IX. LOCATION: Recruitment for schools will be targeted statewide and MDH will report on the location of the schools in future progress reports.

X. REPORTING REQUIREMENTS: Periodic work program progress reports will be submitted not later than December, 2003, July, 2004 and December, 2004. A final work program report and associated products will be submitted by August 5, 2005.

XI. RESEARCH PROJECTS: N/A

Attachment A: Budget Detail for 2003 Projects - Summary and a Budget page for each partner
July, 2005 Final Budget Report

Proposal Title: 12 (a) Healthy Schools: Indoor Air Quality and Asthma Management

Project Manager Name: Dale Dorschner.

LCMR Requested Dollars: $ 168,000

2003 LCMR Proposal Budget	**Result 1 Budget:** Develop Model School Asthma Management Plan and Asthma Education/Training Materials which address Environmental Asthma Triggers in Schools	**Result 1: Budget Amount**	**Amount Spent** (7/1/05)	**Balance** (7/01/05)	**Result 2 Budget:** Provide Consultative Services to participating school districts to assist with the development of District-specific Asthma Management Plans and the Implementation of IAQ and Asthma Management Plans	**Result 2: Budget Amount**	**Amount Spent** (7/1/05)	**Balance** (7/1/05)	**Total Project Expenses To Date**	**Total Budget Balance**	**TOTAL BUDGET**
BUDGET ITEM											
PERSONNEL: Staff Expenses, wages, salaries	1.0 FTE to research Environmental asthma triggers and develop model management plan and perform baseline assessments including measuring amount of environmental contamination present in school buildings before action plans are implemented.	43,700	43,700	0	Perform site visits to perform Environmental assessments and follow-up environmental sampling to determine measurable results and to provide technical consultation to Schools	43,700	43,700	0	87,400	0	**87,400**
PERSONNEL: Staff benefits	1.0 FTE MDH Employee Benefits	13,800	13,800	0		13,800	13,800	0	27,600	0	**27,600**
Contracts											
Professional/technical											
Other contracts	X				X						X
Space rental: NOT ALLOWED											
Other direct operating costs											
Equipment / Tools/Supplies	Sampling Equipment, Postage, Communications, Office Equipment	10,400	10,400	0		5,200	5,200	0	15,600	0	**15,600**
Other Supplies-Contracted Lab Services (tbd)	Sample testing/analysis for allergens	15,100	15,100	0		15,100	15,100	0	30,200	0	**30,200**
Travel expenses in Minnesota	Mileage and per diem for outstate travel	1,000	1,000	0		4,000	4,000	0	5,000	0	**5,000**
Travel outside Minnesota	Washington DC(?) National Asthma/IAQ Conference		0	0		2,200	2,200	0	**2,200**	0	**2,200**
Construction											
Other land improvement											
Other	0			0				**0**			**0**
COLUMN TOTAL		84,000	84,000	**0**		84,000	84,000	**0**	168,000	0	**168,000**