



**Spearheading Health Information Literacy in the Community: The Libraries as Leaders**

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**Abstract:**

*This paper describes a multi-institutional educational program that brings community organizations and libraries together with the goal of developing health information literacy skills in elementary school children aged 11 to 12 years. The primary goal of the program was to improve the ability of elementary school students to find, use, and apply quality health information from specific resources within the National Library of Medicine website. Five institutions in Worcester, Massachusetts, namely the Massachusetts College of Pharmacy and Health Sciences - School of Pharmacy, the Worcester Art Museum, the Worcester Public Library, the Worcester Department of Public Health, and a Worcester inner city elementary school, collaborated to develop a program built around a lead poisoning education theme.*

## INTRODUCTION

The Medical Library Association (MLA) defines health Information literacy (HIL) as “a set of abilities needed to recognize health information need; identify likely information sources and use them to retrieve relevant information; assess the quality of the information and its applicability to a specific situation; and analyze, understand, and use the information to make good health decisions” [1]. This paper describes a multi-institutional educational program that brings together several community organizations and libraries aimed at developing HIL skills in elementary school children in the 6<sup>th</sup> grade who are typically between the ages of 11 and 12 years.

The Massachusetts College of Pharmacy and Health Sciences (MCPHS) School of Pharmacy in Worcester, the Worcester Art Museum (WAM) and its library, the Worcester Public Library (WPL), the Worcester Department of Public Health (DPH), and a Worcester inner city elementary school collaborated to develop an interactive, age-appropriate program, named *Kids to College through the Library*. The MCPHS Worcester librarian spearheaded the effort to fuse together the common interests of pharmacy faculty members and community organizations to conduct an HIL outreach project. The primary goal of the outreach project was to improve elementary school children’s ability to find, use, and apply quality health information available on the Internet via the National Library of Medicine (NLM) website, specifically MedlinePlus and ToxTown. A secondary goal of the project was to encourage inner city students to include attending college as one of their aspirations, an adaptation of the *Kids2College*<sup>®</sup> program [2]. The project was funded through a grant by the National Network of Libraries of Medicine - New England Region.

The program developers (an MCPHS pharmacy faculty and MCPHS librarian) designed the HIL outreach project’s curriculum around a common health problem in the city of Worcester -- lead poisoning. Worcester is the second largest city in the state of Massachusetts, and has been listed in the state’s annual report of “high risk community for childhood lead poisoning” since 2001 [3]. This listing was based partly on the percentage of households with low or moderate income and on the percentage of housing units built prior to 1950 [3]. The target audience of the *Kids to College through the Library* lead poisoning curriculum was comprised of 50 6<sup>th</sup> grade students at a public elementary school in Worcester, Massachusetts. The K-to-6 (kindergarten through 6<sup>th</sup> grade) school was located in a low income neighborhood where substandard housing was prevalent. It has an enrollment of over 200 students who are predominantly non-Caucasian [4]. This school was classified as an “underperforming school” by the Massachusetts Board of Elementary and Secondary Education in its 2005 and 2006 review cycles [5]. This determination was based on low scores on standardized testing. The school did not have a library or librarian services, and unpublished data showed that 50% of the students had never visited the WPL.

There is very little research on the best way to teach HIL skills to elementary school children. Most studies have been done with adults or adolescents. Studies have suggested that early adolescents required interactive, concise, visual, and meaningful programs focused on active engagement [6]. Thus, more likely than not, these design elements applied to educational programs for 6<sup>th</sup> graders. The HIL project curriculum on lead poisoning was comprised of 6 educational sessions, including 3 off-campus field trips.

Program effectiveness was assessed using pre- and post-HIL skills test, lead poisoning pre- and post-program quiz, I-SKILLS résumé [7], and an end-of-program satisfaction survey.

## PROGRAM DESCRIPTION

Six highly interactive, full-day educational sessions were developed for the *Kids to College through the Library* program. Active learning activities were designed into each session. The 6 sessions were linked together using a lead poisoning “medical mystery case”. Five medical mystery cases were written by the authors; they were fictional stories slightly based on the lives of artists who worked with a medium that contained lead and whose artworks were on display at the WAM (e.g., painting, pottery, utensils or tableware made from pewter, stained glass art). The 6<sup>th</sup> graders were divided into teams to work on and solve their medical mystery case, and on the final session, shared their findings through a poster presentation. All the educational materials produced by the program developers were made available at no cost to the WPL and the WAM for their continued use.

**Session 1:** The program developers, 2 pharmacy faculty members and 10 pharmacy students visited 2 6<sup>th</sup> grade classes at the elementary school to introduce the program. Over a 2-hour period, the 6<sup>th</sup> graders took a lead poisoning “pre-program” quiz to assess their baseline knowledge about lead poisoning, and the pre-HIL skills survey to assess their awareness and understanding of HIL. Rotating between the 2 classrooms, MCPHS faculty and students shared their college lives and described potential career paths in the health professions while the librarian discussed ways libraries, librarians and information skills can help students research careers, college campuses, and financial aid in an efficient manner. While with the librarian, the 6<sup>th</sup> graders also completed the I-SKILLS résumé that required them to list in their own words what library skills they thought they already have and still need. (“I-SKILLS” stands for Information Skills and Knowledge for Lifelong Learning Success [7].) The 6<sup>th</sup> graders were given notebook folders to document and store all their *Kids to College through the Library* materials. Those whose parents completed a consent form were photographed; their pictures were pasted on the cover page of their notebook folders.



**Session 2:** Fifty 6<sup>th</sup> graders, 2 teachers, one teacher’s aide and the assistant principal of the elementary school were transported by bus from the elementary school to the MCPHS Worcester campus. They were officially welcomed by the program developers and by the Dean of the MCPHS School of Pharmacy in the college’s largest auditorium. The program developers, 4 MCPHS pharmacy faculty members, 12 MCPHS pharmacy students, 2 MCPHS librarians and 2 WPL librarians facilitated this full-day session (about 6 hours). An

introductory audio/visual slide show outlined the day's agenda for the 6<sup>th</sup> graders. They also "attended" a 15-minute interactive lecture about lead poisoning and were required to take notes in their *Kids to College through the Library* notebook to simulate a typical college lecture.



They were then randomly assigned to one of 5 color teams based on the color of the agenda sheet they received upon arrival. Each group participated in the same 3 active learning activities but at different times during the day to keep the groups small and manageable.

**Activity 1** was a campus tour – The 6<sup>th</sup> graders toured the MCPHS Worcester campus with an MCPHS student as a guide and were shown a typical dormitory room, a laboratory classroom, a lecture hall, and had lunch in the campus student lounge.

**Activity 2** was a laboratory hands-on activity – In the pharmaceutical compounding laboratory, the 6<sup>th</sup> graders weighed, calculated, crushed, measured, prepared and bottled non-toxic paint using a variety of traditional pharmacy tools and equipment. They labeled their bottle of paint with their name; these were collected for later use in session 3.

**Activity 3** was a library activity – The 6<sup>th</sup> graders toured the MCPHS Blais Family Library and learned about resources and services available in a college library. Each 6<sup>th</sup> grader was assigned to a library computer; those belonging to the same color team were seated close to each other. The MCPHS librarian described basic library research skills, the Big6™ information literacy steps [8] and the importance of sequentially following these steps to find reliable health information, and reliable websites focusing on NLM resources, specifically MedlinePlus and ToxTown. To apply what they just heard, the MCPHS and WPL librarians and pharmacy students walked the 6<sup>th</sup> graders through an example medical mystery case using the Big6™ step-by-step approach. Thereafter, the teams were introduced to their team-specific "medical mystery case". The 6<sup>th</sup> graders were steered to use MedlinePlus and ToxTown to answer their case questions. They also were instructed on how to properly cite Internet sources. The "medical mystery cases" were used in the remaining sessions to help tie all of the information and sessions together in a fun and active learning atmosphere.



**Session 3:** Fifty students, 2 teachers, 2 teacher’s aides and the assistant principal of the elementary school were transported by bus from the elementary school to the WAM. The program developers, 5 MCPHS students, 2 WAM librarians and 5 WAM docents facilitated this full-day session. The session began in the WAM library; the 6<sup>th</sup> graders were welcomed by the WAM head librarian. The WAM outreach coordinator and WAM librarians talked about career paths in the arts as well as the importance of having good information literacy skills to find the best possible answers to questions. The 6<sup>th</sup> graders explored different art library resources, including the museum’s database, *Bridges to Art*, and learned how to search for art images. Using different library resources and working in the same teams as in session 2, the 6<sup>th</sup> graders continued to find answers about the artist and artwork involved in their “medical mystery case”. After their visit to and activity in the WAM library, the 6<sup>th</sup> graders were led to a classroom studio for an art activity. In this art activity, they used the paint they mixed and bottled in the MCPHS pharmaceutical compounding laboratory during session 2. In addition to the art activity, they also learned how to identify lead paint by sight (based on the cracking angles of lead paint) and how tap water was tested for the presence of lead.

After lunch in the WAM café, the 6<sup>th</sup> graders toured the museum with WAM docents and were able to see different works of art - paintings, pottery, pewter and stained glass exhibits; all involved the use of lead. At the end of the tour, each group was led to the artwork of the artist that was featured in their “medical mystery case”. While there, they answered more questions about their case that could only be answered after viewing the artwork. They also sketched their case’s artwork. The 6<sup>th</sup> graders and their chaperones returned to the elementary school by bus after the completion of the full-day session.







**Session 4:** The program developers, 1 pharmacy faculty members and 7 pharmacy students visited the 2 6<sup>th</sup>-grade classes at the elementary school to facilitate a module from the original *Kids2College*<sup>®</sup> curriculum [2]. During this 3-hour session, the 6<sup>th</sup> graders broke into small groups to talk about their career goals and aspirations and to ask questions about being in college. This was followed by a business card design activity where the 6<sup>th</sup> graders created their own business card that included their career aspiration. The business cards were posted on the hallway bulletin board for other students and teachers to see. The program developers also checked the progress the 6<sup>th</sup> graders were making on their “medical mystery case” by scanning their *Kids to College through the Library* notebook folders. At the end of the session, they reinforced the main points for choosing and using reliable health information sites on the Internet.



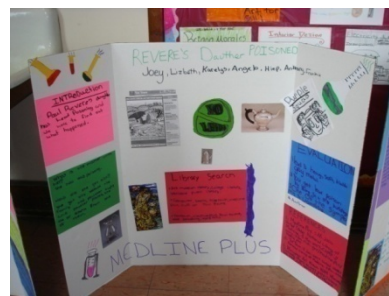
**Session 5:** Fifty students, 2 teachers, 1 teacher’s aides and the assistant principal of the elementary school were transported by bus from the elementary school to the WPL. The program developers, 4 WPL librarians, and the Senior Lead Inspector from the Worcester DPH facilitated this full-day session. The 6<sup>th</sup> graders were welcomed by the WPL children’s librarian, toured the library, completed a library card application, and were shown the library’s health information webpage and print copies of health information resources. Working in their same teams, the 6<sup>th</sup> graders used the library’s computers to access MedlinePlus resources to answer health-related questions on their “medical mystery case”. They were encouraged to use the Big6™ information literacy step-by-step approach in their search for answers, and to continue recording their search strategy and findings in their *Kids to College through the Library* notebook folders.

When the 6<sup>th</sup> graders finished their library work, they gathered to listen to the Senior Lead Inspector from the Worcester DPH. The speaker talked about lead poisoning, its prevalence in the Worcester community, and what the local government was doing to help detect and prevent lead poisoning especially among children. The speaker also answered questions the 6<sup>th</sup> graders had about this health issue, and distributed informational material

from the Worcester DPH. After the group had lunch in the WPL conference room, the 6<sup>th</sup> graders and their chaperones returned to the elementary school by bus.



**Session 6:** The last session of the program was held at the elementary school. The half-day session was facilitated by the program developers. By this time, the teams of 6<sup>th</sup> graders had obtained answers to specific questions pertaining to their medical mystery case. The session was designed for them to present their research work on a team poster. The program developers instructed the students on the basics of creating a research-related poster, using the information they found while at the MCPHS Library, the WAM library, and the WPL. The 6<sup>th</sup> graders were provided the supplies (e.g., poster board, colored markers, glue) to create their team poster. As an incentive, the top-rated team poster was going to receive an educational award gift. The 6<sup>th</sup> graders used a variety of artistic approaches to decorate their poster, including cut outs of images they printed while at the WAM, photographs taken during the previous sessions, and their own drawings. The team posters were then displayed in the hallway where the teams were able to view each others' posters. The program developers used a rubric to rank the team posters and to determine the recipients of the educational award gift.



After the poster-making activity, the program developers asked the 6<sup>th</sup> graders to update their I-SKILLS résumé. They also administered the post-HIL skills test, the lead poisoning "post-program" quiz, and end-of-program satisfaction survey. All the *Kids to College through the Library* notebook folders were collected to be analyzed and used in the program evaluation. (Within a month, the notebook folders were returned to the 6<sup>th</sup> graders.) The 6<sup>th</sup> grade teachers also were asked to complete the end-of-program satisfaction survey.

To conclude the program, each participating 6<sup>th</sup> grader was awarded a \$10 (US) gift card to a local bookstore. The 6<sup>th</sup> grade teachers also were given gift cards to purchase educational materials for their classrooms. Each student also received a “lead testing kit” that their parents could use to test their house for the presence of lead paint. This test kit was supplemented with contact information from the Worcester DPH in the event their house tested positive for lead paint.

## RESULTS

The effectiveness of the *Kids to College through the Library* program was assessed using several tools: a pre- and post-HIL skills test, a lead poisoning pre- and post-program quiz, I-SKILLS Résumé and other contents of the *Kids to College through the Library* notebook folders, end-of-program satisfaction survey (completed by the 6<sup>th</sup> grade students and teachers), poster presentations, and the program developers’ observation notes. Overall, based on the analysis of the data from these assessment tools, the primary and secondary goals of the program were achieved.

Table 1. Results of the Health Information Literacy Skills Test (n=50)

Test Item	Pre-test (% n)	Post-test (% n)
Correctly identified sources to answer a medical question	16%	69.3%
Correctly wrote a reliable health information website (e.g., MedlinePlus) in an open-ended question	0%	64%
Correctly identified MedlinePlus as a source of reliable health information in a multiple choice question	0%	100%

Using a 1-10 scoring system with 1 = “no improvement” and 10 = “improved a lot”, the 6<sup>th</sup> graders averaged an 8.7 when answering the question “To what degree did this program improve the way you search for health information?” They averaged an 8.1 when answering the question “How confident are you finding high quality health information on the Internet?” When asked if they plan to go to college, almost 100% of the 6<sup>th</sup> graders indicated they did. On the end-of the program satisfaction survey, all 6<sup>th</sup> graders expressed that they enjoyed visiting the MCPHS Worcester campus, using the library computers and printers, and conducting a hands-on laboratory exercise. They ranked highly the opportunity to interact with the pharmacy students. They also liked the competitive team poster-making activity.

According to the program developer - librarian’s notes for session 2, the 6<sup>th</sup> graders had difficulty following the Big6™ step-by-step approach for searching health information. They also were not always able to construct an appropriate search question (e.g., some used a fictional name from their medical mystery case), or use appropriate search terms (e.g., some typed whole sentences in the search box or used verbs as search terms), or connect terms correctly using the Boolean operators. The 6<sup>th</sup> graders also had difficulty staying on task; rather than searching for reliable information on the NLM website only, they were tempted to search throughout the Internet. The most difficult tasks for the 6<sup>th</sup> graders,



however, were learning how to cite or reference web-based health information, and how to evaluate websites critically.

## **CONCLUSION**

The *Kids to College through the Library* curriculum was effective in achieving the program's primary and secondary goals due to its extremely interactive format, meaningful context (medical mystery cases that touched upon a community health problem affecting children -- lead poisoning), and excellent collaboration among community organizations with common interests. Other program features that were instrumental included: (1) small group facilitation during hands-on activities that allowed for immediate or just-in-time feedback and made possible through the presence of several facilitators - librarians, pharmacy faculty members and students; (2) to reinforce basic concepts and major points, repetition of the same processes of finding, using, and applying health information from selected NLM resources throughout several sessions; and (3) also to reinforce basic concepts and major points, session reviews – a review of the previous session was conducted at the beginning of each session, and a review of the day's activities was conducted at the end of each session. By spending a day at a college campus and working with college students on various activities, elementary school students' awareness of the importance of attending college was enhanced.

Libraries can advance health information literacy in their communities by leading collaborations and starting dialogues among community organizations with common interests in addressing important local health issues. Librarians can help develop fun and interactive learning programs that expose students to a community-integrated learning environment. In this program, elementary school students witnessed and experienced that learning does not happen in isolation in a classroom with their teachers, but can take place in different settings through a combined effort of different types of educators. To solve their medical mystery case, they were required to work in teams and utilize the expertise of health librarians, museum librarians, public library librarians, volunteer art docents, public health employees, and college faculty members and students. They were exposed to a systematic and sequential process of problem-solving. Through the *Kids to College through the Library* program, these children have begun to develop information literacy skills that are necessary to address health-related questions in today's informational age.

## **FUTURE DIRECTIONS**

The authors plan to develop a similar but simplified HIL skills program curriculum for middle school (grades 7 and 8) students. It will focus on improving students' abilities to identify, locate, evaluate, and use health information primarily from MedlinePlus. They also plan to refine the process of assessing program effectiveness, and add more quantitative measures. The pre- and post-test measures will be revised to make them more age-appropriate and readable. The program curriculum will be designed such that it can be adopted or adapted by any library or community organization.

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