



Reducing Carcinogens in Public Schools: A non-regulatory approach by a regulatory agency

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Abstract

The New Jersey Public Employees' Occupational Safety and Health Program identified 318 public school districts that reported any of 10 selected carcinogens on their 1990 New Jersey Right to Know Survey of hazardous substances. After obtaining more information about the school districts' use of these carcinogens from a 10% random sample phone survey, a letter recommending substitution of less hazardous substances was sent to the 318 school districts. Individualized to reflect information provided by the schools in the 1990 survey, a form requesting additional information on the status of containers holding the carcinogens was also sent. There were 1,303 reports of the 10 carcinogens from the 272 (86%) school districts that completed the form. Most were disposed of (668, 51%), used completely (65, 5%), or were slated for disposal (287, 22%). This is an example of a successful project by a regulatory agency to reduce potential exposure to carcinogens in public schools.

Introduction

The New Jersey Worker and Community Right to Know Act (N.J.S.A. 34:5A-1 et seq.), effective August 29, 1984, resulted from concern about the proliferation of hazardous substances in the workplace and the environment. Under the Act, the New Jersey Department of Health (NJDOH) is responsible for administration of the biennial or annual Right to Know (RTK) Survey, for enforcement of container labeling and worker training and for preparation of hazardous substance fact sheets (1). This paper reports on a pilot project by the NJDOH Public Employees' Occupational Safety and Health (PEOSH) Program (2) which used information from the 1990 RTK Survey to reduce public school staff's potential exposure to carcinogens, thereby reducing the risk of future disease.

Methods

In November 1990, the 1990 RTK Survey, along with instructions for completion, was sent by the NJDOH RTK Program to 1,576 public employers in New Jersey, including state agencies, county and municipal governments, public school districts, and other public authorities. The Chemical Abstracts Service number, Department of Transportation number, type of container,

percent of the hazardous substance in the product (in ranges, e.g. 90-99%), amount of the product (in ranges, e.g. 11-100 gallons), and number of exposed or potentially exposed employees were requested for each individual container of a hazardous substance. The information on the returned surveys (100% participation rate) was computerized by November 1992.

A list of the public school districts that reported any of 10 known human carcinogens with the information on each container of these carcinogens was then generated from the database. These 10 most reported carcinogens were arsenic, arsenic trioxide, asbestos, benzene, benzidine, lead chromate, sodium arsenate, sodium arsenite, sodium dichromate, and vinyl chloride (3,4). The PEOSH Program phoned a 10% random sample of the school districts between February and May 1993 to obtain additional information about the reported carcinogens, i.e., in what product, what used for, who exposed, frequency of use, where stored, if still using.

The results of the phone survey were used in the preparation of a letter, containing specific recommendations about the 10 carcinogens, which was sent by the PEOSH Program in July 1993 to the superintendent of each school district on the list. A form, "Follow-Up on Carcinogens Reported in

the 1990 Right To Know Survey," to be completed and returned to the PEOSH Program, was enclosed with each letter. The form listed each individual container of any of the 10 carcinogens previously reported by the school district, for the purpose of requesting further information. The school districts that had not returned the form by mid-November 1993 were phoned. Information from the returned forms was computerized and analyzed.

Results

Random Sample Phone Survey

Of the 575 public school districts in New Jersey, 318 (55%) reported one or more of the 10 carcinogens on their 1990 RTK Survey. Of the 32 randomly selected school districts, 31 (97%) participated in the phone survey. The findings from the phone survey included use of arsenic, arsenic trioxide, asbestos, benzene, lead chromate, sodium arsenate, and sodium dichromate in pure form for science or chemistry experiments or demonstrations. Also reported were asbestos in roof patching or cement, benzene (pure form) for drying leather, benzene in gasoline/fuel or in cleaners, lead chromate in paint for maintenance and in glazes for an art class, and sodium dichromate in floorstripper. Science and chemistry teachers and maintenance staff were the types of employees potentially exposed; students were also reported as potentially exposed to carcinogens used in science and chemistry classes (Table 1).

More detailed examples of the reported uses of these carcinogens included:

- a can of roofing cement with an unknown percentage of asbestos used by a maintenance person for roof leaks;
- a can of graffiti removal with 1-9% benzene used inside buildings, especially bathrooms, by the custodian;
- a 90-99% solution of benzene used once or twice by two chemistry teachers in a high school chemistry class to test the reactivity of double bonds in benzene rings;

Table 1. Results of Phone Survey to New Jersey Public School Districts About Ten Selected Carcinogens Reported on Their 1990 Right to Know Survey, February Through May 1993 (N=31 School Districts).

Carcinogen	Number of School Districts That Reported	Use of Carcinogen	Who is Exposed	Number of School Districts Still Using
Arsenic (pure)	4	Science/Chemistry Class	Science/Chemistry Teachers/Students	1
Arsenic Trioxide (pure)	5	Science/Chemistry Class	Science/Chemistry Teachers/Students	1
Asbestos (mixture)	3	Roof Patching/Cement	Maintenance Staff	2
	1	Lab Experiments	Science Teachers/Students	1
	3	Unknown	Unknown	0
Asbestos (pure)	1	12" x 12" sheets to place hot glass on	Chemistry Teachers/Students	0
	1	Chemistry class demonstration	Science Teachers	1
Benzene (mixture)	6	Gasoline, fuel	Maintenance Staff, Bus Coordinator Shop Foreman, Auto Shop Teacher	5
	3	Cleaner	Maintenance Staff, Science and Art Teachers	1
	2	Chemistry Class	Chemistry Teachers	1
Benzene (pure)	6	Science/Chemistry Class	Science/Chemistry Teachers/Students	2
	2	Paint Thinner	Maintenance Staff	0
	1	With Paint in Art Class	Art Teacher/Students	0
	1	Leather Drying	Metal Shop Teacher/Students	1
	1	Poured into Pickup Gas Tank	Maintenance Supervisor	0
	1	Unknown	Unknown	0
Benzidine (pure)	1	Unknown	Unknown	0
Lead Chromate (mixture)	7	Paint	Maintenance Staff	3
	1	Glazes for Ceramic Art	Art Teachers, Students	0
	1	Science Class	Science Teachers	1
	2	Unknown	Unknown	0
Lead Chromate (pure)	11	Science/Chemistry Class	Science/Chemistry Teachers/Students	6
Sodium Arsenate (pure)	4	Science/Chemistry Class	Science/Chemistry Teachers/Students	2
Sodium Dichromate (mixture)	1	Floorstripper	Maintenance Staff	0
	1	Science Class	Science Teachers	1
Sodium Dichromate (pure)	8	Science/Chemistry Class	Science/Chemistry Teachers	4

Note: The 31 school districts were participants in a 10% random sample (N=32) of 318 public school districts that reported one or more of ten selected carcinogens on their 1990 Right to Know Survey.

Table 2. Ten Selected Carcinogens Reported by New Jersey Public School Districts on the 1990 Right to Know Survey, Current Status by Carcinogen (N-1,303 Containers)^a.

Carcinogen	Disposed of or Used up		Plan to Dispose		Still in Use		Other		Total #
	#	%	#	%	#	%	#	%	
Benzene	281	62	56	12	112	25	3	1	452
Lead Chromate	147	62	59	25	31	13	0	0	237
Asbestos	114	53	45	21	28	13	30	14	217
Sodium Dichromate	80	42	67	35	41	21	3	2	191
Arsenic Trioxide	32	57	17	30	6	11	1	2	56
Arsenic	28	51	16	29	10	18	1	2	55
Sodium Arsenate	15	38	15	38	9	23	0	0	39
Sodium Arsenite	16	50	8	25	8	25	0	0	32
Benzidine	12	92	1	8	0	0	0	0	13
Vinyl Chloride	8	73	3	27	0	0	0	0	11
Total	733^b	56	287	22	245^c	19	38^d	3	1303

^a From follow-up forms completed by 272 (86%) school districts.

^b Includes 668 (51%) that were disposed of and 65 (5%) that were used up and not reordered.

^c Includes 16 (1%) that plan to use up and not reorder and 46 (4%) benzene in fuel or gasoline, for which there presently is no substitute.

^d Includes 31 (2%) that should not have been reported on the 1990 Right to Know Survey, 27 of which were asbestos in building materials.

- pure benzene used in a high school advanced chemistry class for a demonstration of vapor pressure by a chemistry teacher;
- lead chromate of an unknown percentage in a can of paint used by a maintenance person for painting the metal supports of a cooling tower on the roof;
- a can of yellow paint with 1-9% lead chromate used by custodians to paint lines in a parking lot; and
- pure sodium dichromate used in a high school chemistry class for a demonstration of colors by a chemistry teacher.

The school districts reported the current status of the carcinogens as still being used, disposed of, planning to dispose of, or used completely. The letter to the 318 school districts recommended substitution of less hazardous substances, except for benzene in gasoline/fuel (no substitute).

Letter and Follow-up Form

Of the 318 school districts who were sent the letter and form, "Follow-Up on Carcinogens Reported in the 1990 Right To Know Survey," 272 (86%) completed the

form between July 1993 and May 1994. Of the 10 carcinogens identified in 1,303 reports from the 272 school districts, most had been disposed of (668, 51%), had been used completely and would not be reordered (65, 5%), or were slated for disposal (287, 22%). However, 245 (19%) of the reported carcinogens (of which 46 or 4% were benzene in gasoline/fuel for which there is no substitute) were still in use, and 16 (1%) were planned to be used completely and not reordered. Table 2 shows the current status of the 10 carcinogens reported by the school districts. The 1,303 reports of the 10 carcinogens from the 272 school districts that returned the form represent 74% of the total 1,769 reports from all 318 school districts. Of the carcinogens in the 1,303 reports, most were in pure form or in mixtures in relatively small percentages, while 650 or one-half were in amounts of 10 gallons or less and 433 or one-third were in amounts of 10 pounds or less.

Discussion

This project showed that school districts

reduced potential employee and student exposure to carcinogens, as 78% of the 10 reported carcinogens in school districts that returned the follow-up form were disposed of, used completely and not reordered, or scheduled for disposal. From the phone survey and response to the letter and follow-up form, it is known that both the enforcement of the New Jersey RTK law and this project contributed to the reduction of carcinogens in the schools, though it is not known how much of the reduction was due to each. Although it was not an enforcement project, the fact that it was conducted by a regulatory program (NJDOH PEOSH Program) in conjunction with another regulatory program (NJDOH RTK Program) probably caused more positive results than would have happened if the project had been conducted by a non-regulatory program. This conclusion was reached from conversations with school district staff who indicated that they responded to Right to Know and/or Public Employees' Occupational Safety and Health Program communications because of previous experiences

with the programs.

This project also proved to be a very efficient method to reduce and document the reduction of potential exposure to hazardous substances in the workplace, using information already collected from the RTK Survey. The cost and length of time to achieve results were much less than other methods of addressing hazardous exposures in the workplace, such as on-site industrial hygiene inspections or a registry using laboratory or physician reports of individual workers' exposures or diseases.

One concern is the validity of information on the follow-up forms returned by the school districts. This will be addressed by comparing the school districts' follow-up forms with their 1993 RTK Surveys, administered in spring 1994. School districts will be contacted regarding inconsistencies, and those that did not respond to the letter or responded that they were still using the carcinogens (except benzene in fuel or gasoline) will also be monitored.

Based on the success of this pilot project, the NJDOH PEOSH Program will continue to use the RTK Surveys to identify hazardous substances to which public employees may be exposed and to conduct similar short-term projects to reduce these exposures.

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Source: *Prevention report*, U.S. Public Health Service, Dec 1994/Jan 1995.



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