

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
CENTER FOR DISEASE CONTROL  
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH  
CINCINNATI, OHIO 45226

HEALTH HAZARD EVALUATION DETERMINATION  
REPORT NO. 79-76-602

PATHOLOGIST LABORATORY CONSULTATION SERVICE  
DENVER, COLORADO

JULY 1979

I. TOXICITY DETERMINATION

A health hazard evaluation was conducted by the National Institute for Occupational Safety and Health (NIOSH) at Pathologist Laboratory Consultation Service, Denver, Colorado, on May 9, 1979. At the time of this evaluation breathing zone and general room air samples were taken on workers for isopropyl alcohol and xylene. A health hazard did not exist at this facility during the time of this evaluation. This laboratory has adequate ventilation that is used correctly by the cytologists.

II. DISTRIBUTION AND AVAILABILITY

Copies of this determination report are currently available upon request from NIOSH, Division of Technical Services, Information Resources and Dissemination Section, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days the report will be available through the National Technical Information Service (NTIS), Springfield, Virginia. Information regarding its availability through NTIS can be obtained from NIOSH, Publications Office, at the Cincinnati address.

Copies of this report have been sent to:

1. Pathologist Laboratory Consultation Service
2. U.S. Department of Labor/OSHA - Region VIII
3. NIOSH - Region VIII

For the purpose of informing three employees, a copy of this report shall be posted in a prominent place accessible to the employees for a period of 30 calendar days.

III. INTRODUCTION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6), authorizes the Secretary of Health, Education, and Welfare, following a written request by any employer or

authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

NIOSH received such a request from an employer representative of Pathologist Laboratory Consultation Service, Denver, Colorado, to evaluate potential exposures associated with isopropyl alcohol and xylene used for treatment of slides containing specimens from pap smears and sputum.

#### IV. HEALTH HAZARD EVALUATION

##### A. Processes Evaluated

Pathologist Laboratory Consultation Service receives sputum samples and pap smears which are fixed on slides with solutions that contain xylene and isopropyl alcohol. These are the only two chemicals used during the staining processes. Very small quantities (approximately one liter) of each chemical are used daily.

##### B. Evaluation Design

All three workers were monitored for isopropyl alcohol and xylene throughout the entire period. General room samples were taken directly underneath and in close proximity to the staining solutions containing isopropyl alcohol and xylene.

##### C. Evaluation Methods

Isopropyl alcohol and xylene were collected on organic vapor charcoal sampling tubes and analyzed according to NIOSH P&CAM #127 using a gas chromatograph with a flame ionization detector.

##### D. Criteria for Assessing Concentrations of Air Contaminants

Three sources of criteria are generally used to assess workroom concentrations of air contaminants: (1) recommended Threshold Limit Values (TLVs) and their supporting documentation as set forth by the American Conference of Governmental Industrial Hygienists (ACGIH), 1978; (2) Occupational Safety and Health Administration (OSHA) standards (29 CFR 1910.1000), January 1978; and (3) NIOSH criteria for recommended standards. NIOSH criteria and ACGIH TLVs represent the most recent and relevant recommendations and are given prominence in this evaluation.

<u>Substances</u>	<u>TLV</u>	<u>Permissible Exposures</u> <u>8-Hour Time-Weighted</u> <u>Exposures Basis (mg/M<sup>3</sup>)</u>	
		<u>Current</u> <u>OSHA</u> <u>Standard</u>	<u>NIOSH Criteria</u> <u>For Recommended</u> <u>Standard</u>
Isopropyl Alcohol.....	980	980	980
Xylene.....	435	435	435

mg/M<sup>3</sup> = approximate milligrams of substance per cubic meter of air.

Occupational health standards are established at levels designed to protect individuals occupationally exposed to toxic substances on an 8-hour per day, 40-hour per week basis over a normal working lifetime.

E. Toxicology

Isopropyl Alcohol (Isopropanol) -- Route of entry into body is by inhalation, ingestion or absorption. Isopropanol is an irritant, and a central nervous system depressant. It is metabolized to acetone in the body.

Repeated elevated exposures may cause conjunctivitis, corneal ulceration, and irritation of skin. There are no documented cases of either acute or chronic occupational exposures. The greatest health hazard exists from exposures to more toxic chemicals during the synthesis of isopropanol. (References 1,2)

Xylene -- Overexposures may cause headache, nausea, gastrointestinal disturbance, and dizziness. Eye, nose throat, and skin irritation are also common complaints when workers are exposed to xylene. Workers exposed to xylene should have laboratory test for complete blood count, a routine urinalysis, and liver function test. (Reference 3)

F. Environmental Results and Discussion

Results of the environmental samples presented in Table 1 clearly illustrate that workers are not overexposed since all breathing zone samples were below evaluation criteria. Only one sample had a measurable concentration. This sample was taken underneath the hood where workers never position themselves.

V. RECOMMENDATIONS

1. Continue use of the laboratory hood when tissue slides are being stained.
2. All new employees should be briefed on the toxicity of isopropyl alcohol and xylene.

VI. REFERENCES

1. Plunkett, E.R., Handbook of Industrial Toxicology, Chemical Publishing Company, New York, 1976, pp. 225-226.
2. Criteria for a Recommended Standard...Occupational Exposure to Isopropyl Alcohol, HEW Publication No. (NIOSH) 76-142, Cincinnati, Ohio, 1976.
3. Criteria for a Recommended Standard...Occupational Exposure to Xylene, HEW Publication No. (NIOSH) 75-168, Cincinnati, Ohio, 1976.

VII. AUTHORSHIP AND ACKNOWLEDGMENTS

Report Prepared By:

Bobby J. Gunter, Ph.D.  
Regional Industrial Hygienist  
NIOSH-Region VIII  
Denver, Colorado

Originating Office:

Jerome P. Flesch, Acting Chief  
Hazard Evaluation and Technical  
Assistance Branch  
NIOSH-Cincinnati, Ohio

Report Typed By:

Marilyn K. Schulenberg  
NIOSH-Region VIII  
Denver, Colorado

TABLE 1

Breathing Zone and General Room Air Concentrations of  
Isopropyl Alcohol and Xylene

Pathologist Laboratory Consultation Service  
Denver, Colorado

May 9, 1979

Sample Number	Job Classification	Time of Sampling	mg/M <sup>3</sup>	
			Isopropyl Alcohol	Xylene
1-6	Supervisor	7:25 AM - 2:15 PM	*	*
2-7	Cytology Technologist	7:30 AM - 2:15 PM	*	*
3	General Room	7:31 AM - 2:15 PM	*	*
4	Bookkeeper	7:35 AM - 10:40 AM	*	*
5	General Room	7:40 AM - 2:20 PM	0.9	*
8	Cytology Technologist	1:30 PM - 2:15 PM	*	*
9	Cytology Technologist	11:30 AM - 12:40 PM	*	*
EVALUATION CRITERIA			980	435
LABORATORY LIMIT OF DETECTION mg/sample			0.0078	0.0086

\* = below laboratory limit of detection