

**TOXICOLOGICAL PROFILE FOR
BENZENE**

**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry**

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DISCLAIMER

The use of company or product name(s) is for identification only and does not imply endorsement by the Agency for Toxic Substances and Disease Registry.

UPDATE STATEMENT

A Toxicological Profile for benzene was released in April 1993. This edition supersedes any previously released draft or final profile.

Toxicological profiles are revised and republished as necessary, but no less than once every three years. For information regarding the update status of previously released profiles, contact ATSDR at:

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FOREWORD

This toxicological profile is prepared in accordance with guidelines* developed by the Agency for Toxic Substances and Disease Registry (ATSDR) and the Environmental Protection Agency (EPA). The original guidelines were published in the *Federal Register* on April 17, 1987. Each profile will be revised and republished as necessary.

The ATSDR toxicological profile succinctly characterizes the toxicologic and adverse health effects information for the hazardous substance described therein. Each peer-reviewed profile identifies and reviews the key literature that describes a hazardous substance's toxicologic properties. Other pertinent literature is also presented, but is described in less detail than the key studies. The profile is not intended to be an exhaustive document; however, more comprehensive sources of specialty information are referenced.

The focus of the profiles is on health and toxicologic information; therefore, each toxicological profile begins with a public health statement that describes, in nontechnical language, a substance's relevant toxicological properties. Following the public health statement is information concerning levels of significant human exposure and, where known, significant health effects. The adequacy of information to determine a substance's health effects is described in a health effects summary. Data needs that are of significance to protection of public health are identified by ATSDR and EPA.

Each profile includes the following:

- (A) The examination, summary, and interpretation of available toxicologic information and epidemiologic evaluations on a hazardous substance to ascertain the levels of significant human exposure for the substance and the associated acute, subacute, and chronic health effects;
- (B) A determination of whether adequate information on the health effects of each substance is available or in the process of development to determine levels of exposure that present a significant risk to human health of acute, subacute, and chronic health effects; and
- (C) Where appropriate, identification of toxicologic testing needed to identify the types or levels of exposure that may present significant risk of adverse health effects in humans.

The principal audiences for the toxicological profiles are health professionals at the Federal, State, and local levels; interested private sector organizations and groups; and members of the public.

This profile reflects ATSDR's assessment of all relevant toxicologic testing and information that has been peer-reviewed. Staff of the Centers for Disease Control and Prevention and other Federal scientists have also reviewed the profile. In addition, this profile has been peer-reviewed by a nongovernmental panel and was made available for public review. Final responsibility for the contents and views expressed in this toxicological profile resides with ATSDR.



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*Legislative Background

The toxicological profiles are developed in response to the Superfund Amendments and Reauthorization Act (SARA) of 1986 (Public Law 99-499) which amended the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA or Superfund). This public law directed ATSDR to prepare toxicological profiles for hazardous substances most commonly found at facilities on the CERCLA National Priorities List and that pose the most significant potential threat to human health, as determined by ATSDR and the EPA. The availability of the revised priority list of 275 hazardous substances was announced in the *Federal Register* on April 29, 1996 (61 FR 18744). For prior versions of the list of substances, see *Federal Register* notices dated April 17, 1987 (52 FR 12866); October 20, 1988 (53 FR 41280); October 26, 1989 (54 FR 43619); October 17, 1990 (55 FR 42067); October 17, 1991 (56 FR 52166); October 28, 1992 (57 FR 48801); and February 28, 1994 (59 FR 9486). Section 104(i)(3) of CERCLA, as amended, directs the Administrator of ATSDR to prepare a toxicological profile for each substance on the list.

CONTRIBUTORS

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THE PROFILE HAS UNDERGONE THE FOLLOWING ATSDR INTERNAL REVIEWS:

1. Green Border Review. Green Border review assures consistency with ATSDR policy.
2. Health Effects Review. The Health Effects Review Committee examines the health effects chapter of each profile for consistency and accuracy in interpreting health effects and classifying end points.
3. Minimal Risk Level Review. The Minimal Risk Level Workgroup considers issues relevant to substance-specific minimal risk levels (MRLs), reviews the health effects database of each profile, and makes recommendations for derivation of MRLs.

PEER REVIEW

A peer review panel was assembled for benzene. The panel consisted of the following members:

1. Dr. Rogene Henderson, Biochemist, Lovelace Inhalation Toxicology Research Institute, Kirtland AFB, Albuquerque, New Mexico;
2. Dr. Carroll Snyder, Director, Laboratory of Inhalation Carcinogenesis and Toxicity, A.J. Lanza Laboratories, New York University, Tuxedo, New York; and
3. Dr. Gisela Witz, Professor, University of Medicine & Dentistry New Jersey (UMDNJ), Robert Wood Johnson Medical School, Department of Environmental and Community Medicine, Piscataway, New Jersey.

These experts collectively have knowledge of benzene's physical and chemical properties, toxicokinetics, key health end points, mechanisms of action, human and animal exposure, and quantification of risk to humans. All reviewers were selected in conformity with the conditions for peer review specified in Section 104(i)(13) of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended.

Scientists from the Agency for Toxic Substances and Disease Registry (ATSDR) have reviewed the peer reviewers' comments and determined which comments will be included in the profile. A listing of the peer reviewers' comments not incorporated in the profile, with a brief explanation of the rationale for their exclusion, exists as part of the administrative record for this compound. A list of databases reviewed and a list of unpublished documents cited are also included in the administrative record.

The citation of the peer review panel should not be understood to imply its approval of the profile's final content. The responsibility for the content of this profile lies with the ATSDR.

CONTENTS

FOREWORD	v
CONTRIBUTORS	vii
PEER REVIEW	ix
LIST OF FIGURES	xv
LIST OF TABLES	xvii
1. PUBLIC HEALTH STATEMENT	1
1.1 WHAT IS BENZENE?	1
1.2 WHAT HAPPENS TO BENZENE WHEN IT ENTERS THE ENVIRONMENT?	2
1.3 HOW MIGHT I BE EXPOSED TO BENZENE?	3
1.4 HOW CAN BENZENE ENTER AND LEAVE MY BODY?	4
1.5 HOW CAN BENZENE AFFECT MY HEALTH?	5
1.6 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO BENZENE?	7
1.7 WHAT RECOMMENDATIONS HAS THE FEDERAL GOVERNMENT MADE TO PROTECT HUMAN HEALTH?	8
1.8 WHERE CAN I GET MORE INFORMATION?	9
2. HEALTH EFFECTS	11
2.1 INTRODUCTION	11
2.2 DISCUSSION OF HEALTH EFFECTS BY ROUTE OF EXPOSURE	11
2.2.1 Inhalation Exposure	13
2.2.1.1 Death	13
2.2.1.2 Systemic Effects	42
2.2.1.3 Immunological and Lymphoreticular Effects	56
2.2.1.4 Neurological Effects	62
2.2.1.5 Reproductive Effects	64
2.2.1.6 Developmental Effects	67
2.2.1.7 Genotoxic Effects	70
2.2.1.8 Cancer	77
2.2.2 Oral Exposure	89
2.2.2.1 Death	89
2.2.2.2 Systemic Effects	90
2.2.2.3 Immunological and Lymphoreticular Effects	114
2.2.2.4 Neurological Effects	116
2.2.2.5 Reproductive Effects	118
2.2.2.6 Developmental Effects	118
2.2.2.7 Genotoxic Effects	119
2.2.2.8 Cancer	121

2.2.3	Dermal Exposure	125
2.2.3.1	Death	125
2.2.3.2	Systemic Effects	125
2.2.3.3	Immunological and Lymphoreticular Effects	127
2.2.3.4	Neurological Effects	127
2.2.3.5	Reproductive Effects	128
2.2.3.6	Developmental Effects	128
2.2.3.7	Genotoxic Effects	128
2.2.3.8	Cancer	128
2.3	TOXICOKINETICS	129
2.3.1	Absorption	129
2.3.1.1	Inhalation Exposure	129
2.3.1.2	Oral Exposure	133
2.3.1.3	Dermal Exposure	134
2.3.2	Distribution	138
2.3.2.1	Inhalation Exposure	138
2.3.2.2	Oral Exposure	139
2.3.2.3	Dermal Exposure	140
2.3.3	Metabolism	141
2.3.4	Elimination and Excretion	153
2.3.4.1	Inhalation Exposure	153
2.3.4.2	Oral Exposure	156
2.3.4.3	Dermal Exposure	158
2.3.4.4	Other Routes of Exposure	159
2.3.5	Physiologically Based Pharmacokinetic (PBPK)/Pharmacodynamic (PD) Models	160
2.3.5.1	Summary of PBPK Models.	161
2.3.5.2	Benzene PBPK Model Comparison.	163
2.3.5.3	Discussion of Models.	163
2.4	MECHANISMS OF ACTION	173
2.4.1	Pharmacokinetic Mechanisms	173
2.4.2	Mechanisms of Toxicity	174
2.4.3	Animal-to-Human Extrapolations	179
2.5	RELEVANCE TO PUBLIC HEALTH	180
2.6	BIOMARKERS OF EXPOSURE AND EFFECT	224
2.6.1	Biomarkers Used to Identify or Quantify Exposure to Benzene	225
2.6.2	Biomarkers Used to Characterize Effects Caused by Benzene	231
2.7	INTERACTIONS WITH OTHER CHEMICALS	232
2.8	POPULATIONS THAT ARE UNUSUALLY SUSCEPTIBLE	233
2.9	METHODS FOR REDUCING TOXIC EFFECTS	235
2.9.1	Reducing Peak Absorption Following Exposure	235
2.9.2	Reducing Body Burden	236
2.9.3	Interfering with the Mechanism of Action for Toxic Effects	237
2.10	ADEQUACY OF THE DATABASE	239
2.10.1	Existing Information on Health Effects of Benzene	239
2.10.2	Identification of Data Needs	241
2.10.3	Ongoing Studies	255

3. CHEMICAL AND PHYSICAL INFORMATION 263

 3.1 CHEMICAL IDENTITY 263

 3.2 PHYSICAL AND CHEMICAL PROPERTIES 263

4. PRODUCTION, IMPORT/EXPORT, USE, AND DISPOSAL 267

 4.1 PRODUCTION 267

 4.2 IMPORT/EXPORT 269

 4.3 USE 272

 4.4 DISPOSAL 273

5. POTENTIAL FOR HUMAN EXPOSURE 275

 5.1 OVERVIEW 275

 5.2 RELEASES TO THE ENVIRONMENT 276

 5.2.1 Air 276

 5.2.2 Water 278

 5.2.3 Soil 281

 5.3 ENVIRONMENTAL FATE 282

 5.3.1 Transport and Partitioning 282

 5.3.2 Transformation and Degradation 284

 5.3.2.1 Air 284

 5.3.2.2 Water 286

 5.3.2.3 Sediment and Soil 289

 5.4 LEVELS MONITORED OR ESTIMATED IN THE ENVIRONMENT 290

 5.4.1 Air 291

 5.4.2 Water 294

 5.4.3 Sediment and Soil 295

 5.4.4 Other Environmental Media 295

 5.5 GENERAL POPULATION AND OCCUPATIONAL EXPOSURE 296

 5.6 POPULATIONS WITH POTENTIALLY HIGH EXPOSURES 301

 5.7 ADEQUACY OF THE DATABASE 303

 5.7.1 Identification of Data Needs 303

 5.7.2 Ongoing Studies 307

6. ANALYTICAL METHODS 309

 6.1 BIOLOGICAL SAMPLES 309

 6.2 ENVIRONMENTAL SAMPLES 313

 6.3 ADEQUACY OF THE DATABASE 320

 6.3.1 Identification of Data Needs 320

 6.3.2 Ongoing Studies 322

7. REGULATIONS AND ADVISORIES 325

8. REFERENCES 349

9. GLOSSARY 421

APPENDICES

C. MINIMAL RISK LEVEL WORKSHEETS A-1

B. USER'S GUIDE B-1

C. ACRONYMS, ABBREVIATIONS, AND SYMBOLS C-1

LIST OF FIGURES

2-1	Levels of Significant Exposure to Benzene - Inhalation	37
2-2	Levels of Significant Exposure to Benzene - Oral	105
2-3	Metabolic Pathways for Benzene	144
2-4	Conceptual Representation of a Physiologically Based Pharmacokinetic (PBPK) Model for a Hypothetical Chemical Substance	162
2-5	Physiologic Model Used to Describe the Pharmacokinetics of Benzene in Mice and Rats During Inhalation and Oral Exposures	166
2-6	Existing Information on Health Effects of Benzene	240
5-1	Frequency of NPL Sites With Benzene Contamination	277
5-2	Environmental Transformation Products of Benzene in Various Media	285
5-3	Benzene Emissions and Exposures	298

LIST OF TABLES

2-1	Levels of Significant Exposure to Benzene - Inhalation	15
2-2	Levels of Significant Exposure to Benzene - Oral	91
2-3	Levels of Significant Exposure to Benzene - Dermal	126
2-4	Parameters Used in the Medinsky PBPK Model for Benzene	165
2-5	Genotoxicity of Benzene <i>In Vivo</i>	210
2-6	Genotoxicity of Benzene <i>In Vitro</i>	214
2-7	Ongoing Studies on the Health Effects of Benzene	258
3-1	Chemical Identity of Benzene	264
3-2	Physical and Chemical Properties of Benzene	265
4-1	Facilities That Manufacture or Process Benzene	270
5-1	Releases to the Environment from Facilities That Manufacture or Process Benzene	279
5-2	Benzene Levels in Air Samples	292
5-3	Percentage of Employees Exposed to Benzene by Exposure Level and Industry Division	302
6-1	Analytical Methods for Determining Benzene in Biological Samples	310
6-2	Analytical Methods for Determining Metabolites of Benzene in Urine	312
6-3	Analytical Methods for Determining Benzene in Environmental Samples	314
7-1	Regulations and Guidelines Applicable to Benzene	327

