
The Use of Di-2-Ethylhexyl Phthalate in PVC Medical Devices: Exposure, Toxicity, and Alternatives

by Joel Tickner

with contributions from Phillip Hunt¹, Mark Rossi²,
Nadia Haiama, and Mark Lappe



A Publication of the Lowell Center for Sustainable Production
University of Massachusetts Lowell

This report was commissioned by the Health Care Without Harm campaign.

The Lowell Center for Sustainable Production

The Lowell Center for Sustainable Production develops, studies, and promotes environmentally sound systems of production, healthy work environments, and economically viable work organizations. The Center operates on the premise that environmental quality, safe and healthy workplaces, and social accountability can be achieved while at the same time enhancing the economic life of firms. This is accomplished by broadening the fundamental design criteria for all productive activities to include an explicit and comprehensive commitment to sustainability.

The Center is composed of faculty and staff at the University of Massachusetts Lowell who work directly with industrial firms, social service institutions, citizen organizations, and government agencies to promote sustainable production.

¹ Occupational Health Program, Harvard School of Public Health

² Department of Urban Studies and Planning, Massachusetts Institute of Technology

Table of Contents

Executive Summary	1
Introduction	7
CHAPTER ONE	
Use of Polyvinyl Chloride Plastics and DEHP in Medical Devices	9
CHAPTER TWO	
Human Exposure to DEHP	11
CHAPTER THREE	
Toxicity of DEHP in Animals and Humans	21
Disposition of DEHP	23
Acute toxicity	24
Reproductive and developmental toxicity	24
Nephrotoxicity of DEHP	28
Cardiotoxicity of DEHP	29
Pulmonary toxicity of DEHP	30
Hepatotoxicity of DEHP	30
Mechanisms of effects of DEHP	33
Calculating human risk from DEHP exposure	37
CHAPTER FOUR	
Risk Management Options for DEHP in PVC Medical Devices	39
CHAPTER FIVE	
Alternatives to PVC in the Medical Bags and Tubing Markets	41
CHAPTER SIX	
Conclusions	53
Appendix:	
The Links Between PVC Production and Disposal and the Creation of Dioxin	55
Endnotes	61
Bibliography	65

