

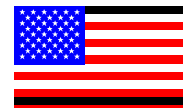
GP5-A2  
ISBN 1-56238-457-0  
ISSN 0273-3099

---

# Clinical Laboratory Waste Management; Approved Guideline— Second Edition

Volume 22 Number 3

Peter A. Reinhardt, M.A., Chairholder  
Gerald A. Denys, Ph.D., A.B.M.M.  
Judith G. Gordon, M.A.  
CAPT Edward H. Rau, M.S., R.S., C.H.S.P.



## Clinical Laboratory Waste Management; Approved Guideline— Second Edition

### Abstract

GP5-A2—*Clinical Laboratory Waste Management; Approved Guideline—Second Edition* was written for use by laboratory managers and is intended to provide approaches to controlling laboratory-generated hazardous and nonhazardous waste. A brief summary of the relevant U.S. federal regulations and laws is included. The types of waste addressed include chemical, infectious, radioactive, sharps, multihazardous, and nonhazardous. In this edition, emphasis is placed on methods for avoiding waste generation (source reduction) and reducing the volume and toxicity of unavoidable wastes (waste minimization). Options for handling, packaging, labeling, storing, recycling, transporting, treating, and disposal of each type of waste are also described. While this document will serve as a useful resource for a wider audience, it is based on U.S. regulations, and is intended for use primarily in the United States.

NCCLS. *Clinical Laboratory Waste Management; Approved Guideline—Second Edition*. NCCLS document GP5-A2 (ISBN 1-56238-457-0). NCCLS, 940 West Valley Road, Suite 1400, Wayne, Pennsylvania 19087-1898, USA 2002.

THE NCCLS consensus process, which is the mechanism for moving a document through two or more levels of review by the healthcare community, is an ongoing process. Users should expect revised editions of any given document. Because rapid changes in technology may affect the procedures, methods, and protocols in a standard or guideline, users should replace outdated editions with the current editions of NCCLS documents. Current editions are listed in the *NCCLS Catalog*, which is distributed to member organizations, and to nonmembers on request. If your organization is not a member and would like to become one, and to request a copy of the *NCCLS Catalog*, contact the NCCLS Executive Offices. Telephone: 610.688.0100; Fax: 610.688.0700; E-Mail: [exoffice@nccls.org](mailto:exoffice@nccls.org); Website: [www.nccls.org](http://www.nccls.org)

## Contents

Abstract .....	i
Committee Membership.....	v
Active Membership .....	vii
Foreword .....	xv
1 Introduction .....	1
2 Scope.....	1
2.1 Categories of Laboratory Waste .....	1
2.2 Waste Management Considerations.....	2
2.3 Responsibilities for Safe Waste Handling .....	2
3 Overview of Requirements for Waste Management .....	3
3.1 Federal Laws and Regulations .....	3
3.2 State Regulations .....	5
3.3 Local Regulations .....	5
3.4 Nonregulatory Requirements .....	6
4 Definitions.....	6
5 Waste Management Program for the Laboratory .....	9
5.1 Planning for Laboratory Waste Management .....	9
5.2 Elements of a Waste Management Program .....	10
5.3 Safe Facilities for Waste Management .....	14
5.4 Plan Implementation .....	15
5.5 Program Evaluation and Corrective Action .....	15
5.6 Environmental Liability .....	15
5.7 The National Waste Management System.....	15
5.8 Selecting a Waste Management Service .....	16
5.9 Where to Get Help .....	18
6 Planning for Pollution Prevention, Waste Minimization, and Recycling.....	18
6.1 EPA’s Guidance for Waste Minimization .....	18
6.2 Examples of Pollution Prevention, Waste Minimization, and Recycling.....	18
7 Education and Training .....	19
7.1 Training Program Elements .....	20
7.2 Mandatory Employee Awareness Training and Education.....	21
7.3 Annual Refresher Training Requirements .....	22
7.4 Emergency Response Training .....	22
7.5 Requirements for Prior Approval.....	22
7.6 Training for Supervisors .....	23
7.7 Training Program Evaluation.....	23
8 Chemical Waste.....	23
8.1 Types of Laboratory Chemical Waste .....	23
8.2 Accumulation and Storage.....	25

**Contents (Continued)**

8.3	Special Requirements for Transporting Hazardous Chemical Waste .....	27
8.4	Treatment and Disposal Options.....	28
8.5	Waste Minimization.....	30
8.6	Contingency Planning and Employee Training .....	31
9	Infectious Waste.....	32
9.1	Definitions of Laboratory Infectious Waste.....	32
9.2	Infectious Waste Management Program .....	33
9.3	Handling Infectious Waste.....	33
9.4	Storage .....	35
9.5	Movement of Infectious Waste Within the Facility.....	35
9.6	Treatment of Infectious Waste.....	35
9.7	Disposal .....	39
9.8	Management of Contaminated Sharps .....	40
9.9	Contingency Planning.....	42
9.10	Regulation of Infectious Wastes .....	43
10	Radioactive Waste.....	44
10.1	Introduction.....	44
10.2	Characterization of Radioactive Wastes from Clinical Laboratories.....	44
10.3	Regulatory Framework .....	45
10.4	Institutional Management .....	46
10.5	Waste Avoidance (Source Reduction) Strategies .....	48
10.6	Management of Unavoidable Wastes .....	48
10.7	General Treatment and Disposal Methods.....	50
11	Multihazardous Waste.....	54
11.1	Introduction.....	54
11.2	Waste Avoidance (Source Reduction) Strategies .....	56
11.3	General Treatment and Disposal Strategies .....	57
11.4	Guidance for Management of Common Multihazardous Waste Streams.....	58
12	Hazardous Glass and Plastic, and Other Laboratory Solid Waste.....	61
12.1	Management of Broken Glass and Plastic .....	62
12.2	Management of Other Laboratory Solid Waste .....	62
	References .....	63
	Additional References .....	64
	Appendix. Annual Review of Waste Management Program .....	71
	Summary of Comments and Working Group Responses.....	73
	Related NCCLS Publications .....	79

## Foreword

The clinical laboratory is responsible for the proper handling and disposal of its waste. This guideline is intended to provide clinical laboratorians with general approaches to controlling laboratory-generated waste. Specific handling techniques and disposal methods are offered for the most important types of clinical waste.

Some legislative and regulatory background is included in Section 3. This section is intended to help users in the United States understand the specific disposal requirements and recommendations that are detailed later in the guideline. It will also help users in other countries understand the regulatory environment that determines laboratory operations in the United States. A series of important definitions follows in Section 4, and a programmatic approach to waste management—from planning to training—is presented in Sections 5 through 7. Pollution prevention, waste minimization, and recycling have been consolidated into a new Section 6, because we believe it is the essential first step in any waste management program.

Sections 8 through 10 cover the major classes of laboratory waste: chemical, infectious, and radioactive. Section 11, dealing with waste that has more than one hazard, is new to this edition. Section 12 describes special procedures for managing uncontaminated glass and plastic. Within each of these sections, the characteristics of that class of waste are addressed, as well as appropriate handling, storage, accumulation, treatment, and disposal options. Contingency planning is also addressed.

The authors have made every effort to be accurate and thorough in explaining the rules that laboratorians should be aware of, but the legal requirements and the scientific basis for proper waste disposal are voluminous, complex, and ever changing. The waste manager needs to understand the current regulations—federal, state, and local—and keep up to date with changes.

NCCLS consensus documents are developed through an open process that ensures wide review and broad application. This unique approach leads to standards and guidelines for medical testing and healthcare services that address identified needs of both its global and national constituents. Most NCCLS consensus documents are intended for global application. Under certain circumstances, however, an NCCLS standard or guideline may be intended for primary use in a specific country or region.

NCCLS document GP5-A2—*Clinical Laboratory Waste Management; Approved Guideline—Second Edition* is one such consensus document. While GP5-A2 is a useful resource for a wider audience, it is intended primarily to help the U.S. user navigate through stringent U.S. regulations. Since disposal of laboratory waste is heavily regulated and relevant practices are widely “country specific,” the Area Committee on General Laboratory Practices determined that it would not be feasible to develop a comparable guideline intended for global application at this time. We hope that development of such a guideline may be possible in the future, as part of a long-term effort to harmonize regulations and practices.

The imprint of the flag and the unique tagline on the cover call attention to its national focus, and differentiate GP5-A2 from our global consensus documents.

## Key Words

Hazard abatement, hazardous waste, infectious waste, laboratory management, laboratory safety, laboratory waste, medical waste, mixed waste, multihazardous waste, pollution prevention, radioactive waste, waste management, waste minimization

# Clinical Laboratory Waste Management; Approved Guideline—Second Edition

## 1 Introduction

The total volume of medical waste generated per laboratory averages 51.7 lbs per day but may weigh as much as 1,400 lbs per day in large facilities; this adds up to more than 30,000 tons of waste per year. Most waste that is generated in laboratories can be disposed of as ordinary solid waste. Wastes that require special management are infectious wastes, sharps, hazardous chemicals, radionuclides, and wastes with multiple hazards.

Over 99% of the hazardous chemical waste generated in the United States was produced by “large-quantity generators” (that is, those that produce 1,000 kg or more of hazardous chemical waste per month). Very few clinical laboratories, by themselves, are large quantity generators. Rather, most clinical laboratories and their institutions are either “small quantity generators” (those that produce between 100 and 1,000 kg of hazardous waste per month), or they produce less than 100 kg of hazardous waste per month.

The clinical laboratory is responsible for proper management of the waste that it generates. The following information is intended to provide approaches to controlling laboratory-generated waste and to offer specific handling techniques and disposal methods. Legal requirements for proper waste disposal are complex. As a supplement to this guideline, a list of pertinent references and an additional references section are included. It is the responsibility of the laboratory manager to understand and comply with all relevant regulations.

## 2 Scope

All clinical laboratories consume materials that are hazardous. Such use generates waste that is hazardous. The majority of the waste resulting from laboratory operations is not hazardous, but that which is hazardous can injure the people who must handle or transport it. Laboratory waste can contaminate sewer systems and other treatment facilities, and it can pollute the environment.

This guideline is intended to provide information about the safe handling and disposal of such wastes. The use of the guideline must be adapted to the local situation. It is not a substitute for awareness of current local, state, and federal rules and regulations. The guideline itself is not to be construed as a regulation. Despite the many similarities of clinical laboratories to one another, differences do exist; no single laboratory waste management program will be appropriate for all facilities. This guideline should, however, provide a basis for the comprehensive waste management program in the user’s laboratory.

While GP5-A2 may serve as a useful resource for a wider audience, it is based on U.S. regulations, and therefore is intended for use primarily in the United States.

### 2.1 Categories of Laboratory Waste

For practical purposes, laboratory waste may be divided into the following categories:

- chemical waste [e.g., Environment Protection Agency (EPA) hazardous waste];
- infectious waste (and other materials regulated as medical waste);

**Related NCCLS Publications\***

- GP17-A**      **Clinical Laboratory Safety; Approved Guideline (1996).** This document contains general guidelines for implementing a high-quality laboratory safety program. The framework is adaptable to any laboratory.
- M29-A2**      **Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline—Second Edition (2001).** Based on U.S. regulations, this document provides guidance on the risk of transmission of hepatitis viruses and human immunodeficiency viruses in any laboratory setting; specific precautions for preventing the laboratory transmission of blood-borne infection from laboratory instruments and materials; and recommendations for the management of blood-borne exposure.
- NRSCL8-A**    **Terminology and Definitions for Use in NCCLS Documents; Approved Standard (1998).** This document provides standard definitions for use in NCCLS standards and guidelines, and for submitting candidate reference methods and materials to the National Reference System for the Clinical laboratory (NRSCL).

---

\* Proposed- and tentative-level documents are being advanced through the NCCLS consensus process; therefore, readers should refer to the most recent editions.