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## Urinalysis and Collection, Transportation, and Preservation of Urine Specimens; Approved Guideline—Second Edition

This document addresses procedures for testing urine, including materials and equipment; macroscopic/physical evaluation; chemical analysis; and microscopic analysis. In addition, a step-by-step outline for collecting, transporting, and storing specimens is included.

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A guideline for global application developed through the NCCLS consensus process.



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## Urinalysis and Collection, Transportation, and Preservation of Urine Specimens; Approved Guideline—Second Edition

### Abstract

*Urinalysis and Collection, Transportation, and Preservation of Urine Specimens; Approved Guideline—Second Edition* (NCCLS document GP16-A2) is written for laboratory and nonlaboratory personnel responsible for the collection, transport, and analysis of urine specimens. The guideline addresses macroscopic evaluation, chemical analysis, and microscopic examination of urine. A step-by-step outline for collecting, transporting, and storing specimens is included. The necessary materials and equipment used in the process are considered.

NCCLS. *Urinalysis and Collection, Transportation, and Preservation of Urine Specimens; Approved Guideline—Second Edition*. NCCLS document GP16-A2 (ISBN 1-56238-448-1). NCCLS, 940 West Valley Road, Suite 1400, Wayne, Pennsylvania 19087-1898, USA 2001.

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## Foreword

Important clinical information may be obtained from laboratory analysis of urine specimens. Much progress has been made since ancient times, when urine was poured on the ground and the attraction of insects to it indicated an abnormal specimen. Physical and chemical analysis of urine and microscopic examination of sediment, often performed today with sophisticated instrumentation, are as useful in physicians' office laboratories as they are in large clinical laboratories.

Urinalysis is an integral part of clinical laboratory testing. Its usefulness is proven in diagnosis of disease (diseases of the kidney, urinary tract, and liver, as well as metabolic disorders such as diabetes), in monitoring the effectiveness of treatment of chronic problems, and in screening for asymptomatic conditions (which is also called "wellness monitoring"). The value of negative/normal results should not be underestimated.

Specimen collection, transportation, and storage are equally as important as urinalysis. Acceptable specimens improve the quality and reliability of urinalysis results. The committee believes that GP16-A2 is a practical guideline that is useful for all parties, laboratorians and nonlaboratorians alike, who are responsible for carrying out the procedure. This is related information that may benefit a variety of institutions using this document.

The committee believes that GP16-A2 will serve as a common reference point and facilitate communication between the site where the specimen is collected and the laboratory where the analysis is performed. By providing a clear picture of how specific actions can affect the test result or how one can give better instruction in specimen collection, the overall testing process will be improved.

## Key Words

Brightfield microscopy, chemical preservatives, flow microscopy, formed elements, harmonic oscillation, microscopic results, multiconstituent controls, pathologic conditions, physicochemical results, reagent strips, refractometer, sediment, slide microscopy, urinalysis



## Urinalysis and Collection, Transportation, and Preservation of Urine Specimens; Approved Guideline—Second Edition

### 1 Introduction

Urinalysis is the testing of urine with procedures commonly performed in an expeditious, reliable, accurate, safe, and cost-effective manner.

For the purposes of this guideline, the term “urinalysis” includes some or all of the following:

- macroscopic evaluation (e.g., color and clarity);
- physical measurements (e.g., volume and specific gravity);
- chemical reagent strip or tablet testing; and
- microscopic examination.

Each laboratory, in consultation with its clinicians, should determine which procedures to use and the extent of the examination. These determinations should be based on an evaluation of known and published studies, as well as the type of patient population (e.g., asymptomatic patient population screening yields few positive results, whereas in-hospital nephrology patients have a higher yield). The decision to perform microscopic examinations should be made by each individual laboratory based on its specific patient population.<sup>1-9</sup>

Urinalysis is performed for a variety of reasons, including:

- to aid in the diagnosis of disease;
- to screen a population for asymptomatic, congenital, or hereditary diseases (i.e., to monitor wellness);
- to monitor the progress of disease;
- to monitor the effectiveness or complications of therapy; and
- to screen asymptomatic industrial workers for acquired diseases.

Information on testing for drugs of abuse can be found in NCCLS document T/DM8—*Urine Drug Testing in the Clinical Laboratory*.

#### 1.1 Scope

This document is written for laboratory and nonlaboratory personnel responsible for the collection, transport, and analysis of urine specimens. The guideline addresses macroscopic evaluation, chemical analysis, and microscopic examination of urine. A step-by-step outline for collecting, transporting, and storing specimens is included. The necessary materials and equipment used in the process are considered.

The focus of this guideline relates to urine collection and performance of the traditional, routine chemical and microscopic urinalysis. Algorithmic approaches to evaluation of urine samples with respect to