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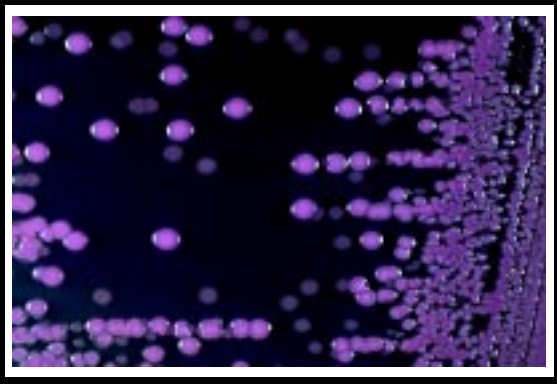
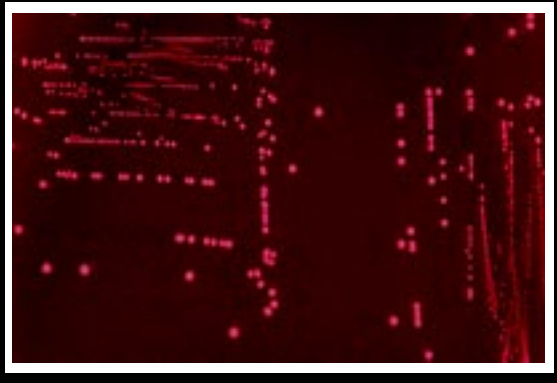
# Laboratory Methods for the Diagnosis of Epidemic Dysentery and Cholera

Centers for Disease Control and Prevention
Atlanta, Georgia 1999





CDC/NCID
CENTERS FOR DISEASE CONTROL AND PREVENTION
NATIONAL CENTER FOR INFECTIOUS DISEASES

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# Laboratory Methods for the Diagnosis of Epidemic Dysentery and Cholera

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This manual was prepared by the National Center for Infectious Diseases (NCID), Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, USA, in cooperation with the World Health Organization Regional Office for Africa, (WHO/AFRO) Harare, Zimbabwe.

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**Cover:** From top, *Escherichia coli* O157:H7 on sorbitol MacConkey agar, *Vibrio cholerae* O1 on TCBS agar, and *Shigella flexneri* on xylose lysine desoxycholate agar.

# Acknowledgments

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This manual was developed as a result of a joint effort by the World Health Organization Regional Office for Africa, WHO Headquarters, and the Centers for Disease Control and Prevention as part of the activities of the WHO Global Task Force on Cholera Control. In particular, the staff of the project for Improving Preparedness and Response to Cholera and Other Epidemic Diarrhoeal Diseases in Southern Africa have worked closely with many laboratorians and epidemiologists in southern Africa to develop an integrated approach to the laboratory diagnosis of cholera and dysentery upon which this manual is based.

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# Introduction

Cholera and dysentery have afflicted humankind for centuries. The epidemics they cause have affected the outcome of wars and the fates of countries. In much of the world, epidemic cholera and dysentery are uncommon, but during the past decade these two diseases have re-emerged as causes of significant morbidity and mortality in many developing countries.

Only a few pathogens cause epidemic diarrhea, although there are many that cause sporadic diarrhea. In developing countries, two etiologic agents are responsible for most epidemic diarrhea: toxigenic *Vibrio cholerae* serogroup O1, which causes watery diarrhea, and *Shigella dysenteriae* serotype 1, which causes bloody diarrhea. Recently, two additional organisms have emerged to cause epidemic diarrhea, *Vibrio cholerae* serogroup O139, which causes watery diarrhea, and *Escherichia coli* serotype O157:H7, which causes bloody diarrhea. The latter is a common agent of diarrhea only in developed countries.

This manual focuses on the epidemiology of these four organisms and the laboratory methods used to identify them and to test their susceptibility to antimicrobial agents in the epidemic setting. The laboratory techniques and study methodology described provide accurate and useful information for the control of epidemics using a minimum of resources. The manual emphasizes coordination of the activities of the microbiologist and the epidemiologist in order to obtain information that can be generalized to develop effective treatment policies for these epidemic diarrheal diseases. It encourages focused studies to determine the organisms causing epidemics and their antimicrobial susceptibility patterns rather than relying on random information that may not accurately represent a situation.

Often the countries that face the challenge of responding to an epidemic are those with the least resources. Therefore, the microbiology laboratory must use its resources wisely in order to have the greatest impact on reducing morbidity and mortality during an epidemic. There may be several ways to reach the end result of identifying the organism causing the outbreak or the epidemic. Often, however, a small added benefit requires a much larger expenditure of materials and time. In this manual this problem is addressed specifically. The procedures described are not new; most have been used for a number of years. However, these procedures were specifically selected for testing specimens from outbreaks rather than for general use in a clinical microbiology laboratory. The selected procedures minimize the materials needed by the laboratory while deriving the most useful information.

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