

Director, Centers for Disease Control and Prevention
David Satcher, M.D., Ph.D.

Director, National Center for Infectious Diseases (NCID)
James Hughes, M.D.

Associate Director for Laboratory Science, NCID
Joseph McDade, Ph.D.

Director, Division of Viral and Rickettsial Diseases (DVRD), NCID
Brian Mahy, Ph.D., Sc.D.

Chief, Special Pathogens Branch, DVRD, NCID
C.J. Peters, M.D.

Chief, Viral and Rickettsial Zoonoses Branch, DVRD, NCID
James Olson, Ph.D.

Director, Public Health Practice Program Office (PHPPO)
Edward Baker, M.D.

Director, Division of Laboratory Systems, PHPPO
Carlyn Collins, M.D.

Use of trade names is for identification only and does not imply endorsement by the Public Health Service or the U.S. Department of Health and Human Services.
--

ACKNOWLEDGMENTS

We thank Barbara Ellis and John O'Connor for careful reviews and suggestions which improved the manuscript. Jim Gathany provided the photography and Karoyle Colbert made the rodent species distribution maps. Thanks also to Diane Small for cover design and desktop publishing, and Stacy Howard for guiding the manual through the publishing process.

Methods for Trapping and Sampling Small Mammals for Virologic Testing

This manual was prepared by:

James N. Mills, Ph.D.

James E. Childs, Sc.D.

Thomas G. Ksiazek, D.V.M., Ph.D.

C.J. Peters, M.D.

Division of Viral and Rickettsial Diseases

National Center for Infectious Diseases

Wallis M. Velleca, B.S.

Division of Laboratory Systems

Public Health Practice Program Office

September 1995

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control and Prevention

Atlanta, Georgia 30333

PREFACE

Despite the tremendous medical progress made since the middle of this century, infectious diseases remain the leading cause of death among humans worldwide. Many infectious diseases have long been recognized as threats to human health; others, the “emerging” diseases, have been identified only recently. A substantial number of these diseases are classified as zoonoses because animals are their natural reservoirs.

The continued human encroachment upon and alterations of natural ecosystems will likely result in more frequent encounters with animal reservoirs of recognized pathogens as well as encounters with previously unknown infectious agents. One of the most important tools in identifying and minimizing the impact of infectious disease outbreaks is intensive and continuous surveillance. In the case of zoonotic diseases, surveillance can be carried out by monitoring reservoir populations. Data collected on infection prevalence and population characteristics of reservoir species can be used to assess risk to humans and ameliorate or prevent outbreaks of human disease.

A recent example of an encounter with a previously unknown agent was the 1993 outbreak of hantavirus pulmonary syndrome (HPS), which caused an initial 70% mortality among predominantly young, previously healthy adults in the southwestern United States. The etiologic agent of HPS, Sin Nombre virus, has been shown to be carried by the deer mouse, one of the most common and widespread rodents in North America. Epidemiologic surveys and ecologic studies of reservoir populations are necessary to determine the threat to public health and to help establish guidelines for risk reduction. Other significant examples of rodent-borne viruses include members of the Arenaviridae, which cause hemorrhagic fevers and other disease in humans throughout much of the world.

This manual is intended as a guide for those persons performing ecologic and epidemiologic studies involving populations of rodents which are potentially infected with hantavirus. However, the procedures outlined are appropriate for any study of small-mammal populations that may harbor an infectious zoonotic agent capable of causing severe disease or death. The manual covers the following major topics in detail: selection of appropriate collection sites; trapping methods that provide a representative sample of the rodent population; handling, operation, and placement of traps for small mammals; safe and humane techniques for trapping and handling rodents; selection of appropriate sample fluids and tissues and detailed methods for obtaining these samples; proper storage, packaging and shipment of specimens to the laboratory; effective decontamination and cleaning of traps and other materials; safe disposal of infectious wastes; and careful collection and recording of all pertinent data. The manual is illustrated with black and white photos to assist the trainee in understanding these techniques. Sample forms are provided in appendices and can be adapted to specific programs by users.

It is our hope that the information contained in this manual will provide assistance to investigators involved in the collection and handling of small mammals and will facilitate surveillance efforts necessary to control and prevent the spread of infectious diseases.

TABLE OF CONTENTS

PREFACE	iii
INTRODUCTION	1
SAFETY	7
Disinfectants	7
Protective clothing and equipment	8
Respirator safety	9
Collection and transporting of captured rodents	9
Choosing a processing site	9
Hazardous chemicals	10
Anesthesia	10
Taking blood samples	11
Necropsy	11
Cleanup	12
Packing and shipping of specimens	12
Other infectious agents	12
PROTOCOL FOR TRAPPING AND PROCESSING	15
SETTING AND CHECKING TRAPS	15
EQUIPMENT AND SUPPLIES	15
PROCEDURE	15
Preparing for the trapping expedition	15
Trap placement	16
Collecting captured rodents	17
PROCESSING CAPTURED RODENTS	19
EQUIPMENT AND SUPPLIES	19
PROCEDURE	20
Choosing a processing site	20
Collecting blood from captured rodents	20
Obtaining reproductive data and standard measurements	26
Necropsying captured rodents	26
Decontaminating traps	29
Cleaning up	29
Shipping of samples for hantavirus testing	30
Preparing voucher specimens	32
REFERENCES	33
APPENDICES	37
Packing Checklist	39
Hazardous Materials Transportation Documentation	41
Trap Tally Form	43
Habitat Assessment Data Sheet	45
Processing Set-up Checklist	47
Necropsy Data Sheet	49
Specialty Equipment for Rodent Capture and Processing	53
Packing Instruction 650	59