



## EDITORIAL BOARD

### NATIONAL PROGRAM CHAIRPERSON

**Paul A. Volberding, MD**  
Professor of Medicine  
University of California, San Francisco  
Director, AIDS Program  
San Francisco General Hospital  
San Francisco, California

### REGIONAL PROGRAM CHAIRPERSONS

#### Chicago Program

**John P. Phair, MD**  
Samuel J. Sackett Professor of Medicine  
Northwestern University Medical School  
Chief, Division of Infectious Diseases  
Director, Comprehensive AIDS Center  
Northwestern Memorial Hospital AIDS Program  
Chicago, Illinois

#### Los Angeles Program

**Ronald T. Mitsuyasu, MD**  
Associate Professor of Medicine  
University of California, Los Angeles  
Director, UCLA Center for  
Clinical AIDS Research and Education (CARE)  
Los Angeles, California

### SELECTED SYMPOSIA FACULTY

#### Chicago Program

**Harold A. Kessler, MD**  
Professor of Medicine and Immunology/Microbiology  
Associate Director, Section of Infectious Diseases  
Rush-Presbyterian St Luke's Medical Center  
Chicago, Illinois

**Thomas C. Merigan, Jr, MD**  
Becker Professor of Medicine  
Director, Center for AIDS Research  
Stanford University School of Medicine  
Stanford, California

**Robert L. Murphy, MD**  
Associate Professor of Clinical Medicine  
Medical Director, AIDS Treatment Unit  
Northwestern University Medical School  
Chicago, Illinois

**Douglas D. Richman, MD**  
Professor of Pathology and Medicine  
University of California, San Diego  
San Diego Veterans Affairs Medical Center  
San Diego, California

**Robert T. Schooley, MD**  
Professor of Medicine  
University of Colorado School of Medicine  
Head, Division of Infectious Diseases  
University of Colorado Health Sciences Center  
Denver, Colorado

#### Los Angeles Program

**Yvonne J. Bryson, MD**  
Professor of Pediatrics  
Director, Los Angeles Pediatric AIDS Consortium  
University of California, Los Angeles  
Los Angeles, California

**Daniel R. Kuritzkes, MD**  
Assistant Professor of Medicine, Microbiology, and Immunology  
University of Colorado Health Sciences Center  
Denver, Colorado

**Steven A. Miles, MD**  
Assistant Professor of Medicine  
University of California, Los Angeles  
UCLA Center for Clinical AIDS Research and Education (CARE)  
Los Angeles, California

# International AIDS Society-USA

## IMPROVING THE MANAGEMENT OF HIV DISEASE

VOLUME 2, NUMBER 1

JUNE, 1994

### HIGHLIGHTS OF A SYMPOSIUM SERIES:

An Advanced Course in Antiretrovirals, Prophylaxis,  
and the Treatment of Opportunistic Diseases

## Health Care Worker Occupational Exposure to HIV

*Occupational exposure of health care workers (HCWs) to HIV was discussed at the Chicago meeting by Harold A. Kessler, MD, from Rush-Presbyterian St Luke's Medical Center in Chicago. As related by Dr Kessler, education regarding occupational exposure to HIV and training in universal precautions for preventing exposure constitute the only effective methods for reducing risk of occupation-related HIV infection in HCWs.*

According to Dr Kessler, approximately 2 million of the 5 to 6 million individuals involved in health care services in this country can be considered to be at risk for percutaneous or mucous membrane exposure to patient blood or body fluids. Although current epidemiologic data indicate that HIV infection among HCWs is predominantly related to nonoccupational factors, occupational exposure carries a quantifiable risk of transmission and transmission does occur in this setting. According to Dr Kessler, the risk of HIV transmission for a defined, high-risk exposure appears to have remained stable over several years of tracking by the Centers for Disease Control and Prevention (CDC) at approximately three to four cases per 1000 exposures (0.3% to 0.4%). It is estimated that 800,000 sharps-related injuries occur in HCWs each year; if it is estimated that approximately 1% of hospital admissions are HIV-infected, then it can be hazarded that as many as 24 HCWs per year become infected through such exposures ( $800,000 \times .01 \times .003$ ). As related by Dr Kessler, risk differs accord-

*continued on page 10*

## Introduction

The International AIDS Society-USA (IAS-USA) is a nonprofit organization dedicated to promoting communication and education in the field of HIV disease management and related disciplines. IAS-USA shares the goals and objectives of IAS, a worldwide institution involved in the organization of the International Conferences on AIDS.

Six IAS-USA-sponsored regional symposia under the program title "Improving the Management of HIV Disease: An Advanced Course in Antiretrovirals, Prophylaxis, and the Treatment of Opportunistic Diseases" were conducted in early 1994, the second consecutive year of the symposium program. The symposia are designed to provide physicians with an advanced-level review of the characteristics, treatment, and management of HIV disease. Program faculty members are regarded as authorities on their respective topics. The content of this publication is drawn from presentations made at the first two symposia, held in Chicago and Los Angeles, covering the topics of pathogenesis and

*continued on page 2*

## CONTENTS

Health Care Worker Occupational Exposure to HIV	1
Immunopathogenesis of HIV Infection	2
Maternal-Fetal Transmission of HIV	3
Initiation of Antiretroviral Therapy	4
Continuing Benefit from Antiretroviral Therapy	6
Opportunistic Infection Prophylaxis	7
Future Directions for Anti-HIV Therapy	8



ing to type of exposure, with hollow core needle exposure carrying greater risk than solid core needle exposure and much greater risk than mucous membrane or skin exposure. He noted that he is unaware of any documented cases of solid core needle transmission; several cases of transmission via mucous membrane or skin exposure have been documented.

With regard to documented cases of transmission, CDC statistics as of September 1993 indicate a total of 39 cases of confirmed seroconversion following occupational exposure, including 15 lab technicians, 13 nurses, 5 physicians, 1 pathologist, and no surgeons. Of these cases, 35 were associated with percutaneous exposure and 36 with exposure to blood. In most cases, inoculation was due to unexpected movement by patient or coworker. Needle recapping injury, a common form of high-risk exposure prior to institution of educational efforts at limiting this type of accident, has been cited in only six of the cases. In addition, 81 cases in which HCWs were found to be HIV seropositive on first postexposure testing have been reported and are considered highly suspicious for occupational transmission given the absence of other identifiable risk factors.

### **Study of exposure: inoculation without infection?**

Recent findings by Dr Kessler and colleagues, including investigators at the National Cancer Institute, suggest that the low overall risk of HIV transmission following high-risk exposure may not be due to absence of actual inoculation of the virus. In this study, peripheral blood mononuclear cells (PBMCs) of eight HCWs having needlestick exposure to HIV and nine HCWs having similar needlesticks involving patients not infected with HIV were regularly evaluated for specific T-helper lymphocyte response to five immunogenic synthetic HIV-1 gp160 peptides (T<sub>1</sub>, T<sub>2</sub>, Th4.1, P18-IIIB, and P18-MN). T-helper cellular response was measured as interleukin-2 (IL-2) production; positive response was defined as at least a 4-fold increase in IL-2 production from antigen-stimulated PBMCs for at least two of the peptides. During up to 64 weeks of follow-up, positive response, suggesting prior priming of T-helper cells with an antigen at least related to the HIV proteins, was observed in six of eight HCWs with HIV exposure and in one of nine controls ( $P < 0.008$ ); overall, there were six responses to each of the five anti-

gens in the former group and one response to three of the five in the latter group. All of the HIV-exposed HCWs remain free of HIV infection according to HIV antibody, p24 antigen, polymerase chain reaction (PCR), and viral culture findings. Kinetics of the cellular response indicate a lag time of 8 to 12 weeks, followed by a peaking of immunologic reactivity and waning of reactivity back to baseline levels, suggesting that no permanent immunologic memory is induced. It is unknown whether the observed T cell responses are associated with a protective effect.

### **Comprehensive management plan**

Dr Kessler outlined a comprehensive program for management of HIV exposure comprising the major components of preexposure education, immediate postexposure care, postexposure counseling, and long-term postexposure care; elements of the program are shown in Table 3. With regard to preexposure education, Dr Kessler stressed the importance of effective teaching and utilization of universal precautions as the primary mechanisms for reducing risk of transmission; he predicted that some type of high-risk procedure training would eventually be mandatory.

In summarizing the role of antiviral prophylaxis in postexposure care, he stated that there have been 13 documented failures of zidovudine prophylaxis, which is widely used in this setting, including five cases of massive exposure; in a subsequent question and answer period, it was noted that in one European case, intravenous zidovudine started within 1 hour of exposure failed to prevent infection. In the absence of an extremely large-scale controlled trial, there currently is no way of obtaining definitive evidence of efficacy; animal models of zidovudine prophylaxis have yielded inconclusive results. At least two cases of transmission of zidovudine-resistant HIV are known; as noted by Dr Kessler, since there may be a greater likelihood of encountering zidovudine-resistant HIV in the hospital setting, with patients being likely to have advanced disease and to have undergone prolonged therapy, zidovudine may not be an optimal prophylaxis choice. According to Dr Kessler, no systematic data on the prophylactic use of didanosine, zalcitabine, interferon, or drug combinations are available. ■

**Table 3. Program for Management of Occupational Exposure to HIV**

#### **Preexposure education**

- Preemployment education
- Institution area-specific education
- Postemployment education (annual retraining mandated by Occupational Safety and Health Administration)
- Universal precautions instruction
- High-risk procedure training
- High-risk procedure certification

#### **Immediate postexposure care**

- Reporting of exposure
- Risk assessment
  - Type of exposure
    - Needlestick: hollow vs solid
    - Sharp injury
    - Mucous membrane exposure
    - Abnormal skin exposure
  - Type of fluid or tissue
- Reeducation for risk
- Baseline serologies: HIV, hepatitis B, hepatitis C, syphilis
- Antiretroviral prophylaxis?
  - Current status –
    - Zidovudine
      - Animal models inconclusive
      - 13 postexposure failures in humans
      - In CDC series, adverse reactions occurred in 75% of 265 HCWs receiving regimens ranging from 1000-2000 mg/d for 2 weeks to 1000-1200 mg/d for 6 weeks; 31% completed prescribed course
    - Zidovudine-resistant HIV transmission reported
  - Alternatives
    - No data available on didanosine, zalcitabine, interferon, or combinations

#### **Postexposure counseling**

- Assurance of confidentiality
- Safer-sex counseling
- Other preventive measures: proper management of body fluids, hygiene, etc
- Psychosocial support services

#### **Long-term postexposure care**

- Clinical monitoring
  - Serial HIV serology for 6-12 months
  - Monitoring of antiretroviral prophylaxis
- Ongoing psychosocial support
- Treatment of infection