INFECTION CONTROLAND

HOSPITAL EPIDEMIOLOGY

Volume 11, Number 2 • February 1990

EDITORIAL Handwashing: Are Experimental Models a Substitute for Clinical Trials? Two Viewpoints Elaine Larson, PhD, RN, FAAN, CIC; M.L. Rotter, MD	63	Hospital Reimbursement Patterns Among Patients With Surgical Wound Infections Following Open Heart Surgery John M. Boyce, MD; Gail Potter-Bynoe, BS; Linda Dziobek, RN	89
		PRODUCT COMMENTARY	
ORIGINAL ARTICLES	67	The Disinfectant Dilemma Revisited	96
Moisturizing Products on the Residual Activity of a Chlorhexidine Gluconate	07	Barbara Yannelli, RN, BS; Burke A. Cunha, MD	
Handwash Using a Pigskin Substrate			
Lee Bush, PhD; John White, BS		Pseudomonas aeruginosa Revisited	101
Clinical Predictors of Infection of	71		
Central Venous Catheters Used for Total		LETTERS TO THE EDITOR	
Parenteral Nutrition Carl W. Armstrong, MD; C. Glen Mayhall, MD; Kathy B. Miller, RN, MS; Heber H. Newsome, Jr., MD; Harvey J. Sugerman, MD; Harry P Dalton, PhD; Gaye 0. Hall; Sally Hunsberger		Prevalence of Viral Hepatitis B Surface Antigen Among Syphilitic Patients: A Serological Screening Survey A.A. Abood, MD; A. Najim; A. Kadum; A.A. Ali Ghalib	61
		SHEA NEWSLETTER	105
Disinfection of Water Distribution Systems for Legionella: A Review of Application Procedures and Methodologies	79		

The Official Journal of The Society of Hospital Epidemiologists of America

Paul W. Muraca, MS; Victor L. Yu, MD;

Angella Goetz, RN, MNEd

Value the Experience, Experience the Value



Value the Experience

- . Over 2.6 million doses distributed in the United States
- . In clinical trials, three IO-mcg doses induced protective levels of antibodies in 96% of healthy adults
- . Contains no detectable yeast DNA and not more than 1% yeast protein
- . Generally well tolerated in over three years of clinical use

Experience the Value

- Innovative services to help support your vaccination program
- . Wide range of doses includes 40-mcg/mL Dialysis Formulation
- . Now a 2.5-mcg pediatric dose may reduce vaccine costs by 50%
- Available in convenient multidose vials direct from MSD



RECOMBIVAX HB is contraindicated in the presence of hypersensitivity to yeast or to any component of the vaccine.

Please see the following page for a Brief Summary of Prescribing Information for RECOMBIVAX HB.



Copyright © 1990 by MERCK &CO., INC

Value the Experience, Experience the Value



(Hepatitis B Vaccine [Recombinant] | MSD)

INDICATIONS AND USAGE RECOMBIVAX HB is indicated for vaccination against infection caused by all known subtypes of hepatitis B virus. RECOMBIVAX HB Dialysis Formulation is indicated for vaccination of adult predialysis and dialysis patients against infection caused by all known subtypes of hepatitis B virus. Vaccination with RECOMBIVAX HB is recom-

mended in persons of all ages who are or will be at increased risk of infection with hepatitis B virus. In areas with high prevalence of infection, most of the population are at risk of acquiring hepatitis B infection at a young age. Therefore, vaccination should be targeted to prevent such transmission In areas of low prevalence, vaccination should be limited to those who are in groups identified as being at increased risk of infection.

CONTRAINDICATIONS

Hypersensitivity to yeast or any component of the vaccine.

WARNINGS

Patients who develop symptoms suggestive of hypersensitivity after an injection should not receive further injections of the vaccine (see

CONTRAINDICATIONS). Because of the long incubation period for hepa-titis B, it is possible for unrecognized infection to be present at the time the vaccine is given. The vaccine may not prevent hepatitis Bin such patients.

PRECAUTIONS

General

As with any percutaneous vaccine, epinephrine should be available for immediate use should an anaphylactoid reaction occur. Any serious active infection is reason for delay-

ing use of the vaccine except when, in the opinion of the physician, withholding the vaccine entails a greater risk.

Caution and appropriate care should be exer cised in administering the vaccine to individuals with severely compromised cardiooulmonary status or to others in whom a febrile or systemic reaction could pose a significant risk. Pregnancy

Pregnancy Category C. Animal reproduction studies have not been conducted with the vaccine. It is also not known whether the vaccine can cause fetal harm when administered to a preg-nant woman or can affect reproduction capacity. The vaccine should be given to a oreanant woman only if clearly needed.

Nursing Mothers

It is not known whether the vaccine is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when the vaccine is administered to a nursina woman. Pediatric Use

RECOMBIVAX HB has been shown to be usu ally well tolerated and highly immunogenic in infants and children of all ages. Newborns also respond well; maternally transferred antibodies do not interfere with the active immune response to the vaccine. See DOSAGE AND ADMINISTRA-TION for recommended pediatric dosage and for recommended dosage for infants born to HBsAg-positive mothers.

The safety and effectiveness of RECOMBIVAX HB Dialysis Formulation in children have not been established

ADVERSE REACTIONS RECOMBIVAX HB and RECOMBIVAX HB Dialysis Formulation are generally well tolerated. No serious adverse reactions attributable to the vaccine have been reported during the course of clinical trials. No adverse experiences were constant during dirical trials which acude ha reported during clinical trials which could be related to changes in the titers of antibodies to

yeast. As with any vaccine, there is the possibility that broad use of the vaccine could reveal adverse reactions not observed in clinical trials. In a group of studies. 3,258 doses of RECOMBIVAX HB were administered to 1.252

RECOMBIVAX HB®

Vaccine [Recombinant], (Hepatitis B MSD) healthy adults who were monitored for 5 days after each dose. Injection-site and systemic com-plaints were reported following 17% and 15% of the injections, respectively.

The following adverse reactions were reported: Incidence Equal to or Greater Than 1% of Injections

LOCAL REACTION (INJECTION SITE) Injection-site reactions consisting principally of soreness and including pain, tenderness, pruritus, erythema, ecchymosis, swelling, warmth, and nodule formation.

BODY AS A WHOLE

The most frequent systemic complaints include fatigue/weakness; headache; fever (≥100°F); malaise

DIGESTIVE SYSTEM

Nausea; diarrhea

RESPIRATORY SYSTEM

Pharyngitis; upper respiratory infection.

Incidence Less Than 1% of Injections BODY AS A WHOLE

Sweating; achiness; sensation of warmth; light-headedness: chills: flushino.

DIGESTIVE SYSTEM

Vomiting; abdominal pains/cramps; dyspepsia; diminished appetite.

RESPIRATORY SYSTEM

Rhinitis; influenza; cough.

NERVOUS SYSTEM

Vertigo/dizziness; paresthesia.

INTEGUMENTARY SYSTEM

Pruritus; rash (non-specified); angioedema; urticaria.

MUSCULOSKELETAL SYSTEM

Arthralgia including monoarticular; myalgia; back pain; neck pain; shoulder pain; neck stiffness.

HEMIC/LYMPHATIC SYSTEM

Lymphadenopathy PSYCHIATRIC/BEHAVIORAL

Insomnia/disturbed sleep

SPECIAL SENSES

Earache

UROGENITAL SYSTEM

Dvsuria.

CARDIOVASCULAR SYSTEM

Hypotension.

The following additional adverse reactions have been reported with use of the marketed vaccine. In many instances, the relationship to the vaccine was unclear.

Hypersensitivity: Anaphylaxis and symptoms of immediate hypersensitivity reactions including rash, pruritus, urticaria, edema, angioedema, dyspnea, chest discomfort, bronchial spasm, palpitation, or symptoms consistent with a hypotensive episode have been reported within the first few hours after vaccination. An appar-ent hypersensitivity syndrome (serum-sickness-like) of delayed onset has been reported days to weeks after vaccination, including arthralgia/ arthritis (usually transient), fever, and dermato-logic reactions such as urticaria. erythema mul-(see WARNINGS and PRECAUTIONS). *Nervous* System: Peripheral neuropathy includ-ing Bell's Palsy; muscle weakness: Guillain-Barré syndrome.

Special Senses: Optic neuritis. Potential ADVERSE EFFECTS

In addition, a variety of adverse effects not observed in clinical trials with RECOMBIVAX HB or RECOMBIVAX HB Dialysis Formulation have been reported with HEPTAVAX-B® (Hepatitis B Vaccine, MSD)(plasma-derived hepatitis B vaccine). Those listed below are to serve as alerting information to physicians:

Nervous System: Neurological disorders such as myelitis including transverse myelitis; acute radiculoneuropathy; herpes zoster. *Hematologic*: Thrombocytopenia. *Special* Senses: Tinnitus; visual disturbances.

RECOMBIVAX HB®

(Hepatitis B Vaccine [Recombinant], MSD) DOSAGE AND ADMINISTRATION Do not inject intravenously or intradermally.

RECOMBIVAX HB DIALYSIS FORMULATION (40 mcg/mL) IS INTENDED ONLY FOR ADULT PREDIALYSIS/DIALYSIS PATIENTS. RECOMBIVAX HB (10 mcg/mL) IS NOT INTENDED FOR USE IN PREDIALYSIS/DIALYSIS PATIENTS

RECOMBIVAX HB and RECOMBIVAX HB Dialysis Formulation are for intramuscular injec-tion. The *deltoid muscle* is the preferred site for intramuscular injection in adults. Data suggest that injections given in the buttocks are frequently given into fatty-tissue instead of into muscle. Such injections have resulted in a lower seroconversion rate than was expected. The *anterolateral thigh* is the recommended site for intramuscular injection

in infants and young children. For persons at risk of hemorrhage following intramuscular injection, RECOMBIVAX HB may be administered subcutaneously. However, when other aluminum-adsorbed vaccines have been administered subcutaneously, an increased incidence of local reactions including subcutaneous nodules has been observed. Therefore, subcuta-neous administration should be used only in persons (e.g., hemophiliacs) who are at risk of hemorrhage following intramuscular injections. The vaccine should be used as supplied;

no dilution or reconstitution is necessary. The full recommended dose of the vaccine should be used.

The RECOMBIVAX HB vaccination regimen consists of 3 doses of vaccine. The volume of vaccine to be given on each occasion is as follows:

Age group	Initial	1 month	6 months
Birth* through	0.25 mL	0.25 mL	0.25 mL
10 years of age	(2.5 mcg)	(2.5 mcg)	(2.5 mcg)
11-19 years of age	0.5 mL	0.5 mL	0.5 mL
	(5 mcg)	(5 mcg)	(5 mcg)
≥20 years	1 mL	1 mL	1 mL
	(10 mcg)	(10 mcg)	(10 mcg)

Infants born of HBsAg-negative mothers. The recommended RECOMBIVAX HB Dialysis

Formulation vaccination regimen for predialysis/ dialysis patients is as follows:

alaryolo patio		
Group	Formulation	Initial 1 month 6 months
Predialysis	Distants	
and Dialysis	Dialysis	

Patients 40 mcg/mL 1 mL 1 mL 1 mL Whenever revaccination or administration of a

booster dose is appropriate, RECOMBIVAX HB may be used. The recommended regimen for infants born of

HBsAg-positive mothers is as follows:

	Birth	Within 7 days	1 month	6 months
RECOMBIVAX HI	В	0.5 mL (5 mcg)	0.5 mL (5 mcg)	0.5 mL (5 mcg)
HEPATITIS B IMMUNE GLOBULIN	0.5 mL	_	_	_
Storage				

Store vials at 2°-8°C (36°-46°F). Storage above or below the recommended temperature may reduce potency.

Do not freeze since freezing destroys potency For more detailed information! consult your MSD Representative or see **Prescribing** Information. Merck Sharp & Dohme, Division of Merck & Co., INC., West Point, PA 19466. J9RX08 (206)



INFECTION CONTROL

AND HOSPITAL EPIDEMIOLOGY

EDITORIAL	Handwashing: Are Experimental Models a Substitute for Clinical Trials? Two Viewpoints Elaine Larson, PhD, RN, FAAN, CIC; M.L. Rotter, MD	63
ORIGINAL ARTICLES	The Effects of Surfactant Systems and Moisturizing Products on the Residual Activity of a Chlorhexidine Gluconate Handwash Using a Pigskin Substrate Lee Benson, BS; Destin LeBlanc, BS; Lee Bush, PhD; John White, BS	67
	Clinical Predictors of Infection of Central Venous Catheters Used for Total Parenteral Nutrition Carl W. Armstrong, MD; C. Glen Mayhall, MD; Kathy B. Miller, RN, MS; Heber H. Newsome, Jr., MD; Harvey J. Sugerman, MD; Harry P. Dalton, PhD; Gaye 0. Hall; Sally Hunsberger	71
	Disinfection of Water Distribution Systems for Legionella: A Review of Application Procedures and Methodologies Paul W. Muraca, MS; Victor L. Yu, MD; Angella Goetz, RN, MNEd	79
	Hospital Reimbursement Patterns Among Patients With Surgical Wound Infections Following Open Heart Surgery John M. Boyce, MD; Gail Potter-Bynoe, BS; Linda Dziobek, RN	89
SPECIAL SECTIONS	Product Commentary The Disinfectant Dilemma Revisited Inge Gurevich, RN, MA; Barbara Yannelli, RN, BS; Burke A. Cunha, MD	96
	Topics in Clinical Microbiology <i>Pseudomonas aeruginosa</i> Revisited Charles W. Stratton, MD	101
DEPARTMENTS	Information for Authors Letters to the Editor60 Calendar of Events 61 Classified Marketplace 105SHEA Newsletter105	107 108

The ideas and opinions expressed by contributing authors do not necessarily reflect those of the editors or publisher.

Publisher: Infection Control and Hospital Epidemiology (ISSN-0899-823X) is published monthly by SLACK Incorporated, 6900 Grove Road, Thorofare, New Jersey 08086 Telephone (609) 848-1000

Copyright 1990: All rights reserved No part of this publication may be reproduced without written permission fmm the publisher

Subscriptions: Requests should be addressed to the publisher (except Japan) In Japan. contact Woodbell Incorporated, 4-22-11, Kitakasai, Edogawaku Tokyo 134, Japan Subscription rates in the US and possessions Individual One years-\$50.00, Two years-\$95.00; Three years-\$125.00 Institutional One year-570.00. Two years-\$110.00, Three years-\$150.00, Canada \$18.00 additional each year, all other countries \$30.00 additional each year Single copies of current issuesmay be obtained for \$800, United States and possessions \$16.00 all other countries

Reprints: All requests to reprint or use material published herein should be addressed to Lester J. Robeson, SLACK Incorporated. 6900 Grove Road, Thorofare, NJ 08086 For reprint orders and prices, contact Joanne Patterson at (609) 848-1000 Authorization to photocopy items for internal or personal use. or the Internal or personal use of specific clients is granted by SLACK Incorporated, provided that the base fee of \$100 per copy, plus \$.15 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970 This consent does not extend to other kinds of Copying, such as for general distribution, resale. advertising and promotional purposes, or for creating new collective works

Change of address: Notice should be sent to the publisher six weeks In advance of effective date Include old and new addresses with rip codes. The publisher cannot accept responsibility for undelivered copies Second-class postage is paid at Thorofare, New Jersey 08086, and additional entry points Postmaster: Send address changes to SLACK Incorporated. 6900 Grove Road, Thorofare, NJ 08066

As of Volume 1, Number 1, INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY is listed in Index Medicus, Current Contents—Clinical Practice. Hospital Literature Index Cumulative Index to Nursing and Allied Health Literature, and Nursing Abstracts

EDITORIAL OFFICES Vanderbilt University School of Medicine A-1131 Medical Center North Nashville, TN 37232-2637 (615) 343-1095; (615) 343-1882 (FAX) Email: iche@mcmail.vanderbilt.edu EDITOR Michael D. Decker, MD, MPH MANAGING EDITOR Susan Cantrell STATISTICAL EDITOR Beverly G. Mellen, PhD SENIOR ASSOCIATE EDITORS C. Glen Mayhall, MD Gina Pugliese, RN, MS William Schaffner, MD ASSOCIATE EDITORS Donald A. Goldmann, MD Didier Pittet, MD, MS Andreas Widmer, MD, MS SECTION EDITORS **Beyond Infection Control:** The New Hospital Epidemiology Bryan P. Simmons, MD Stephen B. Kritchevsky, PhD Memphis, Tennessee Wing Hong Seto, MD Hong Kong **Disinfection and Sterilization** William A. Rutala, PhD, MPH Chapel Hill, North Carolina **Emerging Infectious Diseases** Larry J. Strausbaugh, MD Portland, Oregon Robert W. Pinner, MD Atlanta, Georgia From the Laboratory Marcus Zervos, MD Royal Oak, Michigan Fred C. Tenover, PhD Atlanta, Georgia Information Management John A. Sellick, DO Buffalo, New York The International Perspective Mary D. Nettleman, MD, MS Richmond, Virginia Issues in Surgery James T. Lee, MD, PhD St. Paul, Minnesota **Medical News** Gina Pugliese, RN, MS Chicago, Illinois Martin S. Favero, PhD Irvine, California **Practical Healthcare Epidemiology** Loreen A. Herwaldt, MD Iowa City, Iowa SHEA News Murray D. Batt, MD Clarksburg, West Virginia Statistics for Hospital Epidemiology David Birnbaum, PhD, MPH Sidney, British Columbia, Canada **Topics in Long-Term Care** Philip W. Smith, MD Omaĥa, Nebraska **Topics in Occupational Medicine** David Weber, MD, MPH Chapel Hill, North Carolina

Vice President/Group Publisher Richard N. Roash Publisher John C. Carter Editorial Director Jennifer Kilpatrick Production Editor Shirley P. Strunk, ELS

INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY®

EDITORIAL ADVISORY BOARD

Jacques F. Acar, MD J. Wesley Alexander, MD Paul Arnow, MD Graham A.J. Ayliffe, MD Neil L. Barg, MD Elizabeth Ann Bolyard, RN, MPH, CIC John M. Boyce, MD Professor Dr. Ilja Braveny Charles Bryan, MD Christian Brun-Buisson, MD Donald E. Craven, MD Sue Crow, MSN, RN, CIC Franz Daschner, MD Leigh G. Donowitz, MD Charles E. Edmiston, Jr., PhD Theodore C. Eickhoff, MD Bruce Farber, MD Victoria J. Fraser, MD Peter C. Fuchs, MD, PhD Richard A. Garibaldi, MD Velvl Greene, PhD, MPH Robert Gaynes, MD David W. Gregory, MD David K. Henderson, MD Peter N.R. Heseltine, MD Karen Hoffmann, RN, CIC, MS Marguerite McMillan Jackson, RN, PhD Janine Jagger, MPH, PhD William R. Jarvis, MD Douglas S. Kernodle, MD Robert H. Latham, MD Lewis B. Lefkowitz, MD Hsieh-Shong Leu, MD, MSc Jack Levy, MD Victor Lorian, MD Dennis G. Maki, MD Professor Dr. Walter Marget William J. Martone, MD Allison McGeer, MD John E. McGowan, Jr., MD Jonathan L. Meakins, MD, DSc Raf Mertens, MD Robert R. Muder, MD Joseph M. Mylotte, MD, CIC Lindsay Nicolle, MD Juhani Ojajärvi, MD Michael T. Osterholm, PhD, MPH Jan Evans Patterson, MD Sindy M. Paul, MD Michael A. Pfaller, MD Samuel Ponce de Leon, MD, MSc Isaam Raad, MD Manfred L. Rotter, MD, DipBact Theodore Sacks, MD William E. Scheckler, MD Kent Sepkowitz, MD Denis Spelman, MD Michael L. Tapper, MD Clyde Thornsberry, PhD Professor Leonid P. Titov Timothy R. Townsend, MD Antoni Trilla, MD, PhD Professor Wang Shu-Qun J. John Weems, Jr., MD Robert A. Weinstein, MD Professor Dr. W. Weuffen Sergio B. Wey, MD Rebecca Wurtz, MD

Paris, France Cincinnati, Ohio Chicago, Illinois Birmingham, United Kingdom Yakima, Washington Atlanta, Georgia Providence, Rhode Island Munich, Federal Republic of Germany Columbia, South Carolina Creteil, France Boston, Massachusetts Shreveport, Louisiana Freiburg, Federal Republic of Germany Charlottesville, Virginia Milwaukee, Wisconsin Denver, Colorado Manhasset, New York St. Louis, Missouri Black Butte, Oregon Farmington, Connecticut Beer Sheva. Israel Atlanta, Georgia Nashville, Tennessee Bethesda, Maryland Los Angeles, California Chapel Hill, North Carolina San Diego, California Charlottesville, Virginia Atlanta, Georgia Nashville, Tennessee Nashville, Tennessee Nashville, Tennessee Taipei, Taiwan Brussels, Belgium Bronx, New York Madison, Wisconsin Munich, Federal Republic of Germany Bethesda, Maryland Toronto, Ontario, Canada Atlanta, Georgia Montreal, Quebec, Canada Brussels, Belgium Pittsburgh, Pennsylvania Buffalo, New York Winnepeg, Manitoba, Canada Helsinki, Finland Minneapolis, Minnesota San Antonio, Texas Trenton, New Jersey Iowa City, Iowa Mexico City, Mexico Houston, Texas Vienna, Austria Jerusalem, Israel Madison, Wisconsin New York City, New York Prahran Victoria, Australia New York, New York Brentwood Tennessee Minsk, Republic of Belarus Millwood, Virginia Barcelona, Spain Beijing, People's Republic of China Greenville, South Carolina Chicago, Illinois Greifswald, Federal Republic of Germany São Paulo, Brazil Evanston Illinois

SLACK Incorporated 6900 Grove Road Thorofare, New Jersey 08086 (609) 848-1000 Assistant Editor Eileen C. Anderer

Circulation Manager Lester J. Robeson, CCCP Production Director Christine Malin Production Coordinator Joanne Patterson Publishing Director/ Advertising Wayne McCourt Pharmaceutical Group Sales Director Michael LoPresti Advertising Sales Representative Jennine Kane Classified/Recruitment Sales Manager Michele Burch

"Synergism."

Synergism is the working relationship between two ingredients which results in performance superior to that achieved by each ingredient working separately.

Synergism is Sporicidin. Glutaraldehyde combined with an alkaline phenate system produces superior disinfecting properties.* Patented Sporicidin disinfects with substantually less glutaraldehyde than other products.

Synergism makes Sporicidin tuberculocidal in only ten minutes at room temprature, 68° F and above, when diluted 1:16. Other alkaline glutaraldehyde products cannot be diluted and/or require longer contact times with heating to 77°F.

> Sporicidin fulfills the CDC definition of high level disinfection using the lowest concentration of glutaraldehyde... because of Synergism.

> > Sportentin

un chin

IZING JON

* Journal of Clinical Microbiology, November 1985, p. 735 - 739



000 Old Georgetown Road, Rockville, Maryland 20847





for over a century, that philosophy has guided the growth of the largest and most diversified health care company in the world. Today, as we continue to grow in response to a health care marketplace where the need for effective infection control and wound care products, as well as efficient, specialized services, has never been greater, we can still conceive of no higher purpose.

Johnson &Johnson Medical Inc. was created to better meet your needs in the coming decade. Over the years, *Johnson &Johnson Patient* Care, *Surgikos and Sterile Design* have provided health care professionals with a wide range of products and a valuable body of knowledge in the critical area of infection control. Now, they come together as Johnson & Johnson Medical Inc., giving you a single source of continued support in the vital areas of infection control and wound care, while responding to the everincreasing need for economic efficiencies. We dedicate Johnson &Johnson Medical Inc. to you, the health care professional, as we prepare to meet the special challenges of the 1990s together.

Johnson Johnson MEDICAL INC.

© JJM INC. 1990, ARLINGTON, TEXAS 76004-0130