

INFECTION CONTROL^{AND}

HOSPITAL EPIDEMIOLOGY

Volume 11, Number 6 • June 1990

EDITORIAL

- Clostridium difficile* Colitis in the Hospital Setting: A Potentially Explosive Problem** 281
Charles W. Stratton, MD

ORIGINAL ARTICLES

- Risk Factors for *Clostridium difficile* Toxin-Associated Diarrhea** 283
Elizabeth Brown, MD; George H. Talbot, MD;
Peter Axelrod, MD; Mary Provencher, MT (ASCP);
Cindy Hoegg, RN

- Methicillin-Resistant *Staphylococcus aureus* Outbreak at a Veterans' Affairs Medical Center: Importance of Carriage of the Organism by Hospital Personnel** 291
Annette C. Reboli, MD; Joseph F. John, Jr., MD;
Christel G. Platt, RN; J. Robert Cantey, MD

- Intravascular Catheter Colonization and Related Bloodstream Infection in Critically Ill Neonates** 301
Wendy A. Cronin, MS, MT (ASCP);
Teresa P. Germanson, MS, MPH;
Leigh G. Donowitz, MD

SPECIAL COMMENTARY

- Strategies for the Management of Varicella-Susceptible Healthcare Workers After a Known Exposure** 309
Adele Josephson, PhD, MPH, CIC;
Lynne Karanfil, RN, MA, CIC;
Myles E. Gombert, MD

TOPICS IN CLINICAL MICROBIOLOGY

- Human T-Cell Lymphotropic Virus Type-I** 314
Julie Larkin, BA; John T. Sinnott, IV, MD;
Joshua Weiss, BS; Douglas A. Holt, MD

CLINICAL PHARMACOLOGY OF ANTIBIOTICS

- Pharmacodynamic Properties of Antibiotics: Application to Drug Monitoring and Dosage Regimen Design** 319
Steven C. Ebert, PharmD; William A. Craig, MD

LETTERS TO THE EDITOR

- Prevalence of Toxoplasmosis Among a Sample of Pregnant Women in Risafa, Baghdad** 279
A.A. Abood, MD; S. Abbas; A. Muala; W. Syrop

- Sterilization Container Systems** 279
Nathan L. Belkin, PhD
(Reply) Peggy Ryan, RN

- SHEA NEWSLETTER** 327

SPECIAL ANNOUNCEMENT

- Preliminary Program of the Centers for Disease Control's Third Decennial International Conference on Nosocomial Infections, July 31-August 3, 1990** 297

From SmithKline Biologicals/
Smith Kline & French Laboratories

Engerix-B[®]

Hepatitis B Vaccine (Recombinant)

0, 1, 2 Month Dosing Regimen for Certain Populations*

**20 mcg recombinant
dose helps to ensure
immune response
in adult patients of
all ages**

**Choice of dosing
regimens**

Adult dose (mcg)

Standard dosing regimen (0, 1 and 6
months)

New 0, 1, 2 month dosing regimen for
certain populations*

Published efficacy data: Neonates born
of infected mothers†

VACTRAC[™]—computer software for
vaccination tracking and compliance

Bar-coded, unit-dose vials

Lowest cost per dose²

*For those recently exposed to the virus (including needlestick exposure), certain travelers to high-risk areas, and neonates born of infected mothers. When prolonged maintenance of protective antibody titers is desired, a booster dose at month 12 is recommended.

†Hepatitis B Vaccine (Recombinant), MSD.

‡Please see brief summary of prescribing information on adjacent page for a complete listing of adverse reactions, contraindications, warnings and precautions.

©SmithKline Beckman Corporation, 1990

Lowest Cost Per Dose²

Extensively Tested and Well Tolerated[‡]

State-of-the-art recombinant technology

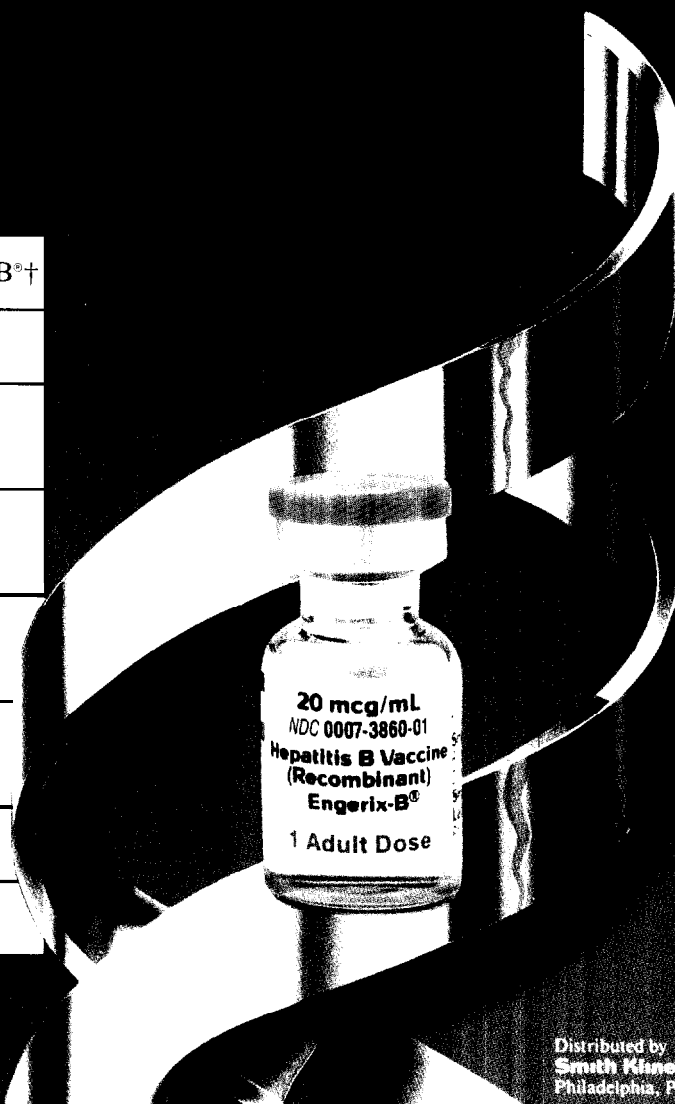
14 million doses distributed in over 87 countries³

Switch to 'Engerix-B'

Can be used to complete a course of vaccination
initiated with another hepatitis B vaccine^{3,4}

Engerix-B®	Recombivax HB®†
20	10
Yes	Yes
Yes	No
Yes	Yes
Yes	No
Yes	No
Yes	No

Manufactured by
SmithKline Biologicals
Rixensart, Belgium



Distributed by
Smith Kline French Laboratories
Philadelphia, PA 19101

Engerix-B®

Hepatitis B Vaccine (Recombinant)

See complete prescribing information in SK&F literature or PDR. The following is a brief summary.

INDICATIONS AND USAGE: 'Engerix-B' is indicated for immunization against infection caused by all known subtypes of hepatitis B virus. Immunization is recommended in persons of all ages, especially those who are, or will be, at increased risk of exposure to hepatitis B virus.

CONTRAINDICATIONS: Hypersensitivity to yeast or any other component of the vaccine is a contraindication for use of the vaccine.

WARNINGS: Do not give additional injections to patients experiencing hypersensitivity after an 'Engerix-B' injection. (See CONTRAINDICATIONS)

Hepatitis B has a long incubation period. Hepatitis B vaccination may not prevent hepatitis B infection in individuals who had an unrecognized hepatitis B infection at the time of vaccine administration. Additionally, it may not prevent infection in individuals who do not achieve protective antibody titers.

PRECAUTIONS: General: As with any percutaneous vaccine, keep epinephrine available for use in case of anaphylaxis or anaphylactoid reaction.

As with any vaccine, delay administration, if possible, in persons with any febrile illness or active infection.

Pregnancy: Pregnancy Category C. Animal reproduction studies have not been conducted with 'Engerix-B'. It is also not known whether 'Engerix-B' can cause fetal harm when administered to a pregnant woman or can affect reproduction capacity. Give 'Engerix-B' to a pregnant woman only if clearly needed.

Nursing Mothers: It is not known whether 'Engerix-B' is excreted in human milk. Because many drugs are excreted in human milk, use caution when giving 'Engerix-B' to a nursing woman.

Pediatric Use: 'Engerix-B' has been shown to be 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.

ADVERSE REACTIONS: 'Engerix-B' is generally well tolerated. During clinical studies involving over 10,000 individuals distributed over all age groups, no serious adverse reactions attributable to vaccine administration were reported. As with any vaccine, however, it is possible that expanded commercial use of the vaccine could reveal rare adverse reactions not observed in clinical studies.

Ten double-blind studies involving 2,252 subjects showed no significant difference in the frequency or severity of adverse experiences between 'Engerix-B' and plasma-derived vaccines. In 36 clinical studies a total of 13,495 doses of 'Engerix-B' were administered to 5,071 healthy adults and children who were initially seronegative for hepatitis B markers, and healthy neonates. All subjects were monitored for 4 days post-administration. Frequency of adverse experiences tended to decrease with successive doses of 'Engerix-B'. Using a symptom checklist, the most frequently reported adverse reactions were injection site soreness (22%), and fatigue* (14%). Other reactions are listed below.

Incidence 1% to 10% of Injections: Induration; erythema; swelling; fever (> 37.5°C); headache; dizziness.*

*Parent or guardian completed forms for children and neonates. Neonatal checklist did not include headache, fatigue or dizziness.

Incidence < 1% of Injections: Pain; pruritus; ecchymosis; sweating; malaise; chills; weakness; flushing; tingling; hypotension; influenza-like symptoms; upper respiratory tract illnesses; nausea; anorexia; abdominal pain; cramps; vomiting; constipation; diarrhea; lymphadenopathy; pain/stiffness in arm, shoulder or neck; arthralgia; myalgia; back pain; rash; urticaria; petechiae; erythema; somnolence; insomnia; irritability; agitation.

Additional adverse experiences have been reported with the commercial use of 'Engerix-B' outside the United States. Those listed below are to serve as alerting information to physicians. Anaphylaxis; erythema multiforme including Stevens-Johnson syndrome; angioedema; arthritis; tachycardia/palpitations; bronchospasm including asthma-like symptoms; abnormal liver function tests; migraine; syncope; paresis; neuropathy including hypoesthesia, paresthesia, Guillain-Barré syndrome and Bell's palsy; transverse myelitis; thrombocytopenia; eczema; purpura; herpes zoster; vertigo; conjunctivitis; keratitis; visual disturbances.

Potential Adverse Experiences: In addition, certain other adverse experiences not observed with 'Engerix-B' have been reported with Heptavax-B®† and/or Recombivax HB®‡. Those listed below are to serve as alerting information to physicians: Optic neuritis.

HOW SUPPLIED: 20 mcg/mL in Single-Dose Vials in packages of 1, 10 and 25 vials.

NDC 0007-3860-01 (package of 1)
NDC 0007-3860-11 (package of 10)
NDC 0007-3860-16 (package of 25)

10 mcg/0.5 mL in Single-Dose Vials in packages of 1 vial
NDC 0007-3859-01 (package of 1)

† plasma-derived Hepatitis B Vaccine, MSD
‡ yeast-derived Hepatitis B Vaccine, MSD

Manufactured by **SmithKline Biologicals**, Rixensart, Belgium
Distributed by **SmithKline & French Laboratories**
Division of SmithKline Beckman Corp. Philadelphia, PA 19101

Date of issuance Aug. 1989

BRS-EB L6

© SmithKline Beckman Corporation, 1989

Engerix-B is a registered trademark of SmithKline Beckman Corporation.

References:


1. Poovorawan Y, Sanpavat S, Pongpunlert W, et al: Protective efficacy of a recombinant DNA hepatitis B vaccine in neonates of HBc antigen-positive mothers. *JAMA* 1989; 261(22):3278-3281.
2. Based on Medi-Span® Hospital Formulary Pricing Guide, December 1989.
3. Damon file, SK&F.
4. Bush L, Moonsammy G, Boscia J: Evaluation of initiating a hepatitis B vaccination schedule with one vaccine and completing it with another. *Hepatology* 1989;10:689.


HATS OFF TO FIRST CLASS SERVICE


At SLACK Incorporated we believe our subscribers are first class people. That's why we do everything possible to publish first class journals. And, that's why we maintain a TOLL-FREE CUSTOMER SERVICE HOTLINE. For the first class customer service you deserve, call:


1-800-257-8290

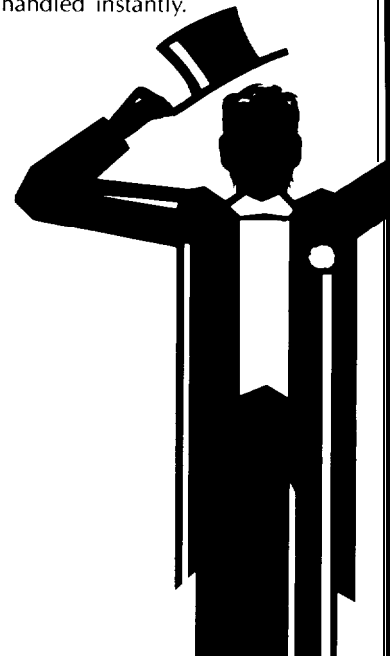
Talk to a SLACK Customer Service Representative about:

 **Subscriptions.** Subscribing by phone is quick and easy; it only takes a minute and Visa and Mastercard are accepted.

 **Renewals.** Early subscription renewal helps avoid possible interruptions in service.

 **Change of Address.** Please notify us four weeks in advance to assure prompt delivery to your new address.

 **Questions or Problems.** Delivery problems or questions about your subscriptions can be handled instantly.



SLACK

6900 Grove Road,
Thorofare, NJ 08086

INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY

EDITORIAL	<i>Clostridium difficile</i> Colitis in the Hospital Setting: A Potentially Explosive Problem	281
	Charles W. Stratton, MD	
ORIGINAL ARTICLES	Risk Factors for <i>Clostridium difficile</i> Toxin-Associated Diarrhea	283
	Elizabeth Brown, MD; George H. Talbot, MD; Peter Axelrod, MD; Mary Provencher, MT (ASCP); Cindy Hoegg, RN	
	Methicillin-Resistant <i>Staphylococcus aureus</i> Outbreak at a Veterans' Affairs Medical Center: Importance of Carriage of the Organism by Hospital Personnel	291
	Annette C. Reboli, MD; Joseph F. John, Jr., MD; Christel G. Platt, RN; J. Robert Cantey, MD	
	Intravascular Catheter Colonization and Related Bloodstream Infection in Critically Ill Neonates	301
	Wendy A. Cronin, MS, MT (ASCP); Teresa P. Germanson, MS, MPH; Leigh G. Donowitz, MD	
SPECIAL SECTIONS	Special Commentary	309
	Strategies for the Management of Varicella-Susceptible Healthcare Workers After a Known Exposure	
	Adele Josephson, PhD, MPH, CIC; Lynne Karanfil, RN, MA, CIC; Myles E. Gombert, MD	
	Topics in Clinical Microbiology	314
	Human T-Cell Lymphotropic Virus Type-I	
	Julie Larkin, BA; John T. Sinott, IV, MD; Joshua Weiss, BS; Douglas A. Holt, MD	
	Clinical Pharmacology of Antibiotics	319
	Pharmacodynamic Properties of Antibiotics: Application to Drug Monitoring and Dosage Regimen Design	
	Steven C. Ebert, PharmD; William A. Craig, MD	
	Special Announcement	297
	Preliminary Program of the Centers for Disease Control's Third Decennial International Conference on Nosocomial Infections, July 31-August 3, 1990	
DEPARTMENTS	Information for Authors	274
	Letters to the Editor	279
	<i>SHEA Newsletter</i>	327

**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 from 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 rate: in the US and possessions Individual One year—\$60 00. Two years—\$95 00. Three years—\$125 00 Institutional One year—\$70 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 issues may be obtained for \$8 00 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 Fran Micaletti 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 zip codes The publisher cannot accept responsibility for undelivered copies Second-class postage is paid at Thorofare, New Jersey 08086, and additional entry pants Postmaster: Send address changes to SLACK Incorporated, 6900 Grove Road Thorofare NJ 08086

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

Omaha, Nebraska

Topics in Occupational Medicine

David Weber, MD, MPH

Chapel Hill, North Carolina

INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY®

EDITORIAL ADVISORY BOARD

Jacques F. Acar, MD	Paris, France
J. Wesley Alexander, MD	Cincinnati, Ohio
Paul Arnow, MD	Chicago, Illinois
Graham A.J. Ayliffe, MD	Birmingham, United Kingdom
Neil L. Barg, MD	Yakima, Washington
Elizabeth Ann Bolyard, RN, MPH, CIC	Atlanta, Georgia
John M. Boyce, MD	Providence, Rhode Island
Professor Dr. Ilja Braveny	Munich, Federal Republic of Germany
Charles Bryan, MD	Columbia, South Carolina
Christian Brun-Buisson, MD	Creteil, France
Donald E. Craven, MD	Boston, Massachusetts
Sue Crow, MSN, RN, CIC	Shreveport, Louisiana
Franz Daschner, MD	Freiburg, Federal Republic of Germany
Leigh G. Donowitz, MD	Charlottesville, Virginia
Charles E. Edmiston, Jr., PhD	Milwaukee, Wisconsin
Theodore C. Eickhoff, MD	Denver, Colorado
Bruce Farber, MD	Manhasset, New York
Victoria J. Fraser, MD	St. Louis, Missouri
Peter C. Fuchs, MD, PhD	Black Butte, Oregon
Richard A. Garibaldi, MD	Farmington, Connecticut
Velvl Greene, PhD, MPH	Beer Sheva, Israel
Robert Gaynes, MD	Atlanta, Georgia
David W. Gregory, MD	Nashville, Tennessee
David K. Henderson, MD	Bethesda, Maryland
Peter N.R. Heseltine, MD	Los Angeles, California
Karen Hoffmann, RN, CIC, MS	Chapel Hill, North Carolina
Marguerite McMillan Jackson, RN, PhD	San Diego, California
Janine Jagger, MPH, PhD	Charlottesville, Virginia
William R. Jarvis, MD	Atlanta, Georgia
Douglas S. Kernodle, MD	Nashville, Tennessee
Robert H. Latham, MD	Nashville, Tennessee
Lewis B. Lefkowitz, MD	Nashville, Tennessee
Hsieh-Shong Leu, MD, MSc	Taipei, Taiwan
Jack Levy, MD	Brussels, Belgium
Victor Lorian, MD	Bronx, New York
Dennis G. Maki, MD	Madison, Wisconsin
Professor Dr. Walter Marget	Munich, Federal Republic of Germany
William J. Martone, MD	Bethesda, Maryland
Allison McGeer, MD	Toronto, Ontario, Canada
John E. McGowan, Jr., MD	Atlanta, Georgia
Jonathan L. Meakins, MD, DSc	Montreal, Quebec, Canada
Raf Mertens, MD	Brussels, Belgium
Robert R. Muder, MD	Pittsburgh, Pennsylvania
Joseph M. Mylotte, MD, CIC	Buffalo, New York
Lindsay Nicolle, MD	Winnipeg, Manitoba, Canada
Juhani Ojajarvi, MD	Helsinki, Finland
Michael T. Osterholm, PhD, MPH	Minneapolis, Minnesota
Jan Evans Patterson, MD	San Antonio, Texas
Sindy M. Paul, MD	Trenton, New Jersey
Michael A. Pfaller, MD	Iowa City, Iowa
Samuel Ponce de Leon, MD, MSc	Mexico City, Mexico
Isaam Raad, MD	Houston, Texas
Manfred L. Rotter, MD, DipBact	Vienna, Austria
Theodore Sacks, MD	Jerusalem, Israel
William E. Scheckler, MD	Madison, Wisconsin
Kent Sepkowitz, MD	New York City, New York
Denis Spelman, MD	Prahran Victoria, Australia
Michael L. Tapper, MD	New York, New York
Clyde Thornsberry, PhD	Brentwood, Tennessee
Professor Leonid P. Titov	Minsk, Republic of Belarus
Timothy R. Townsend, MD	Millwood, Virginia
Antoni Trilla, MD, PhD	Barcelona, Spain
Professor Wang Shu-Qun	Beijing, People's Republic of China
J. John Weems, Jr., MD	Greenville, South Carolina
Robert A. Weinstein, MD	Chicago, Illinois
Professor Dr. W. Weuffen	Greifswald, Federal Republic of Germany
Sergio B. Wey, MD	São Paulo, Brazil
Rebecca Wurtz, MD	Evanston, Illinois

SLACK Incorporated

6900 Grove Road
Thorofare, New Jersey 08086
(609) 848-1000

Vice President/Group Publisher

Richard N. Roash

Publisher

John C. Carter

Editorial Director

Jennifer Kilpatrick

Production Editor

Shirley P. Strunk, ELS

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 substantially less glutaraldehyde than other products.

Synergism makes Sporicidin tuberculocidal in only ten minutes at room temperature, 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.

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



Sporicidin
INTERNATIONAL

2000 Old Georgetown Road, Rockville, Maryland 20847