

Pathogenic microorganisms exploit a number of different routes for transmission and this book demonstrates how the spread of disease can be prevented through the practices of disinfection and control of microbial growth.

The book is organized into four parts. The first part addresses the processes of infectious disease transmission and considers how best to minimize the spread of disease. The second part deals with the prevention of infectious diseases that are transmitted by water or food. Transmission by aerosols, environmental surfaces and medical devices is considered next. The fourth and final part discusses some general mechanisms of disinfection.

This book includes contributions from leading scientists, who provide a wide-ranging synthesis of the problems and prospects for containing the spread of human infectious diseases.

Cambridge University Press

0521481317 - Modeling Disease Transmission and its Prevention by Disinfection

Edited by Christon J. Hurst

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Edited by CHRISTON J. HURST

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Published by the Press Syndicate of the University of Cambridge
The Pitt Building, Trumpington Street, Cambridge CB2 1RP
40 West 20th Street, New York, NY 10011-4211, USA
10 Stamford Road, Oakleigh, Melbourne 3166, Australia

© Cambridge University Press 1996

First published 1996

A catalogue record for this book is available from the British Library

Library of Congress cataloguing in publication data

Modeling disease transmission and its prevention by disinfection /
edited by Christon J. Hurst.

p. cm.

Includes index.

ISBN 0 521 48131 7 (handbook)

1. Disinfection and disinfectants. 2. Communicable diseases –
Transmission. 3. Communicable diseases – Prevention. I. Hurst,
Christon J.

[DNLM: 1. Disease Transmission – prevention & control.

2. Disinfection. WA 110 M6888 1996]

RA761.M59 1996

614.4'8–dc20 96-13529 CIP

DNLM/DLC

for Library of Congress

ISBN 0 521 48131 7 hardback

Transferred to digital printing 2004

RO

Cambridge University Press

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For Pei-Fung, and our children Rachel and Allen

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Preface

We have always had theories about how diseases are transmitted, just as we have always ascribed to methods for preventing disease transmission. Fortunately, our science has progressed to the point that we no longer believe influenza to be caused by the influence of the stars, and we no longer carry nosegays of flowers as protection against the evil vapors once believed to transmit the plague. Instead, we have come to learn that both of these diseases, as well as many others, result from our becoming infected by pathogenic microorganisms. We have also come to understand that not all microorganisms cause disease, and in fact our bodies are naturally colonized by nonpathogenic microorganisms whose presence serves to help protect us against becoming colonized by pathogens. Similarly, we sometimes add nonpathogenic microorganisms as a means of preserving foods against the activity of other organisms that might cause spoilage or disease.

Most of the routes by which pathogens are transmitted involve a period of time when those organisms are exposed to the environment, affording us the opportunity to prevent their transmission through use of disinfection practices. Disinfection can occur naturally since, with the passage of time, any population of microorganisms will die away under conditions that do not favor their replication. The ancient discovery that immersing objects in fire had purifying properties has led to our use of heat treatments to destroy microbial contaminants on objects and in foods. From the knowledge that sunlight had the capability to destroy the causes of infectious diseases, we have progressed to the development of artificial sources of ultraviolet, microwave and gamma irradiation for use in destroying pathogens. Old habits of attempting to purify objects by either burying them in soil, or casting them into water, have led to the development of chemical disinfectants. Our ability to model the processes of disease transmission and disinfection helps us to understand these processes, and affords us knowledge that aids us in achieving our goal of reducing disease-related suffering.

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I wish to thank Gerard N. Stelma and Elizabeth C. Martinson for editing my chapter on diseases associated with foods. The United States of America's Environmental Protection Agency was not involved with the editing of this book.

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