

Handbook of Preventive and Social Medicine

Community Health | Community Medicine

Seventeenth Edition

- Sanitary Inspectors • Public Health Workers • Allied Health Services Staff
- Medical Laboratory Technical Staff • Physiotherapists • Occupational Therapists
- Rehabilitationists • Social Workers • Epidemiologists • Dieticians • Nutritionists • Pharmacists

Preventive and social medicine, comprising community health and community medicine, is a vast developing discipline on which there are a large number of textbooks. This popular Handbook clearly has its own individuality and characteristics carrying the stamp of Dr Yash Pal Bedi. Eleven editions of this book were compiled by Dr Yash Pal Bedi himself. Subsequently, three editions were edited, revised and enlarged by Dr SM Marwah, Professor and Head, Department of Preventive and Social Medicine, Benaras Hindu University, Varanasi. This (Seventeenth) edition has been extensively rewritten, revised and enlarged by Dr Pragya Sharma.

Certain obsolete portions in the previous edition have been deleted and new ones incorporated without losing original characteristics of the *Handbook*. All the chapters in this edition have been thoroughly updated. The text of the book adequately covers all the requirements of students of courses for sanitary inspectors, public health workers, allied health services staff, medical laboratory technical staff and social workers. Besides, the handbook will serve as a useful text for undergraduate students in physiotherapy, occupational therapy, epidemiology, dietetics, nutrition and pharmacy.

In addition, it will fully serve the requirements of doctors in general practice and public health who are today expected to be integrating preventive, promotive and national health services much more than before.

Editor
Pragya Sharma MBBS, MD
is currently
Professor
Department of Preventive and Social Medicine
Maulana Azad Medical College
New Delhi



CBS Publishers & Distributors Pvt Ltd
4819/XI, Prahlad Street, 24 Ansari Road, Daryaganj, New Delhi 110 002, India
E-mail: delhi@cbspd.com, cbspubs@airtelmail.in; Website: www.cbspd.com
New Delhi | Bengaluru | Chennai | Kochi | Kolkata | Mumbai
Hyderabad | Jharkhand | Nagpur | Patna | Pune | Uttarakhand



Seventeenth Edition
Handbook of Preventive and Social Medicine

Community | Community
Health | Medicine

Bedi



Handbook of Preventive and Social Medicine

Community | Community Health | Medicine

Seventeenth Edition

for

Sanitary Inspectors

Public Health Workers

Allied Health Services Staff

Medical Laboratory Technical Staff

Physiotherapists

Occupational Therapists

Rehabilitationists

Social Workers

Epidemiologists

Dieticians

Nutritionists

Pharmacists

Yash Pal Bedi

Editor

Pragya Sharma

Dedicated to Education
CBS Publishers & Distributors Pvt Ltd

Seventeenth Edition

Handbook of **Preventive** and **Social Medicine**

Community Health | Community Medicine

for

Sanitary Inspectors

Public Health Workers

Allied Health Services Staff

Medical Laboratory Technical Staff

Physiotherapists

Occupational Therapists

Rehabilitationists

Social Workers

Epidemiologists

Dieticians

Nutritionists and

Pharmacists

Seventeenth Edition

Handbook of Preventive and Social Medicine

Community Health | Community Medicine

for

Sanitary Inspectors, Public Health Workers, Allied Health Services Staff, Medical Laboratory Technical Staff, Physiotherapists, Occupational Therapists, Rehabilitationists, Social Workers, Epidemiologists, Dieticians, Nutritionists, and Pharmacists

Yash Pal Bedi

MBBS (Pb), DOMS (Eng.), DPH (Lond.), LM (Dub.)

Former

Dean, Hygiene and Vaccine Institute, Punjab
Professor of Preventive and Social Medicine
Medical College, Amritsar

Examiner in Hygiene and Public Health, University of Punjab

External Examiner in Universities of Agra, Patna, Bihar, Rajputana and Bombay
Medical Officer of Health, Amritsar

Editor

Pragya Sharma

MBBS, MD

Professor

Department of Preventive and Social Medicine
Maulana Azad Medical College
New Delhi

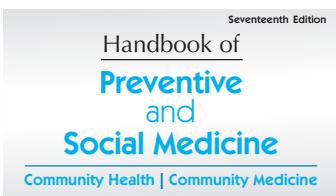


CBS Publishers & Distributors Pvt Ltd

New Delhi • Bengaluru • Chennai • Kochi • Kolkata • Mumbai
Hyderabad • Jharkhand • Nagpur • Patna • Pune • Uttarakhand

Disclaimer

Science and technology are constantly changing fields. New research and experience broaden the scope of information and knowledge. The author/editor has tried his best in giving information available to him while preparing the material for this book. Although, all efforts have been made to ensure optimum accuracy of the material, yet it is quite possible some errors might have been left uncorrected. The publisher, printer and the author/editor will not be held responsible for any inadvertent errors or inaccuracies.



ISBN: 978-93-86478-24-5

Copyright © Publisher

Seventeenth Edition: 2018

First Edition: 1955

Sixteenth Edition: 2003

All rights reserved. No part of this book may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system without permission, in writing, from the author/editor and the publisher.

Published by Satish Kumar Jain and produced by Varun Jain for

CBS Publishers & Distributors Pvt Ltd

4819/XI Prahлад Street, 24 Ansari Road, Daryaganj, New Delhi 110 002, India.

Ph: 23289259, 23266861, 23266867 Website: www.cbspd.com

Fax: 011-23243014 e-mail: delhi@cbspd.com; cbspubs@airtelmail.in.

Corporate Office: 204 FIE, Industrial Area, Patparganj, Delhi 110 092

Ph: 4934 4934 Fax: 4934 4935 e-mail: publishing@cbspd.com; publicity@cbspd.com

Branches

- **Bengaluru:** Seema House 2975, 17th Cross, K.R. Road, Banasankari 2nd Stage, Bengaluru 560 070, Karnataka
Ph: +91-80-26771678/79 Fax: +91-80-26771680 e-mail: bangalore@cbspd.com
- **Chennai:** 7, Subbaraya Street, Shenoy Nagar, Chennai 600 030, Tamil Nadu
Ph: +91-44-26680620, 26681266 Fax: +91-44-42032115 e-mail: chennai@cbspd.com
- **Kochi:** Ashana House, No. 39/1904, AM Thomas Road, Valanjambalam, Ernakulam 682 016, Kochi, Kerala
Ph: +91-484-4059061-65 Fax: +91-484-4059065 e-mail: kochi@cbspd.com
- **Kolkata:** 6/B, Ground Floor, Rameswar Shaw Road, Kolkata-700 014, West Bengal
Ph: +91-33-22891126, 22891127, 22891128 e-mail: kolkata@cbspd.com
- **Mumbai:** 83-C, Dr E Moses Road, Worli, Mumbai-400018, Maharashtra
Ph: +91-22-24902340/41 Fax: +91-22-24902342 e-mail: mumbai@cbspd.com

Representatives

- | | | |
|---------------------------------|---------------------------------|-----------------------------------|
| • Hyderabad 0-9885175004 | • Jharkhand 0-9811541605 | • Nagpur 0-9021734563 |
| • Patna 0-9334159340 | • Pune 0-9623451994 | • Uttarakhand 0-9716462459 |

Printed at Mudrak, Delhi, India



Preface

to the Seventeenth Edition

In a vast developing discipline which today claims a large number of textbooks by authors both within and outside India, every textbook will have its own individuality and characteristics. Eleven editions of this book were compiled by the author Dr Yash Pal Bedi himself. Subsequently, three editions were edited, revised and enlarged by Dr SM Marwah, Professor and Head, Department of Preventive and Social Medicine, Benaras Hindu University, Varanasi. This new edition has been further revised and enlarged by me. Certain obsolete portions in the previous edition have been deleted and new ones incorporated without losing original characteristics of the *Handbook*.

All the chapters in the Seventeenth Edition have been thoroughly revised and made up-to-date. It is reasonably hoped that the book in its present form will adequately cover all the requirements of medical and public health students as well sanitary inspectors, health visitors and other auxiliary health workers, besides being of interest to general readers, as was originally planned by the author. In addition, it will serve the requirements of general practitioners who are today integrating preventive,

promotive and national services much more than before.

In a work like this it is not possible to acknowledge cooperation of all those whose direct and indirect interactions get incorporated through an author's write-ups. However, I acknowledge with thanks the most willing assistance of Dr Harsavardhan Nayak and Dr Akanksha, Senior Residents, Department of Community Medicine, Maulana Azad Medical College, New Delhi, for their work in making valuable contribution, repeated revision and proofreading to give this book a final shape.

I would also like to thank Dr S Garg, Director Professor and Head, Dr GK Ingle, Director Professor, and senior colleagues, Department of Community Medicine, Maulana Azad Medical College, New Delhi, for their immense unconditional support and faith, which has been a constant source of motivation behind this mammoth task. Last but not the least, I would also like to acknowledge my family and friends for being a source of constant inspiration in my life.

Besides, I am indebted to the publishers for their general excellence in the production of this edition.

Pragya Sharma
Editor



Foreword

to the First Edition

It was with great pleasure that I have gone through the manuscript of *Handbook of Preventive and Social Medicine* sent to me by Dr Yash Pal Bedi, Professor of Hygiene and Public Health, Medical College, Amritsar. At present more attention is paid to the preventive aspect than before. Sir George Newman rightly observed, "It is not the event of death which we can escape but the incident of avoidable invalidity and premature death", that gives, in a nutshell, the object of studying hygiene.

Health is not merely absence of disease, the conception of health envisages the full development of physical, mental and spiritual powers with which an individual is endowed. In order to attain this ideal attention is now being paid in different countries, especially in England and America, to what is known as "social medicine". The World Health Organization is playing an important part in this respect. Most of the diseases are preventable, specially those caused by some specific organisms, which are carried by different agencies like air, water or through some intermediaries like the insects. It has, therefore, been possible to adopt preventive measures according to the nature and

method of spread of the different diseases. Since impure air and water, pollution of soil, bad disposal of refuse and excretal matter, errors in diet and improper cleanliness of the house and its surroundings has an important role in the spread of disease and thus require to be carefully studied. On the other hand, the individual himself, being an important unit of the community, should be properly educated to enable him to appreciate the value of sanitation not for his own health, but also for the community in general.

It is essential that all these different factors should be properly dealt with in a book. And judging from this angle, the handbook which Dr Bedi has written will, I am sure, be of great value in inculcating the fundamental principles of hygiene. Apart from environmental hygiene, personal hygiene, village sanitation, sanitation of fairs and melas as also the main principles of prevention of communicable diseases so common in India, have been dealt with succinctly, though nothing of importance has been left out.

I am sure that Dr Bedi's book will meet with all the requirements of the students who, I have no doubt, will read it with interest and profit.

BN Ghosh

Author of
Treatise on Hygiene of Public Health

Contents

Preface to the Seventeenth Edition

v

Foreword to the First Edition

vii

Introduction

1

- 1 Medicine 1
- 2 Hygiene 1
- 3 Public health 2
- 4 Preventive medicine 2
- 5 Social medicine 2
- 6 Preventive and social medicine 2
- 7 Community health/community medicine 3
- 8 Health 3
- 9 Ecology and health 3
- 10 Environmental sanitation 3
- 11 Primary health care 3
- 12 Evolution of medicine from magico-religious to primary health care: global settings 4

1. Water

6

- 1.1 Importance of water 6
- 1.2 Sources of water supply 6
- 1.3 Classification of different types of water 12
- 1.4 Impurities of water 13
- 1.5 Metals in solution 14
- 1.6 Purification of water 15
- 1.7 Domestic purification of water 16
- 1.8 Disinfection of water on a large scale 22
- 1.9 Examination of water 25
- 1.10 Public baths/swimming pools 25
- 1.11 Hygiene of ice-making 26
- 1.12 Aerated water factories 26
- 1.13 Water-related diseases 27

2. Air and Ventilation

28

- 2.1 Importance of air 28
- 2.2 Various factors 28
- 2.3 Impurities of air 28
- 2.4 Kata thermometer 29
- 2.5 Eupatheoscope and eupathometer 30
- 2.6 Air pollution 31
- 2.7 Ventilation 32
- 2.8 Systems of ventilation 33
- 2.9 Methods of ventilation suitable for India 35
- 2.10 Efficiency of ventilation of an inhabited room 35
- 2.11 Heating of rooms 36
- 2.12 Artificial cooling 37

3. Disposal of Refuse: Human and Animal Excreta

39

- 2.13 Air-conditioning 37
 - 2.14 Lighting 37
- 3.1 Collection and removal of refuse 39
 - 3.2 Disposal of refuse 40
 - 3.3 Collection, removal and disposal of human excreta 41
 - 3.4 Conservancy system, collection of night soil 41
 - 3.5 Disposal of night soil 45
 - 3.6 Disadvantages of the conservancy system 48

4. Water Carriage System

50

- 4.1 Water closet 50
- 4.2 Soil pipe 51
- 4.3 House drain 51
- 4.4 Inspection chamber, disconnecting chamber or a manhole 52
- 4.5 Traps 52
- 4.6 Sewers 53
- 4.7 Pneumatic system of sewage removal 55

5. Disposal of Sewage

56

- 5.1 Sewage disposal by dilution 56
- 5.2 Sewage disposal by purification 56

6. Food and Nutrition

62

- 6.1 Importance of food 62
- 6.2 Dietary goals: National Institute of Nutrition, Hyderabad 62
- 6.3 Constituents of food 62
- 6.4 Classification of foods 71
- 6.5 Diet for pregnant and lactating mothers 73
- 6.6 Breastfeeding 73
- 6.7 Diet for infants and children 75
- 6.8 Indian food beliefs, fads and taboos 75
- 6.9 Nutritional disorders 75
- 6.10 Effects of cooking 77
- 6.11 Different methods of cooking 77
- 6.12 Food poisoning 78
- 6.13 Investigation of an outbreak of food poisoning 79
- 6.14 Food hygiene 80
- 6.15 Vegetable foods 80



6.16 Animal foods 83 6.17 Diseased meat 84 6.18 Fish 85 6.19 Tinned meat and fish 85 6.20 Eggs 85 6.21 Milk 86 6.22 Methods of preservation of milk 86 6.23 Diseases transmitted by milk 87 6.24 Infant feeding 87 6.25 Derived milk 87 6.26 Milk products 87 6.27 Vanaspati 88 6.28 Mustard oil 88 6.29 Beverages 88 6.30 Fruit drinks 90 6.31 Condiments 90 6.32 Aromatics 90 6.33 Non-conventional foods 90 6.34 Food fortification and enrichment 90 6.35 Supplementary foods 90 6.36 Food additives 91 6.37 Food adulteration 91	11. Demography and Family Planning 116 11.1 Situation in India 116 11.2 National Population Policy, 2000 117 11.3 Sources of data collection 117 11.4 Current demographic scenario in the country 121 11.5 Demographic transition 121 11.6 Population explosion 121 11.7 Population stabilization 122
7. Soil and Building Sites 92 7.1 Classification of soils 92 7.2 Importance of soil texture for building sites 92 7.3 Groundwater 93 7.4 Ground air 93 7.5 Diseases attributable to soil 93 7.6 Houses and buildings 94 7.7 Housing and health 96	12. Personal Hygiene 124 13. Occupational Health and Offensive Traders 130 13.1 Problem statement 130 13.2 Common occupational health issues 130 13.3 Industrial hazards 134 13.4 Occupational health in agriculture 134 13.5 Health hazards with other occupations 135 13.6 Measures for prevention of occupational diseases 136 13.7 Safety and personal protection 138
8. Climatology and Meteorology 97 8.1 Climate 97 8.2 Effects of climate on health of the people 97 8.3 Meteorology 99 8.4 Atmospheric pressure 99 8.5 Isobars 100 8.6 Temperature 100 8.7 Humidity 101 8.8 Winds 102 8.9 Clouds 103 8.10 Mist 103 8.11 Dew 103 8.12 Fog 103 8.13 Rainfall 103	14. Infectious Disease Epidemiology 139 14.1 Epidemiology 139 14.2 Infection 139 14.3 Dynamics of disease transmission (chain of infection) 141 14.4 Epidemiological triad 142 14.5 Stages of an infectious disease 145 14.6 Prevention and control 146 14.7 Disinfection 148 14.8 Classification of disinfectants 148 14.9 Detergents 155 14.10 Aerosols 156 14.11 Concurrent disinfection 156 14.12 Terminal disinfection 156
9. School Health 105 9.1 Healthy environment 105 9.2 School health service 107 9.3 School Health Programme 108 9.4 Special schools 109 9.5 Child guidance clinics 109	15. Insects and Parasites of Public Health Importance 157 15.1 Insects 157 15.2 Classification of arthropods 157 15.3 Distinctive characteristics of arthropods 157 15.4 Winged insects 161 15.5 National Vector-borne Disease Control Programme (NVBDCP) 167 15.6 Animal parasites 167 15.7 Helminths 167
10. Maternity and Child Welfare 110 10.1 Maternal health 110 10.2 Child health 111 10.3 Newer initiatives 114 10.4 Millennium Development Goals 115 10.5 Integrated Child Development Services Scheme (ICDS Scheme) 115	16. Epidemiology of Communicable Diseases 177 16.1 Malaria 177 16.2 Kala-azar (dum dum fever or black fever) 182 16.3 Yellow fever 182 16.4 Dengue or "break bone" fever 183 16.5 Sandfly fever 183 16.6 Relapsing fever 184 16.7 Rickettsial diseases 184 16.8 Plague 185 16.9 Enteric fever 188 16.10 Cholera 189 16.11 Poliomyelitis 191



16.12 Diphtheria 193	20.3 Educational aids used in health education 238
16.13 Smallpox or variola 195	20.4 Components of health education 238
16.14 Chickenpox or varicella 195	20.5 Barriers in communication 239
16.15 Measles (rubeola) 196	20.6 Basis of human behaviour 239
16.16 German measles (rubella) 198	20.7 Health education and behaviour 240
16.17 Mumps (infectious parotitis) 199	20.8 Methods and media of health education 241
16.18 Cerebrospinal fever 199	20.9 Demonstration 242
16.19 Acute respiratory infections (ARIs) 200	20.10 Miscellaneous methods 242
16.20 Influenza 200	20.11 Health education vs health legislation for behavioural changes 242
16.21 Whooping cough or pertussis 201	
16.22 Tuberculosis 202	
16.23 Rabies 204	
16.24 Tetanus 206	
16.25 Anthrax 207	
16.26 Malta fever or undulant fever 208	
16.27 Glanders 208	21.1 At the centre level 243
16.28 Leprosy 209	21.2 State health system 244
16.29 Trachoma 210	21.3 District level 244
16.30 Sexually transmitted diseases (venereal diseases) 210	21.4 Health care system in India 245
16.31 AIDS 211	21.5 India and the international assistance 248
16.32 Ringworm (tinea) 214	21.6 United Nations Children's Emergency Fund (UNICEF) 249
17. Noncommunicable Diseases 222	21.7 Colombo Plan 251
17.1 Accidents 223	21.8 Other agencies 252
17.2 Blindness 223	21.9 Levels of care 252
17.3 Cancer 224	21.10 Primary health care 253
17.4 Hypertension (high blood pressure) 225	21.11 Common public health problems in India 254
17.5 Cardiovascular diseases 226	21.12 Community Development Programme 255
17.6 Diabetes mellitus 227	21.13 Integrated Rural Development Programme 255
17.7 National Tobacco Control Programme 228	21.14 Health centre approach 256
17.8 National programme for prevention and control of cancer, diabetes, cardiovascular diseases and stroke (NPCDCS) 229	21.15 Health planning in India 256
17.9 Global action plan for the prevention and control of NCDs 2013–2020 229	21.16 Rural health scheme 256
18. Sanitation and Water Supply in Rural Areas 230	21.17 Health for all by the year 2000 AD 256
18.1 Current status 230	21.18 Decentralised planning 257
18.2 Mass education 230	21.19 Planning Commission 257
18.3 Activities under national health mission (NHM) 230	
18.4 Total sanitation campaign (TSC) 231	
18.5 Rural town planning 231	
18.6 Sanitary disposal of waste 232	
18.7 Sanitation in fairs and festivals 232	
18.8 Water supply 233	
19. Sanitation at Fairs and Festivals 235	
19.1 Planning of the arrangements 235	22. Social Medicine 259
19.2 Accommodation 235	22.1 Man, society and social medicine 259
19.3 Medical and sanitary arrangements 235	22.2 Social medicine 259
19.4 Water supply 235	22.3 Social structure/social anatomy 259
19.5 Efficient conservancy 235	22.4 Social physiology 260
19.6 Food supply 236	22.5 Social pathology 261
19.7 Vaccines 236	22.6 Social welfare 262
19.8 Provision of inspection or checkposts 236	22.7 Social security 264
20. Health Education and Communication 237	22.8 Health insurance in India 265
20.1 Principles of health education 237	22.9 Rehabilitation 266
20.2 Methods of approaches in health education 238	
23. Health Statistics 269	
23.1 Meaning of statistics 269	
23.2 Importance of statistics 269	
23.3 Collection of data 269	
23.4 Survey for collection of data 270	
23.5 Tabulation of data 270	
23.6 Graphical presentation of data 271	
23.7 Measures of central tendency 273	



23.8 Measures of dispersion	274
23.9 Sampling procedures	276
23.10 Size of sample	276
23.11 Normal distribution	277
23.12 Sampling variation and tests of significance	277
23.13 Standard error test for large samples	277
23.14 T-test for comparing means	278
23.15 Chi-square test	278
23.16 Vital and morbidity statistics	278
23.17 Population statistics	279
23.18 Census	279
23.19 Intercensal population estimates	279
23.20 Registration of births and deaths	279
23.21 Lapses in the registration of births and deaths	280
23.22 Health indicators	280
23.23 Standardisation of rates	281

24. Mental Health**283**

24.1 Mental illness	283
24.2 Some special considerations in the field of mental health	283
24.3 Problem statement	284
24.4 History of mental health services in India	284
24.5 Current status and challenges	286
24.6 Components of mental healthcare	286

Sample Question Paper**289****Bibliography****293****Index****295**