Foreword		xii
Acknowledg	ments	x
Contributors	s ·	xvi
Abbreviation	ns and Acronyms	xx
Chapter 1	Changing Patterns of Disease and Mortality in Sub-Saharan Africa: An Overview Rorence K. Baingana and Eduard R. Bos	• 1
Chapter 2	Levels and Trends in Mortality in Sub-Saharan Africa: An Overview Jacob Adetunji and Eduard R. Bos	11
Chapter 3	Trends in Child Mortality, 1960 to 2000 Kenneth Hill and Agoessi Amouzou	15
Chapter 4	Levels and Trends of Adult Mortality Debbie Bradshaw and Ian M. Timaeus	31
Chapter 5	Causes of Death Chalapati Rao, Alan D. Lopez, and Yusuf Hamed	43
Chapter 6	Population and Mortality after AIDS Rodolfo A. Bulatao	59
Chapter 7	Levels and Patterns of Mortality at INDEPTH Demographic Surveillance Systems Osman, A. Sankoh, Pierre Ngom, Samuel J. Clark, Don de Savigny, and Fred Binka	75
Chapter 8	Trends and Issues in Child Undernutrition Todd Benson and Meera Shekar	87
Chapter 9	Diarrheal Diseases Cynthia Boschi-Pinto, Claudio F. Lanata, Walter Mendoza, and Demissie Habte	107
Chapter 10	Developmental Disabilities Geoff Solarsh and Karen J. Hofman	125
Chapter 11	Acute Respiratory Infections Shabir A. Madbi and Keith P. Klugman	149
Chapter 12	Vaccine-Preventable Diseases	163

Chap	ter 13	Tuberculosis Christopher Oye, Anthony D. Harries, Dermot Maher, S. Mebran Hosseini, Wilfred Nkhoma, and Felix M. Salaniponi	179
Chap	ter 14	Malaria Robert W. Snow and Judy A. Omembo	195
Chap	ter 15	Onchocerciasis	215
		Uche Amazigo, Mounkaila Noma, Jesse Bump, Bruce Bonton, Bernhard Liese, Laurent Yaméogo, Honorat Zouré, and Azodoga Seketeli	
Chap	ter 16	Maternal Mortality	223
		Khama O. Rogo, John Oucho, and Philip Mwa'ali	
Chap	ter 17	HIV/AIDS	237
		Souleymane Mboup, Rosemary Musonda, Fred Mbalu, and Max Essex	
Chap	ter 18	Lifestyle and Related Risk Factors for Chronic Diseases Krisela Steyn and Albertino Damasceno	247
Chap	ter 19	Diabetes Mellitus	267
٠		Jean-Claude Mhanya and Kaushik Ramiaya	
Chap	ter 20	Cancers	289
Cimp		Freddy Sitas, Max Parkin, Zvavahera Chirenje, Lara Stein, Nokuzola Mgogri, and Henry Wabinga	207
Chap	ter 21	Cardiovascular Disease	305
		Anthony Misewu and Jean-Claude Mbanya	
Chap	ter 22	Mental Health and the Abuse of Alcohol and Controlled Substances Florence K. Baingana, Atalay Alem, and Rachel Jenkins	329
Chap	ter 23	Neurological Disorders Donald Silberberg and Elly Katabira	351
Chapt	ter 24	Violence and Injuries	361
•		Brett Bowman, Mohamed Seedat, Norman Durcan, and Olive Kobusingye	
Index			375
Вохе	s		
1.1		psis of the Key Concerns for DMSSA-1	2
1.2		Health-Related Millennium Development Goals and Indicators	7
13.1 13.2		WHO Stop TB Strategy Constraints to Improving TB Control, as Identified by National Program	186
12,2		egers in Africa	190
16.1		el of Three Levels of Delay	233
19.1		nization of Diabetes Care	282
Figur			
1.1		GDP per Capita Growth, by Region, 1991–2015	4
1.2		GDP per Capita, by Developing Region, 1980–2003	4
1.3 1.4	_	lation below Age 15, 2003 an Age of Population, 1990 and 2003	6
1.5		Fortility Rate, 1990 and 2003	6
1.6		Pertuny Rate, 1990 and 2005 Pyramid for Botswana, 2005, with and without AIDS	6 6
2.1	_	t Mortality Rate in Selected Countries, 1960–2005	13
		,	

vi | Contests

2.2	Life Expectancy in Selected Countries	14
3.1	Contrasting Data Availability: The Republic of Congo and Kenya	16
3.2	Estimated Levels of Under-Five and Infant Mortality, by Region of Africa, 2000	18
3.3	Trends in Under-Five Mortality, by Five-Year Period and Region, 1960-2000	19
3.4	Annual Rate of Change in Under-Five Mortality, by Five-Year Period, 1965-2000	20
3.5	Relationships between CHMR and IMR, by Country	20
3.6	Estimated Relationships between CHMR and IMR, by Region	21
3A.1	Fitted Trends Using Different Numbers of Knot Parameters	23
3B.1	Examples of "Quality" Categories for Selected Countries	29
4.1	Probabilities of Dying between Exact Ages 15 and 60 in Sub-Saharan Africa, by Sex	35
4.2	Conditional Probabilities of Dying between Ages 30 and 65 in Zimbabwe,	
	by Sex, from Different Data Sources, 1969-90	36
4.3	Conditional Probabilities of Dying between Ages 15 and 60 in South Africa,	
	by Sex, from Different Data Sources, 1980–2000	36
4.4	Age Distribution of Reported Adult Deaths on the National Population Register	
	of South Africa, by Sex, 1998-2003	37
4,5	Trend in the Estimates of the Probabilities of Dying between Ages 15	
	and 60 (45915), by Sex and WHO Region, from DHS Sibling Histories	38
5.1	Global Mortality Strata for GBD 2000 Regions	48
5.2	Estimated Age-Specific Death Rates for Zambia, 2000	49
5.3	Model-Based Predictions of GBD Cause-Group Composition of Mortality	•
	by Age and Sex, Zambia, 2000	49
5.4	Summary of GBD Process for Estimating Cause-Specific Mortality in African	
	Countries	53
6.1	Projected Population, Sub-Saharan Africa and Three Selected Countries	62
6.2	Projected Crude Birth Rate, Sub-Saharan Africa and Botswana	64
6.3	Distribution of Women of Reproductive Age in the UN Projection	
	and the No-AIDS Scenario, Botswana	64
6.4	Mortality Effects on Population, Relative to the No-AIDS Scenario,	
	in Different Projections	64
6.5	Projected Life Expectancy, Sub-Saharan Africa and Three Selected Countries	65
6.6	HIV Prevalence and Maximum Loss in Life Expectancy in Alternative Projections	66
6.7	Female Advantage in Life Expectancy, Sub-Saharan Africa and Three	
	Sciented Countries	67
6.8	Adult Mortality (45915) by Sex in UN Projections, Sub-Saharan Africa and Lesotho	68
6.9	Sex Ratios by Age from UN Projections, Zimbabwe	68
6.10	Dependency Ratio, Sub-Saharan Africa and Three Selected Countries	69
6.11	Consistency among Alternative Estimates of Current Adult Mortality (45915)	70
6.12	HIV Prevalence in 2001 and 2003	70
6.13	Alternative Population Projections, Zambia and Botswana	72
6.14	Alternative Projections of Life Expectancy in Zambia and Botswana	72
7.1	Standard Population Age Structure from INDEPTH, Segi, and WHO	78
7.2	Crude Death Rate and Expectation of Life at Birth	79
7.3	Child Mortality: Probability of Dying between Birth and Age Five (590)	80
7.4	INDEPTH Mortality Patterns 1–7, $\ln(nq_x)$	83
8.1	The UNICEF Conceptual Framework of the Determinants of Nutritional Status	89
8.2	The Burden of Undernutrition through the Life Cycle and across Generations	91
8.3	Prevalence of Stunting in Children Age 6 to 60 Months, by Country	93
8.4	Subnational Estimates of the Prevalence of Underweight Preschool Children	
0.1	and Area Density of Underweight Children	94
8.5	Stunting Prevalence among Preschoolers, by Urban or Rural Residence,	
•.5	Selected Countries	95

8.6	Prevalence of Underweight Preschool Children by Wealth Quintile,	oc.
	Selected Countries	95
8.7	Under-Five Mortality Rates and Progress Being Made in Reducing Under-Five	
	Mortality, by Country	96
8.8	Scatter Plot of National Under-Five Mortality and Underweight Prevalence Rates	96
8.9	Daily Dietary Energy Supply Available and Food Production Index, by Country	97
8.10	Access to Safe Water and Adequate Sanitation, by Country	98
8.11	Health Services, by Country	99
8.12	Female Adult Literacy Rates and Girls' Net Primary Enrollment Rates, by Country	100
8.13	Proportion of Infants Receiving Only Breast Milk in the First Year of Life,	
	Selected Countries	101
8.14	Effect of Economic Growth on Attaining the Millennium Development Goal	105
	of Reducing the Prevalence of Underweight Preschool Children, Tanzania	105
1.0	Slowing Progress in Child Mortality	108
9.2	Sites with Available Under-Five Diarrhea Mortality Data	109
9.3	Medians of Diarrheal Proportional Mortality among Children under Five	
	in the African Region, 1980–95	111
9.4	Medians of Diarrheal Proportional Mortality among Children under	
0.5	Five in the African Region and Other Developing Regions, 1980–95	111
9.5	Change in Sanitation Coverage by Region, 1990–2000	115
10.1	Relationship between Impairment, Disability, and Handicap (ICIDH)	126
10.2	Relationship between Body Functions, Activities, and Participation (ICF)	126
10.3	Research Steps in the Development of Public Health Interventions	133
10.4	Causal Pathways for Developmental Disabilities	141
12.J	Percentage of Target Population in Africa Vaccinated, by Vaccine Type, 1980–2002	164
12.2	Immunization Coverage with Measles-Containing Vaccines, 2003	166
12,3	Maternal and Neonatal Tetanus Elimination Status, 2002	169
12.4	Global and Regional Immunization Coverage, Three Doses DTP, 1980-2001	169
12.5	Epidemics of Yellow Fever in Africa Reported to the WHO, 1980–2003	170
12.6	African Nations Using Hepatitis B Vaccine in a National Infant Immunization	171
12.7	Campaign, 2002	171
12.7	Number of Childhood Vaccines Routinely Used in Developing and Established- Market Countries	173
12.1	Relative Incidence of TB in HIV-Infected Individuals as a Function	173
13.1	of CD4 ⁺ Cell Count	183
13.2	Estimated Incidence Rates of New TB Cases and Percentages of TB Patients	103
13.2	Infected with HIV, by Country, 2004	183
13.3	Trends in TB (All Forms) Case Notifications in the WHO African Region	165
13.3	Contrasted with Trends in Other Parts of the World	184
13.4	Estimated TB Incidence in Relation to Estimated HIV Prevalence in Adults	104
13.4	Age 15 to 49 for 42 Countries in the WHO African Region	184
13.5	Prevalence of HIV in TB Cases (All Forms) in Relation to HIV Prevalence	104
13.5	in Adults Age 15 to 49	185
13.6	Progress toward the Target of 70 Percent Case Detection in the WHO African	103
15.6	Region, Compared with the Average Progress Worldwide	187
13.7	Expected Reductions in the Number of TB Cases in Kenya over 10 Years	189
13.8	Proportional Reduction in the Incidence of TB over 20 Years among HIV-Positives	109
15.0	as a Function of Effective Coverage and the CD4 ⁺ Count per Microliter	
	at Which People Start ARV Therapy	189
14.1	Malarial Risks in Children Age 0 to 14 Years in a Stable Endemic Area	107
	of the Kenyan Coast	196
14.2	Public Health Effects of Plasmodium falciparum Malaria	196

14.3	Fuzzy Climate Suitability Membership for Malaria	198
14.4	Malaria-Specific and All-Cause Mortality Estimates per Year for Children	
	under Five	207
14.5	Malaria-Specific, Nonmalaria, and All-Cause Mortality Rates	
	among Children under Five	208
15.1	Prevalence of Onchocerciasis Infection in 1974 and Gradual Expansion, 1977-92	218
15.2	Prevalence of Onchocerciasis Infection in 2002	219
15.3	Scaling Up with Additional Interventions	219
16.1	Major Causes of Maternal Mortality in Sub-Saharan Africa	229
16.2	Relation between Skilled Attendant at Delivery and MMR for All Countries, 1995	231
16.3	Effects of the Introduction in Romania of an Anti-Abortion Law	
10.5	in 1966 and Legalization of Abortion in 1989	232
17.1	Disease Burden and Treatment of AIDS in Relation to Global Population	
17.1	and Economy	238
17.2	Global Burden of HIV-1 Infection	238
17.2	Distribution of Major HIV-1 Subtypes and Circulating Recombinant Forms	200
17.3	in Africa	241
18.1	Pat and Carbohydrate Intake as Functions of Proportion of Life Spent in a City	251
18.2	Macronutrient Intakes in South Africans, per Capita, 1993 and 1999	251
19.1	Prevalence of Diabetes with Increasing Age in Cameroon	276
	Mean Fasting Blood Glucose by Tertiles of Walking Energy Expenditure	
19.2	_	277
10.2	in Women: The Cameroon Study Cost of Different Types of Insulin in Relation to the Gross National Product	282
19.3		290
20.1	Distribution of Radiation Therapy Services in Africa	292
20.2	Major Cancer Types in Sub-Saharan Africa, Both Sexes, All Ages	300
20.3	Number of Cigarettes Consumed per Adult	308
21.1	Cardiovascular Disease, Age-Standardized Rates in the World, 1994–2000	200
21.2	Probability of Death by Broad Cause in Men between the Ages of 15 and 60 Years	317
	in Tanzania	217
Table	or.	
1,1	Gross National Income, per Capita, 1980, 1990, 2003	5
1.2	Overview of Health Worker Vacancy Rates for Four Countries	8
	Conflict-Related Deaths by Region	9
1.3	Life Expectancy at Birth for World and UN Regions, 1960–2005	12
2.1	Infant Mortality Rates for World and UN Regions, 1960–2005	13
2.2	Infant Mortality Rates for Sub-Saharan Africa and UN Subregions, 1960–2005	13
2.3		13
2.4	Life Expectancy at Birth for Sub-Saharan Africa and UN Subregions, 1960–2005	26
3B.1	Estimates of Under-Five Mortality, by Country and Year	27
3B.2	Estimates of Infant Mortality, by Country and Year	28
3B.3	Countries and Data Sources	
4.1	Probabilities of Dying between Ages 15 and 60 ($_{45}q_{15}$) in Sub-Saharan Africa	34
4.2	Probabilities of Dying between Ages 15 and 60 ($_{45}q_{15}$), by Sex, according to	25
	Intercensal Survival, Malawi	35
4.3	Orphanhood Estimates of Person-Years Lived and Lost at Ages 35-75 (Men)	25
	and 25–75 (Women), Kenya	35
4.4	Estimates of the Probability of Dying between Ages 15 and $60(45q_{15})$, from	40
	. DHS Sibling Histories	40
5.1	Described of Deaths Due to Discours and Injuries in Children under Fire Vests	
	Proportion of Deaths Due to Diseases and Injuries in Children under Five Years,	1.4
	by Source of Data	44
5.2		44

5.3	National Vital Records Data: Proportionate Distribution of Cause of Death	
	of Children under Five	40
5.4	National Vital Records Data: Proportionate Distribution of Cause of Death	
	at Age 5 to 14 Years	40
5.5	National Vital Records Data: Proportionate Distribution of Cause of Death	
	at Age 15 to 44 Years	47
5.6	National Vital Records Data: Proportionate Distribution of Cause of Death	
	at 45 Years of Age and Older	47
5.7	Epidemiological Estimates of Malaria Mortality in Nonpregnant African	
	Population, 1995	50
5.8	Estimates of Diarrheal Deaths of Children under Five, 2000	50
5.9	GBD Estimates of Leading Causes of Death, by Sex, 2000	53
5.10	GBD Estimates of Leading Causes of Death in AFR D and AFR E, 2000	54
5.11	GBD Estimates of Leading Causes of Death at Age 0 to 14 Years, 2000	55
5.12	GBD Estimates of Leading Causes of Death at Age 15 to 59 Years, Subregional	
	Comparison, 2000	55
5.13	GBD Estimates of Leading Causes of Death in AFR E at Age 15 to 59 Years:	
	Comparison between Males and Females, 2000	50
5.14	GBD Estimates of Leading Causes of Death at Age 60 Years and Older:	
	Comparison between Males and Females, 2000	56
6.1	Effects of Demographic Factors in Producing Differences between Projections	63
6.2	Estimates of HIV Prevalence among Adults Age 15 to 49, 2001-03	71
7.1	Summary of Mortality Data from INDEPTH Sites, 1995-99	77
7.2	Crude Death Rates and Expectation of Life at Birth	79
7.3	Infant and Child Mortality	80
7.4	Adult Mortality and Child and Adult Mortality Ratio	81
8.1	Percentage of Total Estimated Annual Burden of Disease in Africa Attributed	
	to Major Rick Factors	88
8.2	Indicators of Nutritional Status	90
8.3	Effects of Deficiency of Micronutrients and Principal Dietary Sources	92
8.4	Projected Impact of Economic Growth and Direct Large-Scale Nutrition	
	Intervention Programs on Stunting and Poverty, Kagera Region, Tanzania, 2015	102
9.1	Median Estimates of Episodes of Diarrhea per Child per Year in the African Region,	
	by Age Group	110
9.2	Estimated Number and Proportion of Deaths Due to Diarrhea among Children	
	under Five	112
9.3	Available Etiology Data, by Country and Study Setting	113
9.4	Median of the Proportions of Etiological Agents among Children under Five	
	in the AFR D Subregion, by Study Site	113
9.5	Median of the Proportions of Etiological Agents among Children under Five	
	in the AFR E Subregion, by Study Site	114
9.6	Feces Disposal Practices at Home, by Urban and Rural Residences in Four	
	African Countries	115
9.7	Prevalence (Median) of Diarrheal Disease, the Two Weeks before Survey,	
	by Urban and Rural Site of Residence in AFR D and AFR E	116
9.8	Children under Five Taken to Health Facilities or Receiving Treatment	
	for Diarrheal Disease in the Two Weeks before Survey, by Sex	116
9.9	Cases and Deaths Due to V. cholerae Reported to WHO, 1996-2001	116
9A.1	Regional Reporting Categories for Global Burden of Disease 2000: WHO	214
	African Subregions	117
9A.2	Main Characteristics of the Studies Included in the Morbidity Review	117
9A.3	Main Characteristics of the Studies Included in the Mortality Review	118
		-10

9A.4	Main Characteristics of the Studies Included in the Etiology Review	119
10.1	Prevalence of Disability in Sub-Saharan Africa	129
10.2	Prevalence of Disability in Other Developing Countries	130
10.3	Prevalence of Hearing Disability in Sub-Saharan Africa	131
10.4	Estimated Birth Prevalence of Infants with Serious Congenital Disorders,	
	by WHO Region	133
11.1	Results of Lung Aspirations of Children Who Had Not Received Antibiotics	
	and Not Mentioned Underlying Illness	154
11.2	Estimated Incidence of Organism-Specific, Bacteremic, Community-Acquired	
	Severe LRTI in HIV-1-Infected and HIV-1-Uninfected Children Age 2 to 24 Months	154
11.3	Estimated Incidence for Specific Viral-Associated Severe LRTI in HIV-1-Infected	
	and HIV-1-Uninfected Children Age 2 to 23 Months	155
12.1	WHO-Estimated Deaths and DALYs from Vaccine-Preventable Diseases, 2002	164
12.2	Potential Deaths Averted by HBV, Hib, Rotavirus, and SP Vaccine Implementation	174
13.1	The Contribution of Sub-Saharan Africa to the Global TB Epidemic	184
14.1	Populations at Risk During 2000	199
14.2	Median and Interquartile Ranges of Malaria-Specific Mortality Estimates	
	per 1,000 People per Year	201
14.3	Estimated Numbers of Malaria-Specific Deaths and Interquartile Ranges	
	during 2000	202
15.1	Scaling up APOC, 1996–2003	220
16.1	Maternal Mortality Measures, 1990, 1995, and 2000	226
16.2	Maternal Mortality Measures in Sub-Saharan Africa, by Country, 1990-2000	227
17.1	HIV-1 Prevalence in Representative Regions and Countries	239
18.1	Exposure to Tobacco Products of Participants, Age 13-15 Years, in the Global	
	Youth Tobacco Survey, 1999–2001	249
18.2	Prevalence of Adults Who Smoke Cigarettes, by Country	250
18.3	Anthropometric Indicators, by Country	254
18.4	Large Prevalence Studies on Hypertension since 1997, by Country	256
18.5	Mean Lipid Levels and Prevalence of Dyslipidemia in Black Subjects	259
18.6	The Clustering of NCD Risk Factors in Nigerian Subjects	260
19.1	Data Sources for the Prevalence of Type 2 Diabetes and IGT, by Year of Study	268
19.2	Data Sources for Prevalence Estimates of Diabetes Mellitus and IGT,	
	by Country, 2003	269
19.3	Data Sources for the Prevalence of Diabetes Complications, by Disease and Year	271
19.4	Prevalence Estimates of Diabetes Mellitus, by Country, 2003	274
19.5	Prevalence Estimates of IGT, by Country, 2003	275
19.6	Projections of Diabetes and IGT from 2003 to 2025 in the Age Group	
	of 20 to 79 Years	276
19,7	Calculated Estimates of the Costs of Diabetes Care, by Country	281
20.1	Estimated Percentages of Deaths, by Cause, 2002	290
20.2	Cumulative Incidence of Cancer in Women up to 64 Years of Age, 1993-97	290
20.3	Estimated Number of New Cases and Age-Standardized (World) Incidence Rates	
	for the Leading Cancers in Males and Females, 2002	291
20.4	Prevalence of Hepatitis C Virus IgG Antibodies in Sub-Saharan Africa, 2000	296
21.1	The Epidemiological Transition in the Seychelles, 1976 and 1994	306
21.2	Incidence of Stroke	310
	The Relation between CVD, Risk Factors, Behaviors, and Determinants	314
21.4	Risk Factors for CHD Reported from Hospital Patients	315
21.5	•	316
21.6	· · · · · · · · · · · · · · · · · · ·	318
• 21.7		318

21.8	Prevalence of Alcohol Consumption, by Country	318
21.9	Prevalence of Obesity, by Country	319
21.10	Prevalence of Obesity in Women Age 15 to 49 Years, by Country	319
22.1	Age-Standardized Incidence, Prevalence, and Mortality Rate Estimates for WHO	
	AFRO Epidemiological Subregions, 2000	332
22.2	YLD, YLL, and DALY Estimates for WHO AFRO Epidemiological Subregions, 2000	333
22.3	Summaries of Selected Studies on Suicide and Parasnicide	336
22.4	Selected Studies on the Psychosocial and Mental Health Consequences of HIV/AIDS	340
22A.1	Selected Sub-Saharan Africa Data on Mental Health Disorders	345
24,1	Cause of Injury by Outcome: Mukono District, Uganda	366
24.2	Cause of Injury by Outcome: Kawempe Division, Kampala District, Uganda	366
24.3	Cause of Injury by Outcome: Gulu District, Uganda	367
24.4	Top Three Causes of Injury, by Age, Rural District (Mukono), Uganda	367
24.5	Top Three Causes of Injury, by Age, Urban Division (Kawempe), Uganda	368