

# Index

acquired immunity antidisease, antiparasite, and premunition, 14 at population level, 15 childhood morbidity and mortality "costs" of, 75 discovery of, by Robert Koch, 26 fear of jeopardization of, by curative antimalarial treatment, 45 in African adults, 62-65 low levels of, among highland populations, 51 partial, as a function of the intensity of transmission, 14 postulation of different types of, with racial basis, 65 Aedes aegypti mosquito control campaign against, in Freetown, 28 African antimalarial medicines as palliatives, 49 lack of interest in, on the part of European colonizers, 20 longstanding lack of interest in, on the part of western biomedical community, 48 surge of interest toward, in late twentieth century, 131 African pharmacopoeia, 100 American Public Health Association, 113 Anopheles arabiensis, 12, 57, 70, 151 Anopheles darlingi, 71

Anopheles funestus, 12, 22, 57, 72, 127, 128 Anopheles gambiae complex, 12, 82, 127 Anopheles gambiae sensu lato, 128 Anopheles gambiae sensu stricto, 12, 57, 70, 127, 151 Anopheles labranchiae, 69 Anopheles mosquitoes biological endowments and behaviors, 13 new exophagic subspecies discovered in Burkina Faso, 151 three major species of, 12 with lesser competencies, 12 antimalarial drugs. See also African antimalarial medicines, artemisinin combination therapies (ACTs), chloroquine, cinchona alkaloids, mass drug administration, pyrimethamine, quinine, sulfadoxine-pyrimethamine (SP) direct distribution of, at Bernin Kebbi, 87 direct distribution of, at Bobo-Dioulasso, inability to fully interrupt malaria transmission, 88 modes of distribution, 88 Artemisia annua discovery of antimalarial properties of, 155 highland plantations of, 156 artemisinin parasite resistance to, 157



212 Index

artemisinin combination therapies (ACTs) consequences of high cost of, 156 great hopes for, 156 need for large-scale plantations, 156 reduction of viral HIV load through use of, 159 asymptomatic carriers insight about, by Robert Koch, 25

Bantu migrations, 7
Bathurst, Gambia

Bantu migrations, 7
Bathurst, Gambia
insecticide spraying in, 109
low rates of parasitemia in, 109
bed nets. *See* insecticide-treated bed nets,
long-lasting insecticide-treated nets
(LLINs)
bendiocarb, 153

benezene hexachloride (BHC). See BHC Bennett, H. Leigh, 41 Bernin Kebbi direct distribution of antimalarials at, 87

BHC

long residual action, 84 use in Mozambique, 77 use in southern Africa, 85 use in southwestern Nigeria, 77 vector cross-resistance to, and dieldrin

(DLD), 84 Bill and Melinda Gates Foundation, 142, 144

bionomics, 13 blackwater fever, 24, 26, 63, 64, 68 Blue Nile Health Project (BNHP), 135 Bobo-Dioulasso

direct distribution of antimalarials at, 87 Bruce-Chwatt, L. J., 88 Bush, George W., 144

Cambournac, F. J. C., 74, 75, 79
childhood malaria mortality
contradictory opinions about, 45
estimated at Office du Niger, Mali, 66
estimated in Cameroun, 66
estimated in Dakar, 66
estimates of, in early 1950s, 78
high infant mortality claimed in Dutch
East Indies, 65
in highlands of western Uganda, 136
increase in, from 1990-1995, 120
low infant mortality claimed in South

reduction in, by 25 percent from 2002 to 2010, 154 chloroquine, 101-105 and changing patterns of treatmentseeking, 132 and the second malaria eradication campaign, 155 as basis for tactical variant I, 114 availability in small shops, 131 distribution of medicated salt, 87 parasite resistance to, in Southeast Asia, 114 perceived benefits compared to quinine, 86 spread of parasite resistance to, 119 cholera, 17 Christophers, S. R., 26, 27, 29 chrysanthemum (Chrysanthemum cinerariifolium), 48 cinchona alkaloids, 60, 61 cinchona bark, 17 cinchona plantations, 61-62 Colonial Insecticides Committee of the United Kingdom, 72 Conakry, Guinea mission to investigate feasibility of mosquito control in, 35

dams and irrigation projects, 114–116 increase in schistosomiasis, onchocerciasis, and malaria, 116 overestimation of benefits from, 116 year-round malaria transmission around Manatali dam, 116
Daniels, C. W., 26, 31, 63
Dar es Salaam, Tanganyika data collection on parasitization in, 33
DDT. See also indoor residual spraying (IRS), synthetic insecticides annual spraying in Palimé district, Togo, 111 political controversy over, 154

promise of inexpensive vector control, 69 use in British Guiana, 71 use in Freetown, 83 use in Kigezi pilot malaria eradication project, 84

use in Kipsigis reservc, Kenya in 1946, 73 use in Monrovia, 83 use in Ruanda-Urundi in 1949, 73

use in southern Africa, 85 used in urban settings to control malaria in final years of Second World War, 83

Africa, 65



# Index

213

vector resistance to, in Geniza-Managil project zone, 116 vector resistance to, in West Africa, 84 de Boer, H.S., 40 debt burdens of African states origins of, 99 deforestation impacts on mosquito habitat, 127 demographic transition, 119 dichloro-diphenyl-trichloroethane (DDT). See DDT dieldrin (DLD), 83, 84, 153 vector cross-resistance to, and HCH in West Africa, 84 vector resistance to, in Geniza-Managil project zone, 116 vector resistance to, in West Africa, 84 Dielmo, Senegal shifts in malaria burden to older age cohorts, 162 disease burden of malaria African perceptions of, in 1960s, 94 emergence of vivax, 3 in early epochs, 2 shift to older age cohorts, 162 DLD. See dieldrin (DLD) Dowling, M. A. C., 72 Duffy negativity and dominance of falciparum infections, 5 prevention of vivax infection, 3 spatial distribution of, 3 Duren, A., 59, 67 Dutton, J. E., 34

economic development and foreign investments, 146 Ehret, Christopher, 7 epidemiological crisis as a result of European conquest, 18 epidemiological integration and slave trades, 17 of world regions, 17 equilibrium analysis meta-paradigm of, 98 euquinine, 52

falciparum infections dominance of, owing to Duffy negativity, 5 early selection pressures, 6

imperfect cross-immunity to different genotypes, 9 medical sequelae, 5, 14 Fataki, Belgian Congo small malaria epidemic in 1933-1934, 51 Feacham, Richard, 146 fenitrothion, 111 Firestone Rubber Plantation in Liberia, 54 First African Malaria Conference (Kampala, 1950), 74-78 First International Conference on Primary Health Care (Alma Ata), 106 Fonds du Bien-Être Indigène, 73 food self-sufficiency as economic orthodoxy of the 1960s and 1970s, 115 Freetown, Sierra Leone early mosquito control in, 29 malaria control in 1917 and 1918, 36 mosquito control with larvicides, 54

Gambian Research Unit of the United Kingdom's Medical Research Council, 118 gamma-hexachlorocyclohexane (HCH). See HCH Garki Project, 111-112 Garnham, P. C. C., 52 Gezira-Managil irrigation projects malaria epidemic in 1990s, 135 malaria epidemic in mid-1970s, 116, 134 new bimodal pattern of malaria transmission, 116 Giemsa stain, 31 Giglioli, George, 71 Global Fund creation of, 144

Global Fund
creation of, 144
reduction of European Union
commitment to, 163
Global Malaria Control Strategy, 139
Global Malaria Eradication Program
success of, in Ceylon, 98

#### HCH

used in urban settings to control malaria in final years of Second World War, 83 vector cross-resistance to, and dieldrin (DLD) in West Africa, 84 vector resistance to, in Geniza-Managil project zone, 116



214 Index

health services continued development of, in rural Tanzania, 100 expenditures on, skewed toward urban Africa, 100 user fees for, 121 health transition declining death rates for children and adults, 119 HIV-1 infection, 138, 139 HIV-2 infection, 138 human immunodeficiency virus (HIV). See also HIV-1 infection, HIV-2 infection blood supplies tainted by, 130 Ifakara Research Center in Tanzania, 144 Ilaro, Nigeria, 77 Iliffe, John, 138 indoor residual spraying (IRS), 151-154 and, in Liberia, seasonal use of shelters that had no walls, 81 assumptions of anopheline endophagy, 151 begun in Monrovia in 1945 71 early experiences, 56 early programs in South Africa, Swaziland, Bechuanaland, and Mozambique, 72 economic rationale for, in rural Africa, 77 experimental program in Freetown launched in 1947, 72 four classes of insecticides used for, in contemporary campaign, 153 impacts in western Kenya, 151 in African settlements surrounding the port of Lourenço Marques, Mozambique, 77 in Palimé district, Togo, 111 small-scale project in Southern Rhodesia in 1945, 72 use of fenitrothion near Kisumu, Kenya, 111 insecticides. See synthetic insecticides insecticide-treated bed nets, 148, See also long-lasting insecticide-treated nets (LLINs) and the contemporary malaria elimination campaigns, 151 efficacy in controlled trials, 148 free distribution of, 149

integrated vector management (IVM)
programs, 152
intermittent preventive therapy (IPT), 137,
157–158
intermittent preventive therapy for infants
(IPTi), 158
intermittent preventive therapy for pregnant
women (IPTp), 157, 164
intermittent preventive therapy for young
children (IPTc), 158
International Centers for Excellence in
Malaria Research, 144
International Monetary Fund (IMF)
calls for structural reform of African
governments, 121
ITNs. See insecticide-treated bed nets

J.R. Geigy S.A., 73 Jali, Gambia high rates of parasitemia in, 109 James, S.P., 41

Kaduna, Nigeria negligible impact of larviciding in, 110 Kankiya, Nigeria malaria control program in, 111 kdr gene, 153 Kenya Medical Research Institute, 144 Kigezi, Uganda use of DDT in pilot malaria eradication project, 84 Kinshasa, Zaire malaria control program in, 113 Kipsigis reserve, Kenya use of DDT in, 73 Kisumu, Kenya malaria epidemic in 1926, 40 Kitéga, Ruanda-Urundi, 51 knockdown resistance (kdr) gene, 152 Koch, Robert antimalaria intervention in Kaiser-Wilhelms-Land, 26 antimalaria program in Dar es Salaam, 26 discovery of acquired immunity, 26 insights about asymptomatism, 25 Kpain, Liberia malaria epidemic, in aftermath of pilot malaria eradication project, 90

Lagos Ladies' League, 30 LAMCO Joint Venture, 110

length of functional life of, 150 political controversy over, 149

put to other purposes, 151



Index 215

Liverpool School of Tropical Medicine, 34 Londiani, Kenya malaria outbreaks in 1941-1944, 52 London School of Hygiene and Tropical Medicine, 81 London School of Tropical Medicine, 26 long-lasting insecticide-treated nets (LLINs), 150, See also insecticide-treated bed nets Lumbwa Reserve, Kenya malaria epidemic in 1928, 41 Luso-African communities long established presence in coastal towns of Angola and Mozambique, 36 MacDonald, George mathematical model of, 81 MacGregor, Governor Sir William, 34 MacGregor, Governor William, 30 Madagascar malaria epidemic in highlands, 132-134 program of IRS and larviciding on highland plateau, 73 malaria control and economic growth, 98 campaigns launched in Greece, Corsica, Venezuela, and Ceylon in immediate post-Second World War period, 69 demonstration project in Anécho district, Togo, 111 good propects for, in politically stable contexts, 164 impacts on worker productivity, 145 in Belgian Congo, 39 in Copperbelt of Northern Rhodesia, 42 in Kankiya, Nigeria, 111 in Katanga province, Belgian Congo, 42

in Kinshasa, 113

deposits, 38

contexts, 164

impact, 33

Coast, 33

tactical variants for, 114

in mining areas, 43

near Northern Rhodesian copper

poor prospects for, in politically unstable

railroad construction in Sekondi, Gold

suggestion to remove the seat of district

government from Kumasi, Gold

Coast, without consideration of malaria

Liverpool School of Tropical Diseases, 27, 28

vulnerability caused by intermittent, 43 malaria control-and-lapse, 132-136, See also malaria epidemics ethical dimensions, 92 ethical ramifications, 78 in British and French West African coastal towns in interwar period, 36 in Freetown in 1917 and 1918, 36 in Freetown, 1944-1945, 43 malaria epidemics. See also malaria control-and-lapse in Ceylon in 1935, 97 in Egypt in early 1940s, 70 in Freetown in late 1920s, 11 in Gezira-Managil irrigation scheme in 1970s, 134 in Gezira-Managil irrigation scheme in 1990s, 135 in highlands of Madagascar, 132-134 in highlands of western Uganda, 136 in Kisumu in 1926, 40 in Kpain, Liberia, in aftermath of pilot malaria eradication project, 90 in Kwa-Zulu-Natal in 1931–1932, 55 in lowlands of Madagascar as a result of weakening malaria control, 162-163 in Lumbwa Reserve in highland Kenya in 1928, 41 in Nairobi, Kenya in 1926, 40 in Ngozi territory, Ruanda-Urundi, in 1934-1935, 51 in northeastern Brazil, 70 in the Gezira-Managil projects in the Sudan, 116 near Yaoundé, Cameroun, in aftermath of a pilot malaria eradication project, 90 on São Tomé and Príncipe, following a malaria eradication project, 134 on sugar estates, 55 outbreaks at Londiani, Kenya in 1941-1944, 52 small outbreak at Fataki, Belgian Congo, in 1933-1934, 51 malaria eradication two premises of, 79 malaria experts contemporary, diverse backgrounds of, 144 contemporary, domains of expertise, 144 Malaria Immunology and Vaccine Research

(MIVR) program, 118, 141



216 Index

malaria mortality. See also childhood estimated to produce little severe illness, 11 malaria mortality, disease burden of lack of mortality estimates, 5 malarial infections estimate of, from untreated falciparum and early anthropogenic environmental infections, 5 transformations, 7 as an unavoidable cost of modernization, 53 estimate of, from vivax infections, 5 estimated annual, in Africa, 1 mixed, 11 for foreign nonimmunes during era of malariol, 83 Atlantic Slave Trade, 17 malathion, 116 in Nairobi, 1925–1938, 42 mass drug administration in tropical Africa, 1 at Garki Project, 112 lack of estimates of, from malariae or during era of pilot eradication projects, ovale infections, 5 86-88 Malaria Research and Training Center in in Italy, 85 Mali, 144 Mauritius malaria risk. See also intermittent preventive success in species eradication, 72 therapy (IPT) McGregor, Ian, 118 reduction of, for African children, 65-67 Medical Research Council of the United Kingdom, 141 malaria symptoms, 3, See also malaria Medicines for Malaria Venture, 158 infections, falciparum infections, malariae infections, ovale infections, microscopy vivax infections diagnostic limitations of, 32 malaria transmission migration African folk knowledge, 103 and encounters with new falciparum conditions created for, by establishment of strains, 51 European farms, 50 and malaria eradication projects, 93 intensity of, as a function of altitude, 9 from native reserves, 50, 51 intensity of, limited by low humidity, 9 of African laborers from Swaziland and reduction in Durban, South Africa, 37 several South African provinces, 55 reduction in East London, South Africa, 37 to urban areas, 107 seasonal patterns in early epochs, 2 Ministerial Malaria Conference (1992), 139 seasonality of, on Mount Meru decreased mixed cultural communities, 16 in length by malaria control measures, 50 Mobutu, Sese Seko, 120 malaria transmission intensity Mombasa and acquired immunity, 14 mosquito control in, 39 and ecological behaviors of different Monrovia, Liberia anopheline species, 9 indoor residual spraying in, 71 increased by labor movements from native mosquito behaviors, 82-83 reserves, 50 belief in endophagy of An. gambiae and remarkable declines in, owing to IVM An. funestus, 82 programs, 152 confidence in endophily of An. gambiae malaria vaccine and An. funestus, 82 early efforts to develop, 117-118 mosquito control early prospects for, assayed in West new approaches, 140-142 protective, using circumsporozoite protein Africa, 34 (CSP), 141 early, in Freetown, 29 transmission-blocking, 141 few investments in rural Africa, 100 trials, 159-161 in Freetown with larvicides, 55 Malaria Vaccine Development Program, 141 in Mombasa, 40 malariae infections mission to Conakry, Guinea, 35 epidemic in Freetown, 11 on Firestone holdings, 54



### Index

217

mosquito habitat parasite rates, 31 at Bathurst, 34 parasite resistance. See also artemisinin, created by public works projects, 39 chloroquine, pyrimethamine, impacts of deforestation on, 127 sulfadoxine-pyrimethamine in compounds, 35 to artemisinin, 157 in Cross River region, 28 to chloroquine, 128–132 in Duketown, Southern Nigeria, 28 to pyrimethamine, 95 in Lagos, Southern Nigeria, 27 to sulfadoxine-pyrimethamine (SP), 130 Pare-Taveta, Tanzania/Kenya in Old Calabar, Southern Nigeria, 28 re-establishment of malaria source reduction of, 42 mosquito netting and curtains, 22, See also transmission, 90 insecticide-treated bed nets, long-lasting use of synthetic insecticides at, 85 insecticide-treated nets (LLINs) Paris Green, 42, 71, 83 mosquito nuisance control. See also Park Ross, G. A., 55 Patarroyo, M. E., 140 insecticide-treated bed nets, long-lasting insecticide-treated nets (LLINs) perceptions of malaria efficacy of, 47 early European colonial, 22 fumigants, 46 plasmochin use of smoky fire, 46 administered to African workers in using "mosquito huts", 47 Liberia, 54, 86 using nets made from cotton cloth and experimental treatments, 57 raffian palm fronds, 47 malaria elimination mosquito repellents political commitments to, by African states, 164 made from African plants, 130 sheep's fat and red ochre, 47 political violence mosquito traps, 46 zones of, in late-nineteenth-century, 19 Mugabe, Robert, 121 zones of, since 1980, 125-126 population growth and ecological change, 127 Nairobi, Kenya malaria epidemic in 1926, 40 and rural expansion, 127 nationalist independence movements and rural-urban migration, 127 of the 1950s and 1960s, 96–97 President's Malaria Initiative, 144 native reserves. See also migration Primary Health Care (PHC), 105-107 creation of, 49 neem tree (Azadirachta indica) mosquito resistance to, 150, 153 antimalarial products of, 131 only approved class of insecticides for introduction into tropical Africa, 48 continuous human exposure, 150 Ngozi territory (Ruanda-Urundi) malaria epidemic in 1934-1935, 51 as active ingredient in chrysanthemum Nyerere, Julius, 121 extracts, 48 first major use of, as sprayed insecticide, 55 ovale infections pyrimethamine lack of mortality estimates, 5 parasite resistance to, 95 ozonide, 158 perceived benefits compared to quinine, 86 paddies paradox, 128 quinine pamaquine, 52 access to treatment in urban areas, 42 Pan-African Health Conference (1935), 56 action of, on parasite life stages, 24 and blackwater fever, 24 parasite mosaics domination of, by Plasmodium and concern about loss of acquired falciparum, 10 immunity, 60 mixing of, 10 and transformation of parasite mosaics, 60



Index

218

quinine (cont.) Belgian public health propaganda for prophylaxis in colonies, 25 colonial concerns about quantity required for treatment of Africans, 61 differential effectiveness against malariae infections demonstrated at Stanleyville, Belgian Congo, 59 early experiments with, as therapy for school-age children in Gold Coast, 57 free dispensation in Elisabethville, Belgian Congo, 38 free dispensation in Katanga province, Belgian Congo, 38 in short supply in immediate postwar period, 67 irregular doses cut infant mortality rates in Belgian Congo, 59 made available in Gold Coast through Post Offices, 58 made available in Nigeria through Post Offices, 58 massive use of, to suppress epidemic malaria in Ruanda-Urundi, 51 reserved for whites in South Africa, except in the event of epidemic, 56 unpleasant side effects, 24 use by French military in Dakar, 25 varying access for Africans to, in the Uganda Protectorate, Sierra Leone, and Nyasaland, 58

rapid diagnostic tests, 165 Reagan, Ronald, 121 residential segregation a policy judged to serve public health, 29 advocated by S. R. Christophers and J. W. W. Stephens, 27 and interracial or closely adjoining racial neighborhoods, 30 Christophers and Stephens' views echoed by Liverpool research team, 28 difficulties in implementation, 30 in Belgian Congo, 39 in Freetown, 30 non-adoption in Portuguese colonies, 36 plans for, in Accra, 31 plans for, in Sekondi, 31 rinderpest, 18 Rockefeller Foundation, 69

Roll Back Malaria program (RBM) launched in 1998, 140 problems with roll-out, 140 unrealistic near-term goal of, 166 Ross, Ronald, 27, 28, 30 RTS,S vaccine, 142, 160–161 Ruanda-Urundi early DDT use in, 73 sand flea (*Tunga penetrans*), 18 sanitary boards, 34 São Tomé and Príncipe

malaria epidemic on, following a malaria eradication project, 134
Scramble for Africa, 19
sickle-cell
heterozygous protected from severe malaria, 6
homozygous generally do not live to age of sexual maturity, 6
sisal estates

establishment of malarious conditions on, 53 Soper, Fred L., 70 source reduction of mosquito habitat, 42

South African Land Act of 1913, 55 Southern Rhodesia malaria on European farms, 52 small-scale IRS program began in

1945, 72 species eradication failed effort at, on Sardinia, 69 in Brazil, 70 in Egypt, 70 on Mauritius, 72

spleen palpation
diagnostic limitations of, 32
spleen rates, 31
Stephens, J. W. W., 26, 27, 29
Stratham, J. C. B., 32
structural reforms of African governments
required by the IMF, 121
sulfadoxine-pyrimethamine (SP)

continued use of, after emergence of parasite resistance, 155 parasite resistance to, 130 switch from chloroquine to, in Malawi, 130 Swiss Tropical Institute, 141

Symes, C.B., 53



#### Index

synthetic insecticides
first large-scale use, 71
mixed record of, 83–85
paradigm shift toward control of adult
mosquitoes, 77
transfer to tropical Africa, 71–74
unpredictable interaction with house
materials, 81
vector resistance to, in Gezira-Managil
project zone, 116
vector resistance to, in malaria control and
eradication projects of the 1950s and
1960s, 95
vector resistance to, in West Africa, 84
vector resistance to, in Zambia, 153

Taylor, M. Logan, 34 thalassemias, 6, See also sickleell Thomson, J. G., 63 Trape, Jean-François, 161 tuberculosis (TB) and HIV/AIDS, 143, 158

United Nations Children's Fund
(UNICEF), 79
urbanization
fewer malarial infections in urban areas,
109
health impacts of, 108
US Agency for International Development
(USAID)
Africa Child Survival Initiative –
Combating Childhood Communicable
Diseases (CCCD), 124

assessment of mosquito control in
Kaduna, 110
child survival initiative, 137
Manual on Malaria Control in Primary
Health Care in Africa, 124
US Centers for Disease Control, Malaria
Program, 113

user fees for health services, 123

vaccine. See malaria vaccine
Vaucel, Dr., 67
vector competence, 33
vector resistance. See synthetic insecticides
vivax infections
rare in tropical Africa, owing to Duffy
negativity, 3

219

Watson, Malcolm, 37
white man's grave, 17
WHO 1957 technical meeting in
Brazzaville, 85
Wilson, D. Bagster, 66
Wilson, D. Bruce, 70
World Bank
advocacy for institutionalization of
market model of health care, 123
advocacy for user fees for health
services, 121
calls for structural reforms of African
governments, 121
World Health Assembly, 79, 106

Yaoundé, Cameroun
malaria epidemic, in aftermath
of pilot malaria eradication
project, 90
pilot malaria eradication program
in, 79
Yekepa, Liberia
malaria control program in 1960s, 110
yellow fever laboratories, 32

Zahar, A. R., 111
Zambia
vector resistance to pyrethroids and
DDT, 153
Zanzibar, 60, 61