

WHO treatment guidelines for multidrug- and rifampicin-resistant tuberculosis, 2018 update

Biographies of experts proposed for the Guideline Development Group

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The list of experts participating in the development of the guidelines, a summary of relevant interests disclosed by these experts, and any appropriate mitigation measures taken by WHO relating to the management of potential conflict of interests, will be reported as part of the published guidelines.

To comment on the experts mentioned in this document please email ldr.policies@who.int by **29 June 2018**.

ABADIANO MARIANO, Eden

Institutional affiliation: Samahan ng Lusog Baga Association Inc (patient representative)

Academic degrees: BSc (Chemical Engineering)

City and country of primary residence: Pampanga, Philippines

Brief biography:

Eden Abadiano Mariano was diagnosed with multidrug-resistant TB in the Philippines in 2012 and successfully treated for 18 months. Eden has contributed to several activities and campaigns in recent years, relating to this experience as a patient, advocating on stigma and patient rights. Eden has been a member of the patient support group Samahan ng Lusog Baga Association Inc since 2016 and is currently its president.

ABDEL-RAHMAN, Susan

Institutional affiliation: Division of Clinical Pharmacology, Medical Toxicology and Therapeutic Innovation, Children's Mercy Hospital, USA

Academic degrees: BSc (Pharm.), Pharm. D

City and country of primary residence: Kansas, USA

Brief biography:

Dr Abdel-Rahman is a professor of paediatrics at the University of Missouri and Chief of the Section of Therapeutic Innovation at the Children's Mercy Hospital in Kansas City. She also directs the Fungal Genomics laboratory and the PK/PD core laboratory at the same hospital. She has authored numerous publications, particularly on the paediatric PK/PD of antifungals and other antimicrobials, including anti-tuberculous medicines. In 2016 she reviewed the evidence on the use of delamanid supplementing MDR-TB treatment regimens in children aged 6 years and above in preparation for the Guideline Development Group that developed the WHO interim policy on the use of delamanid in children and adolescents.

CHADHA, Sarabjit S

Institutional affiliation: The International Union Against TB and Lung Disease (The Union)

Academic degrees: MBBS, MD

City and country of primary residence: New Delhi, India

Brief biography:

Dr Chadha is a clinician with over 15 years' experience of treating TB (including drug resistant TB) and public health. He currently works as the Deputy Regional Director with the UNION heading the TB and Communicable Diseases Unit at the Union South East Office. He previously worked with the WHO India country office (2006-2010) as focal point for drug-resistant TB providing technical assistance to the national TB programme of India. He has coordinated the development of the PMDT guidelines and the scale up of the PMDT services in India. He is a member of the WHO Regional Drug-Resistant TB Advisory Committee (regional GLC) for the South East Asian Region (SEAR) since 2012 and since 2016 the Chair of the Committee. Dr Chadha has provided technical assistance on PMDT to several countries in the S-E Asia Region, including Bangladesh, Bhutan, Indonesia, India, Nepal, Sri Lanka and Timor Leste.

CIRILLO, Daniela Maria

Institutional affiliation: WHO collaborating Centre and TB Supranational Reference laboratory

Academic degrees: Medical Degree

City and country of primary residence: Milano, ITALY

Brief biography:

Daniela Maria Cirillo is a board certified clinical microbiologist, Head of the Emerging Bacterial Pathogens Unit at the San Raffaele Scientific Institute (HSR) in Milan, Italy and Director of the WHO SRL and Collaborating Centre ITA98. The main fields of interest are: research on new diagnostic for MDR/XDR-TB, *M.tuberculosis* pathogenesis, virulence markers, host pathogens interaction, NTMs and nosocomial pathogens. She and her collaborators provide technical support to the following countries: Mozambique, Burkina Faso, Kosovo, Albania, Bulgaria, Turkey, Nigeria, Côte d'Ivoire, Zanzibar and TFYR of Macedonia. She has conducted project evaluations and national program reviews in Nigeria, Mozambique, Bulgaria and Turkey. International appointments: Co-Chair of the New Diagnostic Working Group of the Stop TB partnership, Core Group elected member of the Global Drug Resistance Initiative (GDI) of the Stop TB partnership-WHO, member of Global Laboratory Initiative, member of the Scientific and Technical Advisory Board (STAG) of the WHO Global TB department, member of the Core Group of the ERLN-TB and member of the CRYPTIC consortium coordinated by Oxford University. She was the coordinator of two FP7 projects approved by the EU aimed at development of new diagnostic tools and at the development of a European network for study and clinical management of TB drug resistance. She is currently involved in the Global Molecular Surveillance project coordinated by WHO.

DAVIES, Geraint (Gerry) Rhys

Institutional affiliation: University of Liverpool, United Kingdom

Academic degrees: BM, MSc, PhD, DTM&H, FRCP

City and country of primary residence: Liverpool, United Kingdom

Brief biography:

Gerry Davies is Professor of Infection Pharmacology and Honorary Consultant in Infectious Diseases at the University of Liverpool. He ran the TB programme at Hlabisa hospital, Kwazulu/Natal, South Africa from 1994-1998, later obtaining an MSc in Epidemiology from the London School of Hygiene and a PhD in Pharmacology from the University of Liverpool. From 2007-2009, he was based at the Mahidol-Oxford Research Unit in Bangkok where he worked on clinical PK-PD studies of anti-tuberculosis drugs and subsequently as theme leader in HIV-TB pharmacology at the Malawi-Liverpool-Wellcome Unit in Blantyre, Malawi (2012-2014). He is an editor for the Cochrane Infectious Diseases Group, specialising in tuberculosis, and has extensive experience of Phase II and III clinical trials in tuberculosis in differing roles. He was the academic co-ordinator of PreDiCT-TB, an Innovative Medicines Initiative supported consortium addressing preclinical development of combination regimens for tuberculosis and since 2012 has participated in the WHO Taskforces for the development of new policies for the treatment of tuberculosis and pharmacokinetics and pharmacodynamics of tuberculosis drugs.

FOURIE, Bernard

Institutional affiliation: Department of Medical Microbiology, University of Pretoria, S. Africa

Academic degrees: PhD

City and country of primary residence: Pretoria, S. Africa

Brief biography:

Dr Fourie is a Research Professor (Extraordinary) at the University of Pretoria, South Africa. His background is almost entirely in the field of medical science, especially in TB research. He led the internal national TB research efforts of the South African Medical Research Council as Director for 12 years, following 18 years as a research scientist at the MRC. His work involved the mapping of risk of TB infection and prevalence of disease in South Africa in 1974-1986 based on random sampling strategies, MDR-TB reference surveys between 1995 and 2002,

several clinical trials that were instrumental in defining the use of rifabutin, rifapentine, moxifloxacin and gatifloxacin in TB regimens, and defining the composition and quality assurance procedures for the first adult 4-drug and paediatric 3-drug fixed-dose combinations for TB. His current research work is focused on rapid, robust, low-cost molecular diagnostics for TB, in particular collection-to-detection systems that include improvement of specimen sampling techniques for increased molecular yield using contemporary new TB diagnostics. He is also engaged in studies to assess BCG vaccination by the pulmonary route as a means of preventing infection, and of clofazimine as an inhaled therapeutic. Early stage investigations are underway to explore host-directed therapeutics for enhanced clearance of infection from TB-HIV patients. Dr Fourie is a member of the Proposal Review Committee of Unitaid and has participated in Guideline Development Groups which produced the recent WHO treatment policies for bedaquiline and delamanid. He is a member of the WHO Task force for PK/PD of TB Medicines.

HERRERA-FLORES, Edwin

Institutional affiliation: Hospital Nacional Arzobispo Loayza, Lima, Peru

Academic degrees: Medical degree, Master in Epidemiology, Specialization in pulmonology

City and country of primary residence: Lima, Peru

Brief biography:

Dr Herrera is a consultant pulmonologist since 2009 and works in a major MDR-TB referral centre in Lima, the capital of Peru. This centre now has experience in the use of bedaquiline and delamanid as part of longer regimens to treat MDR-TB in conformity with WHO guidelines. In the last six years Dr Herrera has participated actively in many national, regional and international conferences on pulmonology and delivered presentations about drug-resistant TB and TB sequelae. Apart from MDR-TB, his professional interests also include non-tuberculous mycobacteria and sleep disorders.

HIRAI, Ayuko

Institutional affiliation: Médecins sans Frontières (France), Papua New Guinea

Academic degrees: Medical degree, Diploma in tropical medicine

City and country of primary residence: Papua New Guinea

Brief biography:

Dr Hirai is a medical doctor from Japan. She worked as a respiratory physician and in other specialties in clinics and hospitals in his home country, as well as First Secretary and Attaché medical of the Embassy of Japan in Benin. In 2011 Dr Hirai started working with MSF: in Georgia, Madagascar and, since June 2016, in PNG. In PNG Dr Hirai was first project medical referent for the TB project in the National Capital District (NCD), and since March 2017 she is medical coordinator for PNG, with responsibilities for the TB projects in NCD and Gulf.

KAY, Alexander

Institutional affiliation: Baylor Global TB Program, Swaziland

Academic degrees: BA (Hist), MD, US Board certifications: internal medicine, paediatrics, paediatric infectious diseases

City and country of primary residence: Mbabane, Swaziland

Brief biography:

Since 2016 Dr Kay is Assistant Professor of Paediatrics at Baylor College of Medicine, USA and Associate Director of the Baylor Global TB Program in Swaziland. Apart from board certification in internal medicine and paediatrics he also has a certificate from the American Society of Tropical Medicine and Hygiene. Before his current appointment he also worked as a medical officer in TB control at the California Dept of Health, and as a paediatrician in the USA as well as in an AIDS programme in Lesotho. He is currently principal investigator on studies in the use of stool PCR for diagnosis of paediatric TB and of drug-resistant TB infection. He is first author on several publications on TB. In 2013 he contributed to the systematic reviews (using GRADE) for

the update of the WHO evidence-based consolidated guidelines on use of antiretroviral agents to prevent and treat HIV infection.

LANIADO-LABORIN, Rafael

Institutional affiliation: TB Clinic and Laboratory, Tijuana General Hospital & School of Medicine, Universidad Autónoma de Baja California, Mexico

Academic degrees: MD (Pulmonary Medicine), Master in Public Health (MPH)

City and country of primary residence: Tijuana, Mexico

Brief biography:

Dr Laniado-Laborin graduated from medical school in 1975, and completed a residency in pulmonary medicine in 1980. He holds a MPH from San Diego State University, USA (1990). He has been in charge of the TB Clinic at Tijuana General Hospital since 1984 and in charge of the Drug-Resistant Tuberculosis Clinic since 2006. He is a member of the Mexican National Drug-Resistant TB Committee. He is currently Chair of the regional Green Light Committee for the Americas. He is dedicated full time to clinical research in TB diagnosis and treatment and academic medicine. He has authored two books on MDR-TB and a list of the peer-reviewed publications on TB in which he has been involved can be accessed at: <https://www.ncbi.nlm.nih.gov/pubmed/?term=laniado-laborin+r>.

MAARTENS, Gary

Institutional affiliation: Division of Clinical Pharmacology, University of Cape Town, South Africa

Academic degrees: MBChB, MMed

City and country of primary residence: Cape Town, South Africa

Brief biography:

Prof Gary Maartens is head of the Division of Clinical Pharmacology at the University of Cape Town and a chief specialist physician at Groote Schuur hospital, where he does clinical service in internal medicine and infectious diseases. His main research interests are therapeutic aspects of HIV-associated tuberculosis, drug-resistant tuberculosis, and antiretroviral therapy in resource-limited settings. He serves on the Tuberculosis Transformative Science Group of the AIDS Clinical Trials Group, NIAID.

MBUAGBAW, Lawrence

Institutional affiliation: Department of Health Research Methods, Evidence and Impact, McMaster University, Canada

Academic degrees: MD, MPH, PhD, FRSPH

City and country of primary residence: Hamilton, Canada

Brief biography:

Dr Mbuagbaw is a public health physician with a doctorate in health research methodology and over ten years of working experience as a researcher in health technologies, HIV, mother and child health and health systems. He works as an Assistant Professor in Clinical Epidemiology and Biostatistics at McMaster University and a research methods consultant at the Biostatistics Unit of St Joseph's Health Care in Hamilton. He is the principal investigator of a number of research projects covering a wide variety of research designs including randomized trials, mixed methods studies and qualitative studies. He has authored over 100 peer-reviewed publications, including HIV, TB and eHealth. He has done consultancy work in the past for WHO, PAHO, LMC Diabetes and the Bill and Melinda Gates Foundation. He sits on the steering committees of the Guidelines International Network (G-I-N) Africa and Cochrane African Network, leading and supporting capacity building and knowledge translation in evidence based healthcare on the African continent.

NAHID, Payam

Institutional affiliation: School of Medicine, University of California, San Francisco, USA

Academic degrees: MD, MPH

City and country of primary residence: San Francisco, United States of America

Brief biography:

Professor Nahid trained in internal medicine, pulmonary medicine, critical care and epidemiology. He has led US CDC-sponsored TB Trials Consortium-conducted clinical trials in tuberculosis therapeutics. He is protocol co-Chair of an ongoing Phase 3 clinical trial of rifapentine-based short-course treatment regimens for active tuberculosis. He is co-PI of the CDC-sponsored TB Trials Consortium clinical trial site in Hanoi, Viet Nam, in partnership with the Viet Nam National TB Programme. He is co-PI of NIH-funded research programs focused on the discovery and qualification of host and pathogen-specific tuberculosis biomarkers of treatment effect. Dr. Nahid is co-Chair for the GRADE-based practice guidelines for drug-susceptible and drug-resistant tuberculosis, sponsored by the ATS, CDC, IDSA and ERS. He is an appointed member of the WHO Task Force for New Drug Policy Development and has served on other WHO expert panels on TB. Clinically, Dr. Nahid attends in the Chest and TB Clinics at Zuckerberg San Francisco General Hospital, where he also attends on the inpatient pulmonary service, the medical intensive care unit, and provides clinical TB consultation as part of the CDC-funded Curry International Tuberculosis Center at UCSF (<http://www.currytbcenter.ucsf.edu>).

OBIEFUNA, Austin Arinze

Institutional affiliation: Afro Global Alliance (Civil Society)

Academic degrees: Bachelors in Business Admin, Masters in Governance and Leadership, Bachelor of Law

City and country of primary residence: Ghana, Africa

Brief biography:

Mr Obiefuna is a law graduate from Nigeria. He has worked with Afro Global Alliance – of which he is executive director – since 2003 and has work experience in several African countries in the west, central, eastern and southern parts of the continent. Activities include advising governments, CSOs and other partners on public health communication, design and implementation of support programmes in public health behavioural change and building partnerships. He has also served in other capacities, amongst which, member and vice-chair of the Global Fund Country Coordinating Mechanism in Ghana, member of the Ghana National TB Advisory Board, National Coordinator of the Stop TB Partnership Ghana (2005-2012) and since 2013 a member of the Executive Board and Executive Committee of the Stop TB Partnership, Geneva. Since 2015 he served as a board member of the UNION and also secretary general of the UNION Africa Region (Tuberculosis). In 2008 he was awarded the Karel Styblo public health prize by the UNION. Since 2016 Mr Obiefuna is a member of the AFRO regional Green Light Committee. He has published about the role of NGOs in combating TB and the topic of his Master's thesis was "Globalization and its impact on TB control in Ghana".

POPA, Cristina Marcela

Institutional affiliation: Institute of Pneumophthisiology « Marius Nasta », Bucharest, Romania

Academic degrees: Medical degree, Specialty in pulmonary diseases

City and country of primary residence: Bucharest, Romania

Brief biography:

Dr Popa is a clinician in the MDR-TB Department of the Romanian national TB programme's TB institute in the capital. This is one of the main specialist centres for MDR-TB treatment in the country and Dr Popa has been involved in the treatment of about 1,500 MDR-TB patients. For over 15 years she has worked in pulmonology and has also served as a TB trainer. She also participated in the European-wide studies of TB treatment. Dr Popa has completed several

training courses on various aspects of TB and lung health, including MDR-TB and infection control.

REECHAIPICHITKUL, Wipa

Institutional affiliation: Division of Pulmonary and Critical Care Medicine, Department of Medicine, Faculty of Medicine, University of Khon Kaen, Khon Kaen, Thailand

Academic degrees: Medical degree (Honor), Diploma in Internal Medicine, Diploma in Pulmonary and Critical Care Medicine, Diploma in Critical Care, Diploma in Research Methodology and Biostatistics

City and country of primary residence: Khon Kaen, Thailand

Brief biography:

Professor Wipa Reechaipichitkul is a member of Expert Committee for Drug-resistant tuberculosis management and control, Bureau of Tuberculosis, Department of Disease Control, Ministry of Public Health, Thailand. She is also a Head of Pulmonary Unit, Khon Kaen University, Khon Kaen, Thailand. Her former position was Assistant Dean for Research Affair, Faculty of Medicine, and Deputy Director of Service and Research for Academic Clinical Research Office (ACRO), Khon Kaen University. She graduated with a Diploma in Internal Medicine and Pulmonary and Critical Care Medicine from Ramathibodi Hospital Medical School, Faculty of Medicine, Mahidol University, Bangkok, Thailand. She has been working as a teaching staff since 1997 at Division of Pulmonary and Critical Care Medicine, Department of Medicine, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand. Her research interests include tuberculosis and pneumonia. She had 61 research papers and 131 articles published in international and national journals. She was a local scientific committee of 21st Congress of Asian Pacific Society of Respiriology (APSR), Bangkok, Thailand; 12-15 November 2016. She was a Co-Chairperson for Respiratory infections symposium and also Co-Chairperson for Oral presentation on Respiratory infections in APSR 2008 and 2016. She was invited to develop the guidelines for DR-TB, MDR-TB, Pre-XDR-TB and XDR-TB management in Thailand since January 2013. She was an editor in chief of the book: Guideline for Programmatic Management of Drug-Resistant Tuberculosis, which launched by Ministry of Public Health, Thailand in 2015. She was appointed to be a committee to implement shorter course regimen for MDR-TB program in Thailand in 2017. In 2017 she was a member of the Guideline Development Group for the WHO guidelines for the treatment of isoniazid-resistant TB.

RODRIGUEZ DE DOMINGUEZ, Maria

Institutional affiliation: National TB Programme, Dominican Republic

Academic degrees:

City and country of primary residence: Dominican Republic

Brief biography:

Dr Rodriguez is a pulmonologist and started collaborating with the National TB Programme (NTP) of her country in 1992. From 2004 to 2014 she supported the NTP in the programmatic management of MDR-TB. She currently works as the coordinator of the Technical Unit of MDR in Dominican Republic. Dr. Rodriguez has also participated as a facilitator in several drug-resistant TB courses implemented by the International Union against TB and Lung Diseases in the region of The Americas. As an international consultant, she is a member of the regional Green Light Committee (rGLC) of PAHO/WHO and has taken part in several country missions to review the programmatic management of drug-resistant TB. During 2015-2016 she was as a member of the Guideline Development Group for the WHO Treatment Guidelines for drug-resistant tuberculosis - 2016 update and the Ethics Guidance for the Implementation of the End TB Strategy.

SCHÜNEMANN, Holger

Institutional affiliation: Department of Health Research Methods, Evidence, and Impact and of Medicine, McGRADE Centre, McMaster University Health Sciences Centre

Academic degrees: MD, PhD, MSc, FRCP(C)

City and country of primary residence: Hamilton, Canada

Brief biography:

Dr Schünemann is chair of the Department of Health Research Methods, Evidence, and Impact (formerly *Clinical Epidemiology and Biostatistics*) at McMaster University, widely considered the birthplace of evidence-based medicine. He trained in internal medicine, epidemiology, preventive medicine and public health. Having contributed to over 400 peer-reviewed publications (across a broad area of health care questions) he is co-chair of the GRADE working group, co-director of the WHO collaborating centre for evidence informed policy-making, a member of the Board of Trustees of the Guideline International Network, the Cochrane Collaboration Steering Group, and several other committees. He led or participated in numerous high profile guideline panels, including at the WHO, the American College of Physicians, the World Allergy Organization and he was a key contributor to the revised methods for WHO guideline development beginning in 2006. His work also focuses on practical application of his work by researchers and clinicians through contributions to the guideline development tool (www.gradepro.org) and other online resources. Maintaining an active clinical practice fulfils his passion for patient care and ensures his research is people-oriented.

SHABANGU Adman Skirry

Institutional affiliation: National TB Control Program (NTCP), Ministry of Health, Swaziland

Academic degrees: Diploma in Nursing, Diploma in Midwifery, Medical Degree

City and country of primary residence: Manzini, Swaziland

Brief biography:

Dr Shabangu qualified as a nurse and medical doctor and is currently pursuing a course leading to a Master in Business Administration. He has served in different capacities in various health facilities in his native Swaziland. Since 2015 he has worked as a senior medical officer at the National TB referral hospital and is currently head of the hospital, with management responsibilities for drug-resistant TB. In recent years he has led the revision and implementation of the national DR-TB guidance, including the use of new TB medicines. He has also acted as an expert adviser in DR-TB care in the decentralized sites of Swaziland. He is a member of several national committees, including the National TB technical working group; PMDT technical expert review committee; Swaziland Medical and Dental council and the essential drug review committee of which he is Chairperson.

TAHSEEN, Sabira

Institutional affiliation: National TB Programme (NTP), Islamabad, Pakistan

Academic degrees: MBBS, Diploma in Clinical Pathology

City and country of primary residence: Islamabad, Pakistan

Brief biography:

Since 2011, Dr Sabira Tahseen has been the Technical Advisor on TB laboratories for the Ministry of Health, based at the National TB Reference Laboratory (NRL) of Pakistan's NTP. Her main responsibilities in the current position are to oversee all functions of NRL, to contribute in policy guidance, and to provide technical assistance to strengthen TB laboratory diagnostic services (sputum smear microscopy, culture, DST, and rapid molecular tests) in the country. Additional responsibilities include the development of national guidelines and other normative documents for the implementation, monitoring and evaluation of TB laboratory activities. Before occupying this position Dr Tahseen worked as a programme officer and laboratory coordinator at the NTP and as a pathologist. In recent years she has been an active member of the Global Laboratory Initiative (GLI) and the Regional Green Light Committee (rGLC) for the Eastern Mediterranean Region. Dr Tahseen has acted as temporary adviser, training facilitator

and expert in a number of WHO activities (monitoring missions, training of trainer workshops) for many years.

TUDOR, Carrie

Institutional affiliation: International Council of Nurses

Academic degrees: BA, BSN, MPH, PhD

City and country of primary residence: Durban, S. Africa

Brief biography:

Ms Tudor is a registered nurse who has worked with the International Council of Nurses since 2014, being its TB Project Director in S Africa since January 2015. Before that she worked as research coordinator and trainer in China, Lesotho, the Philippines, S Africa and USA. Between 2001 and 2004 she worked with WHO on expanded programme for immunization in India and Myanmar. She has been on the Guideline Development Groups that produced the WHO interim policy on the use of delamanid in children and adolescents and the guidelines for the treatment of drug-susceptible TB and patient care. Ms Tudor is co-author of several articles dealing with TB, patient-centred care, occupational health, infection control and nursing amongst others. Since 2017 she is Associate Editor of the International Journal of Tuberculosis and Lung Disease.

UDWADIA, Zarir F

Institutional affiliation: Hinduja Hospital, Breach Candy Hospital and Parsee General Hospitals, Mumbai, India

Academic degrees: MD, DNB, FRCP (London.), FCCP (USA)

City and country of primary residence: Mumbai, India

Brief biography:

Dr Udhwadia is a consultant chest physician in both hospital and outpatient clinics in Mumbai, India, with a special interest in drug-resistant tuberculosis. Apart from tuberculosis and MDR-TB, he takes part in collaborative research on interstitial lung disease, pneumonia, sleep disorders and sarcoidosis. Dr Udhwadia has participated in several professional meetings in the past, including the UNION and European Respiratory Society. He has over 140 PubMed indexed publications and was the sectional editor for Thorax on tuberculosis. He has also contributed with chapters in tuberculosis textbooks. His book on "Principles of Respiratory Medicine" has just been published. Dr Udhwadia was a member of the Guideline Development Group that produced the fourth edition of the WHO TB treatment guidelines in 2010.

VERNON, Andrew Anthony

Institutional affiliation: Division of TB Elimination, National Center for HIV, Viral Hepatitis, STD and TB Prevention, Centers for Disease Control & Prevention (CDC), USA

Academic degrees: AB, MD, MHS Epidemiology, Board certification in internal medicine and infectious diseases

City and country of primary residence: Atlanta, USA

Brief biography:

Since 2004 Dr Vernon has been Chief of the Clinical Research Branch of the US CDC's Division of TB Elimination. He heads a clinical research group at US CDC (TBTC) doing TB trials. In the past Dr Vernon worked in other capacities at CDC, as Associate Director for Science in the National Center for HIV, STD and TB Prevention and Medical Epidemiologist. Between 1987 and 1989 he was Field Epidemiologist for the International Health Program Office of CDC based in Kinshasa, DR Congo. Before that he served as a physician, infectious disease specialist and epidemiologist at a number of institutions in the US, including Harvard and Johns Hopkins Universities. Dr Vernon has served on WHO expert panels to update the TB treatment guidelines (2009), and on the use of delamanid (2017) and the shorter MDR-TB regimen (2018), as well as a special consultation on TB HAART Study (2011). Between 2012 and 2018 he was a member of the WHO task force on policy for new TB drugs. Between 2013 and 2016 Dr Vernon was committee

member and co-chair of the drug-susceptible TB treatment guidelines revision for CDC/ATS. He has published extensively on tuberculosis, HIV/AIDS and other health risks.