

Sexually Transmitted Infections

Advances in Understanding
and Management

Antonio Cristaudo
Massimo Giuliani
Editors

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Preface

The decision today to edit a handbook on Sexually Transmitted Infection (STI) is a difficult one, mainly due to the complexity of this field and to the growing challenges arising from this wide spectrum of infections for clinicians, researchers, and public health authorities after the year 2000.

STIs remain a global health priority because of their dramatic impact on women and infants and their well-documented biological and epidemiological inter-relationships with HIV infection. The health complications which arise from STIs represent relevant causes of morbidity and mortality for a large part of the planet's population and a main source of spending health financial resources in high-income countries. WHO and UNAIDS have estimated that nearly one million people become infected every day with a bacterial STI and that about 750 million people live with a viral STI such as HIV, HSV, or HPV infection.

Clearly, STIs disproportionately affect low-income and middle-income countries, but since 2000 there has been a disturbing resurgence in Western countries with higher incidence rates in most vulnerable groups, coupled with declining susceptibility or outright resistance of some STI pathogens to large-use antimicrobial agents.

Despite their high global impact, STIs remain a neglected field for clinical and public health practice and for research, and many issues are still incomplete, with several questions unanswered, particularly in the area of basic research and of the behavioral key drivers.

For all these reasons, even though other comprehensive texts and e-publications about STI have already been accessed by many specialists in this field, we have accepted the challenge to design a handbook which focuses on some of the high-priority contents that now concern the STI field. This approach has forced us to make specific choices for building a text based on some selected issues concerning the modern STIs, such as; the novel epidemiology, the challenges of prevention and of basic research and the new clinical aspects for many of the infections.

Thus, the book cannot be considered a typical STI handbook because it is not a complete guide regarding STI, but a streamlined text that tries to enhance knowledge about some selected contents which are proving to be the most decisive for modern STI control.

Naturally, we could not have done all this by ourselves and without the close cooperation of a panel of international experts who agreed with us to take on this challenge. We are honored and proud to have received their pre-

cious dedication. We would like to express our gratitude for their efforts, support for our ideas about the framework of the opera, and the sacrifice of their valuable time. Additional thanks go to the contributors who have enriched the texts with graphics, tables, and algorithms and donated color photographs to improve the didactic value of the texts.

We would like also to thank the Editorial Team at Springer Medical Editions for their assistance and support in the finalization of the different chapters and for the autonomy of decision they granted us as Editors concerning the contents, form, and collaborations. In particular, our special thanks go to Dr. Juliette Kleemann for her trust, her assistance, and precious advice and to Beauty Christobel Gunasekaran who provided support in all the phases of collection, revision, and management of the published materials.

We hope, together with all the contributors, that we have produced a useful text for all those who today are engaged or interested in the study of modern “Venereology.”

Happy reading to all!

Rome, Italy

Antonio Cristaudo
Massimo Giuliani

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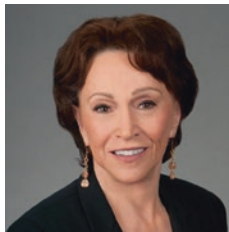
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About the Authors



Massimo Andreoni is a specialist in Internal Medicine and in Infectious Diseases, has been President of Italian Society of Infectious Diseases (2013–2016), and currently he is Scientific Director of the Italian Society of Infectious Diseases. Chief of Ward of Infectious Diseases, Policlinico Tor Vergata, Rome, Italy, Professor Andreoni is Director of Integrated Care Processes Department at Tor Vergata

Hospital and Director of the Department of Medicine of the Systems, University “Tor Vergata,” Rome, Italy. Professor Andreoni has been a project leader of several national and international research programs, and he is the author of more than 300 indexed articles and several chapters of books.



Sevgi Okten Aral has been the Associate Director for Science in the Division of STD Prevention, Centers for Disease Control, since 1993. She holds professorial appointments at the University of Washington in Seattle, University of Manitoba in Winnipeg, and Emory University in Atlanta. Dr. Aral has authored more than 250 scientific articles and edited 17 journal issues and 3 books. She has served

on many national and international work groups, boards, and committees and has consulted for the World Health Organization, the European Union, and the World Bank. She has also received the ASTDA Achievement Award and the Thomas Parran Award. Dr. Aral’s research interests have included social and behavioral aspects of sexually transmitted disease; epidemiology and prevention including gender, age, and race effects; mixing patterns; sexual and social networks; contextual factors; social determinants; and most recently, program science.



Anna Carannante after the degree in Biological Sciences and Biology for Biomedical Research received the Specialization in Microbiology and Virology from the University of Rome *La Sapienza*. She is currently a researcher in the Department of Infectious Diseases of Istituto Superiore di Sanità.

Her professional interests focus on specific aspects of *Neisseria gonorrhoeae* and *Neisseria meningitidis*. In particular, she is involved in the Italian Surveillance System for antimicrobial resistance in *N. gonorrhoeae*. Her routine activity is to perform, on collected strains by Italian outpatients, antimicrobial susceptibility testing and molecular typing, including whole-genome sequencing (WGS).

Moreover, she is involved in serology and molecular typing of *N. meningitidis*. The so-called MATS (The Meningococcal Antigen Typing System) ELISA and the SBA (Serum Bactericidal Antibody) assay are the main field of activities. Her main area of studies includes the molecular typing of meningococcal virulence determinants. VPD-Reference Labs Unit, Department Infectious Diseases, Istituto Superiore di Sanità, Rome, Italy



Manola Comar received her degree in Biology from the University of Trieste, Italy, and is currently an Associate Professor of Clinical Microbiology in the Department of Medical Sciences at the University of Trieste. She is Director of the Advanced and Translational Diagnostic Microbiology Department at IRCCS Burlo Garofolo, Trieste, Italy. She specialized in virology and clinical microbiology at the University of Brescia.

Her main professional interests focus on sexually transmitted microorganisms and host interactions. She is scientific principal or co-investigator in research projects on co-infections of vaginal microorganisms, tumor viruses, vaginal microbiome and its relationship with host innate immune response. In addition, she serves as an expert in sexually transmitted infection (STI) for the Italian Ministry of Health and the Institute of Superiore di Sanità, is a member of the Italian Society of Microbiology, and was with the Premio Natta Copernico for her contributions to molecular microbiology research. She is the author of more than 150 papers in the field of molecular microbiology.



Antonio Cristaudo is a dermatologist and venereologist with a vast experience in STI prevention, diagnosis, and therapies. In 1987, he started his clinical and research activity at the San Gallicano Dermatological Institute in Rome, a research and health institute, his main duties are the management of patients with STI and HIV infections. In April 2013, he became the head of the STI department at

the San Gallicano Dermatological Institute. He is a PI of trials and scientific projects on STI, HIV, and HPV infections. He is author of more than 200

scientific articles in high indexed journals, most of which are in the field of STI. He is the current Past-President of the Italian Association of Hospital Dermatologists (ADOI).



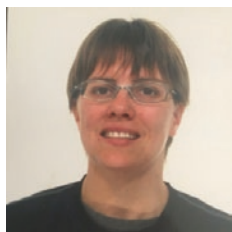
Marco Cusini graduated in Medicine at the University of Milan in 1980. He obtained his Specialization in Dermatology and Venereology in 1983. He worked at the Clinic of Dermatology since then mainly in the field of sexually transmitted diseases. Dr. Cusini became head of the Sexually Transmitted Disease Center of Milan in 1990. He became a member of IUSTI in 1994, organizing the

XXIV IUSTI Europe Meeting in Milan in 2008. Dr. Cusini was the Scientific Chair of the XXX IUSTI Europe Conference held in Budapest in September 2016. He is an IUSTI officer in charge of the Educational Branch and Italian representative for IUSTI. He is the co-organizer of the IUSTI Basic Summer Course held every 2 years in Bertinoro and of the Advanced IUSTI Course held every 2 years at the site of IUSTI Europe conference. He is a member of the IUSTI Guideline Committee. Dr. Cusini is the present president of SIMAST (the Italian Society for Sexually Transmitted Infection); he is also a member of EADV and a member of the EADV task force for STI and HPV. He published more than 100 papers in scientific journals and is the coauthor of the book *Atlas of Male Genital Disorders* edited by Springer. He was awarded with the IUSTI Silver Medal. He is still working in the field of STIs and is planning a co-operation with Lacor Hospital (Gulu Uganda) for the prevention of HPV diseases in Ugandan women.



Sarah Dal Zoppo received her degree in Medicine and Surgery from the University of Brescia (Italy) in 2008 and then obtained her postgraduate degree in Infectious Diseases from the Clinic of Infectious and Tropical Diseases—University of Brescia in 2014. Her professional interests focus on the treatment of HIV-infected people, STDs management, and tuberculosis diagnosis and treatment. Recently, she served

as a research fellow at the Clinic of Infectious and Tropical Diseases—University of Brescia. She currently works as consultant physician in the Infectious Diseases Division of “C. Poma” General Hospital in Mantova. She is a member of the Italian Society of Infectious and Tropical Diseases (SIMIT).



Serena Del Bue received her MSc degree in Medical Biotechnology in 2000 at the University of Milan. Since then, she decided to focus her research on the virology field and strengthened her methodological skills with a fellowship at the Center for Neurovirology and Cancer Biology, Temple University, in Philadelphia. She completed her PhD in Molecular Medicine at the University of Milano.

Currently, she is an Assistant Professor of Clinical Microbiology in the Department of Biomedical, Surgical and Dental Sciences at the University of Milano, and Adjunct Assistant Professor in the Department of Neuroscience at Temple University.

Her scientific interests specifically regard the pathogenesis of the human polyomaviruses, with focus on the infection of the immunosuppressed host (organ transplant recipients, HIV-positive patients, patients affected with tumors). For her studies in these fields, she received the Heine-Medin Award from the European Society of Clinical Virology in 2017. She is the author of more than 80 papers in the field of molecular microbiology.



Davide De Santo was born in Cosenza (Italy) in December 16, 1968. He obtained his Medicine degree summa cum laude in 1999 at the University of Rome “LASAPIENZA” and then specialized in obstetrics and gynecology summa cum laude at the University of Trieste (Italy) in 1999. In March 2003 Dr. De Santo completed his doctorate (PhD) in Perinatal Medicine, Developing Pediatrics and

Perinatology at the University of Trieste (Italy) and during this period he spent 1 year, as exchanging scientist, at Thomas Jefferson University, Philadelphia, USA. In 2003 he became a consultant in Obstetrics and Gynecology at the Monfalcone Hospital (San Polo) (GO-ITALY) until 2007. Since September 2007 until present, he was hired at the IRCCS Burlo Garofolo hospital of Trieste as a consultant in Obstetrics and Gynecology. His personal areas of interest vary from infections in obstetrics and gynecology and minimally invasive surgery. He is a coauthor of more than 150 papers of which more than 20 are peer reviewed. He is a member of many scientific societies mainly in infections in obstetrics and gynecology and minimally invasive surgery.



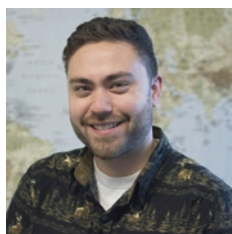
Francesco De Seta (Birth Date April 9th 1968) is an assistant professor of obstetrics and gynecology at the University of Trieste, Italy, where he is involved in clinical practice, teaching, and research in the areas of premature birth and obstetrics/gynecology infectious diseases. After receiving his medical degree from the Medical School of Pavia in 1991, he did his residency in obstetrics and gynecology in

Trieste where he now works with an internationally recognized group that was responsible for the first paper on the proteomic analysis of human cervico-vaginal fluids published in the journal *Proteome Research* and later in collaboration with Sergio Crovella studied Mannose-binding lectin in recurrent vaginal infections. In 2007–2008 he was Research Assistant Professor in the gynecologic infectious disease research program at Des Moines University (Des Moines, USA) and has continued in that position until 2010 where he continued to make short-term research visits to pursue genomic and microbiomic studies in women who deliver prematurely. He was also associated with the international prematurity research group organized by the World Health Organization PREBIC (Preterm Birth International Consortium) that connected him with physicians and scientists who study the causes and complication and interventions for prematurity at locations around the world. Now he is continuing clinical studies and research on vaginitis and vaginosis with next-generation sequencing methods. Since 2018 Dr. De Seta is part of an organizing Committee for a “Permanent School on Human Microbiome” (Turin, Italy). He is currently a member of several scientific societies as ISIDOG (International Society for Infectious Diseases in Obstetrics and Gynecology) and vice-president of SIMAST (Italian Society for Sexually Transmitted Infections).



Maria Gabriella Donà received her degree in Biological Science and her PhD in Biology from the University of Roma Tre (Rome, Italy) and is currently a Senior Researcher at the San Gallicano Dermatological Institute IRCCS (Rome, Italy).

Her professional interests focus on the molecular epidemiology of human papillomavirus (HPV) infection and on the role of HPV in the development of anal and oropharyngeal carcinomas, as well as nonmelanoma skin cancer. Her current projects include the study of (1) the natural history of anal and oral HPV infection in high-risk males with and without HIV-1 infection; (2) the role of HPV-related biomarkers in anal cancer screening; (3) the diagnostic and prognostic role of HPV-related biomarkers in oropharyngeal cancer; and (4) the epidemiology of cutaneous HPV infection in (pre)malignant skin lesions. In addition, she is a member of the Scientific Committee of the biannual Workshop “Emerging Issues in Oncogenic Virus Research,” organized by the International Agency for Research on Cancer (IARC) and the German Cancer Research Center (DKFZ), and a member of the Scientific Committee of “Sinergia & Sviluppo” training company for healthcare professionals.



Mark C. Fernandez graduated from the University of Washington in 2014 with a BSc in Microbiology. As an undergraduate student, he began studying syphilis in Dr. Sheila Lukehart's laboratory. After graduating, Mark worked at the Washington National Primate Research Center as a research scientist in the reproductive biology group, where he developed innovative genetic tools to establish a nonhuman primate model of fragile X syndrome. In 2017, he joined the laboratories of Dr. Sheila Lukehart and Dr. Lorenzo Giacani to work toward developing a syphilis vaccine. He recently entered into the University of Washington Pathobiology PhD program and is currently working on his dissertation project on the molecular pathogenesis of *Chlamydia trachomatis* infection. Mark was awarded a prestigious scholarship through the University of Washington STD/AIDS Research Training Grant for his innovative proposal to characterize the microenvironment of the *Chlamydia trachomatis* inclusion lumen and identify essential host factors that are recruited into this compartment during infection.



Pasquale Ferrante is an MD, specialized in public health and in microbiology and virology. He is full professor of Microbiology and Clinical Microbiology in the Department of Biomedical, Surgical and Dental Sciences of the University of Milano and Adjunct Professor in the Department of Neuroscience at Temple University, Philadelphia.

He has been working on neurovirology for more than 40 years and is one of the world leader in the study of the pathogenesis of the human polyomaviruses, with particular attention to their interaction with the central nervous system. Prof. Ferrante is the chief of the Laboratory of Translational Research at the University of Milano. The laboratory applies the most advanced molecular techniques for the research and the molecular characterization of the viral strains in the clinical specimens collected from patients affected by demyelinating diseases of the central nervous system. He published more than 250 papers on international peer-reviewed journals, receiving about 4000 citations.



Antonio Carlos Gerbase is a Senior Consultant in Sexually Transmitted Infections (STI), HIV/AIDS, and Global Health.

He worked for WHO from 1994 to 2013 as Medical Officer in the Department of HIV/AIDS in functions such as program manager, prevention, partnerships, country support, key populations, and prevention of mother to child transmission of HIV.

Born in Brazil, he also holds Italian and Swiss nationality. He worked from 1977 to 1991 as Public Health MD at the Health Department, Rio Grande do Sul, Brazil, having worked with people affected by leprosy, HIV/AIDS, and STIs. At the national Brazilian level, from 1979 to 1991, he contributed to the establishment of the Brazilian National HIV/AIDS/STI program as a member of the National Commission for AIDS control. He worked with WHO as a consultant in South and Central America from 1986 to 1993. Dr. Gerbase studied medicine at the Federal University of Rio Grande do Sul, Brazil (1974) and became a Resident in Dermatology (1976) before pursuing a Mastership in Clinical Medicine (1989). In 1991, he was granted a Fellowship in Public Health at the Johns Hopkins University, Baltimore, USA, School of Hygiene and Public Health. He has also been active as a plastic artist from 2010.



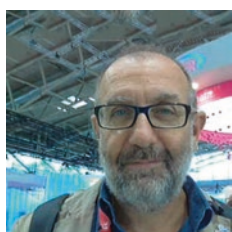
Lorenzo Giacani earned a B.S. in Molecular Biology cum laude at the University of Bologna in 1998. His interest in STIs and syphilis began after being drafted into the Italian Army after graduation, where he was tasked with administering aptitude tests to soldiers and obtaining serum samples for assessment of syphilis infection. At the end of his service, Dr. Giacani enrolled in a PhD program in

Medical Biotechnology also at the University of Bologna, which he obtained in 2005. As a graduate student, Dr. Giacani focused primarily on the study of the virulence factors of the syphilis agent, developing an ongoing interest for this disease. In 2002, he accepted a position as an exchange scholar and moved to the University of Washington, in Seattle (WA), USA, where he also stayed for his postdoctoral training. Dr. Giacani is currently an Associate Professor at the University of Washington, in the Departments of Medicine and Global Health, where he keeps studying syphilis pathogenesis and evaluating vaccine candidates for syphilis. Throughout his career, he has received the ASTDA Developmental Award and the Vallesina Award for his scientific achievements.



Cristina Giambi is a medical doctor, epidemiologist, and public health specialist, working in the field of vaccination and communicable disease control since 2004. She is working in the Infectious Diseases Department at the Istituto Superiore di Sanità, the national public health institute in Italy since 2008. Her interest in epidemiology and public health has led her to complete a PhD in Methodologies in Preventive

Medicine and Therapy (2006–2009) and the European Programme for Intervention Epidemiology Training (EPIET) (2011–2013). She has participated in numerous national and international research projects in the field of vaccination programs, with a focus on vaccine hesitancy and HPV vaccination. Among several activities, she is involved in the Italian surveillance system for congenital rubella and rubella in pregnancy and has been the project manager for the VENICE (Vaccine European New Integrated Collaboration Effort) project that supports vaccine programs in EU/EEA countries. Currently, she is working in the Prevention Department of the Local Public Health Unit in Latina (Italy), dealing with infectious diseases surveillance, vaccination programs, and public health promotion at the local level. She has published over 40 peer-reviewed journal articles related to her work.



Enrico Girardi graduated in Medicine (1981) at Sapienza University in Rome, Italy, where he also specialized in Internal Medicine (1988) and Medical Statistics (1992). He is presently Director of Clinical Epidemiology Unit and Head of Public Health Activities at the National Institute for Infectious Diseases, Lazzaro Spallanzani, Rome, Italy.

His research interests include epidemiology and control of HIV-associated tuberculosis, tuberculosis in migrants, epidemiology and control of HIV infection, cost-effectiveness of control interventions for HIV infection and tuberculosis, and epidemiology of viral hepatitis. His current projects are focused on the HIV continuum of care, on strategies for HCV elimination in high-risk populations, and on intervention to control HIV-associated tuberculosis.

He served as a member of several Italian national and regional committees on tuberculosis, HIV, and hepatitis C. He also served as consultant to WHO on tuberculosis and HIV and to ECDC on tuberculosis control. He is presently a member of the Italian National AIDS Committee.



Massimo Giuliani graduated in Psychology at the University of Rome “La Sapienza” (1982) and became Clinical Psychologist before pursuing a training in Cognitive Behavioral Sciences and Psychotherapy (1985). Since 1987, he earned governmental and international masters in Epidemiology of the Infectious Diseases, particularly focused on sexually transmitted infections and HIV-1. He has been Temporary Advisor

for WHO on projects concerning the Social Aspect of AIDS and Counseling for

HIV prevention. He worked for the Italian Institute of Health (Istituto Superiore di Sanità) as a consultant researcher, and he contributed to the establishment of the National STI Surveillance System in 1992, which he coordinated until the year 2009. He is currently a clinical psychologist and professional counselor in the STI/HIV Unit of the San Gallicano Dermatological Institute (IRCCS) in Rome, Italy, where he is scientific coordinator of the largest Counseling & HIV Testing program (COROH Project) targeted to men who have sex with men (MSM) in Italy. His current research and intervention priorities include management of funded STI prevention projects based on urban point-of-care test and STI behavioral counseling, and of longitudinal cohort studies on the natural history of anal HPV infection in at-risk males. Dr. Giuliani is also a reviewer for various leading biomedical journals in the field of STI and HIV-1, and he is a member of the scientific commission of the Italian Multidisciplinary Society for STI (SIMAST).



Secondo Guaschino graduated in Medicine and Surgery at the University of Pavia in 1973. He obtained his postgraduate degree in 1977. He was an Associate Professor of Obstetrics and Gynaecology from 1983 to 1990 and Full Professor from 1990. From 2011 to 2012, he was Director of the Department of Medical Sciences of the University of Trieste, Italy. From 2012 to 2016, he was Director of the Department of Obstetrics and Gynaecology of the University of Florence at Careggi Hospital. He was past president of the Italian Society of Menopause and Elected President of European Society of Infectious Diseases in Obstetrics and Gynecology (ESIDOG). He was a member of the International Infectious Diseases Society in Obstetrics and Gynecology—USA (I-IDSOG-USA).

Prof. Guaschino's primary focus is to apply gynecological sciences expertise to women's health with a special focus on the prevention, management, and care of infectious diseases of the genital tract. His current interests include contraception, menopause, perinatal medicine, and human reproduction. He published more than 200 papers in scientific journals, and he is the author and coauthor of many chapters of books.



Matthew Hogben received a doctorate in social psychology from the State University of New York, followed by postdoctoral training in the Department of Preventive Medicine and Community Health at Downstate Medical Center in Brooklyn, NY. He is currently the Chief of the Social and Behavioral Research and Evaluation Branch of the Division of STD Prevention at the US Centers for Disease Control and Prevention.

Dr. Hogben's primary focus is to apply social and behavioral science expertise to STD prevention and sexual health problems, especially through translational research and evaluation. His current research priorities include analyses of sex and STD-related behaviors data in nationally representative data, management of STD and HIV in networks through enhanced partner services and

disseminating prevention, and implementation of STD prevention behavioral counseling in primary care.

Dr. Hogben also serves on the editorial boards for *Sexually Transmitted Diseases* and *Sexual Health* and was the Program Definition and Prevention Services track chair for the 2018 STD Prevention Conference in Washington, DC.

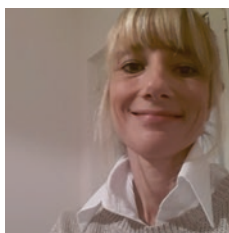


Bryan Larsen serves as associate dean for biomedical sciences, Marian University College of Osteopathic Medicine since 2011. Previously, he was dean for university research and biomedical graduate studies at Des Moines University and executive director of the Iowa Center for Translational and Clinical Research at Mercy Medical Center in Des Moines, Iowa.

Throughout his faculty career, which started at Marshall University School of Medicine, he has been a teacher of microbiology and clinical research methods and ethics. His research career, spanning over four decades, has focused on host-microbe interaction in the obstetrical and gynecologic patients, consistently melding laboratory science and clinical research. More than 150 articles and book chapters have resulted from his work, including a microbiology text which was commissioned by the Council of Resident Education for Obstetrics and Gynecology.

Dr. Larsen contributes to the discipline by serving on the editorial boards of *Annals of Clinical and Laboratory Sciences*, *Infectious Diseases in Obstetrics and Gynecology*, and reviews for several clinical and basic science journals. He also serves on NIH special emphasis grant review panels and engages in post-publication peer review through Faculty of 1000 (Medicine). The Government and industries supported his research, and he received the prestigious Johnson and Johnson Focused Giving Award as well as the Beehler Mentor of the Year Award (OMED 2009) and headed the development of an electronic Osteopathic SOAP note.

He has presented his research at numerous national and international meetings, has been a visiting professor in China and Germany, and collaborates with researchers around the globe. He served as chairperson of the Des Moines Hospitals Joint IRB and served on the inaugural board of directors of the John Stoddard Cancer Center, Des Moines, Iowa. He currently serves on the board of the Indiana Institute for Medical Research. Numerous graduate students and medical students have been mentored over the course of his career, and he continues to guide research students in the laboratory.



Alessandra Latini received her Degree in Medicine and Surgery at the University of Rome “La Sapienza” (Italy) in 1993. She is a specialist in Dermatology and Venereology (1997) and in Infectious Diseases (2014). From 2002 she moved to the Dermatologic Infective Department of the San Gallicano Hospital at the Sexually Transmitted Infections (STI)/HIV Unit where she started to work in prevention, diagnosis, and STI and HIV infection. Her professional interests focused on the management of bacterial and viral STI and HIV-1 infection. Her daily work is directed to clinical management of HIV patients on combined antiretroviral therapy (cART). In addition her area of interest is focused on the management of co-infected patients, in particular those with HPV, HHV8, and Chlamydia trachomatis infections. She is a member of the International Union against Sexually Transmitted Infections (IUSTI).



Jami Leichter is the deputy associate director for science in the Division of STD Prevention at the Centers for Disease Control and Prevention. She received her PhD in applied experimental psychology from Southern Illinois University with a specialization in measurement and evaluation in public health. Prior to joining CDC in 1999, she was an associate scientist for Southern Illinois University Student Health Programs. Her current research activities include evaluating STD-related laws and policies, access to and use of sexual and reproductive health services, the infrastructure for STD prevention in the United States, and behavioral surveillance.



Valentina Marchese received her degree in Medicine and Surgery in 2009 at the Second University of Naples, Naples (Italy), and obtained her postgraduate degree in Infectious Diseases in 2015 from the same academic institute. She is currently a PhD candidate at the University of Brescia and is working as a consultant physician in the University Department of Infectious and Tropical Diseases at the ASST Spedali Civili in Brescia (Italy). Previously, she worked as an Infectious Diseases consultant for newly arrived migrants in Sicily (Lampedusa and Trapani) and at the Centre for Tropical Diseases, Sacro Cuore-Don Calabria Hospital, Negrar, Verona (Italy). Her professional interests focus on tuberculosis, STIs, and tropical diseases. Her current projects include screening activities for STIs, parasites, and tuberculosis among migrants.



Alberto Matteelli received his Degree in Medicine and Surgery from the University of Pavia (Italy) in 1985 and in the same Academic Institute he received the Postgraduate qualification in Infectious Diseases in 1989. He is currently Associate Professor in Infectious Diseases at the University of Brescia (Italy). His professional interests focus on TB-HIV infections and sexually transmitted infections (STI).

He is the director of the Units of Community Infections and Imported Disease of the Spedali Civili General Hospital in Brescia (Italy). Since 2010 he is the director of the WHO Collaborating Centre for TB/HIV and TB elimination.

Between 2013 and 2015, Prof. Matteelli has been the Medical Officer of the TB/HIV and Community Engagement Unit, Global Tuberculosis Programme at the World Health Organization (WHO). In 2016 he joined the Technical Advisory Group on Tuberculosis Control (TAG-TB) of the European Region of WHO, collaborating in the preparation of the “Management of latent tuberculosis infection for people living with HIV, household contacts and other at-risk populations: consolidated guidelines.” He has been WHO Consultant (TB/HIV) of many countries with high TB burden, like Uzbekistan, Belarus, Ukraine, Tanzania, Azerbaijan, Kyrgyzstan, and Russian Federation. Prof. Matteelli has also been coordinator of the Sexually Transmitted Infections (STI) working group of the Italian Society of Infectious Diseases. He is a member of many internationally accredited scientific organizations: committee of the Interdisciplinary Society of Sexually Transmitted Diseases (SIMaST), Italian Society of Medical Parasitology, International Society of Travel Medicine (ISTM), and Italian Society of Tropical Medicine (SIMET).



Aldo Morrone is a dermatologist with documented expertise in tropical pathologies and poverty-related diseases. In the last 30 years, he has developed transcultural medicine and helped focus the attention of public and institutions to the health of migrants and the groups at risk of exclusion. From 2018 he is Scientific Director of San Gallicano Dermatological Institute of Rome, Italy. He is Scientific Director of

the International Institute of Medical Anthropological and Social Sciences (IISMAS), a nonprofit association working in medical, scientific, and formative projects for the most disadvantaged groups in developing countries. He is the founder of the *International Journal of Migration and Transcultural Medicine*. He is the coordinator and head of several clinical and scientific missions in Africa, India, Latin America, and South-eastern Asia. Prof. Morrone is the author of over 500 publications in national and international scientific journals, original articles, clinical and scientific research studies, epidemiological reports, and abstracts presented at national and international congresses. He is the Scientific Director of the annual International Workshop “Culture, Health and Migration” held at the National Council for Research in Rome, and of three International Congresses on Dermatology and Infections in Ethiopia, in collaboration with Tigray Ministry of Health.



Massimo Puoti was born in 1959; he graduated in Medicine in 1983 at the “Sapienza” University in Rome. He completed his first Specialization Course in Gastroenterology and Endoscopy in 1987 at the same university, and then took a second Specialization in Infectious Diseases in 1993 at the University of Brescia, where he worked as Head of the Viral Hepatitis Department.

He moved to Milan in 2010, when he became Head of the Infectious Disease Department at the ASST Grande Ospedale Metropolitano Niguarda. He is a member of the multidisciplinary Niguarda Transplant Center for the management of solid organ transplantation. He founded the “Niguarda Hepatitis Center,” a multidisciplinary department for the management of viral liver disease including ID specialists, gastroenterologists, and transplant surgeons.

He is a member of several national and international scientific societies, including the European Association for the Study of the Liver (EASL) for which he has been in the steering committee of the European Guidelines for the treatment of HCV. The European Medicine Agency has named him Infectious Diseases European Expert since 2008. He is the author of more than 270 scientific papers with a cumulative Impact Factor above 750. His publications published since 1996 have been cited more than 7958 times with a Hirsch Index of 42.



Virginia Quaresima received her MSc in Medical Biotechnology from the University of Modena and Reggio Emilia (Italy) and is currently a PhD candidate at the University of Brescia—Clinical Department of Tropical and Infectious Diseases (Italy). Her professional interests focus on diagnostics in low- to middle-income countries, and her current projects are specifically regarding malaria and

tuberculosis. From 2018 Dr. Quaresima has been working on a study concerning Malaria and Gender in Ghana and is actively collaborating with the Emerging Bacterial Pathogens Unit (EBPU)—WHO Collaborating Centre in Tuberculosis Laboratory Strengthening, San Raffaele Scientific Institute (Milan, Italy). In addition, she serves as Laboratory Manager for the international humanitarian NGO “*Médicins sans frontières* (MSF),” in implementing and strengthening the diagnosis of tuberculosis in South Sudan (2016) and in Papua New Guinea (2017). She has also contributed to the scientific organization of the first edition of the ESCMID postgraduate course in “Migration Health,” held in October 2017.



Stefano Ramoni graduated in Medicine in 2003 and obtained his Specialization in Dermatology and Venereology at the University of Milan in 2007 with a thesis about the epidemiology of sexually transmitted infections (STIs). Since then he has been working at the Clinic of Dermatology of the University of Milan in the field of STIs and as a dermatologist in private practice. He published a lot of papers in sci-

entific journals, mainly in the field of sexually transmitted infections, and he collaborated on the drafting of some chapters of books about dermatology and STIs. Dr. Ramoni has been invited speaker in several STI Conference, and in 2016 he was called as member of the International Scientific Committee of the 30th IUSTI European Congress held in Budapest.

He is a member of many scientific societies: SIDEMAST (Italian Society of Dermatology and Sexually Transmitted Infections), IUSTI (International Union against Sexually Transmitted Infections), and SIMAST (Italian Interdisciplinary Society for Sexually Transmitted Infections).



Giovanni Rezza specialized in hygiene and in infectious diseases, is the Director of the Department of Infectious Diseases at the Istituto Superiore di Sanità (ISS) in Roma, Italy. His main background is in infectious disease epidemiology. His main area of expertise includes HIV and other emerging infectious diseases (such as Chikungunya, West Nile, influenza) and vaccination strategies.

He has worked for the Italian Ministry of Health, the World Health Organization in Geneva, the Italian Cooperation, and the European Union. He has been a contract professor at the University of Sassari and ran courses at the University of Roma (“La Sapienza” and “Tor Vergata”). He has been Chairman of the Administration Board—and he is now President of the Scientific Board—of the Consortium called “Collezione Nazionale dei Composti Chimici e Centro Screening” (CNCCS), a public/private initiative including ISS, National Research Council, and IRBM. He served as a member of several national and international committees and is currently a member of the Italian NITAG.

He has carried out epidemiological investigations in Italy and abroad, regarding both community and hospital outbreaks. He has been the principal investigator of several research projects and is the author of more than 400 articles indexed in PubMed and 4 books.

Finally, he is the editor of the “infectious disease epidemiology” section of BMC Public Health, is a member of the editorial board of *AIDS* for a 6 years period, editor of the supplement of *AIDS* for 2 years, and is acting as a reviewer for several international scientific journals.



Benedetta Rossi graduated in Medicine at the University of Brescia in 2016. In collaboration with the Department of Infectious Diseases of Brescia, in 2018 she has worked on a research project for the implementation of End TB Strategy in Italy, aiming at reducing the MDR-TB burden in the country. She is now working as a resident in Infectious Diseases at the Policlinico Tor Vergata-Rome.



Roberto Rossotti was born in 1979; he graduated in Medicine in 2004 at the University of Milan and took his Specialization in Infectious Diseases in the same university in 2008. He was Head of the HIV Clinical Trial Unit at the “A. Manzoni” Hospital in Lecco from 2008 to 2010; in 2011 he moved to the Infectious Diseases Department of the ASST Grande Ospedale Metropolitano Niguarda in Milan. Since

then, he has worked in the Outpatients HIV clinic and has been involved as sub-investigator in several Phase II-III-IV Clinical Trials, especially for the development of anti-HCV direct-acting agents. He also joined the “Niguarda Hepatitis Center,” a multidisciplinary Department for the management of viral liver disease, with the task of treating HIV/HCV co-infected patients.

In 2018 he created the STI Clinic not only for the treatment of sexually transmitted infections but also for the management of HIV pre- and post-exposure prophylaxis with a special focus on the MSM population.

He is a member of the steering committee of ICONA, the largest Italian cohort of HIV patients. He is the author of more than 50 publications on HIV and viral hepatitis.



Vittorio Sambri was born in Modena on May 22, 1960, and graduated summa cum laude in Medicine at the Alma Mater Studiorum, the University of Bologna, in 1986. In 1988 he attended the Laboratory of the ID Division, the University of California at Los Angeles, working under the supervision of Michael A. Lovett on genetic transformation of spirochetes. He received his PhD in

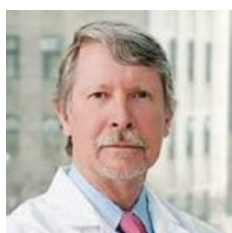
Microbiology from the University of Genoa in 1991, discussing a thesis on the microbiology of spirochetal infection. Presently he holds a position as Associate Professor of Clinical Microbiology at the University of Bologna and Director of the Unit of Clinical Microbiology, Greater Romagna Central Laboratory, in Cesena, Italy. Dr. Sambri has been recently involved in the research on emerging vector-borne infections and on the molecular diagnosis of bacterial infections. He also serves as vice-president of APSI (Association for the Study and Prevention of Infections). His work resulted in 200 scientific publications in international journals with an h-index of 42 and more than 5700 citations. Dr. Sambri is a reviewer for many journals, including

Clinical Infectious Diseases, the Journal of Infectious Diseases, the Journal of Medical Microbiology, PLoS ONE, PLoSNTD, Clinical Microbiology and Infections, Journal of Clinical Microbiology, and the Journal of Infection.



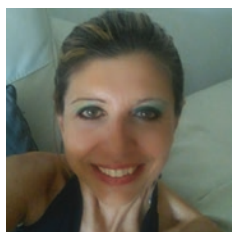
Loredana Sarmati was born in Rome, Italy, on August 13th, 1957, is married, and has three sons. She is a medical doctor specialist in Internal Medicine (1988) and in Infectious Diseases (1992). Since 2012, Loredana Sarmati is an Associate Professor of Infectious Diseases at Tor Vergata University of Rome with teaching and research activities. She has carried out research in the field of epidemiology, clinical

diagnostics, and laboratory infectious diseases with regard to viral (HIV, herpesvirus, and HHV8) and fungal (*Pneumocystis jirovecii*) infections in the immunocompromised host. The results of her scientific activity have been the object of more than 150 PubMed indexed articles. From June 2018, she is the president of the Lazio section of the Italian Society of Infectious Diseases.



Lawrence Stanberry is the Associate Dean for International Programs and Director of the Global Health Initiative at Columbia University's Vagelos College of Physicians and Surgeons. During the last decade, he served as the Reuben S. Carpentier Professor and Chairman of the Department of Pediatrics and Pediatrician-in-Chief of the NewYork-Presbyterian/Morgan Stanley Children's Hospital.

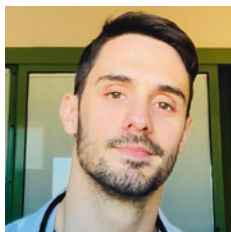
He has served on numerous advisory boards and review panels including serving as the chair of the Vaccine Study Section and the Pediatrics Review Panel at the National Institutes of Health. He is a pioneer in the areas of therapeutic vaccine development to control chronic viral diseases, topical microbicides/pre-exposure prophylaxis for the prevention of reproductive tract infections, and the development of herpes simplex virus and influenza virus vaccines. Dr. Stanberry has authored over 200 scientific articles and chapters. His current work focuses on the preparedness of children's hospitals globally to prevent, detect, and respond to infections with pandemic potential.



Paola Stefanelli is the Head of Vaccine Preventable Diseases (VPD) Reference Labs Unit at Istituto Superiore di Sanità and the Head of the WHO Collaborative Centre for Polio. She coordinates national and international level surveillance activities together with research programs on important pathogens, such as *N. meningitidis*, *N. gonorrhea*, *B. pertussis*, *Polio* and *Enterovirus* no-

polio associated. Her studies have the objective of translating the insights obtained into benefits for human health. Microbiological data are combined with demographic and clinical information of patients. Dynamic modeling and phylogenetic investigations on genomic analysis of RNA

and DNA are in place. Her interest is focused on understanding and evaluating the impact and duration of vaccination of VPD using ELISA, SBA, and Ab titer on cell lines. Head of VPD-Reference Labs Unit, Department Infectious Diseases, Istituto Superiore di Sanità, Rome, Italy



Christof Stingone was born in Rome on 26 February 1986, graduated from the University of Rome La Sapienza on 24 September 2014 with a Bachelor of Medicine and Surgery, and obtained his medical license to practice on 5 February 2015.

His medical interest has been focused on infectious diseases since the beginning of his studies, and he now works as Resident Doctor attending the

Postgraduate Training in the Infectious Diseases ward and clinic at Tor Vergata University Hospital.

His main activities include working in HIV clinic, Sexually Transmitted Infections clinic, Pre-Exposure Prophylaxis clinic, and Infectious Diseases Ward. In 2018, during a training period in London, he attended 56 Dean Street Clinic (Chelsea and Westminster Hospital) in Soho, where he focused on High Resolution Anoscopy Clinic and STD Clinic, studying the use of PrEP among those practicing Chemsex. He also attended the HIV ward at the Royal Free Hospital Foundation Trust, studying the phenomenon of HCV re-infection among MSM individuals.



Massimo Tommasino is Head of the Infections Section and of the Infections and Cancer Biology Group at the International Agency for Research on Cancer (IARC) in Lyon, France. He obtained in 1981 his Doctorate in Pharmacy at the University of Bari, Italy, and has been working for more than 30 years on oncogenic viruses in different European leading cancer research institutes, i.e., ICRF, London

(recently renamed CR-UK), DKFZ, Heidelberg, and IARC. Massimo Tommasino is involved, as coordinator or participant, in several international collaborative programs focused on the elucidation of the role of infectious agents in human carcinogenesis. He is the author of more than 200 papers.



Martí Vall-Mayans received his MD and PhD degrees from the Autonomous University of Barcelona and MPH degree from the University of Texas. He has been working in the field of infectious diseases for 40 years, the last 20 years in STI, and is currently Faculty Specialist at the STI Unit of the Department of Infectious Diseases, Hospital Vall d'Hebron in Barcelona.

His professional interests focus on the clinical and epidemiological aspects of STI, and his current projects include research on syphilis and chlamydia including LGV. He also collaborates abroad in an intervention project about nonvenereal treponematosi.

In addition, he serves as a member of the editorial board of the STI Guidelines of the International Union against Sexually Transmitted Infections (IUSTI), is a member of the Spanish Society of Infectious Diseases and Clinical Microbiology (SEIMC), and was honored with the Award Virgilio Palacio for STD research on LGV in 2009 and the IUSTI-Europe Medal of Merit for his contribution to the organization of the European STI congress in 2015.



Antonio Volpi is “Docens Turris Virgatae” at the University of Rome Tor Vergata, Italy, and Professor of Infectious Diseases at the Catholic University “Our Lady of Good Counsel,” Tirana, Albania. He earned his Degree in Medicine and Surgery (1969–1975) from the University of Rome and was trained as a Specialist in Infectious Diseases (1975–1978) from the same university.

Previously, he served as President of Hospital Infection Committee and Head of Infectious Diseases Clinic at Policlinico Tor Vergata Rome, Associate Professor of Infectious Diseases, Deputy Director of Scuola Iad at the University of Rome “Tor Vergata” Project officer EPI/Health UNICEF Ethiopia, fellow at the University of Alabama in Birmingham, USA, and Tutor at National Somali University, Mogadishu.

He has served on numerous advisory boards and review panels. He has received research funding from the EU, Italian government, vaccine and pharmaceutical companies. He is vice-president of SIMAST and a member of SIMIT. Professor Volpi has authored over 200 scientific articles, abstracts, and chapters. He has been the editor or co-editor of *Herpes*, the journal of IHMF, and the book *Genital Herpes*. His areas of research include diagnosis and therapy of herpesviruses infection, basic studies of the pathogenesis and immunobiology of HSV and VZV, and the special problems of healthcare-associated infections.



Nunzia Zanotta received her degree in Biology from the University of Trieste, Italy, and is currently a researcher in the Advanced and Translational Diagnostic Microbiology Department at IRCCS Burlo Garofolo, Trieste, Italy.

Her professional interests focus on tumor viruses and their relationship with host innate immune response. Her current projects include sexually transmitted microorganisms, vaginal microbiome, and the study of interactions between the host innate immune response and sexually transmitted pathogens. She is the author of 30 papers in the field of molecular microbiology.



Charifa Zemouri received her Master's in Infectious Diseases and Public Health in 2013 at the Vrije Universiteit in Amsterdam. Zemouri will finalize her PhD (2020) on microbial challenges in dentistry focusing on the ecology of biofilms, aerosols, and the oral cavity at the ACTA. Her work takes place in clinics, laboratory, and desk research. Her professional interest focuses on microbial challenges in

public health, reproductive health, poverty-related diseases, politics, and human migration and human right. Zemouri worked as a researcher for several institutes. Zemouri has previously written medical book and published peer-reviewed papers. She contributes to research work relating STIs and tuberculosis and STI point-of-care test with members of the WHO. Zemouri is also an expert panel member at the International Life Sciences Institute in Brussels and an external auditor and consultant to the Kyiv Medical University in Ukraine. Furthermore, Zemouri is a volunteer journalist writing on health and politics in the Middle East and North Africa region for Morocco World News. She loves to continue her career combining science and international public health in the diplomatic field.



Gabriella Zito graduated in Medicine and Surgery at the University of Trieste. She specialized in Gynecology and Obstetrics, and in 2017 she obtained the European Doctorate in Reproductive and Developmental Sciences, carrying out a research project in collaboration with the Instituto Valenciano de Infertilidad (IVI), en Barcelona (Spain). She works at IRCCS Burlo Garofalo Maternal and Child

Institute in Trieste as reproductive gynecologist, and she also deals with oncofertility. Her research areas include infertility, gynecological endocrinology, and oncology.

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