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Infectious Diseases and Pediatrics: Back to The Future 3

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Infectious Diseases and Pediatrics: Back to The Future

A visionary approach from the University of Bologna School of Pediatrics since 1950s

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Abstract

Like other Italian and European University Centers, also in Bologna the clinics of Infectious Diseases proceeded in parallel with the clinic of Pediatrics with both patient assistance and scientific advancements.

In the middle of the so-called “short century” (1900) some clinical and laboratory activities carried out in Bologna anticipated multiple advancements in both diagnosis and treatment of several, relevant infectious diseases like tuberculosis, influenza, viral diseases like Sars, and also shed light on some inflammatory biomarkers, which will play a key role also in the field of general internal medicine, like C-reactive protein.

Keywords

Infectious Diseases; Pediatrics; University of Bologna

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Location and early history

In the Bologna district where the S. Orsola University Hospital had its origin during late XVI century just outside of the main city walls of Porta San Vitale and Porta Maggiore, there was already an area specifically devoted to the assistance of sick children near to the main entrance of the hospital in Massarenti Street, the ancient Roman consular San Vitale Road, linking Bologna with Ravenna.

In the same area, among years 1911 and 1914, the entrance pavilion of the pediatric clinic was builded up and reserved to the care of “Bolognese” children up to the age of 12. Funded thanks to the considerable donations of the countess Gozzadina Gozzadini (1855–1899), and her husband count Zucchini, the historical pavilion had its project performed by the architect Leonida Bertolazzi (1852–1913), whose work was approved on November 15, 1910. The liberty decorations, visible on the facade, are a masterpiece of Alfonso Borghesani (1882-1964). Four sculptures in high relief support the medallions where the following motto is engraved “Charitas Scientia Pro Parvulis” (charity and science for children) [1,2]. The building was completed in the year 1913 [1,2], and had three main floors, with laboratories located in the attic.

During the World War I the pediatric clinic was converted into a military hospital hosting around 10,000 injured and convalescent soldiers. Those hospitalized at the pediatric clinic were called by nationalists “*gli aeroplani del Gozzadini*” (Gozzadini airplanes), since they had extensive casts on their limbs. Only at the end of the World War I in the year 1923, the same buildings went back to their destiny as a university [1,2].

History and genealogical trees of the schools of pediatrics and infectious diseases: fathers, sons, grandsons, grandchildren, and friends

Initially, the Gozzadini University Hospital was headed by Prof. Carlo Francioni (1877–1929). Later, the pediatric clinic was directed by Prof. Maurizio Pincherle (1929–1949), followed by Prof. Gaetano Salvioli (1938–1964), and Prof. Libero Martoni (1960–1964). The earliest managing secretary was Mrs. Nazzarena Fiorini.

Under the direction of Prof. Gaetano Salvioli, the clinic of Infectious Diseases started its autonomous activity at the S. Orsola University Hospital, headed by Prof. Demos Gotti from 1955 to 1986, and by Prof. Francesco Chiodo from 1986 until June, 2009.

The first full professor and chairman of Infectious Diseases was the Pediatrician Prof. Demos Gotti [3–7], who followed the epic deeds of anti-poliomyelitic vaccines and intensely worked at the antipoliomyelitic centre of the University Pediatric clinic founded by Prof. Gaetano Salvioli in the year 1939 as a regional rehabilitation hub characterized by an early motor activity, in order to avoid all orthopedic damages descending from a prolonged immobilisation of paralytic limbs, and relying on basic exercises with the aid of tapis-roulants, and basic hydrokinesitherapy. This centre deserved a major attention by both pediatricians and orthopedics: in fact, just Bologna hosted a significant international conference on children’ palsy (the term used to define poliomyelitis). This prestigious conference ensured the outstanding participation also Prof. Albert Sabin, the worldwide known scientist who made up his live attenuated oral antipoliomyelitic vaccine (OPV).

In the meantime, the Dept. of Infectious Disease founded at the “Maggiore” Hospital of Bologna by the legendary Prof. Giuseppe Lenzi, and later guided by Prof. Francesco Maria Gritti (with Dr. Lucio Bonazzi, Dr. Enzo Raise, Dr. Vittorio Vannini, Dr. Alessandro Grillo, Dr. Maria Gabriella Catalini, Dr.

Gian Luigi Trenti, Dr. Mario Zini, Dr. Giovanni Inardi, and many others), devoted their major care to adult patient with infectious disorders [8,9].

At the time of Prof. Chiodo's direction, which started in Autumn 1986, his team included Prof. Edgardo Monari, expert in parasitic and tropical diseases and often leading co-operation projects with some african countries (Zimbabwe and Tanzania among others), with Dr. Maria Assunta Di Bari and Dr. Magda Mazzetti. Prof. Monari was the earliest user of ivermectin oral solution in lymphatic filariasis, and also organized electricity appliances to promote the use of safe water and to provide vaccine refrigeration in African villages. Dr. Maria Assunta Di Bari personally distributed pediatric vaccines in African villages, carefully maintaining the cold chain, where she had daily experience with all tropical and parasitic diseases. Dr. Magda Mazzetti, also worked at the Dept. of the Infectious Diseases of the "Maggiore" Hospital headed by Prof. Francesco Maria Gritti and in the infection control équipe of the Bologna metropolitan district, directed by Dr. Patrizia Farruggia.

Dr. Gabriella Verucchi became an associate Professor of Infectious Diseases since 2005, and Head of the Postgraduate School of Infectious Disease since 2009. She is specialized in both Pediatrics and Infectious Diseases and is very expert in chronic viral hepatitis (also assessed through abdominal ultrasonography and echography-guided liver biopsy), as well as maternal-fetal infectious diseases, and tropical and travellers' diseases [3,4,10,11].

Earlier, Prof. Verucchi worked together with Dr. Giancarla Gelati, and during the years 2008–2009 faced both Avian and Swine flu epidemics, also heading the University Dept. of Infectious Diseases since the retirement of Prof. Chiodo in June 2009.

In mid-end 1980s, other staff physicians were Dr. Luisa Dallera and Dr. Annamaria Pezzoli, both specialized in Pediatric Infectious Diseases. The last staff physician who acquired both Infectious diseases and pediatric specialties at the S. Orsola Hospital was Dr. Vincenzo Colangeli [3]. Among residents and attending physician we also remind Dr. Elena Dalle Donne and Dr. Maria Carla Risi, who later worked at the Public Hygiene Dept. of Bologna, headed by Dr. Anna Rosa Gianninoni after Prof. Antonio Faggioli, who retired in 1999 [12,13].

Since 1985–1986, the growing pressure caused by the mounting cases of HIV and AIDS and chronic hepatitis C (named non-A-non-B hepatitis until year 1989), allowed Prof. Chiodo to expand his physicians' team, initially with Dr. Paolo Costigliola (also specialist in Hematology), and Dr. Ennio Ricchi (also specialist in Hygiene and Public Health), who dedicated their main efforts to HIV infection clinics and research, and organized all outpatient services for HIV-infected patients, including also informatized databases and informatized outpatients agendas [14–18].

Since December 1990, both Dr. Ginevra Marinacci and Dr. Luciano Attard joined the team, and in mid-September 1991, also Dr. Marco Borderi, Dr. Andrea Boschi, and Dr. Roberto Manfredi were added because of the HIV/AIDS emergency. Dr. Fabio Tumietto [15], earlier interested in Immunology and Laboratory Research, joined Prof. Chiodo's équipe in 1993, and now leads the Infection Control committee at the S Orsola–Malpighi University Hospital.

Dr. Luciano Attard, initially involved in the care of chronic viral hepatitis [3,10,11], is currently responsible for the care of all diffusive and emerging infections, like Zika, Ebola, imported Arboviroses, and Sars–Cov–2, as well as tuberculosis. At the same time, he personally follows patients suffering from fever of unknown origin (FUO), in co-operation with plenty of Italian Rheumatologists, among others.

Dr. Marina Tadolini since the early 2000s became the essential referee for tubercular disease, as she also acts as a permanent consultant of the World Health Organization (WHO) of Geneva, Switzerland, and headed many health care co-operation projects all around the world.

An exceeding valuable informatic support was offered earlier by Dr. Costigliola himself, who already in mid-1980s builded and updated effective databases and agenda applications based on MS–DOS supports [3,14–18], and later Mr. Davide Cocchi and Mr. Andrea Francesconi offered their skilled expertise to many organization and scientific advancements of the Dept. of Infectious Diseases.

The slides for both students and conference presentations were initially prepared by Dr. Manfredi and his colleagues, who started with glossy typewritten screens, projected by an overhead lamp.

Later, an expensive DOS-based informatized machine named “Palette” became available, which included a specific camera which directly captured monitor images on a slide film, which required a standard development process, to be finally framed and charged in a carousel for conventional projection.

When considering the nursing personnel, after Mother Luisa Morisi, who upon retirement came back to her Ursuline convent of Rome, and Mother Gabriella, the chief of nurses was Mrs. Cinzia Fabbri, early replaced by Dr. Gianfranco Bocchi, and then by Dr. Antonio Gramegna and Dr. Maria Gabriela Salvucci [17,18]. Mrs. Maria Antonietta Faggioli acted as the Dept. secretary with Mrs. Sandra Pescosi, followed by Mr. Franco Carosella, and presently by Mrs. Caterina D’Errico.

Mrs. Cristina Vincenzi, Mr. Elio Sparano, Mrs. Lorena Roma, Mrs. Rita Verucchi, Mrs. Graziella Alieri, Mrs. Elena Gramantieri, Mr. Angelo Sclafani, Mrs. Maria Naldi, Mr. Franco Draoli, Mrs. Milva Di Girolamo, Mr. Saverio Caruso, Mr. Leonardo Montanari, Mrs. Teresa Bartolomei, Mrs. Donatella Rotondo, Mr. Giuseppe Cusmano, Mrs. Giulia Calvano, Mrs. Cinzia Rondelli, Mr. Claudio Nazzurri, Mr. Mariano Virgili and Mr. Pasquale De Luca (both of them earlier studied also Medicine & Surgery), Mrs. Silvia Bolognini, Mr. Francesco Gasparelli, Mrs. Milva De Girolamo, Mrs. Laura Petraglia, Mrs. Evi Cavaliere, Mrs. Patrizia Bartolini, Mrs. Rosa Villani, Dr. Lucia Bertei (graduated in Educational Sciences like Dr. Gianfranco Bocchi), Dr. Morena Fantini (graduated in Sociological Sciences) [18], and Dr. Mariella Fiorino (graduated in Biological sciences), among others, were the pioneers of both inpatients and outpatients assistance in the era of HIV, hepatitis, and intravenous drug abuse, with the daily help of Dr. Germano Pilati, Dr. Salvatore Giancane, and Dr. Chiara Pieri, who also working at the Bologna rehabilitation centres, where all the Infectious Diseases specialists of both S. Orsola and “Maggiore” Hospitals worked as permanent consultants of territorial rehabilitation centres.

Later, other nurses joined the team: Mr. Giuseppe Salvo (who earlier worked at the Dept. of Infectious Diseases of the “Ospedale di Circolo-Fondazione Macchi” of Varese directed by Prof. Paolo Fiori, and later at the Infectious Diseases Dept. of the “Maggiore” Hospital of Bologna, headed by Prof. Francesco M. Gritti), Mr. Francesco Perotti, Mr. Raffaele Colacelli, Mr. Antonio Giglio, Mrs. Laura Petraglia, Mrs. Giulia Razza, Mr. Moreno Chiarini, Mr. Cristofaro Violante, Mr. Alessandro Gamberini, Mrs. Milva De Girolamo, Mrs. Teresa Di Milta, Mrs. Simona Varani, Mrs. Jolanda Burzacca, Mr. Luigi Marfella, Mrs. Anna Mignani, Mr. Domenico Perna, Mrs. Cinzia Ruscelli, Mrs. Cinzia Zen, Mrs. Evelina Ragonici, Mrs. Luana Tonelli, Mrs. Marzia Luciani, Mrs. Teresa Di Milta, Mrs. Luana Tonelli, Mrs. Patrizia Meliconi, Mrs. Giovanna Monaru, Mrs. Annalisa Franzoni, Mr. Mauro Bavota, Mrs. Barbara Di Marino, Mrs. Elena Minelli, Mr. Lamberto Mazzanti, Mrs. Rita Pesci, Mrs. Manuela Galassi, Mr. Fiorenzo Bai, Mr. Guido Santandrea, Mrs. Sara Crabu, Mr. Giuseppe Zerbini, Mrs. Margherita Marras, Mrs. Daniela Ugolotti, Mrs. Maddalena Boni, Mrs. Paola Ravaglia, Mrs. Rachele Farsetti, Mrs. Rita Malservisi, Mrs. Francesca La Via, Mrs. Catia Pace, Mr. Domenico Coviello, Mrs. Orietta Squerzanti, Mrs. Daniela Franco, Mrs. Monia Calanchi, Mrs. Concetta Rustico, Mr. Domenico Perna, Mrs. Sabrina Cortesi, Mrs. Mara Riccio, Mr. Luigi Marfella, Mrs. Paola Moriani, Mrs. Stefania Serra, Mrs. Adriana Ori, Mr. Carlo Ravagli, Mrs. Franca Giusti, Mrs. Morena Buferli, Mrs. Iginia Gualmini, Mrs. Elisa Grumelli, Dr. Barbara Sofritti (graduated in Nursing Sciences), Mrs. Angela Basetti, Mrs. Maria Lombardi, Mrs. Anna Palma Cannarile, Mrs. Manuela Marchetti, Mrs. Monica Chiericati, Mr. Felice Mattia Bartolotta, Mrs. Francesca Roda, Mrs. Maria Cristina Pieri, Mrs. Valeria Cesari, Mrs. Ermelinda Costantini, Mr. Stefano Barbieri, Mr. Carmine Nacca, Mr. Stanislao Moccia, Mr. Vincenzo Indelicato and Mr. Eligio Pirrone (both from the “Semeiotica Medica” Dept. of the S. Orsola Hospital), Dr. Paolo Boldini (graduated in Medicine & Surgery) and Mrs. Maria Grazia Martinelli, Mrs. Paola Tanaglia, Mrs. Catia Aldrovandi, Mrs. Giovanna Donati, Mrs. Sonia Pecorari, Mrs. Lisa Savini, Mrs. Serena Caselli, and Mr. Andrea Bovinelli, Mr. Sabrina Cavallini, Mr. Tommaso Caronia Angitta, Mr. Luigi D’Isernia, Mrs. Loredana Cuzzani and Mrs. Tullia Cerutti among many others, joined the équipe: several of them

since mid-2002, as a consequence of the merging of both medical and nursing teams of “Maggiore”, and S. Orsola Hospital at the S. Orsola Dept. of Infectious Diseases, after the retirement of Prof. Gritti, at the Dept. of Infectious Diseases of the “Maggiore” Hospital of Bologna, Mrs. Wilma Dall’Oro acted as the Chief of Nurses, after Mother Evelina, Mother Gaetana Da Mattei, and Mother Maria Adelaide Ambrosi.

In the nursing team of the integrated HIV/AIDS home service and Home Centre (Centro Casa), Mrs. Nadiolina Assueri and Mrs. Angelica Palladino, gave their excellent support.

At the concierge at service Mrs. Maria Gamberini accepted patients and relatives for both inpatient and outpatient services, followed by Mr. Carmelo (Umberto) Greco and Mrs. Carmela Triolo. At the outpatient acceptance office, Mrs. Franca Fiorini was followed by Mrs. Eleonora Rocca, and later by Mrs. Nunzia Pizarra.

When assessing Pharma companies which co-operated with the University Dept. of Infectious Diseases, we are extremely grateful to: Dr. Michelangelo Simonelli, Dr. Maria Pia Ruffilli, Dr. Massimo Scaccabarozzi, Dr. Sofia La Face, Dr. Giampaolo Pizzarelli, Dr. Stefano Tagliavini, Dr. Vittorio Trevisani, Dr. Giuseppe Zamparo, Dr. Filippo Lorenzo Lodi, Dr. Gianluca Guitti, Dr. Leonardo Zanella, Dr. Enzo Sacchet, Dr. Giovanni Pirazzini, Dr. Andrea Atti, Dr. Cinzia Francesca Dursi, Dr. Angela Pelliconi, Dr. Anna Maria Passoni, Dr. Monica Furlaro, Dr. Federico Pallara, Dr. Massimo Zaccardi, Dr. Achille Metsios, Dr. Stefano Colombi, Dr. Giuseppe Forestieri, Dr. Franco Michelini, Dr. Ivan Di Schiena, Dr. Gianfranco Rocca, Dr. Pier Luigi Ariatti, Dr. Oriano Bonetti, Dr. Costantino Karagiannakos, Dr. Carlotta Tosi, Dr. Cristina Bandini, Dr. Stefano Stefani, Dr. Emanuele Tumminelli, Dr. Francesco Gagliardi, Dr. Vittorio Luxardo, Dr. Marco Bolognesi, Dr. Michele Badolato, Dr. Simona Bonafé, Dr. Paolo Carnemolla, Dr. Luca Carlucci, Dr. Antonio Russo, Dr. Stefania Nicastro, Dr. Valentina Anfossi, Dr. Gianni Morselli, Dr. Giacomo Baroni, Dr. Manuela Lazzarin, Dr. Sara Ciampin, Dr. Stefano Valente, Dr. Erika Federici, Dr. Marco Peracchi, Dr. Monica Bellini, Dr. Renata Mazzuchelli, Dr. Franco Dallavena, Dr. Marco Guizzardi, Dr. Michele Bertolini, Dr. Andrea Ippazio Russo, Dr. Leonardo Zanella, Dr. Fabio Latini, Dr. Luisa Nichelatti, Dr. Cristina Bandini, Dr. Carlotta Tosi, Dr. Mario Micalizzi, Dr. Amedeo Enrico, Dr. Claudio Micozzi, Dr. Patrizia Francario, Dr. Marcello Romeo, Dr. Marco Marchetti, Dr. Claudio Gazzola, Dr. Ivano Baldini, Dr. Gianni Foglianti, Dr. Michele Margotti, Dr. Elisabetta Mengoli, Dr. Martino Alfredo Scalzo, Dr. Maurizio Orsini, Dr. Vincenzo Balzani, Dr. Luigi Marfella, Dr. Anna Mignani, Dr. Domenico Perna, Dr. Renato Siviero, Dr. Pietro Vescia, Dr. Murizio Orsini, Dr. Roberta Boscagli, Dr. Claudio Micozzi, Dr. Marcello Mancini, Dr. Susanna Pruni, Dr. Leonardo Busi, Dr. Sonia Fabbri, Dr. Demetrio Camilli, Dr. Guido Filippi, Dr. Paolo Anelli, Dr. Giuseppe Burgio, Dr. Dante Molinari, Dr. Roberto La Ferla, Dr. Lisa Franceschini, Dr. Ettore Travaglione, Dr. Orazio Ravaglia, Dr. Mario Serritelli.

In the meantime, also Dr. Antonio Mastroianni [19, 20], presently head of the Infectious Diseases Dept. of the SS. Annunziata Hospital of Cosenza, largely contributed to all scientific activities, especially in the field of HIV/AIDS, together with Dr. Olga Viviana Coronado Villagarcía [19, 20], now working at the “Maggiore” and “Bellaria” Hospitals of Bologna. Together with Dr. Giovanni Rezza from the Italian National Institute of Health– “Istituto Superiore di Sanità” of Rome, and together with Dr. Victor Coronado of the US Center of Disease Control and prevention (CDC), of Atlanta, GA, US), Dr. Manfredi investigated relevant epidemiological issues of AIDS-related opportunism [20].

Also, with the “Istituto Superiore di Sanità-ISS”, Dr. Manfredi was involved in multiple clinical studies predominantly regarding HIV and HCV treatment with the novel available antiviral molecules (i.e. ISS-IP1 and ISS-IP2, among many others) [21–23].

In early June 2002, Prof. Francesco Maria Gritti, the head of the Dept. of Infectious Diseases located at the “Maggiore” Hospital and mainly devoted to the care of adult infectious diseases [8, 9] retired from clinical activity, and most of his staff merged with that of the S. Orsola Infectious Diseases clinic. Among them, Dr. Sergio Sabbatani, Dr. Gaetano Di Giandomenico, Dr. Giovanni Fasulo, Dr. Nicola Dentale,

Dr. Giorgio Legnani, Dr. Ciro Fulgaro, and Dr. Luca Guerra, who actively contributed to both health care and scientific progress of the Infectious Diseases clinic in the last two decades. Later, Dr. Leonardo Calza, called as an associate Professor of Infectious Diseases since 2014, increased the scientific activity especially in the field of HIV/AIDS, and emerging infectious diseases [24–26].

In the meantime, Dr. Sergio Sabbatani focused his attention on HIV/AIDS [27,28], tuberculosis, antimicrobial treatment [29], and also on emerging parasitic diseases like malaria, as well as the history of infectious diseases as a whole, from ancient times up to the XX century and beyond [29–39].

Dr. Filippo Fabio Trapani and Alessandra Cascavilla were the last “sons” of Prof. Chiodo, who received their graduation and successfully performed their residency at the S. Orsola Dept. of Infectious Diseases, like Dr. Salvatore Talò and Dr. Lorenza Fortunato, who work since several years at the Emergency Dept. of the “Maggiore” Hospital of Bologna.

After them, only the “Sunset Boulevard” remains for the University Dept. of Infectious Diseases.

But the main interests of the Infectious Diseases clinics of the S. Orsola Hospital had already moved towards the emerging infectious diseases of adults, like HIV/AIDS, chronic viral hepatitis, tuberculosis, and tropical medicine, while the emergence of antibiotic resistance was faced with the continued cooperation with the Microbiology Institute of our School of Medicine & Surgery, formerly headed by the legendary Prof. Michele La Placa [40–42], who moved his Institution from the University district of S. Giacomo Steet into the S. Orsola Hospital (to increase both scientific and clinical activities), and published the monumental textbook of Microbiology which proved a reference for several generations of students and residents [42].

Later, the University Dept. of Microbiology was headed by Prof. Maria Paola Landini, who also became dean of the Medicine and Surgery School of Medicine, and later Scientific Director of the Rizzoli University Orthopedic Hospital.

In the same environment, Prof. Maria Luisa Zerbini, Prof. Monica Musiani and Prof. Roberto Cevenini strongly contributed with their pivotal virological and bacteriological studies also devoted to atypical respiratory and uro-genital bacteria [43], together with Prof. Maria Carla Re [41], who developed all diagnostic assays for the management of HIV and hepatitis infections together with Dr. Giuliano Furlini.

Prof. Giorgio Gallinella is highly interested in both Parvovirus and Papillomavirus (HPV) infections, and is presently a full Professor of Microbiology at the School of Pharmacy of the University of Bologna [43], where also Prof. Aldo Mazzoni and Prof. Giovanna Gentilomi worked.

Prof. Stefania Varani, starting from her research on Cytomegalovirus and all Herpesvirinae with Prof. Landini and Prof. Tiziana Lazzarotto [44, 45], while presently she is exceedingly focused on both virology and parasitology, through innovative molecular biology techniques.

Prof. Vittorio Sambri (who founded the regional reference centre for Microbiological Emergencies (CREEM), where Dr Paolo Gaibani and Dr. Caterina Vocale actively work, among others), later became head of the Microbiology Dept. of the greater Romagna region, and is strongly engaged in the fight against Covid, also in the stomatological environment [46].

Prof. Davide Gibellini is strongly interested in Retrovirology, and now works at the University of Verona [43].

In the area of HIV/AIDS, together with Prof. M. C. Re, Prof. Isabella Bon offers an extremely valuable clinical and scientific support, exploring the virological features of HIV infection in all its aspects, including HIV tropism, antiretroviral resistance testing, and antiretroviral drug toxicity [47].

In the field of opportunistic infections caused by Herpesvirinae, Prof. Tiziana Lazzarotto led extensive research on Cytomegalovirus (CMV) [44, 45], and explored the mechanisms of resistance to anti-CMV antivirals, too, becoming an international chairwoman and referee for these virological issues [44, 45]. She also teaches Microbiology to the students at the University of Bologna School of Dentistry, together with Prof. Claudio Foschi [48].

Prof. Paola Dal Monte has been responsible for many years of the dedicated mycobacteriology laboratory, where antitubercular drug resistance is also tested, and the interferon gamma release assay (IGRA) testing, has been performed since ever [49].

Prof. Marcello Gatti, also expert in Parasitology, was responsible of a detached branch of the Dept. of Microbiology at the University of Bologna Odontoiatric Clinic, in S. Vitale Street.

In the same microbiological environment, the emerging invasive fungal infections in the immunocompromised hosts were faced thanks to the careful attention of Prof. Anna Nanetti and Prof. Aldo Mazzoni [50–52], who was also engaged in bioethics until his death, occurred in the year 2007 [52]. As Prof. Mazzoni, also Prof. Pierluigi Lenzi, an engineer also graduated in Medicine & Surgery who taught Physics and Medical Physiology to Medicine & Surgery students at the Bologna University, later in his career was interested in bioethical issues.

On the other hand, another very fruitful co-operation on sexually transmitted infections (STD), was carried out with the clever help of Prof. Antonietta D'Antuono and Prof. Valeria Gaspari of the University Dermatology Clinic [53], and that of Prof. Luciano Bovicelli and Dr. Brunella Guerra, who were part of the University Dept. of Obstetrics since the first occurrences of maternal-fetal HIV infections the year 1986 [54]. At the same Obstetrics Dept., Prof. Gianluigi Pilu became the Director, after Prof. Nicola Rizzo.

Dr. Roberto Manfredi, whose first scholarly publication of the year 1986 regarded neonatal sepsis [55], was called as an associate Professor of Infectious Disease by the Dean of the University of Bologna School of Medicine Prof. Maria Paola Landini, since 2005. Later, Dr. Manfredi covered all ethiological, epidemiological, clinical, diagnostic, therapeutic and preventive issues of all bacterial, mycobacterial, fungal, viral, and parasitic diseases, in all patients' ages spanning from neonates to the elderly, with special attention devoted to HIV/AIDS subspecialty and antimicrobial treatment, even including psychological, sociological, educational, and bioethical issues [56–59].

After contributing to many monographs, book chapters, and conference proceedings of both Infectious Diseases and Pediatrics [60–83], Dr. Manfredi was interested in emerging infectious diseases like avian flu [84], prion diseases [85, 86], bartonellosis [87, 88], and cytomegalovirus in both otherwise healthy individuals with fever of unknown origin [89], and in the immunocompromised host [44, 45, 90].

His versatility allowed Dr. Manfredi to maintain an active interest for infections of the extreme life ages, from neonates [4, 55, 67, 77], up to the elderly [58, 78–83, 91].

The main interest of Prof. Manfredi remained on HIV infection evaluated in all the different ages, with particular attention paid to congenital infections, its natural history, complications, prevention, and management, including salvage anti-HIV treatment [56, 65, 67, 70–72, 91–95].

Main research fields were also laboratory issues in the evolving clinical features [96], HIV and ageing [83, 91, 97–100], including the role of soluble markers of inflammation led by Prof. Calza with Dr. Roberto Motta, head of the Metropolitan Laboratory Dept. of Bologna [100–102], demonstrated the increased risk of myocardial infarction and other life-threatening cerebral-vascular events in HIV-infected patients treated with a protease inhibitor-based anti-HIV therapy [103].

During time, the increasing co-infections and comorbidities, and the toxicity of the same antiretroviral regimens and their associations, as well as their direct and indirect adverse events were also carefully examined [56, 59, 92–95, 97, 103–113].

The pill burden with the related adherence problems [56, 57–59], and HIV-HCV-hepatitis co-infection were always focused, with adverse events of interferons [10, 114, 115].

All available antiretroviral treatments were assessed as soon as possible, starting with the nucleos(t)ide reverse transcriptase inhibitors (NRTI) zidovudine, didanosine, zalcitabine, stavudine, lamivudine, tenofovir and abacavir [116, 117], continuing with the earlier non-nucleoside reverse transcriptase in-

hibitors (NNRTI) [118], later with protease inhibitors [56, 91–94, 97–113], and finally with enfuvirtide [27], maraviroc, and integrase inhibitors [21–23, 27, 119, 120].

The strong HIV-cancer association was also investigated [56, 121–128].

Particular features of HIV infection and antiretroviral therapy were also studied and commented extensively, as well as the direct and indirect effects produced by “alternative” treatments for HIV disease [129], and the “alternative” adherence to anti-HIV therapy [130]. The natural history of HIV infection was also assessed in the very infrequent long-term non-progressors or elite controllers [131]. The mode of reporting extensive multicentre intercohort worldwide studies was also commented [132].

Other viral infections were carefully considered, like measles and infectious mononucleosis [133], Parvovirus [134, 135], and especially chickenpox in infants, which deserved an Italian national multicentre study aimed to check its natural history, the role of antiviral treatment in sick children and household contacts, and its possible complications [136–140].

When attending the Dept. of Pediatrics of the “Ospedale per gli Infermi” of Faenza (RA), Dr. Manfredi co-operated to several studies, also involving infectious diseases [141–146].

Coming back to Bologna, together with Prof. Chiodo, Dr. Manfredi was engaged in the introduction of a novel recombinant granulocyte-macrophage colony-stimulating factor (rhuGM-CSF) [147], which was successfully employed in both pediatric and adult patients to potentiate antimicrobial chemotherapy, especially in the immunocompromised host, as also demonstrated by laboratory studies [148, 149]. Concurrently, a regional comparative study regarding the use of parenteral and oral beta-lactamases plus beta-lactamase inhibitors was assessed in the lower respiratory tract infections of both children and adults [150, 151]. Another Italian national trial compared azithromycin with erythromycin in pediatric respiratory infections [152].

At the S. Orsola University Hospital, together with Prof. Anna Nanetti, Prof. Manfredi actively monitored all antimicrobial isolates from the different clinical specimens and their evolving antimicrobial susceptibility profile for over two decades [153].

After investigating tuberculosis and its pathomorphism [154], Prof. Manfredi was also interested to atypical mycobacteria in immunocompromised patients [155, 156].

All bacterial infections and the novel antibacterial molecules were evaluated over time [29, 157–167].

All sexually transmitted diseases (STD) were carefully assessed also in adolescents and teenagers, together with their differential diagnosis and their atypical presentations [53, 168–173].

Hepatitis A was fully recognized as a STD [174], while the life-threatening potential of HBV was underlined in all patients taking immunosuppressive agents [175].

HHV-8 infection was found and specifically treated in solid organ transplant recipients [176].

Fungal infections and antimycotic treatment and prophylaxis represented a major focus of clinical and scientific activity [19, 20, 177–187].

Tropical and imported infections were always considered the greatest attention [188, 189], as well as febrile neutropenia in all its causes and presentations [190], autoimmune disorders [191], and the rare but engaging primary immunodeficiencies [192].

Large epidemiological studies on both adults and children exposed to infectious diseases were performed thanks to the valuable support of Prof. Elena Baldi, the Professor of Statistics of the Medicine & Surgery School of Medicine of the University of Bologna [193–195].

Several population pharmacoeconomics issues in all field of Infectious Diseases were also successfully carried out [196–200].

Finally, Prof. Manfredi was engaged in some Italian and International literature reviews and comments mostly regarding Medicine and Infectious Diseases, starting from the Middle Ages until the XX century [201–207].

Working as a fellow and resident, Roberto Manfredi first explored some laboratory issues related to secondary immunodeficiencies at the main laboratory of the S. Orsola University Hospital directed by Dr. Paola Boni after Dr. Giuseppe Sprovieri, working aside with Dr. Onda Cappelletti, later had a more autonomous role in evaluating peripheral lymphocyte subsets at the laboratory facilities with a flow cytometry available at the Dept. of Infectious Diseases, where also multiple parasitology studies were performed thanks to the strong experience of Dr. Maria Assunta Di Bari. From stored frozen serum specimens of the Infectious Diseases laboratory, the prevalence of HIV-2 infection and that of HCV infection were retrospectively estimated in 1989 [10,11,15,16], when specific immunoenzymatic (ELISA) assays became available, by relying on a fully manual technique. The seroprevalence of both *Mycoplasma* and *Chlamydia pneumoniae* among hospitalized HIV-infected patients was retrospectively searched, in cooperation with the team of Prof. Roberto Cevenini at the Microbiology University Dept. [208].

At the main laboratory of the S. Orsola Hospital, Roberto Manfredi met Dr. Gabriele Grossi, a pioneer of high-pressure liquid chromatography (HPLC), later developed by Dr. Matteo Conti in the field of therapeutic drug monitoring (TDM) of all antimicrobial agents, including antiretrovirals. Concurrently, Dr. Angela Guariento and Dr. Maria Grazia Silvestri gave their valuable help to some studies focused on hematological toxicity of zidovudine, the first approved antiretroviral drug since 1985. This work was conducted by photographing the written output of the cytometric machine which showed relevant differences in the erythrocyte mean cellular volume (MCV), according to the ongoing treatment with zidovudine [209].

During his residency in the United States during Summer 1991, Roberto Manfredi attended a stage at the Dept. of Pediatrics of the University of Rochester School of Medicine and Dentistry headed by Prof. Rafael Dolin (one of the main editors of the “Bible” of Infectious Diseases specialists: Mandell-Douglas-Dolin). In this clinical and research centre, the Pediatrician and Researcher Prof. Francis Gigliotti worked at a candidate vaccine against *Pneumocystis carinii* pneumonia in an animal model represented by steroid-immunosuppressed ferrets, and relying on gel electrophoresis techniques carried out on frozen animal and human pulmonary specimens [210].

Later, Dr. Manfredi joined some research projects dealing with a passive immunization against HIV infection, carried out in a collaborative group from Belgrade, London, and Trieste: hundreds of frozen sera have been carefully forwarded abroad for these studies, with Dr. Katia Fiorini as the major collaborator in Bologna [211], while Dr. Barbara Farneti largely co-operated to an Italian national project on liver transplantation in HIV-infected patients (progetto HOST – HIV Organ Sharing & Transplantation”, led by Dr. Paolo Costigliola.

Among his multiple activities, Prof. Chiodo also founded the Emilia-Romagna section of the Italian Association for the fight against AIDS (ANLAIDS), and heralded all services for an integrated home assistance of HIV-infected patients, and also inaugurated the first home lodging “casa alloggio”, and home services (“Centro Casa” for AIDS patient), initially located in downtown Bologna (Irnerio and S. Isaia streets), and later in Sala Bolognese.

These health care and social services had been initially guided by Dr. Elda Caldari (specialist in Infectious Disease), and later supported by Dr. Dario Bragadin, and had got a specific medical and nursing staff, recruited from both S. Orsola and “Maggiore” Infectious Diseases équipes.

But the major caretaker of the entire history on the Medical School of the University of Bologna, the oldest Academic School of the Western world being founded by the legendary friar Irnerio in the year 1088, as evoked by the poet Giosuè Carducci when he acted as the University Rector in the year 1888. After Prof. Raffaele Alberto Bernabeo [212], the present Professor of Medicine History is Stefano Arieti [213], who teaches History of Medicine at many graduate and postgraduate courses of the University of Bologna, holds the oldest medical library of Bologna located in courtyard of the Archiginnasio Palace in downtown Bologna, and leads the “Società Medica Chirurgica of Bologna”, which publishes the

oldest Italian medical journal named “*Bollettino delle Scienze Mediche*”, founded and published since the year 1829, which also hosts all histories and memories of the Bolognese “*Maestri*” of Medicine and Surgery [3].

The pioneers of laboratory and clinical studies of pediatric infectious diseases, and their followers

since mid-1950s, every pavilion of the S. Orsola University Hospital had got its own laboratory facilities, for both assistential and research needs.

Although most laboratory analyses were carried out with homemade facilities and with totally hand-managed instruments and reagents, this objectively difficult and really primordial situation did not hamper the research commitment of the young physicians who populated the laboratories of the clinic, located under the roof of the present entrance pavilion.

First of all, the attention of Prof. Corsini and his researchers was focused on some chemical chemistry and biochemistry issues [214–217].

Prof. Franco Corsini, who headed the Pediatric Laboratory in the 1950s, expanded his interest to cover the study of blood proteins during acute leukemia [218], and was the first scientist to use personal computer (PC) and to teach Medicine students mathematics and statistics in the 1980s when this teaching was temporarily vacant at the Bologna School of Medicine & Surgery. Later, blood malignancies of children will be studied and treated by Prof. Guido Paolucci, who performed the first bone marrow transplantation with his research group including Dr. Pasquale Rosito, Dr. Antonia F. Mancini and Dr. Vico Vecchi [219, 220], who later directed the Dept. of Pediatric of the Ospedale degli Infermi of Rimini.

Recently, the clinical and research group especially devoted to pediatric oncohematology has been led by Prof. Andrea Pession and his excellent coworkers, with Dr. Roberto Rondelli and Dr. Arcangelo Prete, among many others [219, 220]. Mrs. Francesca Predieri holds the Secretariat.

In the meantime, thin layer chromatography and gas chromatography allowed a series of studies on the composition of blood cell membranes in healthy children [221], and later in young patients with rheumatological disorders [222], and dysmetabolic diseases [223–225].

After the early laboratory studies [224], Prof. Emanuele Cacciari and his university team: Prof. Alessandro Cicognani, Prof. Laura Mazzanti (especially interested in rare pediatric diseases), Prof. Silvana Salardi (especially involved in the management of pediatric diabetes mellitus), Prof. Franco Zappulla (who published the nomograms of arterial blood pressure in children and adolescents), and Prof. Paola Tassoni, Prof. Piero Pirazzoli, Prof. Antonio Balsamo, Prof. Alessandra Cassio, Dr. Stefano Zucchini and their excellent co-workers, conducted extensive auxological and endocrinological studies also involving the use of biosynthetic growth hormone [226–228] in children with short stature, which seems to sustain also phagocyte and cell-mediated immune response [229].

Together with Prof. Vittorio Bonomini and Prof. Alba Vangelista, Prof. Raffaella Tazzari focused her interest on pediatric Nephrology also including acute post-streptococcal glomerulonephritis and was actively engaged in the management of immigrated and adopted children [227, 230]. She was followed by Dr. Andrea Pasini, who also expanded his interest towards pediatric dialysis.

Concurrently, Prof. Angela Beccari together with Prof. B. Rondinini, Dr. Vittorio Attard and many Colleagues also working at the Italian National Program “Opera Nazionale Maternità ed Infanzia” (ONMI) of Bologna, investigated many aspects of Laboratory and Clinical Pediatrics [231–239].

At the direction of the Dept. of Pediatric Emergency, some years after Prof. Filippo Bernardi [49], Prof. Marcello Lanari [240–242] came back to Bologna after directing the Dept. of Pediatrics of the “S. Maria della Scaletta” Hospital of Imola (BO), previously headed by Prof. Livio Comellini [243–245],

another “son” of the S. Orsola University School of Pediatrics, like Prof. Domenico Mazzacuva [246]. At the Imola Dept. of Pediatrics, also Dr. Francesco Baldi actively worked. Dr. Salvatore Cazzato, a “son” of Prof. Bernardi presently heads a section of the “Giuseppe Salesi” Children’ Hospital of Ancona, specifically devoted to the care of acute respiratory diseases [49].

Prof. Marcello Lanari has been strongly engaged since ever against acute pediatric infectious diseases, tuberculosis, and Covid-19 [240–242].

Dr. Angela Miniaci matured an extensive experience in pediatric rheumatology and is now a national reference in this field [247].

Prof. Giampaolo Ricci enforced a continued and very valuable co-operation with the University Dermatology Dept., where all children with skin-mucous allergic disorders and infectious complications are evaluated by the Director Prof. Annalisa Patrizi (which followed Prof. Antonella Tosti), together with Dr. Iria Neri and Prof. Bianca Maria Piraccini [248–253].

In the same Dermatology clinic, the valuable histopathology research started under the direction of Prof. Claudio Varotti and was continued by Prof. Beatrice Passarini [250], and at last by Dr. Cosimo Misciali, who also followed Prof. Negosanti in implementing a service devoted to the care of “open” cutaneous lesions, which has its dedicated nursing staff.

Prof. Massimo Negosanti actively contributes to all aspects of cutaneous and venereal diseases [248,249], led the inpatient Division of Dermatology of the S. Orsola Hospital, and taught Dermatology and Venereology for at least three decades, including students of the Bologna School of Dentistry. Later, Prof. Emi Dika, who also teaches at the University School of Dentistry [251], and Prof. Michelangelo La Placa, together with Prof. Valeria Gaspari and their teams also including specialized nurses, continued their fruitful engagement in both clinical and scientific aspects of Dermatology and Venereology, with particular attention focused just on children [252, 253].

At the same University Dept. of Dermatology, Dr. Federico Bardazzi put his long-term expertise on psoriasis also assessing HIV-infected patients, who are more frequently interested by this immune-mediated disorder. He also headed multicentre studies on biological therapies in patients living with HIV [254].

Presently, at the large University Departments of Pediatrics and Pediatric Emergency of the University of Bologna, Dr. Fraia Melchionda and Dr. Ilaria Corsini are highly involved in the management of all acute and chronic infectious and tropical diseases [240–242], while Dr. Arcangelo Prete and Dr. Roberto Rondelli among many others, attend to the prevention and management of infectious complications in the immunocompromised children with malignancies [219, 220].

At the University of Bologna School of Dentistry located in S. Vitale street, whose Prof. Lucio Montebugnoli is the Director after Prof. Carlo Prati and after Giorgio Borea (who encouraged the earliest stomatological studies on HIV-infected patients) [255], Prof. Gabriela Piana teaches Pediatric Dentistry since over three decades, posing her careful attention to children with chromosomal disorders and other special needs [256], usually seen upon birth by Prof. Guido Cocchi and coworkers, at the Neonatology Dept. of the S. Orsola Hospital. Dr. Roberto Manfredi joined the same teaching team since 2005, when he “jumped” from his hospital engagements to the University ones, after becoming an associate professor of Infectious Diseases, and taught Infectious Diseases to Dentistry students among others. He has been also interested in the occupational risk of the dentistry environment [257, 258].

Concurrently, the University Dept. of Hygiene early led Prof. Pierluigi Bisbini, later by Prof. Erica Leoni, Prof. Pier Paolo Legnani and Prof. Laura Dallolio, and subsequently by Prof. Maria Pia Fantini and coworkers, provided a continued, excellent support to enforce public health structures, also during local infectious diseases outbreaks and pandemics, in co-operation with all University, Hospital and territorial Depts. Of Microbiology, Pediatrics, and Hygiene, and keeping a strict link with all pediatricians of the whole Bologna metropolitan area, also considering the recent Covid-19 pandemic

[240–242, 259]. Dr. Antonio Faggioli, followed in the year 1999 by Dr. Anna Rosa Gianninoni, directed the public Hygiene office of the Bologna metropolitan district [12, 13].

From the same Dept. of Hygiene and Public Health also Dr. Gianfranco Finzi and Prof. Paolo Cacciari started their career, which led Dr. Finzi to cover the position of President of the Italian National Association of Hospital Medical Hospital Directors (“Associazione Nazionale Medici Direzionari Ospedalieri – ANMDO”), located in Bologna, and Prof. Paolo Cacciari to become the general manager of the S. Orsola Hospital, after the legendary Prof. Mario Zanetti.

The S. Orsola Hospital Pharmacy played an essential role in approving clinical trials and in providing novel medications and diagnostic assays. It has been formerly directed by Dr. Antonino Raitano, and later by Dr. Cristina Puggioli, together with Dr. Marta Morotti, Dr. Paola Fiacchi and Dr. Roberto Romagnoli. Dr. Primož Juric was responsible for clinical trials. Under the growing pressure of outpatient services in the field of HIV, chronic hepatitis and tuberculosis, a detached section of the Hospital Pharmacy was open at the Infectious Diseases Pavilion, for both distribution and accountability of all antimicrobial agents and other drugs directly available through the Italian National Health Care system (SSN). Dr. Lucia Appolloni, together with Dr. Filomena Piro, Dr. Giulia Pensalfine, Dr. Federica Locchi and many other colleagues, directly cooperate day by day with all outpatient services of the Dept. of Infectious Diseases since over three decades [260].

Infectious risks and needed prophylactic measures of patients undergoing solid organ transplantation were evaluated by Dr. Manfredi and Dr. Ginevra Marinacci, who conceived a dedicated outpatient service named “Ambulatorio Integrato” [261], after creating the Day-Hospital service with Dr. Ricchi, for AIDS patients who needed aerosolized pentamidine as a prophylaxis of pneumocystosis, and any kind of antimicrobial or antineoplastic treatment for all opportunistic AIDS-related disorders [17, 18].

At the University Dept. of Pharmacology located in Irnerio Street and initially directed by Prof. Nicola Montanaro, Dr. Nicola Magrini started his career which led him up to the direction of the Italian Agency of Drugs (AIFA). The same Dept. was attended by Dr. Roberto Manfredi when he was an Infectious Diseases resident.

At the S. Orsola University Hospital, Dr. Manfredi was part of the local committee for the antimicrobial prophylaxis in surgery, together with Dr. Anna Maria Marata of the S. Orsola Dept. of Pharmacology directed by Prof. Ettore Ambrosioni, and with Prof. Anna Nanetti from the Microbiology Dept. Dr. Gabriela Sangiorgi from the main ICU, Dr. Nazareno Manoni of the general Hospital direction, the designated members of the S. Orsola Hospital Pharmacy, and all general and specialistic surgeons, who met every Wednesday afternoon during many months, until the release of these guidelines [262].

Dr. Manfredi also joined Dr. Giovanni Grillone, Dr. Iolter Cattabriga and colleagues, at the specialized cardiological, Cardiac Surgery, and Vascular Surgery ICU Dept. of the S. Orsola Hospital [263].

At the Rizzoli Orthopedic Research center, Dr. Manfredi also attended the laboratory of experimental surgery led by Prof. Roberto Giardino [264], and the laboratory of Immunology and biomaterials directed by Prof. Andrea Facchini with Prof. Erminia Mariani, with their skilled coworkers [265].

Dr. Manfredi also acted as a member of the infection control program at the Rizzoli University Orthopedic Hospital, where he also studied antibiotic-loaded cements with Prof. Armando Giunti, Dr. Laura Campanacci, and Dr. Alessandra Sudanese [266].

At the same Rizzoli Orthopedic Hospital, Dr. Onofrio Donzelli directed the dedicated pediatric section (the former “Ottava Divisione”), mainly dealing with congenital abnormalities of bone and joints, and also bone cancer treatment.

Together with Dr. Cristina Martelli and Dr. Calogero Alfonso, Dr. Manfredi was engaged in the infection control at the Dept. of Orthopedics of the S. Orsola Hospital, directed by Prof. Massimo Laus [267, 268].

In the year 1991, an extensive regional survey was conducted by Dr. Manfredi through the Dept. of Pediatrics of the whole Emilia-Romagna region, to assess infectious diseases issues in both immigrated

and adopted children. The Regional Juvenile Court of Bologna was also involved in providing essential figures [269, 270].

In the year 1995, Dr. Manfredi also led research about the resort to social assistance institutions by patients living with HIV infection, with the co-operation of the Italian National Welfare Office—INPS (Istituto Nazionale Previdenza Sociale) [271].

In the year 1991 together with Dr. Laura Folesani and other primary care and Public Health Pediatricians of Faenza, Dr. Roberto Manfredi validated and updated the guidelines for a correct diagnosis, treatment, and active prevention of Pediatric Infectious Diseases. [272].

Together with Dr. Giuseppe Spinnato, Dr. Donato Zocchi, Dr. Mario Monti of the Dept. of Infectious Diseases of the “Maggiore” Hospital of Bologna [8, 9], and many primary care physicians, he wrote and updated the guidelines of antimicrobial chemotherapy of adult patients for the Bologna metropolitan area, from the year 2000 up to the year 2004 (Commissione Linee-Guida, Indicatori, Farmacovigilanza—CLIFF).

Together with Dr Victor Coronado from the US centers for Diseases control and Prevention (CDC), and with the aid of Dr. Gianni Rezza of the Italian National “Istituto Superiore della Sanità” of Rome, Dr. Manfredi explored some epidemiological issues of AIDS related opportunism [19].

Dr. Manfredi continuously co-operated with the Italian National Health Institute (Istituto Superiore di Sanità—ISS), especially with Dr. Stefano Vella, Dr. Giovanni Rezza, Dr. Liliana Elena

Weimer, Dr. Raffaella Bucciardini, Dr. Vincenzo Fragola, Dr. Mauro Andreotti among many others, particularly with studies around HIV and HCV infections. [20–22]

At the Histopathology Dept., necropsy examinations were carefully performed without particular fear for infectious diseases by Prof. Paolo Scarani [273], who later cured the permanent exhibition of the University Museum “Luigi Cattaneo” devoted to anatomic waxes, located in the Bologna University District of Via Irnerio. Prof. Anton Maria Mancini, Prof. Alessandro Piccaluga, Prof. Giuseppe Nicola Martinelli, Prof. Franco Walter Grigioni and Prof. Antonia D’Errico, together with Prof. Gian Andrea Pasquinelli [274–275], Prof. Michelangelo Fiorentino, Dr. Donatella Santini, Dr. Giulia Alampi, Dr. Nunzio Salfi, Dr. Ornella Leone, Dr. Umberto Gianelli [276], Dr. Maria Letizia Prosperi, Dr. Maria Lucia Tardio, Dr. Giulio Fraternali Orcioni [277] and Dr. Benedetta Fabrizio [278], among many others, offered an excellent feedback in terms of histopathological diagnosis of many opportunistic infections and malignancies especially in HIV/AIDS patients. Prof. Stefano A. Pileri posed his international expertise at the service of lymphopathology and much more [279, 280], followed by Dr. Elena Sabattini.

At the Hematology/Oncology Dept of the Bologna University founded by Prof. Sante Tura from Faenza, Prof. Pierluigi Zinzani, Prof. Giovanni Martinelli (later Director of the Greater Romagna Oncology Institute of Meldola), and Prof. Vittorio Stefoni, offered their expertise in managing AIDS-related hematological malignancies, together with Dr. Elena Sabattini, who guides since many years the outstanding hemolymphopathology Dept. of the S. Orsola University Hospital formerly directed by Prof. Stefano A. Pileri [279, 280], together with Dr. Francesco Bacci. Other relevant contributions in the hematological area in the field of Infectious Diseases come from Dr. Nicola Vianelli in the field of platelet disorders and opportunistic infection control, later joined by Dr. Marta Stanzani, Dr. Paolo Ricci who conducted a continued monitoring of bacterial infections and their *in vitro* susceptibility rate in his inpatient unit together with Prof. Anna Nanetti. Dr. Giuseppe Bandini, Dr. Francesca Bonifazi, and Prof. Elena Zamagni are strongly involved in bone marrow and stem cell transplantation, Dr. Mario Arpinati heads the Day-Hospital Service, and Dr. Marco Finelli is strongly engaged in the myelodysplastic syndrome, as well as in the care of thalassemic patients, whereas Prof. Lucia Catani and Prof. Nicoletta Testoni are responsible for the Hematology clinical and research laboratory in Bologna. Dr. Mauro Fiacchini coordinates the home care assistance of hematological patients.

Among our Hematology consultant, we must remind Dr. Giovanni Visani who later led the Hematology Dept. of the “S. Salvatore” Hospital of Pesaro, after the “legendary” Prof. Guido Lucarelli, who

had to face a “mysterious” hepatitis B outbreak in his Dept., well depicted by his son, the reknown writer Carlo Lucarelli. Dr. Filippo Gherlinzoni, also from the Bologna Hematology school founded by the legendary Prof. Sante Tura, later headed the Hematology Dept. of the Ca’ Foncello” Hospital of Treviso, Dr. Patrizio Mazza headed the Hematology Dept. of he “S. Guseppe Moscati” Hospital of Taranto, while Prof. Monica Bocchia is part of the University of Siena Hematology Dept., and Prof. Roberto Massimo Lemoli joined Prof. Marco Gobbi at the University of Genoa Dept. of Hematology,

In the same University Pavilion, refurbished thanks to the Bolognese Seràgnoli Foundation, Prof. Guido Biasco together with Prof. Giovanni Brandi [281] worked in parallel with Prof. Angelo Martoni, who followed Prof. Franco Pannuti as the Head of the Oncology Dept. of the S. Orsola Hospital. Prof. Pannuti also founded the Italian National association for the home care of cancer (Associazione Nazionale Tumori—ANT), now headed by Dr. Raffaella Pannuti.

The General Surgery Dept. headed by Prof. Giuseppe Gozzetti performed the first hepatic transplantation in adults together with Prof. Alighieri Mazziotti, and the support of the Anesthesiology School founded by the legendary Prof. Carlo Cetrullo, followed by Prof. Gerardo Martinelli and later by Prof. Stefano Faenza. One female child managed by Prof. Gabriella Verucchi has been successfully transplanted, and three decades later she remains well.

Dr. Alessandro Nanni Costa from Bologna is an international pioneer in the field of solid organ transplantation, while the referral centre for organ transplantation was directed by Dr. Lorenza Ridolfi, and later by Dr. Gabriela Sangiorgi, with Dr. Carlo De Cillia as the Infectious Diseases specialist.

Adult ceeliac disease has been discovered by the Prof. Gasbarrini’s School of Internal Medicine at the Univeristy of Bologna with the essential role of Prof. Fiorenza Boncivini. Later, Dr. Umberto Volta became an international national referral in this field [282].

Chronic inflammatory bowel diseases like ulcerative colitis and Chron’s disease usually become apparent in the adolescence, and are managed by Prof. Massimo Campieri and Prof. Paolo Gionchetti, Dr. Fernando Rizzello and Dr. Carlo Calabrese among others [283, 284], with Prof. Gilberto Poggioli and Prof. Mario Lima as surgical refereees, according to patients’ age. In all chronic gastrointestinal disorders including celiac disease, Prof. Giovanni Battista Gasbarrini and Prof. Antonio Gasbarrini are internationally known referees [285], and Prof. Patrizia Brigidi as a major “daughter” of Prof. Giorgio Cantelli Forti, also expanded her studies to the microbiota of preterm infants [286].

At the Dept. of Internal Medicine addressed to endocrinology disorders directed by Prof. Paolo Vezzadini, Dr. Manfredi investigated to role of vasoactive intestinal peptide (VIP) in the pathogenesis of apparently idiopathic, refractory, AIDS-related diarrhea, and posed the basis for its treatment with the somatostatin analogue octreotide [287].

The Angiology/Coagulation Department founded by Prof. Sergio Coccheri, followed by Prof. Gualiero Palareti, and later by Prof. Benilde Cosmi, provides an exemplary support to all scientific and clinical needs of our patients, including studies on hemophilia and lupus anticoagulant in HIV-infected and HCV-infected children and adults. Dr. Giuseppina Roderigo follows hemophiliac children often infected with HIV and/or HCV until adult age [15], while Dr. Cristina Legnani conducts many specialistic laboratory assays, including lupus anticoagulant in HIV-infected patients with aseptic femoral head osteonecrosis [113]. Finally, Dr. Vincenzo De Rosa was one of the earlier “sons” of Prof. Coccheri at his Dept. The Bolognese foundation “Marino Golinelli” generously supports this Dept. since over three decades [15].

At the University of Bologna Dept. of Cardiology directed by Prof. Angelo Branzi, after the “legendary” Prof. Bruno Magnani, Dr. Giovanni Melandri and Dr. Paolo Ortolani acted as the major consultant for HIV-infected patients with acute cardiologic problems [288], while Prof. Raffaele Bugiardini, Prof. Olivia Manfrini, and Dr. Edina Cenko are fruitfully engaged since ever in both primary and secondary prevention of cardiovascular risk, also considering gender issues [289].

At the University Dept. of Ophthalmology directed by Prof. Roberto Caramazza, Prof. Mauro Cellini provided his consultancies for adult patients with infectious diseases [290], while Dr. Simonetta Guidelli Guidi offered her expertise to cover all ophthalmological problems since the neonatal age. In the same field, the founder of Pediatric Ophthalmology at the University of Bologna was Prof. Piero Puddu.

Dr. Domenico Saggese after Prof. Tito Malfatti and Giovanni Farneti, was very interested in children ear, nose, and throat (ENT) disorders, while Dr. Ottavio Cavicchi and Dr. Giovanni Sorrenti provided their availability to visit HIV-infected patients too, starting from the University Dept. of Otolaryngology of Bologna, headed by Prof. Ettore Pirodda after Prof. Pietro Caliceti, and Prof. Vittorio Cenacchi followed by Prof. Alberto Rinaldi Ceroni and Prof. Antonio Pirodda, with Dr. Ernesto Pasquini and Dr. Mauro Righi especially interested in infectious complications of ENT surgery) [291, 292].

Prof. Roberto D'Alessandro "father" of the Evidence based medicine (EBM) at the S. Orsola University Hospital with Dr. Roberto Iovine, Dr. Benilde Cosmi, Dr. Maria Guarino, and Dr. Marco Fusconi, together with Dr. Rita Rinaldi always covered all needs of neurological consultancy in the field of Infectious Diseases, especially in terms of differential diagnosis [293].

Dr. Maddalena Menarini and Dr. Roberto Iovine, who followed the legendary founder of Rehabilitation Medicine Prof. Carlo Menarini [294], provided their skilled rehabilitation expertise for children, after the early in-house-arranged techniques heralded by Prof. Demos Gotti the Infectious Dept., which started from 1950s, with tapis-roulants and some form of hydrokinetic therapy to manage the severe remnants of both poliomyelitis and CNS tuberculosis [3,5, 6,7]. Later, Dr. Roberto Iovine with Dr. Maddalena Menarini, provided evidence-based rehabilitation techniques for HIV-infected patients [295, 296].

Prof. Vittorio Volterra, Prof. Domenico Berardi, Prof. Diana De Ronchi, and Prof. Laura Fratiglioni investigated HIV-associated psychiatric disturbances [297, 298], while Dr. Carlo Lazzari (also specialist in Infectious Diseases) [299], was followed by Dr. Andrea Norcini Pala and Dr. Alessia Spinelli, who devoted their skills to AIDS-associated psychological needs [300].

At the University Radiology Dept. directed by Prof. Romeo Canini, and later by Prof. Maurizio Zompatori, Dr. Giovanni Tani with Dr. Rita Sciutti were responsible for the dedicated pediatric radiology service, which also provided ultrasonography, CT, and MRI examinations when needed, while transfontanellar and hip ultrasonography were directly performed by skilled pediatricians themselves. Regarding CNS MRI imaging, Dr. Monica Maffei from the Dept. of Neuroradiology of the "Bellaria" Hospital of Bologna directed by Prof. Marco Leonardi and later by Prof. Raffaele Lodi, presently acting as the Scientific Director of the "Bellaria" Neurologic Research Hospital of Bologna, offered her excellent advice, acting as a pediatric neuropsychiatry specialist. Prof. Giuseppe Battista and Prof. Claudia Sassi covered the most relevant issues related to opportunistic chest infections among adult hematological patients, and also co-operated with Dr. Manfredi, in pointing out a candidate score system for the radiological follow-up of pulmonary tuberculosis, as well as assessing the thymus volume as an imaging marker of therapeutic response in HIV infected patients [301]. The University Dept. of Radiology had got a detached section at the Dentistry Clinics S. Vitale Street, headed by Prof. Paolo Pisi, who is also the reference for oral surgery, performed by Prof. Cladio Marchetti and Prof. Gian Andrea Pelliccioni with their co-workers [302].

Dr. Carla Serra is an internationally reknown referral for contrast-enhanced and interventional ultrasonography. She was also available to perform carotid ultrasonography study as predictive marker of accelerated ageing and increased cardiovascular risk among HIV-infected patient [100].

Previously, Prof. Renata Caudarella of the University of Bologna Dept. of ageing and Nephrological Science offered her skilled expertise to assess osteoporosis and mineral metabolism in HIV-infected patient, with Dr. Fabio Vescini, later working at the Endocrinology & Metabolism Dept. of the University Hospital "S. Maria della Misericordia" of Udine, and University of Bologna dedicated virologists

Both dual X-ray absorptiometry (DEXA) and calcaneal ultrasonography assays have been used for clinical and scientific purposes, under the leadership of Dr. Marco Borderi [303–307].

Dr. Emilia Scanabissi was the pioneer of the Neuropediatric Dept., followed by Prof. Emilio Franzoni who founded a specific subspecialty also extended to all disturbances of alimentary behaviour together with Prof. Antonia Parneggiani. The Dept. of Pediatric Neuropsychiatry is now directed by Prof. Duccio Maria Cordelli with the same team, including Dr. Filomena Moscano and Dr. Elisabetta Malaspina, among others. In the meantime, Dr. Simona Chiodo is the responsible of a Pediatric Neuropsychiatry unit devoted to the care of children with special needs [308].

At the University of Bologna Dept. of Pediatrics, Prof. Rosanna Lazzari headed both clinics and research in the Pediatric Gastroenterology field, with special attention focused on celiac disease and infectious complications [309].

Prof. Alessandro Degli Esposti, who started and continued his work and his studies at the Bologna Pediatric University School [310, 311], later worked at the “Maggiore” Hospital of Bologna.

Prof. Giorgio Grazia, after his laboratory studies [312–314], headed the research in the tuberculosis, pertussis, and active immunization field [315, 316], and also taught at the Postgraduate School of Infectious Diseases founded by Prof. Demos Gotti, and later directed by Prof. Francesco Chiodo, followed by Prof. Gabriella Verucchi.

An exceedingly elevated number of Pediatricians and Neonatologists coming from the University of Bologna School of Pediatrics covered many relevant positions in the direction and management of both inpatients and outpatient services in Bologna, in the Emilia-Romagna region, and in the entire Italian country.

Among them, we wish to remind Dr. Paolo Minelli [317], head of the Dept. of Pediatrics at the Hospital of Bentivoglio after Prof. Vittorio A. Mei [317]. Dr. Minelli later moved to the Pediatric Dept. of the “Maggiore” Hospital of Bologna, earlier directed by Prof. Gabriele Ambrosioni, who maintained a fruitful interest in all pediatric infectious diseases [246].

Among the S. Orsola “sons” we wish to thank Prof. Paoloantonio Scorza, who directed the Dept. of Pediatrics of the S. Maria delle Croci Hospital of Ravenna [318, 319].

Furthermore, we must report about Prof. Cosimo Vannucchi, who headed the Dept. of Pediatrics of the Morgagni-Pierantoni Hospital of Forlì [320], before the arrival of Prof. Paola Dallacasa from Bologna.

Prof. Italo Santopadre in his paper published in the year 1964 summarized even twenty years of experience in treating tubercular meningitis at the University Clinic of Pediatrics of Bologna [321], which represented a major engagement for Prof. Demos Gotti and his extremely innovative rehabilitation techniques applied to all the severe sequelae of both poliomyelitis and tuberculosis, also providing some support and lodging to their families [3,5–7]. Later, Prof. Santopadre guided the Dept. of Pediatrics of the Arcispedale Santa Maria Nuova of Reggio Emilia [244, 321].

Prof. Danilo Gobesso after his early paper on PCR determination on the cerebrospinal fluid [322], and that around the role of neuroaminic acid as a protection against viral diseases [323], together with Prof. Gianna Piazzini was highly involved in pediatric cardiology, rheumatic fever, and all infectious diseases. [324, 325].

Other great “sons” of the University School of Pediatric are Dr. Fabrizio Sandri, Head of the Dept. of Neonatology and Neonatal Intensive care unit of the Maggiore Hospital of Bologna, together with Dr. Fabrizio Demaria and coworkers, all of them usually dealing with infectious diseases complications of newborns and infants until the recent Covid pandemic [326, 327].

Concurrently, Dr. Sandra Sandri kept the territorial direction of the Dept. of Prevention of the local health care of the Bologna metropolitan area, strongly engaged in vaccination planning, with Dr. Elisabetta Tridapalli [328].

The University School of Surgical Pediatrics founded by Prof. Remigio Dòmini and continued by Prof. Mario Lima, Prof. Marcello Dòmini and Prof. Tommaso Gargano, with their staff including Dr. Michele Libri, Dr. Claudio Antonellini and Dr. Giovanni Ruggeri among others, largely co-operated to correct urological and gastrointestinal malformations leading to repeated and life-threatening infectious complications [329]. The present secretary Mrs. Rita Chiarini followed the historical one, Mrs. Lorella Ansaloni.

Children with congenital heart abnormalities also coming from developing countries are treated surgically by Prof. Gaetano Gargiulo [330], while their medical follow-up were ensured by Prof. Fernando Maria Picchio, followed by Prof. Marco Boncivini, and later by Dr. Andrea Donti and their many co-workers, with Dr. Daniela Prandstraller and Dr. Gabriele Bronzetti, among many excellent specialists [331, 332].

Prof. Simonetta Baroncini headed the pediatric intensive care Dept. at that time, offering prompt and efficient co-operation for all possible needs [333], as well as a continued, excellent scientific feedback. Presently, Dr. Fabio Caramelli directs same Dept., working together with Dr. Rosina De Rose, among many others.

Prof. Bruno Babini, earlier involved in the laboratory research at the Gozzadini Clinic, after working together with Prof. Paoloantonio Scorza [319], later directed the Dept. of Pediatrics of the “S. Maria degli Angeli” Hospital of Adria.

Prof. Franco Lotti, another great “son” of Prof. Gaetano Salvioli, headed the Dept. of Pediatrics of the “Casa Sollievo della Sofferenza” Hospital of San Giovanni Rotondo, especially devoted to pediatric oncohematology until his death [334], when Prof. Andrea Pession took over as a consultant [216].

Prof. Giorgio Manfredi moved to the Pediatric/Neonatology Division of the “Ospedale per gli Infermi” of Faenza, together with Dr. Giovanni Serritelli [55], Dr. Giuseppe Bonfiglioli (who later headed the Dept. of Pediatrics of Pavullo nel Frignano), Dr. Andrea Zucchini (also specialist in Infectious Diseases), [55, 140–145, 149, 335], Dr. Giuliana Monti, (who headed the Dept. of Health care prevention of the local health care unit of Faenza) [55, 94], where also Dr. Maria Teresa Di Fiore worked [142, 143, 222, 335], while Dr. Laura Azzaroli, Dr. Annamaria Metri, Dr. Paolo Ricciardelli, Dr. Imelde Ragazzini [335], Dr. Gaetano Pennacchio, Dr. Ernesto Littera (who later worked at the Hospitals of Vignola and Sassuolo), Dr. Adriano Natale Viteritti, and Dr. Maria Teresa Tosi [224], represented an essential part of the medical team.

Dr. Giovanni Serritelli also spent his skills in the check of all thermal cots and incubators for premature newborns, Dr. Giuseppe Bonfiglioli also performed both hip and tranfontanellar CNS ultrasonography, while Dr. Andrea Zucchini was highly involved in both diagnosis and treatment of allergies, pediatric ultrasonography, and in the screening of cystic fibrosis through updated sweat tests.

Finally, the “grandson” Dr. Claudia Laghi from Faenza, reached the direction of a specialized neonatal intensive care Division at the “Bianchi-Melacrino-Morelli” Hospital of Reggio Calabria.

Among “sons, grandsons”, “relatives” and “friends” of Prof. Demos Gotti and Prof. Francesco Chiodo, we are honored to herewith remind:

Dr. Francesco Guzzo, Dr. Elena Guerra, and Dr. Valeria Mondardini at the “S. Martino” Hospital of Belluno;

Dr. Pier Luigi Capponcelli at the “Giuseppe Castelli” Hospital of Verbania-Pallanza;

Dr. Enzo Raise earlier at the “Maggiore” Hospital of Bologna [8, 9], and is the head of the “S. Giovanni & Paolo” Hospital of Venice, and the “Ospedale dell’Angelo” of Mestre;

Dr. Cristina Beltrami in Florence (at the international “Meyer” Children’s Hospital);

Dr. Ivo Maria Crosato at the Azienda Sanitaria Giuliana-Isontina” of Trieste;

Dr. Bartolomeo Cannella, earlier at the Dept. of Infectious Diseases of the “Ospedale Civile” of Modica, and later at the “Giovanni Paolo II” Hospital of Ragusa;

Dr. Cecilia Donzelli directs the primary care immunization program in Mantua, after several international experiences;

Dr. Lucio Bonazzi [8, 9], earlier at the “Maggiore” Hospital of Bologna, and later Head of the Dept. of Infectious Diseases of the Arcispedale S. Maria Nuova of Reggio Emilia;

Dr. Annagiulia Gramenzi, as an Hepatologist at the Dept. of “Semeiotica Medica” headed by Prof. Muro Bernardi, and later by Prof. Franco Trevisani, at S. Orsola Hospital of Bologna;

Dr. Ezio Lazzari, at the Internal Medicine Dept. directed by Prof. Vincenzo Stanghellini after Prof. Roberto Corinaldesi, at the same S. Orsola Hospital;

Dr. Mario Monti, Dr. Vittorio Vannini, Dr. Maria Gabriella Catalini, Dr. Gian Luigi Trenti, Dr. Mario Zini, Dr. Giovanni Inardi, at the “Maggiore” Hospital of Bologna [8, 9], together with Dr. Olga Viviana Coronado Villagarcia [19, 20].

Dr. Stefano Brighi, Dr. Sandra Brighi, Dr. Carmela Grosso, Dr. Maria Carmela Salluce, Dr. Eleonora Magistrelli at both “Morgagni-Pierantoni Hospital” of Forlì/Cesena and at “Maurizio Bufalini” Hospital of Cesena, formerly directed by Dr. Alessandro Stagno;

Dr. Claudio Cancellieri, Dr. Francesco Allegrini, Dr. Simona Di Cesare, and at the “Morgagni-Pierantoni” Hospital of Forlì, with Dr. Antonio Mastroianni who won the contest to become head of the Dept. of Infectious Diseases of the “Pugliese-Ciaccio” Hospital of Catanzaro, and later won the contest and became Director of the SS. Annunziata Hospital of Cosenza;

Dr. Sergio Ranieri, followed by Dr. Tiziano Zauli (also specialist in Dermatology/Venereology), and later by Paolo Bassi, together with Dr. Giuseppe Ballardini, Dr. Davide De Donà, Dr. Elisabetta Briganti, Dr. Stefania Calzolari, Dr. Caterina Salvadori, and Dr. Michele Pavoni, at the “S. Maria delle Croci” Hospital of Ravenna. Dr. Costantina D’Angelo at the Medical Direction of the “Umberto I” Hospital of Lugo.

Dr. Alessandra Govoni at the S. Maria della Scaletta of Imola, where Dr. Cecilia Pintori works in a private setting;

Prof. Antonio Ferlini, followed by Dr. Francesco Albertini, Dr. Bruno Menni, and Dr. Miriam Zannotti at the “Ospedale per gli Infermi” of Faenza, and the “Umberto I” Hospital of Lugo;

Dr. Massimo Arlotti also specialist in Dermatology/Venereology, head of the Dept. of Infectious Diseases of the “Ospedale degli Infermi” of Rimini after Dr. Renzo Ciammarughi [374], with Dr. Fernanda Mori, Dr. Patrizia Ortolani, Dr. Giorgio Morigi, Dr. Giorgio Gobbi, Dr. Carlo Biagetti, and Dr. Giacomo Vandi;

Dr. Antonio Boschini since ever is the responsible of the S. Patrignano Medical Center located in Coriano, also devoted to the management of infectious diseases, and especially HIV/AIDS;

Dr. Livia Tampellini joined “Médecine sans Frontières”;

Dr. Ruggero Giuliani and Dr. Teresa Sebastiani, from “Médecine sans Frontière” moved to Milan, at “S. Paolo & Carlo Hospital”;

Dr. Elisabetta Freo, also working in Milan, at S. Paolo & Carlo Hospital;

Dr. Daria Pocaterra at the Dept. of Infectious Diseases of the “Luigi Sacco” Hospital of Milan;

Dr. Nirmala Rosseti at the “Galliera” Hospital of Genoa;

Dr. Carlo Lazzari, from Sulmona [299];

Dr. Nicolò Girometti, working at the Chelsea & Westminster Hospital of London;

Dr. Michele Nafissi, Dr. Benedetta Piergentili, and Dr. Sabrina Mariel Spinosa Guzman, at major international Pharma Companies making research in the field of Infectious Diseases and HIV/AIDS.

In the Emilia region, we remember the Colleagues who served in the major Infectious Diseases Depts., usually devoted to the care of adult patients.

At the “Guglielmo da Saliceto” Hospital of Piacenza, Dr. Francesco Alberici who completed his studies at the University of Pavia was followed Dr. Daria Sacchini, who directed the same Dept. until her retirement. Later, the same Dept. is headed by Dr. Mauro Codeluppi, with Dr. Marzio Sisti engaged

in infection control, and Dr. Giovanna Ratti, Dr. Laura Guerra, Dr. Maria Cristina Leoni, Dr. Alberto Faggi, Dr. Franco Paolillo, Dr. Alessandro Ruggieri with Dr. Catrina Valdatta, as active members of the medical team;

At the University of Parma Dept. of Infectious Diseases and Hepatology, Prof. Carlo Ferrari leads the research in the field of chronic HCV/HBV hepatitis with Dr. Anna Degli Antoni and Dr. Carlo Calzetti strongly involved in the care of HIV-hepatitis co-infection. Other staff physicians are: Dr. Arianna Alfieri, Dr. Noemi Bazzanini, Dr. Roberto Bertoni, Dr. Elisabetta Tedeschi, Dr. Elisabetta Biasini, Dr. Carolina Boni, Dr. Gianfranco Elia, Dr. Gabriele Missale, Dr. Elisa Negri, Dr. Andrea Olivani, Dr. Alessandra Orlandini, Dr. Marco Pesci, Dr. Paolo Pizzaferrri, Dr. Claudia Schianchi, Dr. Simona Schivazappa, and Dr. Maria Antonietta Valli.

At the “Arcispedale S. Maria Nuova” of Reggio Emilia, Prof. Franco Fiaccadori was followed by Dr. Luciano Bonazzi, and later by Dr. Giacomo Magnani, with Dr. Enrico Barchi involved since ever in HIV/AIDS. After the retirement of Dr. Magnani, Dr. Marco Massari heads the same Dept., together with Dr. Laura Brigidi, Dr. Giada Chiara Contardi, Dr. Elisa Garlassi, Dr. Guido Menozzi, Dr. Sergio Mezzadri, Dr. Francesca Prati, Dr. Maria Alessandra Ursitti, and Dr. Giuliana Zoboli.

At the Ferrara University Dept., after Prof. Luigi Castagnari, Prof. Carlo Contini came from Rome. He conducts extensive laboratory research on viral, protozoal, and mycobacterial diseases among others, together with Prof. Anastasio Grilli and Prof. Rosario Cultrera.

At the “Arcispedale S. Anna” Dept. of Infectious Diseases of Ferrara previously headed by Dr. Florio Ghinelli, Dr. Marco Libanore is presently the head, maintaining his interest in nosocomial infections among others, with Dr. Laura Sighinolfi involved since ever in HIV/AIDS clinical trials, Mario Panteleoni and Roberto Bicocchi also devoted to inpatients, while Dr. Silvia Carradori is mainly dedicated to HIV and chronic hepatitis outpatients.

At the University of Modena Medical Centre, mainly located in the Hospital “Policlinico” of Modena, the University Dept. of Infectious Diseases was formerly headed by Prof. Franco Squadrini and Prof. Bruno De Rienzo with their team including Dr. Nicola Mongiardo, a very appreciated Infectiologist and also a creative writer like Dr. Piero Grima who acted as the head of the Dept. of Infectious Diseases of the “S. Caterina Novella” Hospital of Galatina.

We herewith are pleased to underline that the world-reknown School of Infectious Diseases of the University of Milan heralded the Italian research and clinics in the world with Prof. Mauro Moroni and Prof. Roberto Esposito in the field of adult patients, and concurrently with Prof. Nicola Principi and Prof. Susanna Esposito in the pediatric area [375, 376].

The chair of Infectious Diseases of the University of Modena was later headed by Prof. Roberto Esposito who came from the University of Milan, and also led for some time the University of Parma Dept. of Infectious Diseases. At this time, the Dept. of Infectious Diseases of the University of Modena is headed by Prof. Cristina Mussini, and her staff is composed by: Prof. Giovanni Guaraldi (who created the multidisciplinary Metabolic Clinic, attracting a multitude of HIV-infected patients from the entire country), together with Dr. Andrea Bedini (who also sent a consultant for the “S. Agostino-Estense” Hospital of Baggiovara), and Dr. Federica Carli, Dr. Luca Corradi, Dr. Gianluca Cuomo, Dr. Margherita Di Gaetano, Dr. Erica Franceschini, Dr. Marianna Menozzi, Dr. Gabriella Orlando, Dr. Cinzia Puzzone, and Dr. Antonella Santoro. At the University of Modena, the eminent chairman of Immunology is Prof. Andrea Cossarizza, who is an outstanding and internationally reknown scientist like Prof. Claudio Franceschi of Bologna, and Prof. Pio Conti of Chieti, Prof. Cossarizza’s interests span from basic to applied sciences, and after studying HIV pathogenesis and antiretroviral related toxicity are now also involved in the fight against the Covid-19 pandemic [377, 378].

We herewith are pleased to underline that the world-reknown School of Infectious Diseases of the University of Milan heralded the Italian research and clinics in the world with Prof. Mauro Moroni and Prof. Roberto Esposito in the field of adult patients, and concurrently with Prof. Nicola Principi and Prof. Susanna Esposito in the pediatric area [337, 338].

Studies and intuitions

the same neuraminic acid assessed in preliminary studies in blood cell membranes during infectious diseases [313, 314, 323], was also found in a free form in the serum of rabbits kept at the Pediatric Clinic, which were experimentally infected with influenza virus in their clinic enclosures (“stabulari”). [314]. This apparently trivial, but truly “visionary” observation must be carefully assessed on the ground of the key role of viral-driven neuraminidase role in the diagnosis and especially in the ethiological treatment of influenza disease with oral oseltamivir and topic zanamivir, both specific anti-influenza neuramidase inhibitors which will become available only around 50 years later [336]. Further experimental studies confirmed the major role of the neuraminic acid in the protection against different infectious diseases, the majority of them of viral origin [313, 314, 323], but still not identifiable with the limited virological resources available in mid-1950s.

C-reactive a key biomarker of inflammation was studied also in the cerebrospinal fluid [322], in a period when the erythrocyte sedimentation rate (ESR) was readily accessible with simple, cheap, and easily accessible instruments located in all the inpatients divisions of the hospital, here also nurses could provide a reliable result at the bedside [337, 338]. Recently, highly sensitive C-reactive protein (hsCRP) was assessed by Prof. Calza as a reliable marker of cardiovascular risk in patients with HIV infection exposed to a protease inhibitor-based antiretroviral therapy [101, 102]. These studies have been carried out thanks to the co-operation of Dr. Carla Serra, a national reknown ultrasonographer who performs routine contrast-enhanced and interventional ultrasonography [100].

Finally, the role of leucocyte membrane surface glycopeptide receptors was hypothesized as the attachment location of many different respiratory viral disease, including Sars-Cov-2 [339–343, 334].

Also Prof. Giovanni Romeo, an eminent Genetist of the University of Bologna awarded by many institutions in the United States, took an active part to these researchers [344].

The strict linkage between the expression of some surface glycoproteins as receptors of many viral respiratory diseases was confirmed during several decades until now, when it represents a key part of the pathogenesis of the Sars-Cov-2 virus disease discovered in the year 2019 [340–343].

But the exceedingly most popular advancement in both Pediatrics and Infectious Diseases Clinics of Bologna was represented by laboratory and clinical studies around the diffusing anti-tuberculosis killed vaccine “Vaccino Diffondente Salvioli—VDS” which showed its extraordinary activity and safety just in an era when tuberculosis was a severe, endemic disease of both adults and children. Many studies were addressed not only in Italy but also in Europe, where the potential of VDS was largely recognized [345–370], from the studies performed by Prof. Gaetano Salvioli, by his son Prof. Gian Paolo Salvioli, and their teams of clinicians and researchers in Bologna, Italy, where the vaccine was administered during two decades to all newborns and children, also in the tuberculosis dedicated outpatient facilities located outside of main city hospitals (the so-called “Dispensari anti-tubercolari”) [364], and proved effective also in the Bologna University Dentistry settings [36, 366, 368, 370].

In Italy the VDS vaccine was replaced by the live attenuated Bacille-Calmette Guerin (BCG) vaccine, mainly under the pressure of French vaccine companies. Presently, BCG remains the only commercially available anti-tubercular vaccine extensively used also in health care and teaching personnel, at all levels, although some people still claim for the return of VDS, especially in the city of Bologna, where this vaccination has been successfully exploited to all newborns for over two decades.

BCG vaccine does not protect from invasive, disseminated, tuberculosis [371], and may cause significant local and regional adverse event in young babies [372], as well as cases of local BCG-itis when its preparation is used for the local treatment of urothelial cancer by vesical instillation [373].

Speaking about the founder of the Gozzadini Pediatric University Clinics Prof. Gaetano Salvioli, we also must strongly underline that the presence of parents together with hospitalized children all over the day was not only allowed, but also actively favored as a fundamental part of the care/cure process.

His son Prof. Gian Paolo Salvioli continued his career in the Neonatology and Child Preventive and Welfare Dept. of the University of Bologna, followed by Prof. Giacomo Faldella, Prof. Guido Cocchi, and later by Prof. Luigi Tommaso Corvaglia. His secretariat was organized by Mrs. Monica Sandri. The team of Prof. Corvaglia include Prof. Santo Arcuri and Dr. Giulia Massinissa Maggini, among many others excellent colleagues.

Prof. Gian Paolo Salvioli also acted as the Dean of the School of Medicine and Surgery of the University of Bologna from the year 1984 up to 1995, and he directed the postdoctoral School of Medicine and Surgery from the year 2007 up to year 2012.

The legendary figure of Prof. Gaetano Salvioli is well depicted by his biographer Prof. Italo Farnetani in the year 2014, 120 years after his birth, as reported below (Farnetani I., *Rivista Società Pediatria Preventiva e Sociale*, 2019, with permission).

Gaetano Salvioli was born on October 19, 1894. His grandfather Gaetano was an eminent pathologist and discovered *Streptococcus pneumoniae*. His uncle Igino continued the familiar medical tradition as a Pathologist in Padua.

The Salvioli's biography is very interesting, since it encompasses a key period of the history of Pediatrics, and it also was full of events which enlightened at least sixty years of the Italian history. Gaetano Salvioli took part in the WWI, finally as a medical officer in Health Care Departments of first-line infantry units. At the end of WWI, Salvioli was only 24 years-old, age presently considered part of the adolescence. After the WWI, he attended a bacteriology laboratory in the city of Trieste, where he was involved in the prevention of several infectious diseases like diphtheria, epidemic meningitis and rickettsial typhus, accessing the "isolation" Hospital. So demonstrating the importance of infectious disease emergencies which characterized all wars since ancient times. Gaetano Salvioli participated with firm belief to the Fiume mission heralded by the poet Gabriele D'Annunzio in September 1919. On Sept. 24, 1919, Salvioli obtained a permanent permission to enter and leave the city at any time. On November 20, 1919, Salvioli had got the privilege to wear the commemorative ribbon attributed to the eminent fellows who gave their major contribution to Fiume mission.

Interestingly, we notice that all references to the Fiume campaign were omitted in the Salvioli's biography during the Fascist period, because of the competition between D'Annunzio and Mussolini. Therefore, at the end of the Fascist regimen, all the references to the Fiume mission came back.

The high level of the scientific activity of Salvioli demonstrated by the opinion of Alessandro Lustig (1857–1937), chairman of Pathology at the University of Florence who acted as a consultant for military health care needs during the war, directly called Salvioli to join his prestigious institution at the University of Florence. From these bases, Salvioli started his brilliant academic career, which allowed him to obtain the prestigious chair of Pediatrics at the University of Bologna.

Both scientific and personal history were influenced and determined by the concurrent scenarios.

The bacteriology attracted the interest of Gaetano Salvioli, since it represented one of the most relevant engagements of military health care, since it allowed a significant epidemiological monitoring.

After his arrival in Padua, more elements of that time concurred to stimulate his interests. Salvioli began to take an interest for the imported diseases with the Italian national colonial missions planned after Libia's conquest. At the same time, thanks to his significant background of pathological and bacteriological knowledge, considered an indispensable basic medical subject at that time, he oriented his interest towards to the Pediatric Clinic directed by Guido Berghinz who formerly was his first teacher of Pediatrics, and later became the Head of the Padua University Clinic of Pediatrics, after the death of his predecessor Prof. Vitale Tedeschi (1854–1919).

From Padua, Gaetano Salvioli moved to the University of Siena, where he had got the direction of the Pediatric University Clinic since the year 1928–29. In the city of Siena, Salvioli organized the 15th Italian National Conference of Pediatrics, held in September, 1934. The political-social environment encompassing the promotion of nutrition and physical activity of children and adolescents was

completely different when compared with those of the subsequent national Conference held in Genoa in September 1938, when the Fascist rule, exalted by the conquest of Ethiopia became more and more self-indulgent and autocratic.

During 1930s, Prof. Salvioli was deeply engaged in the field of tuberculosis. In these years the government established a massive campaign of prevention and treatment of this disease, which deeply hit the general population after the WWI. The anti-tubercular vaccination anticipated by Maragliano, was conducted on children on large scale through the “anatercolina Petragliani”.

Prof. Salvioli realized significant research around the first tubercular infection (primary tuberculosis), and later headed the research and the clinical implementation of the Vaccino Diffondente Salvioli (VDS). In the year 1927 Prof. Salvioli moved to the University of Parma, where he remained one year only, since he came to the University of Bologna, because of the absurd racial laws, which led to the vacancy of the chair of the Bolognese Maurizio Pincherle (1879–1949), who had a Jewish origin. In the year 1946, Prof. Pincherle was re-integrated, by doubling the chair of Clinical Pediatrics at the University of Bologna.

After the discovery of antibiotics, Prof. Salvioli pointed out his interest in the treatment of tubercular meningitis with streptomycin, and to the treatment and rehabilitation of poliomyelitis, a disease that in Italy as well as in the entire European continent remained somewhat sporadic until the first great epidemic occurred in the year 1939. Later, it was characterized by multiple relevant epidemic waves.

The Salvioli's activities well depicted the evolution of the entire medicine after the end of the WWII, until 1980s and later. In the field of Pediatrics, these advances included the development of pediatric hospitals, that of pediatric subspecialties with the need to establish dedicated tertiary care institutions, without foregoing primary care centres, and ameliorate the access of parents as an essential part of the entire care/cure process, which remained a keynote in the entire assistance projects of Prof. Gaetano Salvioli during his entire life.

The progress of neonatal and intensive care treatment of the so-called “immaturi” (premature) neonates, signed another engagement of Salvioli in equipping the Pediatric clinic with a dedicated inpatient section named “Reparto materno-immaturi”, since the year 1954. The first incubators were a gift by UNICEF, created by United Nations in the year 1946, to support the young victims of the WWII. This moment represents another relevant point of contact between the political and the assistential history personally lived by Prof. Gaetano Salvioli himself.

The assistance to premature newborns was a poorly studied subject, since at the end of WWII limited researches were available from Italy, while more detailed reports came from France, Finland, and the United States.

Twenty years after, Prof. Salvioli acted as the Chairman of the 23rd Italian National Conference of Pediatrics in Bologna, held in September 1954, which devoted a major part of the congress program to the clinical and social assistance of premature newborns.

Gaetano Salvioli remains a unique figure for young Clinicians and Researchers, since during his life he carefully exploited all his citizen's duties, without conditioning or limiting his medical activities.

He experienced a difficult adolescence during the WWI, which was a truly destructive war conflict the whole nation.

Later, he participated to the WWI thinking that it was a country's need, as well as the Fiume mission.

Through his active involvement, Prof. Salvioli witnessed his strong commitment as a human being and as a citizen, so that external factors never influenced his attitude towards medical assistance and research. Walking again on his path, we underline that his studies had been always related to nationwide epidemiological and health care needs: this represents the best unbreakable link among the person, the physician and the scientist in the sole person of Gaetano Salvioli.

His studies were a high example of civilian engagement since most of them represented an answer to real healthcare needs of the country. In fact, they were significantly influenced by the greatest epidemiological emergencies of the country after the WWI, and later by the engagement in the fight against both tuberculosis and poliomyelitis, which represented “novel” diseases at that time.

Finally, his engagement in the neonatal intensive care was growing over time, thanks to the progressive evolution of the health care scenarios determined by an ameliorated control of many infectious diseases after the introduction of antibiotics, and the novel, relevant technological advances in the assistance to high-risk neonates.

All Professor Salvioli's activities concurrently covered teaching, research, and medical assistance, always linked by a solid connection. This sober attitude, with maximum attention continuously deserved to sick children, and the concurrent civilian engagement, is the greatest lesson left by Salvioli's to his great family of colleagues and collaborators who followed his projects over the subsequent decades, until now (translated in part from: Italo Farnetani, *Rivista Italiana Pediatria Preventiva e Sociale* 2019, with permission).

Prof. Libero Martoni, born in Fusignano on February 17, 1914, after his graduation in Medicine and Surgery at the University of Bologna in the year 1940, joined the pediatric clinics as an assistant. In the year 1958 he was called to cover the chair of Neonatology and Child Welfare (“Puericultura”) at the University of Genoa. In February 18, 1960, he came back to the University of Bologna to cover the chair of Child Welfare and Nutrition (“Puericultura”). Since 1964, he directed the University Pediatric Clinic as a full Professor of Pediatrics: Prof. Martoni joined teaching, clinical, and scientific activities and authored around 200 publications in the different fields of neonatology, immunology, endocrinology, hematology, hepatology, as well as infectious diseases like pneumonia and tuberculosis. “His membership in multiple international and national societies represents a reward to his exceedingly significant engagements” [translated in part from Francesca Farnetani. Libero Martoni. *Dizionario Biografico degli Italiani—Volume 71* (2008), with permission].

The first full Professor and chairman of Infectious Diseases at the University of Bologna was the Pediatrician Prof. Demos Gotti, who taught Infectious Disease of both children and adults.

Prof. Gotti actively worked at the anti-poliomyelitic centre of the University clinic, founded in the year 1939 by Prof. Gaetano Salvioli. This hub rehabilitation centre located at the University Pediatric clinic, was characterized by an early motor activity, to avoid the severe damage of a prolonged limb paralysis which could not be corrected by the available orthopedic techniques. Both tapis-roulants and early hidro kinesiotherapy were actively performed [7, 8]. These highly innovative issues deserved major attention by both Pediatricians and Orthopedics. In fact, an outstanding international conference on juvenile palsy had been just organized in Bologna, which was also attended by the worldwide famous scientist Prof. Albert Sabin, who early proposed his anti-poliomyelitic live-attenuated oral vaccine.

The University Pediatric clinics has been strongly engaged since ever in the care of tubercular meningitis, in both children and adults. In parallel, the killed anti-tubercular vaccine created by Prof. Gaetano Salvioli (the so-called “Vaccino Diffondente Salvioli”—VDS), was successfully administered to all neonates not only at the Obstetric Clinic of the S. Orsola University Hospital, but also at the other Obstetric Hospital located in D'Azeglio Street, downtown Bologna, during at least two decades. The VDS vaccine ensured an effective protection against tuberculosis, which in the pre-antibiotic era was responsible for very dangerous tuberculosis outbreaks in both household and school settings.

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Figures

Figure 1. The entrance pavilion of the Pediatric Clinics in the year 1977. Its appearance did not change until now, when the pavilion hosts some offices and the main lecture hall of all the present Pediatric Departments [1,2]

Figure 2-10. Health care assistance devoted to young patients victim of poliomyelitis, also included in really visionary rehabilitation projects started by Prof. Demos Gotti in the pediatric clinics of Bologna [7,8]

Figure 11-14. Second inauguration, 6 March 6, 1984, after the earliest inauguration of year 1969.

Figure 15. Third inauguration, November 23, 1999. The novel wing photographed from the entrance of the Obstetrics Pavilion.



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