ANNUAL REPORT
2020–21

Vallabhbhai Patel Chest Institute
University of Delhi, Delhi

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From the Director's Desk

It is my privilege to present the Institute's Annual Report for the year 2020–21. The Institute with the support of the University of Delhi and Ministry of Health and Family Welfare, Government of India, has been able to strive and thrive to achieve its objectives: to conduct research in basic and clinical aspects related to chest diseases, to train post-graduates in Pulmonary and Critical Care Medicine (DM and MD in Pulmonary Medicine) and allied disciplines (MD Microbiology, Biochemistry, Physiology and Pharmacology), and PhD in various subjects, to develop new diagnostic technology and disseminate scientific knowledge related to Chest Medicine to other Institutions of the country and, over and above all, to provide specialised patient care services to patients from India as well as other countries of the Asia during the year under report.

A large number of physicians, paramedical staff and students from other Universities/Institutions/Colleges got training in disciplines, such as Biochemistry, Microbiology, Physiology etc in various departments of the Institute during the year. The research laboratories of the Institute are being equipped with the latest technology to keep pace with the rest of the world.

The research contributions from the Institute are widely acclaimed, funded by various Government Departments, like ICMR, CSIR, Ayush DHR-MoHFW and DRDO. The faculty members and students of the Institute delivered orations, guest lectures and presented papers in the International and National conferences through webinar and virtual mode. The faculty members and students of the Institute received several Awards and Honours in the field of their specialisation. The Institute also organised workshops and eminent experts (virtual mode) shared their experiences.

The Viswanathan Chest Hospital (VCH), the clinical wing of the Institute, is a tertiary care Chest Hospital with state-of-the-art patient-care facilities.

National Tobacco Quitline Services (NTQLS) at VPCI is a pioneering concept in our country to tackle the growing menace of tobacco addiction in a cost-effective manner.

With the aim to disseminate scientific knowledge and latest developments in the field of chest diseases and allied sciences, the Institute continued the publication of its reputed quarterly publication *The Indian Journal of Chest Diseases & Allied Sciences*, in collaboration with the National College of Chest Physicians (India). The journal has wide national and international circulation. Institute also continues to publish its biannual *Newsletter*.

Thrust areas identified for special attention in near-future include COPD, Bronchial Asthma and Lung Cancer.

Prof. Raj Kumar

Annual Report (2020–21)

CONTENTS

MILESTONES OF THE INSTITUTE

April 6,	1949	Foundation stone of the Institute was laid down by Sardar Vallabhbhai Patel.
November,	1951	Ad-hoc Governing Body was appointed by the Executive Council of University of Delhi for administrative affairs of the Institute.
December,	1951	Main building of the Institute was completed.
January 12,	1953	The Institute was formally opened by Rajkumari Amrit Kaur, the Union Minister of Health, Government of India.
		Prof. R. Viswanathan was appointed as the Founder-Director. The grant for 1953- 54 was Rs.2 lakhs.
January 21,	1955	A regular Governing Body was constituted by the Executive Council of the University of Delhi for the management and administration of the Institute.
April 4,	1955	The first meeting of the regular Governing Body was held.
	1955	Prof. A.S. Paintal reported the discovery of lung deflation receptors, a historical landmark in understanding the functioning of lung and its diseases.
July 1,	1957	Prof. R. Viswanathan took over as full-time Director of the Institute. Previously, he was the Deputy Director-General of Health Services, Government of India and Honorary Director of the Institute.
September 24,	1957	Pt. Jawaharlal Nehru said in a message: "It was a brave act of the University of Delhi to start the V.P. Chest Institute".
October 24,	1957	Clinical Research Centre was inaugurated by Dr Rajendra Prasad, President of the Republic of India.
January 24,	1959	Indian Association for Chest Diseases was inaugurated by Sir A.L. Mudaliar. It was re-named as National College of Chest Physicians (India) in January 1981.
July,	1959	*The Indian Journal of Chest Diseases*, a Quarterly Journal, was started under the joint auspices of the V.P. Chest Institute and the Indian Association for Chest Diseases.
July,	1959	A ward of 20 beds was opened to admit patients.
	1959	By a resolution of the Governing Body, V.P. Chest Institute was nominated as a "National Institute for Teaching and Research in Chest and Allied Diseases".
January,	1960	A Diploma course in Tuberculosis Diseases, started in March 1947, was re-named as "Diploma in Tuberculosis and Chest Diseases" (DTCD) from XIV Course. The XV DTCD Course started from July 1960.
April 6,	1961	Foundation Day Celebrations of the Institute was started.
April 7,	1962	Foundation stone of Patel Niwas, a Post Graduate Hostel, was laid down by Dr C.D. Deshmukh, Vice-Chancellor, University of Delhi.
January 26,	1963	A contingent of the Institute staff participated in the Republic Day parade.
February 20-24,	1963	VII International Congress on Diseases of the Chest was held at Vigyan Bhawan under the auspices of V.P. Chest Institute, Indian Association for Chest Diseases and the University of Delhi.

August 1,	1964	Prof. A.S. Paintal joined as the Director of the Institute.
April 6,	1965	Patel Niwas (a PG Student Hostel) was inaugurated by Dr C.D. Deshmukh on the XVI Foundation Day of the Institute.
	1966	Prof. A.S. Paintal was elected as the Fellow of the Royal Society of Edinburgh.
	1969	Padma Shree was awarded to Prof. R. Viswanathan.
	1974	Padma Bhushan was awarded to Prof. R. Viswanathan.
	1981	Prof. A.S. Paintal was elected as the Fellow of the Royal Society of London.
	1984	Prof. A.S. Paintal was elected as the General President of the Indian Science Congress Association [1984-85].
	1985	Prof. H.S. Randhawa was elected as the Vice-President of the International Society for Human and Animal Mycology [1985-88].
	1986	Prof. A.S. Paintal was appointed as the Director-General of the Indian Council of Medical Research.
	1986	Padma Vibhushan was awarded to Prof. A.S. Paintal.
	1986	Prof. A.S. Paintal was elected as the President of the Indian National Science Academy [1986-88].
November 10,	1991	Prof. H.S. Randhawa joined as the Director of the Institute.
October 5,	1998	Dr V.K. Vijayan joined as the Director of the Institute.
April 6,	1999	Golden Jubilee Celebrations of the Foundation Day of the Institute. VPCI Oration was started.
June 14,	1999	24-hour Respiratory Emergency Services were started.
November 12,	1999	His Excellency, Shri K.R. Narayanan, President of India, received the copy of Compendium of Activities (VPCI) 1949-99.
August 30,	2000	A New Ward (with an additional 40 beds) was inaugurated by Dr A.K. Walia, Honourable Minister for Health, Govt. of NCT of Delhi.
	2000	Dr V.K. Vijayan was elected as the International Regent, American College of Chest Physicians [2000-06].
March,	2001	Respiratory Critical Care Unit was started.
March 15,	2001	CT Scan Centre was inaugurated by Honourable Padma Shree Dr C.P. Thakur, the Union Minister of Health and Family Welfare, Government of India.
November 21,	2001	Tobacco Cessation Clinic was started.
August 14,	2002	A State-of-the-Art Oxygen Plant was installed and started.
January 12-14,	2003	International Conference on Chest Diseases and Allied Sciences was held at India Habitat Centre, New Delhi, to commemorate the Golden Jubilee of the Inauguration of the Institute.
	2004	Website of the Institute was started (www.vpci.org.in).
September 24,	2005	Prof. Autar Singh Paintal Memorial Oration was started.
January 10,	2006	An 8-bedded Intensive Care Unit was started.

December 8,	2006	Inauguration of the Golden Jubilee Auditorium by organising an International Symposium on Herbal Drug Research and Therapy in Chest Medicine.
March 2,	2007	The Hospital wing of the Institute, Clinical Research Centre was re-named as "Viswanathan Chest Hospital" in honour of the Founder-Director of the Institute and the Golden Jubilee Auditorium was re-named as "Paintal Memorial Golden Jubilee Auditorium" in honour of the former Director of the Institute by a resolution of the Governing Body.
June 22,	2007	Yoga Therapy and Research Centre [in collaboration with the Morarji Desai National Institute of Yoga (MDNIY), New Delhi], was started.
September 18,	2007	Cardio-pulmonary Rehabilitation Clinic was started.
September 17,	2009	Approval by the University of Delhi to start Superspeciality DM Course in Pulmonary and Critical Care Medicine with an intake of two students per year.
August 3,	2010	Approval by the University of Delhi to start Diploma Course in Allergy and Clinical Immunology in VPCI with an intake of two students per year.
February 12,	2011	National Centre of Respiratory Allergy, Asthma and Immunology was started.
March 15,	2011	Permission from Medical Council of India to start DM (Pulmonary Medicine) course with intake of two students per year from the academic year 2011-12.
June 1,	2011	Prof. S.N. Gaur joined as the Acting Director
November 21,	2012	Prof. Rajendra Prasad joined as the Director of the Institute.
May 7,	2013	DOTS Centre was started.
August 18,	2013	DMA Centenary Institution Award received from Smt Sheila Dikshit, the Hon'ble Chief Minister, Government of NCR, Delhi for the "Outstanding Contribution in the Field of Patient Health Care".
August 23,	2013	New Ward (44 beds) was started.
		VPCI Newsletter was started.
September 15,	2014	VPCI Gym was inaugurated.
January 6,	2015	In the memory of Prof. A.S. Paintal, a museum was opened, which was dedicated to Prof. Paintal's life and contributions in the world of science, inspiring young scientists, researchers and academicians.
May 30,	2016	National Tobacco Quit Line Services, which functions from the Institute was inaugurated by Shri J.P. Nadda, Union Minister of Health and Family Welfare, Government of India, during the "World No Tobacco Day" programme organized by WHO-India, Ministry of Health and Family Welfare, Government of India and the National Heritage City Development and Augmentation Yojana (HRIDAY), at New Delhi.
September 30,	2016	Release of VPCI Postal Envelope by Prof. S.N. Gaur, Director (Acting), VPCI at "Neelambari-2016", a District Level Philately Exhibition organized by Sr. Superintendent of Post Offices, Delhi.
February 20,	2017	VPCI Indoor Games Center was inaugurated.
June 6,	2017	Prof. A. Ray joined as the Acting Director.
November 3,	2017	Prof. Raj Kumar joined as the Acting Director.

December 8,	2017	An MOU was signed between Vallabhbhai Patel Chest Institute (VPCI), University of Delhi, Delhi and Department of Allergology, University Hospital, Munster, Germany (UKM) on Teaching and Training; Exchange of Information and Academic Materials and Exchange of Faculty, Research Scholars and Administrative and Other Staff.
January 12,	2018	Patient Education Centre was inaugurated.
April 6,	2018	Daily Digital Pollen Count Information for Public was inaugurated by Shri J.P. Nadda, Hon'ble Union Minister of Health and Family Welfare, Government of India.
	2018	DM (Pulmonary Medicine) was re-started.
October 15,	2018	The Renovated Kitchen of Viswanathan Chest Hospital (VCH) was inaugurated, which is dedicated to the patients admitted at VCH and ensures hygienic meal.
September 28,	2018	Prof. Raj Kumar joined as the Director of the Institute.
April 1	2019	Started Short-Term Training Programme on Pulmonay Function Test (3 Months Duration).
May 31,	2019	Prof. Raj Kumar, Director VPCI, received the prestigious World No Tobacco Day Award for 2019.
May 31	2019	Prof. CG Uragoda Oration-2019 was awarded to Prof. Raj Kumar in the field of Allergy and Immunotherapy by Sri Lanka College of Pulmonologists at Sri Lanka.
June 7,	2019	Renovated Canteen of the VPCI was re-opened.
September 16,	2019	Registration and Waiting Hall for Patients at VCH was inaugurated.
	2019	VPCI declared as Centre of Excellence for climate sensitive allergic diseases under Naional Program for Climate change and human Health in 2019.
March 4,	2020	Pradhan Mantri Jan Arogya Yojana (PMJAY) Counter at VCH was inaugurated by Shri Ashwini Kumar Choubey, Hon'ble Minister of State for Health and Family Welfare, Government of India.
March 4,	2020	Inauguration of Expanded National Tobacco Quit Line Services by Shri Ashwini Kumar Choubey, Hon'ble Minister of State for Health and Family Welfare, Government of India.
June 16,	2020	Tele Medicine for registered patients was started.
October 1,	2020	Composter-A unit of Solid Waste Management Machine was installed at the Institute by Prof. V.S. Chauhan, Chairman, Governing Body, VPCI.
October 1,	2020	VPCI Mobile Application was launched.
	2020	Post COVID-19 Respiratory Management: Expert Panel Report was published.

Prof. R. Viswanathan-VPCI Oration

1st Oration	April 6, 1999	Prof. N.K. Ganguly, Director-General, Indian Council of Medical Research, New Delhi.
2nd Oration	April 6, 2000	Prof. A.S. Paintal, former Director-General, ICMR and former Director, VPCI.
3rd Oration	April 6, 2001	Dr S. Lakshminarayanan, University of Washington School of Medicine, Washington, Seattle, USA.
4th Oration	April 6, 2002	Dr S. Padmavati, President, All India Heart Foundation and Director, National Heart Institute, New Delhi.
5th Oration	April 7, 2003	Prof. J.S. Bajaj, former Member, Planning Commission, Government of India and former Professor and Head, Department of Medicine, All India Institute of Medical Sciences, New Delhi.
6th Oration	April 6, 2004	Prof. H.S. Randhawa, former Director, V.P. Chest Institute, University of Delhi, Delhi.
7th Oration	April 6, 2005	Prof. Naranjan S. Dhalla, Distinguished Professor and Director, Institute of Cardio-vascular Sciences, St. Boniface General Hospital and Research Centre, University of Manitoba, Winnipeg, Canada.
8th Oration	April 6, 2006	Prof. C.N. Deivanayagam, Former Medical Superintendent, Hospital for Thoracic Medicine, Chennai.
9th Oration	April 6, 2007	Prof. K.K. Talwar, Director, Postgraduate Institute of Medical Education and Research, Chandigarh.
10th Oration	April 6, 2008	Prof. C.R. Babu, former Pro-Vice-Chancellor, University of Delhi, Delhi.
11th Oration	April 7, 2009	Prof. Peter J. Barnes, Head of Respiratory Medicine, Imperial College, London and Professor of Thoracic Medicine and Head of Airway Disease at the National Heart and Lung Institute and Honorary Consultant Physician at Royal Brompton Hospital, London.
12th Oration	April 6, 2010	Prof. M.K. Bhan, Secretary, Government of India, Department of Biotechnology, New Delhi.
13th Oration	April 6, 2011	Dr Vishwa Mohan Katoch, Secretary to the Government of India, Department of Health Research, Ministry of Health and Family Welfare and Director-General, Indian Council of Medical Research, New Delhi.
14th Oration	April 6, 2012	Prof. Sami Bahna, Chief, Allergy and Immunology Section, Lousiana State University, LA, USA, and Past-President, American College of Allergy, Asthma and Immunology, USA.
15th Oration	April 6, 2013	Dr W. Selvamurthy, Former Distinguished Scientist and Chief Controller R&D (LS&IC), DRDO, Ministry of Defence, Government of India, New Delhi.
16th Oration	April 6, 2014	Prof. P.S. Shankar, Emeritus Professor of Medicine, Rajiv Gandhi Institute of Health Sciences, Bangalore, Karnataka.
17th Oration	April 6, 2015	Prof. K.C. Mohanty, former Director-Professor, Department of Chest and TB, K.J. Somaiya Medical College and Hospital, Mumbai.
18th Oration	April 6, 2016	Prof. S.K. Jindal, former Head, Department of Pulmonary Medicine, Post Graduate Institute of Medical Education and Research, Chandigarh.
19th Oration	April 6, 2017	Prof. S.K. Katiyar, former Principal and Dean and Professor and Head, Department of Tuberculosis and Respiratory Diseases, Ganesh Shankar Vidhyarthi Memorial (G.S.V.M.) Medical College, Kanpur.
20th Oration	April 6, 2018	Prof. Randeep Guleria, Director, All India Institute of Medical Sciences, New Delhi.
21st Oration	April 5, 2019	Dr Rohit Sarin, Director, National Institute of Tuberculosis and Respiratory Diseases (NITRD), New Delhi.

Prof. A.S. Paintal Memorial Oration

1st Oration	September 24, 2005	Prof. M.S. Valiathan, Honorary Adviser, Manipal Academy of Higher Education, Manipal (Karnataka).
2nd Oration	September 24, 2006	Prof P.N. Tandon, President, National Brain Research Centre Society, Gurgaon.
3rd Oration	September 24, 2007	Prof. P.N. Srivastava, First Chancellor, Manipur Central University, Imphal and former Vice-Chancellor, Jawaharlal Nehru University, New Delhi.
4th Oration	September 24, 2008	Prof. Nanduri R. Prabhakar, Director, Centre for System Biology of Oxygen Sensing, Department of Medicine, University of Chicago, USA.
5th Oration	September 24, 2009	Prof. Arun Dharmarajan, Winthrop Professor, School of Anatomy and Human Biology, Faculty of Life and Physical Sciences, The University of Western Australia, Nedlands, Perth, Western Australia.
6th Oration	September 24, 2010	Prof. Chulani Tissa Kappagoda, Professor of Medicine, University of California, Davis, USA.
7th Oration	September 23, 2011	Prof. J.S. Guleria, Senior Consultant (General Medicine), Sitaram Bhartia Institute of Science and Research, New Delhi and former Professor and Head, Department of Medicine, and Dean, AIIMS, New Delhi.
8th Oration	September 24, 2012	Prof. S.K. Jain, Senior Consultant, Respiratory Medicine, Max Hospital, Noida, Coordinator, DNB (Respiratory Medicine), Metro Hospital, Noida, Ex-Advisor and Member, Scientific Advisory Committee, NIREH (ICMR), Bhopal and Ex-HOD, Cardio-respiratory Physiology, VPCI.
9th Oration	September 24, 2013	Prof. Samir K. Brahmachari, Secretary, Government of India, Department of Scientific and Industrial Research, and Director-General, CSIR, New Delhi.
10th Oration	September 24, 2014	Prof. M. Fahim, Adjunct Research Professor, Department of Physiology, Hamdard Institute of Medical Sciences and Research, Jamia Hamdard, New Delhi and former Professor and Head, Department of Physiology, VPCI.
11th Oration	September 24, 2015	Prof. A.K. Prasad, Chairman, Influenza Foundation of India, and President, Indian Virological Society and former Professor and Head, Department of Respiratory Virology, VPCI.
12th Oration	September 23, 2016	Dr Ashima Anand, Principal Investigator, DST Research Project, V.P. Chest Institute, university of Delhi, Delhi.
13th Oration	September 22, 2017	Dr K. Ravi, Former Professor and Head, Department of Physiology, V.P. Chest Institute, University of Delhi, Delhi.
14th Oration	September 24, 2018	Dr A.K. Jain, Professor of Excellence, Department of Physiology, Maulana Azad Medical College, New Delhi.
15th Oration	September 24, 2019	Professor V.S. Chauhan, ICGEB, Jawaharlal Nehru University, New Delhi - 110067.

Prof. H.S. Randhawa Oration

1st Oration	January 12, 2015	Prof. Ziauddin Khan, Chairman, Department of Microbiology, Kuwait University, Kuwait.
2nd Oration	January 12, 2016	Prof. Indira Nath, former Faculty Member, Department of Pathology, All India Medical Institute of Medical Sciences, New Delhi.
3rd Oration	January 12, 2017	Prof. Subrata Sinha, Director, National Brain Research Centre, Gurugram, Haryana.
4th Oration	January 12, 2018	Prof. Rajesh S. Gokhale, Former Director, CSIR-IGIB, Delhi.
5th Oration	January 12, 2019	Prof. Yogendra Singh, Department of Zoology, University of Delhi, Delhi.
6th Oration	March 4, 2020	Prof. Rakesh Bhatnagar, Vice Chancellor, Banaras Hindu University, Varanasi, Uttar Pradesh.

Dr V.K. Vijayan Oration

1st Oration	October 26, 2015	Dr Soumya Swaminathan, Secretary, Department of Health Research, Ministry of Health and Family Welfare, Government of India, and Director- General, ICMR, New Delhi.
2nd Oration	October 26, 2016	Prof. Digambar Behera, Head, Department of Pulmonary Medicine, Post-Graduate Institute of Medical Education and Research, Chandigarh.
3rd Oration	October 24, 2017	Prof. Seyed Ehtesham Hasnain, Vice-Chancellor, Jamia Hamdard, New Delhi.
4th Oration	October 24, 2018	Dr J.C. Suri, former Consultant, Professor and Head, Department of Pulmonary, Critical Care and Sleep Medicine, VMMC and Safdarjung Hospital, New Delhi.
5th Oration	October 24, 2019	Dr S.K. Luhadia, Professor and Head, Department of Respiratory Medicine, Geentanjali Medical Coleege and Hospital, Udaipur, Rajasthan.

THE INSTITUTE

The Vallabhbhai Patel Chest Institute (VPCI) is a Post-Graduate Medical Institution devoted to the study of chest diseases. It is located in the Delhi University main campus providing the requisite academic environment in which a wide range of scientific facilities are available in various departments along with an excellent Institute Library.

Objectives

The main objectives of VPCI have been to conduct research on basic and clinical aspects of chest medicine, to train post-graduates in Pulmonary Medicine and allied subjects, to develop new diagnostic technology and to disseminate it to other institutions in the country and to provide specialised clinical and investigative services to patients.

Administration

The VPCI is a maintained Institution of University of Delhi and is fully funded by the Grants-in-Aid received from the Ministry of Health and Family Welfare, Government of India. The Institute is governed and administered by its own Governing Body as Constituted under Ordinance XX (2) of the University of Delhi Act. The Director, who is appointed by the Executive Council of University of Delhi, is the Chief Executive of the Institute. The Director of the Institute also functions as Member-Secretary (Ex-Officio) to the Governing Body of the Institute. The Institute also has a Standing Finance Committee constituted by the Governing Body to make recommendations about its budgetary requirements.

Organisation and Management

The organisation and management of the Institute is through Departmentation of activities based on various areas of specialisation and functions. The Academic, Scientific and Clinical services are organised under the Departments of *Anaesthesiology*, Cardio-respiratory Physiology, Radiodiagnosis and Imaging, Respiratory Allergy and Applied Immunology, Pulmonary Medicine and *Thoracic Surgery*. These Departments along with Outdoor/ Indoor patient care services and Respiratory Emergency section are housed in Viswanathan Chest Hospital. The other Departments of the Institute include Biochemistry, Clinical Biochemistry, Biostatistics, Medical Mycology, Microbiology, Pathology, Pharmacology, Physiology and Respiratory Virology. These Departments are headed by the Faculty Members in the respective fields. The General and Personnel Management including various maintenance activities required for the Institute are supported by administrative services of the Institute, controlled by the Joint Registrar who reports to the Director.

Inauguration of Composter Machine by Prof. V.S. Chauhan, Chairman, Governing Body of the Institute on October 01, 2020

GOVERNING BODY

CHAIRMAN The Vice-Chancellor, University of Delhi (Ex-Officio) or a person nominated by him	**Prof. V.S. Chauhan** Former Director ICGEB, Jawaharlal Nehru University New Delhi - 110067
MEMBERS Treasurer, University of Delhi (Ex-Officio)	**Shri Siya Sharan** *(till 26.08.2020)* **Prof. Kavita Sharma** *(27.08.2020 onwards)*
Two members nominated by the Executive Council, University of Delhi	**Prof. Mahesh Verma** **Prof. Neeta Sehgal**
Dean, Faculty of Medical Sciences, University of Delhi	**Dr Gopesh Mehrotra** *(till 25.11.2020)* **Prof. A.K. Jain** *(26.11.2020 onwards)*
Three members nominated by the Ministry of Health and Family Welfare, Government of India, New Delhi	**Dr Dharmendra Singh Gangwar** Additional Secretary and Financial Advisor **Smt. Gayatri Mishra** Joint Secretary **Dr Sunil Kumar** Director-General of Health Services
One member, not connected with the University, nominated by the Executive Council, University of Delhi	**Prof. Randeep Guleria** *(04.05.2018 onwards)* Director, All India Institute of Medical Sciences, New Delhi – 110 029
One Professor of the Institute by rotation according to seniority for a period of one year	**Prof. Anuradha Chowdhary** *(till 02.11.2020)* **Prof. Anita Kotwani** *(03.11.2020 onwards)*
One Reader or Lecturer of the Institute by rotation according to seniority for a period of one year	**Dr Sonam Spalgais** *(till 02.11.2020)* **Dr Parul Mrigpuri** *(03.11.2020 onwards)*
Representative of Non-teaching Staff of the Institute by rotation (as Special Invitee) according to seniority for a period of one year	**Shri Rajeev Sharma** *(till 28.02.2021)* **Shri Satish Kumar** *(01.03.2021 onwards)*
MEMBER-SECRETARY	
Director Vallabhbhai Patel Chest Institute, University of Delhi, Delhi (Ex-Officio)	**Prof. Raj Kumar**

Standing Finance Committee

Additional Secretary and Financial Advisor — *Chairman*
Ministry of Health and Family Welfare
Government of India
Nirman Bhawan
New Delhi-110 001

Joint Secretary or Nominee — *Member*
Ministry of Health and Family Welfare
Government of India
Nirman Bhawan
New Delhi-110 001

Prof. Madhu Khanna — *Member*
Department of Microbiology
V.P. Chest Institute
University of Delhi,
Delhi -110 007

Joint Registrar — *Member*
V.P. Chest Institute
University of Delhi,
Delhi-110 007

Director — *Member-Secretary*
V.P. Chest Institute
University of Delhi,
Delhi-110 007

Scientific Advisory Committee

Dr D. Behera
Department of Pulmonary Medicine
Post Graduate Institute of Medical Education and Research
Chandigarh
Chairman

Deputy Director–General (Medical)
Ministry of Health and Family Welfare Government of India
New Delhi-110001
Member

Principal
University College of Medical Sciences (UCMS)
Delhi-110095
Member

Director
National Institute of TB and Respiratory Diseases
Sri Aurobindo Marg, New Delhi-110030
Member

Dean, Faculty of Science
University of Delhi, Delhi-110007
Member

Dean, Faculty of Medical Sciences
University of Delhi, Delhi-110007
Member

Prof. Balakrishnan Menon
Department of Pulmonary Medicine
Vallabhbhai Patel Chest Institute
University of Delhi, Delhi-110007
Member
(One year term according to seniorority w.e.f. 01.08.2019 to 31.07.2020)

Dr Nitin Goel (Clinician)
Department of Pulmonary Medicine
Vallabhbhai Patel Chest Institute
University of Delhi, Delhi-110007
Member
(One year w.e.f. 26.03.2021)

Prof. Mandira Varma-Basil
Department of Microbiology
Vallabhbhai Patel Chest Institute
University of Delhi, Delhi-110007
Member
(One year term according to seniorority w.e.f. 01.08.2019 to 31.07.2020)

Prof. Madhu Khanna (Basic Science)
Respiratory Virology Unit
Department of Microbiology
Vallabhbhai Patel Chest Institute
University of Delhi, Delhi-110007
Member
(One year w.e.f. 26.03.2021)

Dr Anant Mohan
Professor and Head
Department of Pulmonary Medicine
All Indian Institute of Medical Sciences
New Delhi-110029
Member

Director
V.P. Chest Institute
University of Delhi, Delhi-110007
Member-Secretary

Human Ethics Committee

Dr D. Behera — *Chairman*
Department of Pulmonary Medicine
Post Graduate Institute of Medical Education and Research
Chandigarh

Prof. B.D. Banerjee — *Member (Basic Medical Scientist)*
Department of Biochemistry
University College of Medical Sciences (UCMS)
Shahdara, Delhi-110 095

Dr Kavita Gulati — *Member (Basic Medical Scientist)*
Department of Pharmacology
Vallabhbhai Patel Chest Institute
University of Delhi, Delhi-110 007

Dr Anant Mohan — *Member (Clinician)*
Professor and Head
Department of Pulmonary Medicine
All Indian Institute of Medical Sciences
New Delhi-110 029

Dr Balakrishnan Menon — *Member (Clinician)*
Department of Pulmonary Medicine
Vallabhbhai Patel Chest Institute
University of Delhi, Delhi-110 007

Shri K Sunil — *Member (Legal)*
Advocate, Supreme Court of India
Patiala House Court New Delhi-110 001

Prof. S.C. Mahapatra — *Member (Social Scientist)*
Sri Venkateshwara College
University of Delhi (South Campus) New Delhi-110 034

Shri Suman Kumar — *Member (Social Scientist, w.e.f. 26.03.2021)*
Advocate, Hight Court of Delhi
New Delhi

Dr Udhay Sinha — *Member (Philosopher)*
IHBAAS
Delhi

Shri Sudhir Sharma — *Member (Lay Person)*
Joint Registrar
University of Delhi, Delhi-110007

Director — *Member-Secretary*
V.P. Chest Institute
University of Delhi, Delhi-110 007

Institutional Animal Ethics Committee

Chairman (Biological Scientist)	**Dr Malini Shariff** Head, Department of Microbiology V.P. Chest Institute University of Delhi, Delhi-110 007
Member (Scientist from Different Discipline of the Institute)	**Dr Mandira Varma-Basil** *(28.3.2018 onwards)* Department of Microbiology
Member (Scientist from Different Discipline)	**Dr Madhu Khanna** Department of Virology of the Institute
Member (Scientist Incharge of Animal House Facility of the Institute)	**Dr Kavita Gulati** *(28.03.2018 onwards)* Department of Pharmacology
Main Nominee of CPCSEA	**Dr Harmeet Singh Rehan** *(28.03.2018 onwards)* Head, Department of Pharmacology Lady Hardinge Medical College New Delhi-110 001
Link Nominee of CPCSEA	**Dr Bal Gangadhar Roy** *(28.03.2018 onwards)* EFA, Institute of Nuclear Medicine and Allied Sciences Delhi-110 054
Nominee of CPCSEA (Scientist from Outside the Institute)	**Dr H.B. Singh** *(28.03.2018 onwards)* Ministry of Science and Technology, New Delhi-110 001
Nominee of CPCSEA (Non Scientific Socially Aware Member)	**Shri Mahendra Yadav** *(upto 20.05.2020 onwards)* Plot No. 61, Flat No. D-2, Sector 5, Rajender Nagar, Ghaziabad-201 005 **Dr S. Gowri Shankar** *(22.07.2020 onwards)* A-702, Gayatri Apartments, Sector 10 Dwarka, New Delhi-110 075
Member-Secretary (Veterinarian of the Institute)	**Dr Rajinder Bajaj**

ORGANISATIONAL STRUCTURE

DIRECTOR

Raj Kumar, MD, MNASc, FNCCP (I), FCAI, MIAOH, MAAAAI

Biochemistry (including Clinical Biochemistry)

Vishwajeet Rohil, MD
(Mrs) Jayeeta Bhodra, MD
Assistant Professor

Biostatistics

Ravishankar N., PhD
Assistant Professor

Microbiology (including Medical Mycology and Respiratory Virology)

(Mrs) Malini Shariff, MD, PhD
Professor
(Mrs) Mandira Varma-Basil, MD, DNB
Professor
(Mrs) Anuradha Chowdhary, MD
Professor
(Mrs) Madhu Khanna, MSc, PhD
Professor

Pathology

(Mrs) Ritu Kulshrestha, MS (Biomedical Sciences), DNB (Pathology), PhD, MNAMS
Professor

Pharmacology

(Mrs) Anita Kotwani, MSc, PhD
Professor
(Mrs) Kavita Gulati, MSc, PhD
Professor
(Mrs) Ajita Kapur, MD
Assistant Professor

Physiology

Vishal Bansal, MD, DNB, PhD, MNAMS, FCCP (USA)
Professor

Pulmonary Medicine

Raj Kumar, MD, MNASc, FNCCP (I), FCAI, MIAOH, MAAAAI
Professor
Balakrishnan Menon, MD, DMRD
Professor
Nitin Goel, MD
Assistant Professor
Sonam Spalgais, DNB
Assistant Professor
(Mrs) Parul Mrigpuri, DNB
Assistant Professor
Siddharth Raj Yadav, MD
Assistant Professor

Viswanathan Chest Hospital

Officer-in-Charge

Raj Kumar
Professor

Library

(Mrs) Uma Tyagi, MPhil (Physics), MLib Sci, PhD
Librarian

Animal House

Rajinder Bajaj, BVSc and AH
Veterinarian (superannuated on 31.10.2020)

Administration

P.R. Santhanam, MA (Publ. Admn), MHRM, MBA, LLB, PGDPM
Joint Registrar

Viswanathan Chest Hospital

The Viswanathan Chest Hospital (VCH) attached to the Vallabhbhai Patel Chest Institute has the following Departments/Facilities to provide specialised investigations and treatment to patients referred to this Institute.

Clinical Facilities

The Viswanathan Chest Hospital (VCH), formerly known as Clinical Research Centre, is the hospital wing of the Institute with the following Departments:

- Pulmonary Medicine
- Radiodiagnosis and Imaging
- Clinical Laboratories of Biochemistry, Microbiology and Pathology
- Anaestheia
- Thoracic Surgery

Facilities available at the Viswanathan Chest Hospital

- Out-patient Department
- In-patient Facility with 128 Beds
- 24 Hours Respiratory Emergency
- 8-bedded Respiratory Intensive Care Unit (with 6 Ventilators)
- Pulmonary Function Laboratory
- Cardio-pulmonary Rehabilitation Clinic
- Sleep Laboratory
- Allergy and Applied Immunology Laboratory
- Clinical Hematology and Pathology Laboratory
- Clinical Biochemistry Laboratory
- Microbiology Laboratory
- Radiology Unit with 64 Slice MDCT Scan Center
- Picture Archiving and Communication Systems (PACS)
- Tobacco Cessation Clinic
- Yoga Therapy and Research Centre

Specialized investigations available at VCH

- Fibreoptic bronchoscopy
- Guided FNAC/Biopsy
- Medical thoracoscopy
- Respiratory allergy skin tests
- Clinical immunology
- BACTEC system for tuberculosis

Detailed data of patients attending VCH during the year are as follows:

Number of new patients attending OPD	8839
Number of follow up patients visiting OPD	17342
Total Outdoor Patients	**26181**
Number of indoor patients	
General Wards	4874
Emergency Wards	2709
Total Indoor Patients	**7583**
Emergency treatment provided	11838
Total number of patients treated in ICU	827
Number of routine and specialised investigations done at VCH during the year	
Arterial blood gases	14569
Bronchoscopy	18
Bronchoalveolar lavage	12
Pulmonary function tests	330
CT scans	1004
Ultrasounds	0
X-rays	14331
Electrocardiogram	3465
Polysomnograms	0
HIV testing	1169
Skin tests	2128
Serum IgE test performed	1495
ANA	0
c-ANCA	0
p-ANCA	0
SCL-70	0
HBsAg	1170
HCV	1170
Serum ACE	498
Vitamin D	0
Thyroid Profile	426
Biochemistry Tests (Blood and Pleural fluid): Patient care	
Blood glucose	2120
Liver function tests	21826
Kidney function tests	8002
Pleural fluid biochemistry	114
HbA1c	716
Lipid profile	318
Total	**33096**

Microbiology

1. Bacteriology Laboratory

Clinical specimens processed for isolation and identification of aerobic pathogens

Nature of Specimen	
Sputum	1372
Urine	241
Bronchial aspirate/ lavage	29
Ascitic fluid	02
Blood	139
Endotracheal aspirate	82
Pus/(FNAC/Tips)	29
Throat/nasal swab	2
Total	**1896**

2. Serology Laboratory

Rheumatoid factor	472
C-reactive protein	265
Widal	03
Total	**740**

3. Anaerobic Culture

4. Mycobacteriology Laboratory

Nature of Specimen

	LJ medium	MGIT	GeneXpert
Sputum	4714	80	1858
Bronchial aspirate	410	28	395
Pleural fluid	206	30	195
ET aspirate	61	27	53
CSF	7	—	7
Pus/Biopsy	34	10	30
FNAC	29	12	20
Total	**5461**	**187**	**2558**

Drug susceptibility test (DST) for *M. tuberculosis*: 131

Line probe assay: Molecular DST for *M. tuberculosis*

Line probe assay for firstline drugs: 19 Line probe assay for *Mycobacterium* sp. 13

Parasitology:

Test for filarial antigen: **10**

5. Mycology (VPCI and other hospitals)

Nature of Specimen	
Sputa	3380
Blood specimens	1203
Bronchial lavage/aspirate/washings/endotracheal aspirate/pleural fluid	719
Blood culture	162

Tissue biopsies/ nasal polyps/skin scrapings/nail scrapings	39
CSF	45
Urine and Miscellaneous (swabs/nasal polyp/ FNAC/discharge/pus)	446
Total	**5994**
Besides, referral service for identification of clinical isolates of fungi was extended to other institutions on request.	

Pathology

1. Hematology Laboratory	
Hemogram	7788
Platelet count	7665
Absolute eosinophil count	1937
Peripheral smear	82
P/S for malarial parasite	10
ESR	354
Total	**17836**

2. Coagulation Laboratory

A total of 429 coagulation tests were done during the period as per details given in	
Bleeding time, Clotting Time (BT, CT)	26
Prothrombin Time (PT)	281
Activated Partial Thromboplastin Time (APTT)	148

3. Clinical Pathology Laboratory

Total of 297 urine analysis were done during the period, including specific gravity, pH, albumin, sugar, microscopic examination and ketone bodies.

4. Histopathology Laboratory

Lung biopsy- TBLB and EBLB	34
CT guided Tru-Cut Biopsy	10
Pleural biopsy	2
Cell block	10
Total	**56**

5. Cytopathology Laboratory:

Sputum	359
BAL fluid	11
FNAB: Percutaneous	68
Transbronchial (TBNA)	06
Bronchial aspirate	05
Pleural fluid	161
Tracheal aspirate	06
Pus Cytology	01
Ascitic fluid	03
Total	**620**

6. Immunohistochemistry was done on Lung biopsies -(TBLB, EBLB, VAT, Tru-cut)/Cell block (Pleural fluid, BALF, FNAB, Sputum)/Fine needle aspiration biopsy (FNAB) (n= 277) using automated immunohistochemical stainer.

Immunohistochemistry	No. of Cases
Napsin	28
KRAS	06
PD-L1	15
Pan CK	34
TTF-1	13
Calretinin	06
WT-1	06
CK-20	10
CK-7	12
CEA	23
Synaptophysin	05
CD56	01
ALK	12
P40	89
CD8	04
FGFR1	08
NSE	01
SMA	01
CD-68	02
Vimentin	06
CD-4	05
CD-45/CLA	10
S-100	03
SP-C	01
Chromogranin	05
EMA	15
P63	01
CD30	01
NR-Kb	03
P40	23
CD1A	02
VEGF	03
CD15	01
FGFR2	08
TGF-(BITA)SYMBOL	03

7. Molecular Pathology Laboratory

Total 231 molecular tests were performed on lung biopsies -(TBLB, EBLB, VAT, Tru-cut)/Cell block (Pleural fluid, BALF, FNAB, Sputum)/Fine needle aspiration biopsy (FNAB) using RT-PCR and Sanger Sequencing techniques.

qRT-PCR tests	Number
EGFR (Tissue)	20
EGFR (Circulating)	06
K-RAS	03
BRAF	20
MiRNA-199a_1	90
Sanger Sequencing tests	**Number**
EGFR-Exons 18	23
EGFR-Exons 19	23
EGFR-Exons 20	23
EGFR-Exons 21	23

8. Cell Culture Laboratory

The cell culture laboratory was continued during this period. Research work on the A549 human alveolar epithelial, THP-1 and U-937 cell line is presently being performed. The TGF-β, SMAD-1-7, MTT assay, cell scratch assay and migration assay are being studied by immunocytochemistry and real time PCR.

9. Nanoparticle Laboratory

The polymeric nanoparticles are being synthesized followed by their surface modification and characterization using; transmission electron microscopy, DLS, Zeta potential, NMR, FTIR and HPLC techniques and studying their functionalization in the context of their surface modifications.

Tobacco Cessation Clinic

Tobacco cessation clinic (TCC) was established at the Vallabhbhai Patel Chest Institute in November, 2001. The activities of TCC were expanded in the year 2002 with the financial support from the World Health Organization (WHO) and Ministry of the Health and Family Welfare, Government of India to make it a more comprehensive programmed Centre. Further, the TCC was upgraded in the year 2009 as Resource Centre for Tobacco Control. The tobacco related deaths and suffering from the diseases caused by tobacco consumption has raised the question that what should be done to protect the people from the trap of vicious circle of tobacco addiction.

The Institute's Tobacco Cessation Clinic has been providing its services since 2001 in the outpatient department at hospital wing from Monday to Friday from 9:00 am to 5:00 pm to the tobacco users. The services are offered at the clinic in the form of Counseling, NRT (nicotine replacement therapy), non-NRT including CoHb monitoring, quit date plan follow-up, telephonic follow-up and pulmonary function test. The clinic is also trying to create awareness among the general public and OPD patients about the negative effects of tobacco and about tobacco cessation through power point presentation, booklet, and videos. Registered person will be called for regular follow up at 2 weeks followed by 1 month, 2 months, 3 months, 6 months and 1 year.

Moreover, Tobacco Cessation Clinic conducts workshops regularly in different parts of Delhi and NCR to train the physicians, counselors, volunteers and other stake holders involved in smoking cessation. Since its inception, TCC has conducted 55 educational programmes for physicians, para-medical professionals and general public. TCC supplies educational materials in the form of booklets, pamphlets, stickers, etc, for physicians and general public. Since the inception of TCC to 31st March, 2021, 8612 new tobacco users and 3587 follow-up tobacco users have availed the services. 43 new and 11 follow-up subjects visited TCC for tobacco cessation from 1st April, 2020 to 31st March, 2021. Number of registered subjects and follow up subjects is less compared to previous years due to covid-19 pandemic.

Year	2020-2021
Registered number of subjects	43
Number of subjects set a quit date	39

Year	2020-2021
Number of subjects followed up	11
Number of subjects medication prescribed	0
Telephonic routine follow up	110+
Subjects contacted	26
Total number of quitters	8

During 1st April, 2020 to 31st March, 2021, 8 subjects quitted their tobacco habit for at least 2 weeks. Follow up calls were made to 43 subjects (Tobacco users) registered in this duration to access their present Quitting status, out of these 26 (60.46%) subjects were connected and the remaining 17 (39.54%) calls could not be contacted due to reasons such as switched off, person not available, expired, call not answering, out of station, caller busy, number does not exist, phone dead, did not turn up for follow up due to covid-19 lockdown, etc. A total of 8 Subjects have quitted their tobacco habit with the sessions of Behavioral Counseling alone.

The continuous abstinence rates among the 8 subjects at 1 year and 9 months was not determined as no patient was registered in April, May, June, July-2020 due to covid-19 pandemic). Continuous abstinence rates at 2 weeks, 1 month, 3 months, 5 months, 6 months were 30.77%, 26.92%, 15.38%, 14.28% and 20% respectively. (Table 1 & 2)

Quitting Status (Telephonic Calls)

Month	2 weeks	1 month	3 months	6 months	9 months	12 months	Contacted
April, 2020	0	0	0	0	0	0	0
May	0	0	0	0	0	N.A	0
June	0	0	0	0	0	N.A	0
July	0	0	0	0	0	N.A	0
Aug	0	0	0	0	N.A	N.A	1
Sep	0	0	0	0	N.A	N.A	3
Oct	1	1	1	1	N.A	N.A	1
Nov	0	0	0	N.A	N.A	N.A	2
Dec	0	0	0	N.A	N.A	N.A	0
Jan, 2021	2	1	1	N.A	N.A	N.A	6
Feb	3	3	N.A	N.A	N.A	N.A	7
Mar	2	2	N.A	N.A	N.A	N.A	6
Total	8	7	2	1	0	0	26

Abstinence Rate of Tobacco Users

Abstinence rate	Subjects	%
2 week abstinence rate (n=26)	8	30.77%
1 month abstinence rate (n=26)	7	26.92%
3 month abstinence rate (n=13)	2	15.38%
5 months abstinence rate (n=7)	1	14.28
6 month abstinence rate (n=5)	1	20%
9 month abstinence rate (n=0)	0	N.A
12 month abstinence rate (n=0)	0	N.A

Yoga Therapy and Research Centre

The Yoga Therapy and Research centre conducts yoga classes in collaboration with the Morarji Desai National Institute of Yoga (MDNIY), New Delhi from Monday to Friday during 8 AM to 4 PM at VPCI.

Yoga training classes run in different batches like general group class from 8 AM to 9 AM and Therapy Class from 11 AM to 12 PM and VPCI Staff class from 1 PM to 2PM. In this different Yoga practices to heal the diseases of patients are taught.

Yoga sessions are specially designed for the management and eradication of different health disorders like bronchial asthma, hypertension, stress, obesity etc, the patients first report to yoga OPD at VPCI during 9 AM to 3 PM, Monday to Friday. Doctors and Yoga staff after obtaining the case history of the patient and necessary counselling is given by the yoga ARO. Then the patient is advised to undergo yoga training and educational session according to individual health problems for a particular period till the healing of the disease. The patient is re-examined to note the improvement made by him/her by the yoga therapist. Then the patient is advised for a regular home programme with an advice to attend the training sessions once or twice a week at the Yoga Centre for better health and quality of life and to keep them healthy. Special Yoga sessions for staff of VPCI are also arranged time to time.

In covid pandemic online classes were conducted and follow ups were done for patients and through phone. They were advised report the improvements once in a week through phone.

Yoga Therapy and Research Centre, Vallabhbhai patel Chest University of Delhi in Collaboration with Morarji Desai National Institute of Yoga, New Delhi organized 5th International Day of Yoga programme on 21st june, 2019 at the Paintal Memorial Golden Jubliee Auditorium of the Instituite in Which Yoga team followed the common yoga protocol and imparted training to all staff, students of VPCI, yoga students and childrens.

Cardio-pulmonary Rehabilitation Clinic (Monday to Friday: 9.00 AM to 1.00 PM)

Cardio-Pulmonary Rehabilitation Clinic at Vishwanathan Chest Hospital, VPCI is involved in the management of patients with chronic respiratory diseases, who have disability in activities of daily living and exercise limitation due to shortness of breath despite being on optimal pharmacological treatment. Due to COVID-19 pandemic, the clinic functioned intermittently as per the government guidelines, and therefore, number of patients were restricted during this duration. Seventeen patients attended the Cardio-Pulmonary Rehabilitation Clinic during the year; 11 for breathing retraining and education and 06 completed supervised rehabilitation programme (Intensive and Maintenance).

Division of Sleep Medicine

Sleep Disorders and Sleep Therapy is a cross-disciplinary area concerned with the psychological and physical health conditions related to sleep disorders and conventional and advanced sleep therapies.

VPCI started the Division of Sleep Medicine in 1999. There has been dramatic growth in clinical activity. The number of patient visits has increased approximately five-fold from fiscal year 2002 to the present. It caters to the need of all in-patients & out-patients with three diagnostic machines functioning.

The Division is managed by experienced staff under the headship of Prof. Raj Kumar and broad range of studies are conducted: overnight sleep studies, split overnight sleep study, WatchPAT diagnostic sleep study, OSA screener and auto CPAP.

Training Course on Pulmonary Rehabilitation from March 9-10, 2021

The mission at the Sleep Division is to provide comprehensive diagnostic evaluation to individuals having symptoms occurring during sleep or while awake and management to respiratory patients of age 18 yrs and above.

Technical staff of the Sleep Medicine Division are fully equipped with knowledge required for sleep studies.

VPCI has trained technical staff dedicated to the diagnosis and treatment of sleep/wake disorders in adults and develop research to lead to a better understanding of normal and abnormal sleep.

The expanded Sleep Medicine Division, located on the first floor of the Vishwanathan Chest Hospital building is 338 square feet in size and has one bed, which is dedicated to research also. The Sleep Division is spacious enough for patients to spend the night and has attached private bathroom with shower. The Division is equipped with new, state-of-the-art equipment.

The Division continues to cater to a wide variety of sleep complaints.

Past clinical research projects include "Prevalence of Obstructive sleep apnea syndrome in Delhi, India"; "A study of sleep-related breathing disorders in chronic obstructive pulmonary disease patients with or without cor-pulmonale"; "Obstructive sleep apnoea, oxidative stress and renal function"; "Obstructive sleep apnoea, oxidative stress and liver function"; "Role of some inflammatory markers in obstructive sleep apnoea: effects of grape seed extract".

Clinical care for the full spectrum of sleep disorders is provided by the outpatient practices.

The Division at present has the following aims and objectives: (1) to provide exceptional health care and support through quality service to all patients with sleep disorders and (2) to conduct high quality research related to sleep disorders (with emphasis on local disease and disorders).

Evaluation and Treatment Options

- CPAP/BiPAP, Mask fitting/Desensitization.
- Sleep consultation/Evaluation/ Sleep Counseling.
- Sleep studies.
- Polysomnography (Includes: EEG, EOG, chin and leg EMG, respiratory monitoring, oxygen saturation, and EKG).
- CPAP titration.
- WatchPAT sleep study.
- Split night polysomnography.

Research in Sleep Medicine Division

Research activities continued to be a major part of the Institute from the year 2002 onwards. **Thirteen Scientific Papers** are published in national and international medical meetings and journals from this Division.

Multidisciplinary Research Unit

The Vallabhbhai Patel Chest Institute was approved a Multidisciplinary Research Unit (MRU) by the Department of Health Research, Government of India and is functional since 2015–16. The MRU is actively involved in various research activities since its inception. The MRU is a part of the Government of India initiative for establishment of multi-disciplinary research units in Government medical colleges/research institutions during the 12th Five year Plan period.

Objectives of the VPCI-DHR-ICMR-MRU are to: (i) undertake research in non-communicable diseases and other need-based research employing newer tools and (ii) promote and encourage quality medical research in the institution. The LRAC was reconstituted in May, 2019 with Dr Nitin Goel and Dr Sonam Spalgais as the internal members and Prof. Kavita Gulati as the Member Secretary and Nodal Officer of MRU. The MRU is actively involved in various research activities, viz. participation in the workshop, meetings with Department of Health Research (DHR), approval of new research proposals, etc. to meet the goals by LRAC. Issue of procurement of equipment as per the requirements of projects (approved in the MRU-DHR-VPCI) besides the indicative list laid down by DHR, was also brought out to DHR vide letter no. VPCI/Admn.II/MRU/2020/6892 dated 07-02-2020. The procurement of equipment, as per rules of the Institute, has been approved by LRAC Chairman Dr Anant Mohan (email dated 24 April, 2020) and other members. The vacant posts i.e. Research Scientist-I (01), Research scientist-II (01), Laboratory technician (01) and Lab Assistant (01) on contract basis has been filled during 2020-2021.

Following six Research Projects are ongoing in the MRU:

1. Extracellular matrix remodelling and expression of matrix metalloproteinases in pulmonary fibrosis.
2. Synthesis of polymeric nano-formulations encapsulated with chemotherapeutic agents for lung cancer treatment.
3. Exploring the potential of G-Quardraplex targeting nanoparticle (GQ-NP) conjugates in lung cancer.
4. Pharmacological studies to evaluate the anti-inflammatory and immunomodulatory effects of *Hibiscus rosa-sinensis* and *Piper nigrum* and their cellular and molecular mechanism of action in experimental models of bronchial asthma.
5. Pharmacological studies to evaluate the anti-inflammatory and immunomodulatory effects of *Aerva Lanata Linn* in experimental model of bronchial asthma and the cellular and molecular mechanism by ICMR.
6. Comparison of COPD characteristics in smokers and non-smokers.

Following Workshops and Training Programmes were organized under the aegis of *MRU-DHR-ICMR-VPCI*

1. Workshop on Biostatistics.
2. Training Course on Pulmonary Rehabilitation.
3. Workshop-cum-Training Programme on Proposal Writing and Ethical Issues in Biomedical Research.

National Centre of Respiratory Allergy, Asthma and Immunology

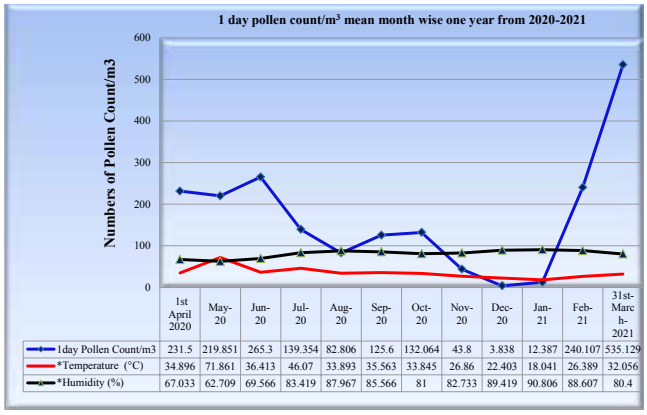
The National Centre of Respiratory Allergy, Asthma and Immunology (NCRAAI) was inaugurated and dedicated in service on February12, 2011 by Prof. P.N. Tandon, Chairman, Governing Body of the Institute and the President, National Brain Research Centre Society, Gurugram, under the supervision of Dr Raj Kumar, Professor and Head, Department of Respiratory Allergy, Asthma and Applied Immunology, VPCI, Delhi. The aim of the Centre is to conduct research and training on various aspects of allergy and asthma (aetiopathogenesis, diagnosis and treatment).

VPCI-Pollen Count Station

The pollens count station was established at the roof of the VPCI multi-storeyed building, in which two "Burkard Air Samplers" have been installed, one is seven day's sampler and the other is one-day sampler. Both the samplers are running continuously and air samples are collected and studied on a daily basis. Details of work done during the period is given below:

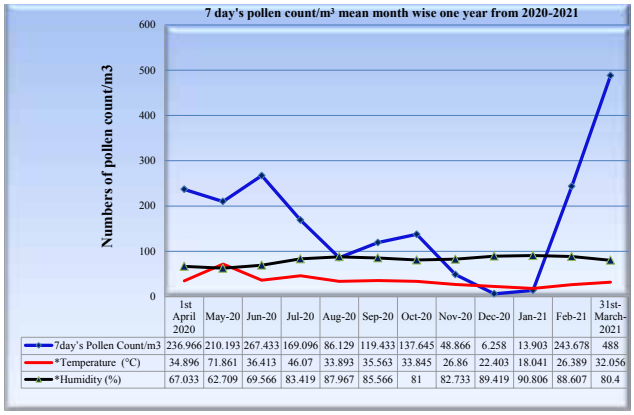
44th Workshop in this series on Respiratory Allergy: Diagnosis and Management, organized by the Institute from May 6-10, 2019.

The total number of slides mounted and analysed during the period 1st April 2020 to 31st March 2021 were 726 out of which 365 were seven day's slides and 361 were one day slides. Total number of 5317 slides were mounted from the establishment of pollen count station to till (2810, seven day's slides and 2507 one-day slides) March 31, 2021.



	1st April 2020	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	31st-March-2021
1day Pollen Count/m3	231.5	219.851	265.3	139.354	82.806	125.6	132.064	43.8	3.838	12.387	240.107	535.129
*Temperature (°C)	34.896	71.861	36.413	46.07	33.893	35.563	33.845	26.86	22.403	18.041	26.389	32.056
*Humidity (%)	67.033	62.709	69.566	83.419	87.967	85.566	81	82.733	89.419	90.806	88.607	80.4

Figure 1. Month-wise mean 1st day Pollen Count/m³, Temperature and Humidity (April 1, 2020– March 31, 2021)



	1st April 2020	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	31st-March-2021
7day's Pollen Count/m3	236.966	210.193	267.433	169.096	86.129	119.433	137.645	48.866	6.258	13.903	243.678	488
*Temperature (°C)	34.896	71.861	36.413	46.07	33.893	35.563	33.845	26.86	22.403	18.041	26.389	32.056
*Humidity (%)	67.033	62.709	69.566	83.419	87.967	85.566	81	82.733	89.419	90.806	88.607	80.4

Figure 2. Month-wise mean 7 days Pollen Count/m3, Temperature and Humidity (April 1, 2020– March 31, 2021)

National Tobacco Quitline Services

National Tobacco Quitline Services (NTQLS) started at VPCI, University of Delhi, Delhi, on 30th May 2016. It is a sponsored scheme of the Ministry of Health and Family Welfare, Government of India. The rationale of this initiative is to provide confidential and nation-wide free of cost telephonic counselling service to enable persons quit tobacco use. The service is accessible through a toll-free number 1800-11-2356, from Tuesday to Sunday (8 AM to 8 PM). The programme is headed under the supervision of Prof. Raj Kumar, Director of the Institute. NTQLS was expanded recently in the year 2020.

The process of NTQLS

- Make a call to the service on toll free number 1800-11-2356.
- All the conversation and information will be kept confidential.
- Select the preferred language (Hindi or English).
- Callers will be registered with this service and the assessment will be done.
- Follow up calls and call back as per callers convenience are made.
- Quit pack will be sent via mail/email.

Call Sequence

Call 1 – Call made by caller.

Call 2 – Pre-quit date call made by the counsellor 3-4 days before the planned quit date

Call 3 – Quit date call made by counsellor on the planned quit date.

Call 4 – Quit date follow up call made by counsellor 3-7 days after the planned quit.

Call 5 – Ongoing support call made by counsellor about 1-3 weeks after the quit date, follow up call.

Progress Report

During the period under report, the total number of calls hitting the IVR were 1105424 at NTQLS. The inbound calls registered were 149773. A total of 58011 quit dates were set for those who called at the NTQLS. The NTQLS enabled many people to quit successfully (15661 quitters this year).

Visitors at NTQLS

Dr V.S Negi, Member, Executive Council, University of Delhi; D.K. Ojha, DDG (Stats), Ministry of Health and Family Welfare, Government of India; Prof. Balram Pani, Dean of Colleges, University of Delhi; Dr Sajal De, AIIMS, Raipur; Dr Jeet Ram Bhatt and Dr Ashima Anand.

E-Hospital Services

Nodal officer along with Mr Sunil Kumar, Technical–in-Charge for implementing E-hospital and associated modules at the Institute as per directions of Ministry of Health and Family Welfare, Government of India. These modules include:

1.	E-hospital	:	Phase-I (Patient registration and Billing)
2.	ORS	:	Online Registration System
3.	Mera Aspataal	:	Patient feedback services
4.	Digital Payment	:	Promotion of digital payment services

Animal House

The Animal House of the Institute is registered for breeding and experiment on animals with the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA), Animal Welfare Division, Government of India, for breeding and conducting experiment on small Laboratory Animals vide registration no. 170/GO/ ReBi/S/99/CPCSEA. All experiments involving animals are approved by the Institutional Animal Ethics Committee (IAEC), constituted by CPCSEA. IAEC keeps a check to promote the humane approach of animal experimentation with the basic objective of providing specifications that will enhance animal care and quality in the pursuit of advancement of scientific knowledge that is relevant to humans and animals.

The Animal House of the Institute provides optimum environment for experimental animals, which is essential for obtaining reliable experimental research. The Animal House of the Institute is being maintained under controlled environment conditions as specified in CPCSEA guidelines with maintained temperature, relative humidity, timer controlled light dark cycle and air change per hour with 100% fresh air.

The Animal House is managed by a team of well qualified Veterinarian, Technical Assistant and Attendants who are experienced and trained in modern methods of animal care, breeding and husbandry.

Library

The VPCI Library is providing patient-care information support and catering to the academic needs of the faculty members, resident doctors, researchers and students alike for research purposes. It forms a part of Institute support services and acquires thought process, collates and disseminates global information in the field of Biomedical Sciences with specialization in pulmonary diseases and allied sciences. The library was started in 1955, but it has back volumes of several journals more than 100 years old. Most of the journals have complete sets of volumes originating right from their treatises of medicine which are readily available for basic and historical insights. It also has a very good comprehensive collection of serial publications, like Annual Reviews, Years books, Recent advances. The Institute has one of the best libraries in the field of Pulmonary Disease and Allied Sciences having 10133 Books, 25025 bound Journals, 175 CD's, 580 Thesis and 27 National and International Reports. A total 16 Journals (05 International and 11 National) are being received on exchange programme with the Institute's Journal (Indian Journal of chest Diseases and Allied Sciences) and 02 Journals (01 International and 01 National) are received on complimentary basis. To cover the need for daily coverage of news related to the medical field, Library is also subscribing four English and four Hindi newspapers. This has encouraged the inculcation of reading habits of all alike.

Library renders its services not only to the scientists/research scholars of the Institute, but also to other Colleges and Institutes of the University of Delhi. The institute is a member of National Level ERMED Consortium (e-journals) for the Calendar since year 2018. ERMED Consortium subscribed 239+ e-journals from five publishers. All e-journals are configured on Static IP / IP's of our Institute. Library initiates appropriate efforts from time to time to create awareness among staff, research scholars, students, etc. to enhance maximum utilisation of e-journals through customised e-journals gateway http://www.ermed.in and benefit of access/download of articles from the 'Cochrane Library'. This is an initiative by 'National Medical Library' which is a collection of six databases that contain different types of high-quality, independent evidence to inform health-care decision-making, and a seventh database that provides information about Cochrane groups through single gatewayhttp://www.cochranelibrary.com. Much emphasis is also laid on to provide abstracts, reference and specific information, if required. Apart from this, online searches are being carried out for providing instant access of Information Resources to the desktop of researchers through LAN (Local Area Network). The Internet services have been provided right on the desktop of each Faculty Member through DUCC network /LAN and a separate Leased line connectivity (VPCI) with 10 Mbps from MTNL. Library also provides inter-library loan facilities and reprographic services on demand.

The Library follows an Open Access System. Library is equipped with modern information technology equipment's and continues to provide Internet/ e-mail services to the users to access CAS (Current Awareness Services) and SDI (Selective Dissemination of Information) services. These are provided to the users in the form of online/offline through e-mail and/or in print during the year. Library uses "LibSys 4.0" Library Management Software, which is an integrated multi-user library management system that supports all in-house operations of the Library. The 'LibSys' consists of modules on acquisition, cataloguing, circulation, serials, article indexing and OPAC.

The Library facilities are available to Members/Users of Delhi University from Monday to Friday from 8:30 AM to 5:30 PM and on Saturday's from 9.00 AM to 5:30 PM.

Publication Division

Publication Division of the Institute has been publishing a quarterly periodical, The Indian Journal of Chest Diseases and Allied Sciences (IJCDAS), in collaboration with the National College of Chest Physicians (India). The Journal was started in 1959 by (late) Prof. R. Viswanathan, Founder-Director of VPCI. The Journal has a wide national and international circulation and is indexed in PubMed, Medline, IndMed, INSEAR, and Ulrich's Directory, etc. Full text articles published in the Journal (July-September 2003 onwards) can be accessed online through the following site:

V.P. Chest Institute's site : http://www.vpci.org.in

The Division is also responsible for documentation and dissemination of research output through Annual Report and other publications of the institute.

DEPARTMENTAL ACTIVITIES

Biochemistry

(Including Biochemistry and Clinical Biochemistry)

Research

Major activities and achievements

The department is providing diagnostic services for indoor and outdoor patients by analyzing the samples using fully automatic autoanalyzers. The total tests done for the period were more than 50,000.

1. MRU – ICMR Project

In the studies to elucidate the role of ellagic acid and its derivative via calreticulin transacetylase in the gene expression profile of lung carcinogenesis, significant upregulation of cyclin dependent kinase inhibitor 1A (p21Cip1) and micro RNA31 (mir31) were observed in the transfected group treated with EAPA+VA above the transfected VA group which is indicative EAPA potentiates the effect of VA in transfected A549 cell line.

2. Studies on erythrocyte membrane protein profile and oxidant and antioxidant status of blood in bronchial asthma

In our earlier study the erythrocyte membrane protein profile through LC/MS/MS, we showed the presence of 97 proteins consisting of ≥2 unique peptides. The abundance ratio of ≥1.5 or ≤0.67 had been considered to identify the proteins significantly upregulated or down regulated. Three proteins showed upregulated and seven proteins downregulated. Besides, several PTMs (phosphorylation and acetylation) were also observed in nine proteins. The PTMs and up/downregulation of these proteins are responsible for the dysregulation of the mechanical strength of rheological strength which may affect the delivery of oxygen to the lungs. The up regulation of GAPDH and PTMs and protein-protein interactions analysis showed that glyceraldehyde-3 phosphate dehydrogenase play an important role in glycolysis and in maintaining the balance between oxidant and antioxidant status in asthma. We have demonstrated a significant correlation of GAPDH with airway obstruction on the basis of FEV1% and oxidative stress in asthma.

3. A study on CRHR1 and GR gene polymorphism and their correlation with the expression of various inflammatory cytokines in asthma in North Indian population

In another study on genetic polymorphism on CRHR1 and GR gene in asthmatics, we observed the presence of 25 SNPs in CRHR1 gene (including three novel SNPs reported for the first time in Indian population). Among these 25 SNPs, 16 were found to be significantly associated with asthma. One SNP in GR gene is found to be significantly associated with asthma.

Biostatistics

The Department of Biostatistics plays a vital role and forms a supportive department of the research activities of the Institute. This department provides the statistical needs of all the research activities i.e. from planning stage of studies or surveys, protocol development designing study schedules/forms, sample size and power determination, collection and validation of data, collation, compilation, generating tables and graphics, analyses of data, and interpretation of the results of various research studies, in order to quantify the effect of risk factors and health interventions on individuals or population. The statistical analysis is being carried out using Statistical Package for Social Sciences (SPSS).

The Department conducts regular teaching programmes for the postgraduates (MD) and doctoral (DM/PhD) students.

The Department has also been entrusted with the responsibility of preparing various reports (monthly, quarterly, half yearly and yearly) of VPCI (pertaining to patients care, patients investigations, patient status, morbidity pattern, communicable and non-communicable diseases; students, faculty and staff, income, expenditure, infrastructure, etc.) and their timely submission to various governmental agencies such as, Ministry of Health and Family Welfare, Government of India; Directorate of Health Services, Government of Delhi; University of Delhi, UGC etc.

The Department shoulders the responsibility of online reporting of vital events, such as mortality and morbidity of notifiable diseases, to the Municipal Corporation of Delhi in stipulated time period.

The Department has identifiable and collaborative research projects with other departments of the Institute.

Workshop on Biostatistics on February 25, 2021

Microbiology

(Including Microbiology, Medical Mycology and Respiratory Virology)

Research

1. Gram-negative bacterial infections in ICU patients: a two-year study

Infectious diseases are one of the leading causes of mortality and morbidity among patients in intensive care unit, and gram-negative bacteria are the most common cause of it. Increasing carbapenem resistance of these isolates makes it difficult to treat, thereby prolonging the hospital stay of patients. Multidrug resistance (MDR) is resistance to at least three classes of antimicrobials. This is a retrospective study including data of 153 ICU patients from 2019 and 2020. Lab data was used to compare the pattern of antibiotic resistance and carbapenem resistant isolates were identified. These resistant isolates were further processed for colistin MIC by microbroth dilution method. The data thus collected was evaluated. Out of a total of 153 patents,114 (74.5%) were males and 39 (25.5%) were females. Majority of organisms isolated were gram-negative bacilli including Acinetobacter species (n=57), Klebsiella pneumoniae (n=43), Pseudomonas aeruginosa (n=31), Enterobacter species (n=1), Enterococcus species (n=1), Escherichia coli (n=3), Corynebacterium striatum (n=4), Stenotrophomonas maltophilia (n=2), MRSA (n=6), Staphylococcus aureus (n=3) and Streptococcus pneumoniae (n=2). 82.5% from these were found to be carbapenem resistant. Out of these carbapenem resistant isolates, colistin sensitivity was found to be intermediate in 63.4% and resistant in 36.6%. Prevalence of carbapenem resistance in ICU patients is 72.5%. Even colistin resistance is very high, i.e. 29.1%. This is an alarming sign. Judicious use of antibiotics as empirical therapy needs to be practised.

2. Phenotypic and molecular characterization of Acinetobacter spp from clinical isolates

Acinetobacter spp are gram-negative, coccobacilli are a major concern for nosocomial infections. Acinetobacter baumanii causes a wide range of infections, such as pneumonia, meningitis, bacteremia, urinary tract infections. Acinetobacter spp has emerged as a significant MDR nosocomial pathogen and is responsible for various infections and increased mortality rates in health-care facilities. The ample use of antimicrobials has led to the emergence of antibiotic-resistant Acinetobacter strains. The objective of this study was to characterize multi-drug resistant Acinetobacter spp by phenotypic as well as molecular methods and to check for the presence of various β-lactamases which is the most common method of resistance through phenotypic tests. The isolates were screened for β-lactamase enzymes including- ESBL, MBL and AmpC β-lactamases. The screening showed a 100% positive result for ESBL, AmpC β-lactamases and 91% for MBL. After screening test, phenotypic confirmatory tests were done and the results showed that out of all the isolates tested for ESBL, MBL and AmpC, β-lactamases, 1% showed confirmatory results for ESBL β-lactamases, 91% for MBL and 41% foe AmpC β-lactamase.

3. Phenotypic and genotypic characterization of multi-drug resistant clinical isolates of *Escherichia coli*

The study involved phenotypic and molecular characterization of multi drug resistant *Escherichia coli*. The aim of the study was to provide better insights into the drug resistant characteristics of clinical isolates, indicating the importance of antimicrobial judiciousness and also the urgent necessity to establish a strong antibiotic resistance surveillance system. Phenotypic detection of 38 *E. coli* clinical isolates was performed using the standard approaches. The enzymes ESBL, MBL, AmpC, and Carbapenemase were phenotypically detected. Phenotypic test results showed that 10 *E. coli* isolates were ESBL, 5 were MBL and 38 were AmpC producers. Modified-Hodge test confirmed that 23 clinical isolates produced carbapenamase. Further, the presence of ESBL, MBL and Oxacillinase enzymes, that are responsible for drug resistance, were tested by PCR. It was observed that ESBL production was highly prevalent among clinical isolates as compared to MBL and Oxacillinase. In a total of 38 clinical isolates, ESBL genes were the most detected in 37 (97.3%) of the total isolates followed by MBL genes in 35 (92.1%) isolates and Oxacillinase genes in 12 (31.6%) isolates. The blaSHV gene was found to be the most common (26.3 %) among ESBL producing *E. coli* isolates. A very low levels of blaVEB, blaGES and blaPER and no evidence of the blaTEM gene was observed. 12 (31.5%) isolates tested positive for OXA-48. In this study, 9 E. *coli* isolates simultaneously carried ESBL, MBL, and oxacillinase encoding genes.

4. Hospital infection control surveillance

Routine surveillance of the hospital was performed at regular intervals to screen the presence of pathogens. Various samples from ICU and wards, like suction ports, oxygen masks and ports, mattresses, airbed, bed railings, hand swabs from health-care professionals working in these units, environment samples etc were collected in the months October to December 2020 and March 2021. A total of 90 samples were tested. The reports were submitted along with the recommendations.

5. Characterization of PE-PPE genes for potential use in a diagnostic assay to identify *Mycobacterium tuberculosis*

Early diagnosis and treatment of TB remains a major health problem hampering TB control worldwide. The shortcomings of currently available diagnostic methods prompted us to develop a rapid, inexpensive and easy to use diagnostic method. To achieve this, we searched for genes that were highly specific for the *Mycobacterium tuberculosis* Complex (MTBC), were conserved and were preferably on the cell wall. One such family of genes with these characteristics is the PE and PPE gene family. Twelve genes from PE and PPE family were selected after BLAST (Basic local alignment search tool) and sequence variation analysis. The sequence variation was studied by performing Sanger sequencing on a panel of 30 clinical isolates. The least polymorphic or the genes without any SNP (single nucleotide polymorphism) were further subjected to transcriptomic analysis under various stress conditions. Six genes that were conserved during stress conditions were finally selected for further experiments. PCR were also performed with nontuberculous mycobacteria (NTM). Although BLAST analysis had shown that the genes were specific to MTBC, PCR using NTM as target genes showed amplification of a few genes. Hence, only two PE genes were selected and were taken up for cloning experiments.

6. Whole genome sequencing of isoniazid monoresistant clinical isolates of *Mycobacterium tuberculosis* reveals novel genetic polymorphisms

Inadequate detection of drug resistance in *M. tuberculosis* may counter the progress made towards global tuberculosis (TB) control. Though several molecular assays have been developed for rapid diagnosis of drug resistant TB, these are limited by the fact that these target canonical mutations. The problem is compounded for isoniazid (INH) due to the involvement of multiple genes in INH resistance including katG, inhA and fabG promoter. Since INH is a crucial first-line anti-tuberculosis agent, INH resistance can affect therapy and also be a precursor to multi-drug resistant TB (MDR-TB). Here, we report an analysis of two INH monoresistant isolates, ASTS24/13 (INHR1) and SHR1/14 (INHR2). Targeted Sanger sequencing was unable to detect the mechanism of resistance in INHR1, while INHR2 had a canonical mutation at katG315. Infection of THP-1 cells and exposure to anti-tuberculosis drugs led to a two-fold increase in the minimum inhibitory concentration (MIC) of INH in INHR2.Whole genome sequence (WGS) revealed that INHR1 and INHR2 belonged to the Delhi Central Asian Strain (Delhi CAS) and East African Indian (EAI) lineages, respectively. The sequences were compared with INH susceptible isolates with the same lineage as the INH monoresistant strains. The strain INHR1 had novel unique mutations in the efflux pump gene Rv0849, while the strain INHR2 had a novel mutation R57S in the efflux pump gene mmpL5. A comparison of the lipid associated genes showed novel mutations in INHR1 in the genes fadE16, fadD3 and fbpD; while INHR2 had mutations in fadE1, Rv0145, Rv01425, fadD9 and mmaA3. Similarly, INHR1 had novel mutations in cell wall associated genes Rv0178 and pitB, while INHR2 carried novel mutations in eight cell wall associated genes. The results of our study highlight the importance of searching for alternate mechanisms of INH resistance that could contribute to the development of more comprehensive diagnostic tools.

7. Cell intrusion proteins of *Mycobacterium tuberculosis*

The present work aims to make an attempt to explore the genes responsible for cell intrusion and to investigate differences in these genes between various clades and lineages of *M. tuberculosis* in an attempt to identify novel targets towards the development of an effective vaccine. Mammalian cell entry (mce) operon has been described and confers mycobacteria with the ability to enter into mammalian cells and survive inside the macrophage. We also investigated the NlpC60 genes, hypothetically concerned with cell intrusion of *M. tuberculosis* to build upon our armamentarium of cell intrusion that can be targeted as potential vaccine candidates. The upregulation of these genes is currently being investigated under stress conditions.

8. Skin and soft-tissue infections due to rapidly growing mycobacteria

Rapidly growing mycobacteria (RGM) are increasingly being recognized as potential pathogens. RGM, particularly *M. abscessus, M. fortuitum*, and *M. chelonae*, have been observed in both pulmonary and extra-pulmonary infections including cutaneous, soft-tissue, and wound infections. However, there are limited reports of these potential pathogens from skin and soft-tissue infections. Moreover, the drug susceptibility profile of RGM is largely unknown in several regions of the world. We analyzed reports on RGM isolated from skin and soft-tissue infections globally for details of RGM species and drug susceptibility profile. We also analyzed the drug susceptibility profile of four RGM isolates, obtained from skin and soft-tissue infections in our laboratory, by broth microdilution method. The most common RGM isolated from skin and soft-tissue infections were *M. abscessus* (184/475, 38.7%), *M. fortuitum* (150/475, 31.5%), *M. chelonae* (72/475, 15%), and *M. chelonae-M. abscessus* complex (46/475, 9.6%). However, drug susceptibility was tested only in 26/39 (66.6%) reports. In our own laboratory, we obtained three isolates of *M. abscessus* and one isolate of *M. fortuitum* from one case of breast abscess and three cases of post-surgical wound infections. Maximum susceptibility of *M. abscessus* was observed to clarithromycin, amikacin, and linezolid. The *M. fortuitum* isolate was susceptible to clarithromycin, amikacin, clofazimine, and linezolid. Paucity of information available on RGM isolated from skin and soft-tissue infections highlights the need to be aware of the pathogenic potential and the drug susceptibility profile of these organisms.

9. The MPB64 immunochromatography assay: an analysis of doubtful results

Culture remains the gold standard for tuberculosis (TB) diagnosis, and the mycobacteria growth indicator tube (MGIT), endorsed by the World Health Organization (WHO), is widely used. Further identification of a positive culture is done with the help of an immunochromatography assay, which often shows faint bands that are difficult to interpret. We analysed 125 BACTEC MGIT culture positive results, of which 11/16 (68.7%) of the doubtful assays, analysed by MGIT™ TBc Identification test (TBcId), were positive for *M. tuberculosis* complex, the remaining being non-tuberculous mycobacteria as determined by an in-house duplex polymerase chain reaction and line probe assay. Guidelines on faint or doubtful bands in immunochromatography assays are important so as not to overlook true-positive cases of TB.

10. Phenotypic and genotypic characterization of bedaquiline resistance in clinical isolates of *M. tuberculosis* in Delhi

The present study was designed to evaluate the minimum inhibitory concentration (MIC) of bedaquiline in drug resistant isolates of *M. tuberculosis* and to study the genetic determinants of bedaquiline resistance. The study was performed on 80 previously treated pulmonary tuberculosis patients who were not on bedaquiline therapy (Group A) and on bedaquiline therapy (Group B), from the department of Respiratory Medicine, Rajan Babu Institute of Pulmonary Medicine and Tuberculosis; and 50 new smear positive patients from the Department of Respiratory Medicine, VPCI (Group C). The sputum samples were processed on LJ medium. MIC for bedaquiline was put up for all the clinical isolates identified as *M. tuberculosis*, using 7H11 Agar Proportion method. Polymorphisms in atpE, Rv0678 and pepQ genes were identified by Sanger sequencing. In Groups A (n=32) and C (n=27), the MIC of all isolates was in the susceptible range (0.0625 Ug/mL to 0.125 Ug/mL). There were no nonsynonymous mutations in atpE, Rv0678 or pepQ in Group B. In Group B, 6/20 (30%) isolates showed non-synonymous mutations. Of the, two strains with MIC in the resistance range (0.5µg/mL), one had an insertion at the 140bp position of Rv0678; while the other had a mutation Leu117Arg in Rv0678. Four remaining isolates with non-synonymous mutations did not show phenotypic resistance. No nonsynonymous mutations were observed in atpE and pepQ. The results from our study highlight the importance of continuous surveillance to monitor the resistance profile of bedaquiline.

11. Colonisation and transmission dynamics of *Candida auris* among chronic respiratory diseases patients hospitalised in a chest hospital in Delhi, India: a comparative analysis of whole genome sequencing and microsatellite typing

Candida auris is a nosocomial pathogen responsible for an expanding global public health threat. This ascomycete yeast has been frequently isolated from hospital environments, representing a significant reservoir for transmission in health-care settings. We investigated the relationships among *C. auris* isolates from patients with chronic respiratory diseases admitted in a chest hospital and from their fomites, using whole-genome sequencing (WGS) and multilocus microsatellite genotyping. Overall, 12/32 patients (37.5%) developed

colonisation by *C. auris* including 9.3% of the screened patients that were colonised at the time of admission and 75% remained colonised till discharge. Furthermore, 10% of fomite samples contained *C. auris* in rooms about 8.5 days after *C. auris* colonised patients were admitted. WGS and microsatellite typing revealed that multiple strains contaminated the fomites and colonised different body sites of patients. Notably, 37% of *C. auris* isolates were resistant to amphotericin B but with no amino acid substitution in ERG2, ERG3, ERG5, and ERG6 as compared to the reference strain B8441 in any of our strains. In addition, 55% of *C. auris* isolates likely had two copies of the MDR1 gene. Our results suggest significant genetic and ecological diversities of *C. auris* in health-care setting. The WGS and microsatellite genotyping methods provided complementary results in genotype identification.

12. In-vitro activity of the novel antifungal olorofim against dermatophytes and opportunistic moulds including *Penicillium* and *Talaromyces* species

Olorofim is a novel antifungal agent with in-vitro activity against *Aspergillus* and other opportunistic moulds. We investigated the in-vitro activity of olorofim against a range of filamentous fungi comprising isolates of *Aspergillus* species, *Scedosporium* species, *Alternaria alternata*, dermatophytes, including *terbinafine* and multidrug-resistant *Trichophyton* species, and *Penicillium/Talaromyces* species originating from patients in North India. Antifungal susceptibility of olorofim was tested against 241 mould isolates of *Penicillium/Talaromyces* species, *Trichophyton* species, *A. fumigatus* and cryptic *Aspergillus* species, *Scedosporium* species, and *Alternaria alternata* using CLSI broth microdilution. The comparators were five systemic azoles, amphotericin B, terbinafine, and luliconazole. Overall, olorofim showed highly potent in-vitro activity against dermatophytes and opportunistic moulds (MIC range of 0.004–0.125 mg/L) except for *Alternaria alternata. Penicillium* and *Talaromyces* species and Trichophyton species exhibited a low geometric mean (GM) MIC (GM 0.027 mg/L and 0.015 mg/L, respectively) of olorofim. Importantly, a 2–12 dilution step decrease in in-vitro activity of olorofim as compared with azoles was observed against *Penicillium* and *Talaromyces*. Notably, olorofim displayed potent in-vitro activity against Trichophyton isolates including terbinafine-resistant and azole-resistant *Trichophyton* mentagrophytes/interdigitale with a modal MIC value of 0.008 mg/L. Further, azole-resistant A. fumigatus isolates harbouring mutations in azole target Cyp51A genes and several cryptic *Aspergillus* species displayed low MICs (range 0.004–0.03 mg/L) of olorofim. However, no in-vitro activity of olorofim against *Alternaria alternata* was observed. The potent in-vitro activity of olorofim against drug-resistant dermatophytes and opportunistic moulds is promising, warranting evaluation of the clinical utility of olorofim.

Virology

The department is mainly associated with diagnosis of respiratory viruses in clinical samples and performing basic/translational research on the viruses. The laboratory is routinely performing diagnosis of SARS-CoV-2 virus in the clinical samples from the patients visited in Viswanathan Chest Hospital. The ongoing research works include working on dendrite cells in-vitro manipulation of RNA, studying signalling cascades during influenza and chikungunya virus infection. The laboratory is also involved in studying different strategies to inhibit viral replication, like RNA based inhibition or inhibiting signalling pathways (UPR). Department is also working on potential universal vaccination candidate against various serotypes of dengue virus, the in-silico and in-vitro efficacy of generated peptide is being studied, which will need further in-vivo validation.

Pathology

Research

Lung Cancer

1. Study of KRAS mutation in lung cancer patients

Lung cancer is one of the commonest cancers and cause of cancer related deaths all over the world. Recently, immune checkpoint inhibitor therapy against PD-L1 has received The United States Food and Drug Administration (US FDA) approval for lung cancer treatment. However, the presence of coexisting mutations in non-small cell lung carcinoma (NSCLC) makes them resistant to immunotherapy, more aggressive and difficult to treat. Previous studies have assessed the efficacy of immunotherapy of PD-L1 inhibitors in KRA-mutant NSCLC. While some of these patients showed improvement in outcome, others showed no benefit. Highlighting the need for KRAS estimation prior to initiation of immunotherapy in these patients. Therefore, we analyzed the clinical and molecular data in 148 lung cancer patients presenting to V.P. Chest Institute, India over three years, (2017–2020). These included, 118 males and 30 females, 28-86 years of age (Mean-60.4 years), in advanced clinical stage-3,4. Tumor DNA was isolated from tru-cut, bronchoscopic and pleural biopsies. KRAS mutations (Therascreen allele-specific PCR) and PD-L1 antibodies (Ventana, clone SP263) were assessed and correlated with histopathology, sex, age and smoking status. KRAS mutations were present in 18/131 (13.7%) (103 males and 28 females) with a positive correlation with smoking. Total 29 mutations were identified; (i) G>T transversion at codon 12(41.4%) caused by replacement of Gly by Cys (13.8%) or Gly by Val (27.6%). (ii) G>A transitions (31.0%) with Gly by Asp substitution at codons 12 (17.2%) and 13 (13.8%) and (iii) G>C transversions at codon 12 (16.6%) by Gly by Ala (2.9%) and Gly by Arg (13.8%) substitution. PD-L1 expression was assessed in 46/148 (31.1%) patients with 22/46 (47.8%) positivity including 40 males and 6 females. PD-L1 positively correlated with smoking status. Correlation between KRAS and PD-L1 was done in 28/46 cases. KRAS and PD-L1 co-expression was seen in only 5/28 (17.9%) while 23/28 cases were mutually exclusive. The PD-L1 positive tumors were more common in males with NSCLC and revealed 9 KRAS mutations; (i) G>T transversion (codon 12, 4/9) caused by Gly-Cys (2/9), Gly-Val (2/9), (ii) G>A transitions (Gly-Asp) at codon 12 (1/9) and 13 (2/9) and (iii)G>C transversions at codon 12 by Gly-Arg (2/9) substitution. Findings of present study showed that KRAS mutation status should be additionally assessed in male patients who are smokers as a predictive biomarker prior to initiation of PD-L1 inhibitor therapy in NSCLC.

2. Untangling the KRAS mutated lung cancer subsets and its therapeutic implications

The Kirsten rat sarcoma virus transforming protein (KRAS) mutations in codons 12, 13, and 61 genomically drive nearly one-third of lung carcinomas. These mutations have complex functions in tumorigenesis, and influence the tumor response to chemotherapy and tyrosine kinase inhibitors resulting in a poor patient prognosis. Recent attempts using targeted therapies against KRAS alone have met with little success. The existence of specific subsets of lung cancer based on KRAS mutations and coexisting mutations is suggested. Therefore, we assessed the KRAS mutations seen in patients presenting to VPCI and correlate with the presence or absence of coexisting mutations, clinical and pathologic characteristics of lung cancer patients associated with KRAS mutations. These may be helpful to develop patient demographic subsets to predict targeted therapies and prognosis of lung cancer patients.

3. Subtyping of advanced lung cancer based on PD-L1 expression, tumour histopathology and mutation burden (EGFR and KRAS): a study from North India

Immune checkpoint blockade (PD-L1) is increasingly used to treat advanced NSCLC with variable outcomes. Formation of pan-cancer panel for subtyping these tumors based on PD-L1 expression, tumor histopathology, tumour mutation burden for treatment stratification is needed. Lung cancers (n=57) diagnosed at Pathology department, VPCI (2018-2021) were retrospectively analysed. PD-L1(SP263) expressed by tumour cells (low (<1%), medium (1–49%), high (≥50%) was correlated with tumour histopathology, EGFR, KRAS gene and KRAS oncoprotein expression. 47 were males (30-89 years) and 10 were females (45-80 years) with a smoking history in 26/47 (45.6%) males and 1/10 (10%) females. Tumour histopathology–squamous cell carcinoma 15/57 (26.3%), adenocarcinoma 6/57 (17.5%), NSCLC-undifferentiated 24/57 (42.1%), adenosquamous carcinoma 5/57 (8.8 %),

carcinosarcoma 4/57 (7.0%) and small cell carcinoma 1/57 (1.8%). Inflammatory tumour microenvironment/TILs was present in 44/57 (77.1%). PD-L1 positive, 31/57 (54.3%), showed concomitant EGFR and KRAS positivity {9/20 (45%); 8/15 (53.3%, respectively), smoking (21/31 [67.7%]). PD-L1 negative, 26/57 (45.6%), were EGFR and KRAS positive (2/14 [14.3%]; 6/19 [31.5%], respectively). PD-L1 positivity was correlated with histopathology, concomitant KRAS and EGFR expression, gender and smoking history. Patients were categorized into high and low risk subtypes. In the present study, PD-L1 expressed correlated with histopathological types of lung cancer. The high risk subtype showed PD-L1 positivity, male preponderance, history of smoking, squamous/undifferentiated histopathology, TILs in tumor microenvironment, higher KRAS positivity, EGFR positivity in nearly 50%. These subtypes can be used as predictors of clinical response/resistance prior to initiation of TKI and PD-L1 inhibitor therapies.

4. Pirfenidone regulates TGF-β1-BMP-Smad-1-7 signaling and inhibits epithelial mesenchymal transition of A-549 cells: use of this repurposed drug can attenuate lung cancer progression

Lung cancer cells adopt a stem cell like phenotype, undergo EMT, and metastasize via lymphatic and blood vessels to preferential sites such as brain, bone and adrenal glands. Pirfenidone is an anti-fibrotic agent used for treatment of pulmonary fibrosis. Utilizing its action on TGF-β1-BMP-Smad-1-7 signaling and on EMT, it can be repurposed to prevent lung cancer cell metastasis and progression. Lung adenocarcinoma (A-549) cells were cultured in DMEM at 37 °C in 5% CO2. Cells were treated with bleomycin (20 mM) and pirfenidone (500 μg/mL) and harvested at 4, 6, 8, 24, and 48h. The time-course of bleomycin induced TGF-β-BMP-Smad-1-7 signaling, development of EMT (E-Cadherin and Vimentin) and their inhibition by pirfenidone was assessed. Bleomycin treated A-549 cells showed a bimodal upregulation of TGF-β1 gene expression at 6 and 48 h. This was associated with (i) a significant differential upregulation of receptor Smads (rSmads): Smad-1 (upregulation in late phase at 24 hr and 48 hr), Smad-2,5 (Bimodal upregulation at 4 and 48 hr), Smad-3,4 (persistent upregulation from 4 to 48 hr), (ii) early up-regulation of inhibitory Smads (iSmad 6,7) with Smad-6 at 4 hr and Smad-7 at 6 hr and (iii) EMT of A549 cells characterized by- progressive E-cadherin downregulation and vimentin upregulation. Pirfenidone therapy significantly reversed EMT of A-549 cells by downregulating the TGF-β1/Smad-2-4 signaling, vimentin expression and upregulating BMP-iSmads-6,7 signaling, E-Cadherin expression, epithelial phenotype and thereby reducing cell migration. Thus, pirfenidone attenuated the lung cancer cell migration by differentially regulating the Smads-1-7-TGF-β1-BMP signaling and inhibiting EMT of lung cancer cells. Adjuvant pirfenidone therapy can attenuate metastasis and improve the prognosis of lung cancer patients on chemotherapy.

5. Combination therapy of cisplatin and bleomycin with pirfenidone in lung cancer

Cisplatin, is standard treatment for advanced stage non-small cell lung cancer (NSCLC). It is used in combination with paclitaxel, gemcitabine, docetaxel, vinorelbine, irinotecan and pemetrexed, and concurrent radiotherapy for stage IIIB NSCLC patients. However, therapeutic outcomes vary from patient to patient. While many patients initially respond to cisplatin-based chemotherapy, others show intrinsic or acquired non-response (Yin, 2012). Therefore, it becomes necessary to (i) identify biomarkers to predict cisplatin sensitivity in NSCLC, involving the nucleotide excision repair, drug transport and metabolic pathway (Rose, 2014) and (ii) use adjuvant therapy with an antifibrotic agent such as pirfenidone to improve its drug delivery to tumor tissue. The effect of pirfenidone, bleomycin and cisplatin on A-549 cells was evaluated in five groups: Group-I-Saline, Group-II-bleomycin (20mM), Group-III-bleomycin+pirfenidone (500μg/ml), Group-IV-bleomycin+cisplatin(10mM). Group-V-bleomycin (20mM)+pirfenidone (500μg/ml)+ cisplatin(10 mM). Cells were harvested at 4,6,8,24,48 hours and MTT assay, Scratch proliferative assay, SMAD-2,3,5 mRNA levels were assessed. Concurrent bleomycin and cisplatin instillation decreased A-549 cell viability and exerted an inhibitory effect on rSMADs-2,3 with an upregulation of iSMAD-5 is seen at 8 and 24 hr. Concurrent bleomycin+pirfenidone and cisplatin instillation on A-549 cells reduced their invasive potential as seen in the Scratch assay. An associated down regulation of rSMAD- 2 after 24 hr and rSMAD-3, 5 after 8 hr was seen. Pirfenidone has a multi-modal effect on NSCLC by inducing cell cycle arrest, down-regulating SMAD expression, reducing lung cancer cell proliferation and influencing the inherent crosstalk between the tumor microenvironment and the tumor (Marwitz, 2020). Pirfenidone may synergize with cisplatin in killing tumor cells and cancer-associated fibroblasts and prevent tumor progression (Mediavilla-Varela, 2016). In addition pirfenidone might have a prophylactic effect against chemotherapy-associated acute exacerbation of IPF.

6. Tumor cell phagocytosis (cannibalism) in lung cancer: possible biomarker for tumor immunotherapy and prognosis

Tumor cell phagocytosis (cannibalism) is rarely seen in lung carcinomas. Little is known about its underlying cellular pathogenesis and associated significance as tumor immune escape mechanism. The cases of lung cancer diagnosed at department of Pathology, VPCI over 13-year period, 2007-2020 (n=350) were retrospectively reviewed. The cases displaying cannibalism were correlated with their tumor morphology, coexisting inflammation, patient age at presentation, sex, stage/grade, smoking status. Cannibalism was identified in 10/350 (2.9%) cases of lung cancer [9/10 (90%) were males and 1/10 (10%) were females]. Patients age ranged from 48–71 years and presented with history of chest pain, anorexia and weight loss. History of smoking was seen in 9/10 (90%) cases while 10% were non-smokers. Mass lesions were seen on computed tomography (CT) scan and CT-guided fine needle aspiration cytology (FNAC) was performed. Cytopathology revealed squamous cell carcinoma (5/10, 50%), adenocarcinoma (3/10, (30%), adenosquamous carcinoma (1/10, 10%), NSCLC (1/10, 10%). No association with small cell carcinoma was seen in our study. Background inflammation and infiltration of acute on chronic inflammatory infiltrate was seen in 6/10 (60%) cases. Lung cancers rarely show cannibalism, a tumor immune escape mechanism, even in advanced stage. This phenomenon correlates with squamous cell and adenocarcinoma morphology, tumor associated inflammatory infiltrate, and smoking status. It may be considered as a possible biomarker for tumor immune escape and poor prognosis.

Lung Fibrosis

7. Molecular studies in interstitial lung disease

The present research on interstitial lung diseases is focusing on the 'Omics of ILD' which includes; genomic, transcriptomic, metabolomic, proteomic and epigenetic biomarkers, gene co-expression networks, drug–gene interaction testing, lung microbiome and mitochondrial DNA analyses, gene expression in BAL assays etc. Correlating these pathomechanistic pathways will help in detecting features of progression of ILD, and in determining their predictive value in disease outcome and mortality. Additionally, paving the way for molecular classification of ILD. MicroRNAs (miRNAs) are non-coding RNA that regulate gene expression by blocking the translation of target messenger RNA in major cellular mechanisms as inflammation, senescence, apoptosis and are emerging as potential biomarkers in several respiratory diseases. In the present study we have estimated the microRNA-199a (miRNA-199a) expressed in bronchoscopic lung biopsies of ILD patients. The miR199a was assessed by performing RT-PCR using miRNA primer Hsa-199a_1 and miScript II RT kit assay. The change in gene expression is being correlated with patient history, clinical features at presentation, histopathological diagnosis (NSIP, DIP, UIP etc). A significant upregulation of miR-199 was observed in biopsy tissues of ILD (NSIP and DIP). However, on correlating with histopathology no significant difference was observed between the two groups. The upregulated miR-199a-5p act on downstream pathways related to integrin signaling, caveolar-mediated endocytosis signaling and metabolic pathways involved in biosynthesis of steroids. Of these caveolin1 is a particularly relevant putative miR-199a-5p target gene that is downregulated in progressive lung fibrosis. The correlation of miRNA with caveolin-1 and their disease-specific expression patterns is being assessed for their value as biomarkers of progression in interstitial lung diseases.

8. Role of PPAR-γ agonist (pioglitazone) in modulating the development of cytokine storm in lung injury

The over-activation of the innate immune response and macrophage influx results in cytokine storm. This is pivotal for the development and severity of diffuse parenchymal lung diseases of infectious (virus, bacteria etc) and non-infectious etiology. The TLR2 surface receptors on tissue macrophages innately sense and trigger the expression of inflammatory cytokines. Therefore, the PPAR-γ agonist thiazolidinediones (TZDs, pioglitazone), which can regulate and repress the hyperactive macrophage response when administered at the correct time can provide a "window of therapeutic opportunity" for the management of these diseases. Therefore, we evaluated the time course and efficacy of pioglitazone in reversing the TLR-2-macrophage infiltration and signaling after bleomycin induced lung injury. Male Wistar rats (n=90, 150-250 gm), were divided into three main groups, Group I: Intratracheal saline control, Group II: Intratracheal bleomycin (7 U/kg.bw) and Group III: [Intratracheal bleomycin (7 U/kg.bw) + pioglitazone (40 mg/kg/day, P.O.)]. Animals were sacrificed on day 0,7,14,28,35 in each group. In group III, pioglitazone drug therapy was initiated after 7th day of bleomycin instillation. Animals were sacrificed and lung parenchymal remodeling was assessed using morphometry. The parenchymal changes were correlated with, macrophage infiltration, TLR-2, CD68, NFκB-p65, VEGF protein expression. Pioglitazone therapy

significantly reduced the macrophage infiltration, NF-kB-p65 signaling and TLR-2, CD8, VEGF expression after 7 days of therapy which correlated with decrease in solid area fraction and attenuation of parenchymal remodeling caused by bleomycin induced lung injury. Thus the PPAR-γ agonists may be repurposed as a single target approach for the simultaneous inhibition of TLR-2 induced cascade of pro-inflammatory cytokines and chemokines in patients experiencing cytokine storm.

9. Dynamic role of LMW-hyaluronan fragments and Toll like receptors 2,4 in progression of bleomycin induced lung parenchymal injury to fibrosis

Pulmonary fibrosis (PF) is a progressive and lethal lung disease whose incidence has been increasing following the Covid-19 pandemic caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2). PF immunopathogenesis involves progressive alveolar epithelial cell damage, release of damage-associated molecular patterns (DAMPs) and extracellular matrix (ECM) injury. The LMW-hyaluronan (LMW-HA) play a dynamic role as DAMP in the initiation of host immune TLR-2,4 responses and as determinant in progression of ECM injury (infectious and non-infectious diseases) to fibrosis. We assessed the time course of release of LMW-HA and TLR-2,4 mRNA and protein levels, after bleomycin injury and correlated with the development of parenchymal inflammation, remodelling and fibrosis. We observed significant increase in LMW-HA in PF caused by non-infectious etiologies. Similar prominent hyaluronan exudates have been observed in the alveolar spaces of Covid-19 lungs, supporting the notion that the macromolecule is involved in ARDS caused by SARS-CoV-2. We demonstrate that the accumulating LMW-HA fragments function as endogenous DAMPs and trigger inflammatory responses, through differential TLR2 and TLR4 signaling, thus promoting inflammation and macrophage influx and are reflective of the state of ongoing tissue inflammation. This can be reversed by the intranasal administration of exogenous hyaluronidase which has recently shown to release inter-α-inhibitor heavy chains, reduce lung hyaluronan content and restore lung function. Thus, the present finding may open up new treatment options in severe Covid-19, aiming at reducing the presence and production of hyaluronan in the lungs.

10. Endothelin receptor antagonist can regulate apoptosis and bFGF expression in bleomycin induced pulmonary fibrosis

The endothelin (ET) system consists of two G-protein-coupled receptors (ET-A,B), three peptide ligands (ET-1-3), and two activating endothelin-converting peptidases (ECE-1,2). ET-1, is a vasoregulatory factor that predominates in most cells and tissues and has recently been implicated in the regulation of fibrosis. The efficacy and molecular mechanisms of endothelin receptor antagonist Bosentan in its antifibrotic actions were assessed after bleomycin induced acute lung injury. Bleomycin caused parenchymal inflammation, apoptosis of the alveolar epithelium through the caspase-3 and-9 pathways, loss of epithelial barrier function, and an aberrant fibroproliferative response with excess collagen deposition. In the present study a significant increase in the number of apoptotic cells per high power field and significant increase in caspase-3 expression was seen in bronchiolar epithelial cells, alveolar epithelial cells and in perivascular inflammatory cells. Bosentan treatment reduced apoptosis and attenuated the parenchymal fibrosis and apoptosis from day 7 to day 28. A reduction in apoptosis was seen in bronchiolar epithelial cells, endothelial cells, perivascular inflammatory cells, alveolar epithelial cells. Next the bFGF expressed is being assessed and the effect of bosentan and sildenafil combined therapy and bosentan monotherapy on bFGF expression in bleomycin induced pulmonary fibrosis is evaluated.

11. Effect of Bosentan on miR-21 and Let-7d expression in bleomycin induced lung vascular remodelling

Pulmonary hypertension (PH) is a progressive condition having poor prognosis. It is defined by remodelling of the pulmonary vasculature and characterized by an increase in mean artery pressure. The precise cellular and molecular mechanism of initiation and progression of PH especially the role of miRNA in its development and its regulation are not completely understood. Recent studies have indicated that a balance in miRNA levels is the fundamental to maintaining homeostasis in the pulmonary vasculature and an imbalance with miRNA level plays a critical role in the pathogenesis of PH. microRNAs (miRNAs) are a class of noncoding small RNAs, 22 nucleotides in length, these bind to the 3′ UTR of target genes and repress translation of target genes and/or induce degradation of target gene mRNA. A major role of miR-21 in the pathogenesis of chronic hypoxia-induced pulmonary vascular remodelling and PH is suggested. Let-7 microRNAs consist of 12 genes (let-7a-i). These encode different mRNAs and are is known to influence VSMC proliferation (Let-7d). TGF-β mRNA upregulation plays a vital role in the (i) initiation and progression of PAH, (ii) vascular remodelling and lung inflammation,

(iii) initiation and progression of pulmonary fibrosis and (iv) cardiac hypertrophy and fibrosis. However, its role in modulating PH is largely unknown. The efficacy of bosentan in modulating the miRNA and subsequently TGF-β mRNA expression was assessed in bleomycin rat model of lung fibrosis. Male Wistar rats (n=48), weighing between 150-250 gm were divided randomly into 3 groups, Group I: Saline control, Group II: Bleomycin, Group-III: Bleomycin + Bosentan. Each group was further divided into four sub-groups (n=6) on the basis of days of sacrifice after saline/or bleomycin instillation: Sub-group A-Day 0, Sub-group B-Day 7, Sub group C-Day 14 and Sub group D-Day 28. In each animal, miR-21 and let-7d levels were assessed and correlated with the TGF- β mRNA and protein levels. Bleomycin administration upregulated miR-21 and downregulated Let-7d microRNA expression in the lungs of rats from day 14 to day 28. The upregulation correlated with enhanced TGF-β1 and functioned in an amplifying circuit to enhance fibrogenic activity of TGF-β1 in human primary fibroblast. The down regulation of Let-7d miRNAs was associated with mild increase in bFGF mRNA expression. This is believed to be caused by direct transcriptional inhibition of Let-7d by profibrotic cytokine-TGF-β1. Inhibition of Let-7d effects the epithelial cell phenotype and leads to significant increase in expression of mesenchymal markers such as vimentin. Further Let-7d is shown to cause increase collagen deposition and thickening of alveolar septa.

Bosentan monotherapy, (i) blocks the endothelin-1 receptors and reduces the effect of endothelial dysfunction on pulmonary vascular smooth muscle and vasoconstriction caused by bleomycin, (ii) reduced theTGF-β1 expression in AECs and BECs on day 14 and on day 28. This correlated with reduction in TGF mRNA levels on day 7, 14 and 28, (iii) downregulated miR-21 on day 28 and significantly reduced proliferation of vascular cell types to near-control levels, indicating that ET signaling plays a critical role in the uncontrolled proliferation of pulmonary vascular cells in PH and (iv) upregulated Let-7d on day 28. The role of Let-7d miRNA in regulatory apoptosis signalling, in inflammation by mediating the toll like receptor pathway and in modulation of TGF-β1 signalling pathways is being studied.

Nanotherapy

12. Nanoapproach targeting TGFβ1-SMAD pathway and modulating lung microenvironment

Lung microenvironment is altered by injurious stimuli resulting in alveolar epithelial cell (AEC) injury, epithelial mesenchymal transition (EMT) and aberrant remodeling. This pathogenetic process reduces the drug amount delivered to the target site, both neoplastic and non-neoplastic and necessitates the use of nanocarriers based targeted drug delivery. Pirfenidone, a partially water-soluble drug was conjugated to; poly(ε-caprolactone) nanoparticles (PCL-NPs) and to MePEG-PCL diblock by nanoprecipitation. Their physicochemical properties were characterized by Nanosight, DLS, Zeta potential, TEM, FTIR and 1H-NMR. Drug encapsulation and release efficiency was evaluated. Their efficacy in modulating TGF-β1, SMAD-2,3,5 signaling and regulating EMT was assessed invitro on A-549 cells by measuring Vimentin and E-cadherin mRNA levels. The pirfenidone conjugated PCL and MePEG-PCL-NPs were spherical with uniform particle size (~150 nm), polydispersity index (0.095-0.224), high encapsulation efficacy (50-75%), drug loading capacity (20%) and good colloidal stability. Bleomycin induced EMT of AECs with an upregulation of mesenchymal protein, vimentin and loss of epithelial marker, E-cadherin. Bimodal increase in TGFβ1, SMAD-2,3.5 genes at 4 hours and then at 24 & 48 hours was seen. The pirfenidone nanoformulations efficiently reversed EMT by downregulation of TGF-β1, SMAD-2,3,5, vimentin and upregulation of E-cadherin gene. The effect of nanoformulations was similar to standard dose pirfenidone.

13. Surface modifications of biodegradable polymeric nanoparticles and their characterization by advanced techniques

Polymeric nanoparticles have been the focus for nanocarrier preparation in numerous biomedical applications, such as cancer treatment, disease diagnosis, vaccination, in the last two decades. These have been variably surface modified using copolymers, polyethylene glycol (PEG), dextran, cyclodextrin, cytokines, small molecules to improve their efficiency and efficacy. The resulting nanoformulations include polymer-protein conjugate, polymeric micelle, polymer-small molecule conjugate, dendrimer, polymeric vesicles, nano-hybrids, hydrogels, etc. These may have intrinsic immunogenicity and require accurate characterization in order to improve their pharmacological targeting, pharmacokinetic profiles and to reduce adverse reactions. Therefore, we are preparing the polymeric nanoparticles, surface modifying them and characterizing them using transmission electron microscopy, DLS, Zeta potential, NMR, FTIR and HPLC techniques and studying their functionalization in the context of their surface modifications.

Pharmacology

Research

1. Smart regulation for antibiotic use in India: understanding, innovating and improving compliance

Antimicrobial resistance (AMR) is a complex global health issue and will push 24 million people into extreme poverty by 2030, risking the sustainable development goals (SDGs) 2, 3, 6, 9, 12 and 17, if not addressed immediately. Humans, animals, and the environment are the reservoirs that contribute and allow AMR to propagate in interconnected ecosystems. One of the major drivers for the rapid development and spread of AMR is the total volume of antimicrobial use, which exerts unnatural selective pressure on bacteria and potentiates the development of AMR. Regulation is one of the key factors for optimum use of antibiotics.

The project has two main aims: (1) to better understand the various problems surrounding the regulation of AMR containment in India and (2) to improve the situation by applying the concepts and methods of 'smart regulation'.

Smart regulation embraces "flexible, imaginative and innovative forms of social control". Taking one-health concept, we have four case studies and they are being studied in Haryana and Telengana with regulations on all four case studies at federal level. The four sectors are: (1) OTC antibiotic sales at pharmacies without valid prescription, (2) poultry farmers using antibiotics (including as a growth factor), (3) hospital AMR containment and (4) pharma industry effluents and AMR

Our project examined antibiotic use in human, animal and environment sectors to explore the potential of smart regulation to contain AMR. The stakeholders included regulators, regulatees (those regulated) and consumers for all the four case studies, namely, over-the-counter sale of antibiotics, hospitals and AMR containment, pharma effluents and poultry sector, with whom a total of 150 in-depth interviews were conducted. These included data amassed from in-person and online consultations post-COVID 19. In 2020-21, the qualitative data analysis from the sector specific case studies is being finalized. Using the qualitative data, we are preparing sector specific recommendations for potential smart regulations that can be piloted as a menu of regulatory options.

2. Availability and price of access, watch and reserve group of antibiotics in National Capital Territory of Delhi, India

As planned for this study, data could not be collected from public and private sector outlets due to COVID pandemic. However, with the peer group working on containment of AMR, we assessed the impact of the COVID-19 pandemic on the national consumption of antibiotics and hydroxychloroquine (HCQ) in India compared to the two-year pre-pandemic period and published a paper. Recently our drug regulator banned some antimicrobial fixed dose combinations. A detailed analysis on banned fixed dose combination of antibiotic was done. These desk-based work is kind of baseline data for the project. As the COVID-19 situation improves, the survey will be re-started.

3. Experimental studies on the hepatoprotective and immunomodulatory effects of Dawa-ul-Kurkum, a polyherbal Unani preparation, and its cellular and molecular mechanisms, in rats

The liver plays a crucial role in the metabolism and elimination of drugs and xenobiotic, and thus, is very susceptible to the toxicity induced by them. A wide range of drugs have been reported to induce liver dysfunction by various mechanisms and leading to hepatobiliary disorders, e.g. anti-TB drugs. In Unani system of medicine, a polyherbal formulation Dawa-ul-Kurkum composed of 9 herbs is used in cases of liver dysfunction, anorexia, ascites and abdominal pain. This study has thus been designed to evaluate the hepatoprotective and immunomodulatory effects of Dawa-ul-Kurkum in the experimental model of Anti-TB, D-Galactosamine induced and paracetamol induced liver damage in order to validate the hepatoprotective properties and delineate the possible mechanisms.

The study concluded that anti-TB drugs, paracetamol and D-Galactosamine are potentially hepatotoxic as proven by changes in markers of LFT, immunoglobulin, cytokines, delayed type hypersensitivity, oxidative stress and histopathological studies in rats. Both Dawa-ul-Kurkum and its HA-extract were found to be effective against the above drug induced hepatotoxicity as it significantly prevented the hepatotoxic damage induced in rats. The sub-chronic toxicity study clearly indicated that Dawa-ul-Kurkum and HA-extract have no adverse/toxic effects in animal models as per Organisation for Economic Co-operation and Development (OECD) guidelines. It can be concluded that Dawa-ul-Kurkum and its HA-extract is non-toxic at tested dose levels as evidenced by sub-chronic toxicity studies. Such translational studies using the reverse pharmacology approach could help in the integration of traditional and modern medicinal concepts in the greater interest of drug development and rational therapy.

4. A clinical study to evaluate the effects of yogic intervention on pulmonary functions, inflammatory markers, oxidative stress and health status in patients of COPD

The study is a prospective, randomized, parallel design clinical research conducted in patients of COPD as per ICH-GCP guidelines after approval by the Institutional Ethical Committee of VPCI. The patients with clinical diagnosis of COPD were recruited as mentioned in earlier annual report. The patients were physically examined and baseline parameters of PFT, BODE index, quality-of-life, markers of inflammation (NLR, OPG, TNF-α, FeNO) and oxidative stress (8-isoprostane, SOD) were assessed and followed up at 1, 2 and 3 months. The comparison of parameters was done between Group I and Group II after respective treatments. Both the groups showed effective and consistent improvement in BODE index and quality-of-life. However, the magnitute of improvement was significantly more in Group II thus, indicating better improvement from the risk of death. Further, PFT values, CC16, SOD levels were significantly improved whereas NLR, OPG, TNF-α, FeNO and 8-isoprostane were reduced in both the groups, but the modulations were remarkably more in Group II, thus indicating anti-inflammatory and anti-oxidative effects of yoga in COPD patients. This was corroborated by significant improvement in quality of life in Group II patients as assessed by St. George's Respiratory Questionnaire for COPD patients (SGRQ-C), which may possibly be mediated by modulation of cellular and molecular markers of inflammation and immunity and restoration of pro-oxidant antioxidant balance. More patients are being recruited as per proposal submitted to AYUSH to complete the study.

5. Pharmacological studies to evaluate the anti-inflammatory and immunomodulatory effects of *Hibiscus rosa-sinensis* and *Piper nigrum* and their cellular and molecular mechanism of action in experimental models of Bronchial asthma

The study is aimed at evaluating the anti-inflammatory and immunomodulatory effects of *Piper nigrum* and *Hibiscus rosa-sinensis* on Ovalbumin (OVA)-induced model of airway inflammation. Wistar rats (200-250g) of either sex were obtained from the CPCSEA approved Animal Facility of the VPCI after approval by the IAEC. All the rats were immunized on day 1 and challenged (except normal controls) on day 14 with OVA adsorbed on to aluminium hydroxide. The rats were divided into 8 groups and treated for 14 days as: (1) Normal controls (2) disease control with vehicle, (3) Positive control with prednisolone, (4 and 5) *Hibiscus rosa-sinensis* at doses of 100 and 250 mg/kg, (6 and 7) *Piper nigrum* at doses of 30 and 100 mg/kg respectively, (8) *Hibiscus-Piper* rats treated with combined dose of *Hibiscus rosa-sinensis* and *Piper nigrum*. After 24 hours of Ovalbumin (OVA) challenge, airway responsiveness was assessed in response to inhaled methacholine using whole body plethysmography and expressed as enhanced pause. Animals were anaesthetized and blood/BALF were collected. The results showed that OVA sensitization and challenge resulted in increased levels of TNF-α, IL-4, OVA specific IgE, MDA, eosinophils, neutrophils, and reduced GSH levels versus normal control rats. Administration of *Hibiscus rosa-sinensis* and *Piper nigrum* for 14 days showed dose-dependent attenuation in all the cytokines, cell counts, MDA, P-enh and increased levels of GSH levels. Further, combined subeffective doses of *Hibiscus rosa-sinensis* and *Piper nigrum* also showed significant results in all the parameters and thus, suggesting bio-enhancing effects of *Piper nigrum*.

6. Pharmacological studies to evaluate the anti-inflammatory and immunomodulatory effects of *Aerva Lanata* Linn in experimental model of bronchial asthma and the cellular and molecular mechanism

The study was designed to validate the therapeutic effects of *Aerva Lanata*, a plant used traditionally for the management of asthma. In OVA sensitized and challenged rats, Penh values were estimated in response to exposure to varying doses of spasmogen, methacholine. Further, markers of inflammation and

immunomodulation were assessed and histopathology of lung tissue was conducted. Results showed that the level of TNF-α, IgE, eosinophil and neutrophil count and Penh values were increased in experimental control group (OVA sensitized and challenged rats) as compared to normal controls, thus validating the experimental model of bronchial asthma. In this experiment the prednisolone is used as positive control group. Histopathological examination of lung tissue section of the vehicle treated OVA sensitized and challenged group showed marked histopathological changes such as large number of inflammatory cell infiltration, increased goblet cell hyperplasia and sub epithelial fibrosis, etc as compared to normal control group. The above histopathological changes were reduced in Aerva Lanata Linn in a dose related manner with maximum effect being at the dose of 100mg/kg which was comparable with prednisolone treated group. The study is under progress to evaluate the effects of the drug on oxidative stress parameters.

7. Pharmacological studies on *Hedychium spicatum* on airway inflammation and remodeling in experimental model of bronchial asthma

Hedychium spicatum is a medicinal plant used in traditional systems of medicine but the effects need to be validated for the effective integration of the traditional and modern medicine. There is no systematic study to scientifically evaluate the potential beneficial effects in bronchial asthma and safety of *H. spicatum*. Thus, a study has been planned to evaluate the efficacy and its possible cellular and molecular mechanisms to validate the therapeutic effects. The methodology for inflammation and remodeling of airways has been standardized. The process of acquiring extracts of *Hedychium spicatum* from Shivayu Ayurved Ltd., Nagpur and standardization is under process.

8. Effects of nitric oxide modulators on airway Inflammation, bronchial hyperresponsiveness and oxidative stress in experimental model of asthma in rats

Nitric oxide pathway plays a crucial role in the pathophysiology of asthma. L-arginine can be metabolized through the arginase or nitric oxide synthase pathways. Higher levels of FeNO (fractional exhaled nitric oxide) are observed in asthma patients that are associated with increased expression of both, arginase and iNOS in the airway epithelium. The study aims to evaluate the effects of nitric oxide modulators (arginase inhibitor, NOS inhibitor and nitric oxide precursor) on airway inflammation, bronchial hyperresponsiveness and oxidative stress in an experimental model of bronchial asthma. Animals were immunized with ovalbumin, followed by challenge with aerosolized ovalbumin for 8 consecutive days. Pre-treatment with respective nitric oxide modulator was done before each OVA challenge. On the day subsequent to the last ovalbumin challenge, animals were challenged with methacholine and whole-body plethysmography was done. Animals were sacrificed as per the approved protocol and, blood and BAL fluid samples were collected and stored for further analysis. Preliminary results show decreased inflammatory cell counts with administration of nitric oxide precursor. Further, the relative roles of NOS/arginase pathways in modulating various cytokines and oxidative stress markers will also be evaluated.

9. Effects of *Withania somnifera* extract on experimental model of type 2 diabetes mellitus induced Alzheimer`s disease and the possible mechanisms in rats

The study aims to investigate the effects of *Withania somnifera* on type 2 diabetes mellitus induced Alzheimer's disease. Witharin A, an alkaloid present in *Withania somnifera* has been shown to produce anti-inflammatory, immunomodulatory, anti-stress, anticonvulsant, anti-hyperglycemic and anti-oxidant effects. Treatment with *Withania somnifera* for 8 weeks reversed the metabolic parameters and insulin levels. In Morris Water Maze test, animals treated with *Withania somnifera* spent significantly more time in the target quadrant when compared with the diabetic group. The results showed that root extract of *Withania somnifera* improved the metabolic dysfunction by reducing the levels of cholesterol, triglycerides, fasting blood sugar and ameliorated insulin resistance with improvement in glucose tolerance. Further, behavioural analysis showed that *Withania somnifera* improved the memory and spatial learning in cognitive impaired diabetic rats. Thus, *Withania somnifera* can be a potential lead for the drug development for the management of T2DM associated cognition deficit.

10. Adverse Drug Reaction Monitoring Centre of Pharmacovigilance Programme of India, Ministry of Health and Family Welfare, Government of India at VPCI

As a Coordinator of Adverse Drug Reaction Monitoring Centre of Pharmacovigilance Programme of India, Ministry of Health and Family Welfare, Government, at VPCI, Individual Case Safety Reports (ICSRs) were

submitted to National Coordination Centre (NCC) at Indian Pharmacopoeia Commission (IPC), Ghaziabad, later submitted to Uppsala Monitoring Centre, Sweden. There were approx 15-25 ICSRs each month from April, 2020 to March, 2021 through online software (Vigiflow). Dr Nitin Goel is Co-coordinator and Dr Neha Sharma is deputed as Patient safety Pharmacovigilance Associate (PsPA) at the VPCI-AMC by IPC. The AMC performed the Causality Assessment (committee members are: Prof. A. Ray and Dr Parul Mrigpuri) of the ICSRs in which the cases were assessed as Possible, Probable and Unlikely category with respect to temporal association with suspected drugs. AMC is involved in disseminating the awareness about reporting ADRs among PG medical students, nurses, health-care professionals and other staff. Awareness programme for health-care professionals were conducted to report ADR for drugs used in treatment/ prophylaxis of COVID-19 in July, 2020.

The suspected ADR form for drugs used in prophylaxis/ treatment of covid-19 was introduced to health-care professional and other staff. World Patient Safety Day was celebrated with HCPs with the theme – "Speak up for Patient Safety!" on September 17, 2020. We participated in Social Media Campaign on "Med Safety Week 2020" organized by Uppsala Monitoring Centre from November 2-8, 2020 and spread awareness regarding PvPI activities to make medicines safer for everyone. Dr Neha Sharma, PsPA of AMC, successfully completed five days Online Skill Development Programme on Pharmacovigilance for Medical Products from November 09-13, 2020.

Coordination with State Nodal Officer, Deworming Programme, New Delhi, regarding focused Pharmacovigilance on Ibendazole administration during the Deworming Programme in the state, February 2020

Introduction of suspected adverse drug reaction form for drugs used in prophylaxis/ treatment of covid-19 to health- care professional and other staff, May, 2020

Participated in Social Media Campaign "Med Safety Week 2020" organized by Uppsala Monitoring Centre from November 2-8, 2020

Invited lecture, "Pharmaceutical effluent: a critical link in the inter-connected ecosystem promoting antimicrobial resistance", Challenges in Prevention of Antimicrobial Resistance, National Conference on Pharmacy Practice, SGT University, February 15, 2021, SGT University, Gurugram, Haryana, India

Physiology

Research

Cognitive performance after short duration sub-maximal exercise in young adults

Exercise has been implicated to improve many different tests of brain function. It has been observed that by performing a moderate intensity aerobic exercise (70%–80% HRmax or sub-maximal exercise); there is an improvement in working memory. In situations of conflicts, e.g. short duration sortie by air force personnel, a strategy is required that can improve the cognitive performance of defense personnel with minimum time consumption.

Pulmonary Medicine

(Including Pulmonary Medicine, Cardo-respiratory Physiology and Respiratory Allergy and Applied Immunology)

The Department is involved in the patient care (Outdoor and Indoor) at Viswanathan Chest Hospital (VCH), the clinical wing of VPCI. The faculty is involved in individual research and thesis work on different aspects of respiratory diseases as well as teaching of the postgraduate students in the subject – Pulmonary Medicine (DM, MD) of University of Delhi. The Department conducts routine lectures, clinical demonstrations along with seminars, clinical meetings and journal clubs, ICU meetings, mortality meetings etc., regularly, as a part of teaching curriculum.

Research

1. Bronchial thermoplasty for severe asthma: a position statement of the Indian Chest Society

Bronchial thermoplasty (BT) is an interventional bronchoscopic treatment for severe asthma. There is a need to define patient selection criteria to guide clinicians in offering the appropriate treatment options to patients with severe asthma. An expert group formed this statement under the aegis of the Indian Chest Society. We performed a systematic search of the MEDLINE and EMBASE databases to extract evidence on patient selection and the technical performance of BT. The experts agreed that the appropriate selection of patients is crucial and proposed identification of the asthma phenotype, a screening algorithm, and inclusion/exclusion criteria for BT. In the presence of atypical clinical or chest radiograph features, there should be a low threshold for obtaining a thoracic computed tomography scan before BT. The patient should not have had an asthma exacerbation in the preceding two weeks from the day of the procedure. A 5-day course of glucocorticoid should be administered, beginning three days before the procedure day, and continued until the day following the procedure. General anesthesia (total intravenous anesthesia with a neuromuscular blocker) provides ideal conditions for performing BT. A thin bronchoscope with a 2.0 mm working channel is preferable. An attempt should be made to deliver the maximum radiofrequency activations. Middle lobe treatment is not recommended. Following the procedure, overnight observation in the hospital, and a follow-up visit, a week following each treatment session, is desirable. This position statement provides practical guidance regarding patient selection and the technical performance of BT for severe asthma.

2. Endobronchial ultrasound-guided transbronchial needle aspiration under local anesthesia: real-time experience over two years in a tertiary care hospital in North India

Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) is usually performed under deep sedation or conscious sedation. We describe the diagnostic yield and complications of EBUS-TBNA performed under local anesthesia. Patients undergoing EBUS-TBNA at our center from February 2016 to April 2018 were evaluated retrospectively. All procedures performed under local anesthesia using lignocaine were assessed for sampling adequacy, diagnostic yield, cough during endoscopic procedure and complications. Mean (standard deviation) dose of lignocaine used was 311.6 (16.4) milligram and mean (standard deviation) duration of the procedure was 23.7 (3.78) minutes. Sample adequacy rate was 88.2%. The diagnostic yield of the procedure was 60%. In 91.1% of patients, cough was absent or did not interfere with EBUS-TBNA. Minor complications related to EBUS were observed in three (8.8%) patients and were self-limiting. None of the patients required escalation of care. We observed that EBUS-TBNA performed under local anesthesia was found to be safe and was associated with an acceptable diagnostic yield.

3. Exploring the effect of presence and type of allergen sensitization on fractional exhaled nitric oxide, immunoglobulin E, and interleukins 4, 5, and 13 among asthmatics

Asthma is associated with airway inflammation. Allergen sensitization (atopy) is common in asthma. This study explored the effect of food and/or aeroallergen sensitization on airway and systemic inflammation using fractional exhaled nitric oxide (FeNO) and interleukins (ILs) 4, 5, and 13. The study enrolled asthmatics (n=203) (diagnosed using Global Initiative for Asthma guidelines). Atopy was diagnosed using skin-prick testing (SPT). All subjects underwent testing for FeNO, blood absolute eosinophil count (AEC), and serum levels of immunoglobulin E (IgE), and ILs 4, 5, and 13. Asthmatics (bronchial asthma [BA]) were classified as atopic (BA-A) and non-atopic (BA-N). Atopic-asthmatics were sub-classified as exclusively food allergen (AtAA) or aeroallergen (AtAA); or dually (AtFAA) sensitized. Mean values of AEC, serum IgE and FeNO, and IL 4 and 13

were significantly higher in BA-A than BA-N. Mean IL-5 was higher in BA-A, but not statistically significant. Subgroups of atopic-asthmatics did not show any consistent difference across all the studied parameters.

4. Management of interstitial lung diseases: A Consensus Statement of the Indian Chest Society and National College of Chest Physicians (India)

Interstitial lung diseases (ILDs) are a complex and heterogeneous group of acute and chronic lung diseases of several known and unknown causes. While clinical practice guidelines (CPG) for idiopathic pulmonary fibrosis (IPF) has been recently updated, CPG for ILD other than IPF are needed. A working-group of multidisciplinary clinicians familiar with the clinical management of the ILD (pulmonologists, radiologists, pathologists, rheumatologists) and three epidemiologists of Indian Chest Society (ICS and National College of Chest Physicians (India) (NCCP[I]), posed questions to address the clinically relevant situation. A systematic search was done on PubMed, Embase and Cochrane databases. Modified GRADE approach was used to grade the evidence. The working-group discussed the evidence and reached a consensus of opinions for each question following face-to-face discussions. Statements have been made for each specific question and the grade of evidence has been provided after performing a systematic review of the literature. For most of the questions addressed, the available evidence was insufficient and of low to very low quality. The consensus of the opinions of the working-group has been presented as statements for the questions and not as an evidence based CPG for the management of ILDs. This document provides the statements made by the consensus of opinions among the experts following discussion of systematic review of evidence pertaining to the specific questions for the management of ILDs other than IPF. It is hoped that this document will help the clinicians understand the accumulated evidence and help better management of idiopathic and non-idiopathic interstitial pneumonias.

5. Prevalence of obstructive sleep apnoea in patients with chronic obstructive pulmonary disease

The concomitant occurrence of moderate-to-severe chronic obstructive pulmonary disease (COPD) and obstructive sleep apnoea (OSA) is reportedly around 60% attributing to worse prognosis in this subset of population. The present study was undertaken to ascertain the prevalence and implications of OSA in patients of COPD and compare it with those of patients of COPD without OSA. Fifty diagnosed patients of moderate-to-severe COPD of age ≥40 years were screened for OSA using a self-reported questionnaire (STOP BANG Questionnaire). Out of these 30 patients who were found to be at risk of OSA (STOP BANG score >2) were included in the study. These 30 patients then underwent (in lab) Type 1 diagnostic polysomnography (PSG) and inflammatory markers interleukin (IL)-4, IL-5, IL-6,IL-13, high sensitivity c-reactive protein [hs-CRP] and fractional exhaled nitric oxide [FeNO] testing. Their quality-of-life was evaluated with St. George'sRespiratory Questionnaire (SGRQ) score, body-mass index, airflow obstruction, dyspnoea and exercise (BODE) index and COPD assessment test (CAT) score. On evaluation with the parameters of pulmonary function test (PFT); significantly lower forced vital capacity (FVC) was found in COPD cases with OSA. No statistically significant difference was found for the level of inflammatory marker based on the presence of OSA. The patients of COPD with OSA fared poorly in CAT, BODE index, modified Medical Research Council (mMRC) scale and SGRQ score in comparison to those with COPD alone. Our study indicates high prevalence of OSA in patients with moderate-to-severe COPD which negatively affects the quality of sleep and symptoms associated with COPD which further leads to poor quality-of-life. Clinicians should maintain a high index of suspicion for OSA while evaluating a patient of poorly controlled COPD.

6. Sensitivity to common aeroallergens in asthma patients in Delhi-National Capital Region

Skin prick test (SPT) is the "gold standard" in the assessment of sensitivity to inhalant allergens. SPT is performed with antigen extracts from India and evaluated according to the Standard Indian Guidelines. The aim of this study was to determine sensitivity by SPT in asthma patients in National Capital Region (NCR) of Delhi. This is a prospective study of skin prick test with aeroallergens in asthma patients and their combination with clinical diagnosis. Fifty-eight different common aeroallergen were tested through SPT in patients of bronchial asthma. The sensitivity of all common aeroallergens was analyzed by MS Excel 2010. A significant (2+ and above) skin-positive reaction against aeroallergens was found in nearly 60% of the study cases asthma patients. The younger adults aged 21-30 years were the foremost commonly affected group with 84. In the present study, we found that insects (cockroaches, housefly, mosquito, and rice weevil) and HDM are the most common skin sensitive aeroallergens in Delhi-NCR. The sensitization was the most common in the younger age group patients.

7. Role of immunological mediators in the follow-up of asthma and allergic rhinitis patients on allergen immunotherapy

Bronchial asthma (BA) is characterized by chronic airway inflammation. Many studies have shown a significant overlap between BA and allergic rhinitis (AR). Specific allergen immunotherapy (AIT) is effective for the treatment of BA and AR. Only limited studies have evaluated the role of immunological parameters to assess the response in patients on AIT. Hence, this study was done to assess the role of interleukin-4 (IL-4), IL-5, and IL-6 in the follow-up of patients of BA and AR on AIT. This study was conducted on diagnosed cases of BA, AR, and BA with AR attending the outpatient department who were started on subcutaneous immunotherapy as per the standard Indian guidelines. Blood samples were collected at the beginning of the treatment and every 3 months thereafter for a period of 51 months, and serum IL-4, IL-5, and IL-6 levels were measured. Significant reduction was observed in IL-4, IL-5, and IL-6 levels during the treatment with AIT over a period of 12 months. Our study suggests a possible role of IL-4, IL-5, and IL-6 in the follow-up of BA and AR patients; however, further studies are needed in this area.

8. Post-COVID-19 respiratory management: Expert Panel Report

The process of development of the "Post-COVID-19 Respiratory Management Expert Panel Report" was undertaken by the Department of Pulmonary Medicine, Vallabhbhai Patel Chest Institute (VPCI), Delhi. a Panel of national respiratory experts included representatives from the Institutes and also experts in the field from all over the country. An extensive initial literature search and review of the literature was performed by searching the electronic databases PubMed, Medline, Google Scholar, Science Direct and Cochrane database, and meetings were organised by the VPCI, Delhi, coordinated by the chairperson and recorded by the rapporteurs. After a detailed discussion on the available literature in group discussions and final decisions were made based on a consensus approach. The final document was reviewed by all the members of the expert panel. This is the first expert panel report on the management of post-COVID-19 patients from India. However, this report may need revision on the basis of the evidence-based literature over a period of time and our experience through patient's care.

9. Performing pulmonary function tests in COVID-19 Pandemic

COVID-19 pandemic has adversely affected the various diagnostic modalities. Pulmonary function test (PFT) is an important investigation for diagnosis and follow up of pulmonary diseases. Performance of PFT leads to aerosol generation. Hence, it predisposes all involved personnel like PFT technician and pulmonary physician including the patient at risk of COVID-19 infection. So, the current pandemic has lead to curtailing of PFT. But this being an essential modality for pulmonary disease diagnosis and management, we gradually need to recommence the PFTs. In the present commentary we discuss various measures and precautions to be undertaken while performing PFTs in the current pandemic scenario.

10. Correlation of hs-CRP, exhaled nitric oxide and atopic status in non-obese and obese bronchial asthma patients

Obesity and asthma are the common conditions that describe the distinctive nature of inflammation. The high-sensitivity C-reactive protein (hs-CRP) and fraction of exhaled nitric oxide (FeNO) levels are known to influence the atopic status. This study was undertaken to compare these inflammatory markers and atopic profile between non-obese and obese asthmatic patients. Two hundred asthma patients aged between 11-58 years were enrolled for this study and divided into two groups: non-obese [body mass index (BMI) <25 kg/m2) (n=100) and obese (BMI>30 kg/m2) (n=100)]. All the subjects were assessed for the pulmonary function test (PFT), hs-CRP from blood serum, FeNO and skin prick test (SPT) against the battery of 58 common aero-allergens and subjects having at least one SPT positive were labelled as atopics. Both FRC% and ERV% were significantly lower in the obese group. Levels of FeNO of non-obese were significantly higher than the obese. The hs-CRP was significantly higher in obese atopics in comparison to non-obese. Obese patients with asthma have a higher hs-CRP level. Thus, while interpreting hs-CRP level in obese patients, atopic status must be evaluated.

11. Association between asthma and obstructive sleep

Asthma and obstructive sleep apnoea (OSA) are the commonest pulmonary diseases worldwide and contribute to significant morbidity and mortality. Fifty patients aged 18 years and above with moderate to severe asthma, presented to our out-patient clinic during 2016-2017, were screened for OSA using a self-reported STOP BANG

Questionnaire. Of these, 30 were found to be at risk of OSA (STOP BANG score >2) and were included in the study. These 3 patients underwent diagnostic polysomnography (PSG), inflammatory markers interleukin (IL)-4, IL-5, IL-6, IL-13, high sensitivity c-reactive protein, fractional exhaled nitric oxide (FeNO) testing. Their quality-of-life and asthma control was evaluated with St. George Respiratory Questionnaire score and Asthma Control Test, respectively. After PSG, OSA, apnoea-hypopnoea index (AHI) >5/h was found in 15/30 (50%) cases with moderate and severe asthma (N=15 each). In moderate asthma 6/15 (40%) and in severe asthma 9/15(60%) were diagnosed to have OSA. Asthma patients with OSA fared poorly in asthma control test questionnaire and St. George's Respiratory Questionnaire (P=0.01) in comparison to those without OSA. Our study indicates high prevalence of OSA among patients of moderate to severe asthma which negatively affects quality of sleep and asthma control that further leads to poor quality-of-life in these patients. Thus, highlighting the need of maintaining high index of suspicion in identifying OSA among patients of moderate to severe asthma.

12. Insights in the management of long COVID-19: preliminary observations

Many patients suffer from various manifestations even after four weeks of severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) positivity and they are labelled as "Long COVID". Guidelines on pharmacological management of these patients are lacking till date. The present study is a retrospective analysis of "Long COVID" patients presenting to one of the units of Viswanathan Chest Hospital of our Institute between June 2020 and December 2020. All the records of these patients were analysed. Inclusion criteria was no pre-existing pulmonary disease and availability of follow-up visits. Systemic steroids had been given to patients with (a) resting hypoxia or (b) exertional desaturation along with radiological abnormalities, categorised as long COVID-interstitial lung disease (LC-ILD). The patients with breathlessness and wheeze or rhonchi on auscultation were categorised as long COVID-obstructive airway disease (LC-OAD). Inhaled corticosteroid and bronchodilators were given to them. Out of the 3363 patients provided consultation in the OPD, 50 patients were categorised as of long-COVID. Only 10 patients fulfilled the inclusion criteria and were included in the present study. Two patients had hypoxia at rest and three patients with significant desaturation on six-minute walk test (6MWT). On chest radiography, six patients had bilateral lower zone reticulations/nonhomogeneous opacities. High resolution computed tomography confirmed ground-glass opacities in five of them. There were seven patients of LC-ILD, 2 of LC-OAD and 1 of "long COVID cough". LC-ILD patients responded to oral steroid therapy and showed clinical, radiological as well as functional improvement. In these patients both resting hypoxia and exertional desaturation disappeared. Also improvement in 6MWT distance was observed in these patients. Long COVID-OAD patients responded well to inhaled corticosteroids and bronchodilators with symptomatic and functional improvement. Patients of LC-ILD responded well to systemic steroids and LC- OAD to inhaled corticosteroids and bronchodilators. Despite the small number of patients, the present study provides a road-map for the management of "long COVID" pulmonary sequalae till large scale studies are being done.

13. Clinico-epidemiological profile of patients during COVID-19 pandemic

The novel corona outbreak emerged in the Wuhan province of China in December 2019, rapidly spread all over the world and was declared as public health emergency of international concern by World Health Organization. India has also been severely affected by the pandemic. We analysed the epidemiological and clinical features of patients diagnosed to be suffering from COVID-19 in our set up. The most common symptom of COVID-19 was cough followed by breathlessness and fever. Nearly half of the patients required supplementary oxygen on presentation. We found that COVID-19 in patients of chronic respiratory diseases manifests with higher prevalence of symptoms and also higher severity of the disease. Also, the symptomatology of COVID-19 closely mimics the acute exacerbation of chronic lung diseases, so cautious screening and testing is required.

14. Evaluation of characteristics of post-Covid-19 and assessment of response to treatment

We analysed the demographic profile, history, functional assessment and all investigations of this study cohort of post-Covid-19 patients. These patients had a mean duration of about four weeks from discharge to first visit to our hospital. Pre-existing respiratory comorbidity was present in 63%. History of hospitalisation was present in 52%. Fatigue (65%) was the most common symptom followed by breathlessness (60%), cough (45.71%) and chest pain (28.57%). We also analysed the initial severity of COVID-19 and its effect on the clinical and radiological manifestations of Long-COVID. Patients with history of severe COVID-19 were found to have significantly higher and severe clinical and radiological manifestations of Long-COVID.

Postgraduate Training and Teaching

The Institute was initially started with a Diploma Course in Tuberculosis and Chest Diseases (DTCD). Later the MD, DM and PhD courses were started. The Institute continues to conduct the MD, DM and PhD courses in Pulmonary Medicine, Biochemistry, Microbiology, Pharmacology and Physiology. The students currently enrolled in these courses are shown here.

DM Degrees (Ongoing)

(Session: 2019-2022)

S. No	Name (Discipline)	Title of the Thesis	Supervisor(s)
1	Dr Arvind Kumar Verma (Pulmonary Medicine)	Effect of pulmonary rehabilitation on chronic hypersensitivity pneumonitis patients	Prof. Raj Kumar Prof. Vishal Bansal
2	Dr Sonal (Pulmonary Medicine)	Vitamin D levels in asthma and ABPA and its correlation with airway inflammation	Prof. Raj Kumar

DM Degrees (1st Year)

(Session: 2020-2023)

S. No	Name (Discipline)	Title of the Thesis	Supervisor(s)
1	Dr Aby Abraham (Pulmonary Medicine)	Effect of home-based pulmonary rehabilitation on health-related quality of life and functional capacity in patients with chronic obstructive pulmonary disease	Prof. Raj Kumar Prof. B. K. Menon Prof. Vishal Bansal Dr Nitin Goel
2	Dr Rakesh Kumar Singh (Pulmonary Medicine)	Study of clinical profile and outcome of patients admitted in respiratory intensive care unit at Vallabhbhai Patel Chest Institute, Delhi	Prof. Raj Kumar Prof. B. K. Menon Dr Nitin Goel

MD Degrees (Awarded)

(Session: 2017-2020)

Name	Discipline
Dr Priyandarshini S	Pulmonary Medicine
Dr Tome Kamgo	Pulmonary Medicine
Dr Akshit Gupta	Pulmonary Medicine
Dr Himanshu Saini	Pulmonary Medicine
Dr Vignesh Kumar K	Pulmonary Medicine
Dr Tonushyam Sonowal	Microbiology

MD Thesis (Submitted)

(Session: 2018-2021)

S. No	Name (Discipline)	Title of the Thesis	Supervisor(s)
1	Dr Anupam Prakash (Pulmonary Medicine)	Evaluation of anthropometry, body composition analysis in asthma and COPD and its correlation with severity	Prof. B. K. Menon Prof. Vishal Bansal
2	Dr Rahul Kumar Meena (Pulmonary Medicine)	Quality of sleep and daytime sleepiness in COPD and asthma	Dr Nitin Goel Prof. Raj Kumar
3	Dr Ahmed Safwan M (Pulmonary Medicine)	Evaluation of inflammatory biomarkers and quality of life in COPD, bronchial asthma and asthma: COPD overlap patients	Prof. Raj Kumar Dr Nitin Goel
4	Dr. Vatsal Bhushan Gupta (Pulmonary Medicine)	Evaluation of Clinical and Radiological Parameters in treated Pulmonary Tuberculosis Patients	Prof. B. K. Menon

MD Thesis (Ongoing)

(Session: 2019-2022)

S. No	Name (Discipline)	Title of the Thesis	Supervisor(s)
1	Dr Pallavi S R (Pulmonary Medicine)	Two-minute versus six-minute walk tests in detecting exertional oxygen desaturation in moderate and severe COPD	Dr Nitin Goel Prof. Raj Kumar
2	Dr Kunal Ranjan (Pulmonary Medicine)	Anxiety and depression in COPD patients and its effect on quality of life	Prof. Raj Kumar Dr Nitin Goel
3	Dr Nitesh Goyal (Pulmonary Medicine)	Assessment of fatigue and quality of life in sarcoidosis patients	Prof. BK Menon Prof. Raj Kumar
4	Dr Vivek Kumar (Pulmonary Medicine)	Evaluation of one minute sit to stand test, six-minute walk test and body composition analysis to assess exercise capacity in patients with COPD	Prof. BK Menon Prof. Raj Kumar Prof. Vishal Bansal
5	Dr Dhilnaz AS (Pulmonary Medicine)	Evaluation of clinical, physiological and radiological parameters and quality of life in patients with bronchiectasis	Prof. BK Menon Prof. Raj Kumar
6	Dr Rohan Arora (Microbiology)	A Study of the Phenotypic and Genetic Determinants of Bedaquiline Resistance in Clinical Isolates of Mycobacterium tuberculosis	Prof. Mandira Varma Basil Prof. BK Menon Dr. Anuj Bhatnagar Rajan Babu Institute of Pulmonary Medicine and Tuberculosis

MD – Ist Year

(Session: 2020-2023)

Name	Discipline
Dr Pooja Narwal	Pulmonary Medicine
Dr Sharmistha Dutta	Pulmonary Medicine
Dr Shyam Mohan K	Pulmonary Medicine
Dr Irshad Ahmed	Pulmonary Medicine
Dr Satvik Manchanda	Pulmonary Medicine
Dr Anmol Guleria	Microbiology
Dr Jyothi Choudhary	Microbiology
Dr Mihir Chauhan	Pharmacology

PhD Awarded/Submitted

S. No.	Name (Discipline)	Title of the Thesis	Supervisor(s)	Status
1.	Mr Anil Kumar Mavi (Pulmonary Medicine)	Biochemical and clinico-immunologic characterization of pigeon (columbilivia) allergens (feathers and droppings) in asthmatic patients	Prof. Raj Kumar Prof. SN Gaur	Awarded
2.	Mr Manoj Kumar (Biochemistry)	Studies on erythrocyte membrane protein profile and oxidant and antioxidant status of blood in bronchial asthma	Prof. S.K. Bansal Prof. Rajendra Prasad and Prof. S.K. Chhabra	Awarded
3.	Mr Sanjesh Saini (Microbiology)	Role of microRNA in pathogenesis of influenza A virus infection	Prof. Malini Shariff and Prof. Madhu Khanna	Submitted
4.	Mr Suresh K. Thokchom (Pharmacology)	A clinical study to evaluate the effects of yogic intervention on pulmonary functions, inflammatory markers, oxidative stress and health status in patients of chronic obstructive pulmonary disease	Prof. Kavita Gulati, and Prof. B.K. Menon	Submitted
5.	Mr Anil Meena (Biochemistry)	A study on CRHR1 and GR gene polymorphism and their correlation with the expression of various inflammatory cytokines in asthma in North Indian population	Prof. S.K. Bansal, Prof. S.K. Chhabra and Prof. B.K. Menon	Submitted
6.	Ms Astha Giri (Microbiology)	Characterization of genotypic indicators of ethambutol resistance in clinical isolates of *Mycobacterium tuberculosis*	Prof. Mandira Varma-Basil and Dr Sadhna Sharma Miranda House, University of Delhi	Awarded

PhD Thesis (Ongoing)

S. No.	Name (Discipline)	Title of the Thesis	Supervisor(s)	Year of Registration
1.	Mr Chanchal Kumar (Microbiology)	Functional analysis of cell infusion proteins of *Mycobacterium tuberculosis* as potential target for vaccine development	Prof. Mandira Varma-Basil and Dr Sadhna Sharma Miranda House, University of Delhi	2017
2.	Ms Tanushri Nandi (Microbiology)	Anti-influenza activity of immune modulatory peptides	Prof. Madhu Khanna and Prof. Nirupama Trehanpati, Additional Professor, Department of Molecular Immunology, Institute of Liver and Biliary Sciences, New Delhi	2017
3.	Mr Kamal Srivastava (Microbiology)	Evaluation fo an arrary of PE-PPE gene for potential use in a diagnostic assay to identify *Mycobacterium tuberculosis*	Prof. Mandira Varma-Basil and Dr Sadhna Sharma Miranda House, University of Delhi	2017
4.	Mr Ashutosh Singh (Microbiology)	Multi-gene phylogengy and MALDI-TOF-MA characterization of melanised fungi and determination of their antifungal susceptibility profiles	Prof. Anuradha Chowdhary	2017
5.	Mr Anshul Tanwar (Pharmacology)	Experimental studies on the effects of *Withania somnifera* extract on type 2 diabetes mellitus induced Alzheimer`s disease and the possible mechanisms in rats	Prof. Kavita Gulati	2017
6.	Mr Pankaj Verma (Pharmacology)	Experimental studies to evaluate the mode of action of traditional herbal agents in bronchial asthma	Prof. Kavita Gulati	2017
7.	Mr Kamal Singh (Pulmonary Medicine)	Indoor air pollution exposures and asthma in children	Prof. Raj Kumar	2017

Faculty Members Associated as Co-supervisors for MD/PhD Theses of DU and Other Institutions

S. No.	Name (Discipline) and Institution's Name	Title of the Thesis	Supervisor(s)	Status
1.	Dr Anamika MS (otorhinolaryngology and head and neck surgery) Department of LHMC and Asso. Kalawati Saran Children Hospital, New Delhi	Clinical profile, aeroallergen sensitivity and assessment of pulmonary function in pediatric chronic rhinosinusities	Dr A. Chakravarti (LHMC and Associated Hospitals, New Delhi) and Prof. Raj Kumar	Submitted
2.	Ms Anita Singh (PhD) Amity Institute of Virology and Immunology, Amity University, Noida	Characterization of recombinant outer membrane proteins of *L. interogans* serovars	Dr M.M. Premlatha (Amity Institute of Virology and Immunology, Noida [UP]) and Prof. Malini Shariff	Awarded
3.	Mr Kaushik Bhattacharya (MSc-PhD combined Programe in Biomedical Sciences) Dr B.R. Ambedkar Centre for Biomedical Research, University of Delhi, Delhi	Novel non synonymous mutations in a multi-drug resistant isolate of *M. tuberculosis*	Dr Vani Brahmachari (Dr B.R. Ambedkar Centre for Biomedical Research, University of Delhi, Delhi) and Prof. Mandira Varma-Basil	Awarded
4.	Dr Kakasaheb H. Bhosale (MD Medicine) Ram Monahar Lohia Hospital, New Delhi	Cryptococcal antigenemia in anti-retroviral therapy naïve patients with human immunodeficiency virus infection	Dr Brijesh Sharma (Deptartment of Medicine, RML Hospital, PGIMER & RML Hospital, New Delhi) and Prof. Anuradha Chowdhary	Submitted
5.	Mr Manoj Kumar (PhD) Department of Applied Chemistry, SoVSAS, Gautam Buddha University Greater Noida (Uttar Pradesh)	Biochemical and Clinico-Immunologic Characterization of Allergenic Proteins of *Periplaneta americana* in Asthma Patients	Dr Rajesh Kumar Gupta (Department of Applied Chemistry, SoVSAS, Gautam Buddha University, Greater Noida [Uttar Pradesh] and Prof. Raj Kumar	Submitted
6.	Ms Smriti Gupta (PhD Biochemistry) Department of Chemistry SRM University Delhi-NCR, Sonipat (Haryana)	Understanding chronic obstructive pulmonary disease by studying single nucleotide polymorphism in Delhi-NCR population	Dr Ajit Kumar (Department of Chemistry, SRM University, Delhi-NCR, Sonepat, Haryana); Dr Anju Bhatnagar, (Rajan Babu Institute for Pulmonary Medicine & Tuberculosis [RBIPMT], Delhi) and Prof. Vishwajeet Rohil	Submitted

S. No.	Name (Discipline) and Institution's Name	Title of the Thesis	Supervisor(s)	Status
7.	Ms. Nishtha Agarwal (PhD Biomedical Sciences) Department of Biomedical Sciences, ANDC, University of Delhi, Delhi	Antigenic and genetic analysis of influenza virus isolated from clinical samples and exploring the potential antiviral target sites	Dr Gagan Dhawan (Department of Biomedical Sciences, ANDC, University of Delhi, Delhi) and Prof. Madhu Khanna	Ongoing
8.	Mr Nilanshu Manocha (PhD Biomedical Sciences) Department of Biomedical Sciences, ANDC, University of Delhi, Delhi	Study on the generation of peptide immunogen against dengue virus	Dr Prashant Kumar (Amity Institute of Virology and Immunology, Amity University, Noida (UP) and Prof. Madhu Khanna	Ongoing
9.	Ms Varsha Chauhan (PhD in Microbiology) MDU, Rohtak (Haryana)	Efflux Pumps: Contribution to Drug Resistance in Various lineages of *Mycobacterium tuberculosis*	Dr Sanjay Kumar (Department of MicrobiologyMDU, Rohtak (Haryana) and Prof. Mandira Varma-Basil	Ongoing

Awards/Honours

Prof. Raj Kumar

- **Editor-in-Chief,** *Indian Journal of Chest Diseases and Allied Sciences*, an official publication of the V.P. Chest Institute and the National College of Chest Physicians (India).
- **Member,** Advisory Council, Delhi School of Public Health (DSPH), University of Delhi, Delhi.
- **Member,** Academic Council, Pondicherry University, Puducherry.
- **Member,** 88th Annual Meeting of the University Court, University of Delhi, Delhi.
- **Member,** Peer Review, New Delhi TB Center (NDTBC), Ministry of Health and Family Welfare (CCD Secton), New Delhi.
- **Member,** Specialists Board, Respiraotry Medicine, National Board of Examination, Ministry of Health and Family Welfare, Government of India, New Delhi.
- **Member,** Academic Advisory Committee, Centre for Professional Development in Higer Educaton (CPDHE) (UGC-HRDC), University of Delhi, Delhi.

Prof. Malini Shariff

- **Member,** Editorial Board, *Indian Journal of Chest Diseases and Allied Sciences*, an official publication of the V.P. Chest Institute and the National College of Chest Physicians (India).

Prof. Mandira Varma-Basil

- Secretary, Indian Association of Mycoplasmologists.
- **Member,** Ethics Committee, Rajan Babu Institute of Pulmonary Medicine and Tuberculosis, Delhi.

Prof. Anuradha Chowdhary

- **Elected Fellow,** Indian Academy of Sciences, Bengaluru.
- **Elected Fellow,** International Society of Antimicrobial Chemotherapy, Aberdeen, Scotland.

Prof. Madhu Khanna

- Virology Unit of the Institute has been designated as Centre for COVID-19 testing.
- **CPCSEA Nominee,** Shri Ram Institute, Delhi.

Prof. Anita Kotwani

- **Member,** Advisory Group on WHO "Fair Medicine Pricing Forum."
- **Member,** Technical Advisory Group and Core working Group constituted by Ministry of health & Family Welfare, GOI on AMR to oversee and coordinate policy decisions and activities relating to AMR including development and operationalizing the National Action Plan on AMR.
- **Member**, *Advisory Panel, Journal of Pharmaceutical Policy and Practice.*
- **Member,** National Advisory Group for the UKRI-GCRF One Health Poultry Hub (OHPH). This interdisciplinary hub is funded by the Global Challenges Research Fund (GCRF) of the UK Research and Innovation (UKRI) to address the larger issue of achieving sustainable global intensification of poultry meat and egg production whilst minimising risk to international public health, with particular focus on South and South East Asia.

Prof. Kavita Gulati

- **Coordinator,** ADR Monitoring Centre (AMC) of Pharmacovigilance Programme of India, Indian Pharmacopeia Commission.
- **Treasurer,** Society for Nitric Oxide and Allied Radicals (SNOAR).
- **Member,** IEAC of PGIMER, RML Hospital, New Delhi.

Prof. Vishwajeet Rohil

- **Executive Member,** Biotechnology Society of India.
- **Nominated (by DBT) as DBT Representative,** Institutional Biosafety Committee, at DEFENCE INSTITUTE OF PHYSIOLOGY AND ALLIED SCIENCES, DRDO, Timarpur, Delhi.

Prof. Ritu Kulshrestha

- **Editor,** VPCI Newsletter.
- **Invited Member,** Scientific Advisory Committee, MRHRU, MOHFW, GOI, established Model Rural Health Research Unit (MRHRU) at Khotpura, Panipat, Haryana in collaboration with the Kalpana Chawla Government Medical College, Karnal under mentorship of ICMR-NICPR, Noida.
- **Member,** Board of Studies, Department. of Paramedical Sciences, Faculty of Allied Health Sciences, SGT University, Gurgaon.
- **Associate Member,** DBT–TDNBC–Deakin–Research Network across Continents for Learning and Innovation (DTD-RNA).

Sponsored Research Projects

S. No.	Faculty Member (Department)	Title of the Project	Funding Agency, Date of Sanction/ Implementation and Duration	Grants Received (in Rs.)
1.	Prof. Kavita Gulati Nodal Officer (Pharmacology)	Multidisciplinary Research Unit	DHR, MoHFW January 01, 2014 (Five years) [extended upto 31.03.2021]	399.23 Lakhs
2.	Prof. Mandira Varma-Basil (Microbiology)	Development of a rapid phenotypic assay to differentiate between *Mycobacterium tuberculosis* and non-tuberculosis mycobacteria	ICMR, August 20, 2019 (Three years)	17.09 Lakhs
3.	Prof. Anuradha Chowdhary (Medical Mycology Unit) (Microbiology)	Exploration of azole resistance in *Candida tropicalis:* detection of ERG11 gene mutations and azole resistant genotypes	ICMR, October 27, 2020 (Three years)	20.21 Lakhs
4.	Prof. Anuradha Chowdhary (Medical Mycology Unit) (Microbiology)	Genomic insights of azole and terbinafine resistance in clonal trichophyton mentagrophytes/ interdigitale spp. complex causing alarming difficult to treat dermatophytosis in North India	SERB-DST, February 10, 2021 (Three years)	19.03 Lakhs
5.	Prof. Anuradha Chowdhary (Medical Mycology Unit) (Microbiology)	Multilocus microsatellite typing and antifungals profile of clinical *cryptococcus neoformans* species complex isolated from patients of cryptococcosis	ICMR, November 15, 2017 (Three years)	29.52 Lakhs
6.	Prof. Madhu Khanna (Respiratory Virology)	Triple targeting engineered virus: a tool to counter influenza infection	ICMR, October 27, 2020 (Three years)	13.28 Lakhs
7.	Prof. Ritu Kulshrestha (Pathology)	Designing of inhalational polymeric nanoparticle drug delivery systems for the treatment of lung fibrosis	ICMR, November 29, 2019 (Three years)	10.42 Lakhs
8.	Prof. Anita Kotwani (Pharmacology)	Smart regulation for antibiotic use in India: understanding, innovating and improving compliance	DBT, September 6, 2018 (Three years)	55.97 Lakhs
9.	Prof. Kavita Gulati (Pharmacology)	Pharmacological studies on *Hedychium spicatum* on airway inflammation and remodeling in experimental model of bronchial asthma	ICMR, March 24, 2021	8.70 Lakhs
10.	Prof. Kavita Gulati (Pharmacology)	Experimental studies on the hepato-protechtive and immune modulatory effects of *Dawa-ul-kurkum*, a polyherbal Unani preparation, and its cellular and molecular mechanisms in rats	CCRUM, AYUSH June 30, 2017 (Three years)	57.23 Lakh

S. No.	Faculty Member (Department)	Title of the Project	Funding Agency, Date of Sanction/ Implementation and Duration	Grants Received (in Rs.)
11.	Prof. Kavita Gulati (Pharmacology)	A clinical study to evaluate the effects of yogic intervention on pulmonary functions, inflammatory markers, oxidative stress and health status in patients of chronic obstructive pulmonary disease	AYUSH, March 26, 2018 (Three years)	25.84 Lakhs
12.	Prof. Vishal Bansal (Physiology)	Cognitive performance after short duration sub-maximal exercise in young adults.	LSRB, DRDO June 27, 2018 (Three years) [extended upto 2021]	20.44 Lakhs
13.	Prof. Raj Kumar (Respiratory Allergy and Applied Immunology)	National Tobacco Quit-Line Services	Ministry of Health & Family Welfare (Govt. of India) – QL March 12, 2015 (Three years) [extended upto 2019-20]	1.02 Crores

Fellowships

S. No.	Name of the Fellow (Department) and Name of the Supervisor	Title of the Fellowship	Funding Agency, Date of Sanction/ Implementation and Duration	Grants Received (in Rs.)
1.	Mr Manoj Kumar (Senior Research Fellow) *(Supervisor: Prof. Vishwajeet Rohil)*	Characterization of proteins differentially expressed erythrocyte membrane in bronchial asthma: identification and purification of one protein and its correlation with severity of the disease	ICMR, September 5, 2018 (Three years)	13.84 Lakhs
2.	Mr. Anil Meena *(Supervisor: Prof. Vishwajeet Rohil)*	National fellowship and scholarship for higher education of ST students (NFST-PhD / MPhil)	Ministry of Tribal Affairs February, 2019 (One Year)	4.10 Lakhs
3.	Mr. Kamal Shrivastava (Senior Research Fellow) *(Supervisor: Prof. Mandira Varma-Basil*	Evaluation of an array of PE-PPE genes for potential use in diagnostic assay to identify *Mycobacterium tuberculosis*	ICMR, April 13, 2018 (Three years)	14.55 Lakhs
4.	Ms Anshita Nagar (Junior Reseach Fellow) (Microbiology) *(Supervisor: Prof. Mandira Varma Basil)*	Novel antituberculosis drug targets: biotin biosynthesis pathway	CSIR, April 01, 2019 to September 01, 2020	0.20 Lakhs
5.	Dr Kalpana Pawar (Women Scientist) (Medical Mycology Unit, Microbiology) *(Supervisor: Prof. Anuradha Chowdhary)*	Mechanism of multidrug resistance and pathogenesis in *Candida glabrata*	DHR-MoHFW, March 12, 2020 (Three years)	13.13 Lakhs
6.	Ms. Ayushi Sharma (Senior Research Fellow) *(Supervisor: Prof. Anita Kotwani)*	Smart Regulation for antibiotic use in India: understanding, innovating and improving compliance	Department of Biotechnology, September 2018-September, 2021 (Three years)	55.97 Lakhs
7.	Ms. Kshetrimayum Surmala Devi (Senior Research Fellow) *(Supervisor: Prof. Anita Kotwani)*	Smart Regulation for antibiotic use in India: understanding, innovating and improving compliance	Department of Biotechnology, September 2018-September, 2021 (Three years)	55.97 Lakhs
8.	Ms. Deeksha Kaloni (Junior Research Fellow) *(Supervisor: Prof. Anita Kotwani)*	Smart Regulation for antibiotic use in India: understanding, innovating and improving compliance	Department of Biotechnology, September 2018-September, 2021 (Three years)	55.97 Lakhs

S. No.	Name of the Fellow (Department) and Name of the Supervisor	Title of the Fellowship	Funding Agency, Date of Sanction/ Implementation and Duration	Grants Received (in Rs.)
9.	Ms. Sneha Sangram Singh Bhonsle (Project Associate) *(Supervisor: Prof. Anita Kotwani)*	Smart Regulation for antibiotic use in India: understanding, innovating and improving compliance	Department of Biotechnology, September 2018-September, 2021 (Three years)	55.97 Lakhs
10.	Mr. Pankaj Verma (Junior Research Fellow) *(Supervisor: Prof. Kavita Gulati)*	Pharmacological studies to evaluate the anti-inflammatory and immunomodulatory effects of *Hibiscus rosa-sinensis* and *Piper nigrum* and their cellular and molecular mechanism of action in experimental models of bronchial asthma	ICMR, January 14, 2019 (Three years)	10.82 Lakhs
11.	Ms Hemlata Sharma (Senior Reseach Fellow) (Pharmacology) *(Supervisor: Prof. Kavita Gulati)*	Pharmacological studies to evaluate the anti-inflammatory and immunomodulatory effects of *Aerva Lanata Linn* in experimental models of bronchial asthma and the cellular and molecular mechanism	ICMR, August 23, 2019 (Three years)	10.82 Lakhs
12.	Ms Priti Yadav (Senior Research Fellow) *(Supervisor: Prof. Vishal Bansal)*	Therapeutic potential of heat pre-conditioning on chronic inflammation and infection in rats	ICMR, January 30, 2019 (Three years)	10.82 Lakhs
13.	Mr Kamal Singh (Senior Research Fellow) *(Supervisor: Prof. Raj Kumar)*	Analysis of inflammatory biomarkers in asthmatic children affected with indoor air pollution in Delhi-NCR	ICMR, July 20, 2018 (Three years)	15.38 Lakhs
14.	Mr Anil Kumar Mavi (Senior Research Fellow) *(Supervisor: Prof. Raj Kumar)*	Biochemical and immunological studies of pigeons allergens in asthma patients	ICMR, July 20, 2018 (Two years)	10.43 Lakhs

Conferences/Symposia/Seminars/Workshops/CMEs

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
1.	Prof. Raj Kumar	Keynote Speaker	ESDA in associantin with Dr B.R. Amedkar College, CSIR-NEERI, Delhi and Amity University, Uttar Pradesh	National Online Conference 2020 Delhi June 5-6, 2020
2.	Prof. Raj Kumar	• Workshop Director for Allergy and Immunotherapy • Guest Lectures on i. Introduction and briefing about allergy workshop ii. Patient selection for allergen immunotherapy iii. Food Allergy • Speaker Skin prick test: practical demonstration and case discussion • ICS - Dr C.V. Ramakrishnan Oration (Air pollution and lung health)	National College of Chest Physicians (NCCP) and Indian Chest Society (ICS)	NAPCON 2020 (Virtual) 22nd Joint National Conference of the National College of Chest Physicians (NCCP) and Indian Chest Society (ICS) Delhi January 27-31, 2021
3.	Prof. Raj Kumar	Chairman Yoga: Modern Medical and Health Services	Department of Philosophy, Nava Nalanda Mahavihara, Nalanda, Bihar	15th Nalanda Dialogue (Online) Delhi February 18, 2021
4.	Prof. V.S. Chauhan, Chairman, GB	Guest lecture on COVID-19 pandemic: vaccines and mutants	V.P. Chest Institute, Delhi	Paintal Memorial Golden Jubilee Auditorium Delhi March 18,2021
5.	Prof. Raj Kumar	Guest Lecture on Do you want to quit tobacco?	Kirori Mal College National Service Scheme in collaboration with NTQLS, V.P. Chest Institute	Virtual Delhi March 19, 2021
6.	Prof. Raj Kumar	Chairman Technical Session on Public health in India	Centre for Canadian Studies, University of Delhi in association with Department of Finance and Business Economics, University of Delhi	Hybrid Mode Biotech Centre Auditorium South Campus, University of Delhi Delhi March 11-12, 2021

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
7.	Prof. Malini Shariff	Participated	UCMS Delhi, Virtual MICRO-D-CON	Pre-conference satellite workshop on Diagnostic Algorithm for Co- infections in COVID-19 Delhi January 28, 2021
8.	Prof. Malini Shariff	Participated	IAMM (Delhi Chapter)	Pre-conference CME on Zoonotic Diseases-Is the Threat Real? 12th Annual Conference of IAMM (Virtual MICRO-D-CON) Delhi January 28-30, 2021
9.	Prof. Mandira Varma-Basil	Guest Lecture on Diagnosis of drug resistant tuberculosis: concerns in an endemic region and our experience with isoniazid monoresistance	Asian African Society of Mycobacteriology	3rd Asian African International Congress of Mycobacteriology Delhi January 27-29, 2021
10.	Prof. Mandira Varma-Basil	Guest Lecture on Newer approaches in tuberculosis diagnosis	Institute of Home Economics, University of Delhi	World TB Day Delhi March 24, 2021
11.	Prof. Anita Kotwani	Participated	World Health Organization (WHO)	WHO Webinar on Introduction to the Monitoring of Antimicrobial Use: National Surveillance of Antimicrobial Consumption (AMC) Delhi June 8-9, 2020
12.	Prof. Anita Kotwani	Lecture on Antimicrobial stewardship during the COVID-19 pandemic: best practice and guidance on prescribing antibiotics	World Health Organization (WHO)	WHO Webinar Delhi June 16, 2020
13.	Prof. Anita Kotwani	Participated	World Health Organization (WHO)	WHO Webinar on GLASS AMC Delhi October 29, 2020

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
14.	Prof. Anita Kotwani	Plenary Speaker on Responding to AMR Consequences for Human Health	One Health Poultry Hub and the CE4AMR	Workshop on Developing Community-Led Solutions to Antimicrobial Resistance: Building a One Health Approach in Low- and Middle-Income Countries Delhi January 15, 2021
15.	Prof. Anita Kotwani	Lecture on Pharmaceutical effluent: a critical link in the inter-connected ecosystem promoting antimicrobial resistance	SGT University, Gurugram (Haryana)	National Conference on Pharmacy Practice Gurugram February 15, 2021
16.	Prof. Anita Kotwani	Panelist on Infectious diseases of South-East Asia Region	Centre for Disease Dynamics and Economic Policy, Washington DC	Online Delhi February 23, 2021
17.	Prof. Anita Kotwani	Speaker and Panelist on Antimicrobial resistance governance: behaviour and blame	One Health Roadmap Series: Chatham House, London	One Health Poultry Hub (Online) Delhi March 17, 2021
18.	Prof. Kavita Gulati	Participated	Research Training Centre for South Zone, Dept. of Clinical Pharmacy, JSS Medical College and Hospital, Mysuru in association with Pharmacovigilance Programme of India, IPC, Ghaziabad	Webinar on Advanced Pharmacovigilance: Research in Pharmacovigilance in the Age of COVID-19 Delhi July 29, 2020
19.	Prof. Kavita Gulati	Participated	DBT	Webinar on Response of the DBT's Autonomous Institutes to COVID-19 (Part-I) Delhi August 21, 2020 and September 11, 2020
20.	Prof. Kavita Gulati	Participated	Indian Journal of Pharmacololgy (IJP) and Indian Pharmacological Society (IPS)	Webinar on COVID 19 Delhi August 22, 2020
21.	Prof. Kavita Gulati	Participated	Delhi Pharmacological Society and Society For Promotion and Research of Cardiovascular Sciences	Webinar on Challenges in Diagnosis and Pharmacotherapy of COVID-19 Delhi September 05, 2020

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
22.	Prof. Kavita Gulati	Participated	Indian Pharmacological Society	• Webinar series on Research Methodology and Research Quality Assessment Delhi September 06, 2020 • Webinar on Animal care and Handling (CPCSEA) and Regulatory Pharmacology and Toxicology Delhi September 13, 2020 • Webinar series on Drug development: Newer Technologies Delhi September 19, 2020
23.	Prof. Kavita Gulati	Guest lecture on Translational research to validate the efficacy of UNIM-352, a polyherbal Unani formulation for bronchial asthma and elucidate the cellular and molecular mechanisms	BioGenesis Health Cluster, Bangalore	International Virtual 3rd World Congress on Drug Discovery and Development-2021 Delhi February 21-22, 2021
24.	Prof. Kavita Gulati	Invited talk on Newer insights into the neuromodulatory role of Nitric oxide	HIMSAR, Jamia Hamdard	Virtual Biennial South Asian Association of Physiologists VII and Physiological Society of India Conference-2021 Delhi March 24-25, 2021
25.	Prof. Vishwajeet Rohil	Participant	Association of Clinical Biochemists of India	Webinar on Non-alcoholic Fatty Liver Disease: An Under Recognized Cause with Emerging Importance Participated Online (ACBI, Dept. of Biochemistry, AIIMS, Kalyani) January 6, 2021 Practical Applications of Six Sigma in Clinical Laboratory Medicine Participated Online (ACBI, Dept. of Biochemistry, AIIMS, Jodhpur) February 5, 2021

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
				Flow Cytometry and Its Application in Laboratory Diagnostics Participated Online (ACBI, Dept. of Biochemistry, MAMC, Delhi) March 26, 2021
26.	Prof. Vishwajeet Rohil	Participated	V.P. Chest Institute	Workshop on Biostatistics Delhi February 25, 2021 Workshop-cum-Training Programme on Proposal Writing and Ethical Issues in Biomedical Research Delhi March 11, 2021
27.	Prof. Ritu Kulshrestha	Participated	TERI-Deakin Nanobiotechnology Centre In Association with DBT and Indian Society of Nanomedicine	Webinar on Nanotechnology Interventions in COVID-19 and Future Pandemics Delhi May 1, 2020
28.	Prof. Ritu Kulshrestha	Participated	TRANASIA Biomedicals Ltd and Erba Mannheim	Webinar on," Covid-19: Lab Parameters as Early Indicators and Prognostic Markers Delhi May 06, 2020
29.	Prof. Ritu Kulshrestha	Presented a e-poster on KRAS gene mutation in bronchoscopy samples of non small cell carcinoma lung: relation with smoking status and KRAS oncoprotein expression	American Thoracic Society	ATS 2020 Virtual International Conference Delhi August 5-10, 2020
30.	Prof. Ritu Kulshrestha	Participated	Centre for Nano Science and Engineering (CeNSE) and Indian Institute of Science Bengaluru, India	CeNSE DBT Nano-biotechnology Alliance Familiarization Workshop Delhi September 8-10, 2020
31.	Prof. Ritu Kulshrestha	Participated	DBT/Wellcome Trust India Alliance New Delhi	Webinar on, Response of the DBTs Autonomous Institutes to Covid-19 (Part –II) Delhi September 11, 2020

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
32.	Prof. Ritu Kulshrestha	Participated	Bioevents Ltd Tel Aviv, Isreal	Virtual Conference on Lung Cancer (Virtual-LC2020) Delhi September 24-25, 2020
33.	Prof. Ritu Kulshrestha	Participated	AIIMS, New Delhi and Indiana University School of Medicine USA	Virtual Workshop on Regenerative and Nano Medicine Delhi December 10, 2020
34.	Prof. Ritu Kulshrestha	Participated	Centre for Science and Environment New Delhi	Web Seminar on Managing Biomedical Waste in India: covid-19 and Beyond Delhi January 19, 2021
35.	Prof. Ritu Kulshrestha	Presented a paper on Combination therapy of pirfenidone and bleomycin in lung cancer: prevents EMT of cancer cells and reduces their invasive potential	Keystone Symposia, Silverthorne, CO USA	Virtual Keystone eSymposia on Tumour Metabolism and Microenvironment Delhi January 25-28, 2021
36.	Prof. Ritu Kulshrestha	Presented a e-poster on Correlation of programmed cell death receptor ligand-1 (PD-L1) expression with KRAS mutation in lung cancer patients: study from tertiary care centre in North India	The International Association for the Study of Lung Cancer (IASLC), Denver, Colorado USA	IASCLC Virtual World Conference on Lung Cancer (WCLC 2020) Delhi January 28-31, 2021
37.	Prof. Ritu Kulshrestha	Invited Faculty Lectures on • MDT discussion of ILD • Pathology of ILD	Indian Chest Society	e-conference ICS ILD Course 2021 Delhi February 25, 2021
38.	Prof. Ritu Kulshrestha	Participated	The Energy and Resources Institute (TERI) New Delhi	e-Workshop on High - End Characterization of Microalgae: Overcoming the Technological Barriers Delhi March 3-4, 2021
39.	Prof. Ritu Kulshrestha	Participated	AIIMS, New Delhi	Webinar on An introduction to Biobanking and Biospecimen Science Delhi March 05, 2021

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
40.	Prof. Vishal Bansal	Invited Lecture on Role of exercise in management of chronic respiratory diseases	UGC - Human Resource Development Centre, Sri Venkateshwara University, Andhra Pradesh	Refresher Course in Health Management Tirupati (Andhra Pradesh) November 16-28, 2020
41.	Prof. Vishal Bansal	Invited Lecture on Cardiopulmonary rehabilitation in chronic respiratory diseases	Department of Respiratory Medicine, Chettinad Hospital and Research Institute, Tamil Nadu	CHETPULMOCON 2021 Recent Advances in Respiratory Medicine Tamil Nadu March 22, 2021
42.	Dr Nitin Goel	Faculty in Workshop on allergy and immunotherapy Presented paper on Clinico-radiological characteristics of post-COVID-19 at a tertiary pulmonary care centre	National College of Chest Physicians (India) and Indian Chest Society	22nd Joint National Conference of National College of Chest Physicians (India) and Indian Chest Society January 27-31, 2021
43.	Dr Nitin Goel	Lecture on Oxygen therapy in chronic lung diseases	MRU, VPCI	Training Course on Pulmonary Rehabilitation Delhi March 10, 2021
44.	Dr Parul Mrigpuri	Chairperson Symposium on Respiratory Infections-III: Therapy in post antibiotic Era Lectures on • Vaping and second hand effects in • Antimicrobial properties of Apismellifera"s Bee Venom • Lecture-cum-demonstration • Skin prick test: practical demonstration (Virtual) • Case discussion on Clinical Interpretation of Diagnostic Tests and starting of immunotherapy	National College of Chest Physicians and Indian Chest Society	NAPCON-2020 (virtual) 22nd Joint National Conference of the National College of Chest Physicians (NCCP) and Indian Chest Society (ICS) January 27-31, 2021 Symposium on Vaping: A New Smoking Wave Session on Practice changing research in Respiratory Infections
45.	Dr Parul Mrigpuri	Organizer	VPCI	Workshop on Biostatistics Delhi February 25, 2021

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
46.	Dr Parul Mrigpuri	Faculty Lecture on Nutritional aspects of chronic respiratory diseases	VPCI	Training Course on Pulmonary Rehabilitation Delhi March 9-10, 2021
47.	Dr Parul Mrigpuri	Faculty Lecture on Types of tobacco and its addiction	VPCI	Webinar on Do You Want to Quit Tobacco? Delhi March 19, 2021
48.	Ahmed Safwan M (*Supervisor: Prof. Raj Kumar*)	Presented papers on • Evaluation of Inflammatory biomarkers and quality of life in asthma, COPD and asthma-COPD overlap • Two siblings with Kartagener's syndrome treated as bronchial asthma • 38-year-old male with non-resolving pneumonia • Drug induced erythroderma and hepatitis to all 1st line anti-tubercular drugs	National College of Chest Physicians (NCCP) and Indian Chest Society (ICS)	Virtual 22nd Joint National Conference of the National College of Chest Physicians (NCCP) and Indian Chest Society (ICS) Delhi January 27-31, 2021
49.	Anupam Prakash (*Supervisor: Prof. Raj Kumar*)	Presented a paper on Evaluation of anthropometry, body composition analysis in asthma and COPD and its correlation with severity	National College of Chest Physicians (NCCP) and Indian Chest Society (ICS)	Virtual 22nd Joint National Conference of the National College of Chest Physicians (NCCP) and Indian Chest Society (ICS) Delhi January 27-31, 2021
50.	Vatsal Bhushan Gupta (*Supervisor: Prof. Raj Kumar*)	Presented papers on • Rheumatoid lung delay diagnosis of adenocarcinoma for 8 months • Isolated pulmonary cysticercosis presenting as mass lesion • Evaluation of clinical, physiological and radiological parameters in treated pulmonary tuberculosis patients	National College of Chest Physicians (NCCP) and Indian Chest Society (ICS)	Virtual 22nd Joint National Conference of the National College of Chest Physicians (NCCP) and Indian Chest Society (ICS) Delhi January 27-31, 2021

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
51.	Dr Jayeeta Bhadra (*Supervisor: Prof. Vishwajeet Rohil*)	Participant	Association of Clinical Biochemists of India (ACBI)	Webinar on Practical Applications of Six Sigma in Clinical Laboratory Medicine Participated Online (ACBI, Dept. of Biochemistry, AIIMS, Jodhpur) February 5, 2021 Flow Cytometry and Its Application in Laboratory Diagnostics Participated Online (ACBI, Dept. of Biochemistry, MAMC, Delhi) March 26, 2021
52.	Dr Jayeeta Bhadra (*Supervisor: Prof. Vishwajeet Rohil*)	Participant	V.P. Chest Institute	Workshop on Biostatistics Delhi February 25, 2021 Workshop-cum-Training Programme on Proposal Writing and Ethical Issues in Biomedical Research Delhi March 11, 2021
53.	Dr Ravishankar. N	Organizer	V.P. Chest Institute	Workshop on Biostatistics Delhi February 25, 2021
54.	Mr. Suresh Kumar Thokchom (*Supervisor: Prof. Kavita Gulati*)	Oral presentation on A randomized controlled study to evaluate the effects of yogic interventions as an adjunct to conventional pharmacotherapy in patients of COPD and the possible mechanisms	Society of Toxicology (STOX) jointly organized by PGIMER, Chandigarh and Sree Chitra Tirunal Institute for Medical Sciences Technology Trivandrum	40th Annual Conference of Society of Toxicology (STOX-(online)) from India Delhi January 29-30, 2021
55.	Mr. Suresh Kumar Thokchom (*Supervisor: Prof. Kavita Gulati*)	Oral presentation on A randomized controlled study to evaluate the effects of yogic intervention on BODE index, markers of inflammation, oxidative stress and quality of life in patients of COPD	Bio Genesis Health Cluster, Bangalore	Virtual International Conference of 3rd World Congress on Drug Discovery and Development 2021 Delhi February 21-22, 2021

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
56.	Mr. Pankaj Verma (*Supervisor: Prof. Kavita Gulati*)	Poster presentation on • Pharmacological studies to evaluate mode of action of traditional herbal agent in experimental model of bronchial asthma • Pharmacological studies to evaluate the therapeutic effects of piper nigrum in experimental models of bronchial asthma in rat	STOX jointly organized by PGIMER, Chandigarh and Sree Chitra Tirunal Institute for Medical Sciences Technology, Trivandrum	40th Annual Conference of Society of Toxicology (STOX-(online)) from India Delhi January 29-30, 2021
57.	Dr Rahul K. Meena (*Supervisor: Dr Nitin Goel*)	Poster presentation on Quality of sleep and daytime sleepiness in COPD and asthma	National College of Chest Physicians (India) and Indian Chest Society	NAPCON-2020 (virtual) 22nd Joint National Conference of National College of Chest Physicians (India) and Indian Chest Society January 27-31, 2021

Participation in Advanced and Specialised Training Programme by Faculty Members

S. No.	Participant (Department)	Course Title/ Topic	Training Duration	Host
1.	Prof. Ritu Kulshrestha (Pathology)	Online Training programme on Statistical data analysis using SPSS	January 21-27, 2021	Science Tech Institute, Lucknow
2.	Prof. Ritu Kulshrestha (Pathology)	Workshop on Biostatistics	February 25,2021	MRU-DHR-ICMR-VPCI
3.	Prof. Ritu Kulshrestha (Pathology)	Training Course on Pulmonary rehabilitation	March 9-10, 2021	MRU-DHR-ICMR-VPCI
4.	Prof. Ritu Kulshrestha (Pathology)	Workshop-cum-Training Programme on Proposal writing and ethical issues in research	March 11, 2021	MRU-DHR-ICMR-VPCI
5.	Prof. Ritu Kulshrestha (Pathology)	Online Training Workshop on PD-L1 (SP142) in TNBC interpretation"	March 26, 2021	Roche Diagnostics India Pvt Ltd
6.	Prof. Kavita Gulati (Pharmacology)	Workshop-cum-Training Programme on Proposal writing and ethical issues in biomedical research	March 11, 2021	MRU-DHR-VPCI

Short-term Specialised Training Imparted by Faculty Members

S. No.	Name, Subject and University/ Institute/College	Course Title/ Topic	Faculty Member (Department)	Period
1.	Ms Shavya Menon, MSc (Microbiology) Amity Institute of Microbial Technology, Amity University, Noida (Uttar Pradesh)	Phenotypic and molecular characterization of *Acinetobacter* spp from clinical isolates	Prof. Malini Shariff (Microbiology)	January - June 2020
2.	Suamreiliu Kamei, (Biotechnology) Amity University, Noida (Uttar Pradesh)	Phenotypic and genotypic determination of bedaquiline resistance in clinical isolates of *Mycobacterium tuberculosis*	Prof. Mandira Varma-Basil (Microbiology)	January 16, 2020-May 15, 2020
3.	Sushma Khaidem, (Biotechnology) Amity University, Noida (Uttar Pradesh)	Phenotypic and genotypic determination of linezolid resistance in clinical isolates of *Mycobacterium tuberculosis*	Prof. Mandira Varma-Basil (Microbiology)	January 16, 2020-May 15, 2020
4.	Suraj Rawat, (Microbiology) Graphic Era University, Dehradun (Uttarakhand)	Exploration of cell invasion genes of *Mycobacterium tuberculosis*	Prof. Mandira Varma-Basil (Microbiology)	January 16, 2020-May 15, 2020
5.	Himanshu Dhanda, MSc (Biotechnology) Amity Institute of Biotechnology, Amity University, Noida (Uttar Pradesh)	Biotechnology	Prof. Ritu Kulshrestha (Pathology)	January 01-June 30, 2020
6.	Romani Dahiya, MSc (Biotechnology) Amity Institute of Biotechnology, Amity University, Noida (Uttar Pradesh)	Biotechnology	Prof. Ritu Kulshrestha (Pathology)	January 01-April 01, 2021
7.	Tanvir Fatima, MSc (Biotechnology) Amity Institute of Biotechnology, Amity University, Noida (Uttar Pradesh)	Biotechnology	Prof. Ritu Kulshrestha (Pathology)	December 01 2020-February 28, 2021
8.	Ms. Ishita Bhutani, B Tech+M Tech (Biotechnology) Amity Institute of Biotechnology, Amity University, Noida (Uttar Pradesh)	Biotechnology	Prof. Kavita Gulati (Pharmacology)	February 15-March 31, 2021
9.	Ms. Himanshi Saxena, B Tech+M Tech (Biotechnology) Amity Institute of Biotechnology, Amity University, Noida (Uttar Pradesh)	Biotechnology	Prof. Kavita Gulati (Pharmacology)	February 15-March 31, 2021
10.	PG Students and Faculty of VPCI and Other Institutions	Training Course on Pulmonary Rehabilitation	Prof. Vishal Bansal (Physiology)	March 9-10, 2021

Cultural and Sports Activities

Institute maintained its tradition to celebrate Independence Day (74th Independence Day on August 15, 2020) and Republic Day (72nd Republic Day on January 26, 2021).

Farewell functions were held to bid adieu to the retiring employees of the Institute.

List of Publications

Journals

1. Babita, Gulati Kavita, Menon BK, Kumar R, Ray A. A Clinical study to evaluate the effects of yoga and pharmacotherapy on pulmonary functions, mechanism of inflammation and quality of life in bronchial asthma patients. *Clin Invest 2020;*10:106–16.
2. Bhattacharyya K, Nemaysh V, Joon M, Pratap R, Varma-Basil Mandira, Bose M, Brahmachari V. Correlation of drug resistance with single nucleotide variations through genome analysis and experimental validation in a multi-drug resistant clinical isolate of *M. tuberculosis. BMC Microbiol* 2020;25;20:223. doi: 10.1186/s12866-020-01912-6.
3. Chauhan V, Shrivastava K, Anand S, Kumar C, Singh A, Varma-Basil Mandira. Draft genome sequence of mycobacterium simiae, a potential pathogen isolated from the normal human oral cavity. *Microbiol Resour Announc* 2020;12;9:e01185-20.
4. Chowdhary Anuradha, Sharada K, Singh PK, Bhagwani DK, Kumar N, de Groot T, Meis JF. 2020 Outbreak of *Dirkmeia churashimaensis fungemia* in a neonatal intensive care unit, India. *Emerg Infect Dis* 2020;26:764–8.
5. Chowdhary Anuradha, Stielow JB, Upadhaya G, Singh PK, Singh A, Meis JF. *Candida blankii*: an emerging yeast in an outbreak of fungemia in neonates in Delhi, India. *Clin Microbiol Infect* 2020;26:648.e5–648.e8.
6. Chowdhary Anuradha, Tarai B, Singh A, Sharma A. Multidrug-resistant *Candida auris* infections in critically ill coronavirus disease patients, India, April–July. *Emerg Infect Dis* 2020;26:2694–6.
7. Dahiya B, Sharma S, Khan A, Kamra E, Mor P, Sheoran A, Sreenivas V, Varma-Basil Mandira, Gupta KB, Gupta MC, Chaudhary D, Mehta PK. Detection of mycobacterial CFP-10 (Rv3874) protein in tuberculosis patients by gold nanoparticle-based real-time immuno-PCR. *Future Microbiolay* 2020;15:601-612. doi: 10.2217/fmb-2019-0347.
8. Dasgupta R, Tomley F, Alders R, Barbuddhe SB, Kotwani Anita. Adopting an intersectoral One Health approach in India: Time for One Health Committees. *Indian J Med Res* 2021;153:281–6.
9. Goel N, Goyal N, Kumar R. Clinico-radiological evaluation of post COVID-19 at a tertiary pulmonary care centre in Delhi, India. *Monaldi Arch Chest Dis* 2021;91. doi: 10.4081/monaldi.2021.1682.
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