ANNUAL REPORT
2019–20

Vallabhbhai Patel Chest Institute

University of Delhi, Delhi

The Institute observed 67th Institute Day on March 4, 2020. Shri Ashwini Kumar Choubey, Hon'ble Minister of State for Health and Family Welfare, Government of India was the Chief Guest. Professor Yogesh Tyagi, Vice-Chancellor, University of Delhi was the Guest of Honour. On this occasion Shri Ashwini Kumar Choubey, inaugurated the renovated Registration Counter and PM-JAY Counter and Flag off of the new Ambulance for patient transportation at VCH of the Institute

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From the Director's Desk

It is my privilege to present the Institute's Annual Report for the year 2019-20. 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 were trained 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, as 25 research projects funded by various Government Departments, like ICMR, DST, DBT, CSIR and Ayush amounting to funds over 11 crores in the Institute at present. The vibrancy of these research projects/activities can be well judged from the list of publications in peer/reviewed journals. The faculty members and students of the Institute delivered orations, guest lectures and presented papers in the International and National conferences. The faculty members and students of the Institute received several Awards and Honours in their field of specialisation. The Institute organised several conferences and workshops where eminent experts from all over the world participated and shared their experiences.

The Viswanathan Chest Hospital, the clinical wing of the Institute, is a tertiary care Chest Hospital with state-of-the-art patient-care facilities. It continues to provide excellent diagnostic and treatment services including critical care management to patients from Delhi, other parts of the country and neighbouring countries suffering from Respiratory Diseases.

National Tobacco Quitline Services (NTQLS), started at VPCI, is a pioneering concept in our country to tackle the growing menace of tobacco addiction in a cost-effective manner. The services of NTQLS, accessible on telephone, free of cost, from anywhere and at anytime, may reach to rural India through proper advertisement, motivating illiterate tobacco users or launching of awareness programmes.

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 lung cancer, thoracoscopy and interventional bronchology, paediatric pulmonology, stem cell research. Research in the major areas, especially relevant to the country's needs, is a continuous process that will be pursued with the renewed vigour besides continuing educational activities.

The report provides an overview of the activities and achievements of the Institute during the year.

Prof. Raj Kumar

Annual Report (2019–20)

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MILESTONES OF 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 University of Delhi.
August 1,	1964	Prof. A.S. Paintal joined as 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 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 Fellow of the Royal Society of London.
	1984	Prof. A.S. Paintal was elected General President of the Indian Science Congress Association [1984-85].
	1985	Prof. H.S. Randhawa was elected Vice-President of the International Society for Human and Animal Mycology [1985-88].
	1986	Prof. A.S. Paintal was appointed as 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 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 International Regent, American College of Chest Physicians [2000-06].
March,	2001	A 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.
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 scientist, researchers and academicians.
May 30,	2016	National Tobacco Quit Line Services, which functions from V.P. Chest Institute, University of Delhi, Delhi, was inaugurated by Shri J.P. Nadda, Union Minister of Health and Family Welfare, Govt. of India, during the "World No Tobacco Day" programme organized by WHO-India, Ministry of Health and Family Welfare, Govt. 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.
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.
September 28,	2018	Prof. Raj Kumar joined as Director of the Institute.
March 4,	2020	Pradhan Mantri Jan Arogya Yojana (PMJAY) Counter at VCH was inaugurated by Shri Ahwini Kumar Choubey, Hon'ble Minister of State for Health and Family Welfare, Government of India.

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.

Thes Institute celebrated its 70th Foundation Day on April 5, 2019. Shri Sanjeeva Kumar, Additional Secretary (Health), Ministry of Health and Family Welfare, Government of India was the Chief Guest and Dr Jagdish Kaur, Regional Adviser, Tobacco Free Initiative, WHO Regional Office for South-East Asia was the Guest of Honour. Dr Rohit Sarin, Director, National Institute of Tuberculosis and Respiratory Diseases (NITRD), New Delhi, delivered 21st Prof. R. Viswanathan-VPCI Oration titled "Newer Drugs and Shorter Regimen for MDR TB: The Road Ahead".

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.

15th Professor Autar Singh Paintal Memorial Oration was delivered by Professor V.S. Chauhan (September 24, 2019). The topic of the Oration was: Challenges and Opportunities in Controlling Infectious Diseases in India. Shri Arun Kumar Jha, Director-General, National Productivity Council, Department for Promotion of Industries and Internal Trade, Ministry of Commerce and Industry, Government of India was the Chief Guest. Professor Anil Kumar Jain, Principal, University College of Medical Sciences and Professor C.P. Baveja, Head, Department of Microbiology, Maulana Azad Medical College were the Guests of Honour.

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	Professor 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 College and Hospital, Udaipur, Rajasthan.

5th V.K. Vijayan Oration was delivered by Dr S.K. Luhadia (October 24, 2019). The topic of the Oration was: Bacterial Lysates in Chronic Respiratory Disease: Personal Experience. Professor Mahesh Verma, Vice-Chancellor, Guru Govind Singh Indraprshtha University, New Delhi was the Chief Guest. Professor Arun Kumar Pandey, Vice-Chancellor, Mansarovar Global University, Madhya Pradesh was the Guest of Honour.

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 which are available through following three sections controlled by the Deputy Registrar who reports to the Director.

The Institute observed World Environment Day on June 5, 2019.

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
MEMBERS Treasurer, University of Delhi (Ex-Officio)	**Shri T.S. Kripanidhi** **Shri Siya Sharan**
Two members nominated by the Executive Council, University of Delhi	**Prof. Mahesh Verma** **Prof. Neeta Sehgal**
Dean, Faculty of Medical Sciences, University of Delhi	**Prof. Vandana Roy** **Dr Gopesh Mehrotra**
Three members nominated by the Ministry of Health and Family Welfare, Government of India, New Delhi	**Dr Dharmendra Singh Gangwar** Special Secretary and Financial Advisor
	Smt. Gayatri Mishra **Joint Secretary**
	Dr S. Venkatesh Director-General of Health Services
	Dr Sanjay Tyagi 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. Balakrishnan Menon** *(03.11.2019 onwards)* **Prof. Anuradha Chowdhary** *(03.11.2019 onwards)*
One Reader or Lecturer of the Institute by rotation according to seniority for a period of one year	**Dr Ritu Kulshreshta** *(till 02.11.2018)* **Dr Nitin Goel** *(02.11.2019 onwards)*
Representative of Non-teaching Staff of the Institute by rotation (as Special Invitee) according to seniority for a period of one year	**Shri Dhirendra Pal** *(01.03.2019 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. Mandira Varma-Basil — *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

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

Deputy Director–General — *Member*
National Programme for Control of Blindness
Ministry of Health and Family Welfare
Government of India
New Delhi-110001

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

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

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

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

Prof. Balakrishnan Menon — *Member (One year term according to seniorority 01.08.2018 onwards)*
Department of Pulmonary Medicine
Vallabhbhai Patel Chest Institute
University of Delhi, Delhi-110007

Prof. Mandira Varma-Basil — *Member (One year term according to seniorority)*
Department of Microbiology
Vallabhbhai Patel Chest Institute
University of Delhi, Delhi-110007

Prof. K. Ravi — *Member (Till 20.08.2019)*
Department of Microbiology
Vallabhbhai Patel Chest Institute
University of Delhi, Delhi-110007

Dr Anant Mohan — *Member (21.08.2019 onwards)*
Professor and Head
Department of Pulmonary Medicine
All Indian Institute of Medical Sciences
New Delhi

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

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

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

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 of the Institute)	**Dr Madhu Khanna** Department of Virology
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** *(28.03.2018 onwards)* Plot No. 61, Flat No. D-2, Sector 5, Rajender Nagar, Ghaziabad-201 005
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)

S.K. Bansal, MSc, PhD
Professor (superannuated on 31-10-2019)

Vishwajeet Rohil, MD
Assistant Professor

Microbiology (including Medical Mycology and Respiratory Virology)

(Mrs) Malini Shariff, MD, PhD
Associate Professor

(Mrs) Mandira Varma-Basil, MD, DNB
Associate Professor

(Mrs) Anuradha Chowdhary, MD
Associate Professor

(Mrs) Madhu Khanna, MSc, PhD
Associate Professor

Pathology

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

Pharmacology

(Mrs) Anita Kotwani, MSc, PhD
Associate Professor

(Mrs) Kavita Gulati, MSc, PhD
Associate Professor

Physiology

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

Pulmonary Medicine

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

Balakrishnan Menon, MD, DMRD
Associate Professor

Nitin Goel, MD
Assistant Professor

Sonam Spalgais, DNB
Assistant Professor

Parul Mrigpuri, DNB
Assistant Professor

Viswanathan Chest Hospital

Officer-in-Charge

Raj Kumar
Professor

Library

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

Animal House

Rajinder Bajaj, BVSc and AH
Veterinarian

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 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

The Institute started a Short-term Training Programme for Technicians in Pulmonary Function Testing during the year.

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	12087
Number of follow up patients visiting OPD	52161
Total Outdoor Patients	**64248**
Number of indoor patients	
General Wards	1587
Emergency Wards	2433
Total Indoor Patients	**4020**
Emergency treatment provided	35093
Total number of patients treated in ICU	360
Number of routine and specialised investigations done at VCH during the year	
Arterial blood gases	13774
Bronchoscopy	164
Bronchoalveolar lavage	75
Pulmonary function tests	24239
CT scans	3119
Ultrasounds	0
X-rays	26431
Electrocardiogram	4461
Polysomnograms	220
HIV testing	1555
Clinical biochemistry	43170
Skin tests	1214
Serum IgE test performed	5432
ANA	1009
c-ANCA	436
p-ANCA	434
SCL-70	741
HBsAg	1542
HCV	1542
Serum ACE	994
Vitamin D	91
Thyroid Profile	705

Biochemistry	
Blood glucose	3,557
Liver function tests	25,295
Kidney function tests	22,440
Pleural fluid biochemistry	270
HbA1c	2,173
Lipid profile	1,027
Total	**54,762**

Microbiology

1. Bacteriology Laboratory

Clinical specimens processed for isolation and identification of aerobic pathogens

Nature of Specimen	
Sputum	2738
Urine	345
Bronchial aspirate/ lavage	366
Pleural fluid	54
Blood	217
Endotracheal aspirate	187
Pus/(FNAC/Tips)	
Throat/nasal swab	53
	4
Total	**3964**

2. Serology Laboratory

Rheumatoid factor	755
C-reactive protein	198
Widal	6
Total	**959**

3. Anaerobic Culture **172**

4. Mycobacteriology Laboratory

Nature of Specimen

	LJ medium	**MGIT**	**GeneXpert**
Sputum	7376	212	1676
Bronchial aspirate	207	31	372
Pleural fluid	112	12	182
ET aspirate	54	4	21
CSF	6	3	2
Pus/Biopsy	27	6	20
FNAC	23	5	24
Total	**7805**	**273**	**2297**
Drug susceptibility test (DST) for *M. tuberculosis:*	80		

Line probe assay: Molecular DST for *M. tuberculosis*	
Line probe assay for firstline drugs: 30 Line probe assay for *Mycobacterium sp.* 80	
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	15,863
Platelet count	14,231
Absolute eosinophil count	3,188
Peripheral smear	26
P/S for malarial parasite	26
ESR	17
BT, CT, PT, APTT	764
Total	**34,115**

2. *Clinical Pathology Laboratory*

Total of 460 urine analysis were done during the period, including specific gravity, pH, albumin, sugar, microscopic examination and ketone bodies.

3. *Histopathology Laboratory*	
Lung biopsy–TBLB and EBLB	170
Experimental biopsy	10
Pleural biopsy	6
Total	**186**
4. *Cytopathology Laboratory*	
Sputum	268
BAL fluid	89
FNAB: Percutaneous	73

Transbronchial (TBNA)	23
Bronchial aspirate	26
Pleural fluid	188
Tracheal aspirate	05
Pus cytology	04
Total	**676**

5. Immunohistochemistry (n=768) using a panel of markers was done on biopsies/ Cell block/FNAB using automated immunohistochemical stainer for the differential diagnosis of lung carcinomas and lung fibrosis. IHC staining was done on: (1) Lung biopsies including transbronchial lung biopsy (TBLB), endobronchial lung biopsy (EBLB), Fine needle aspiration biopsy (FNAB), Tru-Cut biopsy, Cell block (Pleural fluid, BALF, FNAB, Sputum) (2) skin biopsy (3) Experimental lung biopsy

Biopsies Processed	**Number**
Lung biopsy-TBLB, EBLB	170
Experimental Biopsy	10
Pleural Biopsy	06
Immunohistochemistry	**No of Cases**
Napsin	71
KRAS	28
PD-L1	63
Pan CK	79
TTF-1	69
Calretinin	29
WT-1	24
CK-20	37
CK-7	40
CEA	48
Synaptophysin	19
CK5/6	2
ALK	10
P40	89
CD8	14
bFGF	2
NSE	9
SMA	7
CD-68	3
Vimentin	23
CD-4	14
CD-45	16
S-100	3
SP-C	21
Chromogranin	15
EMA	33

6. Molecular Pathology Laboratory

Total 193 molecular tests were performed during this period using RT-PCR for gene expression in lung cancer tissue and circulating blood DNA.

Molecular Tests	Number
EGFR (Tissue)	46
EGFR (Circulating)	21
K-RAS	70
BRAF	53
ALK	03

7. Cell Culture Laboratory

The cell culture laboratory was continued during this period. Research work on the A549 human alveolar epithelial cell line is presently being performed. The TGF-β, SMAD-2,3,5, E-Cadherin and vimentin expression are being studied by immunocytochemistry and real time PCR.

Tobacco Cessation Clinic

Tobacco cessation clinic (TCC) was established at 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 Health and Family Welfare, Government of India to make it a more comprehensive programme Centre. Further, the TCC was upgraded in the year 2009 as Resource Centre for Tobacco Control. The tobacco related deaths and suffering from diseases caused by tobacco consumption had raised the question that what should be done to protect the people from the trap of vicious circle of tobacco addiction. The TCC is providing services since November 2001 in outpatient department at hospital wing from Monday to Friday at 9 AM to 5 PM to the smokers and tobacco chewers who are willing to quit smoking and tobacco chewing. The services offered at the clinic are in the form of Counseling, NRT (nicotine replacement therapy), Non-NRT including Registration, CoHb monitoring, Quit date plan follow up and telephonic follow ups and pulmonary function test are being performed here. The TCC 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, booklets, pamphlets, and videos. Registered person is being called for regular follow-up at an interval of 2 weeks followed by 1 month, 2 months, 3 months, 6 months and 1 year. Moreover, TCC 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 conducted 55 educational programmes for physicians, para-medical professionals and general public. Since the inception of TCC to 31st March, 2020, 8574 new tobacco users and 3576 follow-up tobacco users have availed the services; 302 new and 140 follow-up cases came for tobacco cessation at TCC, from April, 2019 to March, 2020.

Total new subjects registered for TCC from 1st April, 2019 to 31st March, 2020	302
Subjects turn up for follow-up	140
Telephonic routine follow-up of registered subjects	1100+
Number of cases to whom medication prescribed	12 (4.0%)
Subjects quitted with medication	4 (33.3%)
Subjects contacted	94 (31.1%)
Total number of quitters (n=94)	**50 (53.2%)**

During the period, 50 subjects quitted their tobacco habit for at least 2 weeks. Follow up calls were made to 302 subjects registered in this duration to access their present quitting status, out of these 94 (31.1%) subjects were connected and rest 208 (78.9%) could not be contacted due to std number, switch off, person not available, expire, 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 (46 with the sessions of behavioural counseling alone and 4 with pharmacotherapy).

The continuous abstinence rates among the 50 subjects at 2 weeks, 1 month, 3 months, 6 months, 9 months, and 12 months were 53.2%, 51.1%, 29.8%, 20.4%, 12.5%, and 9.3, respectively.

Abstinence Rate	Subjects (%)
2 week abstinence rate (n=94)	50 (53.2)
1 month abstinence rate (n=94)	48 (51.1)
3 month abstinence rate (n=94)	28 (29.8)
6 month abstinence rate (n=93)	19 (20.4)
9 month abstinence rate (n=80)	10 (12.5)
12 month abstinence rate (n=54)	5 (9.3)

Professor Raj Kumar, Director of the Institute received the prestigious South-East Asia Region-World No Tobacco Day Award-2019 for his exemplary accomplishments in the area of tobacco control during the programme on National Consultation on Tobacco Lung Health, on the eve of World No Tobacco Day, organised by the Ministry of Health and Family Welfare, Government of India in partnership with World Health Organization.

The Institute celebrated World No Tobacco Day (Tobacoo and Lung Health) on the eve of—World No Tobacco Day, on May 30, 2019. Shri Praveen Sinha, National Professional Officer, WHO was the Chief Guest. Dr Manoj Kumar Khanna, Principal, Ramjas College, Dr Vibha Singh Chauhan, Principal, Kirori Mal College, Dr Simrit Kaur, Principal, Sri Ram College of Commerce and Dr Vipin Aggarwal, Principal, Sri Aurobindo College were the Guests of Honour.

Yoga Therapy and Research Centre

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

Yoga training classes run in different batches from 8 AM to 4 PM daily to teach different Yoga therapy to heal the diseases of patients come to attend these therapy classes.

Yoga sessions are specially designed for the management and eradication of different health disorders, like

bronchial asthma, hypertension, stress, obesity etc. the patients first reports to yoga OPD at VPCI during the period 9.00 AM to 3.00 PM Monday to Friday by Doctors and Yoga staff there after obtaining the case history of the patient, necessary counselling is given by the yoga ARO. Then the patient is advised to undergo yoga training and educational session according to individual's health problems for a particular period till the healing of disease. The patient is re-examined to note the improvement made by him /her by the yoga Therapist. Then 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.

Yoga Therapy and Research Centre, Vallabhbhai Patel Chest University of Delhi in collaboration with Morarji Desai National Institute of Yoga, New Delhi, organised 5th International Day of Yoga programme on 21 June, 2019 at Paintal Memorial Golden Jubilee Auditorium of the Institute in which yoga team follow the common yoga protocol and imparted training to all staff, students VPCI, yoga students and children.

5th International Yoga Day in collaboration with Morarji Desai National Institute of Yoga was celebrated on June 21, 2019.

Cardio-pulmonary Rehabilitation Clinic (Monday to Friday: 9 AM to 1 PM)

Cardio-Pulmonary Rehabilitation Clinic at Viswanathan 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. Patients are advised to enroll in supervised rehabilitation programme which can help them regain their functional capacity, reduce breathlessness and help them get their life back. A comprehensive pulmonary rehabilitation programme includes education on disease information, energy conservation, lung health, bronchial hygiene, chest physiotherapy, nutrition, optimization of medication intake, domiciliary oxygen usage, stress management, breathing retraining, inspiratory muscle training and strength and endurance training of upper and lower limbs. Four hundred twenty-seven patients attended the Cardio-Pulmonary Rehabilitation Clinic during the year; 382 for breathing retraining and education and 42 completed supervised rehabilitation programme (Intensive and Maintenance).

The Institute organised a Certificate Course in Pulmonary Rehabilitation from December 8–9, 2019. Professor V.S. Chauhan, Chairman, Governing Body of the Institute inaugurated the programme.

Basic Cardiopulmonary Resuscitation (CPR) Training was held from February 5–6, 2020. Dr Tanuja, Assistant Professor, Department of Anaesthesiology and Dr Nitin Goel, Assistant Professor, Department of Pulmonary Medicine gave the training. All Nursing, Technical and Laboratory staff attended the programme.

Multidisciplinary Research Unit

The VPCI-DHR-ICMR- Multi-disciplinary research unit (MRU) was established and made functional during the year 2015-16. This 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 Plan period. The scheme was implemented by the Department of Health Research with the technical support of ICMR. This path-breaking programme aims to develop/strengthen the health research infrastructure in the country. Under this scheme, financial assistance of upto 5.25 crores is to be provided for setting up of modern biological lab/multi-disciplinary research unit at VPCI.

The objectives of the scheme are: (i) to encourage and strengthen the environment of research in medical colleges; (ii) to bridge the gap in the infrastructure which is inhibiting health research in the medical colleges by assisting them to establish multi-disciplinary research facilities with a view to improve the health research; (iii) to ensure the geographical spread of health research infrastructure, in order to cover un-served and underserved medical colleges and other institutions; and (iv) to improve the overall health status of the population by creating evidence-based application of diagnostic procedures/processes/methods.

The VPCI-DHR-ICMR-Multi-disciplinary research unit aims (i) to undertake research in non-communicable diseases and other need-based research employing newer tools and (ii) to promote and encourage quality medical research in the institution.

National Centre of Respiratory Allergy, Asthma and Immunology

TThe 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). A brief description about the activities of NCRAAI during the year is given below.

A digital pollen count monitor for public, inaugurated by Union Minister of Health, Shri J.P. Nadda on the occasion of 69th Foundation Day of the Institute, has been set up at the Institute at Delhi University. Now pollen count would be displayed at the hospital gate nos 1 & 4 so that people who are predisposed to allergy caused by pollens can take preventive measures.The digital display board at the institute will enable people with chronic allergies to be better prepared for a dusty or pollen day on the road. It will also help create awareness about pollen concentration in the air, which is one of the major reasons for repeated attacks in asthma patients.

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

National Tobacco Quitline Services

"National Tobacco Quitline Services" runs under the aegis of Vallabhbhai Patel Chest Institute, University of Delhi, are a confidential, non-judgemental telephone-based counselling, information and referral service for anyone seeking help to quit tobacco for their own or another person's tobacco use. The NTQLS is accessed through a toll free no. 1800-11-2356. The programme is headed under the supervision of Prof. Raj Kumar, Director, of the Institute. It is operational 6 days a week, (Tuesday to Sunday 8AM to 8PM) following WHO protocol of Quit-line services.

The process of National Tobacco Quitline Services

- Make a call to the service on toll free number 1800-11-2356
- All the conversation & 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
- We will arrange for follow up calls and call you back as per your convenience
- 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

Shri Ashwini Kumar Choubey, Honourable Minister of State for Health and Family Welfare, Government of India, visited National Tobacco Quitline Services at the Institute on December 4, 2019.

The Institute organized a training programme for old and newly appointed counsellors at National Tobacco Quitline Services on 19th and 26th August 2019. During the training programme Shri Johar Ali Khan a renowned Violonist and the Brand Ambassador for the "No Tobacco Campaign" also invited to boost and motivate counsellors by his music and motivational speech.

The Institute organised an Interaction Meet on "NO TOBACCO CAMPAIGN" on November 13, 2019 at Paintal Memorial Golden Jubilee Auditorium of the Institute. Principals and educational leaders from many reputed educational institutions came and participated in this interaction meet. Shri Johar Ali Khan, the renowned Violinist also came and interacted with the leaders.

E-Hospital Services

As per directives from Ministry of Health and Family Welfare, Government of India, Dr Vishal Bansal, was nominated as Nodal Officer along with Mr Sunil Kumar, Technical-in-Charge to look after e-hospital and associated modules at the Institute. These modules include: (1) e-hospital: Phase-I (Patient registration and Billing); (2) ORS: Online Registration System; (3) *Mera Aspataal:* Patient feedback services and (4) Digital Payment: Promotion of digital payment services. Details of these modules are given below:

1. e-hospital

The National Informatics Centre (NIC) has developed e-Hospital@NIC, e-BloodBank@NIC and ORS (Online Registration System) applications under the Digital India initiative of the Government of India's Ministry of Electronics and Information Technology.

The Hospital Management Information System (HMIS) for hospital internal workflows and procedures is the e-Hospital@NIC program. A one-stop solution that helps link patients, hospitals and doctors on a single digital platform is e-Hospital@NIC.

Patient Registration (OPD, Casualty, Appointment and ORS)

The patient registration module of the e-Hospital application is used for patient registration in the OPD and Casualty departments as well as to book, confirm and cancel appointments.

Billing

The Billing module handles all types of billing workflows. This module facilitates cashier and billing operators for managing billing functions related to billing receipts and refunds.

Admission, Discharge and Transfer (IPD)

The IPD module commences when the patient is being registered and allotted bed in the ward. It deals with the complete treatment and services provided to the patient during his stay in the hospital.

Clinic (OPD and IPD)

The Clinic module allows the clinicians and doctors to record the clinical data of the patients like visits, examination, diagnosis, history, treatment, prescriptions etc., and to order investigations, procedures and medicines, to keep track of the treatment and other services provided to the patients.

e-Hospital@NIC is an open source health information management system which is onfigurable and easily customizable with multi-tenancy support. It is designed to deploy in cloud infrastructure to manage multiple hospitals seamlessly.

Customized configuration of e-Hospital@NICPhase-I software *i.e* Patient Registration (OPD, Casualty, Appointment and ORS), Billing, Admission, Discharge and Transfer (IPD), Clinic (OPD & IPD) for VPCI has been completed in July 2019 and we are switch over from HIS system to e-Hospital from 1st January, 2020.

2. Online Registration System

The e-Hospital, e-BloodBank and Online Registration System (ORS) applications were developed by NIC as part of the Ministry of Electronics and Information Technology's Digital India initiative. The Honorable Prime Minister of India inaugurated the ORS portal on 1st July, 2015.

Online Registration System is a framework to link various hospitals across the country. It is a Photo ID- or Aadhaar-based online registration and appointment application installed at hospitals where counter-based OPD registration and appointment system has been digitalized through HMIS.

Patients can select a specific department/doctor and book an appointment through this portal (https://ors.gov.in). The application has been hosted on the cloud services of NIC. This portal facilitates online appointments with various departments of different Hospitals using eKYC data of Aadhaar number, if patient's mobile number is registered with UIDAI. In case mobile number is not registered with UIDAI, it uses patient's name. New patient will get an appointment as well as allotted a Unique Health Identification (UHID) number. If Aadhaar number is already linked with UHID number, then only appointment number will be given and UHID will remain the same.

VPCI started the facility of Online Registration System from 01-12-2017 which can be accessed on http://vpci.org.in.

3. Mera Aspataal

मेरा अस्पताल My Hospital

Share your experience to improve hospitals

Ministry of Health & Family Welfare Government of India

मेरा अस्पताल (My Hospital) is Ministry of Health and Family Welfare, Government of India initiative to capture patient feedback for the services received at the hospital through user-friendly multiple channels, such as Short

Message Service (SMS), Outbound Dialling (OBD) mobile application and web portal. The patient can submit the feedback in seven different languages on mobile app and web portal; for the hospitals visited in last 7 days.

The patient can also check the already submitted feedback. The collected feedback will be compiled, analysed and visualized in the form of a dashboard accessible to the different stakeholders at facility, district, state and national level.

My Hospital will help the government to take appropriate decisions for enhancing the quality of health-care delivery across public facilities which will improve the patient's experience. The patient will be able to receive an effective and appropriate care. My Hospital will ultimately help establish patient driven, responsive and accountable health-care system.

My Hospital will ultimately help establish patient driven, responsive and accountable health-care system. VPCI has been integrated with *MeraAspataal* application on 14th June, 2017.

4. Digital Payment

Digital India programme is a flagship programme of the Government of India with a vision to transform India into a digitally empowered society. Promotion of digital payments has been accorded highest priority by the Government and is one of the key highlights of the Union Budget 2017-2018. Digital transactions through five payment modes namely: UPI, USSD, Aadhar Pay, IMPS and Debit cards has been emphasized.

Ministry of Health and Family Welfare has directed all the public and private Health Care Organizations (HCOs) for enabling all customer touch points with digital payment acceptance infrastructure so that patients/citizen can pay by means of UPI, BHIM, Mobile wallet, Credit and Debit Cards in various health-care organizations.

Present status of e-hospital services at VPCI

- Total 1889 digital transactions done in 2019-20.
- Monthly reporting of details of digital transaction is done by the Accounts Department, VPCI before 3rd of every month on MIS portal: https://dp.nhp.gov.in/index.php.
- Five POS machines have been installed at registration counter, cash counter at accounts department, canteen, ward and ICU to facilitate digital transactions.
- Payment to vendors and various service providers is also being made digitally through RTGS, NEFT and ECS.
- Awareness about the availability of digital payment facility for patients and citizens is being implemented through information displayed on small posters pasted at various locations in the institute premises.

e-hospital at VPCI can be accessed at: http://vpci.org.in and http://ehospital.gov.in.

Animal House

The Animal House of the Institute is registered for breeding and experiment on animals with 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.

The Animal House of the Institute provide optimum environment for experimental animals, which is essential for obtaining reliable experimental research. The most reliable results will be obtained from animals that are healthy, unstressed and at ease with their surroundings

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.

All experiments involving animals are approved by the Institutional Animal Ethics Committee (IAEC), which is constituted by CPCSEA. Institutional Animal Ethics Committee 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 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, collate 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, Year books, Recent advances. The Institute has one of the best library in the field of Pulmonary Disease and Allied Sciences having 10,130 Books, 25,025 bound Journals, 175 CD's, 570 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 and 03 Journals (02 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. 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 the 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 gateway http://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 [8:30 AM to 5:30 PM] and on Saturday [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

Providing Diagnostic services for the patient care, actively involved in Research, Teaching, Supervising MD and PhD Medical Biochemistry students and training to students of other prestigious institutes. Diagnostic services are provided to indoor and outdoor patients, samples analyzed by fully automatic autoanalyzers including AU 480 AutoAnalyzer, Beckman Coulter & benchtop *Biochemistry Analyzer*.

1. One MRU – ICMR Project

In the studies to elucidate the role of Ellagic acid and its derivative via CalreticulinTransacetylase (CRTAase) in the gene expression profile of lung carcinogenesis, we studied the role of CRTAase using ellagic acid peracetate (EAPA) and HDAC inhibitors (HDI) in the progression or suppression of lung cancer. We have studied the up-regulation or down-regulation of genes induced by CRTAase in presence or absence of HDI by microarray.The microarray analysis was performed in duplicate in A549 NSCLC, lung adenocarcinoma cell line treated with ellagic acid peracetate (EAPA) and HDAC inhibitor (Valproic acid, VA) before and after transfection with human calreticulin (CALR orCRTAase) gene taking transfected and untransfected A549 cells as control and compared against the seven treatment groups, viz A549 + EAPA, A549 + VA, A549 + EAPA + VA, A549 + CALR gene, A549 + EAPA + CALR gene, A549 + VA + CALR gene & A549 + EAPA + VA + CALR gene to understand the therapeutic potential of the individual drugs as well as the synergistic potential of the two drugs in the presence of Cal gene. The gene array was outsourced at genotypic, Bangalore. The total number of probes used were 14980 for 727 targets, further analysis is being carried out.

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

In our earlier study on erythrocyte membrane protein profile of asthmatics and healthy controls we showed the presence of 97 proteins consisting of ≥2 unique peptides and several PTMs (phosphorylation and acetylation) in 9 proteins, i.e. Spectrin α chainerythrocyte 1, Spectrin β chainerythrocytic, Band 3 anion transport protein, Glyceraldehyde 3 phosphate dehydrogenase (GAPDH), erythrocyte 55 kDa protein, Piezo-type mechanosensitive channel component 1, isoform 4 of protein 4.1, isoform long of erythrocyte membrane protein band 4.2 and erythrocyte band 7 integral membrane protein.The PTMs 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 protein-protein interactions analysis showed glyceraldehyde 3 phosphate dehydrogenase (GAPDH) to be an important protein, which is known to play an important role in glycolysis and in maintaining the balance between oxidant and antioxidant status in asthma. We have optimized the method to purify the GAPDH protein from human erythrocyte membrane. The analysis of overall 75 subjects through LCMS/MS is under process.

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 and healthy controls, we had observed the presence of 25 SNPs in *CRHR1* gene (including three novel SNPs reported for the first time from our laboratory). 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/DTCD) 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, in Viswanathan Chest Hospital, VPCI to the Municipal Corporation of Delhi in stipulated time period.

The Department also undertakes responsibility of documenting and maintaining the database of various research protocols of DM/PhD/MD students. The Department has identifiable and collaborative research projects with other department of the Institute.

Microbiology

(Including Microbiology, Medical Mycology and Respiratory Virology)

Research

1. Isolation and characterization of anaerobic bacteria causing lower respiratory tract infections in patients attending the Institute

Three hundred and forty-four patients were included in the study (200 males and 144 females). 109 and 235 patients were <40 and >40 years of age, respectively. The clinical samples included were bronchial aspirates from patients showing exacerbation. Out of these 344 patients, 165 patients yielded anaerobes in their clinical samples. Ninety patients had one type of anaerobic organisms, 57 had two types and 13 had 3 types . Eighty patients had both aerobes and anaerobes. Hence, a total of 271 isolates were recovered belonging to as many as 16 genera. Two hundred and six aerobic organisms were isolated of which *Klebsiella pneumoniae* (5), *Escherichia coli* (4), *Pseudomonas aeruginosa* (2) *Pseudomonas sp* (3) and *Streptococcus pneumoniae* (14) *Enterococcus sp* (2), *Staphlococcus aureus* (2) have been implicated in the lower respiratory infections. MIC was determined by agar dilution method for all the species of anaerobes except *Bacteroides spp* where in Microbroth dilution was used. MIC of seven antibiotics on 67 isolates was tested. The isolates belonged to genera *Bacteroides, Prevotella, Veilonella, Actinomyces* among others. Sensitivity to penicilin ranged from 27% to 30% in gram negatives and 14% and 21% in Parvimonas micra and Actinomyces, respectively. 83% to 100% of isolates were sensitive to cefoxitin. Similarly, most strains showed good sensitivity to tetracycline and chloramphenicol. 75% to 82% were sensitive to metronidazole but some genera *Prevotella* (38%), *Actinomyces* (53%) and *Parvimonas* (29%) showed lower susceptibility. Surprisingly, considerable resistance was seen for moxiflox and clindamycin.

2. Characterization of atypical Escherichia coli isolates from clinical samples

Sixteen lactose fermenting isolates of which four identified as typical *Escherichia coli* and others showing atypical reactions were collected and included in the study. Isolates differing in motility and indole production were further confirmed with VITEK (Biomerieux). Antibiotic susceptibility testing as per (CLSI) guidelines and molecular characterization by (RAPD) was performed. Isolates confirming to *E. coli* and those showing phenotypic variation were grouped into four groups, namely, Group 1 (Motile and Indole positive, typical *E. coli*) , Group 2 (Motile and Indole negative), Group 3 (Non-motile and Indole negative) and group 4 (Non -motile and Indole positive) each having 4, 2, 1 and 9 isolates, respectively. With minimal biochemical reactions, 10 isolates belonging to group 3 and 4 were indistinguishable from *Klebsiella*. However, colony morphology was similar to typical *E. coli*. Hence, identity of these isolates including Group 2 were confirmed with VITEK, and were found to be *E. coli* with ≥95% probability. All isolates were further tested for Malonate utilization to differentiate from *Klebsiella pneumoniae*. Malonate utilization was negative in all there by excluding *Klebsiella pneumoniae*. All isolates were found to be MDR, however, different groups showed varying degree of resistance to antimicrobials, Group 4 showing more resistance than others. No clonality was observed within groups indicating no major genotypic difference. With limited tests put up in routine diagnostic laboratory, we observed that many atypical *E. coli* may be misidentified as *Klebsiella pneumoniae*. Laboratories with no access to VITEK can add Malonate for differentiating atypical *E. coli* from *Klebsiella pneumoniae*.

3. Phenotypic and genetic identification of beta-lactamase production in multidrug resistant uropathogenic *Escherichia coli*.

Urinary isolates collected during 2016-2018 from the patients of the institute, were included in this study. These were identified using the conventional methods. Out of a total of 1150 urinary samples, 122 yielded pathogens out of which 55 were *Escherichia coli*. Out of these 55, 29 (52.7%) isolates were multi-drug resistant and were further tested for the presence of beta-lactamases. All the 29 isolates were screened positive out of which 11, 2 and 0 were confirmed to be ESBL, MBL and AmpC respectively. However, all 29 and 6 isolates were

positive for ESBL, MBLs genes by PCR, respectively. OXA (n=21) was the commonest followed by TEM (n=13) and SHV (n=2) and in MBL, Suspended particulate matter (SPM) (n=6), GIM (n=4), IMP (n=3), and VIM (n=2) were detected. Thirteen isolates showed multiple types of beta-lactamase genes. None were positive for AmpC genes.

4. Hospital infection control surveillance

Routine surveillance of the hospital was performed at regular intervals to screen for the presence of pathogens. Various samples from intensice care unit (ICU) and ward 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. A total of 22 samples were tested. The reports were submitted along with the recommendations.

The Institute organised a mini symposium on tackling antimicrobial drug resistance in tuberculosis on April 17, 2019 at Paintal Memorial Golden Jubilee Auditorium. Dr Sanjib Bhakta, ISMB – Mycobacterial Research Laboratory, Birberck University of London, United Kingdom, an eminent Professor and Doctor delivered a lecture on this occasion.

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

Early diagnosis and treatment of TB remains a major 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. To achieve our objectives, 12 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. The genes that will show stable expression under various stress condition will serve as best candidate for diagnostic assay development. The diagnostic assay will be an ELISA based assay which will be easy-to-use, rapid and economical.

6. An Overview of pulmonary infections due to rapidly growing Mycobacteria in south Asia and impressions from a sub-tropical region

Rapidly growing mycobacteria (RGM) comprise nearly half of the validated species of non-tuberculous mycobacteria (NTM) and have been reported to have a higher incidence in Asia as compared to Europe and America. There is limited information on RGM infections from South Asia. Hence, the present study aimed

to ascertain the incidence of pulmonary infections due to RGM in Delhi and to review the status of available information on the prevalence of RGM in South Asia, a region endemic for tuberculosis. We analysed 933 mycobacterial isolates obtained from pulmonary samples in Delhi and performed species identification by polymerase chain reaction (PCR) restriction analysis (restriction fragment length polymorphism) and line probe assay. Drug susceptibility testing (DST) was performed by broth microdilution method. We also reviewed reports available on pulmonary infections in South Asia, attributed to RGM. Of the 933 mycobacterial isolates studied, NTM were identified in 152 (16.3%). Of these, 65/152 (42.8%) were RGM comprising *Mycobacterium fortuitum* (34/65; 52.3%), *Mycobacterium abscessus* (25/65; 38.5%), *Mycobacterium chelonae* (3/65; 4.61%), *Mycobacterium mucogenicum* (2/65; 3.1%), and *Mycobacterium smegmatis* (1/65; 1.5%). On applying the American Thoracic Society/Infectious Diseases Society of America guidelines, 11/25 (44%) *M. abscessus*, 3/3 (100%) *M. chelonae,* and both isolates of *M. mucogenicum* were found to be clinically relevant. DST revealed that maximum susceptibility of the RGM was seen to linezolid, clarithromycin, and amikacin. Of the RGM isolated in the present study, 16/65 (24.6%) were found to be clinically relevant. Hence, it is important to recognize these organisms as potential pathogens to identify patients with RGM disease to initiate appropriate therapy.

7. Efflux pumps: contribution to drug resistance in various lineages of *M. tuberculosis*

In spite of the availability of effective anti-tuberculosis drugs, tuberculosis is still among the most fatal infectious disease worldwide. The World Health Organization (WHO) has declared tuberculosis a global emergency. The emergence of drug-resistant tuberculosis, particularly multidrug-resistant (MDR) and extensive drug resistant (XDR) tuberculosis seriously hampers TB control activities. Multidrug therapy was introduced for tuberculosis treatment due to the ineffectiveness of monotherapy, and to prevent the development of drug resistance, however, *M. tuberculosis* has developed resistance to all first-line drugs and most of the second-line drugs.

Mutations in drug target genes are the major cause for the development of acquired resistance, although such mutations donot explain resistance mechanism in all clinical cases. Some intrinsic factors have also been associated with drug resistance mechanisms including, (1) cell wall impermeability to antibiotics due to a high level of mycolic, and (2) efflux pump activity. There is a limited understanding of the contribution of efflux pumps in drug resistance. The activity of efflux pumps, in synergy with the less permeable cell wall, results in intrinsic drug resistance in *M. tuberculosis*. Also, various molecular genotypic techniques such as, IS6110 DNA RFLP fingerprinting, spoligotyping and 24-loci MIRU-VNTR typing have divided the *M. tuberculosis* complex into three major phylogenetic groups consisting of 7 phylogenetic lineages and more than 30 sub-lineages/ subgroups. The role of these genetic variations has not been getting much importance from a long time. Various population-based epidemiological studies reveal that some strains are responsible for the outbreak of disease while others are not. phylogenetic information from the clinical isolates has been used to generate the hypothesis of differential gene expression between the different lineages of *M. tuberculosis*.

Hence, we are studying the role of efflux pump in the development of drug resistance and analyzing the correlation between expression of efflux pump genes in the predominant lineages of *M. tuberculosis*.

8. Non-tuberculous mycobacteria (NTM) as normal human commensals and their propensity to cause infection.

NTM are ubiquitous and can be found in numerous environments, including households and water plants. These can be present as saprophytes, commensal organisms and symbionts. The incidence of opportunistic NTM infections has increased considerably in the past decades causing an array of diseases, including respiratory and soft-tissue infections. These vary tremendously in their growth rate, colony characteristics and virulence. It has been previously suggested that the respiratory tract can harbor NTM without causing infection, especially in patients with chronic respiratory disorder. Therefore, a number of studies have been carried out to characterize human-associated bacterial communities, including oral and upper respiratory tract microbiota. Although these studies have identified a significant number of organism's representative of different bacterial taxa but NTM were hardly detected among them. The possible reasons for this could be the lack of efficient decontamination, detection and extraction methods leading to the bacteria being unidentified. Pulmonary infections due to NTM are increasingly recognized worldwide. Although over 180 different species of NTM

have been described, pulmonary infections are most commonly due to *Mycobacterium avium* complex (MAC), *Mycobacterium kansasii*, and *Mycobacterium abscessus*. Therefore, in this study, we have attempted to detect and identify NTM in soil and water samples of nearby areas and also in the mouthwash samples of healthy human beings. We have used the 4% NaOH method for decontamination of the samples and line probe assay for detecting the species of the isolate. This study will help us to determine relative abundance and diversity of NTM in these environmental and biological niches. Efforts are needed to identify NTM in human-associated niches and will be highly significant for the understanding of the potential etiology of the diseases they cause.

9. Functional analysis of cell intrusion proteins of Mycobacterium tuberculosis as potential target for vaccine development

The establishment of an infection by *M. tuberculosis* depends on the initial interactions between *M. tuberculosis* and host cells interactions, that are dictated by the surface characteristic of both. Intracellular pathogens select specific host cell receptors to facilitate both adherence and entry, the latter requiring a complex dialogue of signalling events between the pathogen and the host.Although the mechanisms used by *M. tuberculosis* to modify macrophage functions have not been fully elucidated.

There is a need to identify new targets to devise new strategies to outsmart this pathogen. Hence, aim of the present study is 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. We also aim to find a possible difference in host immune modulation by various lineage of *M. tuberculosis* with respect to cell invasion.

Mammalian cell entry (mce) operon has been described that Mce1 conferred mycobacteria the ability to enter into mammalian cells and survive inside the macrophage. Similarly, some other genes are also associated with mycobacteria invasion. However, the functional role of these genes is still unclear in *Mycobacterium tuberculosis*. Since, these genes are of prime importance in cell entry, we hypothesize that these could be used as potential vaccine target

Respiratory Virology Unit

The main objective of the department is diagnostics of respiratory viruses in clinical samples and performing basic/translational research in the field of virology. The laboratory is routinely performing influenza (H1N1) diagnostics and corona virus testing in clinical samples from the patients visiting in Viswanathan Chest Hospital of the Institute. The ongoing research in the department includes the vaccine development against influenza and dengue virus along with the research on understanding the pathogenesis of influenza and chikungunya virus. Recently, we have completed a DST-SERB sponsored project in which we have performed in-vivo targeted delivery of mRNA vaccine candidate in mice. Targeted delivery was achieved successfully but *in vivo* delivery of chimera itself was not observed sufficient to elicit effective immune response. Another vaccination approach against dengue virus is being evaluated. The study anticipates the generation of peptide immunogen expressing immunogenic epitopes from all the serotypes of dengue virus. The chimeric peptide immunogen has been generated in HEK 293T cells using recombinant plasmids expressing the epitopes from different serotypes of dengue virus. The chimera has been purified and characterised. Now, the immunogenicity and efficacy of the peptide will be assessed in vitro in murine dendritic cells. Another project involves, understanding the pathogenesis of chikungunya viruses.

Pathology

Research

1. Beneficial effects of N-acetylcysteine on protease antiprotease balance in attenuating bleomycin-induced pulmonary fibrosis in rats

The role of N-acetylcysteine (NAC) as an antioxidant in attenuating bleomycin-induced pulmonary fibrosis is reported. However, its effect on parenchymal remodelling via regulating the protease-antiprotease balance is not fully defined. Therefore, the present study was designed to explore the possible role of matrix metalloproteases (MMP), TIMP and tumour growth factor-beta 1 (TGF-β1) pathway and their modulation by NAC in attenuating bleomycin-induced pulmonary fibrosis in rats. Bleomycin sulphate (7 units/kg) was instilled inside the trachea to induce pulmonary fibrosis. The time course of TGF-β1, matrix metalloproteases (MMP)-9, TIMP-1,3 Messenger RNA (mRNA) and protein expression; TGF-β1 and hydroxyproline levels were evaluated on day 7, 14, 28. NAC (0.3 mmol/kg and 3 mmol/kg) was administered in bleomycin instilled animals. NAC treatment significantly attenuated bleomycin-induced histopathological changes by decreasing interstitial inflammation and reducing deposition of extracellular matrix proteins, such as collagen. Moreover, it increased the mRNA and protein expression of MMP-9 and decreased the expression of TIMP-1,3 in alveolar epithelial cells, interstitial macrophages and inflammatory cells. Indeed, there was decrease in the MMP-9/TIMP ratio in bleomycin instilled rats, which has increased with the treatment of NAC. Moreover, NAC also attenuated bleomycin-induced increased expression of TGF-β1 and total lung collagen levels. NAC attenuates bleomycin-induced pulmonary fibrosis by normalizing the protease-antiprotease balance and favoring the degradation of collegen to reduce fibrosis.

2. Pirfenidone polymeric nanoparticle drug delivery systems can modulate TGF-β1- SMAD expression and attenuate epithelial mesenchymal transition in lung cancer cell-line

Polymeric pirfenidone nano particles (Pirf-Nps) have potential for targeted drug delivery in the treatment of pulmonary fibrosis. Their efficacy on epithelial mesenchymal transition (EMT) by modulating TGF-β induced intracellular signalling via SMAD-2/3 transcription factors and downstream regulation of profibrotic gene expression, such as collagens, matrix metalloproteases remains to be elaborated. In this study, MePEG-PCL diblock nanoparticles were synthesized by ring opening polymerization and double emulsion solvent technique. Nps were characterized by Nanosight, DLS, TEM1, FTIR and drug loading and release efficiency was examined. The efficacy of Pirf-Nps was studied on A549 cell lines: Group-I- Saline, Group-II- bleomycin (50mM), Group III-Bleomycin+Pirfenidone (520μg/mL) and Group IV-Bleomycin+Pirf-PCL-PEG Nps at different time intervals (4,6,8,24,48 hours). Cells were harvested and TGF-β1, SMAD-2,3, mRNA levels were evaluated. Bleomycin instillation resulted in bimodal increase in TGF-β1, SMAD-2,3 gene expression initially at 2 hours and then at 24/48 hours and correlated with EMT of alveolar epithelial cells. Pirfenidone, standard dose decreased gene expression of TGF-β1 and SMAD-2,3 at 48 hours. Pirf-Nps were used at 4.7×10^7 Nps/mL concentration. The surface morphology of Pirf-PCL-PEG Nps was spherical with a mean size of 181 nm. The loading and releasing efficiency of Nps was calculated and Pirf-PCL-PEG NPs were administered at serial dilution. Pirf-PCL-PEG NPs efficiently reversed the EMT caused by bleomycin. Thus, we demonstrate the in vitro efficacy of nanoscopic drug delivery system in targeting the gene expression and reducing the TGF-β1 and SMAD2/3 induced EMT caused by bleomycin in lung cancer cells.

3. Caveolin-1 as a critical component in the pathogenesis of lung fibrosis of different etiology

Caveolin is a structural protein of flask-shaped invaginations of the plasma membrane termed as caveolae and is widely expressed on the endothelial cells, smooth muscle cells and fibroblasts in the different parts of the body including the lung tissues. The expression of caveolin-1 in the lung tissues is important to prevent the fibrogenic actions of TGF-β1 in lung fibrosis of different etiology including idiopathic pulmonary fibrosis, systemic sclerosis-associated interstitial lung disease and allergen-induced airway remodeling. Caveolin-1-mediated internalization and degradation of TGF-β1 receptors may possibly account for the decreased actions of TGF-β1. Studies in our laboratory have shown that the deficiency of caveolin-1 is very important in inducing lung fibrosis

and its upregulation is reported to prevent lung fibrosis. The biological actions of caveolin-1 involve signaling pathways including JNK signalling, interleukin (IL) IL-4, STAT-3, miR199a-5p, CXCR4+ and CXCL12. The key role of caveolin and associated signaling pathways in the pathogenesis of lung fibrosis of different etiology, emphysema and combined pulmonary fibrosis and emphysema were evaluated.

4. Role of macrophages in pathogenesis and management of diffuse parenchymal pulmonary diseases

The diffuse parenchymal pulmonary diseases include progressive interstitial lung diseases (ILDs) with unclear etiology, poor long-term survival and no effective treatment. Their pathogenesis is characterized by alveolar epithelial cell injury, inflammatory cell infiltration, epithelial mesenchymal transition and parenchymal fibrosis. Recent studies have focused on the role of enhanced macrophage recruitment, polarization and immune response associated with lung fibrotic remodling. In this study, we eevaluated the role of macrophages and its mediators in the pathogenesis of macrophage rich diffuse parenchymal pulmonary diseases. These include, idiopathic ILDs, such as desquamative interstitial pneumonitis, respiratory bronchiolitis associated-ILD, hypersensitivity pneumonitis, drug induced pneumonitis, pneumoconiosis, smoking related interstitial fibrosis, among others. Our goal is to update the understanding of the immune mechanisms underlying the initiation and progression of fibrosis after cell injury in macrophage rich pulmonary diseases. We expect that the identification of the morphology, phenotype and localization of macrophages in the lungs will not only be helpful in the diagnosis of ILD, but will additionally, provide help for developing effective therapeutic strategies in these clinical settings.

5. KRAS gene mutation in bronchoscopy samples of non-small cell carcinoma lung: relation with smoking status and KRAS oncoprotein expression

Lung cancer is the most frequent cause of cancer-related deaths in India. Therapeutic targeting of KRAS-mutation in non-small cell lung carcinoma (NSCLC) remains a major goal of the clinical oncology. KRAS activating point mutations occur in codons 12, 13, 61 and are strongly associated with resistance to anti-EGFR therapies. 58 patients of lung cancer (46 males and 12 females; between the age of 28 to 86 years) presenting over one year (2018) were diagnosed at Department of Pathology, of the Institute. Deoxyribonucleic acid (DNA) was isolated from (FFPE) tissue of bronchoscopic biopsies. KRAS mutations (codon 12,13, allele-specific PCR) and KRAS oncoprotein (immunohistochemistry, SAB-WH0003845M1, clone 3B10-2F2) were assessed and correlated with histopathology, smoking status, sex, and age. EGFR mutations were found in 8/44 (18.2%) patients. Four of these patients (9.1%) displayed KRAS mutations. EGFR and KRAS mutations were exclusive of each other. EGFR mutations inversely correlated with smoking status while KRAS mutation correlated with smoking status. KRAS oncoprotein expression was associated with squamous histomorphology and showed an increase independent of KRAS gene mutation. Present study suggests that KRAS oncoprotein expression can serve as a diagnostic strategy to identify lung cancers driven by KRAS activation, especially where molecular testing facility is not available. This can help decide on initiation of anti-EGFR therapies which may exert deleterious effects on individuals with activating KRAS mutations and downstream signaling pathways.

6. Lung cancer mutation analysis studies

A total of 118 lung cancer patients (92 males and 26 females) reported to VPCI were evaluated for their expression of genetic mutations, such as epidermal growth factor receptor (EGFR), anaplastic lymphoma kinase (ALK) fusion, KRAS oncogene, BRAF oncogene etc. These are promising therapeutic targets and can improve the prognosis of advanced lung cancer patients. KRAS mutations are associated with resistance to EGFR tyrosine kinase inhibitors (TKIs); gefitinib, and erlotinib. Of these, 193 molecular tests were performed; 46 patients were analyzed for the presence of EGFR, 70 patients were assessed for KRAS, 53 patients for BRAF mutations and 3 for ALK mutations using real-time polymerase chain reaction (RT-PCR) and using allele specific real time PCR assays. For these mutation studies, DNA was isolated from the following samples (n=118): Biopsy-77, Blood-42, Sputum-12, fine needle aspiration cytology (FNAC)-14, Pleural fluid-10. Positive EGFR mutations were identified in 12/46 (21.7%) samples, more frequent in male patients and smokers; 7/46 biopsies, 1/46 blood and sputum samples each and 2/46 pleural fluid cell block samples were positive for EGFR. KRAS mutations in Codon 12 and 13 were assessed in 70 samples. A total 10/70 samples were positive; biopsies were 9/70 and pleural fluid was positive in 1/70 tests carried out. BRAF mutation status was assessed in 53 cases. A total 4/53 biopsies were positive for BRAF studies. The development of molecular pathology into early lung cancer detection and personalized therapy is needed to provide a way forward.

7. The detection of circulating plasma EGFR mutations in lung cancer

In this ongoing study, we have standardized the isolation and detection of EGFR mutations from the circulating plasma of lung cancer patients. In the past one year, 21 cases have been tested for circulating EGFR using the RT-PCR assay method. It is hypothesized that the detection of such circulating biomarkers from peripheral blood, will offer a new source of cancer-derived materials and reflect the status of the disease better, and thereby, contribute to more personalized treatment. This will also help in monitoring of the patient response to chemotherapy and other adjuvant therapies and help in better monitoring of patients. So far, 2/21 (9.52%) cases were positive for circulating plasma EGFR mutations. This non-invasive technique will be useful in targeted therapies where the development of resistance is almost inevitable and requires reassessment of the molecular profile.

8. Lung cancer immunohistochemical analysis

In this ongoing study, immunohistochemistry (n=768) was performed for categorization of poorly differentiated lung cancer cases. A panel of lung cancer antibodies using fully automated immunohistochemical analyser (Ventana Benchmark-GX) was used along with monoclonal antibodies to: (1) confirm the primary site of origin of lung tumor and its categorization: Napsin, p63, p40, TTF-1, CK-7, synaptophysin, chromogranin-A, CD 45, SP-C etc; (2) assess the proliferating capability of the tumour cells, caspase-3 etc; (3) assess the tumour expression of molecular markers such as KRAS, ALK, EGFR mutations for adjunct therapy and (4) assess the metastatic potential of the cancer cells using VEGF-1, α-SMA, βFGF, MMP etc. In addition, the new parameter of PD-L1 was added in this year. Immunotherapy with antibodies to prevent the interaction of the PD-L1 with the programmed PD-1 receptor, also known as cluster of differentiation 274 (CD274), has dramatically improved the survival of some patients with lung cancer. This marker is gaining significance for treatment of lung cancer, especially after the FDA has the approved pembrolizumab for lung cancer treatment. The PD-L1 protein on the surface of some cancer cells can help them avoid being found and destroyed by the body's immune system. Drugs that block the PD-L1 protein, or the corresponding PD-1 protein on immune cells, can help the immune system recognize the cancer cells and attack them.

9. Study of pathogenesis of combined pulmonary fibrosis and emphysema

Combined pulmonary fibrosis and emphysema (CPFE) is a relatively new entity within the spectrum of cigarette smoke induced lung disorders. Currently there is no consensus about its pathogenesis and treatment. We hypothesized that caveolin-1 critically determines the parenchymal and vascular remodelling leading to the development of CPFE and elucidated the time course of histopathological pathways and pathogenesis of CPFE. We also assessed the effect of therapeutic targeting of caveolin-1 in mesenchymal and endothelial cells by the phosphodiesterase-5 inhibitor, sildenafil. Male Wistar rats (n=168) were exposed to; room air (control); bleomycin (7 U/kg), bleomycin+sildenafil (50 mg/kg/day P.O.), cigarette smoke (4 Gold Flake 69 mm/day), CS+sildenafil, CS+bleomycin, CS+bleomycin+sildenafil. Animals were euthanized at 8, 9, 11, 12 weeks and lung histopathological changes, collagen deposition, reactive oxygen species (ROS), xanthine oxidase, caveolin-1 determined. Cigarette smoke causes progressive ROS accumulation, caveolin-1 up-regulation in alveolar epithelial cells, alveolar macrophages, peribronchiolar fibroblasts, endothelial and vascular smooth muscle cells, interstitial inflammation and emphysema. Sildenafil reduces oxidative stress, parenchymal caveolin-1 and attenuates emphysema caused by cigarette smoke. Bleomycin increases lung ROS and downregulates caveolin-1 leading to fibroblast proliferation and fibrosis. Combined cigarette smoke and bleomycin exposure results in differential caveolin-1 expression and heterogeneous parenchymal remodelling with alternating areas of emphysema and fibrosis. Increased caveolin-1 induces premature senescence of lung fibroblasts and emphysema. Decreased caveolin-1 is associated with propagation of epithelial mesenchymal transition (EMT) and fibrosis. Sildenafil attenuates the parenchymal remodelling, however it is not effective in reducing vascular smooth muscle cells (VSMC) hypertrophy in combined group. CPFE is characterized by heterogenous parenchymal remodelling and differential caveolin-1 expression. Sildenafil therapy attenuates parenchymal pathologies in CPFE. However, additional therapy may be needed for attenuating VSMC remodelling.

10. Role of LMW-hyaluronan fragments in progression of lung parenchymal remodelling to fibrosis

The pathogenesis of pulmonary fibrosis involves alveolar epithelial cell (AEC) extracellular matrix (ECM) damage with release of damage-associated molecular patterns (DAMPs). The ECM is suggested to play a dynamic role leading to the initiation of host immune responses. We assessed the role of LMW-hyaluronan, TLR-2,4 in determining progression of ECM injury to fibrosis. Male Wistar rats were divided into two groups: Group I (saline

control, n=24) and Group II (intratracheal bleomycin, 7 U/kg/animal, n=24). Animals were euthanized on 0, 7, 14 and 28 days. The time course of release of LMW-HA fragments, TLR-2,4 mRNA and protein levels, NF-κBp65 levels, macrophage influx and CD68 expression after bleomycin injury were correlated with the development of parenchymal inflammation, remodelling and fibrosis. Bleomycin induces ECM injury resulting in a significant increase of pro-inflammatory LMW-HA fragments and elevated TLR-2,4 mRNA levels on day 7. The subsequent TLR-4 downregulation results in progressive tissue inflammation and alveolar and interstitial macrophage accumulation. The upregulation of TLR-2 gene and protein expression is associated with NF-κB dependent signalling cascade on day 14 and 28 and progression of fibrosis. Thus the LMW-HA fragments, differential TLR expression, macrophage influx and activation determine the propagation of lung parenchymal remodelling to fibrosis. Thus, the LMW-HA fragments, TLR 2,4 and recruited pulmonary macrophages are reflective of the state of tissue integrity and may be considered as a natural biosensor for fibrotic lung diseases. Estimation of their expression can serve as biomarker of active fibrosis in chronic lung diseases and as potential therapeutic targets.

Pharmacology

Research

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

Antimicrobial resistance (AMR), which refers to the ability of a microorganism to resist an antimicrobial drug (such as an antibiotic), is a very serious global public health challenge. The O'Neill report estimates that AMR will pose a risk to 10 million lives a year and a cumulative 100 trillion USD of economic output by 2050, if we do not act now. A major contributing factor, particularly in low- and middle-income countries (LMICs), is widespread inappropriate use of antibiotics together with lack of knowledge about responsible use among many stakeholders. The World Health Organization's Global Action Plan on Antimicrobial Resistance recognizes *inter alia* the need for regulation to optimise the use of antibiotics. Countries including India have aligned their National Action Plans (NAPs) on AMR. One of the important links for various activities for AMR containment is the appropriate use of antibiotics to reduce the selection pressure on microbes. Regulation is one of the key factors for optimum use of antibiotics. For many of the sectors impacted by AMR, the law in India seems fragmented, disconnected or lacking. Compliance is often poor and enforcement is patchy; even when the existing regulations are fairly clear as in case of over-the-counter sales of antibiotics at licensed retail pharmacies (Central Drugs Standards and Control Organization, CDSCO).

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'.

We have chosen four key sectors particularly affected by the AMR that will be studied in detail in three geographical contexts, *i.e.* within two Indian states and at the national 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.

Geographically, we aim to conduct this research at the national level and in the two selected states of Haryana and Telengana. Our multi-disciplinary and international team of researchers has the skills, knowledge, experience and professional connections needed to successfully implement the project. Project has been started in September 2018 and highlights of the work conducted in this year 2019-20 (1) stakeholder mapping for two case studies has been done, (2) pilot testing of topic guide and in-depth interviews of various stakeholders for all four case studies, (3) in-depth interviews of different stakeholders in Haryana and Telangana for all the four case studies, (4) analysis of the qualitative data generated, (5) documents prepared: review of regulations within the four sectors in India, literature review of smart regulation, review of global regulatory best practices and initiatives, and methodological approach for stakeholder engagement, (6) first meeting with UK partners in UK in and annual project progress meeting in May 2019 at New Delhi, and (7) one paper published and one submitted.

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

Optimising the use of antimicrobials is a key priority of the global strategy to combat AMR. To do so, the World Health Organization (WHO) in 2017 updated their Essential Medicine List (EML) and categorised the antibiotics into three groups —Access, Watch and Reserve (AWaRe). This AWaRe categorisation is helpful for the development of tools for antibiotic stewardship at local, national and global levels and to reduce AMR. WHO recommends that Access group of antibiotics should be widely available and at an affordable cost and minimise the use of other two groups of antibiotics. In 2019, WHO revised the EML along with AWaRE categories of antibiotics. As per WHO, Access antibiotics should be widely available, affordable and quality assured and should be accessible in the primary health-care centres. The overall objective is to reduce the use of Watch and Reserve Groups of antibiotics and to increase the use of Access antibiotics where the availability is

low. The aim of the study is to gain insight on the current availability and price of AWaRe group of antibiotics in private and public sectors in National Capital Territory of Delhi, India. The initial work is done, finalizing the list of antibiotics to be surveyed, the samplimg methodology and data collection forms.

3. A clinical study to evaluate the effects of yoga on pulmonary functions, cellular and molecular markers and quality-of-life in patients of bronchial asthma

This was a prospective, open-label, randomized, parallel design clinical study to evaluate the effects of yoga on pulmonary functions, cellular and molecular markers and quality-of-life (QoL) in patients of bronchial asthma. Patients of mild to moderate asthma were recruited from Out-patients Departments, VCH of the Institute divided into two groups. Both the groups of patients received standard treatment (inhaled corticosteroids with long acting β-agonist) as per Global Initiative for Asthma (GINA) guidelines for the treatment of bronchial asthma. Group II patients received standard treatment along with yogic intervention for 50 minutes daily by a trained yoga teacher. Patients of both the groups were followed up for 3 months and comparison of parameters was done between group I and group II at 4 weeks, 8 weeks and 12 weeks of respective treatments. Biomarkers of bronchial asthma, *viz.* fraction of exhaled nitric oxide (FeNO), QoL, oxidative stress markers and pulmonary function test (PFT) were evaluated and significant improvement in forced expiratory volume in one second, forced vital capacity [FEV1 and FVC], QoL, SOD, GSH parameters was observed in Group II patients. Significantly marked reduction in oxidative, nitrosative and inflammatory (TNF-α) parameters was also observed in Group II as compared to Group I. Therefore, it is concluded that introducing yoga as an adjunct therapy in patients of bronchial asthma improved pulmonary functions and the QoL, which may possibly be mediated by restoration of pro-oxidant-antioxidant balance and modulation of cellular and molecular markers of inflammation and immunity.

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

This study is being conducted to assess the role of yogic intervention in improving pulmonary functions, inflammatory markers, oxidative stress and health status in patients with chronic obstructive pulmonary disease (COPD). Patients were recruited from out-patient department (OPD) of the Viswanathan Chest Hospital of the Institute, and divided into Group I (control group, taking conventional drug treatment) and Group II (yogic intervention for 1 hour daily with conventional drug treatment). Individual components of BODE index (BMI, FEV_1, mMRC dyspnea scale, 6MWD) were compared at baseline (0 day) and after 12 weeks of treatment in both the groups. There was a significant difference in three components of BODE *i.e.*, FEV_1, mMRC dyspnea scale, 6MWD when compared to their corresponding baselines scores. The results also showed that the serum neutrophil-lymphocyte ratio (%) was decreased in both the groups, after 3 months of respective treatment. However, the % decrease in neutrophil-lymphocyte ratio level was much more in Group II, *i.e.* by 48.3 % as compared to 19.9 % in Group I *versus* respective baseline value. The serum osteoprotogerin (pmol/L) levels were found to be reduced significantly in both the groups, however, the reduction was 12.3% in Group I and 41. 5% in Group II after 3 months of respective treatments as compared to that of baseline values. More patients are being recruited as per proposal submitted to AYUSH to complete the study.

5. Experimental pharmacological studies for optimization of constituents UNIM-352, a polyherbal preparation, for efficacious and safe treatment of bronchial asthma

UNIM-352, a polyherbal preparation containing six ingredients *Linum usitatissimum, Trigonella-foenum-graecum, Allium sativum, Strychnos potatorum, Caesalpinia bonducella* Fleming (1g) and *Pongomia glabra*, Honey (q.s.), is used in patients of bronchial asthma in Unani traditional system of medicine. The effective and validated formulation can achieve better global usage only if its ingredients are brought down without affecting its efficacy and safety. Therefore, in the present study an attempt has been made to optimize UNIM-352 by comparing its efficacy and safety with four different optimized preparation (OP) containing 3-4 ingredients. The anti-inflammatory and immunomodulatory effect of various optimized versions of UNIM -352 were compared with the classical preparation of UNIM-352 in experimental models of bronchial asthma and airway remodelling. The safety of UNIM-352 and optimized preparations of UNIM-352 were evaluated by sub-acute oral toxicity studies in rats as per OECD guidelines. The sub-acute toxicity study of optimized preparations of UNIM-352 showed no toxicity sign with body weight gain compared to that in experimental control group of rats. Our study

that optimized preparations OP-1and OP-3 (with reduced number of ingredients) of UNIM-352 seem to be more effective and equally safe as the conventional UNIM-352 as assessed on markers of airway inflammation, immunity, oxidative stress and bronchial hyperresponsiveness in experimental models of asthma.

6. Experimental studies to evaluate the mode of action of traditional herbal agents in bronchial asthma

The present study has been designed to evaluate the mode of action of traditional herbal agents, *Adiantum venustum* and *Lychnis coronaria* using standardized experimental animal models of bronchial asthma. In an acute model of airway inflammation, rats were immunized with ovalbumin (10 mg/rat, i.p.) adsorbed to 10 μg of aluminium hydroxide on day 0. Prior 14 days after immunization, challenge treatment with ovalbumin (1 mg per rat) was carried out. After 24 hours of ovalbumin challenge, airway hyper-responsiveness was measured in response to inhaled methacholine using whole body plethysmography. The oxidative stress markers, such as MDA (lipid peroxidaion), GSH and SOD (anti-oxidants) and nitric oxide levels were also evaluated in blood, BAL and lungs. In acute model of bronchial asthma, sensitization and challenge with ovalbumin resulted in increased levels of eosinophil, neutrophils TNF-α, IL-4, Ova-specific IgE, IL-5 and NF-KB in blood and BAL fluid in acute model of bronchial asthma. However, treatment with different doses of *Adiantum venustum* and *Lychnis coronaria* showed reduction in levels of eosinophil, neutrophils TNF-α, IL-4, Ova-specific IgE, IL-5 and NF-Kβ in blood and BAL fluid as compared to ovalbumin sensitized and challenged rats in acute model of bronchial asthma. The reduction in levels of these cytokines and inflammatory cells were significantly marked with higher doses of *Adiantum venustum* (61.92 mg/kg), *Lychnis coronaria* (6.17 mg/kg).

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

The present study is designed to evaluate the effects of *Withania somnifera* extract on type 2 diabetes mellitus induced cognition impairment: Type 2 diabetes mellitus is a metabolic syndrome that was induced in rats by feeding them with high fat diet (HFD) followed by intraperitoneal administration of Streptozotocin (STZ; 35 mg/kg). Test drugs, *viz. Withania somnifera* extract and pioglitazone were administered for 8 weeks to the diabetic rats. At the end of the treatment animals were tested for memory deficits in passive avoidance test and Morris water maze test. After behavioral analysis serum samples were collected for biochemical analysis for the confirmation of metabolic syndrome. Significant elevation in fasting blood glucose, cholesterol and triglyceride levels were observed which validated the present model of HFD-STZ induced diabetes in rats. In behavioural analysis, diabetic rats were found to have significant lower retention as compared to control animals. However, the group of animals treated with test drugs showed a significant more retention when compared with diabetic group. The data suggest that treatment with *Withania somnifera* and pioglitazone decreases the fasting blood glucose, triglycerides and cholesterol levels, when compared with diabetic control group. Also treatment with test drugs improved retention. Thus, *Withania somnifera* may have therapeutic effects in type 2 diabetes mellitus induced memory loss.

Dr Kavita Gulati, Department of Pharmacology, gave a Lecture on Translational research for rational use of theophylline in bronchial asthma, at World Congress on Pharmacology at Indian Institute of Science, Bangalore (August 28-29, 2019)

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

A huge number of medicinal plants are being used traditionally for immunomodulation and hepatoprotection and these effects need to be validated following modern scientific methodology. In Unani system of medicine, a polyherbal formulation *Dawa-Ul-Kurkum* is used in cases of liver dysfunction, anorexia, ascites and abdominal pain. The polyherbal Unani preparation, *Dawa-Ul-Kurkum* is composed of 9 herbs, namely *Sunbul-ut-Teeb, Mur Makki, Saleekha, Qust, Shagufa-e-Izkhir, Darcheeni, Zafran, Sharab-e-musallas* and *Asal*. This study has thus been designed to evaluate the hepatoprotective and immunomodulatory effects of *Dawa-Ul-Kurkum* in the experimental model of anti-TB induced hepatotoxicity, D-galactosamine induced hepatic dysfunction and paracetamol induced liver damage in order to validate the hepatoprotective properties and delineate the possible mechanisms. Hepatotoxicity was induced by anti-tubercular therapy. The combination of rifampicin + isoniazid + pyrazinamide was administered daily for 28 days orally. The blood samples were collected after 28 days, animals were sacrificed and liver tissue was collected for histopathological studies and evaluation of oxidative stress markers. The results showed significant increase in the markers of oxidative stress, *i.e.* enhanced MDA, reduced GSH levels and histopathological examination of rat liver showed changes of inflammation, degeneration and necrosis as compared to normal hepatic architecture thus validating the model of hepatotoxicity. Administration of *Dawa-Ul-Kurkum* attenuated the oxidative markers and reversed the histological changes induced by anti-tubercular drug therapy.

9. 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 present study has been designed to validate anti-asthmatic effects of *Hibiscus rosa-sinensis* and *Piper nigrum* using standardized experimental animal models of bronchial asthma. In an acute model of airway inflammation, rats were immunized with ovalbumin adsorbed to aluminium hydroxide on day 0. Herbal agent, *Hibiscus rosa-sinensis* (100 and 250 mg/kg) and *Piper nigrum* (30 and 100 mg/kg), prednisolone (10 mg/kg) and combined dose of *Hibiscus rosa-sinensis* (100 mg/kg) and *Piper nigrum* (30 mg/kg) were given to their respective groups for 14 days daily. Prior 14 days after immunization, challenge treatment with ovalbumin was carried out. After 24 hours of ovalbumin challenge, airway hyper-responsiveness was measured in response to inhaled methacholine using whole body plethysmography. The animals were anesthetized and blood and bronchoalveolar lavage (BAL) fluid were collected to evaluate OVA specific IgE, cell counts (eosinophil and neutrophil cell count) and markers of oxidative stress (MDA and GSH). Increased level of Penh (marker of bronchial hyper-responsiveness) was observed in OVA-sensitized and challenged rats which gets reduced following the treatment with *Hibiscus rosa-sinensis* and *Piper nigrum.* In acute experimental models of bronchial asthma, OVA sensitization followed by challenge treatment increased the levels of OVA specific IgE, eosinophil, neutrophil, MDA and reduced the levels of GSH. However, pre-treatment with herbal agents, *Hibiscus rosa-sinensis, Piper nigrum* and prednisolone significantly reduced the levels of OVA specific IgE, eosinophil, neutrophil, MDA and elevated GSH levels in blood and BAL fluid as compared to OVA-induced sensitized and challenged group.

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. Objective of this study is to explore whether short duration of sub-maximal exercise improves cognitive performance.

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 and 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. Tobacco menace from conventional to E-cigarettes

Tobacco smoking has been in practice for hundreds of years. With the spread of tobacco to Europe and other parts of the world from the sixteenth Century, tobacco smoking also gained popularity in India when Portuguese sailors brought tobacco and offered to the emperor Akbar. After a heated debate on the safety of the substance, the royal *hakim* advised the emperor to smoke only if the smoke passes through water. In few years tobacco became the valuable commodity and its use spread like a wild fire. That was the royal error which gave birth to the leading cause of preventable deaths in India. Now tobacco is one of the major causes of deaths and disease all over the world. In India, it is accounting for over eight lakh deaths every year. Apart from smoking bidis which is made from rectangular piece of *Tendu* leaf with 0.15 - 0.25 g of sundried flaked tobacco, a plethora of smoking and smokeless forms of consumption exist in India, such as cigarettes, cigars, reverse *chhutta, chumti, hooklis, chillum, hookah, paan, khaini, mawa, snus, snuff, bajjar, mishri, gul, gudhaku,* tobacco water and so many other regional ways of using tobacco.

2. Association of indoor air pollution with allergic respiratory diseases in the National Capital Region

World Health Organization (WHO) has observed that around seven million people died every year globally due to indoor air pollution. The purpose of this study is to evaluate the effect of indoor air pollution on respiratory health [bronchial asthma (BA) and/or allergic rhinitis (AR)] in paediatric population in the National Capital Region (NCR) of Delhi, India. A cross-sectional study to assess the factors responsible for respiratory diseases (BA and/or AR) in homes in rural areas of NCR, was done. Sixty-one households where at least one child who had symptoms of BA/AR (case households; Group A) and another 61 households with children without any symptom of BA/AR (Group B) were selected for the study. A standard questionnaire was used to collect the information about the health status of children and pollution levels in these homes. A total of 95 (43.8%) children in Group A households were found to have history of allergic respiratory diseases (n=43–BA, n=19–AR) while 33 children had both BA and AR. There was a statistically significant difference in the 24-hour particulate matter concentration (24-hour) PM2.5 (P=0.01) and 6-hour concentration of PM10 (P=0.02) in Group A households as compared to Group B households. The 6-hour concentration of PM2.5 and PM1 and 12-hour concentration of volatile organic compounds (VOCs) was found to be higher in households of Group A. Group A households also had a higher number of smokers and usage of kerosene oil for lighting of lamps. The present study concluded that tobacco smoking, use of kerosene oil for lighting and combustion of solid fuel for cooking results in an increased level of particulate matter and VOCs in indoor air and are the major contributing factors for respiratory illness in the paediatric population.

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: 2018-2021)

S. No.	Name (Discipline)	Title of Theses	Supervisor(s)
1.	Dr Kapil Kumar (Pulmonary Medicine)	Comparison of COPD characteristics in smokers and non-smokers	Prof. Raj Kumar Dr B.K. Menon and Dr Nitin Goel
2.	Dr Sankararaman N (Pulmonary Medicine)	Clinical, serological, fuctional and radiological profile of interstitial lung diasease patients in a tertiary care centre	Prof. Raj Kumar Dr B.K. Menon and Dr Nitin Goel

DM Degrees (1st Year)

(Session: 2019-2022)

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

MD Degrees (Awarded)

(Session: 2016-2019)

Name	Discipline
Dr Lovika Lakhtakia	Pulmonary Medicine
Dr Naveen Vennilavan RA	Pulmonary Medicine
Dr Neha Kaushik	Pulmonary Medicine
Dr Priyanka	Microbiology
Dr Ravinder Kumar Yadav	Pharmacology

MD Theses (Submitted)

(Session: 2017-2020)

S. No.	Name (Discipline)	Title of Theses	Supervisor(s)
1.	Dr Priyandarshini S (Pulmonary Medicine)	Occurrence of sub-clinical interstinal lung disease in obstructive sleep apnoea	Prof. Raj Kumar
2.	Dr Tome Kamgo (Pulmonary Medicine)	Occurrence of obstructive sleep apnoea in patients of interstitial lung disease	Prof. Raj Kumar
3.	Dr Akshit Gupta (Pulmonary Medicine)	Study on sino-nasal involvement in pulmonary sarcoidosis	Dr B.K. Menon
4.	Dr Himanshu Saini (Pulmonary Medicine)	Study of level of inducible protein-10 in tuberculosis	Dr B.K. Menon
5.	Dr Tonushyam Sonowal (Microbiology)	Bacterial infection in chronic obstructive pulmonary disease with special reference to atypical bacteria	Dr Malini Shariff

MD Theses (Ongoing)

(Session: 2018-2021)

S. No.	Name (Discipline)	Title of Theses	Supervisor(s)
1.	Dr Vignesh Kumar K (Pulmonary Medicine)	Evaluation of soluble IL-2 receptor in interstitial lung disease	Dr B K Menon
2.	Dr Rahul Kumar Meena (Pulmonary Medicine)	Quality of sleep and daytime sleepiness in COPD and asthma	Prof. Raj Kumar and Nitin Goel
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 and Nitin Goel
4.	Dr Vatsal Bhushan Gupta (Pulmonary Medicine)	Evaluation of clinical and radiological parameters in treated pulmonary tuberculosis patients	Dr B K Menon
5.	Dr Anupam Prakash (Pulmonary Medicine)	Evaluation of anthropometry, body compostion analysis in asthma and COPD and its correlation with severity	Dr B K Menon
6.	Dr Anubhav Singh (Microbiology)	A study of candidemia and yeast carriage with special reference to *Candida auris* in patients with respiratory disorders.	Dr Anuradha Chowdhary
7.	Dr Rohan Arora (Microbiology)	A study of the phenotypic and genetic determinants of Bedaquiline resistance in clinical isolates of *Mycobacterium tuberculosis*	Dr Mandira Varma-Basil

MD – Ist Year

(Session: 2019-2022)

Name	Discipline
Dr Nitesh Goyal	Pulmonary Medicine
Dr Pallavi SR	Pulmonary Medicine
Dr Vivek Kumar	Pulmonary Medicine
Dr Kunal Ranjan	Pulmonary Medicine
Dr Dhilnaz AS	Pulmonary Medicine

PhD Awarded/Submitted

S. No.	Name (Discipline)	Title of Theses	Supervisor(s)	Status
1.	Ms Babita Kumari (Pharmacology)	A clinical study to evaluate the effects of yoga on pulmonary functions, cellular and molecular markers and quality of life in patients of bronchial asthma	Dr Kavita Gulati, Prof. A. Ray and Dr B.K. Menon	Awarded
2.	Mr Maaz Naqvi (Pharmacology)	Experimental pharmacological studies for optimization of constituents UNIM-352, a polyherbal preparation, for efficacious and safe treatment of bronchial asthma	Dr Kavita Gulati, Prof. A. Ray and Dr B.K. Menon	Awarded
3.	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	Submitted
4.	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 Dr B.K. Menon	Submitted
5.	Ms Astha Giri (Microbiology)	Characterization of genotypic indicators of ethambutol resistance in clinical isolates of *Mycobacterium tuberculosis*	Dr Mandira Varma-Basil and Dr Sadhna Sharma Miranda House, University of Delhi	Submitted
6.	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	Submitted

PhD Theses (Ongoing)

S. No.	Name (Discipline)	Title of Theses	Supervisor(s)	Year of Registration
1.	Mr Sanjesh Saini (Microbiology)	Role of microRNA in pathogenesis of influenza A virus infection	Dr Malini Shariff and Dr Madhu Khanna	2015
2.	Mr Chanchal Kumar (Microbiology)	Functional analysis of cell infusion proteins of *Mycobacterium tuberculosis* as potential target for vaccine development	Dr Mandira Varma-Basil and Dr Sadhna Sharma Miranda House University of Delhi	2017
3.	Ms Tanushri Nandi (Microbiology)	Anti-influenza activity of immune modulatory peptides	Dr Madhu Khanna and Prof. Nirupama Trehanpati, Institute of Liver and Biliary Sciences, New Delhi	2017
4.	Mr Kamal Srivastava (Microbilogy)	Evaluation fo an arrary of PE-PPE gene for potential use in a diagnostic assay to identify *Mycobacterium tuberculosis*	Dr Mandira Varma-Basil and Dr Sadhna Sharma Miranda House University of Delhi	2017
5.	Mr Ashutosh Singh (Microbiology)	Multi-gene phylogengy and MALDI-TOF-MA characterization of melanised fungi and determination of their antifungal susceptibility profiles	Dr Anuradha Chowdhary	2017
6.	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	Dr Kavita Gulati	2017
7.	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	Dr Kavita Gulati and Dr B K Menon	2017
8.	Mr Pankaj Verma (Pharmacology)	Experimental studies to evaluate the mode of action of traditional herbal agents in bronchial asthma	Dr Kavita Gulati	2017
9.	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 Theses	Supervisor(s)	Status
1.	Dr Anamika (MS) (Department of otorhinolaryngology and head and neck surgery) LHMC & Associated Kalawati Saran Children Hospital, New Delhi	Clinical profile, aero-allergen sensitivity and assessment of pulmonary function in pediatric chronic rhinosinusitis	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 Dr Malini Shariff	Submitted
3.	Mr Kaushik Bhattacharya (MSc-PhD combined Programme 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 Dr Mandira Varma-Basil	Submitted
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 and RML Hospital, New Delhi) and Dr Anuradha Chowdhary	Submitted
5.	Mr Manoj Kumar (PhD) Department of Applied Chemistry, SoVSAS, Gautam Buddha University Greater Noida (UP)	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 [UP]) and Prof. Raj Kumar	Ongoing
6.	Ms Smriti Gupta (PhD Biochemistry) Department of Chemistry SRM University Delhi-NCR, Sonepat (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 and Tuberculosis [RBIPMT], Delhi) and Dr Viswajeet Rohil	Ongoing

S. No.	Name (Discipline) and Institution's Name	Title of Theses	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 Dr 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 Dr Madhu Khanna	Ongoing

Distinguished Visitors

- Prof. Inder Mohan Kapahi, Member, University Grants Commission (UGC) visited the Institute on 28th February, 2020.

Awards/Honours

Prof. Raj Kumar

- **Publisher and 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)
- **Visitior Nominee,** Executive Council, Nagaland University for a period of 3 (three) years, 2019
- **Anti-Discrimination Officer,** University of Delhi, Delhi, 2019
- **Member,** Pulmonary Speciality Committee, Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY), National Health Authority, Government of India, 2019
- **Expert Member,** NPCCHH, Technical Expert Committee on Air Pollution and Health, NCD, Delhi, 2019
- **Chairman,** Institutional Ethics Committee, Ramjas College, University of Delhi, Delhi, 2020

Dr 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)

Dr Mandira Varma-Basil

- **Member,** Ethics Committee, Rajan Babu Institute of Pulmonary Medicine and Tuberculosis, Delhi
- **Secretary,** Indian Association of Mycoplasmologists
- **Best Poster Award:** (Kamal Shrivastava, Varsha Chauhan, Chanchal Kumar, Anupriya Singh, Mandira Varma-Basil). Development of real-time assay for rapid identification of *Mycobacterium tuberculosis* and Non-tuberculous mycobacteria directly in sputum samples. Indian Association of Medical Microbiologist (Delhi Chapter), 20th July 2019

Dr Anuradha Chowdhary

- **Elected Fellow,** National Academy of Medical Sciences (FAMS), Delhi, India , 2019
- **Editor,** *PlOS Pathogens,* 2019
- **Editor,** *FEMS Pathogens and Disease,* 2019
- **Editor,** *Journal of Fungi,* "Special Issue-*Candida auris*" 2019
- **Editor,** *Fungal Genetics and Biology,* "Special Issue on Antifungal resistance in clinically significant fungi" 2019.
- **Developer,** Early Implementation Protocol for Inclusion of *Candida* species in Global Antimicrobial Resistance Surveillance System (GLASS), World Health Organization, August, 2019
- **Executive Council Member**, International Society of Antimicrobial Agents and Chemotherapy (ISAC), 2019.
- **Treasurer,** Fungal Working Group, International Society of Antimicrobial Agents and Chemotherapy (ISAC), 2019

Dr Madhu Khanna

- **Travel Grant,** ISIRV Conference, Siena, Italy (31 March - 02 April 2019)
- **Bill-Melinda Gates Foundation Young Investigator Travel Fellowship** was given to Mr Sanjesh Saini (PhD Scholar) and Mr Nilanshu Manocha (PhD Scholar) to attend the 10th Conference 'Options for the Control of Influenza' (OPTIONS X).

Dr Anita Kotwani

- **Member,** Core Working Group and Technical Advisory Group on AMR, Ministry of Health and Family Welfare to oversee and coordinate policy decisions and activities relating to antimicrobial resistance and for "National consultation to operationalize NAP-AMR"
- **Member,** Advisory Group on WHO "Fair Medicine Pricing Forum"
- **Member,** Advisory Panel, *Journal of Pharmaceutical Policy and Practice*
- **Awarded Scholarship,** International Society to Improve Use of Medicines to participate in meeting at Bangkok, January 26-28,2020
- **Member,** Institutional Ethics Committee, Indraprastha Apollo Hospital, New Delhi,

Dr Kavita Gulati

- **Fellow,** International Academy of Cardiovascular Sciences (FIACS), Winnipeg, Canada
- **Treasurer,** Society for Nitric Oxide and Allied Radicals (SNOAR)
- **Member,** IEAC of Dr B.R. Ambedkar Center for Biomedical Research (ACBR)
- **Member,** IEAC of PGIMER, RML Hospital

Dr Vishvajeet Rohil

- **Excutive Member,** Biotechnology Society of India
- **DMA's Distinguished Service Award,** Delhi Medical Association, for his remarkable contribution of services as a dedicated doctor on the occasion of 105th Foundation Day Celebrations of DMA, August 18, 2019

Dr Ritu Kulshrestha

- **Editor,** *VPCI Newsletter*
- **DST Nominee,** Facility Management Committee, Sophisticated Analytical Instrument Facility (SAIF), New Delhi (AIIMS)
- **Working Group Member,** Under-Graduate Curriculum Revision Committee-2019, University of Delhi for the revision of the Course titled Human Pathology Course, Code 32581601 in Programme (CBCS) B.Sc. (Hons.) Biomedical Sciences, as per the UGC's Learning Outcome-Based Curriculum Framework (UGC-LOCF).
- **Member/Biosafety Officer,** Institutional Biosafety Committee (IBSC), Jamia Milia Islamia, New Delhi

Sponsored Research Projects

S. No.	Faculty Member (Department)	Title of Project	Funding Agency, Date of Sanction/ Implementation and Duration	Grants Received (in Rs.)
1.	Dr Malini Shariff (Microbiology)	Isolation and characterization of anaerobic bacteria causing lower respiratory tract infections in patients attending VPCI, Delhi	ICMR March 01, 2017 (Three years) [extended upto 31.07.2019]	26.72 Lakhs
2.	Dr 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.	Dr Anuradha Chowdhary (Microbiology [Medical Mycology Unit])	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
4.	Dr Madhu Khanna (Microbiology [Respiratory Virology Unit])	Aptamer-mRNA Chimera – the next generation RNA vaccine	DST-SERB August 19, 2016 (Three years)) [extended upto 18.02.2020]	34.31 Lakhs
5.	Dr Ritu Kulshrestha (Pathology)	Designing of inhalational polymeric nanoparticle drug delivery systems for the treatment of lung fibrosis	ICMR November 29, 2019 (Three years)	5.21 Lakhs
6.	Dr Kavita Gulati Nodal Officer (Pharmacology)	Multidisciplinary Research Unit	DHR, MoHFW January 01, 2014 (Five years) [extended upto 31.03.2021]	379.23 Lakhs
7.	Dr Anita Kotwani (Pharmacology)	Smart regulation for antibiotic use in India: understanding, innovating and improving compliance	DBT September 6, 2018 (Three years)	36.42 Lakhs
8.	Dr Kavita Gulati (Pharmacology)	A clinical study to evaluate the effects of yoga on pulmonary functions, cellular and molecular markers and quality of life in patients of bronchial asthma	AYUSH October 01, 2015 (Three years) [extended upto 31.05.2019]	40.78 Lakhs
9.	Dr 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)	40.10 Lakh

S. No.	Faculty Member (Department)	Title of Project	Funding Agency, Date of Sanction/ Implementation and Duration	Grants Received (in Rs.)
10.	Dr 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
11.	Dr Vishal Bansal (Physiology)	Cognitive performance after short duration sub-maximal exercise in young adults	DIPAS June 27, 2018 (Three years)	16.28 Lakhs
12.	Prof. Raj Kumar (Respiratory Allergy and Applied Immunology)	National Tobacco Quitline Services	Ministry of Health & Family Welfare (Govt. of India) – QL March 12, 2015 (Three years) [extended upto 2019-20]	603.49 Lakhs
13.	Dr Ashima Anand (Principal Investigator) DST Project	To investigate the role of J-receptors as a primary causative factor leading to dysponea on exertion in patients with pulmonary hypertension: (1) (i) with and (ii) without atrial septal defect and (2) with connective tissue disease	DST September 21, 2016 (Three years)	14.13 Lakhs

Fellowships

S. No.	Name of the Fellow (Department) and Name of Supervisor	Title of Fellowship	Funding Agency, Date of Sanction/ Implementation and Duration	Grants Received (in Rs.)
1.	Mr Manoj Kumar (Senior Research Fellow) Biochemistry *(Supervisor: Dr Vishvajeet 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 (Two years)	3.26 Lakhs
2.	Mr Anil Meena Biochemistry *(Supervisor: Dr 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) (Microbiology) *(Supervisor: Dr 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)	9.23Lakhs
4.	Ms Anshita Nagar (Junior Reseach Fellow) (Microbiology) *(Supervisor: Dr Mandira Varma Basil)*	Novel anti-tuberculosis drug targets: biotin biosynthesis pathway	CSIR April 01, 2019 (Two years)	0.20 lakhs
5.	Mr Ashutosh Singh, (Junior Research Fellow) (Microbiology [Medical Mycology Unit]) *(Supervisor: Dr Anuradha Chowdhary)*	Molecular epidemiology and ecology of humar pathogenic fungi	CSIR October 20, 2014 (Two years) [extended upto 31.10.2019]	9.04 Lakh
6.	Dr Kalpana Pawar (Women Scientist) (Microbiology [Medical Mycology Unit]) *(Supervisor: Dr Anuradha Chowdhary)*	Mechanism of multidrug resistance and pathogenesis in *Candida glabrata*	DHR-MoHFW March 12, 2020 (Three years)	13.13 lakhs
7.	Ms Tanushri Nandi (Senior Research Fellow) (Microbiology [Respiratory Virology Unit]) *(Supervisor: Dr Madhu Khanna)*	Synergistic effect of host defensive immune peptides in regulation of influenza. A virus replication	ICMR August 12, 2015 (Three years) [extended upto 11.08.2019]	18.62 Lakhs

S. No.	Name of the Fellow (Department) and Name of Supervisor	Title of Fellowship	Funding Agency, Date of Sanction/ Implementation and Duration	Grants Received (in Rs.)
8.	Mr. Pankaj Verma (Junior Research Fellow) (Pharmacology) *(Supervisor: Dr 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)	5.41 Lakhs
9.	Ms Hemlata Sharma (Senior Reseach Fellow) (Pharmacology) *(Supervisor: Dr 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)	5.41 lakhs
10.	Ms Priti Yadav (Senior Research Fellow) (Physiology) *(Supervisor: Dr Vishal Bansal)*	Therapeutic potential of heat pre-conditioning on chronic inflammation and infection in rats	ICMR January 30, 2019 (Three years)	4.54 Lakhs
11.	Mr Kamal Singh (Senior Research Fellow) *(Supervisor: Prof. Raj Kumar)*	Analysis of inflammatory bio markers in asthmatic children affected with indoor air pollution in Delhi-NCR	ICMR July 20, 2018 (Three years)	10.42 lakhs
12.	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 (Three 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	Guest Lecture on Consequences of air pollution: rise of asthma and allergy in Delhi City	Kirori Mall College, University of Delhi	Annual Eco-clum Festival Bhoomi 2019 Delhi April 16, 2019
2.	Prof. Raj Kumar	Guest Lecture on Allergy diseases at prepared by centre of excellence	Resource Centre, Nirman Bhawan	Health Adaptation Plan for Climate Sensitive Diseases New Delhi May 3, 2019
3.	Prof. Raj Kumar	Guest Lectures on • Allergy diagosis: *in-vivo* • Mites and its allergens: its concentration and clinical relevance Food allergy in clinical practice	VPCI	44th Workshop on Respiratory Allergy: Diagnosis and Management Delhi May 6-10, 2019
4.	Prof. Raj Kumar	Guest Lecture on Allergy condition in India Moderator, Panel Discussion on *In-vitro* vs *in-vivo* test Moderator Important consideration of SPT	The Medanta City,	Medanta Respiratory Postgraduate Update-2019 Gurgaon May 25, 2019
5	Prof. Raj Kumar	Guest Lectures on • Leveraging technology for expanding access to serveces: cessation and tobacco quitline services • Launch of Quitters Forum Cordinator From tobacco use to quit tobacco: experience sharing by tobacco quitters Panelist, for panel discussion on Collaborative approach towards tobacco control and related co-morbidites: progress and challenges	Ministry of Health and Family welfare, GOI and WHO	National Conferece of Tobacco and Health World No Tobacco Day New Delhi May 31, 2019
6	Prof. Raj Kumar	Moderator High risk COPD: reappraisal beyond triple therapy	Metro Hopital	PACS INDIA -2019 New Delhi August 18, 2019

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
7	Prof. Raj Kumar	Chairperson CG Uragoda Oration on Allergy and immunotherapy Guest Lecture on Place of immunotherapy in respiratory medicine Expert reviewer Update on respiratory allergy	Sri Lanka College of Pulmonologists	Respire-11 Annual Academic Session of Sri Lanka College of Pulmonologists Sri Lanka October 29–30, 2019
8.	Prof. Raj Kumar	Chairperson in session Tuberculosis: Mission Elemination Guest Lecture on Tobacco menace from conventional method of e-cigarettes	Bangladesh Lung Foundation	PULMOCON–2019 6th International Conference on Lung Health Dhaka, Bangladesh November 5–8, 2019
9.	Prof. Raj Kumar	Guest Lectures on • Indoor air polutin and respiratory allergy • Food allergy in bronchial asthma: diagnosis and management	Indian College of Allergy, Asthma and Applied Immunology and VPCI	ICAAICON-2019 53rd Conference of the Indian College of Allergy, Asthma and Applied Immunology Delhi November 7 – 9, 2019

Professor Raj Kumar received the prestigious Sri Lanka C.G. Urogoda Oration by the Sri Lanka College of Pulmonologists at the Annual Congress of the Sri Lanka College of Pulmonologists (Respire – 11) at Colombo, Srilanka (October 29-31, 2019)

Professor Raj Kumar received the prestigious 7th ICAAI Foundation Day Lecture Award for his outstanding contributions and distinguished scientific attainments in the field of clinical Allergy, Asthma and Immunology, during 53rd Conference of the Indian College of Allergy, Asthma and Applied Immunology (ICAAICON–2019) (November 7–10, 2019).

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
10.	Prof. Raj Kumar	Co-ordinatioor Allergy and immunotherapy workshop Guest Lectures on • Skin prick testing: unravelling the cause of atopicasthma • Manage the circuit and trouble shoot the alarms • Anticoagulation during ECMO • Innovations in implementing smoking cessation	Kerala Chapter of Indian Chest Society, Academy of Pulmonary and Critical Care Medicine; National College of Chest Physicians (NCCP) and Indian Chest Society (ICS)	NAPCON – 2019 21st Joint National Conference of the National College of Chest Physicians (NC CP) and Indian Chest Society (ICS) Kochi (Kerala) November 21–24, 2019
11.	Prof. Raj Kumar	Guest Lecture on Smoking cessation	VPCI	Certificate Course on Pulmonary Rehabilitaion Delhi December 8–9, 2019
12.	Prof. Raj Kumar	Eminent Speaker on Air pollution and smog in metro cities: causes, effects and innovative solutions	ESDA	ESDACON-2020 World Environmnent Summit 2020 Delhi January 18–19, 2020
13.	Prof. Raj Kumar	Chairperson	Centre for Community Medicine, AIIMS and IPHA (Delhi State Branch)	IPHACON 2020 64th Annual National Conference of Indian Public Health Association New Delhi February 29–March 2, 2020

World Environment Summit – 2020 (18th – 19th January, 2020)

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
14.	Dr Malini Shariff	Participated	IAMM (Delhi Chapter)	Pre-conference CME on Antimicrobial Stewardship: Partnering with Microbiology New Delhi November 1, 2019
15.	Dr Mandira Varma-Basil	Guest Lecture on Moving towards Newer approaches for laboratory diagnosis of Tuberculosis	Sanjay Gandhi Postgraduate Institute of Medical Sciences	TB CME Lucknow April 8, 2019
16.	Dr Mandira Varma-Basil	Guest Lecture on Drug resistant tuberculosis: mechanisms and diagnosis	UGC and Department of Microbiology Punjab University	UGC SAP Programme Chandigarh July 26, 2019
17.	Dr Mandira Varma-Basil	Guest Lecture on Molecular diagnosis of tuberculosis	Miranda House University of Delhi	Add on Certificate Course in Medical Biotechnology Delhi August 22, 2019
18.	Dr Mandira Varma-Basil	Guest Lecture on Diagnosis of drug resistant tuberculosis: challenges faced in resource-limited regions	UCSI University Malaysia University of Maryland and Gavin Conferences	2nd International Summit on Microbiology, Immunology and Pathology 2019 Bangkok Thailand November 7-8, 2019
19.	Dr Mandira Varma-Basil	Guest Lecture on Latent tuberculosis: an update	Baroda Chest Group	CME on Recent Updates in Tuberculosis Baroda (Gujarat) November 10, 2019
20.	Dr Mandira Varma-Basil	Guest Lecture on Diagnosis of tuberculosis: a Microbiologists journey	Pt. B.D. Sharma PGIMS	North West Microcon Rohtak (Haryana) November 16, 2019
21.	Dr Mandira Varma-Basil	Lecture on Serogical assays in *Mycoplasma pneumoniae* infection	NCMR, Pune and American Society for Microbiology	International Conference on Human Animal and Plant Mycoplasmas Pune December 2–5, 2019
22.	Dr Anuradha Chowdhary	Chairperson on session *Candida auris* Invited speaker on *Candida auris:* in resource-limited countries	European Confederation of Medical Mycology (ECMM) and the Infectious Diseases Group of the European Organisation for Research and Treatment of Cancer (EORTC-IDG)	9th Trends in Medical Mycology Nice, France October 11–14, 2019

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
23.	Dr Anuradha Chowdhary	Chairperson on session Antifungal resistance in *Candida* Invited speaker on *Candida auris:* epidemiology, clinical features and management	American Society of Microbiology	ASM Microbe San Francisco, USA June 20–24, 2019
24.	Dr Anita Kotwani	Invited as an expert in roundtable discussion on Reducing environmental risks from antibiotics Expert group meeting	Embassy of Sweden	Embassy of Sweden New Delhi May 13, 2019
25.	Dr Anita Kotwani	Chairperson for the session on Antimicrobial medicine use from local context Chairperson and Invited Speaker on Access *versus* excess situation of Access and Watch group of antimicrobials in India Rapporteur for a session on Role of governments, policies and systems in improving the use of medicines	International Society to Improve the Use of Medicines	International Society to Improve the Use of Medicines Bangkok January 26–28, 2020
26.	Dr Anita Kotwani	Chairperson for the session Universal health coverage Panelist and Invited Speaker on Optimizing use of antimicrobial medicines: essential for containment of antimicrobial resistance	Giri Institute of Development Studies	Global Consultations on Medicines Related Issues and Universal Health Coverage Lucknow February 3, 2020
27.	Dr Anita Kotwani	Participated	Swedish Water House, AMR Industry Alliance, Swiss Agency for Development and Corporation	Meeting on Responsible Antibiotics Manufacturing Platform New Delhi February 11, 2020
28.	Dr Kavita Gulati	Invited talk on How to assess adverse drug reactions: clinical relevance and judgment	Indian Pharmacopoeia Commission (IPC)	Induction-cum-Training Programme on Pharmacovigilance New Delhi July 1–5, 2019

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
29.	Dr Kavita Gulati	Invited talk on Translational research for rational use of theophylline in bronchial asthma	Indian Institute of Science	International Conference at Indian Institute of Science, Bangalore August 28–29, 2019
30.	Dr Kavita Gulati	Guest Lecture on Complementary role of yogic intervention in the management of obstructive airway diseases	SVYASA, Bangalore	SVYASA Bangalore August 30, 2019
31.	Dr Kavita Gulati	Participated	Department of Health Research in collaboration with ICMR-NIP, and Dr Rajendra Prasad Government Medical College, Kangra (HP)	Workshop on Research Methodology and Paper Writing Techniques Dharamshala (Himachal Pradesh) September 4–6, 2019
32.	Dr Kavita Gulati	Invited Talk on Evaluation of methylxanthine induced cardiotoxicity: a translational approach	International Academy of Cardiovascular Sciences (IACS), (North American Section)	Joint 6th Meeting of European Section and 7th Meeting of North American Section of the International Academy of Cardiovascular Sciences (IACS) Serbia September 11–14, 2019
33.	Dr Kavita Gulati	Resource person Nurses awareness programme on Pharmacoigilance	VPCI	Awareness Programme Delhi November 21, 2019
34.	Dr Kavita Gulati	Resource person on Medication errors	HIMSR	Workshop–cum-Awareness Programme on Pharmacovigilance: A Tool to Ensure Drug Safety Delhi November 21, 2019
35.	Dr Kavita Gulati	Invited talk on Role of NO in the adaptogenic effects of *Withania somnifera*	Society for Nitric Oxide and Allied Radicals (SNOAR)	Society for Nitric Oxide and Allied Radicals (SNOAR) New Delhi November 28, 2019
36.	Dr Kavita Gulati	Invited talk on Complementary roles of traditional and modern medicine in obstructive airway disease: an integrated approach	IUPHAR and Indian Pharmacological Society (IPS)	Annual Conference Hyderabad December 4–7, 2019

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
37.	Dr Kavita Gulati	Invited talk on Developing new strategies for the treatment of bronchial asthma by interactions of traditional and modern medicine	School of Pharmaceutical Education and Research, Jamia Hamdard	International Congress of Society for Ethnopharmacology New Delhi February 15–17, 2020
38.	Dr Kavita Gulati	Invited talk on Translational approach to abate theophylline induced cardiotoxicity	Delhi Pharmaceutical Sciences and Research University	International Conference of Cardiovascular Sciences -2020 Delhi February 21-23, 2020
39.	Dr Vishwajeet Rohil	Participated	Department of Health Research in collaboration with the ICMR-National Institute of Pathology and Dr Rajendra Prasad Goverment Medical College	Workshop on Research Methodology and Paper Writing Techniques Dharamshala (Himachal Pradesh) September 5–6, 2019
40.	Dr Vishwajeet Rohil	Participated and Delivered a talk on Hypertension and chronic renal disease role of diagnostic lab	Department of Clinical Biochemistry and Biochemical Genetics, Dr LalPath Labs under the aegis of Association of Medical Biochemists of India (Delhi Chapter)	1st Annual CME New Delhi Novermber 2, 2019
41.	Dr Vishwajeet Rohil	Chairperson and Judge of Poster Session on New Insights in atherosclerosis: from etiopathogenesis to clinical management	The Indian Society for Atherosclerosis Research	ISARCON 2019 32nd Annual Conference of the Indian Society for Atherosclerosis New Delhi November 8–10, 2019
42.	Dr Ritu Kulshrestha	Presented a paper on Efficacy of MePEG-PCL Diblock polymeric nanoparticles for drug deliervery in lung fibrosis	American Thoracic Society	ATS-2019 USA May 17–22, 2019
43.	Dr Ritu Kulshrestha	Invited Faculty and Delivered a talk on HPE diagnosis of progressive fibrosis: idiopathic pulmonary fibrosis and importance in diagnosing IPF Panelist for Teaching through ILD cases: total 3 case presentation	National Allergy Asthma Bronchitis Institute	Symposium on Recent Updates in IPF: Diagnosis and Management Kolkata June 20, 2019

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
44.	Dr Ritu Kulshrestha	Invited Faculty and Delivered a talk on Inflammatory diseases of mediastinum: what oncologist should know	Delhi Cancer Registry	Max Super Speciality Hospital New Delhi July 17, 2019
45.	Dr Ritu Kulshrestha	Invited Faculty and Delivered a talk on Innovations in drug delivery systems: recent breakthroughs and new approaches in formulation, drug delivery mechanisms and advanced delivery systems	Polymer Material Science and Engineering (PMSE) Division,	ACS Symposium Fall 2019 American Chemical Society (ACS) National Meeting San Diego, CA August 25–29, 2019
46.	Dr Ritu Kulshrestha	Invited Faculty and Delivered a talk on Occupational and drug induced interstitial lung diseases Moderator for the CME on Interstitial lung disease	Department of Histopathology, PGIMER	APCON 2019 Chandigarh December 7, 2019
47.	Dr Ritu Kulshrestha	Invited Faculty and Delivered a talk on Pathology of ILD: what every Chest physician should know Panelist in panel discussion on ILD	Hinduja Hospital	11th National Update in Respiratory Medicine Mumbai December 13–15, 2019
48.	Dr Ritu Kulshrestha	Presented paper on Effect of bleomycin on SMAD-2,3,5, TGF-β signalling and epithelial mesenchymal transition in A549 lung adenocarcinoma cell line	Department of Biochemistry, Institute of Science, BHU and Society for Translational Cancer Research	8th International Translational Cancer Research Conference: Role of Inflammation and Immune System for Cancer Prevention and Treatment Varanasi February 13–16, 2020
49.	Dr. Vishal Bansal	Chairperson Lectures on • Respiratory fitness in special situations and surgery • Novel approaches for pulmonary rehabilitation in chronic lung diseases	Sri Lanka College of Pulmonologists	'Respire-11' 11th Annual Academic Session Colombo, Sri Lanka October 29–31, 2019
50.	Dr. Vishal Bansal	Lecture on Interventions to improve hypoxia tolerance	CSIR-Institute of Genomics and Integrative Biology	10th National Leh Symposium on Clinical and Molecular Portrayals under Hypoxia Delhi November 15, 2019

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
51.	Dr. Vishal Bansal	Lecture on Interventions to improve hypoxia tolerance	Defence Institute of Physiology and Allied Sciences	CEP on Pathophysiology of High Altitude Disease Delhi November 19–21, 2019
52.	Dr Vishal Bansal	Invited Speaker Lung function and its variability in healthy and diseased states	Centre of Excellence for Applied Development of *Ayurveda Prakriti* and Genomics, CSIR-IGIB	CME on Ayurgenomics and Integrative Medicine for Wellness Delhi November 20–26, 2019
53.	Dr Vishal Bansal	Chairperson (Poster competition)	Department of Physiology, Maulana Azad Medical College	Conference on Exercise and Physical Activity: Recent Trends and Future Challenges Delhi February 28–29, 2020
54.	Dr Parul Mrigpuri	Chairperson Asthma: overview	Allergy and Immunology Unit, NITRD	ICAAICON 2019 New Delhi November 9, 2019
55.	Dr Parul Mrigpuri	Faculty lecture on Nutrition in chronic respiratory diseases	VPCI	Certificate Course on Pulmonary Rehabilitation Delhi December 8, 2019
56.	Suresh Kumar Thokchom (*Supervisor: Dr Kavita Gulati*)	Presented a paper on A randomized controlled study to evaluate the effects of yogic intervention as an adjunct to conventional pharmacotherapy in COPD and the possible cellular and molecular mechanisms	IUPHAR and Indian Pharmacological Society	International Conference Hyderabad December 4–7, 2019
57.	Mohd. Rafi Reshi (*Supervisor: Dr Kavita Gulati*)	Presented a paper on Effects of *Dawa-Ul-Kurkum*, a unani polyherbal preparation, in experimental model of d-galactosamine induced hepatoxicity in rats and its possible mechanisms	IUPHAR and Indian Pharmacological Society	International Conference Hyderabad December 4–7, 2019
58.	Anshul Tanwar (*Supervisor: Dr Kavita Gulati*)	Presented a paper on Effects of *Withania somnifera* extract on experimental model of type 2 diabetes mellitus induced amnesia	IUPHAR and Indian Pharmacological Society	International Conference Hyderabad December 4–7, 2019

S. No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
59.	Maaz Naqvi (*Supervisor: Dr Kavita Gulati*)	Presented a paper on Experimental pharmacological studies to evaluate the immunomodulatory and anti-inflammatory potential of optimized polyherbal preparation of asthma in rats	IUPHAR and Indian Pharmacological Society	International Conference Hyderabad December 4–7, 2019
60.	Dr Uma Tyagi	Presented paper on Academia dynamics in contextual ICT: evolving library sub-textual approaches in current knowledge society	National Medical Library	Second National Conference on ERMED Consortium: Digital Health resources: A Reality New Delhi May 2–3, 2019
61.	Dr Uma Tyagi	Presented paper on Quantifiable competency levels in ICT framework towards capacity building in LIS: a study	Central Government Library Association	2nd International Conference of CGLA EAGID-GPL 2019 on Equitable Access to Government Information and Data: Role of Government and Public Libraries in South Asia New Delhi October 17–19, 2019

Participation in Advanced and Specialised Training Programme by Faculty Members

S. No.	Participant (Department)	Course Title/ Topic	Training Duration	Host
1.	Dr Anita Kotwani (Pharmacology)	WHO-SEARO Training of Trainers Workshop on Antimicrobial Stewardship, India	March 3–6, 2020	Christian Medical College Vellore
2.	Dr Anita Kotwani (Pharmacology)	WHO-SEARO Training on WHO Methodology for Antimicrobial Consumption	February 4–7, 2020	WHO-South-East Asia Office New Delhi
3.	Dr Kavita Gulati (Pharmacology)	Induction-cum-Training Programme on Pharmacovigilance	July 1–2, 2019 (for Coordinators) and July 1–5, 2019 (for Pharmacovigilance Associate	Indian Pharmacopoeia Commission (IPC) Ghaziabad
4.	Dr Kavita Gulati (Pharmacology)	Nurses Awareness Programme on Pharmacovigilance	November 21, 2019	VPCI Delhi

Nurses Awareness Programme on Pharmacoigilance at VPCI (November 21, 2019)

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 Anjali Bhatt BSc, MLT (Bio-Medical Sciences) Uttaranchal P.G. College of Bio-Medical Sciences and Hospital Uttarakhand	Clinical Biochemistry/ Biotechnology	Dr Vishwajeet Rohil (Clinical Biochemistry)	March 05 - May 15, 2019
2.	Mr Arjun Singh BSc (Hons) Ms Shiwangi Shahi (MSc Biotechnology) Amity Institute of Biotechnology, Amity University Noida (Uttar Pradesh)	Clinical Biochemistry/ Biotechnology	Dr Vishwajeet Rohil (Clinical Biochemistry)	May 15 - June 15, 2019
3.	Mr Archit Saxena Ms Shrishti Gupta BTech+MTech (Biotechnology) Amity Institute of Biotechnology, Amity University Noida (Uttar Pradesh)	Clinical Biochemistry/ Biotechnology	Dr Vishwajeet Rohil (Clinical Biochemistry)	May 15 - July 05, 2019
4.	Ms Shavya Menon MSc Amity Institute of Microbial Technology Amity University Noida (Uttar Pradesh)	Phenotypic and molecular characterization of *Acinetobacter* spp from clinical isolates	Dr Malini Shariff (Microbiology)	January - June 2020
5.	Mr Sudhanshu Sharma MSc Galgotias University Noida (Uttar Pradesh)	A study of phenotypic resistance to bedaquiline in clinical isolates of *Mycobacterium tuberculosis* exposed to bedaquiline in Delhi	Dr Mandira Varma-Basil (Microbiology)	December 2018 - May 2019
6.	Ms Sakshi Anand Dr B.R. Ambedkar Center for Biomedical Research, University of Delhi Delhi	A Study on the occurrence of nontuberculous mycobacteria in the Environment and as normal flora of humans	Dr Mandira Varma-Basil (Microbiology)	December 2018-May 2019
7.	Mr Vishawjeet Barik Dr B.R. Ambedkar Center for Biomedical Research, University of Delhi Delhi	A study of genotypic resistance to bedaquiline *in naïve* clinical isolates of *Mycobacterium tuberculosis*	Dr Mandira Varma-Basil (Microbiology)	December 2018 - May 2019
8.	Simran Kaur Ahluwalia BTech+MTech (Biotechnology) Amity Institute of Biotechnology, Amity University Noida (Uttar Pradesh)	Biotechnology	Dr Kavita Gulati (Pharmacology)	May 15 - July 5, 2019

S. No.	Name, Subject and University/ Institute/College	Course Title/ Topic	Faculty Member (Department)	Period
9.	Nikita Sharma BTech (Biotechnology) Amity Institute of Biotechnology, Amity University Noida (Uttar Pradesh)	Biotechnology	Dr Kavita Gulati (Pharmacology)	June 10 - August 10, 2019
10.	Coordinators of Various ADR Monitoring Centers Indian Pharmacopoeia Commission Ghaziabad	Induction-cum-Training Programme on Pharmacovigilance	Dr Kavita Gulati (Pharmacology)	July 1-2, 2019
11.	Faculty and PG Students HIMSR, Jamia Hamdard Delhi	Workshop–cum-Awareness Programme on Pharmacovigilance	Dr Kavita Gulati (Pharmacology)	November 21, 2019
12.	Suhani Rastogi Ankita Prusty BTech (Biotechnology) Amity Institute of Biotechnology Amity University Noida (Uttar Pradesh)	Biotechnology	Dr Kavita Gulati (Pharmacology)	Febuary 1 - March 31, 2020
13.	Ms Neha Ms Anjali Jain Ms Rashmi MSc (Biotechnology) Institute of Deenbandhu Chhotu Ram University of Science and Technology Murthal (Haryana)	Certificate Course on Pulmonary Rehabilitation	Dr Vishal Bansal (Physiology)	December 8– 9, 2019

Dr Kavita Gulati, Department of Pharmacology, gave a Lecture on Complementary roles of traditional and modern medicine in obstructive airway disease: an integrated approach at 5th IUPHAR World Conference on the Pharmacology of Natural Products and 51st Annual Conference of Indian Pharmacological Society (IPS) at Hyderabad (December 4-7, 2019)

Public Lecture Series

To educate general public at large about common diseases, their treatments, myths, people sufferings and to clear their doubts, Institute conducted Public Lectures regularly. During the year, a public awareness programme on Air Pollution: Its Impact on Health and Possible Solution was held on April 2, 2019

Public Lecture and Panel Discussion on Air Pollution: Its Impact on Health and Possible Solution, organized by the Institute at the Paintal Memorial Golden Jubilee Auditorium (April 2, 2019)

Cultural and Sports Activities

The Institute conducted the VPCI Sports and Cultural Activity Programme from 27th December 2019 to 2nd January 2020, inaugurated by Prof. Raj Kumar, Director of the Institute. The Sports events include: Musical Chair, Table Tennis, Badminton, Bench Press (Weight Lifting), Carom and Chess; and the Cultural events include: Play, Dance, Vocal Music, Instrumental Music and Poem Recitation. Most of the staff members, students and their family members participated in this Programme. The Institute distributed Trophies and Certificates (First, Second and Third) to the winners. The staff members of the Institute had also participated in various events of the Annual Tournament of Delhi University Staff Club. Institute maintained its tradition to celebrate Independence Day (August 15, 2019) and Republic Day (January 26, 2020)

List of Publications

Journals

1. Bidaud AL, Botterel F, Chowdhary A, Dannaoui E. *In vitro* antifungal combination of flucytosine with amphotericin B, voriconazole, or micafungin against *Candida auris* shows no antagonism. *Antimicrob Agents Chemother* 2019; 63: e01393-19.

2. Colley T, Sharma C, Alanio A, Kimura G, Daly L, Nakaoki T, Nishimoto Y, Bretagne S, Kizawa Y, Strong P, Rapeport G, Ito K, Meis JF, Chowdhary A. Anti-fungal activity of a novel triazole, PC1244, against emerging azole-resistant *Aspergillus fumigatus* and other species of *Aspergillus*. *J Antimicrob Chemother* 2019;74:2950-8. doi: 10.1093/jac/dkz302.

3. Dubey H, Gulati K, Ray A. Alzheimer's disease: a contextual link with nitric oxide synthase. *Current Molecular Medicine* 2020;20:1–11.

4. Gandra S, Kotwani A. Need to improve availability of "Access" group antibiotics and reduce the use of "Watch" group antibiotics in India. *Journal of Pharmaceutical Policy and Practice* 2019;12:20.

5. Gaur M, Singh A, Sharma V, Tandon G, Bothra A, Vasudeva A, Kedia S, Khanna A, Khanna V, Lohiya S, Varma-Basil M, Chaudhry A, Misra R, Singh Y. Diagnostic performance of non-invasive, stool-based molecular assays in patients with paucibacillary tuberculosis. *Sci Rep 2020*;10:7102. doi:10.1038/s41598-020-63901-z

6. Gulati K, Reshi MR, Rehman RU, akhtar J, Ray A. Hepatoprotective effects of *Dawa-Ul-Kurkum*, a Unani polyherbal preparation and the possible mechanisms in experimental model of D-galactosamine induced liver damage in rats. *EC Pharmacol Toxicol* 2019;10:948–60.

7. Gupta A, Mrigpuri Parul. An unusual cause for massive pleural effusion. *Indian Journal of Chest Diseases and Allied Sciences* 2019;61:141–2.

8. Gupta S, Kumar A, Rohil V, Bhatnagar AK. ADAM33: role and pathogenesis study in COPD in Delhi NCR population. *International Journal of Biological and Medical Research* 2019;10:6623–30.

9. Gupta S, Kumar A, Rohil V, Bhatnagar AK. Role of tumor necrosis factor-alpha (TNF-α) in pulmonary pathophysiology of chronic obstructive pulmonary disease. *Indian Journal of Public Health Research and Development* 2019;10:105–10.

10. Kenters N, Kiernan M, Chowdhary A, Denning DW, Pemán J, Saris K, Schelenz S, Tartari E, Widmer A, Meis JF, Voss A. Control of *Candida auris* in health care institutions: outcome of an International Society for Antimicrobial Chemotherapy Expert meeting. *Int J Antimicrob Agents* 2019;54:400-6. doi: 10.1016/j.ijantimicag.2019.08.013. Aug 13.

11. Khanna M, Manocha N, Himanshi, Joshi G, Saxena L, Saini S. Role of retroviral vector-based interventions in combating virus infections. *Future Virology* 2019;14:7.

12. Khanna M, Saini S, Shariff M, Ronsard L, Singh J K, Kumar H. Data highlighting mir-155 and GAPDH correlation. *Data in Brief* 2019;24:103945.

13. Khurana A, Sardana K, Chowdhary A. Antifungal resistance in dermatophytes: recent trends and therapeutic implications. *Fungal Genet Biol* 2019;132:103255. doi: 10.1016/j.fgb.2019.103255.

14. Khurana A, Sardana K, Chowdhary A, Sethia K. Clinical implications of antifungal drug susceptibility testing of dermatophytes. *Indian Dermatol Online J* 2019;10: 737–738. doi: 10.4103/idoj.IDOJ_253_19

15. Kotwani A, Gandra S. Potential pharmacological agents for COVID-19. *Indian Journal of Public Health* 2020;64:S112–116.

16. Kulshrestha R, Pandey A, Jaggi A, Bansal S. Beneficial effects of N-acetylcysteine on protease antiprotease balance in attenuating bleomycin induced pulmonary fibrosis in rats. *Iranian J Basic Med Sci* 2020; 23:396–405.

17. Kulshrestha R, Prasad R, Kumar M, Jaggi AS. A review on molecular epidemiology of lung cancer in India. *Innovative J Med Health Sci* 2019; 12:702–14.

18. Kulshrestha R, Singh H, Pandey A, Mehta A, Bhardwaj S, Jaggi A. Caveolin-1 as a critical component in the pathogenesis of lung fibrosis of different etiology: evidences and mechanisms. *Experimental and Molecular Pathology* 2019;111:104315.

19. Kulshrestha R, Singh H, Pandey A, Soundarya D, Jaggi A, Ravi K. Expression of caveolin-1 during pathogenesis during combined pulmonary fibrosis and emphysema: effect of phosphodiesterase-5 inhibitor. *BBA-Mol Basis Dis* 2020;1866. http://doi.org/10.1016-j.bbadis.2020.165802.

20. Kumar A, Kunoor A, Eapen M, Singh PK, Chowdhary A. Blastomycosis misdiagnosed as tuberculosis, India. *Emerg Infect Dis* 2019; 25: 1776–7. doi: 10.3201/eid2509.190587.

21. Kumar M, Hooda P, Khanna M, Patel U, Sehgal D. Development of BacMam induced hepatitis e virus replication model in hepatoma cells study the polyprotein processing. *Front Microbiol* 2020;11:1347.

22. Kumar M, Rohil V, Singh R, Meena A, Patidar BS, Goel S, Prasad R, Chhabra SK, Bansal SK. Whole erythrocyte membranes protein profiling and their correlation with GAPDH, FEV_1% and oxidant/antioxidant status in asthma.

23. Kumar M, Kulshrestha R, Singh N, Jaggi AS. Expanding spectrum of anticancer drug, imatinib, in the disorders affecting brain and spinal cord. *Pharmacological Research* 2019;143: 86–96.

24. Kumar R. Tobacco menace from conventional to e-cigarettes. *Indian Journal of Chest Diseases and Allied Sciences* 2019;61:169–70.

25. Kumar R, Singh K, Nagar JK, Mavi AK, Kumar M, Kumar D. Association of indoor air pollution with allergic respiratory diseases in paediatric population residing in National Capital Region. *Indian Journal of Chest Diseases and Allied Sciences* 2019;61:181–97.

26. Kumari Asha, Khanna M, Binod Kumar. Current insights into the host immune response to respiratory viral infections. *Advances in Experimental Medicine and Biology* 2020.

27. Laxmi V, Gupta R, Bhattacharya SK, Ray A, Gulati K. Inhibitory effects of sildenafil and tadalafil on inflammation, oxidative stress and nitrosative stress in animal model of bronchial asthma. *Pharmacol Rep* 2019;73:517–21.

28. Madan K, Mittal S, Suri TM, Jain A, Mohan A, Hadda V, Tiwari P, Guleria R, Talwar DP, Chaudhri S, Singh V, Swarnakar R, Bharti SJ, Garg R, Gupta N, Kumar V, Agarwal R, Aggarwal AN, Ayub II, Chhajed PN, Dhamija A, Dhar R, Dhooria S, Gonuguntla HK, Goyal R, Koul PA, Kumar R, Maturu N, Mehta RM, Parakh U, Pattabhiraman V, Narasimhan R, Sehgal IS, Srinivasan A, Venkatnarayan Kavitha. Bronchial thermoplasty for severe asthma: a position statement of the Indian Chest Society. *Lung India* 2020;37:86–96.

29. Mahmoudi S, Rezaie S, DaieGhazvini R, Hashemi SJ, Badali H, Foroumadi A, Diba K, Chowdhary A,Meis JF, Khodavaisy S. *In vitro* interaction of geldanamycin with triazoles and echinocandins against common and emerging *Candida* species. *Mycopathologia* 2019;184:607-613. doi: 10.1007/s11046-019-00370-7.

30. Meena A, Rohil V, Kumar M, Patidar BS, Goel S, Menon B, Chhabra SK, Bansal SK. Association of rs242940 and rs242941 SNPs of *CRHR1* gene and plasma levels of IFN-γ, IL-6, IL-10 and IL-22 cytokines in asthma. *Journal of Medical Science and Clinical Research* 2020;8:527–36.

31. Mohan A, Madan K, Hadda V, Tiwari P, Mittal S, Guleria R, Khilnani GC, Luhadia SK, Solanki RN, Gupta KB, Swarnakar R, Gaur SN, Singhal Pratibha, Ayub II, Bansal Shweta, Bista PR, Biswal SK, Dhungana A, Doddamani S, Dubey D, Garg A, Hussain T, Iyer H, Venkatnarayan Kavitha, Kalai U, Kumar R, Mehta S, Nongpiur VN, Loganathan N, Sryma PB, Pangeni RP, Shrestha P, Singh J, Suri TM, Agarwal S, Agarwal R, Aggarwal AN, Agrawal G, Arora SS, Thangakunam B, Behera D, Jayachandra, Chaudhry D, Chawla R, Chawla RK, Chhajed PN, Christopher DJ, Daga MK, Das RK, D'Souza G, Dhar R, Dhooria S, Ghoshal AG, Goel M, Gopal B, Goyal R, Gupta N, Jain NK, Jain Neetu, Jindal A, Jindal SK, Kant S, Katiyar S, Katiyar SK, Koul PA, Kumar Jaya, Kumar R, Lall A, Mehta R, Nath A, Pattabhiraman VR, Patel D, Prasad R, Samaria JK, Sehgal IS, Shah S, Sindhwani G, Singh S, Singh V, Singla R, Suri JC, Talwar D, Jayalakshmi TK, Rajagopal TP. Guidelines for diagnostic flexible bronchoscopy in adults: Joint Indian Chest Society/National College of Chest Physicians (I)/Indian Association for Bronchology recommendations. *Lung India* 2019;36:S37–89.

32. Narang A, Garima K, Porwal S, Bhandekar A, Shrivastava K, Giri A, Sharma NK, Bose M, Varma-Basil M. Potential impact of efflux pump genes in mediating rifampicin resistance in clinical isolates of *Mycobacterium tuberculosis* from India. *PLoS One* 2019;14: e0223163. doi: 10.1371/journal.pone.0223163

33. Pal G, Behl T, Rohil V, Khandelwal M, Gupta G, Jena J. Evaluation of oxidative stress and its modulation by L-Arginine and L-Ascorbic acid in repetitive restraint stress model in Wistar rats. *Obesity Medicine* 2020;17:100-172.

34. Porter G, Joshi J, Bhullar L, Kotwani A. Using 'smart regulation' to tackle antimicrobial resistance in low-income and middle-income countries. *BMJ Global Health* 2020;5e001864, doi 10.1136/bmjgh-2019-001864.

35. Ranjan D, Sharma S, Kumar B, Singh V, Khanna M. Evaluation of respiratory virus pathogen from patients presenting with influenza like illness at various hospitals in Delhi, India. *J Pulm Med Respir Res* 2019;5:23.

36. Ray A, Gulati K, Henke PG. Stress gastric ulcers and cytoprotective strategies: perspectives and trends. *Curr Pharm Des* 2020;26:1–9.

37. Rintoul A, Colbert A, Garner S, Kotwani A, Vogler S, Bouvy J, Hill A. Medicines with one seller and many buyers: strategies to increase the power of the payer. *BMJ* 2020;369: m1705.

38. Sathe PA, Vaideeswar P, Kulshrestha R. An unusal cause of respiratory distress in an infant. *IJPM* 2020;63:672-4.

39. Sharma C, Nelson-Sathi S, Singh A, Radhakrishna Pillai M, Chowdhary A. Genomic perspective of triazole resistance in clinical and environmental *Aspergillus fumigatus* isolates without *cyp51*A mutations. *Fungal Genet Biol* 2019;132:103265. doi: 10.1016/j.fgb.2019.103265.

40. Sharma J, Kulshrestha R, Singh N, Jaggi AS. Dual role of D-amino acid oxidase in experimental pain models. *Eur J Pharmacol* 2019;May 13. pii: S0014-2999(19)30305-X.

41. Sharma NK, Rathor N, Sinha R, Gupta S, Tyagi G, Garima K, Pathak R, Singh P, Jain A, Bose M, Varma-Basil M. Expression of mycolic acid in response to stress and association with differential clinical manifestations of tuberculosis. *Int J Mycobacteriol* 2019;8:237-43. doi: 10.4103/ijmy.ijmy_69_19

42. Shrivastava, K, Kumar Chanchal, Singh Anupriya, Narang Anshika, Giri Astha, Gupta Shraddha, Sharma N, Chauhan Varsha, Prasad R,Varma-Basil Mandira. An overview of pulmonary infections due to rapidly growing mycobacteria in South Asia and impressions from a subtropical region. *Int J Mycobacteriol* 2020;9:62-70.doi:10.4103/ijmy.ijmy_179_19.

43. Singh A, Masih A, Monroy-Nieto J, Kumar Singh P, Bowers J, Travis J, Khurana A, Engelthaler DM, Meis JF, Chowdhary A. A unique multidrug-resistant clonal *Trichophyton* population distinct from *Trichophyton mentagrophytes/Trichophyton interdigitale* complex causing an ongoing alarming dermatophytosis outbreak in India: genomic insights and resistance profile. *Fungal Genet Biol* 2019;133: 103266.doi: 10.1016/j.fgb.2019.103266.

44. Singh A, Singh P, de Groot T, Kumar A, Mathur P, Tarai B, SachdevaN, Upadhyaya G, Sarma S, Meis JF. Chowdhary A Emergence of clonal fluconazole resistant *Candida parapsilosis* clinical isolates in a multicentre laboratory-based surveillance in India. *J Antimicrob Agents Chemother* 2019;74:1260-8. doi: 10.1093/jac/dkz029. (Impact factor: 5.113)

45. Singh M, Bhatt P, Sharma M, Varma-Basil M, Chaudhry A, Sharma S. Immunogenicity of late stage specific peptide antigens of *Mycobacterium tuberculosis*. *Infect Genet Evol* 2019;74:103930. doi:10.1016/j.meegid.2019.103930

46. Spalgais S, Kumar R, Mrigpuri Parul. Symptomatic pulmonary siderosis in scissors/knife sharpening worker: a case report. *Indian J Occup Environ Med* 2020;24:42–44.

47. Tonushyam S, Malini Shariff. Atypical *Escherichia coli*: a dilema of a clinical diagnostic laboratory. *Indian J Med Microbiol* 2019;37:287–8.

48. Ugwu MC, Shariff M, Nnajide CM, Beri K, Okezie UM, Iroha IR, Esimone CO. Phenotypic and molecular characterization of β-lactamases among enterobacterial uropathogens in Southeastern Nigeria. *Canadian J Infect Dis Med Microbiol* 2020 https://doi.org/ 10.1155/2020/5843904

49. Vaidya S, Gothi D, Kulshrestha R. St Peregrine tumour with synchronous primary renal cell carcinoma. *Lung India* 2019;36:256–9.

50. Varma-Basil M, Bose M. Innovations in tuberculosis diagnostics: how far are we from reaching our goal?. *Indian J Med Res* 2019;150:4-6. doi:10.4103/ijmr.IJMR_537_19

Chapters in Books

1. Gulati K, Thokchom SK, Ray A. Impact of chemical warfare agents on immune system. In: Gupta RC, editor *Handbook of Toxicology of Chemical Warfare Agents*; 3rd Edition. San Diego: Elsevier Inc./Academic Press, 2020: pp685-704.

2. Mrigpuri Parul. Nutrition in chronic respiratory diseases. In: Kumar R, editor *Certificate Course on Pulmonary Rehabilitation*. Delhi: Vallabhbhai Patel Chest Institute; 2019: pp1–29.

3. Tyagi Uma. Academia dynamics in contextual ICT: evolving library sub-textual approaches in current knowledge society. *Proceedings of Second National Conference on ERMED Consortium - Digital Health Resources: A Reality*, New Delhi: CBS Publishers & Distributers Pvt Ltd; 2019: pp77–81.

4. Tyagi Uma. Quantifiable competency levels in ICT framework towards capacity building in LIS: A study. *Proceeding of 2nd International Conference of CGLA EAGID-GPL 2019 on 'Equitable Access to Government Information and Data: Role of Government and Public Libraries in South Asia.* Delhi: Central Government Library Association; 2019:pp343–56.

Inauguration of Swachhta Pakhwada, india's biggest cleanliness drive – SWACHH BHARAT MISSION to improve sanitation and cleanliness in the country, at VPCI (April 1, 2019). Workshop on Sanitation and Hygiene during Swachhta Pakhwada and a Seminar on Hand Hygiene for Nursing Staff at the Paintal Memorial Golden Jubilee Auditorium (April 4, 2019)

Professor V.S. Chauhan , Chairman, Governing Body of the Institute inaugurated the renovated Registration and Waiting Hall at Viswanathan Chest Hospital (VCH) and Famous Violinist, Shri Johar Ali Khan inaugurated the Programme of Swachh Bharat Abhiyan Programme on "Swacchta Hi Seva 2019", on September 16, 2019.

An Orientation Programme on NABH Accreditation for VPCI was held at the Institute on December 18, 2019. Dr J.L. Meena, General Manager, Hospital Networking and Quality Assurance, National Health Authority was the speaker of the programme.

The Institute celebrated 73rd Independence Day on August 15, 2019 and 71st Republic Day 2020 on January 26, 2020.

Vigilance Awareness Week was observed from October 28 – November 2, 2019.

The Institute organised Constitution Day and Citizens Duties Campaign on December 26, 2019.

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