# APFCB News

The Newsletter of the Asia-Pacific Federation for Clinical Biochemistry and Laboratory Medicine for circulation among APFCB and IFCC members only

APFCB News

Volume 2 Issue 1
2023

**Publication Team,** APFCB News Volume 2, Issue 1, 2023

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|---|---|
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| Immediate Past President | Dr. Endang Hoyaranda<br>Prodia Group, Jakarta, Indonesia |
| Vice-President | Dr. Samuel Vasikaran<br>Consultant Chemical Pathologist, PathWest-Laboratory Medicine, Western Australia |
| Secretary | Prof. Praveen Sharma<br>Former Professor and Head, Dean Research Biochemistry at AIIMS, Jodhpur, India<br>Editor-in-chief, Indian Journal of Clinical Biochemistry |
| Treasurer | Dr. Raja Elina Raja Aziddin<br>Senior Biochemist and Head of the Drug and Research Laboratory, Kuala Lumpur, Malaysia |
| Corporate Representative | Dr. Douglas W. Chung<br>Area Marketing Manager Asia Pacific, Core Diagnostics at Abbott Laboratories |

### Chairmen of Committees

| | |
|---|---|
| Communications and Publications | Prof. Pradeep Kumar Dabla, INDIA |
| Education | Dr. Cui Wei, CHINA |
| Laboratory Management | Dr. Tjan Sian Hwa,INDONESIA |
| Scientific | Dr. Tze Ping Loh, SINGAPORE |
| Congress and Conference | Dr. Woei-horng Fang, TAIWAN |

## Submissions

The APFCB News welcomes suitable contributions for publication. These should be sent electronically to the Chief Editor. Statements of opinions are those of the contributors and are not to be construed as official statements, evaluations or endorsements by the APFCB or its official bodies.

Contact email: afpcbofficial@apfcb.org

**Cover page: A Bunch of Ripening Bananas with Flower Bud Still Attached, in my Home Garden created during the first week of the lunar _Year of the Rabbit Contributed by Dr. Tan It Koo, Founding and Past President APFCB**

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# Contents


From the desk of Chief Editor – Prof. Pradeep Kumar Dabla 01

Message from APFCB President – Dr. Tony Badrick 02

**APFCB Activities 2023**

Welcome APFCB Executive Board 03

Welcome APFCB Communication & Publications Committee (C-CP) 08

Welcome APFCB Congresses & Conferences Committee (C-CC) 10

Report APFCB Education & Laboratory Management Committee (C-ELM) -2022 12

Report APFCB Scientific Committee (SC) – 2022 14

Report APFCB Congress & Conferences Committee (C-CC) – 2022 16

Report APFCB Communications & Publications Committee (C-CP) -2022 18

**Member Societies – Annual Activities Reports**

Association of Clinical Biochemists of India (ACBI) 21

Chinese Association for Clinical Biochemistry (CACB) 34

Hong Kong Society of Clinical Chemistry (HKSCC) 37

Japan Society of Clinical Chemistry (JSCC) 39

Indonesian Association of Clinical Chemistry (IACC) 41

Malaysian Association of Clinical Biochemists (MACB) 43

Association of Medical Biochemists of India (AMBI) 46

**Young Scientists Column**

IFCC-Task Force Young Scientists (TFYS) at ACBICON 24$^{th}$ – 26$^{th}$ November – 2022 New Delhi, India 49

IFCC Global Medicine Week & IFCC TFYS 51

Young Scientist Interview 53

**Industry Voice Section**

Announcement on Corporate Appointments to the Committees and Working Groups 55

Sigma Metrics for Vitros Acute Care Assays from Asia-Pacific Region 57

Advancing Women's Health Key Takeaways from AOGIN – 2022 64

**Expert Opinion Paper**

Artificial Intelligence and Laboratory Medicine at the Crossroads of Value, ethics, and Liability 69

Comparative Analysis of COVID-19 Image Processing with X-ray and CT scan 71

Accreditation of Medical Laboratories as per ISO 15189 - New the 4th Version Changes From 2012 - 2022 81

**Special Report**

ACBICON, Assessing AI Technologies and Ethics in Healthcare Services - 2022 84

The Learning Lab for Laboratory Medicine 90

Newborn Screening Innovation Ramps up at Murdoch Children's in Australia 92

In a Taiwan Clinical Lab, Molecular Consolidation offers key Benefits 96

**Quiz Section** 99

**Quiz Answers** 102

**Painting Story** 103

My Acrylic on Canvas Painting of a Bunch of Ripening Bananas with Flower Bud Still Attached, in my Home Garden created during the first week of the lunar "Year of the Rabbit"

# From the desk of Chief Editor

**Prof. Pradeep Kumar Dabla**
*Chief Editor, APFCB eNews*

My Dear Colleagues,

It is with my utmost pleasure to present you the 1st issue of APFCB eNews, 2023. APFCB being one of the largest organisation of laboratorians in the south east region and as a prominent scientific organisation is always committed to promote science and education for the clinical biochemists.

Thus, with the rise of year 2023, the new APFCB Executive Board (EB) took over the charge that further led to giving me the baton of Chair APFCB C-Communication & Publications (C-CP) & Chief Editor APFCB eNews. Though, every position always comes with the greater responsibility. So, we the Team C-CP, first faced the challenge to publish APFCB eNews in limited time which is committee's one of the foremost responsibilities. Thus, we took the challenge and with the help of APFCB members societies, EB & Industry partners, we are pleased to present this current eNews.

This issue is featuring Member society's Annual Reports, Welcoming new EB & Committees, Annual Reports Committees ending 2022, Industry Voice, Technical articles and Special reports. No need to mention that the contributions and showcasing the good work in education & lab medicine by APFCB member Societies is one of the prime objectives of APFCB eNews. The same is complemented by the technical articles from industry partners and experts featuring Newborn screening, Molecular consolidation, Sigma metrics for acute care assays, Artificial Intelligence in lab medicine and Medical lab accreditation ISO 15189: 2012-2022.
We are also thrilled to introduce Young Scientists column for the first time by giving them exclusive space, to present their opinion and work done with future perspectives. They are the future leaders and ready to take charge with responsibility and innovation.
In addition, we hope that the modified Quiz section in the form of Clinical Case Discussion with the investigations, graphs, pictures and relevant queries will be enjoyed by the readers.
At the end, no words would define the appreciations for the support rendered by the "TEAM APFCB" to make this publication a reality.

Best Wishes

Team APFCB C-CP

Prof. Pradeep Kumar Dabla

Chief Editor, APFCB eNews

# Message from APFCB President

**President, APFCB**

**Dr. Tony Badrick**
*President, APFCB*

The APFCB is trusted organisation with a long history of service and distinguished leadership. The new Executive Board will humbly strive to build on the legacy of previous Executive Boards and leaders to build the reputation and capabilities of the APFCB.

Our goals are:

- To engage with a member organisation to provide to the APFCB a cost effective secretariat that can provide resources to manage key records and documents, assist with communication within the APFCB, and improve the efficiency of the Executive Board, Committees and Council
- To prudently manage and invest the financial resources of the APFCB
- To develop succession plan for the Executive Board and Chairs of committees
- To increase the frequency and effectiveness of Council meetings
- To implement the Strategic Plan and modify it as necessary to ensure it remains relevant and valuable to the APFCB members
- To focus the educational activities on webinars and our website to democratise this Knowledge
- To provide opportunities for young scientists to present and learn
- To work with Corporate members to develop educational programs and return value to this important group
- To focus the scientific and educational activities on regional priorities
- To establish a greater international profile for the APFCB
- To work closely with the IFCC and member organisations to improve laboratory practice in our Region

President, APFCB

Dr. Tony Badrick

# Welcome APFCB Executive Board

Welcome Note

I would formally like to welcome the member of the new APFCB Executive Board. As a group we have worked together for many year as Committee Chairs so we share a passion for developing the APFCB. I would also like to welcome the new Committee Chairs. The majority of the visible work and progress of the APFCB depends on this group of people. I thank you for your support and hope you find the next few years rewarding personally and for the laboratory professionals of this enormous Region we serve. I would also like to thank the previous Executive Board for their leadership and commitment to the APFCB through some very difficult years.

## MEET OUR TEAM

**Dr. Tony Badrick**
***President***

B. App SC, BSc, BA, M Lit St (Math), MBA, PhD(QUT), PhD(UQ),FAIMS, FAACB, FACB, FAIM, Member Aust Math's Soc, FRCPA (Hon), FFSc(RCPA).

He was Associate Professor, Faculty of Health Sciences and Medicine at Bond University for 4 years before becoming the CEO of the RCPAQAP in 2015. He is a visiting Fellow at the John Curtin School of Medical Research at the Australian National University, also at Australian Institute for Health Innovation Macquarie University and an honorary Associate Professor in Biomedical Science at Bond University and an honorary Associate Professor in Biomedical Science at Bond University.

He was President of the Australasian Association of Clinical Biochemists (2003- 2007), is Chair of the Education and Laboratory Management Committee of the Asian Pacific Federation of Clinical Biochemistry, Vice President of the Australian Institute of Medical Scientists and currently the deputy Chief Examiner and Chair of the Faculty of Science of the Royal College of Pathologists of Australasia

## Dr. Endang Hoyaranda

*Vice-President*

Prodia Group, Jakarta, Indonesia

Indonesian citizen, 65 years old, educated as Bachelor of Science in Pharmacy, and Pharmacist at Bandung Institute of Technology, Indonesia

Appointed as the President Director of Prodia Group Holding Company in 2009, which has currently 6 health operating business entities (Prodia Clinical Laboratory, Prodia the CRO, Prodia Occupational Health Institute, Prodia Stem cell, Prodia Diagnostic Line and Prodia'sInnovasi Diagnostika

Previously she was the Operation Director of Prodia Clinical Laboratory in 1990 and President Director of Prodia Clinical Laboratory for the period of 2002 to 2009

She actively engaged in various academic & associations' activities such as lecturer in management, entrepreneurship and ethics at Hasanuddin University and the Health Polytechnic and Vice Chairman of the Indonesian Institute for Laboratory Technologists Certification, serving at the Board of the Indonesia Clinical Chemistry Association, as Advisor of the Indonesia Health Laboratory Technologists Association and Director of the Asian Association for Medical Laboratory Sciences, as Vice President of the Asia Pacific Federation for Clinical Biochemistry and Laboratory Medicine (2010-2016), and Vice Chair of the Indonesian Institute for Corporate Directorship.

## Dr. Samuel Vasikaran

*Vice President*

Consultant Chemical Pathologist at Path West – Laboratory Medicine, Western Australia.

Dr. Samuel Vasikaran is a Chemical Pathologist based in Path West-Laboratory Medicine, Perth, Western Australia. He was Clinical Professor, Pathology and Laboratory Medicine, University of Western Australia until 2016.

He was previously Chair of the APFCB Scientific Committee. He has extensive research experience in the use of bone turnover markers and a major interest in interpretative commenting on laboratory reports, with over 140 publications in peer reviewed journals (H-index Google Scholar 42).

**Prof. Praveen Sharma**
*Secretary*

Former Professor and Head, Dean Research Biochemistry at All India Institute of Medical Sciences, Jodhpur, Editor-in-chief, Indian Journal of Clinical Biochemistry

Prof. Praveen Sharma (MSc (Med), PhD (Med), FACBI, FAMS, FAACC) has more than 44 years' experience of teaching Clinical Biochemistry and Laboratory Medicine. Professor Sharma is an eminent Indian Biochemists, served as Professor and Head of the Department of Biochemistry and Dean Research at All India Institute of Medical Sciences, Jodhpur, India. He has over 250 research publications in various prestigious journals. And has an interest in Metabolic Syndrome, Atherosclerosis, Antioxidants, Metal Toxicity, and Lab Management. He has delivered Invited Lectures at various National and International Meetings. He has been ranked among top 2% in worldwide scientist from India, stated by Stanford University study (Updated science-wide author databases, Plos Biology, 2020).

He is a recipient of the G S Seth Medical College Oration Award (2004), Pattabiram an Oration Award (2010), Awadhesh saran memorial Oration Awards (2013), and A. J. Thakur-ACBI award (2015) for distinguished service and significant contribution to the field of Clinical Biochemistry. He has been awarded a merit award by Rajasthan Government in 2002.

He has been twice President of ACBI and is Fellow of the Association of Clinical Biochemists of India (FACBI), Fellow of National Academy of Medical Sciences (FAMS), and Fellow of American Academy of Clinical Chemistry (FAACC).

He is Editor-in-Chief, Indian Journal of Clinical Biochemistry (IJCB) and Chairman, Corporate Wing of ACBI. He has also served as a member of the Accreditation Committee of the National Accreditation Board for Testing and Calibration Laboratories (NABL) and a NABL Assessor. Dr. Sharma is President of the Indian Society for Lead Awareness and Research (Insular) and Director of the National Referral Center of Lead Project India, Jodhpur.

He has served as member of IFCC-CCLM Committee (2016-2019) and is Chair of the IFCC-CCLM Committee (2019-till date).

He is Director on WAS Palm board for South East Asia (2020-till date).

He served as Chair Communication Committee of APFCB and Chief Editor of APFCB News (2010-2019) and Chair of the APFCB Committee on Congress and Conferences (2019-2022). Besides he has also organized the 15th APFCB Congress 2019 from 17th to 20th November 2019 as Organizing Chairman at Jaipur.

Presently he is Secretary APFCB for the year 2023-2024.

## Dr. Raja Elina Raja Aziddin

*Treasurer*

Dr. Elina is a senior Biochemist and Head of the Drug and Research Laboratory in Hospital Kuala Lumpur. She received her Degree in Biochemistry and PhD from University of Malaya. She has more than 30 years' experience in Clinical Biochemistry and has special interest in drugs of abuse testing and quality management.

Dr. Elina's research studies include method development for toxicology and drugs of abuse testing, drug pharmacology and toxicity studies, effect of genetic profile on drug uptake and therapeutic levels, studies on reference values and quality improvement studies.

Dr. Elina has held numerous representative roles at national and international level such as being a member of the technical committee in the development of 'Standards For the Accreditation of Controlled Substances Forensic Science Testing Laboratories, Standards Malaysia', review committee for 'MS ISO 15189 Specific Technical Requirements for Chemical Pathology', committee member on Programme Standards For Medical and Health Sciences, Malaysian Qualifications', member of the national committee on 'Method Standardization' and member of the 'Research Committee for Allied Health Professionals, Ministry of Health'.

She is the Technical Manager for Pathology Department Hospital Kuala Lumpur, President of the Malaysian Association of Clinical Biochemists (MACB), national representative to the Asia Pacific Federation of Clinical Biochemistry and Laboratory Medicine (APFCB), national representative to the International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) and member of the APFCB Scientific Committee.

**Dr. Douglas W. Chung**
*Corporate Representative*

Dr. Douglas W. Chung is Area Marketing Manager Asia Pacific, Core Diagnostics at Abbott Laboratories. He received undergraduate training in molecular biology at the University of Pennsylvania, doctorate and public health degrees from University of Newcastle and Chinese University of Hong Kong Faculty of Medicine, with a concentration in infectious diseases.

His experience in laboratory medicine ranges from biochemistry to bacteriology, immunohematology and molecular diagnostics; and across the spectrum from point-of-care testing to the centralized core laboratory. Prior to joining the Executive Board of the APFCB, he served on the IFCC-World Lab Congress Organising Committee from 2018 to 2022.

# Welcome APFCB Communication & Publications Committee (C-CP)

Contributed by:
**Prof. Pradeep Kumar Dabla**
***Chair: APFCB C-CP***

The objectives of the Communication and Publications Committee (C-CP ) is to communicate and promote the activities of APFCB both at the national & regional level of the member countries and extending further to the international level. Though not limited but extending further with the important task of bi-annual APFCB eNews publications and supporting the APFCB website management for the APFCB council activities and initiatives.

Thus, the new Team C-CP resumed the task in the beginning of the year 2023 to meet the objectives of the committee. The new APFCB website was launched in Feb 2023 and that came with the expected task of dynamic website updating & modifications. The committee is open for suggestions to make better visibility for APFCB tasks and activities. Further, the C-CP is planned to extend the readership of eNews and communication further by utilising mass mail activities and adding more interested readers. Though not limited but to add flash news activities in future to compliment with the important announcements informing the dynamic activities of APFCB EB & Committees in-between the bi-annual eNews publications. We are also planned to extend the utilization of all social media platforms for the promotion, education & networking of APFCB activities. Thus, leaving no stone unturned to unite every single member with the APFCB council. We congratulate the previous C-CP team for handling the objectives efficiently during their tenure. Thus, the Team C-CP is given an important task to bring the full Asia Pacific Clinical Biochemistry community together on same front for the promotion of education & laboratory medicine and C-CP is committed to the same.

I feel deeply honored and glad to receive the charge of APFCB Committee Communication & Publications (C-CP) to support the APFCB activities.

## Meet Our Team

## Chair APFCB Committee-CP

**Prof. Pradeep Kumar Dabla (ACBI, India)**

*Professor*
*Department of Biochemistry*

G.B.Pant Institute of Postgraduate Medical Education & Research (GIPMER)
Associated Maulana Azad Medical College, Delhi, India
Email: pradeep_dabla@yahoo.com

## Members APFCB Committee-CP

**Dr. Ryunosuke Ohkawa (Japan)**

Professor of Analytical Laboratory Chemistry
Graduate School of Medical and Dental Sciences
Tokyo Medical and Dental University, JAPAN

**Dr. Mingma Lhamu Sherpa (India)**

Professor and Head
Department of Biochemistry
Sikkim Manipal Institute of Medical Sciences,
Sikkim Manipal University
5th Mile Tadong,
Gangtok, Sikkim, INDIA

**Dr. Alireza Lotfi Kian (Iran)**

Board member of the association doctorate
In Laboratory sciences of medical diagnosis,

# Welcome APFCB Congresses and Conferences Committee (C-CC)

Chair: Dr. Woei-horng Fang
(Taiwan)

Committee Members:

Dr. Ronaldo E. Puno
(Philippine)

Dr. Rajiv Ranjan Sinha
(India)

Dr. Mehrdad Vanaki
(Iran)

It is a great pleasure and honor to be newly appointed chair of APFCB Committee on Congresses and Conferences. I am also very delighted to work with three C-CC members appointed by APFCB EB. Briefly introduce the Committee members' background

Dr. Woei-horng Fang is Associate Professor, Department of Clinical Laboratory Sciences and Medical Biotechnology, National Taiwan University College of Medicine, Taiwan.
Mr. Ronaldo E. Puno RMT, MBA-H is the Chief Medical Technologist, PROLAB Diagnostics, Philippine. It is his second term as APFCB C-CC member.

Dr. Rajiv Ranjan Sinha is Professor, Department of Biochemistry, and Nalanda Medical College, India.

Dr. Mehrdad Vanaki is the lab director of FARVARDIN pathology genetic laboratory complex, Iran.

The APFCB C-CC is a standing committee of the APFCB. It was responsible to the APFCB EB and Council. The functions of the C-CC are as follows:

1) **Role in APFCB Congresses**

- Oversee the organization of the APFCB Congress.
- Help raise sponsorship for meetings.
- Appoint members to be on the Scientific Committee of the APFCB Congress to ensure the international nature of the scientific content.

The role of the Congress Committee shall follow APFCB Congress Guidelines. The current Guidelines were approved by EB in early 2016 and then by the Council Meeting in November 2016. For the coming the 17th APFCB Congress, scheduled on 31 October – 3 November 2024 in ICC, Sydney, Australia, and the C-CC shall work closely with Congress Organizing Committee (COC) of the 17th APFCB Congress. According to the APFCB Congress Guidelines, the COC shall furnish regular reports with budget and details of the progress of preparation. Reports will also be submitted to the IFCC C-CC through Dr. Woei-horng Fang who is a member of this committee as well. The Chair and APFCB President shall plan to meet with the COC in Congress venue in November of this year to discuss the progress of preparations. A report of the visit will be prepared by the Chair C-CC and submitted to the Executive Board and the C-CC.

2) **Auspices**

One of the functions of the APFCB C-CC is the award of auspices of the APFCB for scientific meetings. The provision of auspices is mutually beneficial: the APFCB lends its prestige to a meeting which should help it attract greater participation and in return the APFCB benefits from greater name recognition among the participating laboratory scientists.

All applications for APFCB auspices are evaluated by the C-CC and treated on a case-by-case basis in an efficient and timely manner. The C-CC is careful to award auspices only to scientific meetings that are organized by learned bodies and vendors such as APFCB corporate members where the content is of educational value and non-commercial in nature.

# Report APFCB Education and Laboratory Management Committee (C-ELM) - 2022

- The Education and Laboratory Management Committee (C-ELM) is chaired by Dr. Tony Badrick (Australia) with the following members: Dr. Lia Gardenia Partakusuma (Indonesia); Dr. Tze Ping Loh (Singapore); Dr. Ronda Greaves (Australia); Dr. Raja Elina (Malaysia); Dr. July Kumalawati (Indonesia); Dra Endang Hoyaranda (Indonesia); Dr. Jozi Habijanic (Roche Corporate); Dr. Amit Manjure (Siemens Corporate); Dr. Rojeet Shrestha (Japan); Dr. Hong-yew Lim (Roche Corporate).

- The role of the C-ELM is to provide support for member organisations in education. This usually involves the organisation of visiting lecturers, seminars, and training activities.

- Impact of COVID
- Travel restrictions

**Education and Laboratory Management Committee**

**1. APFCB Travelling Lecturer**

The APFCB Visiting Lecturer for 2021/22 is Dr. Helen Martin from Australia. Whilst there are travel restrictions on this key role, virtual lectures will continue.

**2. APFCB - Roche - 12th Chemical Pathology Course - Vietnam**

This is an ongoing annual event organised by Roche in collaboration with Rhonda Greaves from Australia. In2020, the virtual event attracted approximately 400 participants and consisted of a mixture of invited and local speakers presenting on routine chemical pathology topics.

The course is supported and endorsed by many prestigious local and international medical organisations and associations, such as International Federation of Clinical Chemistry and Laboratory Medicine (IFCC), Asia-Pacific Federation for Clinical Biochemistry and Laboratory Medicine (APFCB), Australasian Association of Clinical Biochemists (AACB), Vietnamese Association of Clinical Biochemists (VACB), Ho Chi Minh City Association of Clinical Biochemists (HACB), Ho Chi Minh City Association of Medical Laboratory Technologists (HAMLT), Bach Mai Hospital, Cho Ray Hospital and other medical organizations and Associations

**3. APFCB-AACC Workshops**

The APFCB has been collaborating with the AACC with their Global Lab Quality Initiative (GLQI) as part of the Asia-Pacific Working Group (APWG). It was not possible to run any workshop in 2020. However, it is planned to run the next program in Mongolia in 2022.

**4. Workshop on Laboratory Testing of COVID-19**

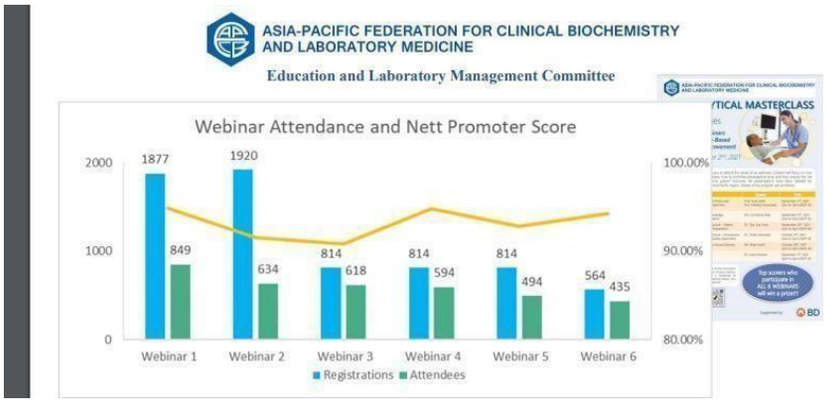
As the information of laboratory diagnosis and monitoring of COVID-19 was rapidly evolving with new information arising on a daily basis, laboratory professionals needed a constant update on the developments. Furthermore, many developing countries were struggling to meet requirements of appropriate testing not only because of lack of resources but also due to lack of well-trained laboratory professionals on the molecular assays. To help lab professionals with appropriate guide in COVID-19 testing, the APFCB committee for

Education and Laboratory Management organised a two-day virtual workshop that contained a series of lectures from experts as a complete guide on Laboratory Testing of COVID-19.

**5. APFCB Young Scientist Award**

**Objectives:**

The APFCB Young Scientist Award Competition is a scientific paper competition conducted by the APFCB through its Education and Laboratory Management Committee with the following objectives: • Foster scientific potential of young scientists within the Asia-Pacific region, • As a means of aiding and encouraging young scientists in written and oral communication of their research results • There are 12 recipients at this meeting.




# Report APFCB Scientific Committee (SC) 2022

**Chair: Dr. Samuel Vasikaran**

**Members:**

1. Tze Ping Loh, Chair of Harmonization of Reference Intervals WG
2. Ronda Greaves, Chair of Mass Spectrometry Harmonisation WG
3. Mohamed Saleem, Chair of Laboratory Data for Improving Diagnostics WG
4. Mithu Banerjee, Chair of Diabetes Testing Harmonisation WG
5. Pavai Sthaneswar, Chair of APFCB / WAS Palm Task Force on CKD

**1. Reference Intervals WG**

The Harmonization of Reference Intervals WG has examined and compared indirect methods for the derivation of reference intervals using data from laboratories within the Asia-Pacific region. The results of these studies have resulted in three publications

**Publications:**

Comparison of two (data mining) indirect approaches for between-subject biological variation determination. Tan RZ, Markus C, Vasikaran S, Loh TP; APFCB Harmonization of Reference Intervals Working Group. Clin Brioche 2022; 105-106:57-63.

Comparison of 8 methods for univariate statistical exclusion of pathological subpopulations for indirect reference intervals and biological variation studies. Tan RZ, Markus C, Vasikaran S, Loh TP; APFCB Harmonization of Reference Intervals Working Group. Clin Brioche 2022; 103:16-24

Comparison of four indirect (data mining) approaches to derive within-subject biological variation. Tan RZ, Markus C, Vasikaran S, Loh TP; APFCB Harmonization of Reference Intervals Working Group. Clin Chem Lab Med 2022; 60(4):636-44.

**2. Mass Spectrometry Harmonisation WG**

A multicenter study of the influence of internal standard on the analysis of 17-hydroxyprogesterone by LCMSMS was completed in association with RCPAQAP - AACB and IFCC ETD Pediatric Harmonics Working Group.

A study of patients presenting to the National Children's Hospital in Vietnam with 5α-reductase type 2 deficiency detected by GC-MS analysis of the urinary steroid metabolome was conducted. The additional aim of this study was to determine the sensitivity and specificity of urinary steroid metabolite ratios in the diagnosis of 5α-reductase type 2 deficiency

**Publications:**

Validation of steroid ratios for random urine by mass spectrometry to detect 5α-reductase deficiency in Vietnamese children. Tran TCM, Tran TNA, Le HBN, Nguyen VH, Tran MD, Vu CD, Greaves RF. Clin Chem Lab Med 2022;60(8):1225-33.

**3. Laboratory Data for Improving Diagnostics WG**

The WG has Analysed Laboratory Data for Improving Diagnostics and produced data on the reporting of critical results in Asian laboratories and Quality indicators in Chinese Laboratories. These survey reports will be used to support healthcare goals for improved disease management in the region. The support of Roche Diagnostics for this activity is acknowledged.

**4. Diabetes Testing Harmonisation WG**

The WG has expanded its survey of diabetes testing and reporting practices in the region. Results of surveys conducted in the Philippines, Sri Lanka and Singapore have been analysed and was presented as a poster at the AACB Annual Scientific Conference in Perth, Australia in October 2022. Results confirm that whilst most laboratories follow recommended practices, there is some lag in laboratory practices in some areas which could benefit from activities to harmonize and update practice. The data are being written up for publication in eJIFCC.

**5. APFCB-WAS Palm TF-CKD**

The WG has undertaken a survey of testing and reporting practices for CKD related laboratory indices in India in order to ascertain concordance of reporting practices with current guidelines and industry standards. The results have been analysed and were presented as a poster at the AACB Annual Scientific Conference in Perth, Australia in October 2022. It is hoped that the findings would lead to activities to harmonize testing and reporting practices according to current recommendations throughout the region.

**6. Masterclass webinars: Interpretative commenting on clinical chemistry reports.**

Webinars to discuss and analyses interpretative comments and to educate laboratory professionals on the addition of interpretative commenting have continued through the rest of 2022 with wide participation from the region. The resource material and the recordings of these webinars are available on the APFCB website: https://apfcb.org/webinar

The support and the excellent organisation of the webinars by Dr. Pearline Teo, Siemens Healthcare Pte Ltd is acknowledged.

Samuel Vasikaran
Chair 2022

# Report APFCB Congresses and Conferences Committee (C-CC) - 2022

**Chair: Prof. Praveen Sharma**
***APFCB Congress Committee***

1. Praveen Sharma (India) – Chair
2. Woei Horng Fang (Taiwan) – Member
3. Ronaldo Puno (Philippines) – Member
4. Prasenjit Mitra (India) – Member
5. Will Greene (Roche) – Corporate Member
6. Ai Tin Lim (Siemens) – Corporate Member

The mandate of the committee is to streamline the process of granting APFCB auspices to various scientific events like conferences, congresses, events organized by regional society members, and corporate member events. With the COVID-19 situation affecting the global scientific community, there were no applications for physical conferences. Rather, there was a surge in the events based on virtual platforms. The committee received a number of applications for grant of APFCB auspices. During2021 – 2022, the committee members evaluated and granted APFCB auspices to the following scientific events.

**Conferences and Courses**

| Event name | Organised by | Event Start Date | Event End Date |
|---|---|---|---|
| 15th IACC Working Conference | IACC | 25/06/21 | 27/06/21 |
| CCPSL AAS 2021 | CCPSL | 26/07/21 | 27/07/21 |
| LMCE 2021 | KSLM | 30/09/21 | 02/10/21 |
| North Zone ACBICON 2022 | ACBI | 22/04/22 | 23/04/22 |
| 29th AMBICON 2022 | AMBI | 18/07/22 | 23/07/22 |
| 15th IACC Conference 2022 | IACC | 25/06/22 | 27/06/22 |
| Annual Academic sessions CCPSL AAS 2022 | CCPSL | 26/08/22 | 27/08/22 |
| 32nd MACB (virtual) Conference 2022 | MACB | 11/09/22 | 13/09/22 |
| AACB 59th Annual Scientific Conference 2022 | AACB | 18/10/22 | 20/10/22 |
| 48th ACBICON 2022 | ACBI | 23/11/22 | 26/11/22 |
| Vietnam Chemical Pathology Course XIII 2022 | VACB | 01/12/22 | 01/12/22 |

Corporate Member Events/Webinars:

| Event name | Organised by | Event Date |
|---|---|---|
| Roche Experience Days (RED) 2021 Virtual Event | Roche | 16/11/21 15-16/11/22 |
| Webinar on "Managing the Covid-19 pandemic in 2021: The Henry Ford Experience" | Beckman Coulter | 15/06/21 |
| Webinar on "Digital webinar on Observability in healthcare" | Roche | 16/06/21 |
| Series of educational webinars focused on the Asia Pacific region related to Prenatal & Pre-eclampsia Screening, Clinical Biochemistry, Toxicology and 3rd party QC | Thermo-Scientific | Multiple webinars 2021-2022 |
| Leveraging the latest trends in the digital healthcare revolution: Lab workflow solutions | (Roche Digital Webinar) | 15/09/21 |

The committee is also working on updating the Congresses and Conferences webpage of APFCB to include the details of all the scientific events, which have been granted APFCB auspices.

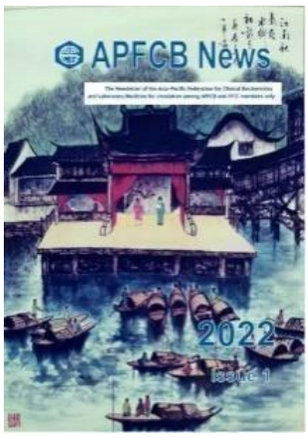
# Report APFCB Communications and Publications Committee (C-CP) - 2022

Prepared by:
**Dr. Raja Elina Binti Raja Aziddin,**
*Past Chair-CCP and Past Chief Editor, APFCB News*

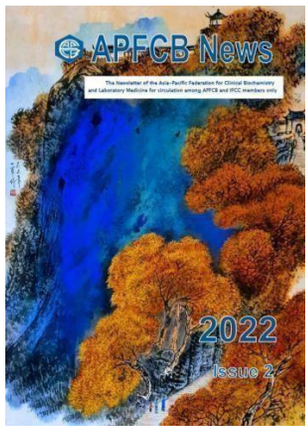
The C-CCP committee in 2022 comprised of the following members:

1. Dr. Raja Elina Raja Aziddin – Chair and Chief Editor of APFCB News
2. Dr. Purvi Purohit (Web Editor)
3. Dr. Rojeet Shrestha (Media Coordinator)
4. Prof. Pradeep Kumar Dabla (Full Member)
5. Will Greene (Corporate –Roche) replaced by Yvonn Ong (Roche) in June 2022
6. Lim Ai Tin (Corporate –Siemens)

In 2022, the C-CCP published 2 copies of the APFCB News which are available on the APFCB website as e-book and pdf copy. A new feature that was added to APFCB News 2022 issue 1 is the quiz section. Questions in this section are based on the APFCB webinars which were organized in 2020-2021 and which are still available on the APFCB website.

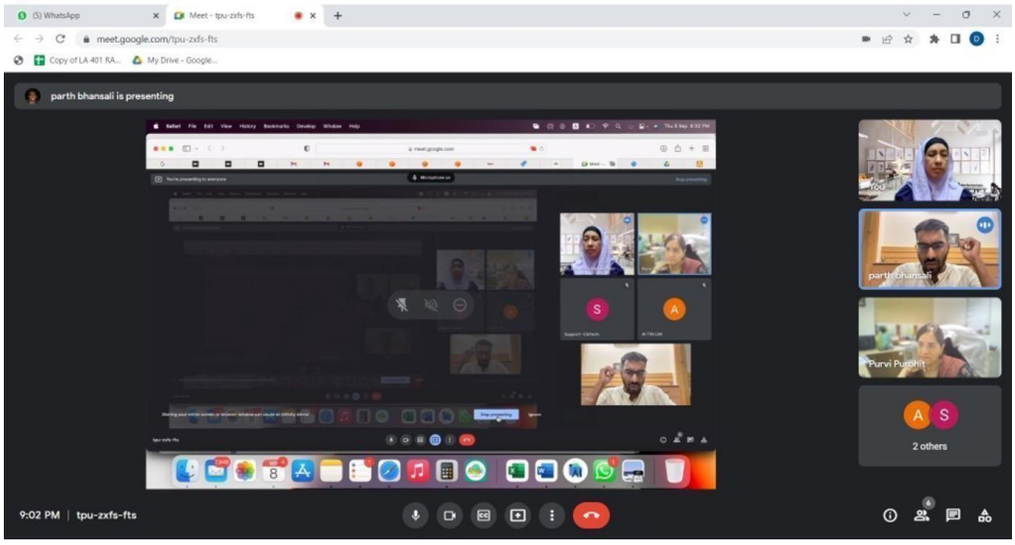



APFCB News 2022 Issue 1




APFCB News 2022 Issue 2

The focus of the C-CCP in 2022 was to work on the new APFCB website. In total, the committee met more than 10 times in 2022 to discuss the features, to work on the development and to review the content migration from the old to the new website.



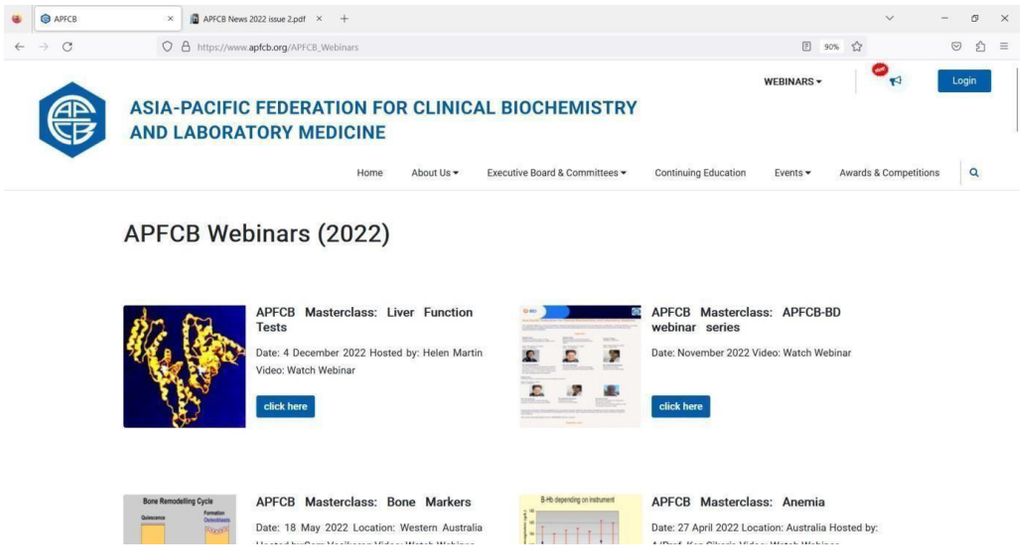

**C-CP meeting to discuss new APFCB website development**

In 2023, the committee again met 3 times for final review and to endorse the content of the new website. The new website finally went live on 30 January, 2023. Features of the new website include: mobile friendly browsing, improved hosting environment, search function, tracking and analytics, website hit counter, password protected pages and security features.

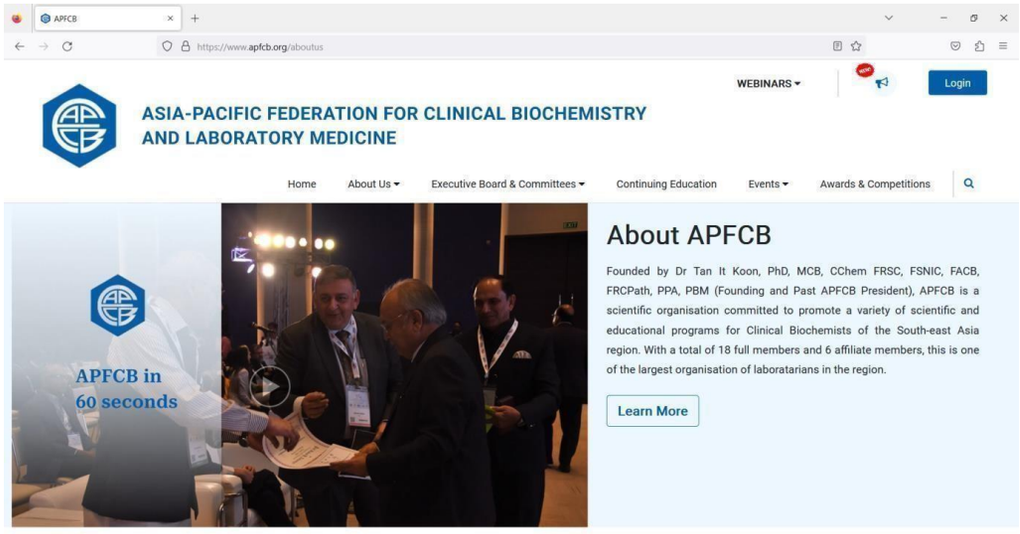

**Home page of the new APFCB website**

In addition to migrating existing content, new sections such as educational articles, continuing education, awards and competitions have been added. To facilitate networking the APFCB website provides direct links to national society's website and to corporate member's website pages.

The website also allows easy access to past webinars which have been arranged according to year. Just go to the webinars page and search under Archives.




**Recordings and power point presentations of past APFCB webinars**




**A 60 second video on the APFCB in the APFCB website**

The committee also worked on creating a 60 second introduction video on APFCB and this video is now available on the About us page on the APFCB website.

# Association of Clinical Biochemists of India (ACBI)

**ACBICON 2022 New Delhi Report**


**The Registration Counters and the entrance of the Convention Center**

The 48th annual conference of the Association of Clinical Biochemists of India, ACBICON 2022, was held at the ICAR Convention Center in New Delhi, India from 24th to 26th November, 2022, on the theme "Harnessing Basic and Molecular Research to Enhance Patient Care". The clinically oriented state-of-the-art preconference workshops were held on the 22nd and 23rd of November, 2022. With the whole-hearted support from our two international academic partners (International Federation of Clinical Chemistry and Laboratory Medicine, and Asia Pacific Federation of Clinical Biochemistry), National and International advisors, 26 Corporate partners and the organizing Secretariat – Department of Biochemistry, Sir Ganga Ram Hospital (SGRH), ACBICON 2022, was very fruitful and successful, under the able guidance and leadership of Prof. L. M. Srivastava as Organizing Chairman, and Prof. Seema Bhargava as Organizing Secretary.

This was the first totally in-person conference of ACBI since the beginning of the COVID pandemic. The Delhi Medical Council granted 6.5 credit hours for the preconference workshops and 16 credit hours for the main conference.


At the Inauguration. From L to R: Dr. Parul Singla (Member, Core Organizing Committee, ACBICON 2022), Dr. Anjali Manocha (Treasurer and It Secretary, ACBICON 2022), Dr. Rajiv Ranjan Sinha (General Secretary, ACBI), Dr. Harshvardhan Singh (It Secretary.

ACBICON 2022), Dr.Subir K Das (Immediate Past-President, ACBI), Dr. S.P.Byotra (Patron, ACBICON 2022 and Director, Clinical Laboratory Services, Sir Ganga Ram Hospital, New Delhi), Dr.D.S. Rana (Patron, ACBICON 2022 and Chairman, Sir Ganga Ram Trust Society), Dr.V.K.Paul (Chief Guest, Hon'ble Member, Niti Aayog, Govt of India), Dr. Ajay Swaroop (Chairman, Board of Management, Sir Ganga Ram Hospital, New Delhi), Prof. L. M. Srivastava (Organizing Chairman, ACBICON 2022), Dr. Seema Bhargava (Organizing Secretary, ACBICON 2022 and Chairperson, Dept. of Biochemistry, Sir Ganga Ram Hospital, New Delhi), Dr. Mamta Kankra (IT Secretary, ACBICON 2022).

Traditional lighting of the 'Lamp of Knowledge' by the dignitaries on the dais

The theme, preconference workshops and symposia generated a lot of enthusiasm and there were over 800 delegates who attended the conference. In the inaugural function, Master of Ceremonies, Dr. Mamta Kankra, Joint Organizing Secretary, ACBICON 2022, introduced the dignitaries and invited them to the dais. The Chief Guest for the inauguration was Dr. V. K. Paul, Hon'ble Member, NITI Aayog, and Government of India.

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Dr. V. K. Paul was also awarded the Awadhesh Saran Oration for which he gave his inaugural-cum-oration address on 'The COVID Journey of India'. it was a concise narrative of an exhaustive journey, highlighting how our country has not only managed to design and produce effective vaccines for COVID, but also how we have helped over a hundred countries across the globe to fight this virus. The oration carried a cash prize too which he graciously donated to the association. The Guest of Honor was Dr. Ajay Swaroop, Chairman, Board of Management, and SGRH. The meeting was also presided over by the patrons of the conference, Dr. D.S. Rana, Chairman, Sir Ganga Ram Trust Society, and Dr. S. P. Byotra, Director, Clinical Laboratory Services, SGRH, President, ACBI, Dr. Subir Das, General Secretary, ACBI, Dr. Rajiv Ranjan Sinha, and Organizing Chairman, Prof. L.M.Srivastava. ACBICON 2022. The patrons, Dr. Rana and Dr. Byotra, appreciated the efforts of the organizing committee. The President, Dr. Das, talked about ACBI and its role in promotion of clinical biochemistry. Dr. Sinha presented the annual report of ACBI activities of the preceding year. The guest of honor, Dr. Swaroop, encouraged the fraternity to continue its good work. The Souvenir and the Proceedings of the conference were released during the inauguration. Organizing Secretary, Dr. Seema Bhargava, ACBICON 2022, was handed over the reins of the President ship of ACBI from Prof. Subir Kr. Das.


During the inaugural function, ACBI Fellowship was awarded to Prof. Abbas Ali Mahdi and Prof. Pradeep K Dabla. The ACBI-A J Thakur award, an award of appreciation and proficiency in Clinical Biochemistry, was given to Prof Jayashree Bhattacharjee in absentia. Several other awards were also presented to their respective awardees. The Vote of Thanks was delivered by Dr. Anjali Manocha, Treasurer and Joint Organizing Secretary, ACBICON 2022.

**Scientific Programmer**

The scientific Committee was chaired by Prof. Shyam S Chauhan. His team of eminent biochemists form various premier institutes of Delhi and the Northern Capital Region (NCR) included Dr. S. B. Sharma and Prof. Vijay Kutala as the Chair and Co-Chair of the Symposia Committee, and Dr. Ritu Singh as chair of the Pre-Conference Workshops' Committee. They put together an educative scientific programme oriented to current policies and guidelines pertinent to patient care.

**Pre-conference workshops:** Nine preconference workshops (PCW) were organized. They were:

Genetics in Medical Diagnostics and Prognostics, Statistical Analysis of Research Data including Meta-analysis –Hands on Workshop, Hands-on-training: In vitro mammalian cell culture techniques and its application, Newborn Screening – From Text to Test, End-to-end Integrated Total Laboratory Automation, Applied Artificial Intelligence Research Genome editing via CRISPR-Cas9, Roadmap to Laboratory Accreditation as per ISO 15189 and Molecular Advances in Cardiovascular Research
These were highly appreciated by all the participants for their newer topics and techniques, and their highly sophisticated methodologies and content.

ORATIONS: Seven Orations were delivered by eminent members of the national and international faculty of the fraternity as given below: 1. Awadhesh Saran Memorial Oration: Dr. V.K.Paul Hon'ble Member, Niti Aayog Govt. of India 2. Dr. K.P Sinha Oration: Dr. Maurizio Ferrari (Past President IFCC) Director of Research Institute for Photonics and Nanotechnologies, CNR Trento, Italy 3. Seth GS Medical College & . King Edward Memorial Hospital Oration: Dr. Khusrow Adeli, President, IFCC 4. Dr. Praveen Sharma Oration: Prof. Sedef Yenice Professor of Biochemistry and Clinical Chemistry Group Florence Nightingale Hastaneleri Istanbul, Turkey 5. K.L.Gupta Memorial Oration: Dr.Rahul Purwar Associate Professor Department of Biosciences and Bioengineering Indian Institute of Technology, Powai Mumbai 6. Dr. T.N. Patabhiraman Oration: Dr Vijay Kutala Dept. of Clinical Pharmacology & Therapeutics Nizam's Institute of Medical Sciences Chairman, Hyderabad 7. Mrs. & Dr. G.P. Talwar Oration: Prof. Arnab Pal Professor, Department of Biochemistry PGIMER, Chandigarh

SYMPOSIA There were 33 symposia which addressed varied areas of clinical chemistry and involved clinicians in each session so as to establish a cohesive workflow between laboratorians and clinicians towards better patient care. These symposia were distributed over 2.5 days in 5 parallel sessions. Special emphasis was laid on artificial intelligence, ethics in laboratory medicine and epidemiology, including special programmes set up by the Government of India. The scientific community was very appreciative of the scientific program and the venue. The symposia generated lots of discussions.

**Other highlights**

The International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) had granted 3 Visiting Lecturers for this conference –

1. Prof Sedef Yenice Professor of Biochemistry and Clinical Chemistry Chair, EFLM Working Group on Laboratory Medicine Credit Points
2. Prof Bernard Gouget Chair, IFCC Committee on Mobile Health and Bioengineering in Laboratory Medicine President-Healthcare Division Committee Comate François d'accréditation (Cofrac) Paris, France
3. Dr. Ramy SH Assad Khalil, SCE Endocrinology & Diabetes- Royal College of Physicians (UK)

In addition, we had several other international faculty from across the borders and seas:

1. Prof. Alexander Haliossos (Greece)
2. Egon Peter Amann (Germany)
3. Prof. Ken.

Sikaris (Melbourne, Australia) [Online] 4. Dr. Qing Meng (Texas, USA) 5. Prof. Jay Kalra (Saskatchewan, Canada) 6. Prof. Sergio Bernardini (Italy) 7. Dr. Pierre-Jean Lamy (France) 8. Prof. Shabbir Syed Abdul (Taiwan) 9. Prof. Tahir Pillay (South Africa) 10. Mr. Anil Srivastava (Maryland, USA) 11. Dr. Rajesh Sharma (California, USA) 12. Dr. Madhab Lamsal (Nepal) 13. Dr. Nirmal Baral (Nepal)

The AFMC Quiz is an integral feature of our Annual Conferences of ACBI. It is meant especially for postgraduate students of Biochemistry to encourage and inspire them. It was conducted by the faculty of Armed Forces Medical College (AFMC), Pune, Dr. Col. Anurodh Gupta and Dr. Vivek Ambade. The participants performed very well and, hence, to further encourage them, the Organizing Committee gave several Prizes of Appreciation over and above the regularly instituted first 3 prizes.

A special innovative feature of this ACBICON 2022 was the 'Vigyan Chaupal' – a program convened by Prof. Tapasya Srivastava, Department of Genetics at University of Delhi, South Campus. This was a hands-on session for senior school children in the science stream. There were 60 participants from two schools. They were taken through 3-4 experiments like DNA extraction, to pique their interest in Biochemistry. They were extremely excited and enthusiastic and their accompanying school teachers also appreciated the program.

There were several symposia conducted under the aegis of different committees of IFCC and AACC, namely IFCC Evidence Based Laboratory Medicine Committee, IFCC Global Lab Quality Committee, and AACC India section. Prof. Bernard Gouget kindly submitted a report on the IFCC EBLM symposium. The young scientists' presentations and posters were also appreciated. In addition to the regular awards for young researchers, we, the organizing committee, had instituted the "Sir Ganga Ram Hospital Award for Translation Research in Clinical Biochemistry" in the form of first and second prizes each for posters and oral presentations. The conference culminated with the Valedictory Function where all the awards were given to the participants who had been selected by the judges of the respective sessions.


**Prof Sedef Yenice delivering her oration (Left) and receiving the Dr. Praveen Sharma Oration Award. (right)**

**Dr. Vijay Kutala Receiving the Pattabiraman Oration Award**


**Prof Sedef Yenice receiving the Seth GS Medical College & KEM Hospital Oration Award on behalf of Prof Khusrow Adeli.**



**Prof Maurizio Ferrari delivering the oration (left) and receiving the Dr K.P. Sinha Oration Award (right)**

**Prof Sedef Yenice being felicitated (Left) & The audience as IFCC VLP (right)**


**International and National faculty in the audience**


**Faculty of the IFCC GLQ-C symposium: (Above from L to R) – Prof Qing Meng, Prof Egon Amann, Prof Alexander Haliossos, Prof Seema Bhargava, Dr. Mamta Kankra, Prof Venkatesh Thuppil, Prof Pradeep K Dabla, Prof Bernard Gouget.**
**(Below from L to R) – Prof Alexander Haliossos delivering a lecture and being felicitated; Prof Qing Meng being felicitated and delivering a lecture in the IFCC GLQ-C symposium**


24th to 26th November 2022
ICAR Convention
Delhi 110012
48th
ACBICON2022
Harnessing Basic And Molecular Research To Enhance Patient Care
24th to 26th November 2022


Venue:- ICAR Convention
PS Marg,
110012

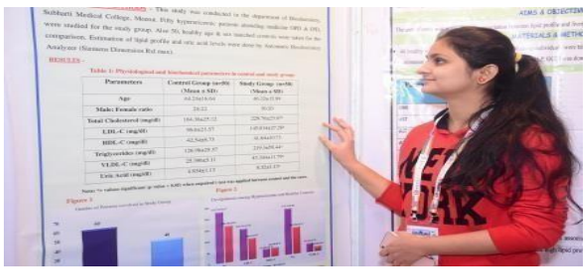

**The Faculty of the IFCC EBLM-C symposium: From L to R – Dr. Arvind Kumar Mehta (AIIMS, New Delhi, India), Dr. S Arulselvi (AIIMS, New Delhi, India), Prof Arif Ali (Chairperson, India)), Prof Seema Bhargava (Convenor), Prof Bernard Gouget (Chairperson, France), Dr. Tahir Pillay (South Africa), Dr. Ramy SH Assad Khalil (VLP of IFCC EBLM-C from Egypt).**

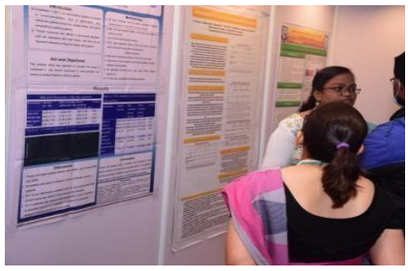
**Below: Speakers being felicitated**





**Dr. Praveen Sharma and Prof D. K. Srivastava felicitating the faculty of the symposium titled "Heavy Metals in Health and Disease", L to R Dr. Rachna Agarwal (New Delhi), Dr. Prasenjit Mitra (Chandigarh), Dr. Shailja Sharma (New Delhi).**



**Posters**



**Corporate Exhibition**

**Corporate Exhibition**


# Chinese Association for Clinical Biochemistry (CACB-Taiwan)

**National Society Report for APFCB News**

| | |
|---|---|
| NAME OF SOCIETY | Chinese Association for Clinical Biochemistry (CACB-Taiwan) |
| OFFICIAL SOCIETY EMAIL ADDRESS | office@cacb.org.tw |
| NAME OF PRESIDENT & EMAIL ADDRESS | Sandy Huey-Jen Hsu<br>sandyhsu@ntu.edu.tw |
| NAME OF NATIONAL REPRESENTATIVE TO APFCB & EMAIL ADDRESS | Woei-horng Fang<br>whfang@ntu.edu.tw |

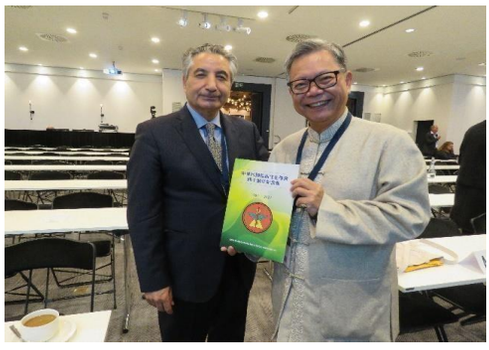
**Report on Society Activities**

To Celebrate IFCC 70th Anniversary, CACB president Dr. Sandy Huey-Jen Hsu and her staff contribute a photo to congratulate IFCC 70 years Global Leadership in Laboratory Medicine (photo 1).

CACB Executive Director and National Representative Dr. Woei-horng Fang attended 2022 IFCC General Conference in Brussels. Dr. Fang reunited with old friends in IFCC and had a fruitful discussion on education and regulation (Photo 2).

In the 2022 IFCC General Conference in Brussels, an agreement was achieved between Prof. Nader Rifai (AACC) and Dr. Woei-horng Fang (CACB) (Photo 3). In order to increase utility and eliminate language barriers, Dr. Fang would join the Chinese version initiative of AACC Learning Lab for Laboratory Medicine on NEJM Knowledge+ program. Dr. Fang proposed the Traditional Chinese version initiative and was accepted. The translation was started in December 2022 and the Chinese site was schedule to be launched in April 2023.


**Photo 1 CACB congratulates IFCC 70th Anniversary**



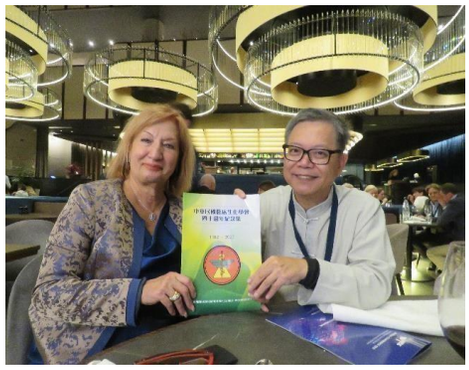


**Photo 2. At 2022 IFCC General Conference in Brussels, CACB Executive Director Dr. Fang presented CACB 40th Anniversary Celebration book of "The chronicle and commemorative photographs of Chinese Association for Clinical Biochemistry 1982-2022 to APFCB President Dr. Endang Horyanda, IFCC President Prof Khosrow Adeli, Past President Prof Maurizio Ferrari and President-elect Prof Tomris Ozben, and IFCC Secretariats staff.**


**Photo 3 At 2022 IFCC General Conference in Brussels, Prof. Nader Rifai (AACC) and Dr. Woei-horng Fang (CACB) agreed on the AACC Learning Lab for Laboratory Medicine traditional Chinese version initiative**

**Upcoming events for 2023**

CACB annual conference and scientific symposium in conjunction with the 37th Joint Annual Conference of Biomedical Science (JACBS). The main theme for JACBS this year is “Metabolism in Human Health”. Four speakers will be invited to present the progress on metabolomics and its clinical applications. Professor Andrew Hoofnagle, Director of Division of Chemistry, Department of Laboratory Medicine and Pathology University of Washington, is going to deliver a keynote speech on “Clinical Metabolomics: Current state and future directions”. Professor Ming-Shi Shiao, Consultant and CRO, Geneon Link, and adjunct Professor, Graduate Institute of Traditional Medicine, National Yang Ming Chau Ton University, will present “Metabolomics Enables Precision Medicine”. Professor Jentaie Shiea from National Sun Yat-sen University will talk about “Rapid Characterization and Imaging of Drugs and Potential Metabolic Disease Biomarkers on Human Skin with Ambient Ionization Tandem Mass Spectrometry”. Professor Tjin-Shing Jap, Physician, Division of Endocrinology and Metabolism, Taipei-Veterans General Hospital will present” The laboratory evaluation of glucose and lipid metabolism from Biochemical perspectives”.

# Hong Kong Society of Clinical Chemistry (HKSCC)

**National Society Report for APFCB News**

| | |
|---|---|
| NAME OF SOCIETY | Hong Kong Society of Clinical Chemistry |
| OFFICIAL EMAIL | hkscc@hos.com.hk |
| PRESIDENT | Name: Dr. Iris HS Chan |
| | Email: chs483@ha.org.hk |
| APFCB NATIONAL REPRESENTATIVE | Name: Dr. Iris HS Chan |
| | Email: chs483@ha.org.hk |

**Report on Society Activities**

The Hong Kong Society of Clinical Chemistry (HKSCC) hold 2 online scientific webinars via Zoom platform in 2022. The 1st one was on 23rd July 2022. There were three presentations from invited local speakers: 'Iron Profile Made Easy' by Dr Jenny CHENG, Prince of Wales Hospital, 'Porphyria: Topic Review and Case Presentation' by Dr Jeremiah TSEUNG, Princess Margaret Hospital, 'Review on the Biomarker in Liver Fibrosis' by Dr. Kelvin YIP of Pamela Youde Nethersole Eastern Hospital.

Another online seminar was hold on 19th November 2022. There were three presentations by invited local speakers: 'Cushing's syndrome: Diagnostic workup and challenges' by Dr. Hoi Shan LEUNG, Princess Margaret Hospital; 'Vitamin D Metabolism: A Review' by Dr. Shreenidhi R SUBRAMANIAM, Prince of Wales Hospital; 'Abnormal thyroid function tests in a 9-month-old boy' by Dr. Rachel SW YIU of Queen Mary Hospital.

The year 2023 was started with the Annual Scientific Meeting (ASM) held on 7 January 2023. It was the first physical ASM of the society since the COVID-19 pandemic. The theme of the ASM was "Current Advances in Clinical Investigation and Management". There were two presentations by invited speakers: (1) " Development of Robotic Surgical System for Clinical Application – from Laparoscopic to Endoscopic Surgery" by Professor Philip WY CHIU, Head of Division of Upper GI & Metabolic Surgery, Department of Surgery; Associate Dean (External Affairs), Faculty of Medicine, The Chinese University of Hong Kong; and (2) " Therapeutic Drug Monitoring of 5-fluorouracil to improve Patient Safety and Drug Efficacy" by Dr Felix CK WONG, Consultant, Division of Chemical Pathology, Department of Pathology, Queen Mary Hospital. These were followed by five industrial presentations by Beckman Coulter Hong Kong Limited, Bio-Rad Pacific Limited, Ortho Clinical Diagnostics and Roche Diagnostics (Hong Kong) Limited, Waters Corporation. The ASM was well attended by 139 HKSCC members and guests. There were also fifteen industrial partners participating in the industrial exhibition.


**Group photo of HKSCC Council Members (Term 2022 – 2023) with Industrial Partners**

HKSCC celebrated its 40th Anniversary in 2023. One of the events was photo contest with a theme of "Wonderful Moments in the Clinical Chemistry" for members to share their career lives, stories, precious moments and others in the past 40 years in the field of Clinical Chemistry. A total of 28 photos was received. Below is the winner from Ms. Judy Po Shan LAI sharing her happy moments at the Neonatal Screening Laboratory during Christmas in 1985.

# Japan Society of Clinical Chemistry (JSCC)

**APFCB News**

The 62nd Annual Meeting of the Japan Society of Clinical Chemistry (JSCC), chaired by Professor Isao Kitajima (University of Toyama), was held in Toyama from September 30 to October 2 in 2022. The theme of the meeting was “Development of clinical chemistry through interdisciplinary collaboration” reflecting the origin of the Society of Clinical Chemistry, "Creating Clinical Laboratory”. Conference participants were anticipated to join the meeting on site. However, for those participants who could not make it to the venue, lectures were made available on demand after the conference. A total 669 of registration were obtained.


**Photo1: Poster for the 62nd Annual Meeting of the Japan Society of Clinical Chemistry**

Special lectures and symposiums were held to raise awareness of interdisciplinary collaboration. Special Lecture 2 was "Functions of the Idle Brain" by Kaoru Inokuchi (Distinguished Professor, University of Toyama), and Special Lecture 3 was "Mathematical Modeling of Complex Systems and its Application to Research on Un wellness" by Kazuyuki Aihara (Professor Emeritus, University of Tokyo). They showed us that new research can be opened up through collaboration between different fields of brain research and mathematical science.


**Photo 2: Dialogue between Kaoru Inoguchi (Distinguished Professor, University of Toyama) on and Kazuyuki Aihara (Professor Emeritus, University of Tokyo)**

**Photo 3: The international symposium. (From left) Dr. Subehan Lallo, Hasanuddin University (Indonesia), Dr. Pornang Aramwit, Chulangkorn University (Thailand), Dr. Isao Kitajima (Meeting chair). Dr. Yoshihiro Hayakawa (Symposium chair)**

The international symposium was held under the theme of Current status and future perspective of traditional medicines. Dr. Pornang Aramwit, Dean of Faculty of Pharmacy, Chulangkorn University (Thailand), and Dr. Subehan Lallo, Faculty of Pharmacy, Hasanuddin University (Indonesia), spoke on the current status of traditional medicines in ASEAN countries and their regulation for clinical use. In ASEAN countries, including Japan, medical treatment using traditional medicines and natural drug resources is widely used even today. Collaboration between traditional medicine and Western medicine is becoming increasingly important. In particular, there is a strong demand for scientific evidence and clinical trials of the efficacy and safety of traditional medicine.

The next 63rd meeting is be held by Dr. Hiroshi Yoshida (Tokyo Jikei University) in Tokyo from October 27 to 29 in 2023.

# Indonesian Association of Clinical Chemistry (IACC)

PERKUMPULAN KESEMINATAN KIMIA KLINIK DAN LABORATORIUM INDONESIA
INDONESIAN ASSOCIATION FOR CLINICAL CHEMISTRY

**Arwin Prasasto**

hkki.secretariat@gmail.com or arwin.prasasto@yahoo.com

**16th IACC NATIONAL CONGRESS**

The 16th IACC National Congress was held in Jakarta on 22nd-24th July 2022. This Congress elected Dr. Tjan Sian Hwa, Sp.PK, and MSc for the President of IACC for the 2nd period. During her time as President of IACC, IACC enjoyed rapid growth from 12 branches to 14 branches (with Lampung and North Sumatra as new branches) and achieved the highest number of members (more than 800 IACC registered members). IACC branches were also growing with more members and more educational activities (webinars, educational videos, and public seminars). This Congress also set the tone for IACC's direction in the future by targeting more educational seminars and webinars, public webinars, green lab development in Indonesia, and promoting quality assurance in Indonesian clinical laboratories.

During the Congress, IACC also held an offline seminar with "The Future of Clinical Laboratory: Precision Medicine Perspective" as the seminar's theme. We had keynote speakers from the Indonesia Ministry of Health, Prof. Damien Grison, Prof. Aw Thar Chon, and many more. The target audiences of this seminar were clinical pathologists, laboratory technicians, and all laboratory practitioners. We had more than 500 participants across Indonesia.

**IACC's Lampung Branch Inauguration**

Lampung Branch Inauguration was held in Lampung on the 16th of September 2022. Attended by IACC President (Dr. Tjan Sian Hwa), IACC board member (Dr. Lia Partakusuma), and IACC Lampung Branch members. Along with this inauguration, an offline seminar was held. The topic of the seminar was "Update of Autoimmune Diseases: Early Diagnosis, Management and Laboratory Aspect of Systemic Lupus Erythematosus".

**Westgard Series: From A to Z Laboratory Risk Management (Quality and Laboratory Management Webinar by IACC)**

This webinar was held on the 19th of November 2022 and 1155 participants attended. The participants are not only from Indonesia, but from Asia Pacific countries (including Malaysia, Australia, Philippines, Singapore, India, Pakistan, and Sri Lanka). Stem Westgard was the keynote speaker in this webinar.

**IACC-GLEAM (Green Laboratory for Environment and Mankind) Initiative Webinar**

IACC, in collaboration with Abbott, will hold a webinar on the 4th of March 2023. This webinar will have a representative from the Indonesia Ministry of Health, Prof. Tomris Ozben, and Dra. Endang Horyanda, and Dr. Lia Partakusuma, Sp.PK (K) as speakers. IACC aims to promote green laboratories in Indonesia with this webinar.

**Visiting Lecture by Prof. Khosrow Adeli**

Prof. Khosrow Adeli will visit Indonesia on the 23rd-25th of March 2023 and IACC will have him as a lecturer on his short visit to Indonesia. The aim of this visiting lecture is to promote newborn screening programs in Indonesia. This is also aligned with Indonesia's national programs.

# MALAYSIAN ASSOCIATION OF CLINICAL BIOCHEMISTS (MACB)

## 1. MACB Annual Conference

The 32nd Annual MACB Conference under the auspices of the APFCB was held via a virtual platform from 11-13 September, 2022. A pre-conference which focused on Point of Care Testing (POCT) was held on 11 September 2022 followed by a 2-day conference. The theme of the virtual conference was "Integrated Approach in Medical Laboratory: Challenges and Opportunities". Various topics of interest such as integrated diagnostics, updates on eGFR reporting, personalised medicine and quality management were presented by local and international experts. The conference was attended by 245 participants with 3 oral and 30 e-poster presentations.


**Attendees at the 32nd MACB Conference 2023**

In conjunction with the conference, a Young Scientist Award Competition 2022 was held for the first time. The main objective of the MACB YSA Competition 2022 was to recognize the achievements of young scientists under 40 years in the field of Clinical Biochemistry. The Awards was conferred to the recipients during the 32nd MACB Annual Conference 2022. The competition received applications from 10 candidates which included locals as well as from India and Sri Lanka. The five (5) deserving scientists under the age of 40 years old who were selected as award winners comprised on 4 locals and one from India.

Winners were given free registration and a token sum. They were given the opportunity to present their papers in a special oral presentation session during the conference. The following were the recipients of the MACB YSA Competition 2022

1. Dr. Prasad Mundllamudi Iman
2. Nabilah Abd Rahim
3. Mohd Firdaus Abdul Aziz
4. Raja Hasyidah Raja Bongsu
5. Siti Suhana BT Abdullah Soheimi

**3. Forum on "eGFR reporting in Malaysia"**

A pre-MACB AGM Forum entitled "eGFR reporting in Malaysia" was held on Saturday, 24th Sept 2022 via Microsoft Teams. One nephrologist and 2 chemical pathologists make up the 3 panelists. The objective of the forum was:

1. To discuss the current practice of eGFR reporting in Malaysia
2. To discuss the impact of the implementation of the new CKD-EPI 2021 equation that does not include a race coefficient.

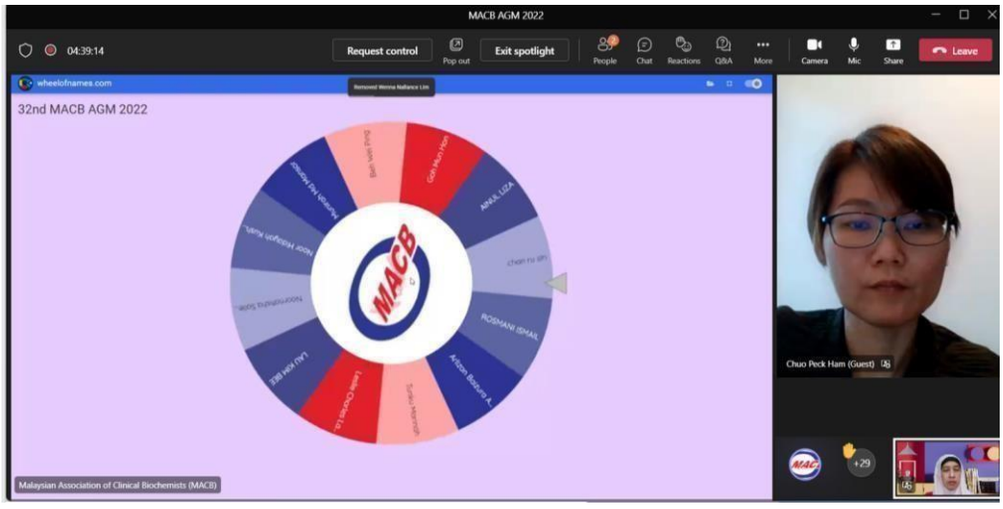
The forum began with a presentation of the report of surveys that were carried out on the practice of eGFR reporting in Malaysia. Lively discussion followed the presentation and a decision was made not the make any changes to the current MACB guideline on eGFR reporting.

**4. MACB Annual General Meeting**

The 32nd Annual General Meeting (AGM) of the Malaysian Association of Clinical Biochemists (MACB) was held on Saturday, 24th September, 2022. The nomination for MACB Council for the term 2022-2024 was closed on 31st August 2022 and election of MACB Council was carried out during the AGM by electronic voting.

**The new elected MACB council members for the term 2022-2024 are as follows:**

| | |
|---|---|
| **President** | Dr. Raja Elina binti Raja Aziddin |
| **Vice-President** | Tunku Marinah Ashraf binti Tunku Abdullah |
| **Secretary** | Chuo Peck Ham |
| **Assistant Secretary** | Sivasangkari a/p Supremaniam |
| **Treasurer** | Chen Bee Chin |
| **Council Members** | 1. Chew Yee Yean<br>2. Vani a/p Munusamy<br>3. Roziela binti Abu Bakar<br>4. Dr. Nurulamin Abu Bakar |




**Lucky draw at the MACB AGM**

**5. Membership to the EFLM Academy**

The MACB has been a member of the EFLM Academy since 2021. In November 2023, the MACB again made a block enrolment to the EFLC Academy for its active members. The active MACB members who enrolled into the academy has been steadily increasing since the first enrolment in 2021.

**6. MACB Participation at the 17th APFCB Council meeting**

The MACB was represented by Tunku Marinah, Vice President of MACB at the meeting as the MACB president attended the meeting as chair of the APFCB Communications and Publications Committee.

# Association of Medical Biochemists of India (AMBI)

**The Executive Council**:

Members of **the Executive Council** for Association of Medical Biochemists of India (AMBI) was appointed in the Annual General Body Meeting held at Bangalore, on 22nd July 2022 at 29th Annual National conference of the AMBI. The office bearers were:

| | |
|---|---|
| Head Office | Dr V Govindaraju |
| Secretary General | Dr Shanthi Naidu |
| President | Dr Prashant Vishwanath |
| Honorary Secretary | Dr Jasbinder Kaur |
| Joint Secretary | Dr Anitha Devanath<br>Dr A Pullaiah |
| National Coordinator | Dr Shivani Jaiswal |
| Treasurer | Dr Anila Sushma Challa |
| Editor in Chief | Dr Anju Jain |

| | | |
|---|---|---|
| Dr V Govindaraju | Dr Prashant V | Dr Jasbinder Kaur |
| Head Office | President 2022-23 | Honorary Secretary Bangalore |
| Bangalore | JSSMC Mysuru | GMCH, Chandigarh |
| drgovindaraju@gmail.com | prashantv@jssuni.edu.in | jasbinderkaurambi@yahoo.com<br>jasbinderkaur@yahoo.co.in |

| | |
|---|---|
| **Secretary General** | Dr Shanthi Naidu K Care Hospital, Hyderabad |
| **President Elect** 2021 | Dr Prashant V JSS Medical College, Mysuru Immediate |
| **Past President** | Dr Navjot Kaur DMC, Ludhiana |
| **Joint Secretary** | Dr Anitha Devanath St Johns Medical College, Bangalore |
| **Joint Secretary** | Dr A Pullaiah GMC, Nalgonda |
| **National Coordinator** | Dr Shivani Jaswal GMCH, Chandigarh |
| **Treasurer** | Dr Anila Sushma Continental Hospital, Hyderabad |
| **Editor in Chief- IJMB** | Dr Anju Jain LHMC, New Delhi |

**AMBI NATIONAL CONFERENCE-AMBICON 2022**

The 29th Annual conference of AMBI was held for three days (21st to 23rd July 2022) and the theme this year was "Building tomorrow's leaders by the young generation". It was organized by Dr V Govindraju and Dr Shanthi Naidu at Moongate Resort, Bengaluru. The conference was inaugurated by Dr Srinath Reddy, President of Public Health Foundation of India and Former Head of Department of Cardiology, All India Institute of Medical Sciences, New Delhi along with Dr K S Ravindranath, Former Vice-Chancelor, Rajiv Gandhi university of Health Sciences, Bengaluru and Chief Cardiologist, Jayadeva Institute of Cardiac Sciences, Bengaluru. It was attended and appreciated by about 450 academicians from prestigious institutions across the country. Young scientists and Experts all over India

were invited to deliver orations and lectures. In addition to scientific sessions, there were platform/poster presentations, and postgraduate Quiz program.


A 3-day preconference workshop (18th to 19th July 2022) was organized and the theme for this year was "Advanced Techniques in Biochemistry". The workshops were designed to cover both theoretical and hands-on training in certain niche areas like PCR (Polymerase Chain Reaction), HPLC, LCMS/MS, Cell culture, prenatal workup, genetic testing, cytogenetics, and Next generation sequencing. Nine workshops were conducted parallely during this 3-day period. Target audience were postgraduates and residents who had completed master's degree.

**State Chapter Academic Activities**

Various state chapters of the association held conferences , CMEs, workshops and like academic activities during the year.

6th March 2022, AMBI State Chapter Odisha held at MKCG Medical College, Odisha.India Organizing Secretary- Dr Madhusmita Acharya.

26th March 2022,AMBI State Chapter Telangana, CME and workshop held on Advances in molecular biology7 and primer designing' at AIIMS Bibi agar, Hyderabad. Organizing Secretary- Dr Anand Tyati. 23rd April 2022, AMBI Bihar State Chapter, Indira Gandhi Institute of Medical Sciences, Patna held a Webinar on Essence of POCT in emergency. Organizing Secretary-Dr RaviShekhar.

22nd -23rd April 22 , 5th Annual State Conference of AMBI Telangana held at Kamineni Academy of Medical Sciences and Research Centre, Hyderabad, India. The theme of the conference was 'Biochemistry of Aging' and workshop was held on 'Therapeutic Drug Monitoring'. Organizing Secretary_ Dr.Archana Dharwadkar.

28th-29th April 22, Tamil nadu State chapter CME: 'Integrated biochemistry-basics to therapy'. Conducted for postgraduates based on clinical scenarios. Scientific online and hybrid sessions on hemoglobinopathies, quality assurance, inborn error of metabolism, metabolomics and instrumentation were conducted. Organizing Secretary- Dr. M P Sarvanan.

7th Dec 2022 AMBI Panjab State Chapter. CME on 'Newborn Screening -The Road Ahead' held at AIIMS, Bathida. Punjab. India. Organizing Secretary-Dr Monica.

28th Jan 2023 AMBI State held a CME at JIPMER, Pondicherry "LABMEDIX: Focus on Modern Concepts" held at JIPMER, Pondicherry ,India. Organizing Secretary - Dr Ramesh Ramasamy.

5th Feb 2023 AMBI State Chapter Odisha held at Veer Surendra Sai Institute of Medical Science & Research, Burla, Odisha. Organizing Secretary- Dr Madhusmita Acharya.

**AMBI -Academic Webinars**

| | |
|---|---|
| 25.01.23 | Topic: Understanding automation in a diagnostic lab<br>Speaker; Dr G.Jayachandran |
| 16.02.23 | Topic: ABC of molecular visualization<br>Speaker: Dr Shailesh Patel |

**National Academic Activities Planned in 2023:**

11th-13th March 2023. Planned National PG Update by AMBI Chandigarh State Chapter, in Chandigarh

Dec 2023 Annual National Conference of AMBI, in Mumbai. India

**JOURNAL - IJMB**

Journal of the Association-IJMB is bringing out two issues per year.

**Contributed by:**

Dr. Jasbinder Kaur
Hon. sec-AMBI

# IFCC-Task Force Young Scientists (TFYS) at ACBICON - 24th-26th November - 2022 New Delhi, India

The 48th Annual Conference of Association of Clinical Biochemists of India (ACBI), was held in ICAR Convention Center, New Delhi, from 24th to 26th November 2022. IFCC Task Force Young Scientists symposium was successfully organized with the support of the organizing committee of 48th ACBICON on 24th November 2022. The theme of the IFCC TFYS symposium was "Shifting Paradigms in Clinical Dialectology, reflecting recent trends in the management of Diabetes Mellitus. The symposium was chaired by Dr. Krishnajyoti Goswami and Dr. Jitender Sharma (Corresponding Member, IFCC TFYS, and India).

Diabetes mellitus affects people at the most productive age, slows economic growth, reduces life-expectancy in older population, causes rise in healthcare expenditure. Diabetes is a more complex disease than initially expected and its management should target multiple defects that contribute to hyperglycemia. Evidence emerging over the decade showed that intensive glycemic control does not seem to lower all-cause mortality in Diabetes. Technological advances opened the route to the connected care helping to shape new approaches to diabetes care.

**L to R: Dr. Brijesh, Dr. Susruta Sen, Prof Kannan Vaidyanathan, Dr. Jitender Sharma and Dr. Krishnajyoti Goswami**


The topics covered were, 1) Redefining Diabetes Care: Shift from Glossocentric to Organ protective approach- Dr. Anand Chellappan, Asst. Prof, Nephrology, AIIMS Nagpur. 2) Emerging technologies for Diabetes Management: Application and Challenges-Prof Kannan Vaidyanathan, IFCC TF-NBS, Vice President ACBI, 3) Unravelling the mysteries of Hormonal Assays-Dr. Susruta Sen, Director Lab Medicine, CMRI Kolkata, 4) Incidence of new onset diabetes in post COVID-19 patients-Dr. Brijesh, Era's Medical College, Lucknow.

The symposium concluded with an interactive discussion between speakers and young scientists and the participating delegates.

We are thankful to the organizing committee ACBICON 2022, senior members IFCC and ACBI; especially Prof Pradeep K Dabla, Consultant IFCC TFYS and our young delegates from India.

By: Dr. Jitender Sharma, Assistant Professor Biochemistry, GIPMER, New Delhi and Corresponding Member, IFCC TFYS, India.

# IFCC Global Medicine Week & IFCC TFYS

**Maria Schroeder Castagno**

***Contributed By: Maria Schroeder-Castagno (C-PR / TF-YS / WG-FC)***
***Acknowledgments: C-PR, Prof. Erasmus (Chair: C-PR), TF-YS; Santiago Fares Taie (Chair: TF-YS)***

From 2022, IFCC has launched a new initiative entitled *"IFCC Global Medicine Week" which* will be carried out in April each year. However, many of this week programmes will be carried out throughout the year. The idea behind this initiative is to create awareness of the fundamental role our profession plays in patient care and public health.

While our profession is vital to healthcare, health systems and the general public are not always aware of its crucial role in healthcare delivery. COVID pandemic has greatly contributed to increase the visibility of our profession. We must keep it alive over time with "Global Lab week" (GLW). In an era of social medias, with Public Relations Committee (C-PR) and Task Force Young Scientists (TF-YS) have worked together and created a worldwide young scientists' network to adapt our C-PR programmes to current channels of communication. In this line, at the end of 2022, C-PR have made liaison with Task Force young scientists (TF-YS) and at the beginning of 2023 additionally with Committee on Internet and Digital Communications (C-IDC).

Thus, from 2023 young scientists (YS) around the globe have been invited to work together with C-PR, C-IDC in collaboration with National IFCC Champions and Association Representatives to develop plans for promoting Laboratory Medicine to the public in their respective countries during GLW mainly and throughout the year.

Among those plans are worldwide competitions for the tasks mentioned below to be carried out in Spanish/English/French/Chinese-mandarin. We expect to expand our activities into additional languages in the future.

1. Creation of videos in several languages as part of a project entitled “Live My Lab”, where young scientists explain to the general population our daily work
2. Creation of Audios (to be transformed in Spotify and Apple Podcasts) highlighting the fundamental role of lab professionals in public healthcare. Clinicians and patients’ opinion about the value of lab tests and lab professionals in the improvement of patient care and diagnosis.
3. Invite lab professionals to share their expert opinion on clinical diagnostics
4. Organization of Open Days in clinical diagnostic labs in IFCC-member societies
5. Organization of conferences/public lectures focused on emphasizing the role of lab professionals and laboratory tests in diagnosis and disease management
6. Creation of brochures and video clips related to the impact of lab diagnostics in healthcare.

Together we “develop programs to raise the awareness the fundamental contribution of lab medicine in patient care and public health”.

- We believe that this Campaign to create awareness of the fundamental role our profession plays in patient care and public health will impact positively in the vision of general public of our profession resulting in the support of our profession in our respective countries.
- We additionally expect a positive impact that health care providers, different than lab-professionals, have of our professions.

# Young Scientist Interview

**Kohki Okada**
*Junior associate professor*

*Department of Medical Technology and Sciences,*

*Faculty of Health Sciences, Kyoto Tachibana University, Kyoto, Japan*

*Corresponding member of Task Force for Young Scientists,*

*International Federation of Clinical Chemistry and Laboratory Medicine (IFCC)*

1. **Please introduce yourself**

My name is Kohki Okada, from Japan. I used to work as a biomedical laboratory scientist in a general hospital and as a research assistant in a university. Currently, I am a junior associate professor at Kyoto Tachibana University, mainly teaching clinical chemistry to students. I am actively engaged in both education and research in the university.

2. **What is your main focus?**

I especially focus on research activities. My research theme is to develop laboratory methods for detecting natural toxins derived from mushrooms, pufferfish, potatoes, etc. Food poisoning by natural toxins even currently occurs worldwide, but most medical facilities are unable to measure them in biological samples such as serum and urine. Then, I am trying to establish laboratory methods based on high-performance liquid chromatography (HPLC), enzyme-linked immuno sorbent assay (ELISA), and immunochromatography.New HPLC and ELISA methods for α-amanitin, a mushroom toxin, and tetrodotoxin, a pufferfish toxin, have already been developed and reported in research papers. At present, I am in the process of constructing easy and rapid laboratory methods for detecting α-selinene and α-chaconne, which are natural toxins of potatoes. Through these results, I would like to contribute to the improvement of diagnostics regarding food poisoning in medical facilities.

3. **What else is important to you?**

I feel that international exchange is important. To date, I have attended and given presentations at international academic meetings in France, China, and Korea. Furthermore, I have been a corresponding member of the International Federation of Clinical Chemistry and Laboratory Medicine Task Force for Young Scientists (IFCC TF-YS) since 2020.In recent years, although the activities of the international academic society were restricted due to the global COVID-19 pandemic, I have made efforts to continue them. IN collaboration with other members of the IFCC TF-YS, we created a video to encourage medical staffs striving to suppress the COVID-19 pandemic.

This video is now available on YouTube, in which I also make an appearance as a representative of young scientists in Japan. In addition, to providing useful information on the pathology of COVID-19, I gave a presentation entitled "S100 proteins as potentially therapeutic targets of the cytokine storm in COVID-19" at the IFCC Global Conference on COVID-19; Critical Role of Clinical Laboratories in the COVID-19 Pandemic (virtual conference). Owing to these achievements, I have also been assigned as a member of the Japan Association for Clinical Laboratory Science Committee on International Activities. In 2023, under the project of this committee, we will organize a symposium together with young scientists in Southeast Asia. I would like to be more active in gaining experience in international exchange, and to promote the importance of these experience to young scientists.

**4. What are your interests in biomedical laboratory medicine?**

I predict that artificial intelligence (AI) will dramatically advance biomedical laboratory medicine in the future. In recent years, there has been concern that AI may take away the jobs of biomedical laboratory scientists. In my opinion, we do not have to compete with AI. AI certainly performs some tasks mechanically with given knowledge and can learn from the results. However, AI can't flexibly work compared with humans and isn't good at multi-tasking beyond their programs. I think that AI will probably come to conduct some screening examination in the future, but biomedical laboratory scientists will have to carry out highly specialized and complex examination and the interpretation of the examined results. We need to develop our knowledge and expertise to keep up with AI. I strongly recommend that young scientists try to obtain professional certifications and engage in research activities. In order to improve my English skills and develop my expertise, I have previously taken and passed the Medical Laboratory Scientist of American Society for Clinical Pathology certification. In addition, I have two professional certifications in clinical chemistry and quality control in Japan. I believe that such efforts are necessary to prevent our work from being. Substituted by convenient tools such as AI and automatic analyzers.

**5. What are your future goals?**

As a researcher, I would like to introduce new laboratory methods into the medical field in the future. For this purpose, I would like to continue to acquire specialized knowledge and polish experimental skills. As a faculty member, I would like to promote the growth of students so that they will become internationally active young biomedical laboratory scientists. For this purpose, we would like to not only teach students a lot of specialized knowledge but also provide them with opportunities to participate in academic conferences and make presentations.

**Interviewer:**

**Dr. Ryunosuke Ohkawa, PhD**

Professor of Analytical Laboratory Chemistry, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University. Committee member of Communication & Publications Committee.

# Announcement on Corporate Appointments to the Committees and Working Groups

**Contributed by:**

**Dr. Douglas Chung FRSPH**
***APFCB Corporate Representative***

The APFCB recognises the immense amount of knowledge and passion in laboratory medicine amongst our industry partners. As such, we have encouraged interested and qualified individuals from our Corporate Member companies to join our various committees and working groups. Their inclusion enables more direct hands-on involvement and close collaboration with experts around the Asia-Pacific region, and ensures that important industry viewpoints and expertise are not overlooked across our various programs and initiatives.

I am pleased to announce the appointment of the following individuals from our supportive Corporate Members to the various committees and working groups. Please join me in congratulating them on their appointments, I am sure we will be seeing many fruitful and win-win collaborations moving forward.

| | | |
|---|---|---|
| Publications and Communications Committee | **Dr Tze Wei Poh** ***(Beckman Coulter)*** |  |
| Congress and Conferences Committee | **Ms Sasha Duan** ***(Mindray)*** |  |
| Congress and Conferences Committee | **Mr Fionn Quinlan** ***(Waters)*** |  |
| Scientific Committee – Working Group on Harmonisation of Mass Spectrometry | **Mr Hong-Yew Lim** ***(Roche)*** |  |
| Scientific Committee – Working Group on Harmonisation of Reference Intervals | **Dr Claire Chen** ***(Abbott)*** |  |

| | | |
|---|---|---|
| Scientific Committee – Working Group on Patient-Based Quality Control | **Dr Shane Brown** ***(Abbott)*** |  |
| Education Committee | **Mr Sum Li** ***(Greiner Bio-One)*** |  |
| Education Committee | **Dr Pearline Teo** ***(BD)*** |  |
| Laboratory Management Committee | **Dr Douglas Chung** ***(Abbott)*** |  |
| Laboratory Management Committee | **Mr Anup Shamsher Budhathoki** ***(SNIBE)*** |  |

# Sigma Metrics for Vitros Acute Care Assays from Asia-Pacific Region

*Author: Johanna Miller, Ajita Kondalkar, Dr. Mayank Upadhyay*
*Conflict of interest: The authors are employees of Quidel Ortho*
*Content Owner: Quidel Ortho*
*Source of funding: Quidel Ortho*
*Corresponding Author:*

**Dr. Mayank Upadhyay**

Regional Marketing Manager, Quidel Ortho Corporation
Email – Mayank.upadhyay@orthoclinicaldiagnostics.com

**Introduction**

Acute care assays are essential in providing timely and accurate information to healthcare providers, enabling them to make informed decisions about the patient's treatment and management. These assays which include a variety of biomarkers can help to identify underlying conditions that may be contributing to a patient's critical illness. This allows healthcare providers to have a more complete understanding of a patient's condition, and to implement more targeted and effective treatments. Critical care assays play a crucial role in the management of critically ill patients with conditions such as acute myocardial infarction, heart failure, acute kidney injury, and sepsis. Early diagnosis and treatment of sepsis, which is a severe and often a life-threatening condition, is critical as the risk of death increases with each hour that passes without appropriate intervention.

Our goal at Quidel Ortho is to provide hospital and diagnostic labs with easy to use innovative technologies and systems that have the menu to support their clinical and operational needs. The assays we provide need to be clinically precise, to support their medical decisions in order to provide accurate and timely diagnosis for improved patient care. Especially in a critical care setting like the Emergency Department or Intensive Care Unit, getting the right result the first time in a timely manner is extremely important. Laboratories are required by regulatory and accreditation agencies to assess and monitor assay performance relative to acceptability criteria determined by CLIA (Clinical Laboratory Improvement Amendments) or other apex bodies as part of their quality systems. The on-going quality assurance program includes external QC (e.g. proficiency material, inter-lab testing, etc. tested at various intervals throughout the year) and internal QC (assayed or un-assayed quality control materials tested at least once per day).Internal QC utilizes various tools like Westgard Rules, Sigma Metrics etc. to monitor assay. Precision and accuracy. Labs can use results from internal or external QC to calculate Sigma Metrics as part of a quality management system that can be used for process improvement.[1] Sigma Metrics are important because they provide a measure of both the precision and accuracy of the test results. This is particularly vital in a critical care setting, where accurate test results are essential for effective patient care and for ensuring optimal patient outcomes. Sigma Metrics can be used to measure process performance on the "Sigma Scale" which typically runs from 0 to 6, although a process can exceed Six Sigma if variability is sufficiently

Low as to decrease the defect rate. Within the context of clinical laboratories, the following calculation is used to derive the Sigma metric for an assay: [2]

$$\sigma_{metric} = \frac{(TEa - \%Bias)}{\%CV}$$

Where

**Tea**= Total Error Allowed. Typically use proficiency limits

**%Bias** = % error of a sample relative to a reference method or peer mean

**%CV** = 100 %*( Standard Deviation)/ (Mean) for QC fluids

CLIA proficiency limits are targeted to be adopted in 2024 and have been used in this paper as the total allowable error when available[3]. If unavailable, other published Tea values were used such as the RCPA (Royal College of Pathologists of Australasia) [4,5] and Ricco's Desirable Limits. [6]

This paper examines the Sigma metric values for critical care assays running on Vitros analyzers. A control fluid was selected for each assay to be the most popular fluid for the control level in the study time range with a medically relevant concentration. In order to report a single value for each assay, the Sigma metric is taken as the median value across all Vitros analyzers in the study that ran the control fluid of interest. Thus, when this paper reports an assay as a particular sigma level, it means that at least half of E-Connected® analyzers achieved that level of quality in a real-world setting.

**Methods**

The Quidel Ortho E-Connectivity® system connects Vitros analyzers to a cloud data where results are collated. All results are pseudonym zed at source so result data cannot be attributed to any patient information. However, the information on control fluids used for quality control (QC) measurements is retained. The E-Connectivity® database.

Contains QC measurements for Vitros instruments for every assay from labs around the world. In addition, several months of results are available, leading to the hypothesis that it could be possible to assess the Sigma metric performance for the population of Vitros analyzers.

This study specifically examined critical care assays running on Vitros analyzers in the following countries: Australia, Bangladesh, India, Malaysia, Maldives, Myanmar, Nepal, New Zealand, Philippines, South Korea, Sri Lanka, Thailand, and Vietnam. These countries represent a diverse range of healthcare markets, providing a good overview of how the Vitros assays perform in varied settings. An algorithm was developed using Python to extract QC data for a time span ranging from January 2022 to August 2022 (inclusive). This was done for each set of QC data that originates from a single assay, control fluid lot, analyzer, reagent lot, and calibration curve – which will be referred to as a "combination" below. This analysis incorporated serum and plasma body fluids. In the laboratory if the high and low QC levels are wrongly labelled, they can be manually amended or deleted. However, in the E-Connectivity® database, all results will be present which leaves the analysis susceptible to outliers if not mitigated. To assess for outlier QC results within a combination, an interquartile range outlier detection method[7] was employed, and spurious replicates were removed if detected.

The average concentration for each combination was then calculated, requiring there to be at least 15 control data points in the combination.

For each control fluid for an assay, the peer mean and peer standard deviation were calculated using all the relevant combination averages. To objectively assess whether mislabeled fluids were present, a z-score was then calculated for each combination using the following equation[8]:

$$z - score_i = \left| \frac{mean_i - peermean}{peerSD} \right|$$

Where mean is the average concentration for a combination, peer mean is the average concentration for a QC fluid lot across the means of all combinations, and peer SD is the standard deviation of the combination means for a QC fluid lot. Any combination with a z-score $> 1.96$ was considered to be mislabeled and was excluded. Any fluid that did not have at least 5 different analyzers used in the peer mean calculation was excluded. For each combination, calculate the Sigma Metric as

$$\%\ Bias_i = 100\% * \left| \frac{mean_i - peermean}{peermean} \right|$$

$$\%CV_i = 100\% * \left| \frac{SD_i}{mean_i} \right|$$

$$SigmaMetric_i = \frac{TEa - \%\ Bias_i}{\%CV_i}$$

Where mean is the average concentration for a combination, SD is the standard deviation for points within a combination, peer mean is the average concentration for a QC fluid lot across the means of all combinations, and Tea is the "total allowable error". Note that peer group mean is an acceptable method for determining bias for Sigma Metric calculations when standard reference materials are not available[9]. The value of the Teased for each assay is included in Table 1. For assays with a Tea expressed as a fixed limit, the peer mean was used to convert the fixed limit to a percent as opposed to the combination mean. Where the Tea value was available in the 2024 CLIA published data[3], it was used to calculate the Sigma values. If 2024 CLIA data was unavailable, the following other sources were used: Royal College of Pathologists of Australasia (RCPA) [4,5], and Ricco's Desirable Limits[6].Once a Sigma metric is calculated for each combination for every assay, the median value across all combinations is taken as the Sigma metric for the assay.

**Results**

The Sigma metric results for each assay are shown in Table 1. In the table below, "TV" stands for True Value.

**Table 1: Sigma Metric Results for Vitros Critical/Acute Care Assays**

| Assay Code | Assay Name | TEa Source | TEa Limit | Peer Mean | Units | # Analyzers | % Bias | %CV | TEa (%) | Sigma Metric |
|---|---|---|---|---|---|---|---|---|---|---|
| **ALB** | Albumin | CLIA 2024 | TV ± 8% | 4.6 | g/dL | 167 | 2.2 | 2.0 | 8.0 | 2.7 |
| **ALKP** | Alkaline Phosphatase | CLIA 2024 | TV ± 20% | 53.6 | U/L | 175 | 3.6 | 3.1 | 20.0 | 5.0 |
| **AST** | Aspartate aminotransferase (Activated) | CLIA 2024 | TV ± 15% or ± 6 U/L | 45.3 | U/L | 174 | 2.4 | 2.0 | 15.0 | 6.1 |
| **BhCG2** | Human chorionic gonadotropin | CLIA 2024 | TV ± 18% or ± 3 mIU/mL | 9.3 | mIU/mL | 50 | 3.6 | 2.8 | 32.1 | 9.9 |
| **Ca** | Calcium | CLIA 2024 | TV ± 1.0 mg/dL | 8.3 | mg/dL | 166 | 1.3 | 1.0 | 12.1 | 11.0 |
| **CHOL** | Cholesterol | CLIA 2024 | TV ± 10% | 238.0 | mg/dL | 171 | 1.6 | 1.7 | 10.0 | 4.9 |
| **CK** | Creatine Kinase | CLIA 2024 | TV ± 20% | 70.4 | U/L | 111 | 4.4 | 4.3 | 20.0 | 3.6 |
| **CKMB** | Creatine Kinase MicroSlide | RCPA | ± 3 up to 15 U/L; 20% > 15 U/L | 20.1 | U/L | 48 | 7.0 | 8.9 | 20.0 | 1.3 |
| **CK-MB** | CK-MB MicroWell | CLIA 2024 | TV ± 25% or ± 3 ng/mL | 1.8 | ng/mL | 14 | 6.9 | 4.5 | 162.9 | 34.8 |
| **Cl-** | Chloride | CLIA 2024 | TV ± 5% | 95.9 | mmol/L | 143 | 1.0 | 1.0 | 5.0 | 3.7 |
| **CREA** | Creatinine | CLIA 2024 | TV ± 0.2 mg/dL or ± 10% | 1.0 | mg/dL | 69 | 1.5 | 1.7 | 20.7 | 11.0 |
| **CRP** | C-Reactive Protein | CLIA 2024 | TV ± 1 mg/dL or ±30% | 23.4 | mg/L | 60 | 4.2 | 5.8 | 42.7 | 6.2 |
| **dHDL** | Direct HDLC | CLIA 2024 | TV ± 20% TV or ± 6 mg/dL | 68.5 | mg/dL | 166 | 2.5 | 3.0 | 20.0 | 5.7 |
| **dLDL** | Direct LDLC | CLIA 2024 | TV ± 20% | 132.2 | mg/dL | 77 | 2.1 | 2.5 | 20.0 | 6.9 |
| **GLU** | Glucose | CLIA 2024 | TV ± 6 mg/dL or ± 8% | 88.9 | mg/dL | 176 | 1.6 | 1.4 | 8.0 | 4.6 |
| **hsCRP** | high sensitivity CRP | CLIA 2024 | TV ± 1 mg/dLor ±30% | 0.7 | mg/L | 13 | 2.0 | 2.3 | 83.5 | 36.3 |
| **hsTnI** | hs Troponin I | Ricos | TV ± 27.91% | 9.8 | ng/L | 17 | 4.3 | 5.2 | 27.9 | 4.6 |
| **K+** | Potassium | CLIA 2024 | TV ± 0.3 mmol/L | 3.9 | mmol/L | 172 | 1.0 | 1.2 | 7.7 | 5.6 |
| **LDH** | Lactate dehydrogenase | CLIA 2024 | TV ± 15% | 469.7 | U/L | 125 | 1.9 | 1.6 | 15.0 | 8.2 |

| Assay Code | Assay Name | TEa Source | TEa Limit | Peer Mean | Units | # Analyzers | % Bias | %CV | TEa (%) | Sigma Metric |
|---|---|---|---|---|---|---|---|---|---|---|
| Na+ | Sodium | CLIA 2024 | TV ± 4 mmol/L | 142.0 | mmol/L | 169 | 0.8 | 1.0 | 2.8 | 2.0 |
| NBNP2 | NT-proBNP II | CLIA 2024 | TV ± 30% | 156.6 | pg/mL | 15 | 2.0 | 2.9 | 30.0 | 10.2 |
| PCT | Procalcitonin | RCPA | ± 0.05 up to 0.15 ng/mL; 30% > 0.15 ng/mL | 1.9 | ng/mL | 26 | 3.3 | 2.5 | 30.0 | 10.3 |
| TBIL | Total Bilirubin | CLIA 2024 | TV ± 20% or 0.4 mg/dL | 0.9 | mg/dL | 170 | 7.1 | 4.9 | 44.8 | 7.6 |
| TP | Total Protein | CLIA 2024 | TV ± 8% | 5.0 | g/dL | 171 | 1.9 | 1.7 | 8.0 | 3.5 |
| TrpES | Troponin | CLIA 2024 | TV ± 0.9 ng/dL or 30% | 0.7 | ng/mL | 10 | 3.5 | 3.2 | 130.8 | 40.1 |
| TRIG | Triglycerides | CLIA 2024 | TV ± 15% | 195.3 | mg/dL | 172 | 1.4 | 1.3 | 15.0 | 10.5 |
| UREA | Urea Nitrogen | CLIA 2024 | TV ± 2 mg/dL or ± 9% | 15.9 | mg/dL | 177 | 2.1 | 1.8 | 12.6 | 5.7 |
| XT ALB | XT Albumin | CLIA 2024 | TV ± 8% | 4.7 | g/dL | 10 | 1.8 | 1.8 | 8.0 | 3.7 |
| XT ALTV | XT Alanine aminotransferase (activated) | CLIA 2024 | TV ± 15% or ± 6 U/L | 21.2 | U/L | 6 | 1.5 | 2.0 | 28.3 | 13.7 |
| XT AST | XT Aspartate aminotransferase (Activated) | CLIA 2024 | TV ± 15% or ± 6 U/L | 36.9 | U/L | 8 | 2.0 | 2.3 | 16.3 | 5.6 |
| XT CHOL | Cholesterol | CLIA 2024 | TV ± 10% | 147.7 | mg/dL | 7 | 2.7 | 1.8 | 10.0 | 4.1 |
| XT CREA | XT Creatinine | CLIA 2024 | TV ± 0.2 mg/dL or ± 10% | 0.9 | mg/dL | 15 | 1.4 | 0.8 | 21.2 | 23.2 |
| XT TP | Total Protein | CLIA 2024 | TV ± 8% | 5.0 | g/dL | 9 | 1.0 | 1.4 | 8.0 | 5.0 |
| XT TRIG | Triglycerides | CLIA 2024 | TV ± 15% | 200.6 | mg/dL | 5 | 0.8 | 1.3 | 15.0 | 10.8 |
| XT UREA | XT Urea Nitrogen | CLIA 2024 | TV ± 2 mg/dL or ± 9% | 18.9 | mg/dL | 15 | 2.6 | 1.0 | 10.6 | 7.1 |

A summary of Vitros assays within each calculated median Sigma level is shown in Table 2

**Table 2: Summary of Vitros Acute Care Assays for Each Sigma Level**

| > 6 Sigma | | | | 5 Sigma | | 4 Sigma | 3 Sigma | 2 Sigma | < 2 Sigma |
|---|---|---|---|---|---|---|---|---|---|
| AST | CREA | TrpES | XT ALTV | ALKP | XT AST | CHOL | CK | ALB | CKMB |
| bHCG | CRP | PCT | XT CREA | dHDL | XT TP | GLU | Cl- | Na+ | |
| 2 | | | | | | | | | |
| Ca | hsCRP | TBIL | XT TRIG | K+ | | hsTnI | TP | | |
| LDH | dLDL | TRIG | XT UREA | UREA | | XT CHOL | XT ALB | | |
| CK-MB | NBNP2 | | | | | | | | |

**Discussion**

Conventionally, Sigma metrics are calculated within a single laboratory using reagents and QC material stored and managed in the same way. In this study, the Sigma metric for Vitros assays were calculated using QC results collected from Vitros analyzers across different laboratories and countries. Although the systems were running the same QC material, unknown variation in material handling could not be eliminated in our analysis. It is also noted that this study included results from as many analyzers as were available in the E-Connectivity® database, for some assays numbering in the hundreds. At a minimum, there were 5 different analyzers assessed for every control fluid and assay. Thus, this study includes variability sources such as lab-to-lab, testing on different days, and multiple reagent lots. It is noted that assays that demonstrated high Sigma levels did so despite this variation.

In this analysis, 28 out of 35 of the assays assessed achieved 4 Sigma or better. Since the reported metric is taken as the median value across all Vitros analyzers in the study, it means that at least half of E-Connected analyzers achieved that level of quality in a real-world setting. Several assays that are key in managing critically ill patients achieved Sigma metrics of six or better such as Troponin, NTproBNP, Creatinine(both single and XT formats), C-Reactive Protein (both standard and high sensitivity), and PCT. Potassium nearly achieved Six Sigma performance with a Sigma level of 5.6. Another important assay, high sensitivity troponin, achieved a Sigma metric of4.6 which can be described as having between “Good” and “Excellent” performance.[10]

A key assay that appears to have low Sigma metrics is Sodium. Interestingly, it has lower Sigma metric results compared to Potassium despite comparable %CV and %Bias levels. However, the Tea limits are very different: the Tea is near 3% for Sodium while it’s over 7% for Potassium. An examination of available literature suggests that the relatively tight Tea values result in low Sigma metrics for Sodium assays from other manufacturers. When the same CLIA 2024 Tea limits are used to derive Sigma metrics for Abbott’s ICT Sodium assay, 11 Siemen’s Sodium assay,12 or a cross-method assessment of Bio-Rad Unity Inter laboratory Program data,13 Sigma metrics consistently measure less than 4 for Sodium. This consistency is seen across studies is despite differences in the type of reference method used, number of labs included in the studies and assay reagent manufacturer. These lower Sigma values suggest that laboratories would benefit from running more Levels of QC more frequently14 than Potassium, regardless of manufacturer. It was observed during the analysis that the selection of control fluid for each assay sometimes had a significant impact on the Sigma metric reported. For example, with high sensitivity troponin we report a Sigma level of 4.6 in this study based on a fluid with a peer mean of 9.8 ng/L. Had the analysis instead used a higher level control fluid with a peer mean of 5,998 ng/L, the reported Sigma metric could have been 8.14.However, it was determined that the performance of high sensitivity troponin at an often an assay does not have a single “Sigma level” for its performance. Rather, Sigma metrics can vary depending on the fluid selection plus factors such as Tea. This is an inherent limitation of the study and it is encouraged that the reader examine the Sigma metric results in the context of their patient population.

This study also suggests that further investigation is required to understand the reason behind lower performing assays such as CKMB micro slide. An initial assessment of the raw data indicates that imprecision as opposed to inaccuracy is the main driver of the sigma results for CKMB, but more study is needed. The utility of CKMB as a marker for Acute Myocardial Infarction (AMI) has been decreasing in recent years. The main reason for this is that there are newer and more specific biomarkers available such as Troponin, which have higher sensitivity and specificity for AMI diagnosis. It is also noted for CKMB that a patient is typically tested using serial blood draws with the intention of looking for trends over time. In this scenario, the serial CKMB results would most likely be measured across the same reagent lot and same laboratory. Thus, the %CV would be expected to be lower during patient management than what is reported in this study. However, we would still like to examine the results further and an important next step around that would be to examine results from proficiency testing to confirm the findings.

**Conclusions**

Quidel Ortho aims to provide easy-to-use and innovative systems and technologies to support clinical and operational needs.critical care assays are essential in providing healthcare providers with accurate and timely information that allows them to make informed decisions about patient treatment and management. In critical care settings, Sigma Metrics are an important tool for measuring the precision and accuracy of test results.

This study demonstrates that quality assay results are being achieved by Vitros labs across multiple countries in the Asia-Pacific region. High sigma scores are particularly important for assays like potassium, creatinine, urea, high sensitivity Troponin, NTproBNP, and Procalcitonin as these are used to diagnose and monitor critically ill patients.

# Advancing Women's Health Key Takeaways from AOGIN - 2022

*Samantha Yeoh*

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With face-to-face conferences and scientific symposiums back on, the Lab Insights team recently attended the 14th meeting of the Asia-Oceania Research Organisation in Genital Infection and Neoplasia (AOGIN 2022). Distinguished speakers from around the world gathered to talk about human papillomavirus (HPV) and the several cancers it can cause, the most notable among them being cervical cancer. Here are some highlights from the 3-day conference.

**Asia Pacific's vaccination and screening challenges**

To tackle cervical cancer, one of the most dominant cancers in young women worldwide, the World Health Organization (WHO) recommends a '90-70-90' approach that involves three key pillars: vaccination, screening and treatment. Yet coverage of vaccination or screening is lacking in many parts of the world, including much of the Asia Pacific region.

"With a vaccination programme rate that covers only 40%, Asia is lagging badly behind the Americas and Europe," noted Professor Suresh Kumar asamy, clinician and adjunct clinical professor at the Royal College of Surgeons in Ireland (UCD, Malaysia campus). This is especially severe as low vaccination coverage means approximately 345 million women are at risk. A lagging vaccine rollout and implementation was further hindered by the low supply of vaccines during the COVID-19 pandemic.

To address these challenges, speakers at AOGIN 2022 brought up recommendations that can be summarised into the following categories:

**More funding to improve vaccine and screening access**

- Increased public education and trust in health institutions to address vaccine hesitancy
- Gender-neutral vaccination approach and herd immunity
- School-based delivery of vaccines
- Destigmatisation of cervical cancer and HPV infection

AOGIN 2022 speakers also discussed how various countries in the Asia Pacific region have implemented policies in line with these recommendations, from vaccination leadership in Australia to screening policy in Malaysia.

**Vaccination leadership in Australia**

The first pillar of the WHO's 90-70-90 target is to ensure that 90% of girls are fully vaccinated against HPV by 15 years old. Vaccination programmes are critical because they help interrupt transmission risk, according to Dr Suzanne Garland, Director of the Women's Centre for Infectious Diseases in Australia.

Widely regarded as a pioneer in cervical cancer vaccination, Australia has had many successes in its elimination efforts. Since the introduction of a vaccination programme in 2007, very little high-risk HPV strains are circulating in the community, a fact that can be attributed to the very high vaccination coverage in girls.

In 2018, Australia moved to vaccinate all eligible children, with coverage rates reaching about 70% in adolescent males. "There is no one size fits all approach," said Dr Garland. "In our messaging, we must be sure not to stigmatise those with infection." Projection data provides further evidence of vaccine efficacy [1]. Dr Karen Canfell, Director at The Daffodil Centre in Australia, shared data showing that an estimated 4.9 – 6.0 million cases of cervical cancer can be averted with ramped up HPV 16/18 specific vaccination, and an even larger estimate of 6.7 – 7.7 million cases of cervical cancer with broad-spectrum vaccination.

When public trust in the efficacy and safety of vaccines is undermined, however, the impact is far-reaching. In 2013, safety concerns raised by the public and media reporting in Japan resulted in the ministry of health pausing HPV vaccine programmes. Dr Ryo Konno of the Department of Obstetrics and Gynaecology at Jichi Medical University said that surveys and research will soon reveal the ramifications of the 9-year suspension. Even if and when vaccination rates recover and escalate, there is a limit to what this can do for women (and men) who are vaccinated in their post-teen years [2].

**The critical importance of screening**

The second pillar of the WHO's 90-70-90 target is to ensure 70% of women would be screened with a high performance test by age 35 and again by 45. Screening has the ability to achieve the targeted 4 or less cases per 100,000 women much earlier [2]. Despite the advantages of high-performance approaches like the HPV DNA test, however, most experts would agree that screening with any test is better than none at all. There are a number of clinically validated assays that are approved for primary screening, which you can find here.

"We have a long way to reaching 70% coverage of screening with a high performance test," noted Dr Neerja Bhatla, Professor of Obstetrics & Gynaecology at the All India Institute of Medical Sciences in India. "Eventually, [implementing] screening programmes will be even more important than the test itself." Only 4 out of 10 ASEAN countries have launched a population-based screening, with most women screened opportunistically or not at all. This lack of access to screening can be due to many factors, ranging from the lack of financial resources to pay for a test to the low quality of testing infrastructure within a country.

Effective cervical cancer screening programmes are worth the investment as they can improve outcomes and reduce costs to health systems and women. The benefits can also extend to the broader economy, with an estimated USD $3.20 return for every dollar spent on intervention measures, and up to USD $26 when this support is extended to broader aspects of a woman's life [3].

To reap all the benefits from screening programmes, having good follow-up services is important. For Professor JautpolSrisomboon of Chiang Mai University, the practice in his region for follow-up is predominantly colposcopy due to the low cost. Yet this practice comes with its own set of challenges, such as 20-40% loss to follow-up, the emotional stress of waiting, and women incurring more expenses due to these multiple visits. Srisomboon said that introducing HPV DNA testing for primary screening in Thailand across all 77 provinces in 2023 would reduce the expected workload from colposcopies to an estimated 2% of all screened women.

Screening is especially important in some minority populations, such as those living with HIV. In APAC, there are about 6 million adults and children living with HIV, second only to the highly burdened regions of East and Southern Africa. With a compromised immune system, HIV-infected women are 6 times more likely to develop cervical cancer due to their inability to clear what should be a transient HPV infection [4].

Dr Annette H Sohn, paediatrician and Vice President and Director of TREAT Asia at amfAR, argued that women living with HIV should be screened earlier, and screened with HPV DNA tests more frequently. She highlighted that there is no one set of guidelines for the management of HPV in this population, and called for efforts to close the research gap.

**The power of self-sampling**

Many countries are also exploring self-sampling approaches to make it easier for more women to get tested. These approaches are beneficial in places where women's health issues are culturally sensitive and for women who may hesitate before visiting a doctor for sample collection. Being easily transportable, they are also beneficial for remote and low-resource settings where access to testing services is limited.

Professor Woo Yin Ling, Consultant Gynaecological Oncologist at the University of Malaya Medical Centre and Founder of Program ROSE (a community-based screening programme in Malaysia) spoke about the use of self-sampling as a possible for

conventional methods. Allaying concerns regarding the validity of the, she shared a list of papers (see below under additional resources) that show good concordance of results between self-sampled and healthcare worker collected ones.

While not yet part of any national guidelines, urine-based HPV tests are another approach to self-sampling that may have advantages in settings where vaginal swabs are not as readily accepted. Studies run in the past few years have shown good concordance between first void urine samples and vaginal swab samples, but current research is limited to small subject groups and most experts agree that more evidence is needed to evaluate this method [5].

**Additional Resources:**

Arbyn, M. et al. (2018) "Detecting cervical preconcert and reaching under screened women by using HPV testing on self-samples: Updated meta-analyses," BMJ [Preprint]. Available at: https://doi.org/10.1136/bmj.k4823.

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# Artificial intelligence and laboratory medicine: at the crossroads of value ethics and liability

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Laboratory medicine plays a pivotal role in healthcare and provides essential diagnostic information to guide clinical decision-making. Emerging technologies such as next-generation sequencing, liquid biopsies, and omics have transformed diagnostic testing on the way of a more personalized medicine. These technologies enable healthcare professionals to obtain more precise and accurate diagnostic information, which can lead to more targeted therapies. Artificial intelligence (AI) is also revolutionizing laboratory medicine with the potential to leverage value at different levels such as improving patient outcomes, clinical laboratories efficiencies and allocation of resources.

AI has the potential to transform laboratory medicine by enabling better decision-making, faster diagnosis, and more personalized treatment. AI can analyze and integrate vast amounts of data, identify patterns, and make predictions that can assist healthcare professionals in making accurate diagnoses. AI can also optimize laboratory workflows, reducing turnaround.

Time and improving patient outcomes. AI is also at the basis of a next generation of clinical decision support systems (CDSS) that can assist healthcare professionals in making clinical decisions. CDSS can integrate patient-specific data, imaging, and clinical guidelines to provide personalized treatment recommendations. However, CDSS must be carefully designed and evaluated to ensure that they are accurate and reliable and laboratory specialists are playing a fundamental role for that.

However, these advancements also raise ethical concerns and questions of liability. The use of emerging technologies and AI in laboratory medicine raises ethical concerns such as patient privacy, informed consent, and the potential for biases. AI algorithms must be transparent, explainable, and accountable to ensure that they are not perpetuating biases or making decisions that are not in the best interest of the patient. Patient privacy must also be protected when using AI, as patient data can be vulnerable to hacking and misuse.

Another important concern for the use of AI is liability. Who is responsible if an AI algorithm makes an incorrect diagnosis or recommendation? Is it the healthcare professional who uses the tool, the manufacturer of the tool, or the AI algorithm itself? Liability must be carefully considered and addressed to ensure that patients are protected, and healthcare professionals are not held responsible for errors that may be beyond their control.

Specialists in laboratory medicine are central players in the transition of emerging technologies as well as in the application of AI. They should be engaged, collectively and in multidisciplinary teams to achieve it. They must also carefully evaluate and implement these technologies to ensure that they are accurate, reliable, and ethical. It is crucial to strike a balance between the benefits and potential risks of using emerging technologies and AI in laboratory medicine to ensure the best possible outcomes for patients.

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# Comparative Analysis of COVID - 19 Image Processing With X-Ray And CT Scan

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ABSTRACT- the SARS-COV2 (COVID-19) virus continues to spread over the world in the form of various mutant strains that are responsible for epidemic conditions. As a result, the clinical prognosis cannot be relied upon. Chest x-rays, computed tomography, and ultrasound imaging models supplement the analytical methods (for example, RT-PCR) to a certain degree, despite the fact that different clinical diagnostic approaches have been developed and used up to this point. The purpose of this work is to carry out the diagnosis of COVID-19 individuals utilizing the image padding technique, as well as to develop a Deep Covix-Net model for the identification of COVID-19, Pneumonia, and healthy individuals utilizing X-ray and CT scan images. Both of these objectives will be accomplished through this work. Using ultrasound pictures, create a model called Ultra Covix-Net for early diagnosis of COVID-19, pneumonia, and healthy persons; then, using CT scan images, estimate the severity of the COVID-19 infection. In order to complete the categorization process, machine learning and deep learning strategies are used.

**KEYWORDS:** COVID-19, World Health Organization (WHO), Computed Tomography, SARS-CoV-2, diarrhea,

**General introduction**

AI and its applications are among the most explored research regions. Over recent years, we have seen AI upsetting a wide range of clinical imaging, including chest X-Ray, ultrasound.

CT, fMRI, PET, as well as SPECT. Different AI-situated devices have to modernize clinical picture assessment and further create robotized picture interpretation. Modern medical imaging methods allow doctors to access data from a wide range of different sorts of research, including artificial intelligence. Deep learning, fuzzy sets, rough sets, doubtful analysis, multi-target development, swarm knowledge improvement, and machine learning are only few of the many areas of study that often make use of these elements. Patients are surveyed according to clinical groups using the delayed findings of these commonly used tests as a data point. By taking use of AI models' capacity to understand patterns and connections in clinical images, this new experiment in computer intelligence-driven configurations enhances tools for individualized infection evaluation. To do this, clinical images are used as the training data.

**Prevalence of covid-19 disease**

In the latter half of 2019, the SARS-COV2 (COVID-19) outbreak began in Wuhan City in China, and it eventually became a pandemic over the whole world. The pandemic caused by the COVID-19 virus has spread to more than 220 countries and territories throughout the world and has had an effect on every aspect of our day-to-day life. The quantities of contaminated cases passing despite everything increment significantly, which does not indicate a very well controlled circumstance; as of the 22nd of January in the year 2022, a total aggregate of 34,64,64,304 (55,85,224) contaminated (deceased) COVID-19 cases were accounted for all over the world [1]. The World Health Organization (WHO) has classified this illness as a global epidemic and has recommended a number of preventative actions in response to the growing severity of the pandemic. In the 21st century, Human COVIDS like as SARS-CoV and MERS-CoV have emerged out of the animal supplies-induced global pandemic, bringing with them a distressingly high mortality rate as well as morbidity. Infections caused by the COVID-19 virus seen in humans are classified under the Corona vitrine subgroup, which is part of the larger Corona viridae group. It was given the name COVID-19 owing to the presence of spikes in the pattern on the outside surface of the infection when seen under an electron microscope. Its RNA is a lone abandoned molecule with a diameter ranging from 80 to 120 nm, and the length of the nucleic material reaches varies between 26 and 32 Nucleotides [2]. In its most basic form, they may be broken down into four different genera known as, whereas -Cove and -Cove are mostly responsible for infecting vertebrates, -Cove and -Cove are primarily responsible for infecting avian species. HCoV-229E, in addition to HCoV-NL63 of -Coves, as well as HCoV-HKU1 and HCoV-OC43 of -Coves, demonstrates modest pathogenicity as well as mild respiratory side effects as a normal virus. This makes them one of the six defenseless human illnesses.

Figure 1 exhibits the total number of reported cases. Figure 2 represents the daily number of deaths reported up to 22nd January, 2022.

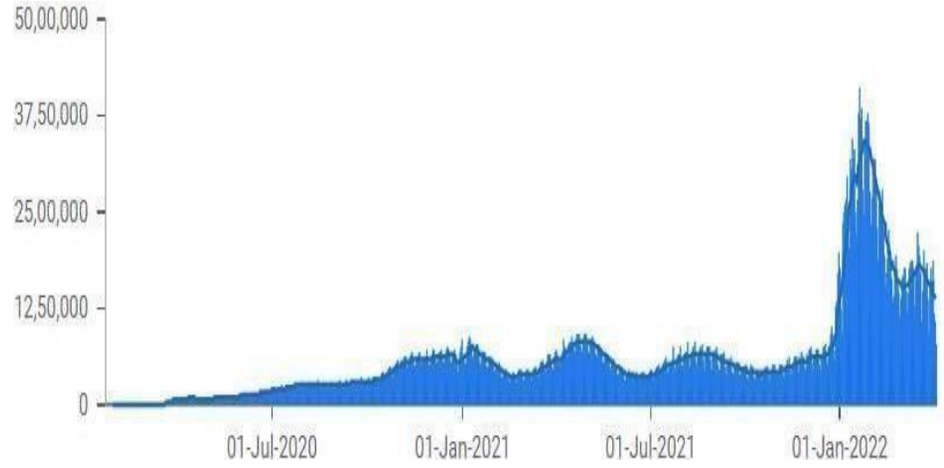



**Figure 1- Number of active cases up to 22nd January, 2022 [1]**

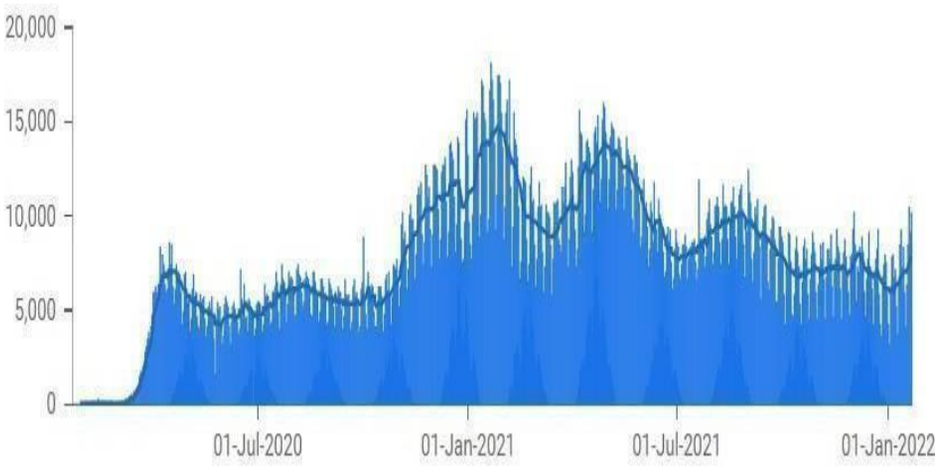



**Figure 2- Number of deceased cases up to 22nd January, 2022 [1]**

**Characteristics of COVID-19**

While the profoundly pathogenic infection predominantly influences individuals through respiratory droplets, disseminated via ecological contact [5, 6]. Unlike the various respiratory infections, other studies [7, 8] recommended that the SARS-CoV-2 communicated through the oral-fecal course. An ongoing investigation was done in ref. [9] on stool specimens of seventy-one individuals with COVID-19, 39 individuals +ve for fecal COVID-19 RNA, which supports the speculation that fecal-oral contamination could be an extra course for the extent of the infection. Generally, COVID- 19 manifestations are cough, fever, as well as fatigue [10-12].Various gastrointestinal indications showed in contaminated individuals like diarrhea, nausea, as well as deficiency of appetite [13, 14]. It is also important to note that the infection contamination could happen with no manifestation; asymptomatic people are a possible wellspring of infection transmission.

Consequently, stringent adherence to the climate, hand cleanliness, as well as contact segregation is needed to guarantee viral control. The ACE2 is the cell receptor for COVID-19 as well as various respiratory asperity condition viruses [15]. It acts a real job in the guideline of intestinal aggravation as well as the management of heart physiology. In any case, it has been accounted for that ACE2 is a cell-surface receptor for the infection, which works with the viral RNA section in the lung [16, 17].

**Aspects of medical imaging modalities in the prognosis of COVID-19**

The RT-PCR is usually employed being the determination of COVID-19. This biochemical response utilizes RNA rather than DNA as an initial step [8]. The reverse transcriptase chemical utilizes the RNA to generate a corresponding single-abandoned DNA in the reverse transcription measure. Then, at that point, the new integral single DNA is changed over into twofold abandoned DNA since it is utilized as a format for a PCR reaction [1, 2]. Even though numerous endeavors have been led to augment the number of PCR tests each day, this method experiences a few limits. The remarkable pace of false-negative recognized in individuals identifying COVID-19, the non-accessibility of PCR reagent kits, and the generally lengthy timespan interaction of this technique [2]. Various more precise procedures or practices are expected to help determine COVID-19 infected individuals in such a setting. In this circumstance, clinical imaging methods assume a significant part in separating patients chosen from a front-line medical emergency and in the portrayal of pulmonary inclusion of COVID-19. The role of clinical imaging in battling the epidemic of COVID-19 and achieved outcomes of each imaging approach are explained.

COVID-19 exists in the form of various mutants, making epidemic circumstances around the globe. Thus, the clinical prognosis is not precise. However, different medical predictive techniques are in practice, viz. CXR, Computed Tomography, a furthermore non-radiation technique like ultrasound diagnostic method to augment the analytical techniques (for example, RT-PCR) to a definite restraint.

**Chest X-Ray**

Description: A typical X-ray utilizes an immovable tube that transmits X-rays in a single direction.

Working Principle: An electromagnetic wave of immense energy as well as shortened wavelength, which can send over the body.

Wavelength range: 10-9 to 10-12 meters and Energy range: 124 eV to 124 Kev.

Usage: To detect dislocations and fractures of bones as well as to detect cancers and Pneumonia.

Given the large number of medical infectious of COVID-19, the Chest X-ray method is possibly a convenient tool for identifying the infection because its vacancy correlated to CT tools. In a few nations like Spain, X-ray is the primary imaging procedure utilized for the prognosis of COVID-19 infected individuals [2].

The significant characteristics noticed in X-ray image individuals with COVID -19 were GGO as shown in figure 3, pulmonary nodules as well as interstitial variations [3, 4]. The Ground Glass Opacities were described as hazy regions by expanded lung thickness without obscuration of bronchial designs as well as vessels [18, 19].

Likely the rise of infected cases, the adoption of X-rays could perform a significant aspect. It may inhibit CT analysis, especially in the nations with restricted availability of the RT-PCR method. Nonetheless, in extremely medically infected, an RT- PCR test / Computed Tomographic films should be carried out [20, 21].

Figure 3- A sample of COVID-19 infected Chest X-ray image shows peripheral opacities in all pulmonary lobes.

**Chest Computed Tomography**

Description: Computed Tomographic films are associated with abundant X-ray measurements, collected from various angles to yield cross-sectional pictures of a particular region of a scanned body

**Working Principle:** A mechanized X-ray source that explodes narrow beams of X-rays as it pivots around the individual.

**Usage:** Particularized images of abundant structures inside the body, containing the bones, internal organs, as well as blood vessels.

Under current medical involvement, Chest CT is contemplated as the best accurate tool for identifying COVID-19 disease [5]. Albeit various early prognosis tests of viral infectious like RT-PCR as well as biomarkers [6, 7]. The CT pictures give more signs of infection movement; furthermore, it is endorsed for asymptomatic individuals with -ve nucleic acid testing [8].

Indeed, affectability of chest Computed Tomography is better than RT-PCR in recognition of COVID-19 disease as exhibited in Fang et al. [9], as well as was illustrated in the analysis that enclosed 1014 individuals amidst +ve RT-PCR test that revealed an affectability of 97 percent of chest Computed Tomography in the identification of COVID-19 [3]. In general, CT identification is the crazy-paving pattern that resides in linear patterns overlapped on circumstances of Ground Glass Opacities [1, 2], as indicated as shown in figure 4. Various abnormal features were accomplished in CT pictures like pleural effusion, lung fibrosis, and airway transitions [3, 4].

Figure 4- A sample of COVID-19 infected CT scan image shows the crazy-paving pattern

**Chest Ultrasound**

**Description** A piezoelectric crystal vibrates when an electric signal is enforced creating high-recurrence sound waves.

**Working Principle** Transducer transmits sound waves inside the body, gathers the reverberations that are reflected, and transfers them to PC, which makes the pictures.

**Sound wave range** 2 to 18 MHz

**Usage** To detect the organs damage, tissues, and other structures inside the body.

Figure 5- A sample of COVID-19 infected Ultrasound image

Researchers concentrated on X-ray and CT results for COVID-19 diagnosis to the greatest extent possible. Ultrasound images and their potential inputs were used to do some analysis that helped diagnose the illness. Ultrasound artefacts from the pleural surface and the chest wall are important to analyse for diagnosing lung infections. As shown in figure 5, the B lines artefacts, in their varying manifestations, are characteristic of COVID-19 in LUS images [5]. This is particularly true for the situation of intermediate asperity. The focus on this artefact as a specific lung infection lineage is growing. Broad bands of tissue in the lungs emerge at the pleural line and move forward in a coordinated manner through lung sliding, as described in [6,25].

Additional indicators of COVID-19 in LUS images include pleural line abnormalities. The average range separates the horizontal lines below the pleural lines in normal lungs. These pleural lines seem broken, uneven, and thickened to the person living with COVID-19 [22, 23].

The LUS method may be useful in determining the presence or absence of an active infection, and it certainly has the advantage of being less expensive [24]. Chest ultrasounds have limited use in medicine, being limited to detecting abnormalities in the lungs' periphery [7].

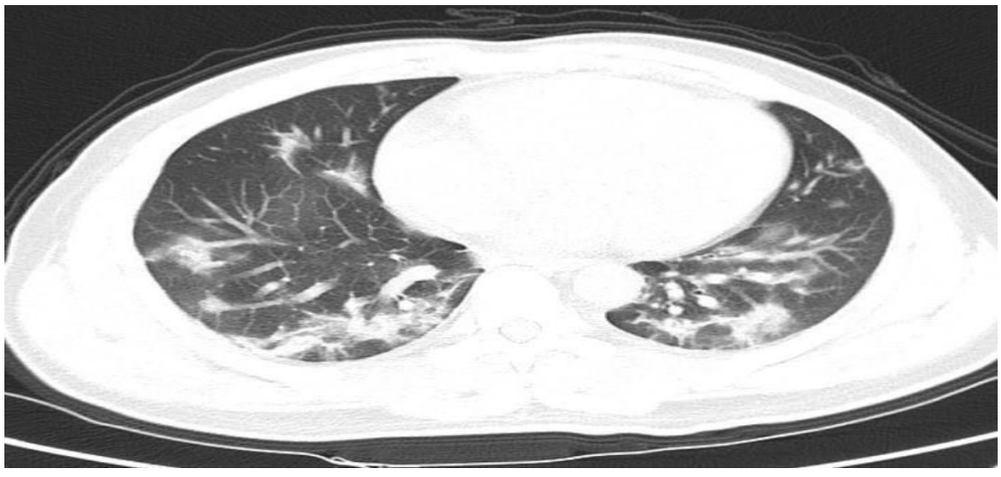
**Medical Imaging Positioned on AI on the Prognosis of COVID-19**

In the face of widespread worries over the COVID-19 pandemic, the majority of countries have adopted the policy of home isolation for infected persons who move through moderate or advanced phases of the disease. Nevertheless, using this strategy results in an extremely high mortality rate, which is proportional to the number of patients that are infected. The rapid worsening in patients' health brought on by COVID-19 at the emergency stage of the disease in the presence of very severe circumstances [8] may help to explain the rise in the mortality rate. In severe cases of respiratory failure, heart attack, or severe pneumonia, hospitalization is required as one of the next stages in the treatment process.

It is possible that clinical imaging technologies that include AI techniques will be vital in the future since they will provide patients with a quick and early diagnostic mechanism during times of severe illnesses. In addition, AI would be able to determine the major vulnerability instances that are associated with the quick progression of serious consequences for people who have COVID-19, which would make it possible to expand the treatment plan.

**Conclusion**

The findings that were presented and reported in the dissertation were the result analysis of radiological pictures to locate people who were infected with COVID-19. At the preliminary phase of the pandemic, simulation was carried out on a small number of the samples that were available in the repository. As time goes on, more photographs are added to the repositories as a result of the rising number of incidents that occur each day. An early detection of COVID-19 using Ultrasound pictures may



There by minimize the severity level and prevent the infection from spreading to other people. The approaches that were exhibited produced superior performance accuracy with big and balanced picture datasets in comparison to previous published studies. Neither overfitting nor under fitting will have any effect on the suggested models while they are being trained or tested. After receiving this first diagnosis, these processes could be of use to the doctors and radiologists in caring for COVID-19 infected patients.

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# Accreditation of Medical Laboratories as per ISO 15189 - New the 4th Version Changes from 2012 – 2022

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One and key of the priorities in laboratory medicine is improvement of quality management system for patient safety. Quality in the health care is tightly connected to the level of excellence of the health care provided in relation to the current level of knowledge and technical development.

Accreditation is an effective way to demonstrate competence of the laboratory, is a tool to recognize laboratories world-wide, is linked to periodical audits stimulating to keep and improve the quality, leads to high standard of services for clients (patients, health care providers, etc.). Accreditation is a procedure by which an authoritative body gives formal recognition that a body or person is competent to carry out specific tasks, it is an independent process and there is only one recognized national accreditation body in each country.

The history of quality systems in labs has started many decades ago. The first steps are implementation of internal (IQA) and external quality control (EQA) systems and their basic principles in daily laboratory practice.

An importance set of criteria was done in EN 45 001 (European Standard), specifying general criteria for the operation of a testing laboratory. Next step for accreditation was documented in ISO 17025 (General Requirements for the Competence of Testing and Calibration Laboratories). This standard is widely used for testing laboratories in whole world in industry and also in medicine. This standard requires a management system and how the laboratory be found competent to perform specific tests/calibrations or types of tests/calibration.

The strategic plans of IFCC and EFLM include focusing on accreditation of labs based on ISO standards and cooperation with regional accreditation bodies and national accreditation bodies. IFCC and EFLM recognised that ISO 15189 Medical laboratories – Requirements for quality and competence is precisely describing standard for labs and has been widely accepted. The first issue of standard was in 2003, 2007 next 2012 and in December 2022 was issued the last the 4th version.

**Main principles for the revision of ISO 15189 and new ISO 15189:2022 version**

- **ISO/IEC 17025 is the normative reference to ISO 15189** and the 2017 revision of ISO/IEC 17025 informs the revision of ISO 15189 (restructured according ISO 17025); therefore, the common structure of ISO CASCO standards (ISO CASCOPROC 33) has been implemented in the new draft of ISO 15189. Mandatory language coming from PROC 33 was integrated into the document and will continue to be highlighted throughout the relevant parts of the document.
- **The revised ISO 15189 will consider other relevant published ISO documents** with the aim of avoiding redundant repetitions, as well as synchronizing relevant clauses in the following: ISO 15190, ISO 22367, ISO TS 20658, ISO 17511, ISO TS 20914, and the suite of molecular diagnostic standards developed by ISO TC 212 WG 4.
- **The revised ISO 15189 should be less prescriptive** risk based and linked to patient care.
- **The revised ISO 15189 will include relevant aspects of POCT** performed under the control of the laboratory.

**Main changes in ISO 15189: 2022**

- New part of ISO/IEC includes part - impartiality **(**Laboratory activities shall be undertaken impartially and structured and managed so as to safeguard impartiality) Confidentiality **(**The laboratory shall be responsible, through legally enforceable commitments, for the management of all patient information obtained or created during the performance of laboratory activities) and ethical conduct.
- More ethical issues – timely satisfaction of the needs of patients and medical staff
- Complexity of services from preparation of patient to interpretation of results
- Better communication between labs and other health care providres – harmonization of processes
- Management system – in accordance with the principles of ISO 9001:2015. The laboratory shall establish, document, implement and maintain a management system. The laboratory shall implement a management system in accordance with Option A or Option B.

- Emphasis on risk management (aligned with the principles of ISO 22367 Medical laboratories – Application of risk management to medical laboratories) and evaluation of effectiveness of processes
- The requirements for laboratory safety are aligned with the principles of ISO 15190 Medical laboratories – Requirements for Safety.

Implementation of POCT requirements – additional requirements for Point of Care Testing (POCT) – Annex C (normative)

We cannot forget that the most critical parameter for improving the quality of labs is educational activities inside and outside the labs, which are the key points in accreditation and quality management systems.

Accreditation is mandatory in some countries or will be mandatory in the future (e.g. France, Hungary, Lithuania) or some specific parameters should be accredited (e.g. Germany, Belgium, Czech Republic, Serbia, Greece – molecular biology, new born screening, blood transfusion, etc.) or accredited labs have better reimbursement or contract with health insurance companies (e.g. Sweden, Belgium, Czech Republic).

The accreditation of labs improves laboratory medicine and all processes in laboratories, which include – reduction of errors in the pre-analytical, analytical and post analytical processes, facilitation of accurate and rapid diagnostics, participation in acceleration and efficiency of treatment, facilitation of personalised medicine development, and stimulates continuous improvement.

Accreditation is more an instrument than the aim that increases the quality of services for clients – patients, physicians. Accreditation is not about who the best is, but who has a system of standard procedures. Improvement of quality system in labs is ambitious and never ending story. Don't forget that quality system is about people, with people and for people.

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# ACBICON, Assessing AI Technologies and Ethics in Healthcare Services – 2022

**Bernard GOUGET, Chair IFCC-CMHBLM, IFCC Abbott VLP**

**With the participation at the preconference workshop of IFCC ETD EC and IFCC C MHBLM:**

**Pradeep Kumar DABLA**, Department of Biochemistry, G.B.Pant Institute of Postgraduate Medical Education & Research (GIPMER), Member IFCC C-MHBLM

**Damien GRUSON**, IFCC- ETD member, IFCC-C MHBLM liaison

**Sergio BERNARDINI**, Chair IFCC ETD

On the occasion of the 48th annual conference ACBICON 2022 (New Delhi, Nov 24-26th 2022) organized by the Association of Clinical Biochemists of India, the topic Artificial Intelligence and its ethical challenges in Lab Medicine was the subject of several presentations. As disruptive technology advances, that interact more directly with the digital sphere, the healthcare and lab medicine sectors are transforming themselves on a daily basis, characterized by better clinical diagnosis. Across the healthcare sector, technological and product advances are supporting patient diagnosis and care. Lab Medicine is affected significantly by 4.0 technologies, which include machine learning and artificial intelligence, Internet of Things and automation, data mining as well as multiomics and POCT devices improving healthy lifestyle. The integration of these new technologies is perhaps one of the most essential developments in the Indian context.

A preconference workshop dedicated to: "Assessing AI technologies in healthcare services "was organized by Prof Pradeep Dabla and IFCCC-MHBLM on November 23th at the Delhi Govind Ballah Pant Institute of Post Graduate Medical Education and Research (GIPMER). In his opening speech, he recalled that the primary duty of the specialist in Lab Medicine is to the patient, placing the welfare of the patient above their own needs and desires and ensuring that each one receives the highest quality of care according to current standards of medical practice. Laboratory medicine has always been one of the medical disciplines with the highest degree of digitalization. Since its emergence, automation, electronic transmission of results, and electronic Reporting have becoming increasingly prevalent. High quality lab medicine services must be safe, effective, efficient, timely, equitable, and patient-centered. Specific knowledge of AI in the lab medical community is still poor and AI education is much needed. This was the challenge of the workshop. Education on the value of AI and research to prove its clinical utility are needed to integrate AI into laboratory medicine.

AI in healthcare is the use of complex algorithms and software to mimic human cognition in the analysis of complex medical data. AI algorithms can only work properly with reliable and accurate laboratory data. As laboratory medicine enters into the era of big data and artificial intelligence (AI), the ability to provide accurate, readily available and contextualized data is crucial. AI has the potential to improve diagnostics through more accurate pathology detection, better laboratory workflows, better decision support, leading to greater efficiency. Prof. Sergio Bernard in précised that AI employs quite different mathematical and algorithmic approaches, from operational research to constrained programming, and is therefore at the crossroads of neuro-computing, statistical inference, pattern recognition, data mining, knowledge discovery, and machine learning (ML). As a subfield of AI, ML is built upon statistical and optimization concepts. It can be described as the development of computer programs that learn from experience with respect to task and performance measures. AI and data science have demonstrated success in image analysis in radiology, pathology, and genomics analysis for accelerating diagnosis speed; improving accuracy and enhancing medical expertise. Considering the growing quantity and diversity of data to which healthcare professionals are exposed as biological data, genomics, proteomics, clinical observations, and personal records, Data science with AI will no doubt prove useful for holistic interpretation of the wealth of information in lab Medicine. Prof. Damien Gruson, attending on line, explained that modern medicine generates a great deal of data stored in medical databases. Data mining, also known as knowledge discovery in databases, refers to the process of extracting potentially useful information and knowledge hidden in a large amount of incomplete, redundancy fuzzy, and random practical application data, and closely related to time and, medical data mining differs. Analyzing the quantitative and qualitative clinical data in addition to discovering relationships among a massive number of samples using data mining techniques can unveil hidden medical information in terms of correlation and association of apparently independent variables and discover new relationships among substantial data sets. Data mining is a multidisciplinary field at the intersection of database technology, statistics, ML, and pattern recognition that profits from all these disciplines. Although this approach is not yet widespread in the field of medical research, several studies have demonstrated the promise of data mining in building disease-prediction models, assessing patient risk, and helping physicians make clinical decisions.

At the end of the morning session, Dr. Manu Shetty, MAMC, Delhi (IN), described a comprehensive life cycle for the design, development, and deployment of artificial intelligence (AI) systems and solutions. The preliminary risk assessment will contribute toward an informed practice of AI, as well as the increased awareness, knowledge, and transparency of AI and its capabilities. After a convivial lunch shared with the students, the IT and computer team presented a practical guide and exercises to getting the most out of Excel, using it for data preparation, applying machine learning models, including cloud services and understanding the outcome of the data analysis. The second afternoon session started With Dr. Pierre-Jean Lamy, Montpellier (FR).

He recalled the origins of the concept of Artificial Intelligence. After the first developments initiated by the mathematician Alan Turing, modern AI was founded in 1956, at a conference at Dartmouth College, (New Hampshire, USA), where the term "artificial intelligence" was coined. Based on cybernetics and computer science, AI benefited from important research funds until 1974. After several reports criticizing progress in AI, government funding and interest in the field dropped off – a period from 1974–80 that became known as the “AI winter”. At this time, two AI began to compete: the symbolic AI and the connectionist AI. Symbolic AI is also known as expert systems is widely used in laboratory medicine. As connectionist AI tend to mimic more precisely human intelligence using neural network, its use to resolve complex problems has grown significantly since the 2000s. Machine learning and deep learning, which are a part of AI were developed for image recognition and exploration of Big Data. As laboratory medicine continues to undergo digitalization and automation, laboratorians will likely be confronted with the challenges associated with AI. Currently, the most common roles for AI in medical settings are clinical decision support and imaging analysis. Digital pathology, cytology and cytogenetics in hematology, genetics (NGS diagnostics), and automated validation of clinical laboratory test results are some of the fields of laboratory medicine already has been impacted by AI development. The biggest challenge for AI in medicine is working on quality data with the best possible curation. It has a significant cost. Using AI in genomics is difficult to navigate, not only for the great variety and large amount of available data, not just to understand what question to ask and which equipment to use, but also because this field is highly sensitive to legal, ethical and moral aspects. AI opens up many possibilities and the road that follows the development of AI is just beginning to unfold and bringing many promises. AI is just at the beginning of its potential applications in genomics, the path is still long but irreversible. AI presents an opportunity to improve the efficiency of lab medicine, health care delivery and the quality of patient care, but there is much work to do for using AI safely and ethically. AI in medicine has also its own challenges. Four major ethical issues must be addressed: informed consent to use data, safety and transparency, algorithmic fairness and biases, and data privacy are all key factors to consider. AI triggers major ethical concerns and questions regarding the ability to disseminate their benefits in an equitable manner. During the preconference, Bernard Gouget first defined Ethics as the science of morale concerning principle of human duty in the society. It is the social value which binds the society by uniform opinion/consideration and enables the society to decide what is wrong and what is right. Ethics is engaging multiple disciplines, including philosophy, law, political science, and education. Ethics is not static, applicable for all times. What was considered good ethics a hundred years ago may not be considered the same today The disruptive technologies confront us with many ethical questions: new genetic knowledge, AI, Big Data, precision medicine organ transplantation, new definition of death, sophisticated means of keeping people alive, anxiety about the costs of health care, and a more informed and educated public. These matters are moving well beyond the boundaries of medical ethics. The term bioethics generally refers to the study of ethical issues arising because of the development made in the field of medicine.

Biology, and technology, which might become a cause of concern for humans or detrimentally affects the association between human and their environment. Gouget recalled the Core Principles of Bioethics: - Beneficence: duty to help the patient advance their own good and to act in a patient's *best interest*-Autonomy: duty to honor a patients right to make their own decision and to be self-determining-No maleficence: duty to do no harm to the patient-*Justice:* duty to be fair in how care is provided and in how resources are allocated. No single principle trumps the others; their relationship is dynamic and requires clinicians to carefully evaluate each situation on its own merits and patient needs.

As with any transformative technology, some AI applications may raise new ethical and legal questions, for example related to liability or potentially biased decision-making. AI must be developed and applied in an appropriate framework which promotes innovation and respects the human values and fundamental rights as well as ethical principles such as accountability, transparency an equitable healthcare delivery. The EU guidelines address issues such as the future of work, Informed consent to use data; fairness, safety, security, social inclusion and algorithmic biases and transparency, data protection and privacy, cybersecurity, and Intellectual property law. The insertion of an algorithm's predictions into the patient-physician relationship introduces a third party, turning it into one between the patient and the healthcare system. It changes the dynamics of responsibility and the expectation of confidentiality. Later on during the congress, Prof. Jawahar Kalra (CN) shared his experience with the Delphi technique, a well stablished international protocol used to find consensus among experts and solutions to complex multidisciplinary challenges, that has identified key ethical issues pertaining and presented the SHERPA (Systemic Human Error Reduction and Prediction Approach) a consortium of eleven partners from six countries that analysed how AI impacts ethics and human rights. Dr. R Dhananjayan, Chennai (IN), discussed on the several eras in Lab Medicine practice where the implementation of ethical guidelines presents challenges. They included: Consent from patients (i.e. consent for unforeseen complications, usage of leftover samples and bio-banking)- Considerations in genetic testing-Reporting implications in incidental findings-errors disclosure-Role of laboratories in test utilization-Direct to consumer testing - Emerging diseases settings. IFCC-TF for Ethics, AACC, ISO have defined ethical recommendations for medical labs. The IFCC TF-E has streamlined documents available worldwide (https//www.ifcc.org/taskforceethics/). ISO 15189:2012Its section 4.1.1.3 elaborated the ethical conduct required in laboratories. Its section 4.1.1.3 elaborated the ethical conduct expected in laboratories including topics like confidentiality, conflict of interest, undue pressures and influences and requirements.

Today, artificial intelligence plays a role in billions of people's lives. Sometimes unnoticed but often with profound consequences, it transforms our societies and challenges what it means to be human. AI has the real potential to provide real social, Economic and environmental benefits making direct improvements to people 'everyday lives. We only can agree with the WHO's guidance of June 28th 2021 : "While new technologies using artificial intelligence hold great promise to improve diagnosis, treatment, health research and drug development supporting governments carrying out public health functions, including surveillance and outbreak response, such technologies must put ethics and human rights at the heart of its design, deployment

and use. “Congratulation to Prof. Pradeep K Dabla for the organization of the preconference at the GIPMER and for its participation at the ACBICON 2022. Training medical students in AI and Ethics have to be acknowledged as an important need. It was possible to familiarize students with the development of AI and Ethics in Lab medicine and to provide students with competencies in the use of IT tools, AI theories and ethics principles as well as to familiarize students with disruptive technologies.

**Photo: AT the GIPMER, GB Pant Hospital, and New Delhi L to R: Sergio Bernardini Bhawna Mahajan, Pradeep K Dabla, and Bernard Gouge**


**Photo: IFCC MHBLM Workshop Participants & Speakers at the GIPMER GB Pant Hospital, New Delhi**

**IFCC MHBLM Workshop Participants & Speakers at the GIPMER GB Pant Hospital, New Delhi**

**IFCC Speakers AT the ACBICON 2022, New Delhi**

# The Learning Lab for Laboratory Medicine: 10,000 Strong!

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The Learning Lab for Laboratory Medicine on NEJM Knowledge+ program recently hit a major milestone! Over 10,000 individuals from 149 countries are currently using this program; 80% of users are from outside the United States. This cloud-based program consists of >115advancedcourses and >80 courses for practicing Medical Laboratory Specialists, covering topics that span across all disciplines of laboratory medicine(https://area9lyceum.com/laboratorymedicine/). The entire program is free of charge for individual users to eliminate financial barriers and is endorsed and promoted by IFCC.

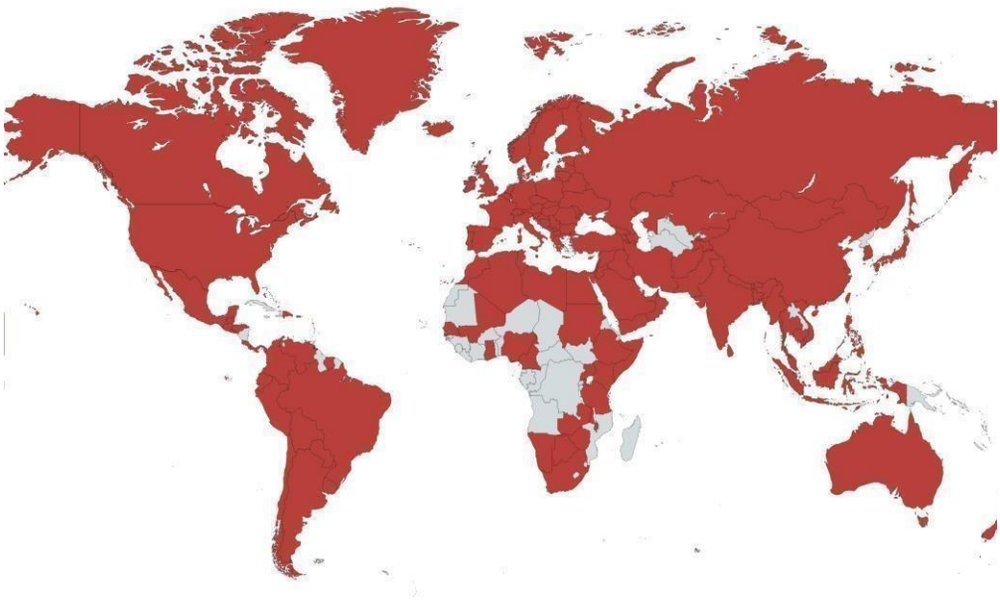

**Photo: Users of the Learning Lab**

The courses are based on the concept of adaptive learning, the closest to personalized education. Adaptive learning is an ingenious way to communicate information. Through sophisticated computer algorithms, the platform interacts with the learner and identifies the areas in which they are not proficient. It then provides targeted learning materials to remedy the deficiency, thus enabling efficient learning in small blocks of time. The program can be accessed via mobile devices for added flexibility.

Over 130 leading clinical laboratory scientists and physicians from the United States, United Kingdom, Canada, Australia, Iceland, Denmark, Norway, Croatia, Italy, South Africa, Hong Kong, Turkey, and Singapore have built these courses. Each course consists of ~100 granular learning objectives; every learning objective is coupled with one to two probes and a learning resource. The probes are the actual questions and can be presented in one of nine different formats that meant to be engaging and interesting to the learner. Each course goes through a rigorous internal and external Review process followed by a beta testing evaluation. Over 300 laboratory medicine professionals have participated in reviewing and performing the beta testing evaluation of these courses.

This program has been designed for laboratory medicine professionals in hospital and commercial laboratories as well as the *in vitro* diagnostics industry to help them to assess their knowledge, remain abreast with current knowledge, and prepare for certification exams.

Currently, this program is only available in English. However, efforts are underway to have the entire program translated to Chinese, both simplified and traditional, Japanese, French, Arabic, and Bahasa Indonesia. The Chinese and French websites will be launched in mid-2023; the other languages will follow shortly. Discussions are currently underway to also include Spanish and Portuguese versions. As daunting as these efforts are, they are essential to increase accessibility of this program throughout the world and to enable those who are not comfortable with English to benefit from it.

This ambitious program is a collaborative effort between New England Journal of Medicine Group, AACC, and Area9 Lyceum, a global leader in education technology. IFCC YS and all other laboratory medicine professionals worldwide are strongly encouraged to take advantage of this opportunity and join the over 10,000 users of this program.

# Newborn screening innovation ramps up at Murdoch Children's in Australia

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As interest and investment in newborn bloodspot screening (NBS) grows across Australia, the Murdoch Children's Research Institute in Melbourne is gaining momentum as an important centre for NBS research and innovation in the country.

Based at the Royal Children's Hospital in Melbourne, the capital of the State of Victoria in south-eastern Australia, Murdoch Children's is one of the largest child health research institutes in the world. It manages a portfolio of research programmes that generate knowledge and drive benefits for children in Australia and around the world. It also hosts some clinical services, including Victoria's NBS programme.

While Murdoch Children's is known for much more than NBS and clinical genetics, its impact in this specific space is noteworthy and growing. From expansion of its existing NBS panels to developing novel approaches for detecting rare genetic diseases in newborns, Murdoch Children's is running projects that showcase both the power of NBS as a public health tool and its potential for delivering even more benefits in the coming years.

**Expanding existing NBS panels**

Murdoch Children's provides NBS services through Victorian Clinical Genetics Services (VCGS), a non-profit subsidiary that offers prenatal, childhood and adult genetics services. All NBS services at VCGS are publicly funded by the Victorian Department of Health and offered free of charge to state residents.

In its standard NBS panel, VCGS currently screens for 26 conditions. Last year, it added congenital adrenal hyperplasia, and in keeping with federal efforts to expand and standard dies NBS panels across the states, it is now in the process of adding NBS tests for spinal muscular atrophy (SMA) and severe combined immunodeficiency disorder (SCID), two tests that were recently made available in the neighboring state of New South Wales.

Expanding the panels by even one condition requires considerable effort, notes Dr. Ronda Greaves, Deputy Head of Biochemical Genetics at VCGS. The SMA/SCID tests will require them to use molecular methods in first-tier analysis for the first time, but Greaves says that implementing the technology is the easy part. The harder part is training the staff to adapt to changing workflows without compromising the integrity of the existing NBS programme.

**Educating and engaging the community in research**

In addition to managing NBS services, Murdoch Children's also supports community outreach efforts that ensure high uptake of NBS services and help maintain public trust. These efforts have increased in recent years, according to Monica Ferrie, head of the Genetic Support Network Victoria, an organisation that works with rare disease patient groups and families across the state.

Proactive community engagement also drives support for NBS research programmes. Dr Meg Wall, CEO of VCGS, estimates that roughly 85-90% of parents who receive NBS services will consent to sharing DE identified newborn blood spot data with Murdoch Children's investigators.

Some of this NBS data is also linked with the Generation Victoria (Gen V) initiative, a $55 million whole-of-state natural history study that aims to enroll 100,000 newborns by late 2023 [1]. Through Gen V, parents of newborns will share longitudinal data about various health, social and developmental parameters. This will facilitate many types of research, including better understanding of the clinical utility and economic impacts of NBS programmes.

**Developing and testing novel NBS methods**

Murdoch Children's also supports researchers who focus on creating and assessing new NBS modalities. One of these researchers is Dr David Godler, a molecular geneticist who leads the Diagnostics and Development Laboratory at Murdoch Children's. Godler is currently developing a low-cost diagnostic method called **EpiGNs**, which uses a combination of DNA methylation testing and genomic workflows to expand NBS panels.

In prior studies, EpiGNs showed promise as a cost-effective method for expanding NBS panels to cover numerous conditions, including Fragile X, Prader-Willi, Angelman and Dup15q syndromes [2]. In 2022, Godler won a $3 million grant from the Medical Research Future Fund (MRFF) [3] and an additional $1.8 million from the National Health and Medical Research Council Ideas Grants to develop this work further [4].

For next steps, Godler intends to use these two grants to test his EpiGNs method on an expanded panel that includes 8 conditions, generating further data on its potential cost effectiveness and clinical utility. Some of this research will leverage the GenVprogramme, allowing Godler to assess the impact of early detection of genetic disease on longer-term clinical and health economic outcomes.

**Assessing the power of Whole Genome Sequencing (WGS)**

Another MRFF-funded researcher at Murdoch Children's is Dr. SebLunke, who serves as Head of the Division of Genetics and Genomics at VCGS, where he runs one of the largest clinical genetics labs in Australia. Last year, Lunke won an AUD $3 million grant from MRFF to assess the role of whole genome sequencing (WGS) for NBS.

In the first phase of this project, which will be called **Baby Screen+**, Lunke will trial a WGS model of NBS on a thousand babies in Victoria. Although WGS enables screening for potentially thousands of conditions, Lunke will start with a panel of several hundred conditions that are well validated, clinically actionable and meet predetermined bioethical criteria. The ultimate goal is to better understand how to use WGS data responsibly at birth and over the life of care.

Lunke and colleagues are careful to point out that WGS is not a silver bullet for genetic disease detection and is unlikely to replace traditional NBS methods anytime soon. In fact, running both methods in parallel may eventually allow NBS labs to detect a broader array of conditions with greater accuracy, notes Dr. David Amor, a clinical geneticist and research group leader at Murdoch Children's who serves as a co-investigator on both the EpiGNs and WGS grants.

**Building the broader ecosystem of rare disease diagnostics**

Beyond NBS, Murdoch Children's and VCGS are working to drive improvement in the broader array of rare disease diagnostics that facilitate early and rapid detection of genetic diseases. This includes work in carrier screening, non-invasive prenatal testing, and acute care genomics (they are among the fastest providers of whole genome sequencing services in Asia Pacific).

Advances in these areas may shape the future of NBS, and as Australia continues to drive research and innovation in this exciting field, Murdoch Children's and VCGS will be places to watch.

This article was written by Will Greene, Healthcare Engagement Manager at Roche Diagnostics Asia Pacific and co-lead of Project Strong bow, an initiative to drive best practices in NBS through educational content and community building. Other articles and videos that were produced as part of this project can be found on our Newborn Screening page.

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# In a Taiwan Clinical Lab, Molecular Consolidation offers Key Benefits

**By Dr. Fang-Yeh Chu**

***Director, Department of Clinical Pathology and QMC, Far Eastern Memorial Hospital, Taiwan***

Molecular consolidation is a significant improvement over the long tradition of buying a specific platform for each test offered by a clinical lab. These single-test technologies had to be implemented and validated individually, and each one required its own training and calibration protocols. In many cases, each platform also required a substantial financial outlay. For labs looking to provide more than just a few types of tests, having test-specific instruments was a major limiting factor in their ability to respond to patients' needs.

Today, though, diagnostic platform manufacturers are addressing these challenges by designing systems that can be operated with many different assays. These flexible platforms might operate at low, medium, or high throughput, allowing laboratories to choose the system that best fits their testing needs. Instrument manufacturers offer many types of assays that can be run on the platform, making it easy for labs to expand their test menus simply by ordering new kits. Some platforms can even be used as the foundation for laboratory-developed tests, greatly increasing their flexibility and value to clinical labs.

At Far East Memorial Hospital in Taiwan, Dr Fang-Yeh Chu leads a team that recently implemented a diagnostic platform that enables them to run a broad range of tests. Their evaluation of the molecular consolidation approach has been very successful and was particularly important for meeting increased testing demand in the COVID-19 pandemic.

According to Dr Chu, molecular consolidation offered his team a number of key benefits.

**Broad test menu** implementing a flexible, high-throughput molecular diagnostic platform allowed the clinical lab to run many different types of tests at scale with excellent precision. They use it for virology assays, including HIV, HBV, HCV; transplant assays, including CMV, EBV and BKV; and respiratory assays, including influenza and SARS-CoV-2. They are now working to add HPV and MTB/MAI testing to their offerings.

**Lean lab** While COVID-19 testing temporarily doubled the clinical lab's staff size, the team is normally composed of just five lab members. Consolidating more tests onto a single automated platform that requires minimal hands-on time makes it possible for even a very small team to handle a wide array of testing needs.

**Standardisation** Since all tests are designed to operate on the same instrument, training time for new tests is minimal. Once the team members learn the system, anyone can run any of the tests provided for it, making it easy to achieve higher precision. Dr Chu believes this is one of the most important benefits of molecular consolidation, and notes that training for the system in his lab was very easy. "My colleagues can use the device very quickly," he says. He added that setup was very quick too, with the new assays up and running in the lab in less than a week.

**LIS Simplicity** Typically adding a new test to a clinical lab involves not just validating the new technology, but also dealing with the inevitable challenge of connecting the new platform to the lab information system (LIS). But when new tests can be added to an existing platform.

There is no need for additional LIS connections. Dr Chu says the system he chose connected to his LIS very easily. Now, new tests can be added at any time without requiring additional LIS setup.

**Reliable support** with any new test platform, clinical lab teams take a gamble on the quality of technical support they will receive from the vendor. Some manufacturers have terrific support resources, while others can leave their customers hanging. By consolidating tests on a single system from a reliable vendor, clinical labs can avoid the possibility of inadequate support. "We always select the device based on the performance not only of the device, but also of the support team," Dr Chu says, noting that his team has been able to get answers immediately for the system they adopted.

As Dr Chu's experience shows, molecular consolidation offers many benefits. It allows clinical labs to broaden their test menu with ready-to-use reagents while streamlining their workflows, simplifying LIS connectivity and minimising training demands, all while maintaining excellent performance and without necessarily requiring new headcount.

Through partnership with instrument manufacturers that offer high-quality systems and fast and reliable support, consolidated molecular systems give clinical labs the power to scale up or down based on rapidly shifting demands, such as those brought about by current and future pandemics.

# Quiz Section!!

**Question 1: (Case 1)**

Patient: 63-year-old Male

Clinical information: Myeloma?

Episode: Since abnormal serum Haptoglobin data was obtained (1st test, Table 1), a biomedical laboratory scientist checked the time course of the reaction as shown in Figure 1. After diluting the serum with saline, serum Haptoglobin level in the diluted serum was measured (2nd test).

Table1 Data from auto analyzer (1st and 2nd)

| Analyte | Result (1st test) | Result (2nd test) |
|---|---|---|
| Haptoglobin | <10 mg/dL | 32 mg/dL |
| Total protein | 9.0 g/dL | |
| Albumin | 3.3 g/dL | |
| IgG | 513 mg/dL | |
| IgA | 45 mg/dL | |
| IgM | 4,021 mg/dL | |

Haptoglobin, IgG, IgA, and IgM levels were measured byimmunoturbidimetric assay: Reagent 1 and Reagent 2 mainly include reaction buffer and their corresponding antibodies, respectively.

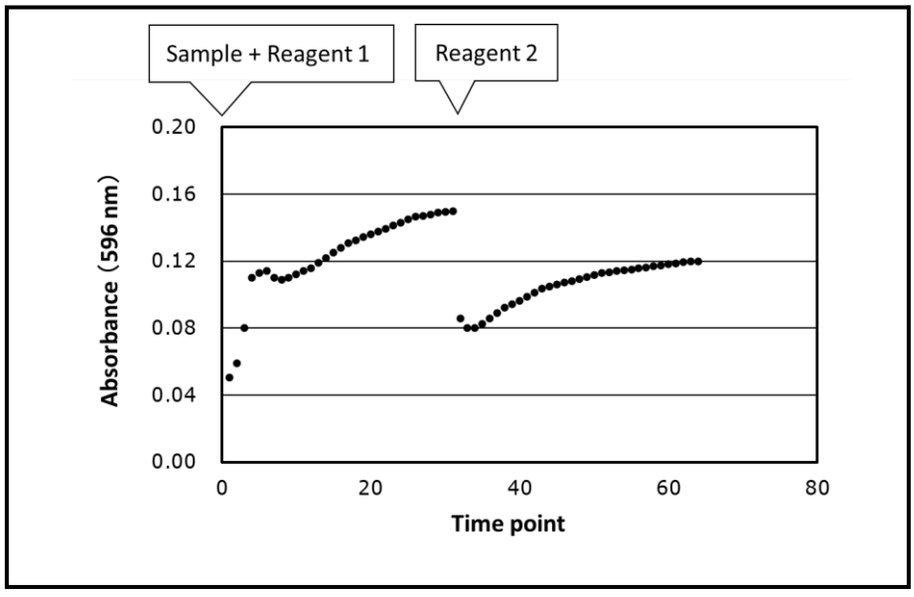


**Figure 1: Reaction time course of haptoglobin (1st test)**

Which of the following is the most likely cause of the abnormal data?

a) Sampling error
b) Reagent dispensing error
c) Turbidity of reaction solution
d) Deterioration of halogen lamp
e) Air bubbles on the reaction vessels

**Question 2: (Case 2)**

Patient: 58-year-old Male
Location: Ward
Clinical information: Myeloma
Analyte (Serum for clinical chemistry tests, whole blood (EDTA-2K) for CBC)
Episode: After whole blood obtained from the patient was centrifuged to isolate serum sample, the appearance of the test tube was as shown in the Figure 2. The volume of the serum sample was not enough to perform all analyses. Blood test results on the day before are presented in Table 2.

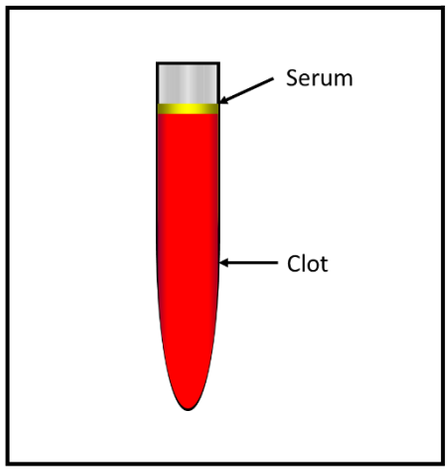


**Figure 2 Appearance of the centrifuged test tube**

Table 2 Clinical chemistry and CBC test results on the day before

| Analyte | Result |
|---|---|
| Total protein | 11.3 g/dL |
| Albumin | 3.1 g/dL |
| IgG | 7,200 mg/dL |
| IgA | 112 mg/dL |
| IgM | 34 mg/dL |
| RBC counts | 320 $\times 10^4$ cells/μL |
| hematocrit | 30.2 % |
| hemoglobin | 10.3 g/dL |

Which of the following is the most likely action that laboratory scientist should do?

a) Measure only some analytes, and no additional action
b) Try re-centrifugation of the test tube to further the isolate serum
c) Request the additional blood sample collection using serum test tube
d) Request the additional blood sample collection using heparin-lithium test tube
e) After diluting the serum sample to get enough volume, use the diluted sample for measurement.

**Contributed by:**

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# Answer Section!!

Answer for question 1: (c)

You sometimes encounter a negative value output from an auto analyzer. In case of that, just re-test or re-test using the diluted sample can be helpful to obtain the true value. However, since it might be caused from a technical hitch of the auto analyzer, exhaustive investigation is essential to avoid or solve the problem. One of the effective way for the investigation is having a look at the reaction time course. Generally, for immunoturbidimetric assay using two types of reagents, Reagent 1 is used for buffering and measuring sample blank, and Regent 2 is added for actual immune reaction. Hence, the absorbance is not supposed to change after mixing sample and Reagent 1. In case of the reaction observed in serum from case 1, the increased absorbance after adding Reagent 1 would provide negative value by subtraction of the absorbance (after mixing Reagent 1) from absorbance at the end of reaction after mixing Reagent 2. Serum from patient with myeloma often includes lots of gamma globulin to make the reaction solution turbidity after mixing with buffer. If you find such a time course in which the absorbance is increasing just after addition of Reagent 1, you can doubt a non-specific aggregation from numerous gamma globulin, and dilution of serum sample is one of useful way to obtain true value. In addition, there are some ways including gel-filtration chromatography, use of serum from the corresponding animal species and polyethylene glycol to investigate the cause.

**Answer for question 2: (d)**

Serum specimen is collected after centrifugation of clotted whole blood sample. In clotting process, fibrin monomer formation from fibrinogen, polymerization of fibrin monomer, and clot retraction resulting in the blood clot becoming smaller size. Some immunoglobulins produced in myeloma patient inhibit the fibrin polymerization (1). Laboratory sometimes encounters bulky blood clot and cannot obtain a sufficient serum quantity. Especially, in case of CBC results with low hematocrit, the laboratory should not request additional blood collection for serum. Myeloma patients tend to have anemia, and actually, the whole blood must have a large liquid component. Measuring some test items is not necessarily wrong, but that does not become a solution to the root of the problem. Using test tube with heparin-lithium, you can obtain expected amount of specimen (plasma) because of no blood clotting.

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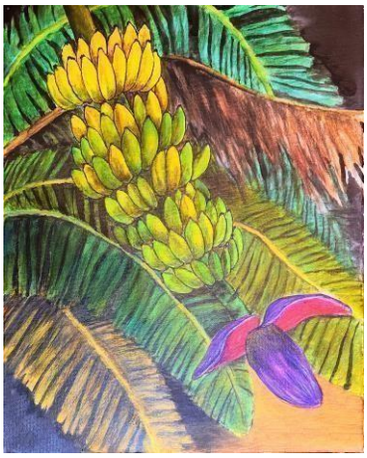

# My Acrylic on Canvas painting of A Bunch of Ripening Bananas with Flower Bud Still Attached, in my Home Garden created during the first week of the lunar "Year of the Rabbit"

**Contributed by:**

**It Koon TAN (gpttik@gmail.com)**

**A Bunch of Ripening Bananas with Flower Bud Still Attached**

This painting of a ripening bunch of bananas in my home garden was created during the first week of the Lunar New Year in late January 2023, when continuous rain for 3 days prevented many people from leaving home to visit friends and places for the festive holiday celebration activities. I have been growing several banana trees at a cornerof my garden since the 1970s. At the time of fruiting, they would produce long bunches of up to some 100 delicious fruits each. I would share the abundant harvest with neighbors and friends. I would take the opportunity to make banana fritters or cook different varieties of dessert which can be kept in the refrigerator for several days. Afterfruiting, the plant would die, but new ones will emerge from the ground as its replacement.

Bananas originated in the hot, tropical climates of the Malay Archipelago in Southeast Asia. It is widely believed that there are more than 1,000 types of bananas in the world. They are subdivided into 50 groups. Today, they are grown in tropical regions across the globe, from India, China, Australia, Africa to South and Central America, in more than 150 countries. Some 105 million tons of fruit are produced each year. Currently, the largest producers of the fruit are India and China. Bananas are one of the most popular fruits worldwide. They are important as a fruit crop in tropical and subtropical regions of the world. Banana fruit is a good source of energy and minerals and is normally consumed fresh, cooked or processed to make many products such as chips, powder, jam and even home-made wine in a few countries. It contains essential nutrients that have a beneficial impact on health. Other than being rich in carbohydrate, they are a good source of potassium, magnesium, vitamin B6 (pyridoxine), vitamin C and various other antioxidants, dietary fiber and An essential amino acid, tryptophan which is converted into serotonin and serotonin, 2 mood and sleep-regulating neurotransmitters, necessary for regulating good sleep. Potassium and magnesium are essential minerals and that play important roles in many bodily processes. The electrolytes work synergistically together performing many functions including regulating muscle movement and the nervous system. In addition, potassium regulates fluid balance and magnesium helps control blood pressure and also maintains and repairs DNA. Together they influence overall mood, sense of satisfaction and calmness. Vitamin B6 is important for normal brain development and for healthy function of the nervous system and immune system. Vitamin C and other antioxidants prevent our bodies against oxidative stress and free

radical damage. As a soluble fiber with unique gelling properties, pectin aids digestion in many ways. The soluble fiber turns into gel in our digestive tract in the presence of water. As such, they soften the stool and speed the transit time of material through the digestive tract, reducing constipation.

Bananas are also a good source of prebiotics that activate friendly probiotic bacteria found in yogurt and kefir. Probiotics are important because they support our immune system, keep our digestive system healthy and promote urinal and genital health.

The skin of the fruit has been used as facial and skin beauty aid. Banana peel contains a variety of phytochemicals, such as polyphenols and carotenoids that can promote skin health by fighting free radical damage. These compounds have protective effects and may help to remove lines and lighten dark spots on the face and give our skin a more youthful appearance.

Banana peels are also used as supplementary feed for livestock, goats, poultry, rabbits, fish, and other species. They provide healthy phytonutrients and antioxidants. Theyalso serve as an excellent fertiliser for flowering plants, such as the orchids.

Pectin, a gelatinous polysaccharide present in ripe fruits, is a high value functional food ingredient because of its excellent emulsifying properties and stability which can be used as a gelling agent and stabilizer. As banana peel extracts yield 15.89 to 24.08% of pectin, studies are being carried out to determine the usefulness of banana skin as asource of commercial pectin production for use as food additive.

Banana leaves are often used for preparation, wrapping, and serving of food in Southeast Asian countries. They are used for decorative and symbolic purposes in numerous Hindu and Buddhist ceremonies. In traditional homebuilding in tropical areas, roofs and fences are made with dry banana-leaf thatch.

I remember during my childhood days, that after fruiting, banana tree trunks were cut down to be used as food for the pigs. Their fibers were used to make strings and ropes. In India and Philippines, the fibers contained in banana peels and trunks have been turned into valuable textile products, fabrics and clothing's. Banana symbolizes good health, fertility and abundance. May the year of 2023 be one of productivity and abundance in good quality patient-care services, innovative research and discoveries of new diagnostic tests for more speedy and accurate clinical diagnosis and patient management, like the abundance of fruits in a bunch of banana shown in the painting.

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