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ISMS Bulletin[§] Editors

(1986 to 2012)

Prof. T. Krishnan, ISI, Calcutta (1986-93)[#]

Prof. Arvind Pandey, IIPS, Mumbai (1994-98)

Dr. P. Venkatesan, TRC, Chennai (1999-2003)

Prof. N. K. Tyagi, MGMC, Wardha (2004-05)

Prof. R. M. Pandey, AIIMS, New Delhi (2006-07)

Prof. N. S. K Nair, Manipal University, (2008-12)

[§] Till 1995, it was “ISMS Newsletter” and 1996 onwards got upgraded as “ISMS Bulletin”.
Since the year 2006, only electronic-version instead of print-version is officially being circulated.

[#] Initial three issues (1986-87) were coordinated by **Prof. BN Mukherjee**, ISI Calcutta.

Note: No Publications were made during the years 2002 to 2005 & 2007, 2009 and 2012.

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Editorial

Even at the cost of repetitions, I personally invite senior members of the Society for submission of technical notes, review articles as well original papers and other useful information. Though, the Bulletin is gradually getting set to improve, there is an urgent need to form a core-group to restart 'book reviews' and 'journal articles' as well to write editorials. We expect from our earlier Presidents, Editors, General-Secretaries, FSMS & other awardees to come forward at least with their 'brief overview's notes' of decades of professional experiences.

I may further like to request to our esteemed members to share on regular basis the feedback information on the seminars and workshops organized by them during the block of each six months' period preceding to the publication of the bulletin and also the details of the activities planned to be organized in future six months' period.

Due recognitions for the essential role of biostatistics in medical and allied disciplines' research and teaching through separate departments / units in all medical schools in the country and especially in postgraduate medical institutions was long pending with MCI. The ISMS have recently formed a committee to work out the mechanism and initiate the dialogue before its final recommendations. The report published in the very first ISMS Newsletter in December 1986 by the committee lead by Prof. Indrayan "on teaching of

Biostatistics to medical undergraduates in India" is interesting. Also, the recommendations and the follow-ups made by several subsequent committees during the past three decades are useful. ISMS Constitution, Rules and By-laws have been waiting since long to be revised. The recommendations of the recently formed 'Constitution and Award Rules Review Committee' shall take us a long way.

Through the forum of ISMS Bulletin, we have successfully updated the detailed charts, one for year-wise ISMS conferencing since 1983 with the corrected lists of Office bearers; and the other for FSMS awardees since 1985. The same are to be placed on our official website soon and this process is to be continued for various other ISMS awards, since their inceptions. The responsibility for follow-ups for completions has been recently taken over by our enthusiastic General Secretary.

Despite serious efforts made through repeated attempts by our current President and General Secretary, unfortunately, the comprehensive list of e-mail IDs of some 850+ life members is yet to be completed for the purpose of circulation of online Bulletin as well for routine correspondence.



Prof. Ajit Sahai



Message from the President

Beyond Annual Conferences

I consider myself blessed to be elected to lead our Society as President during the years 2015 and 2016. I take this opportunity to place on record my deep sense of appreciation for the outgoing President, Dr Subbakrishna, for his exemplary service during the preceding two years.

Those who have seen my previous message as President-Elect may have noted our fresh thrust on moving beyond holding the annual conferences. Many members have expressed their concern on this count. Soon after taking over, it became clear that this expansion of activities is going to be a challenge. Nonetheless, members may have noted that communications are now going regarding new developments such as MCI circular for establishing a research cell in each medical college, courses being organized such as by CMC, Vellore, and information on websites on biostatistics and research methodology. This has been possible with the ismsgroup on Google so kindly setup by our General Secretary Dr Anil Mathew.

Many life members were missing from the membership register and I had to dig past directories to update it as much as I could. We had active email IDs of limited number of members but with the help of many of you and

a letter sent to all those whose active email IDs were missing has increased our database to have email IDs of more than 500 members. All these are now on ismsgroup on Google. I am particularly indebted to Dr Ajit Mukherjee who provided email IDs of many members from ICMR. For those who want to see the glass half empty, we still do not have current email IDs of more than 300 members. Please help in completing this if you can.

We are surely not stopping at this. The Society has setup three Committees that are working full steam. The first is revising our Constitution and awards. This is headed by Dr BL Verma. He is working hard with the other members of this Committee to frame the recommendations. The second, chaired by me, is for framing our proposal for upgrading the teaching of biostatistics in medical colleges. Our emphasis will be on modernizing the curriculum and formalizing the biostatistics and informatics facilities in bigger institutions. This Committee has expanded its ambit to include dental, nursing, pharmacy, AYUSH and veterinary colleges. Dr Manoj Diwakar has run around offices of various Councils and has collected their Regulations. Information for biostatistics and informatics is being extracted from these hefty documents and collated. We

will then draft our proposals. If any of you has any suggestion, please forward to me. We will love to hear from you. The third Committee is on getting renewal of registration of our Society that is pending for the last so many years. Our Treasurer Dr Ajay Bansal has collected the information needed for this renewal and is now trying hard to collect the large number of documents from the current and the previous years to be submitted to the Registrar. Collecting authenticated documents from previous years is a stupendous task but we are giving it a sincere try.

As you are aware, our Editor Dr Ajit Sahai has worked hard and has raised our Bulletin to a very respectable level. Many of the articles now published deserve your serious attention. As and when the technical content of these articles

reaches a threshold, and if funds are available, we will be happy to consider publishing of a full quarterly journal. Please submit high quality articles for publication in the Bulletin for the journal to become a reality.

Thanks also to Dr B Antonisamy, the Web Coordinator for keeping the website active and updated.

We hope to do more to meet the aspirations of the members. We have some more activities in mind but I do not want to raise the expectations too high at this stage. Please do let me know what more you expect from this Society.

Dr. Abhaya Indrayan, PhD (OhioState), FAMS,
FRSS, FSMS, FASc
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Message from the General Secretary

Dear Members,

Greetings from the ISMS Secretariat I am happy to report that the progress of the ISMSCON 2015 is moving rapidly under the excellent supervision of Prof. N K Tyagi.

Over the past years our Society has grown and I look forward to working with the ISMS to continue our growth in the future. We need to further strengthen our subject by offering more short courses and workshops at different institutions/Universities/ Professional Societies

and developing curriculum in tune with the local needs.

I look forward to seeing all of you in Belagavi in October.

Dr. Anil C Mathew,
MSc (Biostat.), PhD (Biostat.)
Professor of Biostatistics
Department of Community Medicine
PSG Institute of Medical Sciences and
Research, Coimbatore.



Formation History of ISMS

Indian Society for Medical Statistics: Why and How It was Formed?

B L Verma and G D Shukla

Introduction

Statistics is a basic tool in the scientific methods of public health and clinical studies - both observational and experimental. This is particularly so, because the lack of precision in the medical and health data often lends itself to the vagaries of subjectivity in the stages of planning, execution, analysis and interpretation – descriptive as well as inferential. Researchers must be wary of an uncritical credulity since it is an objective world in which we live and to which this subjective world, must pay deference.

History of Biostatistics in India

Origin of the term *biostatistics*, more specifically - *Medical and Public Health Statistics*, can be traced to the pioneering work of Florence Nightingale¹ – a great Nurse of Crimean War in UK. She had a great fascination for the quantified information and during the War; she kept meticulous record of the causes of death of soldiers. With elementary statistical analysis, she demonstrated that more soldiers died in barracks due to lack of knowledge of tropical diseases, poor health and sanitation than in the battlefield. This

conclusion was responsible for creating the *London School of Health and Tropical Medicine (LSHTM) in U.K.* In a similar Follow-up Study done in 1873 on “How Some People Have Lived and Not Died in India”, she demonstrated that death rate in the British Army posted in India, came down from 69/1,000 to 18/1,000 in 10 years due to improved hygiene and sanitation. Through repeat similar studies in the country, Florence helped in establishing *Medical and Public Health Statistics* in India.

Biostatistics, as a discipline, is relatively new in India. This discipline evolved from application of the discipline of statistics in biological and biomedical areas. It is a branch of *Applied Statistics* which, in early part of 20th Century, was with agriculture and other areas of biological sciences. At that time, even textbooks like those of Snedecor & Cochran², were models for biostatistics. It gained momentum in the middle of 20th Century with rapid advancement in medicine. Biostatistics started its own life with the establishment of *Schools of Public Health* in USA & UK around 1950s. In earlier days, conclusions about

human illnesses mainly occurred through studies of Anatomy and Physiology. 'Case Studies' or 'Case Series' were common ways to prove that a particular treatment was beneficial or that, certain aetiology was the cause of an illness. The use of statistical reasoning for above purposes took some time to develop, because of differences in the opinion of physicians regarding the two approaches³. With emergence of evidence-based medicine, a greater need of bio-statistical approaches was felt in the country.

How the Idea for Formation of a Professional Society in the Speciality Came to Mind?

In early 80s, while working as faculty in the specialities of *Biostatistics, Psychiatry and Social & Preventive Medicine* in a Teaching Hospital of Uttar Pradesh (India), we had a serious concern about poor quality of statistics in medicine. At that time we realized that, even in the era of precision and accuracy, there was an element of mutual mistrust and scare between medical and statistical experts that has often hampered the working and progress of both, by rendering them distant neighbors. The former viewed the latter as more of evil than necessity – an undue interference by a non medical person, while the latter often felt neglected, ignored and by-passed by the former

We were also of the view that this had been mainly because of a lack of common platform for the mutually beneficial dialogue between them. Before early 80s, there were little opportunities in our country for cross

fertilization with each others' ideas and viewpoints. Statistics in medicine for medical undergraduates was regarded as just a part of Social & Preventive Medicine – to be somehow cleared and then forgotten. Also, our literature search, at that time, did not reveal existence of any professional Society in the discipline of medical statistics in the whole of South East Asia. In fact, there was a crying need for making medical men more objective and statisticians more pragmatic. Realizing a professional Society in this part of the Globe may help in developing medical statistics and increase quality of its applications in health research, we intended to form a professional Society in the speciality.

How the Society was formed?



Dr R N Srivastava

In early 80s, Maharani Laxmi Bai Medical College & Hospital, Jhansi in Uttar Pradesh, had a good and dedicated academic team of 3 professionals - i) Head of the Department of Social & Preventive Medicine, Dean of the Faculty of Medicine & Principal – Dr R N Srivastava, ii) Head of the Department of Psychiatry – Dr G D Shukla and iii) In-charge of the Biostatistics Unit – Dr B L Verma. This team had a lot of concern for poor quality of statistics in medicine and also, great

enthusiasm to contribute towards its development in the country. Thus, keeping both the objectives in mind – on the one hand, of providing a common platform to medical men and statisticians for their mutually beneficial scientific dialogues and on the other hand, for exploring possibilities of forming a professional Society in medical statistics, we called a country-wide meeting, in form of a National Symposium, of active biostatisticians and medical professionals - known for their support to biostatistics in medical teaching, research and consultancy.

1. Organization of A National Symposium on Statistics in Medicine:

The above team of 3 professionals organized a *National Symposium on Statistics in Medicine* at Jhansi (UP) on 10-12 November 1983. Dr R N Srivastava, Dr B L Verma and Dr G D Shukla were actively involved with the organization of this event in capacity of Organizing Chairman, Organizing Secretary and the Treasurer.



Chief Guest – Dr Rameshwar Sharma

This Symposium⁴ was inaugurated by Professor Rameshwar Sharma – a globally eminent epidemiologist, SEA Regional

Councillor of International Epidemiological Association and Principal, S M S Medical College & Hospital, Jaipur (Rajasthan), who also delivered an Inaugural Address, in form of a Lecture on “Teaching Statistics to Medical Undergraduates – The Situation in India”.

The above event included several senior biostatisticians from the different corners of the country and Bangladesh; the prominent ones were Dr PSS Sundar Rao (CMC, Vellore), Dr A D Taskar & Dr S S Verma (both from IRMS, New Delhi), Dr K B Pathak (IIPS, Bombay), Dr J Roy and Dr S Bandyopadhyay (both from ISI, Calcutta), Dr S K Sanyal (AIHH&PH, Calcutta), Dr KMS Aziz, Mr AI Chowdhury & Mr M Rahman (all from ICDDR,B, Bangladesh), Dr S Biswas (DU, Delhi), Dr S Sadananda (JNU, New Delhi), Dr K Visweswara Rao (NIN, Hyderabad), Dr K D Gautam (TB DTCCI, Agra), Mr P A George (CDRI, Lucknow) and Mr BB Yeole (BCR, Bombay). Amongst medical participants, prominent ones were – Dr B Dutt and Dr D N Mishra (both from MLBMC & H, Jhansi), Dr G Singh & Dr Deoki Nandan (both from SNMC, Agra), Dr D L Ingole (MC, Nagpur), Dr K R Prasad (SVMC, Tirupati), Lt. Col. N G Rao (AMC, Delhi) and Dr D Bachani (MPSMC, Jamnagar). The scientific program of the above Symposium covered lectures, invited talks and research papers on series of priority topics related to statistics, public health and computers etc. The details of the Program are available in the Proceedings⁵, brought-out on this occasion. The event was beautifully organized considering multifarious needs of the attending delegates.



Dr P S S Sundar Rao at Jhansi 1983

2. The Formation of ISMS :

As per the objectives of the above Symposium, a *Special Session* on the last day of the event was dedicated to exploring the possibilities for forming a Society in medical statistics. A small “write-up” in this effect had already been distributed to the Symposium’s delegates (as a part of the Delegates’ Kit) at the time of their registration on the first day of the event. The idea behind this ‘write-up’ was to enable the delegates do some advance home work and prepare themselves for discussions in the Session by putting constructive suggestions on the proposal.



Dr R N Srivastava at Jhansi 1983

The above *Special Session* was called in the forenoon of 12 November 1983 in the Lecture Theatre 3 of the M L B Medical College & Hospital, Jhansi (UP).

Dr R N Srivastava, as Chairman of this Session, spoke on the purpose and introduced the proposal. The opinion of the delegates was sought on following points and then discussion followed:

1. Whether a professional Society on Statistics in Medicine is really needed and whether we should form it here?
2. If yes, then suggestions on the name of the Society.
3. Where should be its first HQ Office?
4. Who should be the initial lead persons (President, General Secretary and Treasurer) to carry the idea forward?
5. Where it should be registered?
6. Further suggestions on the proposal, if any.

The delegates appreciated the idea of the Society, agreed on its need and unanimously decided to form it – right in the Symposium. After considering several suggestions and alternatives on its name, they finally agreed on the name - *Indian Society for Medical Statistics*. Incidentally, Dr PSS Sundar Rao (CMC, Vellore) had already left a day earlier for some different engagement and so, he was not available in this *Special Session*. As such, Dr AD Taskar was the senior most biostatistician available in the Session. Dr R N Srivastava, therefore, proposed his name for being the first President of this new Society and suggested that he may nominate any two persons from his Institute / New Delhi, for the positions of General Secretary & Treasurer and thus, keep initial HQ of the Society at IRMS, New Delhi and complete necessary formalities towards its registration etc.



Dr A D Taskar at Jhansi in 1983

Dr A D Taskar however, did not agree with this idea. He was very firm in putting-up his viewpoint. He said, “If we really want to form this Society and wish that its Constitution is written, body is registered and the Society starts functioning, we should initially keep its HQ Office at Jhansi for some time”. He suggested that Dr R N Srivastava, Dr B L Verma and Dr G D Shukla, should jointly put their efforts to take the idea of the Society forward in the way they deem appropriate.



Dr R N Srivastava

This proposal of Dr A D Taskar appealed to all the delegates and accordingly, Dr R N Srivastava was elected as the First President, Dr B L Verma as General Secretary and Dr G D Shukla as the Treasurer of this new Society. Soon afterwards, we wrote its initial Constitution and Bye-laws and got the Society

registered with the Office of the Registrar of Societies at Kanpur in Uttar Pradesh. Also, from our own resources, we created some funds and Dr Srivastava spared institutional staff, solely for ISMS work, for the smooth functioning of the Society.



Dr B L Verma as speaker in 1983

The Next 5 Years of the Society

After registration of the Society, we concentrated on increasing its membership and for this; we started a *Membership Campaign* - contacted prominent biostatisticians, epidemiologists, clinicians, public health people and professionals from some other disciplines. Such efforts continued till we continued as its Founding Office-Bearers (1988). Very soon, the Society achieved good strength in membership. Further, in the beginning, the term of the Society's Office-Bearers (except the Editor) was for 1 year only. Thus, in subsequent 4 years each time in the GBM, proposal for electing new Office-Bearers was brought forth by us before the august House. However, the members were of the view that till Society comes in a good shape, the Founding Office Bearers should continue in their positions.

We organized 2nd National Annual Conference of ISMS at K G Medical College,

Lucknow (with Professor B C Srivastava as Organizing Chairman and Dr Vidya Bhushan as Organizing Secretary). At the 2nd General Body Meeting (GBM), some important decisions were taken on strengthening different aspects of Society, including finalization of the *ISMS Emblem*, institution of the *Fellowship* and venue for the 3rd Annual Conference, to be held next year. Its 3rd Annual Conference was organized in 1985 by the Computer Science Unit of the ISI, Calcutta, with Dr T Krishnan as its Organizing Secretary. In GBM, we took some more new decisions; prominent ones were institution of the first Award, namely - *Professor B G Prasad Award*, formation of a *MCI Committee for Teaching of Biostatistics to Medical Undergraduates* and starting a *Newsletter* as Society's official publication. Also, the then Director, ISI, Calcutta – Dr Ashok Maitra, on our request, very kindly agreed to provide some financial assistance to our proposed Newsletter. In the Conference *Valedictory Function*, he announced that ISI will bear the postage and the production cost of the *ISMS Newsletter* till it continues to be published from ISI Calcutta. Thus, our Society started publishing its official publication – the *ISMS Newsletter* from the year 1986 with Dr B N Mukherjee of the Applied Science Unit of ISI as its first Editor. But soon afterwards, Dr T Krishnan from the Computer Science Unit of ISI, had to take over its Editorship from Dr B N Mukherjee. Dr T Krishnan continued his responsibility successfully for next 5 years.

The 4th Annual National Conference of ISMS took place in 1986 at NIMHANS, Bangalore. It was organized by Dr V G

Kaliaperumal and his team. By this time, several senior professionals from, both medical and statistical disciplines, had joined the Society and so also, they were available in this Conference. During its GBM, Society instituted the second Award of the Society, namely - *Smt. Surakali Jain Award*, and finalized Srinagar (J &K) as the venue for its next Annual Conference. The 5th Annual Conference of ISMS was thus, organized by Dr M L Zutsi - as Organizing Secretary, from the Biostatistics Unit of the Government Medical College, Srinagar in 1987. Srinagar being the well known tourist place, this Conference attracted a huge gathering of participants, including some delegates from abroad. During this Conference, the Society – under the Chairmanship of Dr S Radhakrishna, completed the uphill task of approving its revised Constitution and Bye-laws. The Society thus, implemented new rules from the beginning of the year 1988.

The Handing- over Charge by the Society's Founders:

At the Srinagar ISMS Conference (1987), we had cleared a proposal for organizing the 6th Annual National Conference of ISMS at the National Institute of Nutrition (NIN), Hyderabad, in 1988. This Conference-proposal was submitted by Dr K Visweswara Rao – Head of the Biostatistics Division of the NIN. Incidentally, Dr Visweswara Rao was amongst those senior biostatisticians of the country who were present at Jhansi (UP) in 1983 when ISMS was formed and so, members had a lot of expectations from him for the event. His whole

team, including the Institutes' Director – Dr Vinodini Reddy, was throughout available to the delegates, even during the Scientific Sessions. The Conference was organized very well.

During past 5 years, the Society had stood quite well on its footings and so, we had a clear view that we should now vacate our positions for the new Council. We therefore, discussed our viewpoint with many of our senior colleagues in ISMS and got convinced them for need of such a change. On our request *Padma Bhushan Dr P V Sukhatme (Pune)* agreed to become next President of the Society. We also requested *Dr Padam Singh* and *Dr IMS Lamba* (both from IRMS, New Delhi) and they very kindly consented for the positions of General Secretary and the Treasurer respectively. Accordingly, their nominations for above positions were arranged. In the Annual GBM, held in 1988 at Hyderabad (AP), the new Council of ISMS was elected. We, as *Founding Team*, expressed our gratitude and paid hearty thanks to all ISMS Members for their tremendous faith in us and also for giving us overwhelming support since the inception of



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the Society. We later handed over our charge to the respective new Office-Bearers of the Society and they started functioning from 1 January 1989.

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ISMS Fellows of International Imminence *(to be continued...)*



Professor C.R. RAO SC.D. (CANTAB), F.R.S

Member, National Academy of Sciences, USA.

National Medal of Science Laureate, USA

Eberly Professor Emeritus of Statistics, PSU, USA

Padma Vibhushan Awardee INDIA

A Product of India

Dr C.R. Rao was born on 10 September, 1920 in Huvanna Hadagali, now in Karnataka State. He studied in schools at Gudur, Nuzvid, Nandigama and Visakhapatnam, in Andhra Pradesh and completed his M.A. Degree in Mathematics at the Andhra University in Waltair (AP) India. He did his M.A. Degree in Statistics from Calcutta University in Kolkata, West Bengal.

Dr Rao worked in India at the Indian Statistical Institute for 40 years before he took mandatory retirement at the age of 60. He moved to USA and worked for another 25 years at the University of Pittsburgh and the Pennsylvania State University. In reply to a query put to him as to what particular achievement he is most proud of, Dr C.R. Rao replied, "It is the outstanding contributions my students are making to statistical theory and practice." He is still active at the age of 87 as

the Director of the Center for Multivariate Analysis at Pennsylvania State University.

Academic Qualifications

Rao received MA Degree in Mathematics with a first class and first rank from Andhra University (1941) and MA Degree in Statistics from Calcutta University (1943) with a first class, first rank and a record of marks unbeaten till now, and a gold medal. He started working in the ISI at Calcutta as a research scholar in 1943.

He was invited to work in a Project at the Museum of Anthropology and Archeology in Cambridge University, UK, which required the statistical methodology developed by P.C. Mahalanobis - Founder of ISI. Based on the work he did, he earned his Ph.D. in 1948 from Cambridge University with *R.A. Fisher, the Father of Modern Statistics*, as his Thesis Advisor. A few years later, in 1965, the University awarded him the prestigious Sc.D.

Degree, based on a peer review of his research contributions to statistics.

Honorary Doctoral Degrees: Up to date, Dr Rao received 31 *Honorary Doctoral Degrees* from universities in 18 countries spanning six continents.

Positions Held

He held prestigious positions, such as - Director of the ISI, Jawaharlal Nehru Professor, and National Professor, all in India, University Professor at the University of Pittsburgh and Eberly Professor of Statistics and Director of the Center for Multivariate Analysis at Pennsylvania State University in USA.

Development of Statistics in India

As Head and later, *Director of the Research and Training School* at the ISI for a period of over 40 years, Dr Rao developed research and training programs and produced outstanding students which “put India not far from the center of the statistical map of the world”, and earned for ISI, the name of Indian School of Statistics. During this period, he also directed training programs at the International Statistical Educational Center which led to the development of statistics in the South East Asian Region. Dr Rao was the Chairman of a UN Committee, which examined the demand for statistical personnel in Asian countries and recommended the establishment of an Institute for statistical development in South East Asia. On the basis of his recommendation, *The Asian Statistical Institute*, now known as *Statistical Institute for Asia and Pacific* was established in Tokyo to provide training to statisticians

working in Government and industrial organizations.

Dr C.R. Rao played an important role, under the direction the doyen of *Indian statistics - Dr P.C. Mahalanobis*, in setting up *State Statistical Bureau* in different States of India and developing a network of statistical agencies at the district level for collection of data. Together with the *Central Statistical Organization* and the *National Sample Survey* in planning of which, Dr Rao played a significant role, India has one of the best national statistical systems. He founded the *Indian Econometric Society*, which has been active in promoting quantitative studies in economics for planning purposes.

Dr C.R. Rao was the Founder of the Indian Econometric Society. He has been closely associated with the Indian Society for Medical Statistics since its founding stage. These Societies hold national level conferences annually to discuss issues of current national interest.

Work in USA

Dr C. Radhakrishna Rao accepted *University Professorship* at the University of Pittsburgh after he took mandatory retirement from the ISI in India. He worked for 8 years at the University of Pittsburgh and moved to the Pennsylvania State University as *Eberly Professor of Statistics*, where he continues to work as the *Director of the Center for Multivariate Analysis (CMA)*. The CMA, established at his initiative, serves as a meeting place for research workers in multivariate analysis from all over the world. He directed

the research work of several students for the Ph D Degree in USA. He edited series of Handbooks on Statistics (27 volumes up to date) in various fields of applications for the benefit of researchers and consultants, and continues to be active in research event at the age of 87.

Contributions to Statistical Theory and Applications

Dr C. Radhakrishna Rao is among the world leaders in statistical science over the last six decades. His research, scholarship, and professional services have had a profound influence on theory and applications of statistics.

Technical terms such as, *Cramer-Rao inequality*, *Rao-Blackwellization*, *Rao's Score Test*, *Fisher-Rao and Rao Theorems on second order efficiency of an estimator*, *Rao metric and distance*, *Analysis of Dispersion (MANOVA)* and *Canonical Variate analysis* and *G-inverse of matrices* appear in all standard books on statistics. Cramer-Rao Bound and Rao-Blackwellization are the most frequently quoted key words in statistical and engineering literature. Special uses of Cramer-Rao Bound under the technical term, Quantum Cramer-Rao Bound have appeared in Quantum Physics. Rao-Blackwellization has found applications in adaptive sampling, particle filtering in high-dimensional state spaces, dynamic Bayesian networks etc. These results have led to contributions of strategic significance to signal detection, tracking of non-friendly planes and recognition of objects by shape.

Other technical terms bearing his name appearing in specialized books are *Rao's F and U tests in multivariate analysis*, *Rao's Quadratic Entropy*, *Cross Entropy and Rao-Rubin*, *Lau-Rao*, *Lau-Rao-Shanbhag and Kagan-Linnik-Rao theorems on characterization of probability distributions*. Two of his papers, one on estimation leading to many technical terms and key words and the other on score test which had a high impact on the development of statistical theory appear in the book *Breakthroughs in Statistics: 1889-1990*.

Dr Rao has made some significant contributions to combinatorial mathematics for use in design of experiments, the most important of which is Orthogonal arrays (OA). The basic paper on the subject appeared in *Proc. Edinburgh Math. Soc.* (the Referee of the paper reported that it is a fresh and original piece of work). The Japanese Quality Control Expert - *G.Taguchi*, made extensive use of OA's (described by *Forbes Magazine* as "new mantra" for industries), in industrial experimentation. Rao defined a generalized inverse (g-inverse) of a matrix (singular or rectangular) and demonstrated its usefulness in the Study of linear models and singular multivariate normal distributions.

He is the author of 14 books and about 350 research papers. Three of his books have been translated into several European, Chinese and Japanese languages. C.R. Rao is the eighth child in a family of six brothers and four sisters.



Late Professor P. V. SUKHATME, PhD, D Sc

Former Chief–Division of Statistics,
Food & Agriculture Organization (FAO)
United Nations Organization, Rome
Padma Bhushan Awardee by the President of India
(27 July 1911 - 28 January 1997)

Dr Pandurang Vasudeo Sukhatme was born of Vasudeo Hari Sukhatme and Satyabhama Sukhatme on 27th July 1911 in the village Budh, district Satara, 100 miles south of Pune (India). After completing his school education at Pune, he graduated in 1932 from Ferguson College of the same city with Mathematics as the principal subject and Physics as the subsidiary. During 1933-36, he studied at the University College, London and was awarded Ph.D. in 1936 and D.Sc. Degree in 1939 for his work on bipartitional functions. This work was published in the “*Philosophical Transactions of the Royal Society of London, Series A*” in June 1938.

Whilst in London, Dr Sukhatme came under the influence of eminent authorities in Statistics, such as - *R.A. Fisher, Jerzy Neyman* and *E.S. Person* and did valuable research in statistical theory of sampling. His two most significant contributions are – one, to bipartitional functions under the guidance of R.A.Fisher and the other, to sampling theory entitled “Contributions to the Theory of the Representative Method” under the guidance of

J. Neyman and E.S. Pearson. The latter paper laid solid foundation for his subsequent pioneering research in the sampling theory of surveys and improvement of agricultural statistics which ushered in what may be appropriately termed as the “Sukhatme Era” in the development of agricultural statistics in India and the world.

When Dr P.V. Sukhatme returned to India, while searching for a University job, he had an interview with the Late Pandit Madan Mohan Malviya - the *Vice Chancellor, Banaras Hindu University*. Though Panditji was satisfied with the brilliant career of Dr Sukhatme and agreed to create a Department of Statistics in the University to accommodate him but he wanted to know from him that how a Chair in Statistics would help our poor country–India? Dr P.V. Sukhatme did not know - how to answer this question? So he did not join Banaras Hindu University. But this question moved him sufficiently in determining his future life, particularly his fundamental work on nutrition.

During 1939-40, he was Professor at the All India Institute of Hygiene and Public

Health, Calcutta. In 1940, he joined ICAR as a Statistician, and was later, appointed as Statistical Advisor to the Council to head its Statistical Unit. On account of his dynamic leadership, following the path and tradition set by him, the statistical branch of ICAR eventually grew to become a full-fledged Institute (Indian Agricultural Statistics Research Institute) exclusively devoted to research in agricultural statistics. In the context of the green revolution, the importance of statistical techniques in agricultural research hardly needs any emphasis.

Dr Sukhatme, as a founder of the *Indian Society of Agricultural Statistics*, devoted a good deal of his time and energy to the popularization on statistical methods among the practitioners of agricultural, veterinary and related sciences. He served as the First Honorary Secretary of the *Indian Society of Agricultural Statistics* for a number of years. The Society owes him a lot for his continued valuable guidance as well as for shouldering the responsibility, as its President during 1991 and Executive President since 1970 till his demise. From its inception to 1963, he worked closely with Dr. Ragendra Prasad (*Founder President* of the Society), the then Minister for Food and Agriculture and later, President of India.

In 1951, he was Visiting Professor at *Iowa State University, Ames Iowa, USA* where he completed his textbook on sampling. During 1952-70, he headed the Division of Statistics, *Food & Agriculture Organization (FAO)* of the *United Nations* in Rome. After retiring from the UN in 1971, he served as Regents Professor,

University of California at Berkeley and then settled in Pune, carrying out valuable work on nutrition at the *Maharashtra Association for the Cultivation of Science*. He authored several books on the various scientific topics of interest and published more than 200 research papers in reputed national and international journals.

Dr. Sukhatme was well known in the field of nutrition for the *Sukhatme-Margen Hypothesis* which in plain language implies the following: “At low levels of calorie intake, energy is used with greater metabolic efficiency and efficiency decreases as the intake increases over the homeostatic range”.

He was awarded the *Guy Medal* by the *Royal Statistical Society* for his paper on nutrition which he presented to the Society in 1963, the *B.C. Guha Memorial Lectureship* of the *Indian Science Congress Association* in 1965 and the *B.D. Tilak Lectureship* of the *Indian National Science Academy* in 1982. Among the numerous other honours he had received, mention must be made of the *Fellowships* of the *American Statistical Association, National Academy of Sciences, Allahabad, Indian Academy of Sciences, Bangalore and Indian National Science Academy, New Delhi*.

Dr Sukhatme was closely associated with the Indian Society for Medical Statistics, since very beginning. He was conferred ISMS Fellowship in 1985 and was unanimously elected the second President in the year 1988.

He was elected Member of the *International Statistical Institute, Netherlands* and its Vice President in 1969-70. For his

outstanding contribution to Science and Human Welfare, he was conferred the *Padma Bhushan* by the President of India in 1973. He was awarded the *Hari Om Ashram Trust Award* by the *University Grants Commission* in 1983. For the distinguished service to the cause of Statistics and its application to agriculture and

allied fields, he was conferred with the *Honor of Sankhyiki Bhushan* in 1989 by the *Indian Society of Agricultural Statistics*, New Delhi. He also received the *P.C. Mohalanobis Birth Centenary Award* at the Jaipur Session of the Indian Science Congress Association in 1994.

How ISMS Got Connected to Professor C R Rao and Professor P V Sukhatme?

During 1983-84, *ISMS* was a newly formed small body and at that time, we were trying to expand and increase its membership as well as activities. During 1984-85, as per its Constitution, its Founder EC decided to elect Fellows also and so, we thought of first nominating great personalities of the world in our discipline with origin from India. We therefore, decided to approach Dr C R Rao, USA and Dr P V Sukhatme, Pune (India) and seek their blessings in our Society. We took a decision to first invite Dr C R Rao for this purpose. As Founder General Secretary of the Society, I sent a formal invitation - requesting him for becoming its Life Member (as *LM Status* was necessary to nominate a professional for the Fellowship as per the Society's rules) and also for his consent to nominate him for our Fellowship. While appreciating our idea for forming a national Society in medical statistics in the country, he immediately agreed to become our Life Member (LM). But at the same time, he advised us (through a hand written letter) to first invite and nominate Dr P V Sukhatme for the Fellowship of the Society, being a senior

person, available in the country (and that, he himself should be nominated for this purpose afterwards). Following his advice, when I sent an invitation for this purpose to Dr P V Sukhatme he, in turn, advised us to give this honor to Dr C R Rao first. When I wrote back to Dr C R Rao again, enclosing a copy of Dr Sukhatme's letter, he finally agreed to our request and gave his consent for nominating him to the Fellowship. As such, Dr C R Rao is our *1st Fellow* and Dr P V Sukhatme is the *2nd Fellow* of *ISMS*. Afterwards, Dr C R Rao also remained in our Fellowship Award Committee for a few years. Dr P V Sukhatme later, acted as President of the Society in 1989.

On behalf of Founders of the Society, we express our gratitude to both these great personalities of our disciplines for their blessings, valuable support and important contributions to this professional Society through-out.

Babu L Verma,
Founder General Secretary, ISMS

International Advisory Board Members *(to be continued...)*



Dr Kuldeep Kumar

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http://apps.bond.edu.au/staff/profile.asp?s_id=157

Dr Kuldeep Kumar did his PhD. from University of Kent at Canterbury and has taught at Indian Institute of Management, Lucknow and National University of Singapore before joining Bond University, Gold Coast, Australia in 1993.

Winner of several awards including Commonwealth Fellowship, Commission of European Countries Post Doc Fellowship, Young Statistician award of the International Statistical Institute which is given to three young statisticians in the whole world every two years, Bond-Oxford Fellowship and Vice Chancellor's Quality award for research supervision, Dr Kumar is also winner of several Teaching Excellence awards and Research Excellence awards. He has also won Lecturer of the year award and best research paper awards. Recently in 2013 he has won outstanding contribution award from the International Society of Management Engineers. Dr Kumar is currently Professor and Head of Economics and Statistics Department in the Faculty of Business at Bond University.

Dr Kumar has published more than 120

research papers in the international refereed journals/conference proceedings, eleven chapters in the books, 25 book reviews for Royal Statistical Society besides presenting papers in more than hundred seminars and conferences. He has been Key note speaker and Chaired sessions in several conferences. He has also edited a special issue of Managerial Finance journal besides several conference proceedings. His current research interests are in the areas of computer aided diagnostic system, telemedicine, breast cancer detection, financial fraud detection, forensic accounting and higher education. He has supervised many Masters and PhD students in this area. He has received several research grants in these areas. His papers are well cited in many journals and books. He has refereed papers for more than 30 top international journals and is on the editorial board of several international journals.

Dr Kumar is Fellow of Royal Statistical Society since 1984 and a chartered statistician. Recently he was awarded the status of Chartered Scientist by the Science Council of United Kingdom.

Editorial Board Members *(to be continued...)*



Dr. Ajit Mukherjee

Email: mukherjeeajit@hotmail.com

Dr. Mukherjee holds the degrees of M.Sc., Mathematical Statistics and Ph.D., Statistics and is presently working as Scientist-F/ Deputy Director General (Sr. Grade) in Indian Council of Medical Research (ICMR), New Delhi.

Dr. Mukherjee has published over 30 research papers in National and International journals. He has also authored six Books/ Technical Reports of ICMR and contributed a chapter in a book on Biostatistics. He has presented about 40 research papers in National and International seminars and conferences and has delivered 36 professional talks on various important topics in the area of Biostatistics in Training Workshops/ Seminars held in different parts of the country. He was awarded the prestigious “Dr. B.G. Prasad” award of ISMS in the year 2003 for best published work in the area of Epidemiology.

He has been a member in the Expert Group of various committees set up by the Govt. on programmes such as Micronutrient Malnutrition, Framing Guidelines for the survey and resurvey on IDD, National Policy for Data Sharing and Accessibility (NDSAP), Task Force on “Safety and efficacy of Ayurvedic formulations for the management of osteopenia/osteoporosis among women”, Technical Advisory Group (TAG) of INCLIN. He has also served in the award committee of ISMS. He is currently a Co-guide of a Ph.D. scholar in Dept. of Biostatistics, AIIMS, New Delhi

He has been a regular statistical reviewer for journals such as IJMR, IJPVM and has also reviewed for Statistics in Medicine, JHPN and WHO Bulletin.

Estimation of Type 2 Direct Effect of Sulphonylureas/Metformin Therapy on Fasting Blood Sugar Levels of Patients of NIDDM Using Simple Multiple Linear Regression Approach

Ajit Mukherjee

Division of Reproductive and Child Health (RCH), ICMR, New Delhi

Many research questions in epidemiology are concerned with understanding the causal pathways by which an exposure or treatment affects an outcome, e.g. the biological mechanism by which a treatment slows disease progression or an exposure acts to cause or prevent a disease. Example: In HIV-infected individuals, antiretroviral therapy preserves CD4 T-cell counts. Are these beneficial effects due entirely to reductions in viral load?

Line of treatment is often altered depending upon the results of exposure. It may be of interest to know the causal effects of an exposure if the exposure's effect on treatment decisions were blocked. Example: High pollutant levels may cause people to increase their medication. How would pollutant levels affect lung function if medication use were to remain at the same frequency in the population that it would have had in the absence of elevated pollutants?

Assessment of the quality of a surrogate marker by estimating the extent to which the effect of an exposure on an outcome is captured by the exposure's effects on the surrogate. Example: C-reactive protein has been

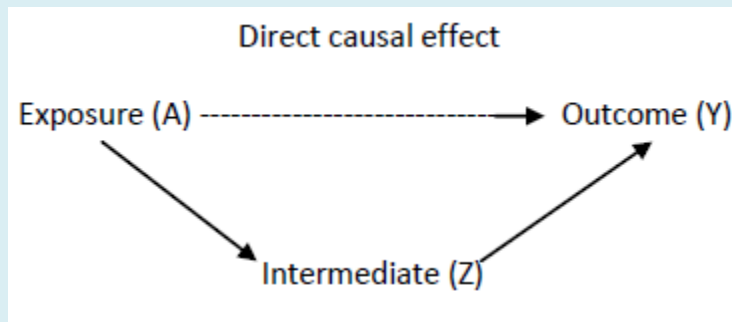
suggested as a promising surrogate outcome for assessing the risk of cardiovascular events. To what extent does the hormone therapy affect the true outcome of interest i.e. the risk of cardiovascular event, via a pathway that does not involve C-reactive protein?

Direct Effects

It is clear that the exposure of interest acts on the outcome via two pathways, one in which the exposure affects an intermediate variable which in turn affects the outcome, and one in which the effects of the exposure do not occur via changes in the intermediate. The effect of the exposure on outcome if its effect on the intermediate variable were blocked is referred to as Direct Effect.

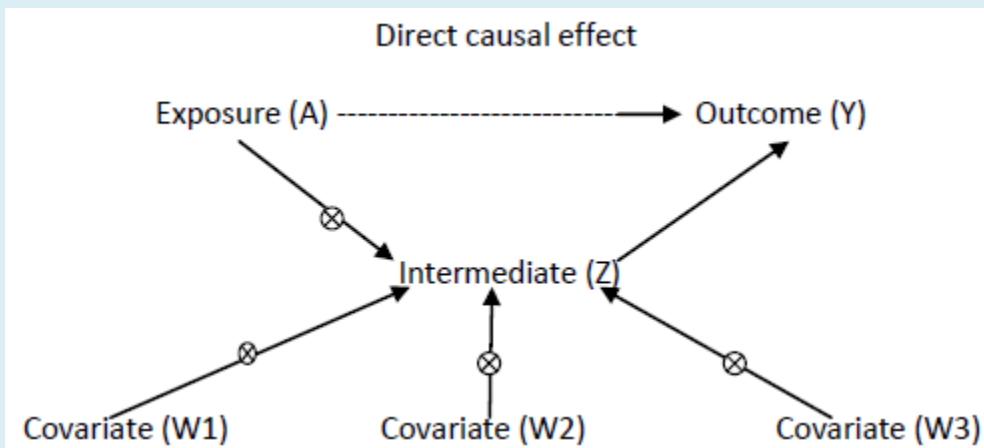
The multivariable regression provides an estimate of the direct effect of an exposure, **at a fixed level of the intermediate variable**. Alternatively, a direct effect can also be obtained as the effect of an exposure on an outcome, **blocking only the effect of the exposure on the intermediate**. In this case the standard multivariable regression is often found to be insufficient.

Figure 1



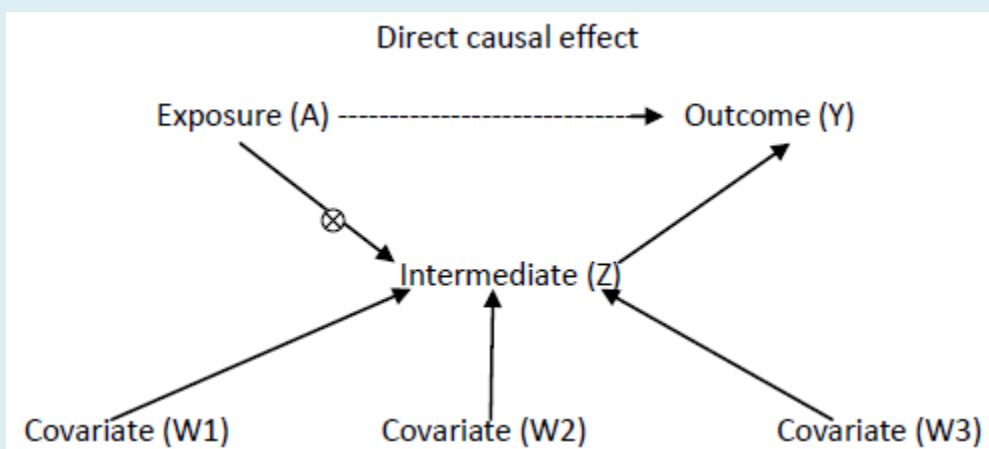
A-hormone therapy, Z-C-reactive protein, Y-cardiovascular event

Figure 2



Type 1 Direct Effect of A on Y, holding Z at a fixed level (blocking all effects on Z)

Figure 3



Type 2 Direct Effect of A on Y, blocking only the effect of A on Z

Type 1 and Type 2 Direct Effects -

Let Y_a denote the outcome given exposure $A=a$ e.g., for a binary exposure Y_0 would denote the outcome in the absence of exposure and Y_1 would denote the outcome in the presence of the exposure. Further, let the intermediate variable Z be fixed at $Z=z$. Then the type 1 direct effect of an individual is defined as

$$(Y_{az} - Y_{0z})$$

where Y_{az} denotes the outcome controlling both exposure and intermediate variable. Similarly the type 2 direct effect of an individual is defined as

$$(Y_{az_0} - Y_{0z_0})$$

where z_0 is the level of the intermediate in the absence of exposure. Under both definitions the population direct effect is defined as below:

Type 1 Direct Effect:

$$E(Y_{az} - Y_{0z})$$

Type 2 Direct Effect:

$$E(Y_{az_0} - Y_{0z_0})$$

The type 2 direct effect can be estimated by the following formula:

$$DE(a) = E_w \sum_z \{E(Y_{az} / W) - E(Y_{0z} / W)\} \Pr(Z_0 = z / W)$$

If the confounder is affected by the exposure, the above equation would still provide consistent estimation of type 2 direct effect by assuming a marginal structural model and by employing estimation procedure such as inverse probability weighting or g-computation for estimating the quantity

$$E(Y_{az} / W) - E(Y_{0z} / W)$$

An illustration:

In an ICMR-multicentre task force study, 4637 patients of Type 2 Diabetes Mellitus were enrolled and a number of biochemical and clinical investigations were carried out.

Let S denote fasting blood sugar, D denote the drug of Sulphonylureas/Metformin, I denote history of insulin and H denote the glycated haemoglobin level (HbA1c).

Carrying out a simple multiple linear regression on fasting blood sugar, we obtained

$$\hat{E}(S / D, I, H) = 145.47 + 1.722H - 0.56I + 9.554D - 1.264D * H - 2.408D * I - 0.262D * H * I$$

Thus

$$\hat{E}(S_{ah} - S_{0h}) = \hat{E}(S / D = 1, I, H = h) - \hat{E}(S / D = 0, I, H = h)$$

Giving

$$\hat{E}(S_{ah} - S_{0h}) = 9.554 - 1.264h - 20.408I - 0.262hI$$

Thus effect due to sulphonylureas/metformin therapy depended on HbA1c and history of insulin intake.

Estimating Type 2 Direct effect keeping HbA1c at a fixed level, say H_0

$$\hat{E}(S_{1H_0} - S_{0H_0}) = 9.554 - 1.264\hat{E}(H_0) - 20.408\hat{E}(I) - 0.262\hat{E}(H_0I) \dots (1)$$

Estimating $E(H_0)$ by regressing H on D and I

$$\hat{E}(H / D, I) = 11.285 + 0.639I + 1.288D - 1.28D * I$$

The average of $\hat{E}(H / D, I)$ across the population provided an estimate of $\hat{E}(H_0)$.

Since 17.9% of the patients have reported history of intake of insulin in the past,

$$\hat{E}(I) = \Pr(I = 1) = 0.179.$$

Thus average predicted value of HbA_{1c} under no drug therapy was given by

$$\begin{aligned}\hat{E}(H_0) &= \hat{E}(\hat{E}(H/D=0, I)) = \hat{E}(H/D=0, I=1)\hat{\Pr}(I=1) \\ &\quad + \hat{E}(H/D=0, I=0)\hat{\Pr}(I=0) \\ &= 11.924*0.179 + 11.285*0.821 = 11.399\end{aligned}$$

Or

$$\hat{E}(H_0) = 11.399.$$

Similarly, the average E(H/D=0, I)*I across the population provided an estimate of E(H₀*I).

Thus

$$\begin{aligned}\hat{E}(H_0 * I) &= \hat{E}(\hat{E}(H/D=0, I)) = \hat{E}(H/D=0, I=1)*1*\hat{\Pr}(I=1) \\ &\quad + \hat{E}(H/D=0, I=0)*0*\hat{\Pr}(I=0) \\ &= 11.924*0.179 + 0 \\ &= 2.134\end{aligned}$$

Or

$$\hat{E}(H_0 * I) = 2.134$$

Substituting these values back in (1), the type 2 direct effect of Sulphonylureas/Metformin therapy on fasting blood sugar was obtained as below:

$$\begin{aligned}\hat{DE} &= \hat{E}(S_{1H_0} - S_{0H_0}) = 9.554 - 1.264*11.399 \\ &\quad - 20.408*0.179 - 0.262*2.134 \\ &= -9.066\end{aligned}$$

Hence treatment of patients with Sulphonylureas/Metformin therapy resulted on an average a drop of 9 mg of blood sugar fasting if the effect of the drug was blocked on HbA_{1c}.

Conclusion:

The type 2 direct effect in epidemiological and other health research studies may play a very important and useful role as has been shown above. Therefore more research work should be undertaken to explore the utility of **Type 2 Direct Effect**.

Main reference:

Estimation of Direct Causal Effects Author(s): Maya L. Petersen, Sandra E. Sinisi and Mark J. van der Laan *Epidemiology*, Vol. 17, No. 3 (May, 2006), pp. 276-284

Field Epidemiology and Clinical Research at ICPO

Dr L. Satyanarayana and Dr Smita Asthana

Institute of cytology & Preventive Oncology (ICPO) ICMR, Noida

It was indeed a great opportunity for us as Principal Investigators to plan and successfully execute hugely funded and major clinico-epidemiological studies related to cervical cancer screening demonstration projects. The projects were-

- i. Screening for Cancer of Cervix by Aided Visual in a rural community of Dadri District Gautam Buddha Nagar. ICMR Granted a funding of Rs 74.0 lakhs for this project. Objectives were to demonstrate the implementation of

Aided Visual tests and to study the performance of aided visual test in a rural community.

- ii. CareHPV versus other options of Screening for Cancer of Cervix in a Rural Community- Demonstration project. Funding was Rs. 1.14 Cr from Melinda Bill Gates foundation through PATH (Programmes for appropriate technologies in health) Seattle, USA. Objective was to evaluate careHPV test for cervical screening in a rural population of North India.

Site Map was developed by us and the total Dadri rural area was divided in two halves each half was on either side of Dadri CHC the area for each of the project was demarcated and defined. Villages covered for both of the projects were 36 for ICMR and 42 for Path project. A baseline survey was conducted for both the project separately. Total women surveyed were 7604 for ICMR and 7704 for PATH project. Screening centers were established on CHC (Community Health center), PHC (Primary Health center), sub centers Anwanwadi center and village schools or any other place convenient for rural women to come for screening. Centers were established one or two at a time in a particular village then the center was moved to other village. Total ANMs trained were 36 (including staff of state Govt. primary health care workers) on cervical cancer screening aspect (visual inspection and Pap smear techniques) and total ASHAs (accredited social health activists) trained for motivational aspect were 150. Screen positives detected were referred to colposcopy clinic

established at CHC Dadri. Co PI (Dr Smita Asthana) performed colposcopy and cryo therapie along with field monitoring. For other clinical treatments surgery and Radiotherapy we developed a referral system to Lok Naik Hospital and All India Institute of Medical Sciences (AIIMS), New Delhi. The Project administration and monitoring was looked after by PI (Dr L Satyanarayana). Staff appointed was 9 for ICMR and 15 for PATH in both the project a total of 24 staff appointed (Two Doctors, three assistant statistician, three medical social workers, nine ANMs, three field attendants and three lab technicians).

The contribution was towards operational research and public health. ICMR Ad Hoc funded project demonstrated Visual inspection of cervix using Acetic acid (VIA) screening implementation successfully. A newer HPV DNA test called careHPV developed and tested by Qiagen & PATH was offered to ICPO for field demonstration. careHPV project at ICPO was a part of a multi country global project to explore the feasibility of careHPV Screening. Under our leadership at ICPO as Principal Investigators, demonstrated the screening implementation of careHPV testing and compared with other conventional methods. Care HPV was found to perform superior as compared to other tests. In addition, careHPV tests in combination with other tests was also tested on true field setting to see whether careHPV testing in combination with other conventional would improve detection rates. This might provide clues to policy makers in selection and implementation of suitable screening test for the prevention of disease.

Several publications have been brought out in International and national journals on various aspects of these projects. This work was authenticated by winning of two prestigious awards along with cash prizes from two international forums on cancer care. These studies are unique to conduct in a rural community of North India where most of the women were illiterate and had lack awareness about cervical cancer and screening. Health education material prepared was suitable for the need of community, to be used by ASHAs to motivate the women. A good coverage (65%) of population was achieved for women aged 30-59 years for screening. Our projects could show testing of the actual performance of screening test in true rural setting where women at risk were actually asymptomatic. Project demonstrated a referral system and a total of 10000 women screened and a total of 175 women harboring CIN lesions and cancer were treated during the project execution. These are good operational and public health contributions that could be useful for cervical cancer screening implementation.

List of Publications from ICMR Project

1. Labani Satyanarayana, Asthana S, Bhambhani S, Sodhani P, Gupta S. Implementation of cervical cancer screening: A demonstration in a rural community of North India. Clin Cancer Investig J 2014; 3: 43-8. **IF0.0 Citation-1**
2. Asthana S, Labani S. Factors associated with attitudes of rural women toward cervical cancer screening. Ind J Comm Med

2013;38:246-8. **IF 1.66 Citation 6**

3. Satyanarayana L, Asthana S, Bhambhani S, Sodhani P, Gupta S. A comparative study of cervical cancer screening methods in a rural community setting of North India. Ind J cancer 2014;51: 124-8. **IF 1.03 Citation 0.0**
4. Asthana S, Labani S. Cervical cancer screening from the perspective of a rural population of northern India. Ganga Ram Journal 2013;3; 128-131. **IF 0.0 Citation 0.0**

List of Publications from PATH Project

5. Asthana S, Labani S. Adjunct screening of cervical or vaginal samples using careHPV testing with Pap and aided visual inspection for detecting high-grade cervical intraepithelial neoplasia. Cancer Epidemiol. 2014 Dec 26. pii: S1877-7821(14)00214-8. **IF 2.56 Citation- yet to cite**
6. S Labani, S. Asthana, P. Sodhani, et al. CareHPV cervical cancer screening demonstration in a rural population of north India. E J O G R B 2014; 176: 75-9. **IF 1.63 Citation 4**
7. Jeronimo J, Bansil P, Lim J, Peck R, Paul P, Amador JJ, Mirembe F, Byamugisha J, Poli UR, Satyanarayana L, Asthana S; START-UP Study Group. A Multicountry Evaluation of careHPV Testing, Visual Inspection With Acetic Acid, and Papanicolaou Testing for the Detection of Cervical Cancer (Int J Gynecol Cancer 2014;

24: 576-585. **IF 1.94 Citation 10**

8. Labani S, Asthana S. Human papillomavirus viral load on careHPV testing of self-collected vaginal samples vs. clinician-collected cervical

samples. *European Journal of Obstetrics & Gynecology and Reproductive Biology* 2014; 181: 233–239. **IF 1.63 Citation-2**

Letter to Editor

Information Therapy – A Hope for Improving Primary Health Care in India

In the field of medicine, information management is indispensable need. A medical practitioner needs information in the form of patient medical history in order to have the correct diagnosis and plan the right course of treatment. At the same time it is also very important that the practitioner is able to keep a record of all the patient data which would include the patient medical history, treatment plan, prescriptions, any biological or clinical tests requested and the reports of any tests performed earlier; in a database or a software which would enable easy access and pulling out of the patient record during a follow up visit, ruling out the hassles of managing hard copies. However hard copy backups are always kept.

Patient needs information in the form of diagnosis, treatment plan, prescriptions and the tests requested for him. This is being practiced by many corporate hospitals now and some Government hospitals too have partially started incorporating this. The Central Government Health Scheme dispensaries have got a centralized system, software that maintains the CGHS patient data and their

prescriptions. But this is not just confined to the data management and record keeping but much more. Along with creating convenience of data access to doctors, it is equally important for the patient too to have access to (view only) his medical record, prescription and the schedule of appointments.

In India email use is on rise over a decade and there are 15% users in 2013 as compared to 46% in China and 84% in USA in the year 2014. Presently, mobile use could be an option as there are 74% mobile users in India and India ranks second in the globe. It could be beneficial in improving primary health care by a thorough information and communication medium such as email or text message on mobile phones.

A pre-requisite is that all the doctors, hospitals, chiropractors, laboratories, pharmacies and insurance companies have to work as a group and get registered to handle a pre designed and pre tested software application. As a part of administration, the registered hospital or clinic administration staff would register a patient along with the patient

contact information and the appointments would be booked. The application could be designed in a way that would send out automatic reminders to the patient through email, text message or an automated call. For diagnostic test results, a registered medical practitioner could request for the necessary tests for a registered patient to a registered diagnostic laboratory and the laboratory would be responsible to feed the patient results into the application for the doctor and the patient to view them. Then, the doctor/doctor assistant feeds in the necessary treatment plan for the team of doctors to be able to view it and function accordingly. For patient prescriptions, the doctor would order a prescription to a registered pharmacy of the patient's choice which would be at a close access to the patient

to pick up his medicines. The registered pharmacy would try to keep the medicine order ready for the patient to collect it.

Along with a web application, the application could be advanced further to get a mobile application and be right on the person's palm and just a few taps away.

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Referred source:

<http://www.plus91.in/plus91-arab-health-2015/>

Appeal 1

Esteemed members of the Society and the Office bearers are requested to send Original Articles; Technical Reports, Review Articles; ISMS Academic News items such as Workshops / Seminars Conducted in recent past or planed to be organized during 2015–16.

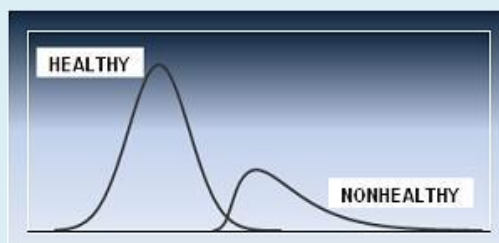
Also the personal academic achievements by the members, membership activity and messages including useful information to be shared with other members may be please forwarded to the official e-Mail address of ISMS bulletin at the earliest to enable us to include the same in the next issue of the bulletin.

e-Mail: ismsbulletin2013@gmail.com

Biostatistics Departments in Medical Institutions in India

(Part-II of the series to be continued...)

University College of Medical Sciences, Delhi



The seeds of this department were sown in the year 1987 when the college set up a Computer Cell with just one PC8086 computer, one Statistical Assistant, one Clerical Assistant and one Laboratory Attendant. PC was just introduced in India at that time. Dr Abhaya Indrayan was designated as the Officer-In-charge in view of his initiative but the facility was independent of the Department of PSM where he was Reader at that time. It had the facility of data analysis through SPSSv2.0 and payroll generation using Lotus123. The college (UCMS) became the first in the entire Delhi University setup to computerize payroll and provide payslips to the staff each month. SPSS was used to analyse the data of the research undertaken by the faculty.

The Cell did not limit itself to statistical help but was actively engaged in other computer-related activities. This was possibly the first in the entire country to get MedLARS service from NIC network on free trial basis in the year 1991 when it was just introduced in India, and email facility in the year 1992.

With the advancement of time and

technology, more and more machines, skilled and professionally qualified staff was added to the Computer Cell. Beside Biostatistical consultation and data analysis, programming work was also given priority to computerize histopathology laboratory, library and payroll for the college with the great efforts of Dr Ajay Bansal.

In view of our significant contribution, the Governing Body of the College upgraded the Computer Cell to the status of Division of Biostatistics and Medical Informatics (DBMI) in the year 1995. This also was completely independent of the Department of PSM and was directly under the Principal, and functioned just as any department with its own budget. With the raise in status, the Division did best of its efforts to provide computer to each department and networked them through Wi-Fi. DBMI was the first division among medical colleges in Delhi which managed to get the radio link and Wi-Fi. With the assistance of an enthusiastic alumnus, the Division started the college website in the year 1995. At that time, few medical colleges, if at

all, had website of their own.



A view of the college



The Head of the Department

Beside teaching to under- and post-graduate medical students, and in nursing and other paramedical courses, the Division continued its statistical activity in terms of providing world-class help to all the PGs and faculty in planning of their research, and in analysis and interpretation of their data. The Division also conducted research of its own and published more than 40 papers between 1995 and 2005, many in international journals. It was during this period that the Division collaborated on a large number of projects funded by the World Health Organization, UNAIDS, the World Bank and the DANPCB (Denmark agency). The staff of DBMI, particularly Dr Ajay Bansal and Dr Rajeev Kumar, significantly contributed to these efforts.

Department of Biostatistics and Medical Informatics

The year 2005 provided a watershed moment as the Division was formally upgraded to a full-fledged department. At that time only the CMC (Vellore), AIIMS (New Delhi) and SGPGI (Lucknow) had full department of biostatistics among medical colleges in India. This department remains first and only full department of biostatistics outside PG institutes in India. Because of its informatics activities, this was named as Department of Biostatistics and Medical Informatics. This has become model to emulate by others.



Dr Ajay Bansal



A view of the statistics and computer lab

The Department is providing all kinds of services like teaching to under- and postgraduate medical and para-medical students, biostatistical consultation for

planning and designing funded research projects and PG theses, data analysis, programming, hardware and software maintenance, network and server maintenance, website construction and maintenance, training, and research. The Department is running from 5 rooms plus a big hall serving as statistics and computer laboratory. It has its own small library, 2 teaching posts and 2 other academic posts. They are supported by 7 technical assistants, 2 statistical assistants and complete office infrastructure in terms office assistants and attendants. The Department is providing statistical computation help with SPSSv20.

Research

Beside providing world-class statistical help to a large number of PG theses that may have exceeded one thousand, the department has supervised/co-supervised many PG theses and PhD dissertations. Recently completed PhD dissertations are on

Multilevel modelling approach to evaluate the quality of the multivariable logistic reporting in national and international medical journals

Generalized linear models for correlated ordinal responses related to paired organs and their application to ophthalmology data

Mathematics of cluster analysis of mixed data and of time trends with bio-statistical applications

These show that the department has strong focus on core biostatistics topics, and not merely analysis of medical data.

Externally funded projects carried out or

collaborated by the department are as follows:

1. Health Atlas of India (ICSSR)
2. Indian Database on HIV/STD (UNAIDS)
3. Synchronization of HIV Databases in South Asian Countries (UNAIDS)
4. Rapid Assessment of Blindness. Danish Assistance to the National Programme for Control of Blindness (DANPCB)
5. A Package to Facilitate Rapid Assessment of Prevalence of Cataract Blindness in a Community. Danish Assistance to National Programme for Control of Blindness (DANPCB)
6. HIV Epidemiology in India (The World Bank)
7. Sensitivity analysis of the estimates of total HIV positives in India (The World Bank)
8. Teaching Health Statistics: Lesson and Seminar Outlines (WHO)
9. Changes in Sexual Behaviour in Response to Increased Risk Awareness (WHO)
10. Teaching Health Statistics: A Guide for Lesson and Seminar Outlines. Second Edition (WHO)
11. A Guide for National Burden of Disease Studies (WHO)
12. Health Information System in India (WHO)
13. Regional Averages of Health Indicators in South-East Asian Countries(WHO)

14. Indicators for Regional Representation in WHO–Executive Board (WHO)
15. 11 Health Questions about the 11 SEAR Countries (WHO)
16. Social Determinants of Health in South-East Asia and Western Pacific Regions (WHO)
17. Mortality in South-East Asia and Western Pacific Regions (WHO)
18. Burden of Disease in South-East Asia and Western Pacific Regions (WHO)
19. Non-communicable Diseases in South-East Asia (WHO)
20. Attributable Mortality due to Smokeless Tobacco in Countries of South-East Region (WHO)
21. Attributable Mortality due to Smoking, Use of Smokeless Tobacco and Dual Use in Major States of India (WHO)
22. Socio-demographic Factors Contributing to Smoking, Use of Smokeless Tobacco and Dual Use in Myanmar (WHO)
23. Demographic and Socio-economic Profile of Users of Various Forms of Tobacco in Nepal (WHO)
24. Tobacco Use in Maldives: An Analysis of Demographic and Health Survey Data (WHO)
25. Logistic Analysis of Demographic Contributors to Tobacco Use, Smoking and Smokeless Tobacco Use in Nepal (WHO)
26. Forecasting vascular disease cases and associated mortality in India (NCMH)

- Indrayan’s smoking index
- Indicators of positive health
- Relative performance of various cluster analysis procedures on random data
- Modelling for clustering of time trends
- Index of need of health resources
- Health cartography
- Nomograms for cluster sampling and sample size for estimating sensitivity and specificity
- Multilevel modelling
- First burden of disease estimates for major states of India
- First human development index values for Indian states
- Estimation of cases of CAD and diabetes in India (quoted as national estimates by the Govt. of India)

These again show that the department has been striving to make significant contribution to the core biostatistics topics that require out-of-box thinking.

Publications

The staff of the department so far has more than 250 publications including books published in the U.S. and Germany, chapters in books and large number of reports, including many for international organizations. This is despite strict policy of the department to not accept co-authorship in publications where the staff provided statistical help. This is contrary to the general practice in medical colleges where teachers want to be named as co-authors even when they provided laboratory help as part of their routine duty.

Original research of the department includes:

- Dr Abhaya Indrayan, PhD (Biostatistics): 226 (list available at <http://indrayan.weebly.com/publications.html>)
- Dr Ajay Bansal, PhD (Mathematical Statistics): 20
- Dr Rajeev Kumar, PhD (Biostatistics): 27
- The research done in the department has been presented in 17 international conferences.

Books published

- Medical Biostatistics, Third Edition, Chapman & Hall, CRC Press (USA), 2012
- Fundamentals of Medical Research, Lap Lambert (Germany), 2013
- Simple Biostatistics for MBBS, PG Entrance and USMLE, Fourth Edition, Academa, 2014
- Biostatistics for Medical, Nursing and Pharmacy Students, Prentice-Hall, 2006
- Basic Methods of Medical Research, Third Edition, AITBS, 2013
- Solution Manual for Introduction to Statistical Methods, Vol I, Rowman & Allanheld (USA), 1986

Recognitions

Dr A. Indrayan, Head of the Department till 2010 since inception, has been Visiting Faculty at the Ohio State University (USA) and

Visiting Research Scientist at University of Massachusetts (USA). He has delivered invited talks at The Ohio State University (USA), Food and Drug Administration (USA), National Center for Health Statistics (USA), University of Massachusetts (USA), and Hacettepe University (Turkey). He has been Short-Term Professional at the World Bank and UNAIDS, and Temporary Adviser to the World Health Organization a large number of times.

The Head of this Department was elected Fellow of the National Academy of Medical Sciences (India) (FAMS) in the year 1998 when very few non-medicals were so recognized. He is possibly the only Biostatistician in India to be elected as a Fellow of the Indian Academy of Sciences (FASc). This Academy is for all sciences of which medicine is just one component. This fellowship is recognized by UGC as an academic distinction. He is now President of the Indian Society for Medical Statistics.

Dr Ajay Bansal is Treasurer of the Indian Society for Medical Statistics and Treasurer of the Computer Society of India (Delhi Chapter).

Dr. Abhaya Indrayan,
Ex Senior Professor and Head,
Department of Biostatistics and Medical
Informatics
a.indrayan@gmail.com

National Institute of Medical Statistics

In early sixties, Division of Biostatistics was established at Indian Council of Medical Research (ICMR) catering the statistical needs of its various research programmes. With the passage of time and increasing demand for statistical consultation, training in research methodology and programme evaluation, it was converted into a full-fledged Institute for Research in Medical Statistics (IRMS) in the year 1976.



Prof C.R. Rao, Chairman of IRMS formation committee visiting the Institute in Dec 2000.



SAC members – Dr.M.C.Kapilashrami, Dr.K.V.Rao, Prof.R.C.Yadav, Prof.K.Ramachandran, Dr.M.D.Gupte, Prof.K.R.Sundaram, Prof.P.P.Talwar, Prof.Kaliaperumal, Dr.Padam Singh, Prof.Arvind Pandey, Prof.B.N.Bhattacharya at silver jubilee year 2002

Over the years, the Institute has grown in its stature due to the expansion of scope and contributions in the field and renamed as the National Institute of Medical Statistics (NIMS) in 2005.



On the occasion of renaming ceremony, sitting on the dais are Prof. Arvind Pandey, Dr. Padam Singh, Dr. N.K. Ganguly, Dr. A.D. Taskar and Dr. S.S. Verma

The Institute celebrated its foundation day in the centenary year of ICMR. Dr. Prashant Mohapatra, principle secretary, Gov. of Andhra Pradesh delivered the NIMS foundation Oration. Meeting was presided by Dr. V.M. Katoch, Secretary Health Research and DG, ICMR.

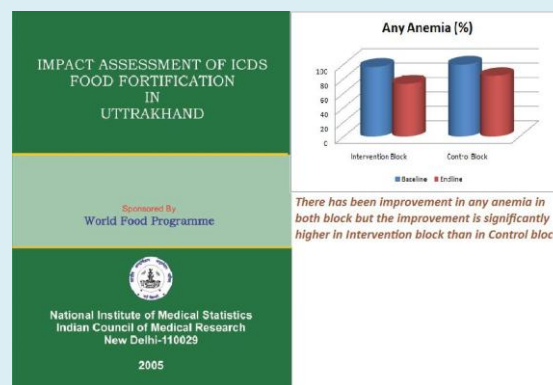
Past Directors of the institute, Dr. Padam Singh and Prof. K. Ramachandran were also present on the occasion.



The Institute undertook important research activities on modelling human reproductive process estimating various parameters which were directly not observable but essential for programme management. A number of programme evaluations were carried out which included, the health facility survey, causes of infant deaths assessment, coverage evaluation in demographically weak districts in India employing modified WHO thirty-cluster survey methodology. The Institute evaluated the Pulse Polio programme in Bihar through UNICEF.

The Institute jointly with the National JALMA Institute of Leprosy, Agra, undertook the endline survey of Mw vaccine trial in Ghatampur, Kanpur Dehat of Uttar Pradesh.

A study on the usage and acceptability of Indian System of Medicine and Homeopathy (ISM&H) was undertaken by the Institute in 2000-02. During the same period, NIMS evaluated the 'India Population Project - VIII (IPP-VIII)' in four metropolitan cities, namely Bangalore, Delhi, Hyderabad and Kolkata.

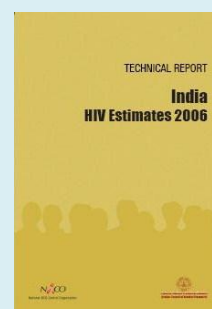


The Institute carried out research to provide empirical evidence on the impact of fortified ICDS supplementary in the States of Madhya Pradesh, Uttar Pradesh and Uttarakhand.

Towards adolescent health, the Institute assessed the impact of the Kishori Shakti Yojna (KSY) and Adolescent Friendly Health Facilities in India.

Epidemiology of HIV/AIDS

The NIMS have been collaborating with the National Institute of Health & Family Welfare (NIHFW) for NACO's HIV Sentinel Surveillance (HSS) and have been acting as a nodal Institute for the estimation of HIV/AIDS burden in the country since 2002. It undertook the Integrated behavioural and Biological Assessment (IBBA) along National Highways (IBBA-NH) assessing the outcomes and impact of the interventions under the BMGF Avahan project, India.

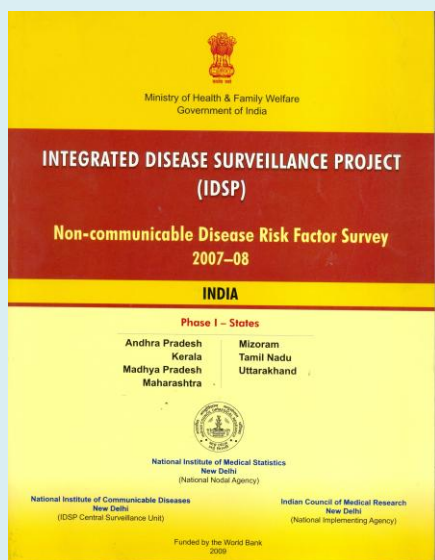


Survey Methodology

The Institute evolved innovative survey methodologies in health research, e.g. snowball sampling technique as a cost effective methodology for capturing maternal deaths; community based case control study to determine the risk factors associated with the maternal deaths, Lot Quality Assurance Sampling as rapid assessment technique for immunization coverage, and inverse sampling as a systemic approach for the estimation of disease burden of leprosy in India.

Non Communicable Diseases

In 2006-07, the Institute acted as the National Nodal Agency for the survey on NCD risk factors in India providing the estimate of prevalence of high risk factors in different strata of population, viz. age, sex and place of residence (urban/rural). A survey was also undertaken to review studies on screening strategies for cervical cancer in India.



Establishment of Health Sector Policy Reform Option Database (HSPROD)

In 2004-05, the Institute established an e-database of various health sector policy

reforms in collaboration with Central Bureau of Health Intelligence (CBHI) and technical support from European Commission Technical Assistance (ECTA). It is being used as reference material to solve common problems and improve the health management services.



Establishment of Clinical Trials registry India

Clinical Trials Registry - India (CTRI) (www.ctri.nic.in) has been established at the Institute as an online public record system for registration of clinical trials being conducted in India. It was launched on 20 July 2007 by the DG, ICMR in the presence of Drug Controller General, India (DCGI) and WHO Representative - India. Registration of trials in the CTRI is free. All registered trials are publicly available and searchable by anyone free of charge. The mission of the CTRI is to encourage all clinical trials conducted in India to be prospectively registered before the enrolment of the first participant and to disclose details of the 20 mandatory items of the WHO International Clinical Trials Registry Platform (ICTRP) dataset.



Ph.D. Programme at NIMS

Institute is recognised by Guru Govind Singh Indra Prastha University, New Delhi for undertaking the Ph.D. programme in Statistics. At present nine students are registered for Ph.D.

Research and Consultancies

The Institute have also been providing statistical consultancies to the researchers and students of various research institutes, medical colleges and hospitals.

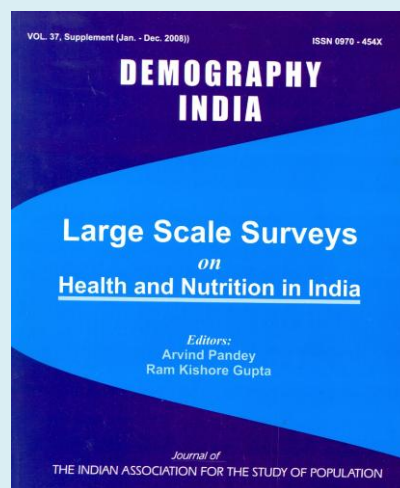
Major Training Workshops

Capacity building workshops of HIV estimation

The Institute have been organizing dissemination workshops on HIV/AIDS model based estimation technique in different regions of the country.

National Workshop of Issues related to Large Scale Surveys on Health and Nutrition

The Institute organized national workshop on Issues Concerning Large Scale Surveys on Health & Nutrition. The objectives were: (1) to prepare a document on various surveys undertaken on Health and Nutrition enlisting the problems and their management, and (2) to share experiences in conducting and dissemination of information on large-scale surveys with the experts and researchers. A special issue of Demography India was devoted to the Issues related to large scale surveys on health and nutrition.



CTRI Dissemination workshops

Dissemination Workshop for Clinical Trial Registry are being organized by NIMS,

throughout the country for Pharma industry and researchers in the field of clinical trials.



Training programmes on Medical Statistics to the students of M.Sc. (Statistics) /Health Statistics of various Universities

Training to the M.Sc. students of statistics and health statistics for different universities has been a regular feature of the Institute. A number of training programmes have been organized in this direction for various universities, viz., Banaras Hindu University, Kurukshetra University, and Delhi University.



NIMS organises orientation Course on Statistical Methods and SPSS for the faculty of National Institute of Public Cooperation and Child Development, New Delhi.



ISMS conferences organized by NIMS

X ISMS Conference in 1991 by IRMS (ICMR) & AIIMS, New Delhi

The institute organized the IXth ISMS conference in joint collaboration with All India Institute of Medical Sciences.



XX ISMS Conference and Silver Jubilee celebration in 2003

To mark the silver jubilee occasion Institute organized an oration programme on 19th December 2003 by Dr. J.K.Banthia Registrar General, India and Census Commission. The Institute also organized XX annual conference of Indian Society for Medical Statistics during 20-22 December 2003 in collaboration with Department of Biostatistics AIIMS.



Dr. J.K. Banthia, RGI delivered IRMS Silver Jubilee Oration and felicitated by Dr. Arvind Pandey, Director NIMS

The conference was preceded by a two day work shop on Statistical Methods in Epidemiology. Overall 147 delegates from National and International scientific organizations participated in the conference.

XXVIII ISMS Conference in 2010 by NIMS (Old IRMS) DELHI,

XXVIII Annual conference of ISMS was organized by NIMS and NIHFV jointly at New Delhi during 11-13 November.



Dr. V.M. Katoch, Secretary DHR & DG-ICMR, Dr. R.K. Srivastava, DGHS, Prof. Arvind Pandey, Director-NIMS & President ISMS, Dr. Deoki Nandan, Director-NIHFV, Dr. Venkatesan, Dr. RJ Yadav & Dr. V.K. Tiwari in the inaugural session of the XXVIII ISMS Conference

Association of NIMS with ISMS

Time period	Office Bearers and Conferences Organised by NIMS
1989 -1992	Dr. Padam Singh, Gen Secretary Dr. IMS Lamba, Treasurer Dr. Padam Singh, Gen Secretary and Organizing secretary, IX ISMS Conference in 1991, at IRMS Dr. IMS Lamba, Treasurer
1999 - 2001	Dr. IMS Lamba, Gen Secretary Dr. R J Yadav, Treasurer
2001 - 2002	Dr. Padam Singh, President Dr. IMS Lamba, Gen Secretary (2001) Dr. R J Yadav, Treasurer (2001) Prof. Arvind Pandey, Organizing Secretary, XX ISMS Conference in 2002 at IRMS
2009 -10	Dr. Arvind Pandey, President, Dr. R. J. Yadav, Organizing Secretary, XXVIII -ISMS Conference at NIHFV, 2010
2011 -13	Dr. R. J. Yadav, General Secretary Dr. Sharad Mathur, Treasurer

2014-2016	Dr. R. J. Yadav, EC Member, ISMS Dr. Sharad Mathur, EC Member, ISMS
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ISMS Honours and Awards for NIMS Scientists

1. FSMS Award	Dr Padam Singh, 1992 Prof. Arvind Pandey, 1998 Dr. R.J. Yadav, 2007 Dr. Abha Aggarwal, 2012
2. Prof S.K. Bhattacharya Oration Award	Prof. Arvind Pandey delivered the Prof. S.K. Bhattacharya Oration at the 32 nd Annual ISMS Conference, 2014 at Jammu
3. Prof. P.V. Sukhatme Award	Dr. R.J. Yadav, 1999 Dr. Abha Aggarwal, 2004
4. Prof. B.G. Prasad	Dr. Abha Aggarwal, 2010
5. Sirimati Suraj Kali Jain Award	Dr. Abha Aggarwal, 1993 Dr. Atul Juneja, 1990, 1996
6. Dr. R.N. Srivastava Award	Dr. Tulsi Adhikari, 2005

Dr. Arvind Pandey,
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Appeal 2

Esteemed members of the Society and the Office bearers are requested to send their recommendations / nominations and interests to help construct Editorial Advisory Board (International and National Members); Editorial Board (including Medical Faculty) and the Council of Regional Editors (Northern; North-Eastern; Eastern; Western; Central and Southern Regions). The anticipated eligibility requirements for would be members are highlighted on the very first page-"ISMS Bulletin Editors".

Interested members may please forward the contributed articles and suggestions to the official e-Mail address of ISMS bulletin.

e-Mail: ismsbulletin2013@gmail.com

Report on 32nd Annual National Conference of ISMS at Jammu & Kashmir

32nd Annual National Conference of Indian Society for Medical Statistics (ISMSCON14) was held in the Department of Statistics, University of Jammu, Jammu J&K during November 1-3, 2014 on the theme **“Recent Advances in Statistical Methods and their Applications in Health Sciences”** along with One Day Pre-Conference Workshop on **“Survival Analysis in Clinical Research (Hands on training in SPSS)”** on October 31, 2014. Prof Deshbandhu, Director Colleges Development Council, University of Jammu was the Chief Guest on the occasion of Pre-Conference workshop and he threw light on the utility of Statistics in almost every field of human activity in general, and on its use in the field of Medical and Health Sciences, in particular. About 75 scholars from across the country participated in the workshop in which Prof Anil Mathew, General secretary of Indian society for Medical Statistics, gave the introductory speech on Survival Analysis followed by lectures on Kaplan Meir Curve, Log Rank Test and Hazard Models besides conducting Group tasks for the participants. In the post lunch session lectures were delivered by Professor K K Singh of BHU Varanasi on Parametric Modeling and by Prof S N Dwivedi

on competing Risk Survival Analysis along with training on SPSS to give practical knowledge. In the Conference held between 1-3, November 2014, which was inaugurated by Prof R D Sharma, Vice Chancellor, University of Jammu, Prof K R Sundaram was the key note speaker who stressed upon various aspects of a good quality research paper. In the inaugural high academic excellence award was given jointly to Prof R K Soni and Prof S S Ganguly, award for applications of Statistics in epidemiology was awarded to Prof R P Srinivasan while Prof R N Srivastava award was given to Dr Brijesh Sathian. More than 250 scholars participated from about 19 states of the country and took part in the deliberations of the 3 day conference which included Invited Lectures, Brainstorming sessions, meetings and contributed paper/poster presentations in the fields of Biostatistics, Bioinformatics, Clinical trials, Epidemiological Methods, Food and Nutrition, Health Economics, Large Scale Surveys, Communicable and Non Communicable diseases, Occupational and Environmental Health, Urban Health, Sequential Analysis, Bayesian analysis, Statistical Genomics etc. Prof L Satyanarayana, Prof S S Ganguly, Prof K K Jose, Prof T B

Ramkumar, Prof Ravi K Mahajan, Prof Sangeeta Arora delivered invited lectures in the fields of Cancer incidence modeling, Cholera, Chikunguniya, Climate Change, Quality of life of infertile couples and so, on the first day of the conference besides about 80 paper presentations in parallel sessions. In the evening a colorful cultural show was organized by the students of University of Jammu, which included exhibition of local Dogri and Kashmiri culture and was applauded by everyone.

On the second and third day various invited lectures were organised which included lecture on Modelling Infectious Disease by Prof L Jeyaseelan, Kaplan-Meier and Cox Regression Model by Prof D K Ghosh, non parametric tests by Prof Kalpna Mahajan, Genetic Association

mapping of Count Phenotypes by Prof Saurabh Ghosh, Maternal Health Care by Prof Ram Kishore Gupta, Oncological Outcomes among Breast Cancer Patients by Prof S N Dwivedi, and on Clinical Trial of drugs by Prof Nazneen Shariff. About 125 papers were also presented on 2nd and 3rd day and the conference successfully concluded on 3.11.2014 with a well managed Valedictory function in which the ISMS Secretariat consisting of Dr D K Subbakrishna, Dr A Indrayan, Dr Anil Mathew, Dr A K Bansal and Dr Ajit Sahai along with the local organizing committee consisting of Prof J P Singh Joorel, Prof Rahul Gupta, Dr Pawan Kumar, Dr Parmil Kumar and Dr V K Shivgotra thanked all the participants and guests for making the conference a memorable academic event.















Statistics - from Protocol to Publication
Key-note address delivered at ISMSSCON-2014
by Prof. K. R. Sundaram

I started reviewing Medical Journal articles and Research Protocols after joining the Indian Council of Medical Research (ICMR) in 1969. Myself along with three other Statisticians from ICMR were required to scrutinize a large number of medical and health research protocols in statistical angles. It was a good experience and exposure for me. I could learn a lot in that process. Experience gained from ICMR was very useful to me in reviewing articles received for publication from reputed

Journals such as IJMR, IJP, IHJ, IP, NMJI, IJA & IJCM and many other medical and health research Journals since 1969. I was / am Statistical Consultant / Editorial Committee member / Reviewer to these Journals for many years. This article is based on my experience and exposure in reviewing articles received for publication in these Journals.

Statistics and Statistician were included in the review of scientific articles in Medical and allied Journals not very long ago, perhaps about

three decades ago and more seriously only about a couple of decades ago. Now, no Medical Journal, both International and National, accepts scientific papers for publication without getting them reviewed by qualified statisticians.

The reviewing statisticians may keep certain guidelines while reviewing the articles. The type of article coming for review could be any of the following categories: Case reports, short articles, short notes, clinical observations, epidemiological studies, clinical trials, collaborative study reports, original articles and review articles. Though the criteria to be used to review any scientific article are more or less the same, depending upon the type of study certain considerations are made. For example, for articles of the types of case reports or short notes stringent criteria and steps may not be necessary and possible. However the general guidelines for reviewing the articles are the same.

First of all the body of the paper with respect to the broad order of presentation is checked. The normal way of presentation of any scientific article could be:

- Abstract
- Introduction
- Methods
- Results/Findings
- Discussion/Conclusions
- References

Statistician goes through the whole article and not only the design & analysis, tables and graphs. Without going through the rationale and objectives of the study and the review of

literature proper justification cannot be done in reviewing the article.

The Abstract, which should give the overall summary of the article is gone through to get an idea of the article. The Introduction section should give the back ground of the article, past studies on the topic, lacunae in those studies and clear objectives of the study. The statistician goes through these sections carefully before reading the statistical part-material, methods & results.

The Material & Methods and results sections are designed to explain:

- *who* all and how many participated in the research
- *how* they were chosen (random sample, whether stratification done or not if required or any other type of sampling method appropriate for the study)
- the *design* of the research-whether it is a case study or case series analysis or cross-sectional study or case-control study or cohort study or clinical trial :
- what kind of research was done-whether it is only estimating the value of the parameter like mean & standard deviation / correlation / a percentage? or is it a hypothesis testing study ;
- how was the study done?- Did it involve interviews?, Did it involve clinical examination, laboratory investigations and reviewing medical records?;
- *how* the data were analysed, what statistical methods were used for the

analysis of data and are they appropriate

- how the results were presented and interpreted,
- what conclusions were drawn and
- whether the results are generalizable and statistically and clinically meaningful and valid?.

Source of the figures (mean & SD / correlation coefficient / percentage) of the parameters to be estimated and research hypotheses to be tested statistically based on which the minimum sample size was computed for the particular study, amount of statistical confidence (minimum 95% or higher than that) and allowable error (10%, 20% or any other scientifically acceptable figure) stipulated in case of estimation studies / amount of statistical confidence (minimum of 95% or higher than that) and power (minimum of 80 % or higher than that) stipulated in case of hypotheses testing studies, procedure used for estimating the minimum sample size and the method used for selecting the sample are carefully checked. The authors have to clearly state the design of the study like whether it is cross-sectional study, case-control study, cohort study, field study or a hospital based clinical trial or a community based prevention (prophylaxis) trials, whether it is parallel design or cross over design, what type of blinding was used, how the various parameters are collected and recorded, how the questionnaires were administered, whether reliability of the responses and investigators were studied or not, methods of statistical analysis applied for the

analysis of data and non-response rate, if any, and how it was adjusted or taken into consideration while analyzing the data and making interpretations.

Definitions and methods of measuring / recording of each of the background variables and study parameters are checked. For example, definition and classification of socio-economic class, literacy level and occupation are checked for their accuracy and acceptance. Similarly, method of measuring/recording various laboratory parameters and clinical investigations are checked for their accuracy, reliability and validity. Tools like interview schedules, questionnaires and proformae are also checked for their validity and reliability.

In the Results section, whether appropriate statistical methods are applied or not for the analysis of data as presented in the tables is checked. Also, it is verified whether proper interpretations of the results have been done or not while explaining the results of the data. Some of the examples are –whether paired Student's 't' test has been applied or not for the paired data (before and after design) whether or modified 't' test has been applied or not in case of heterogeneity of variances in the populations with respect to the variables studied, whether nonparametric test has been applied or not when the assumptions on normality of the distribution of the values of the variables and homogeneity of variances in the populations are violated and the sample size is very small, say, less than 30, whether, chi-squared with correction factor or Fisher's exact test has been applied or not for the analysis of data related to

categorical variables from small samples, whether Analysis of Variance has been applied or not in case there are more than two groups for comparison of the measurable variables, on an average etc.

Tables and graphs are checked carefully for their appropriateness, contents and presentation. Sometimes graphs may be preferred to Tables or vice-versa. Both Tables & graphs may not be suggested due to shortage of space available for the article in the Journal. Percentages, numbers, decimal points, spacing, headings & sub headings and units of measurements in case of measurable parameters are looked into. In the Results and Discussion section, it is checked whether the Research questions stated under Objectives are answered or not. Or, research hypotheses have been accepted or rejected? In case of rejection of the hypothesis, it is seen whether the 'p' value has been stated correctly or not and the confidence intervals have been given or not. In case of acceptance of the hypothesis it is seen whether Power of the test has been stated or not to see the adequacy of the sample size. Statistical significance indicators such as 'p' values etc. are checked carefully. Sometimes 'p' value might have been given as $p > 0.05$ in case of significance. Or, 'p' value might have been given as 0.00000, which has no meaning. While stating the results in terms of statistical significance, its clinical significance is also checked. If the sample size is very large a small difference could turn out to be statistically significant, but, it may not have any clinical significance.

Sometimes, the authors may merely state

that standard statistical techniques were applied to analyse the data. This is not acceptable. They should clearly state what all statistical methods were applied for the analysis of data, clearly specifying for which parameters they were applied. Proper references of the methods applied should be given for the benefit of the readers.

A good research paper will end with 'Discussion' and a 'Conclusion' sections. These sections are often the most useful parts of the article. It gives what the research findings mean and how they're relevant. The authors should also describe the *limitations* and drawbacks of their research. They should discuss what you can and *can't* conclude, what the research *failed* to find and how relevant the findings are to other people.

The editor of the journal communicates the comments of the statistician alongwith the comments of the other expert reviewers, with respect to the above mentioned sections. On receipt of the modified article, along with the satisfactory answers for the various comments, point by point, from the authors the editorial board takes appropriate decision on the inclusion of the article in their Journals for publication.

While re-reviewing the articles certain guidelines are followed. The authors are requested to provide point by point clarification so that proper care can be taken in verifying what points of the comments have been agreed upon and what points have not been agreed upon. If the authors have agreed upon certain points, it is clearly verified how they have been incorporated in the modified paper. For those

points for which the authors have not agreed upon, the justifications given for them are carefully gone through to see whether they are scientifically and statistically acceptable or not. If they are not acceptable, the reasons for non-acceptability are stated so as to enable the authors to look into them and to take care of them accordingly while modifying the article. Sometimes the authors may state that the suggested modifications have been incorporated. But, the authors should be asked to provide point by point clarifications separately in addition to modifying the paper as per the comments.

Care is taken not to reject any good article and not to accept really bad article.

The authors should note that articles with an appropriate design and with the data treated statistically applying appropriate statistical methods would certainly have very high chance of getting published in reputed journals. But, at the same time, they also may note that articles without an appropriate design and sample size and with wrongly applied statistical analysis of data and without conforming to the stipulated

guidelines may not have any chance of getting them published. Though this may sound a bit hard and harsh to the authors this is a reality in case of almost all the Indexed journals to enable them to keep up the standard of articles published in their Journals.

I feel that this article will convince the researchers that Statistics is inevitable right from the stage of preparing the research protocol till the article is getting published. Statistician plays a central part and not a subsidiary part in any research, including Medical and Health research.

Dr. K. R. Sundaram

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(Pages:15-17)*

Constitution and Award Rules Review Committee

- | | |
|-------------------|-----------------|
| 1. Dr A Indrayan | Member |
| 2. Dr G D Shukla | Member |
| 3. Dr Ajit Sahai | Member |
| 4. Dr Anil Mathew | Member |
| 5. Dr B L Verma | Chair/ Convenor |

This Committee, will review the existing Constitution, its Bye-Laws and Rules for Awards, propose changes and prepare new Draft - incorporating these changes, for further needful. The Committee has already started functioning. To proceed ahead in its working, your valuable suggestions, if any, are welcomed by the President.

Human Resource Development at ICPO Noida

Dr L. Satyanarayana, M. Sc, Ph D, FSMS – Scientist-F – Course Director and

Dr. Smita Asthana, MD (Community Medicine) Scientist-C – Course Coordinator

Research Methodology Courses at ICPO, Noida during Sept 2014- to Jan 2015 for UG/PG Bio-medical

Department of Biostatistics & Epidemiology is conducting workshops and training courses throughout the year. ICPO is training medical and nonmedical postgraduates, doctoral and medical Undergraduates on various aspect of Biomedical research including development of protocol, collection, analysis and interpretation of data and scientific writing. This report is in continuation with the earlier report published in

September 2014 ISMS Bulletin. Under graduate medical are targeted to give orientation in research to upcoming future clinical/medical researchers. However, the response was less active. Participants who attended the courses were highly satisfactory and well received the courses.

Details of Biostatistics and Epidemiology Training Courses (BETC) conducted during Sep 2014 to Jan 2015 at ICPO are shown in Table.

	Training course	Period	Duration	No. of persons trained
1	For Under Graduate Medical students a course on Project Protocol writing and Study report writing	29 th to 30 th September 2014; & Jan 7 th and 8 th Jan 2015	2 days	7
2	For PG Bio-Medical students a workshop on "Biostatistical Analysis and design of medical studies".	7 th to 10 th Oct 2014 & 12-15 Jan 2015	4 Days	20
3	For PG Bio-Medical students a workshop on "Protocol development & Research Paper writing".	13 th to 16 th Oct 2014	4 Days	16

4	For PG Bio-Medical /Statistics an “Orientation course on Research methodology & Biostatistical analysis”.	29 th Sep to 28 th Oct 2014	1 month course	6
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Information on Forthcoming Courses of BETC at ICPO Noida as available on ICMR Website are as Follows.

Research Methodology Courses at ICPO, Noida (Jan-March-May 2015) for UG/PG Bio-medical

1. For Under Graduate Medical:

2nd week of Jan-March-May 2015; seats: 10 in a month

- **Project Protocol writing** (one day course)
Rs. 500/- Dt: March 9th / May 5th
- **Study report writing** (one day course),
Rs. 500/- Dt: March 10th / May 6th
- **Protocol & Report writing** (Two day course) Fee: Rs.900/-;Dt: March 9-10 / May 5-6

2. For PG Bio-Medical:

3rd week of Jan-March-May 2015; seats: 10 in each month

- **Biostatistical Analysis and design of medical studies** (Four day course) Fee: Rs. 2500/- Dates: March 16-19 / May 11-14

3. For PG Bio-Medical:

4th week of Jan-March-May 2015; seats: 10 in each course

- **Protocol development & Research Paper writing** (Four day workshop) Fee: Rs.2500/- Dates; March 23-26 / May 18-21

4. For PG Bio-Medical/Statistics:

Month of Jan-March-May 2015; seats:5 in each month (Medical-2. Life sciences-2, Statistics-1)

- **Orientation course on Research Methodology & Biostatistical Analysis** (1 month course –on five day week basis);
Fee: Rs. 6500/- Date: March 2-31 / May 1-30

The number of participants for each course is limited to number mentioned above against each, and the selection of students and exact days of courses in each month in take will be intimated on receipt of a mail from interested students. Students interested may:

- i. first send their e-mail request at icpo.betc@yahoo.com along with a brief half page bio-data specifying college, city, email address and mobile contact number. Seats will be tentatively reserved in each particular month of interest to those who send mail requests.
- ii. Secondly, enrollment on selection to the course be made by paying the **course fee through demand draft / pay order in favour of Director, ICPO, NOIDA** payable at Noida or Delhi for each month course **any time**

in advance and 30th April 2015 for last course. Course Fee does not include lunch & Tea. For these in-house courses, organizers will help participants in arranging catering facilities on request.

Course Contents:

Types of studies (descriptive, analytical & clinical trials), sampling, sample size determination, data collection. Descriptive statistics, concept of p-values, confidence intervals, principles of statistical tests, tests on compare means & proportions, correlation, concepts of linear / logistic regressions, methods in epidemiology such as assess diagnostic tests, measures of disease

frequency, relative risks & odds ratios, etc.,. Hands on training of statistical analysis using SPSS for most biostatistical methods used in clinical research.

Steps in protocol preparation- Development of Research protocol, Writing Research Report, ethics in medical research. Biostatistics and Epidemiology Requirements of Research Protocol such as: Types of studies, sampling, data collection methods, approach of statistical evaluation (Descriptive statistics, Significance Tests, concept of p-values). Specific course wise details may be obtained on enrollment. Ethics in medical research, research paper writing and critical evaluation of research paper/ reports.



Indian Society for Medical Statistics (ISMS)

Minutes of the General Body (GB) Meeting held on 2nd November 2014 at the Seminar hall,
Department of Statistics, Jammu University, Jammu at 6.15 pm

Members present: 40

Agenda:

Item 1 – Welcome address

The president welcomed the members for the GB meeting and thanked the Jammu University authorities for hosting it.

Item 2 – Confirmation of the minutes of the GB Meeting held on 25th October 2013 at CMC, Vellore

The minutes of the GB meeting held on 25th October 2013 at CMC Vellore were accepted as a true record of the meeting

Item 3 – Opening remarks of the President

In the opening remarks, President highlighted the major activities of the society during the last one year. As suggested by the President, the members mourned the death of two senior fellows of the society -Prof J S Rastogi and Prof Deokinandan by observing 2 minutes of silence praying for their souls to rest in peace.

Item 4 – Report of the General Secretary

The General Secretary presented his report and explained the various works carried out by the society. The major activities of the year highlighted were updating the mailing address, creating a ISMS google group, finalizing the rules of several awards and getting a PAN Card for the society. The members appreciated the

efforts of the General Secretary. **GB approved the Google group** and **suggested** that list of emails of all members should be updated and included from time to time. The recommendations of various committees approved by the Executive Council (EC) were also presented which are mentioned below.

A. Recommendations of FSMS Committee

For the FSMS 2014 award, 3 nominations were received and the names of **Prof. N. Sreekumaran Nair**, Manipal and **Prof K Thennarasu**, Bangalore have been recommended by the FSMS committee.

B. Recommendations of Nominations Committee

The nominations committee recommended the name of Prof CM Pandey, SGPGI, Lucknow as President elect.

C. Recommendations of Award Committee

Smt Ramrati Lalima Sahai award 2014- **Prof. K Srinivasan**, Chennai Prof. P V Sukhatme award 2014 - No nomination received Prof. S K Bhattacharya award 2014 - **Prof. Ajit Sahai**, Puducherry

Smt. Suraj Kali Jain award 2014-No nomination received

Prof. B G Prasad award - **Dr. Anil Kumar**, JALMA Institute, Agra

Smt. Saroj Shukla award- No nomination received

Prof. A Indrayan travel award- **Dr. R K Gupta**
New Delhi, **Dr Ram Kumar**, Thrissur

Prof. K R Sundaram Young research scholar award - **Ms. Muthu Vijayalakshmi**, NIE, Chennai

Five applicants competed for this award. **Mr. John Michael Raj**, Christian Medical College, Vellore was adjudged as the winner.

GB approved these recommendations and the report of the General Secretary. Agenda item 5-Proposals for venue of conference in 2015

The venue for the next conference was discussed. There was a proposal from Dr Anil Kumar, National JALMA Institute for Leprosy, Agra and an oral request from SRM Medical College, Chennai. Dr Anil Kumar was suggested to back up his claim with a supporting letter from the institutes' Director. For the 2016 conference, there was a letter from Prof. Saurabh Ghosh of Indian Statistical Institute, Calcutta. As a policy, **it was decided** that the society takes decisions about the next year's conference only in that year.

Item 6 – Report of the Treasurer

The Treasurer reported that during the last seven months since he has taken over, 26 new life members have been recruited/enrolled and every attempt is being made to enrol more members. Members appreciated the Treasurer for obtaining the PAN Card of the society. The following suggestions made in the EC meeting were also presented.

1. During the ISMS conference, a membership drive could be undertaken by opening a desk in the registration counter.
2. A break-up of membership as medical and non medical is required.
3. The funding of various awards from their inception should be put in a flowchart to enable the currently available money for each award.
4. Interest on fixed deposit for each award fund should be credited to that fund only after subtracting the costs of medals or the mementos. **GB approved these recommendations and the report of the Treasurer.**

Item 7 – Report of the Editor

The Editor elaborated on the various steps taken to bring out the bulletin regularly with increased information which will be of use to the members and requested the members to contribute scientific articles for the bulletin. The members appreciated the sincerity and regularity of the editor in bringing out the bulletin. **It was decided** that further attempts to bring in a journal of the society should be suspended for a while and that we should concentrate on bringing out the bulletin, **It was also decided** to constitute an editorial board for the bulletin. The editor will choose the members for this board. **It was also decided** that an item under the heading of new publications should be included and extracts of their review from other journals could be reproduced which might help youngsters who may not have access to journals. GB approved

these recommendations and the report of the editor.

Item 8 – Other decisions:

A. ISMS Seminars, Lecturers and Workshops

The President mentioned that he feels satisfied that the Society has done some good work during the year in the form of workshops, seminars, lectures, refresher courses in various parts across the country even if not necessarily under the banner of ISMS as it was organised by ISMS active members and some even funded by Central funding agencies of the country. It may be interpreted as an ISMS activity. This activity has to expand in the coming years to create increased awareness about the field.

The membership fee structure was discussed in detail and **it was decided to change** the structure as below

Category	India	Foreign
Student (annual)	Rs.200	US \$ 20
Annual membership	Rs.500	US\$50
Life membership	Rs.3000	US \$ 200
Institutional membership (annual)*	Rs.10,000	US\$1000

*Institutional head can nominate three members for conferences on par with ISMS life members. All membership fee are for a calendar year - that shall begin from the month of January for the year of start. SAARC members have to pay in equivalent amount in Indian rupees at the same rate as for India. **Prof. Ajit Sahai** has agreed that he will try to

make three institutions to join the society through institutional memberships. GB approved these recommendations.

C. Annual expense of the Secretariat

In order to meet the routine expenses of the secretariat it was **decided** that a sum of Rs 15,000 be released **as advance** to the General Secretary, Rs. 5000 each to the Treasurer and the Editor. This will be received on 1 January every year and accounts submitted during the EC that year.

D. Donations from FSMS members

It was also decided that all FSMS awardees shall pay Rs. 10,000 to the society from the year 2015 as Fellowship fee by June 30th of the following year. This condition will be included and displayed in the Society's website and in the circular seeking the nominations. Without this, no fellowship award be made henceforth.

E. Constitution and award review sub committee

In order to review the existing ISMS Constitution, rules of the society, rules of the awards and to give recommendations wherever changes are needed, **a subcommittee was formed** with the President as chairman, Prof. B L Verma and the General Secretary as members. They were **also permitted** to coopt other members.

F. Registration

The Society's registration with Registrar of cooperative societies has to be renewed. In order to complete the formalities, Prof, A. Indrayan and Dr A K. Bansal **were requested** to kindly look into the same.

G. MCI issues

It was also **decided** to form a committee with Prof. A Indrayan as Chairman, with Prof. B L Verma, Prof. Ajit Sahai and Prof. K R John as members to act at the earliest to get into the long pending issues of MCI recommendations on biostatistics related curriculum, infrastructure and manpower for all the UG as well as PG Medical colleges in the country. They were **also permitted** to co-opt other members.

H. ISMS Web coordinator

The members appreciated the efforts of Prof. B. Antonisamy, ISMS Web coordinator & Professor and Head of Biostatistics, CMC Vellore in providing stability and respectability to the ISMS web site. It was **decided** that ISMS Web-coordinator is an important official position and should be an ex-officio member of ISMS EC.

I. SMS Awards and Conference certificates

It was **decided** that ISMS conference certificates should be signed only by the President, General Secretary and Organizing Secretary OR Organizing Chairman. ISMS awards certificates should be signed by the President and the General Secretary. ISMS Life member certificates should be signed by the President, Treasurer and the General Secretary.

J. Timing of GB Meeting

It was decided that GB meeting should be held on Day 1 of the Annual Conference to facilitate more members to attend the meeting.

K. Donation from Prof. Madhutekha Bhattacharya

The GB thanked the generosity of Prof. M.Bhattacharya & family promising to donate **Rs 1 Lakh** towards **Prof. S K Bhattacharya Oration Award** of the Society. The Donors expressed their wish that out of the interest released, the speaker should be given a cash award of Rs. 5000 in addition to a memento.

Item 9 – Thanks for the outgoing members

The GB placed on record the excellent services of Prof. T Krishnan as Editor, EC member and President of the Society. The GB feels that he should continue to guide the society.

Item 10 – Vote of thanks

The meeting concluded with a vote of thanks by the President to all the members for their valuable suggestions for the proper functioning of ISMS. The President also thanked the administration of University of Jammu for hosting the 32nd Annual National Conference.

DK Subbakrishna – President

Anil C Mathew – General Secretary

Actions arising from the minutes of EC approved in the GB

Action	By whom?	When?
Updating the address at ISMS google group	Dr. Anil C Mathew	Immediate
Break up of membership as medical and non medical	Dr. A K Bansal	Immediate
Funding of various awards from their inception to put in a flowchart	Dr. A K Bansal	Immediate
Editorial board for the ISMS Bulletin	Dr. Ajit Sahai	2015
Revised membership form	Dr. Anil C Mathew	Jan-15
To enroll minimum three institutions to the Society through institutional membership	Dr. Ajit Sahai	2015
Amount to be released for the annual expenses of the Secretariat	Dr. A K Bansal	Jan-15
Preparing the revised constitution/revised rules for the awards	Dr. A Indrayan Dr. B L Verma Dr. Anil C Mathew	Jun-15
Look into registration of the Society	Dr. A Indrayan Dr. A K Bansal	2015
MCI recommendations on biostatistics-related curriculum, infrastructure and manpower in medical colleges	Dr. A Indrayan Dr. B L Verma Dr. Ajit Sahai Dr. K R John	2015

ISMS Committee on MCI Issues

- | | |
|-------------------|---------------------|
| 1. Dr. A Indrayan | 4. Dr. K R John |
| 2. Dr. B L Verma | 5. Dr CM Pandey |
| 3. Dr. Ajit Sahai | 6. Dr Manoj Diwakar |

The Committee has already started functioning. To proceed ahead in its working, your valuable suggestions, if any, are welcomed by the President.

Executive Council

President (2015-16)



Dr. A Indrayan,
Noida.
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President Elect (2015-16)



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Member (2013-15)



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Chairman



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Member



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*Chairman, Smt. Ramrati
Lalima Sahai Award
Committee*

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Member



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Chairman



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Member



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Member



Dr. Ajit Sahai,
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**33rd Annual National Conference of the
Indian Society for Medical Statistics
(ISMSCON–2015)**

14th to 16th October 2015, Belagavi (Belgaum), Karnataka

Focal Theme:

*National Conference on
Statistics in Practice and Research of Modern and
Traditional Medicine*

Pre-Conference Events

13th October 2015, JNMC Campus, Belgaum

Further Information:

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