

Scientist Profile

Name: Dr K Rajendran
Designation: Scientist – “E”
Date of Birth: 15 02 1966
Date of Joining in ICMR: 21.02.1994
Date of joining present post: 01.09. 2021
Discipline: Statistics
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Dr K Rajendran, PHD.,
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Scholastic record

Degree/Subject	Institution/ University	Year	Grade/ Division
1) B.Sc/Statistics	Bharathidasan University	1989	First class
2) M.Sc/Statistics	Madras University (LOYOLA COLLEGE)	1991	First class
3) Ph.D/Bio- Statistics	Jadavpur University Kolkata, West Bengal, INDIA.	August 2009	Title of thesis:- Novel statistical applications for the inference of spatial and temporal distribution of cholera in and around Calcutta, India.

Twenty-eight year’s exposure of Bio-Statistics in the Bio-medical Research includes applied research fields diarrhoeal diseases (past) and Tuberculosis (present), of which design the research proposal, data management, statistical Analysis of Epidemiological studies, Clinical Trials, Microbiological Studies, Vaccine Trails Etc... the details proficiency of statistical application of

Multivariate models includes parametric and non-parametric models, cluster models, General linear models, mixed models, regression models, log-linear models, survival Models and time series model. I have exposure in statistical packages SPSS, S-PLUS, EPI-INFO, in spatial analysis by using Geographical Information system (GIS) Arcview, Gram++ in health research and Diseases Burden Analysis. Handled around 30 intramural and extramural projects has resultant 69 publications in international and national journals. I have acquired 29 trainings in different field in the reputed international and national Instructions includes Awarded WHO fellowship to equip competence of Epidemiology and Bio-Statistics at KKU, Thailand. Received best poster award in climatic research an International symposium on 2009, WHO's Clinical Data Management training has been received at TU, Thailand. I have acquired exposure in GIS at ISI, Kolkata and IVI, Seoul, Korea. I have presented my research work in 13 national and international conference includes India, Japan, USA, Malaysia and Bangladesh.

11. Projects Handled

1. Completed 14 intramural projects: Co-PI for 12 projects and PI for 2 Projects (ICMR)-NICED
2. Completed 3 extramural projects (Co-PI) (IVI, WHO)-NICED
3. 5 ongoing institutional projects (Co-PI in TRC)
4. 7 extramural projects have been completed projects (PI &Co-PI in TRC)

12. LIST OF PUBLICATION:

- 1) **Rajendran Krishnan**, Kannan Thiruvengadam, Lavanya Jayabal, Sriram Selvaraju, Basilea Watson, Muniyandi Malaisamy, Karikalan Nagarajan, Srikanth P Tripathy, Ponnuraja Chinnaiyan, Padmapriyadarsini Chandrasekaran. An influence of dew point temperature on the occurrence of Mycobacterium tuberculosis disease in Chennai, India (**Accepted by Nature Scientific Report**)
- 2) Dolla CK, Dhanaraj B, Chandrasekaran P, Selvaraj S, Menon PA, Thiruvengadam K, **Krishnan R**, Mondal R, Malaisamy M, Marinaik SB, Murali L, Tripathy SP. Prevalence of bacteriologically confirmed pulmonary tuberculosis and associated risk factors: A community survey in Thirvallur District, south India. PLoS One. 2021 Oct 5;16(10):e0247245. doi: 10.1371/journal.pone.0247245. PMID: 34610012; PMCID: PMC8491886.
- 3) Malaisamy M, Nagarajan K, Kirti T, Malkeet S, Venkatesan P, Senthilkumar S, Sananthya K, **Rajendran K**, Kavitha R, Vivekanandan S, Selvavinayagam TS. Economic Evaluation of Implementing a Rapid Point-of-Care Screening Test for the Identification of Hepatitis C Virus under National Viral Hepatitis Control Programme in Tamil Nadu, South India. J Glob Infect Dis. 2021 Aug 31;13(3):126-132.
- 4) Muniyandi M, Karikalan N, Ravi K, Sengodan S, **Krishnan R**, Tyagi K, Rajsekar K, Raju S, Selvavinayagam TS. An economic evaluation of implementing a decentralized dengue screening intervention under the National Vector Borne Disease Control Programme in Tamil Nadu, South India. Int Health. 2021 Aug 28:ihab045. doi: 10.1093/inthealth/ihab045. Epub ahead of print. PMID: 34453836.
- 5) Muniyandi M, Tyagi K, Singh M, Prakash V, Karikalan N, Senthilkumar S, Karthikeyan S, **Krishnan R**, Rajsekar K, Shanmugam V, Selvavinayagam TS. Economic evaluation of implementing a decentralised Hepatitis B virus diagnostic intervention under National Viral

- Hepatitis Control Programme in Tamil Nadu, South India. *Trop Med Int Health*. 2021 Mar;26(3):374-384.
- 6) Muniyandi M, Karikalan N, Kannan T, Saravanan B, Vidhya P, **Rajendran K**. TB diagnostic cascade among patients registered under the Revised National TB Control Programme in Chennai, South India. *Trop Med Int Health*. 2020 May;25(5):612-617.
 - 7) Muniyandi M, Thomas BE, Karikalan N, Kannan T, **Rajendran K**, Saravanan B, Vohra V, Okorosobo T, Lönnroth K, Tripathy SP. Association of Tuberculosis With Household Catastrophic Expenditure in South India. *JAMA Netw Open*. 2020 Feb 5;3(2):e1920973.
 - 8) Muniyandi M, Thomas BE, Karikalan N, Kannan T, **Rajendran K**, Dolla CK, Saravanan B, Tholkappian AS, Tripathy SP, Swaminathan S. Catastrophic costs due to tuberculosis in South India: comparison between active and passive case finding. *Trans R Soc Trop Med Hyg*. 2020 Feb 7;114(3):185-192.
 - 9) Dolla CK, Dhanraj B, Malaisamy M, Padma PC, Syeed HS, Natrajan M, **Rajendran K**, Tripathy SP. Burden of pulmonary tuberculosis in modern prison: a cross sectional prevalence survey from south India, *Indian J Tuberc*. 2019 Jan;66(1):189-192.
 - 10) Sarin R, Vohra V, Singla N, Thomas B, **Krishnan R**, Muniyandi M, Identifying costs contributing to catastrophic expenditure among TB patients registered under RNTCP in Delhi metro city in India, *Indian J Tuberc*. 2019 Jan;66(1):150-157.
 - 11) Chowdhury G, Stine OC, **Rajendran K**, Mukhopadhyay AK, Okamoto K, Ramamurthy T. Detection of Uncommon Enteric Bacterial Pathogens from Acute Diarrheal Specimens using SYBR-Green Real Time PCR. *Jpn J Infect Dis*. 2019 Mar 25;72(2):88-93.
 - 12) Chowdhury G, Pazhani GP, Sarkar A, **Rajendran K**, Mukhopadhyay AK, Bhattacharya MK, Ghosh A, Ramamurthy T. Carbapenem Resistance in Clonally Distinct Clinical Strains of *Vibrio fluvialis* Isolated from Diarrheal Samples. *Emerg Infect Dis*. 2016 Oct;22(10):1754-61.
 - 13) Bhattacharya MK, Kanungo S, Ramamurthy T, **Rajendran K**, Sinha A, Bhattacharya A, Sarkar BS. Comparison between Single Dose Azithromycin and Six Doses, 3 Day Norfloxacin for Treatment of Cholera in Adult. *Int J Biomed Sci*. 2014;Dec;10(4):248-51.
 - 14) Mullick S, Mandal P, Nayak MK, Ghosh S, De P, **Rajendran K**, Bhattacharya MK, Mitra U, Ramamurthy T, Kobayashi N, Chawla-Sarkar M. Hospital based surveillance and genetic characterization of rotavirus strains in children (<5 years) with acute gastroenteritis in Kolkata, India, revealed resurgence of G9 and G2 genotypes during 2011-2013. *Vaccine*. 2014 Aug 11;32 Suppl 1:A20-8.
 - 15) Mukherjee AK, Chowdhury P, **Rajendran K**, Nozaki T and Ganguly S. Association between *Giardia duodenalis* and coinfection with other diarrhea-causing pathogens in India. *Biomed Res Int*. 2014 May. Volume 2014 (2014), Article ID 786480, 7 pages. <http://dx.doi.org/10.1155/2014/786480>.
 - 16) Pazhani GP, Bhowmik SK, Ghosh S, Guin S, Dutta S, **Rajendran K**, Saha DR, Nandy RK, Bhattacharya MK, Mukhopadhyay AK, Ramamurthy T. Trends in the epidemiology of pandemic

and non-pandemic strains of *Vibrio parahaemolyticus* isolated from diarrheal patients in Kolkata, India. *PLoS Negl Trop Dis*. 2014 May 1-8(5).

- 17) Saha DR, Guin S, **Krishnan R**, Nag D, Koley H, Shinoda S, Ramamurthy T. Inflammatory diarrhea due to enteroaggregative *Escherichia coli*: evidence from clinical and mice model studies. *Gut Pathog*. 2013 Dec 3; 5(1):36.
- 18) Roy S, **Krishnan R**, Mukherjee S, Schneiders T, Niyogi SK, Basu S. Prevalence of ST131 virulence-associated strains among CTX-M-producing *Escherichia coli* in the gut of hospitalized neonates in India. *Diagn Microbiol Infect Dis*. 2013 Oct; 77(2):158-9.
- 19) Sumi A, **Rajendran K**, Ramamurthy T, Krishnan T, Nair GB, Harigane K, Kobayashi N. Effect of temperature, relative humidity and rainfall on rotavirus infections in Kolkata, India. *Epidemiol Infect*. 2013 Aug; 141(8):1652-61.
- 20) Das P, Singh AK, Mukherjee S, **Rajendran K**, Saha DR, Koley H, Basu S. Composition of *Escherichia coli* population in the neonatal gut: phylogroups and virulence determinants. *J Med Microbiol*. 2013 Nov;62(Pt 11):1680-7.
- 21) Mukherjee P, Ramamurthy T, Bhattacharya MK, **Rajendran K**, Mukhopadhyay AK. *Campylobacter jejuni* in Hospitalized Patients with Diarrhea, Kolkata, India. *Emerg Infect Dis*. 2013 Jul;19(7):1155-6.
- 22) Dharanidhran Ramamurthy, Gururaja P. Pazhani, Abirban Sarkar, Ranjan K. Nandy, **Krishnan Rajendran**, Dipika Sur, Bamkesh Manna, Thandavarayan Ramamurthy. Case-Control study on the Role of Enterotoxigenic *bacteroides fragilis* as a cause of diarrhea among children in Kolkata, India. *PLoS ne*.2013;8(4):e60622.
- 23) Devarati Dutta, Goutam Chowdhury, Gururaja P. Pazhani, Sucharita Guin, Danjuncta Dutta, Santanu Ghosh, **K. Rajendran**, Ranjan K Nandy, Assish K. Mukhopadhyay, Mihir K Bhattacharya, Utpala Mitra, Yoshifumi Takeda, G. Balakrish Nair, and Thandavarayan Ramamurthy. *Vibrio Cholerae* Non-O1, Non-O139 serogroups and cholera-like diarrhea, Kolkata, India. *Emerg Infect Dis*. 2013 Mar.19(3):464-67..
- 24) Das S, **Rajendran K**, Dutta P, Saha TK, Dutta S. Validation of a new serology-based dipstick test for rapid diagnosis of typhoid fever. *Diagn Microbiol Infect Dis*. 2013 May;76(1):5-9.
- 25) Dutta S, Guin S, Ghosh S, Pazhani GP, **Rajendran K**, Bhattacharya MK, Takeda Y, Nair GB, Ramamurthy T. Trends in the Prevalence of Diarrheagenic *Escherichia coli* Hospitalized Diarrheal Patients in Kolkata, India. *PLoS ne*.2013;8(2):e56068. doi: 10.1371/journal.pone.0056068. Epub 2013 Feb 14. PubMed PMID: 23457500;
- 26) Mazumdar J, Chawla-Sarkar M, **Rajendran K**, Ganguly A, Sarkar UK, Ghosh S, Sarkar MD, Maulik S. Burden of respiratory tract infections among paediatric in and out-patient units during 2010-11. *Eur Rev Med Pharmacol Sci*. 2013;17:802-808.

- 27) Chowdhury G, Pazhani GP, Dutta D, Guin S, Dutta S, Ghosh S, Izumiya H, Asakura M, Yamasaki S, Takeda Y, Arakawa E, Watanabe H, Mukhopadhyay AK, Bhattacharya MK, **Rajendran K**, Nair GB, Ramamurthy T. *Vibrio fluvialis* in Patients with Diarrhea, Kolkata, India. *Emerg Infect Dis.* 2012 Nov;18(11):1868-71.
- 28) Pativada M, Nataraju SM, Ganesh B, **Rajendran K**, Ramamurthy T, Ganguly S, Bhattacharya MK, Ghosh M, Kobayashi N, Krishnan T. Emerging trends in the epidemiology of human astrovirus infection among infants, children and adults hospitalized with acute watery diarrhea in Kolkata, India. *Infect Genet Evol.* 2012 Aug 11;12(8):1685-1693.
- 29) Sabui S, Dutta S, Debnath A, Ghosh A, Hamabata T, **Rajendran K**, Ramamurthy T, Nataro JP, Sur D, Levine MM, Chatterjee NS. Real-Time PCR-Based Mismatch Amplification Mutation Assay for Specific Detection of CS6-Expressing Allelic Variants of Enterotoxigenic *Escherichia coli* and Its Application in Assessing Diarrheal Cases and Asymptomatic Controls. *J Clin Microbiol.* 2012; 50(4):1308-12.
- 30) Madhu S P, Chatterjee D, Nataraju SM, **Rajendran K**, Bhattacharya MK, Ghosh M, Kobayashi N, Krishnan T. Emergence of unique variants and inter-genotype recombinants of human astroviruses infecting infants, children and adults in Kolkata, India. *Int J Mol Epidemiol Genet* 2011;2(3):228-235.
- 31) B. L. Sarkar, T. S. Bhowmick, M. Das, **K. Rajendran**, G. Balakrish Nair. Phage Types of *Vibrio cholerae* O1 and O139 in the Past Decade in India. *Jpn. J. Infect. Dis.*, 64 (4), 312-315, 2011.
- 32) Ghosh S, Pazhani GP, Chowdhury G, Guin S, Dutta S, **Rajendran K**, Bhattacharya MK, Takeda Y, Niyogi SK, Nair GB, Ramamurthy T. Genetic Characteristics and Changing Antimicrobial Resistance among *Shigella* spp Isolated from Hospitalized Diarrhoeal Patients in Kolkata, India. *J Med Microbiol.* 2011;60(10):1460-6.
- 33) **Rajendran K**, Sumi A, Bhattachariya MK, Manna B, Sur D, Kobayashi N, Ramamurthy T. Influence of relative humidity in *Vibrio cholerae* infection: A time series model. *Indian J Med Res.* 2011 Feb;133(2):138-45.
- 34) Brianna Lindsay, T. Ramamurthy, Sourav Sen Gupta, Yoshifumi Takeda, **Krishnan Rajendran**, G. Balakrish Nair, and O. Colin Stine. Diarrheagenic Pathogens in Polymicrobial Infections. *Emerg Infect Dis.* 2011 ; 17(4) :606-611.
- 35) Phalguni Dutta, Utpala Mitra, Shanta Dutta, Dhira Rani Saha, Trailokya Nath Naik, **Krishnan Rajendran** , Tushar Kanti Saha and Mrinal Kanti Chatterjee. Zinc , vitamin A and micronutrients supplementation in pediatric diarrhea: A randomized controlled clinical trial of combination versus monotherapy. *J Pediatr.* 2011;159(4):633-7.
- 36) Dutta P, Mitra U, Dutta S, **Rajendran K**, Saha TK, Chatterjee MK. Randomised controlled clinical trial of *Lactobacillus sporogenes* (*Bacillus coagulans*), used as probiotic in clinical practice, on acute watery diarrhoea in children. *Trop Med Int Health.* 2011;16(5); 555-561.

- 37) Ganesh B, Nagashima S, Ghosh S, Nataraju SM, Rajendran K, Manna B, Ramamurthy T, Niyogi SK, Kanungo S, Sur D, Kobayashi N, Krishnan T. Detection and molecular characterization of multiple strains of Picobirnavirus causing mixed infection in a diarrhoeic child: Emergence of prototype Genogroup II-like strain in Kolkata, India. *Int J Mol Epidemiol Genet* 2011;2(1):61-72.
- 38) Nandy S, Mitra U, **Rajendran K**, Dutta P, Dutta S. Subtype prevalence, plasmid profiles and growing fluoroquinolone resistance in *Shigella* from Kolkata, India (2001-2007): a hospital-based study. *Trop Med Int Health*. 2010 Dec;15(12):1499-1507.
- 39) Nataraju SM, Pativada M, Chatterjee D, Nayak MK, Ganesh B, Bhattacharya MK, Ramamurthy T, Ganguly S, Saha DR, **Rajendran K**, Ghosh M, Kobayashi N, Krishnan T. Molecular epidemiology of norovirus infections in children and adults: sequence analysis of region C indicates genetic diversity of NVGII strains in Kolkata, India. *Epidemiol Infect.* 2011; 139: 910-918.
- 40) Nair GB, Ramamurthy T, Bhattacharya MK, Krishnan T, Ganguly S, Saha DR, **Rajendran K**, Manna B, Ghosh M, Okamoto K, Takeda Y. Emerging trends in the etiology of enteric pathogens as evidenced from an active surveillance of hospitalized diarrhoeal patients in Kolkata, India. *Gut Pathog.* 2010 5;2(1):4.
- 41) Ghosh S, Batabyal P, **Rajendran K**, Palit A. Typhoid fever in rural communities of West Bengal, India--an age-wise perspective. *Jpn J Infect Dis.* 2010 May;63(3):219-21.
- 42) Kanungo S, Tsuzuki A, Deen JL, Lopez AL, **Rajendran K**, Manna B, Sur D, Kim D R, Gupta VK, Ochiai RL, Ali M, Seidlein Lorenz von, Bhattacharya SK, Clemens JD. Verbal autopsy to determine causal, age, and gender mortality patterns in an urban slum in Kolkata, India. *Bull World Health Organ.* 2010
- 43) Ganesh B, Nataraju SM, **Rajendran K**, Ramamurthy T, Kanungo S, Manna B, Nagashima S, Sur D, Kobayashi N, Krishnan T. Detection of closely related Picobirnaviruses among diarrhoeic children in Kolkata: evidence of zoonoses? *Infect Genet Evol.* 2010 ;10(4):511-6.
- 44) Agrawal AS, Sarkar M, Chakrabarti S, **Rajendran K**, Kaur H, Mishra AC, Chatterjee MK, Naik TN, Chadha MS, Chawla-Sarkar M. Comparative evaluation of real-time PCR and conventional RT-PCR during a 2 year surveillance for influenza and respiratory syncytial virus among children with acute respiratory infections in Kolkata, India, reveals a distinct seasonality of infection. *J Med Microbiol.* 2009; 58(12):1616-22.
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- 46) Saha DR, Datta S, Chattopadhyay S, Patra R, De R, **Rajendran K**, Chowdhury A, Ramamurthy T, Mukhopadhyay AK. Indistinguishable cellular changes in gastric mucosa between *Helicobacter pylori* infected asymptomatic tribals and duodenal ulcer patients. *World J Gastroenterol* 2009; 15(9): 1105-1112.
- 47) Constantin de Magny G, Murtugudde R, Sapiano MR, Nizam A, Brown CW, Busalacchi AJ, Yunus M, Nair GB, Gil AI, Lanata CF, Calkins J, Manna B, **Rajendran K**, Bhattacharya MK,

Huq A, Sack RB, Colwell RR. Environmental signatures associated with cholera epidemics. Proc Natl Acad Sci U S A. 2008 ;105(46):17676-17681.

- 48) **K Rajendran**, T.Ramamurthy and S.K. Bhattacharya Log-linear model to asses socioeconomic and environmental factors with childhood diarrhoea using hospital based surveillance J Mod. Appl Stat Methods. 2008 ; 7(1),304-313.
- 49) D.R. Saha, **K. Rajendran**, T. Ramamurthy, R.K. Nandy and S.K. Bhattacharya. Intestinal parasitism and Vibrio cholerae infection among diarrhoeal patients in Kolkata, India. Epidemiol Infect. 2008; 136: 661-664.
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- 51) D. N. Gupta, **K. Rajendran**, S. K. Mondal, S.Ghosh and S. K. Bhattacharya. Operational feasibility of implementation of community based zinc supplementation: impact on childhood diarrhoeal morbidity. The Pediatric Infectious Diseases Journal. 2007; 26(4): 306-310.
- 52) R.Bhattacharya, G.C. Sahoo, M.K. Nayak, **K.Rajendran**, P.Dutta, U.Mitra, M.K.Bhattacharya, T.N. Naik, S.K.Bhattacharya and T.Krishnan. Detection of genogroup I and II human picobirnaviruses showing small genomic RNA profile causing acute watery diarrhoea among children in kolkata, India. Infect. Genet. Evol. 2007; 7:229-238.
- 53) P Bhattacharya, P.K.Chandra, A.Banerjee, S.Datta, S.Chakraborty, **K.Rajendran**, S.K.Basu, and R.Chakraborty. Significant increase in HIV,HBV,HCV and syphilis infections among blood donors in Kolkata 2004-2005:exploratory screening reveals high frequency of occult HBV infection. World J Gastroenterol. 2007;13(27):3730-3733.
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- 58) D.Sur, D.R. Saha, B.Manna, **K.Rajendran** and S.K.Bhattacharya. Periodic deworming with albendazole and its impact on growth status and diarrhoeal incidence among children in an urban slum of India. Transactions of the Royal Society of Tropical Medicine and Hygiene, 2005;99(4): 261-267.

- 59) S.Kahali, B.Sarkar, **K.Rajendran**, J.Khanam, S.Yamasaki, R.K.Nandy, S.K.Bhattacharya and T.Ramamurthy. Virulence Characteristics and Molecular Epidemiology of enteroaggregative Escherichia Coli Isolates from Hospitalized Diarrheal Patients in Kolkata, India. *Journal of Clinical Microbiology*, 2004; 42(9):4111-4120.
- 60) D.N.Gupta, S.K.Mondal, S.Ghosh, **K.Rajendran**, D.Sur, B.Manna. Impact of Zinc Supplementation on diarrhoeal morbidity in rural children of West Bengal, India. *Acta Paediatr* ,2003;92:531-536.
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- 62) S.Chattopadhyay, S.Datta, A.Chowdhury, S.Chowdhury , A.K. Mukhopadhyay , **K.Rajendran**, S.K.Bhattacharya, D.E. Berg and G.B.Nair. Virulence gene in Helicobacter pylori strains from west Bengal residents with overt H.Pylori-associated disease versus healthy volunteers. *Journal of Clinical Microbiology*, 2002; 40(7):2622-2625.
- 63) Shanta Dutta, **K.Rajendran** , S.Roy ,A.Chatterjee, P.Dutta, , G.B. Nair S.K.Battacharya and S.I. Yoshida. Shifting serotypes, plasmid profile analysis and antimicrobial resistance pattern of shigellae strains isolated from Kolkata, India during 1995-2000. *Epidemiol. Infect.* 2002;129:235-243.
- 64) Shanta Dutta, A.Chatterjee, P.Dutta, **K.Rajendran**, S.Roy, K.C.Pramanik and S.K.Battacharya Sensitivity and performance characteristics of a direct PCR with stool samples in comparison to conventional techniques for diagnosis of Shigella and enteroinvasive Escherichia Coli infection in children with acute diarrhoea in Calcutta, India. *J. Med. Microbiol.* 2001;50: 667-674.
- 65) T.Ramamurthy, **K.Rajendran**, Pallavi Garg, T.Shimada, Arnab Basu, Nandini Roy Chowdhury, Ranjan K. Nundy, Shinji Yamasaki, S.K.Bhattacharya, Yoshifumi Takeda, G.Balkrish Nair.Cluster Analysis and patterns of Dissemination of Multidrug Resistance among Clinical Strains of Vibrio Cholerae in Calcutta, INDIA. *Indian J Med Res.* 2000;112: 78-85.
- 66) P.Garg, S.Chakraborty, I.Basu, S.Datta, **K.Rajendran**, T.Battacharya, S.Yamasaki, S.K.Bhattacharya, Y.Takeda, G.Balakrish Nair and T.Ramamurthy Expanding multiple Antibiotic resistance among clinical Strains of Vibrio Cholerae Isolated from from 1992-7 in Calcutta,INDIA. *Epidemiol. Infect.* 2000;124:393-399.
- 67) S.K.Mondal, B.K.Sircar, K.Banerjee, P.G.Sengupta, D.N.Gupta, S.Ghosh, **K.Rajendran**, T.Biswas and S.K.Bhattacharya.Lactoferrin content of breast milk and Incidence of Diarrhoea in Infants. *Ind. J. Physiol. & Allied Sci.*, 1998;52(1):35-40.
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- 69) S.K.Mondal, P.G.Sengupta, D.N.Gupta, S.Ghosh,S.N.Sikder, **K.Rajendran**, M.R.saha, B.K.Sircar and S.K. Bhattacharya. (1996) Occurrence of diarrhoeal diseases in relation to infant feeding practices in a rural community in practices in a rural community in West Bengal, India. *Acta Paediatr.* 1996;85:1159-62.

Conference Proceeding:

1. **Rajendran K & Ramamurthy T. Dynamic focus on diarrhoeal diseases with influence of climate factors in Kolkata: time series and spatial data analysis ” . 2012: page no:52-75.** An international conference on epidemiology with “ special focus to modelling infectious and chronic diseases data using Time series and Spatial data analysis” held during 16-18th august 2012 at St Thomas college palai, Mahatma Gandhi University, Kottayam, Kerala-74, India.

Presented papers in conferences

- 1 **Rajendran K**, Sumio Shinoda , B Manna and T.Ramamurthy. “Time series components of climate factors determines real time of cholera infection in Kolkata, India: Methodical approach at 49th US-Japan Conference on Cholera and Other Bacterial Enteric Infections organized by US-Japan Cooperative Medical Sciences panel was held at “Touchdown Terrace in Bell Hill Griffin Stadium on University of Florida” **Gainesville, Florida, USA** during January 14-16, 2015.
- 2 **Rajendran K**, Sumio Shinoda , B Manna and T.Ramamurthy. Climate factors role in cholera prevalence in Kolkata, India: Time series models at the 48th Joint Meeting and Conference of the US-Japan Panel on Cholera and Other Bacterial Enteric Infections held at International Centre for Diarrhoeal Diseases Research, Bangladesh (ICDDR,B) during February 11-13, 2014 **at Dhaka, Bangladesh.**
- 3 **Rajendran K**, Sumio Shinoda and T.Ramamurthy. EL Niña and La Niña thirty years persuade cholera in Kolkata, India: Time series model: at 16th International conference on Emerging Infectious Diseases in the Pacific Rim held at International Centre for Diarrhoeal Diseases Research, Bangladesh (ICDDR,B) during February 09-11, **2014 at Dhaka, Bangladesh.**
- 4 **Rajendran K & Ramamurthy T.** “Influence of Relative Humidity on Persistence of Cholera in West Bengal: A three decade comparison with Time Series Model” at the 47th Joint Meeting and Conference of the US-Japan Panel on Cholera and Other Bacterial Enteric Infections held during December 12-14, 2012 at **Chiba University , Chiba, Japan.**
- 5 **Rajendran K & Ramamurthy T. Dynamic focus on diarrhoeal diseases with influence of climate factors in Kolkata: time series and spatial data analysis ”** An international conference on epidemiology with “ special focus to modelling infectious and chronic diseases data using Time series and Spatial data analysis” held during 16-18th august 2012 at St Thomas college palai, Mahatma Gandhi University, Kottayam, Kerala-74, India.
- 6 T. Ramamurthy, G.B. Nair, M.K.Bhattacharya , U.Mitra, T.Krishnan , S.ganguly, D.R.Saha , **K.Rajendran** , B.Manna, M.Ghosh, M.Chatterjee and Y.Takeda. Etiology of Enteric Pathogens among Diarrheal Children: Comparative Analysis of Hospitalized Cases and Outpatients in Kolkata, India. Annual Asia-African Research Forum” organized by the Japan Initiative for Global Research Network on Infectious Diseases held in Kobe, Japan from January 11 and 12, 2012.
- 7 **Rajendran K & Ramamurthy T. Climate and cholera: A Changing Scenario in Kolkata, West Bengal”** A National Conference on “Climate Change, Oil Spill and Radiation Risk; New

- Environmental Challenges” Yashwantrao Chavan Pratishthan, Mumbai- 21 during 15 - 16 November, 2011.
- 8 **Rajendran K**, Sumi A, Manna B, Kobayashi N, Takeda Y, Nair GB & Ramamurthy T. Sunshine duration manoeuvre *V. Cholerae* infection in Kolkata, India: Generalized linear model. The 46th US- Japan cooperative Medical Science Programme Cholera and Other Bacterial Enteric Infections on December 13-15, 2011. Kolkata, India
 - 9 T. Ramamurthy, G.B. Nair, M. K. Bhattacharya , T.Krishnan , S.ganguly, D. R. Saha , **K. Rajendran** , B. Manna and Y.Takeda. Etiology of Enteric Pathogens among Diarrheal Patients Admitted at the Infectious Diseases Hospital, Kolkata, India. XIII International Congress of Bacteriology and Applied Microbiology of International Union of Microbiological Societies 2011 Congress (IUMS2011) held in Sapporo, Japan from 6 to 10 September, 2011.
 - 10 **K.Rajendran**, A.Sum, M.K. Bhattacharya, Krishnan T, Ganguly S, Sha DR, B.Manna, N.Kobayashi, Takeda Y, G.B.Nair and T.Ramamurthy. "Influence of Climatic Factors on Prevalence of Enteric Pathogens in Kolkata, India: General linear model” . The 14th International Conference on Emerging Infectious Diseases of the Pacific Rim: Next Generation Diagnostics for Infectious Diseases. October 4-6, 2010 Penang, Malaysia.
 - 11 **K.Rajendran**, A.Sum, M.K. Bhattacharya, B.Manna, N.Kobayashi, G.B.Nair and T.Ramamurthy. Spectral analysis of Climate, El Niño and solar effects on the prevalence of Cholera in Kolkata, India. The 13th International Conference on Emerging Infectious Diseases of the Pacific Rim: Focus on Enteric Diseases. April 6-9, Kolkata, India.
 - 12 **K.Rajendran**, T.Ramamurthy, D.Sur, B.Manna, M.K.Bhattacharya, D.N.Gupta and S.K.Bhattacharya. Time Series Autoregressive Integrated Moving Average (ARIMA) Model to Evaluate the Temporal Pattern of Cholera in Calcutta, India. In Abstract Book. 11th Asian Conference on Diarrhoeal Diseases and Nutrition held at Bangkok, Thailand during March 8-10, 2006 pp.118-119.
 - 13 **K.Rajendran**, T.Ramamurthy and D.Dutta. Multinomial Logistic Regression Model to explore the inferential risk age groups of *V.cholerae* O1, O139 and Non-O1 and Non-O139 infection during 1996-2000 in Calcutta, India. 10th Asian Conference on Diarrheal Diseases & Nutrition. Bangladesh, Dhaka 7-9 December 2003
 - 14 **K. Rajendran**, P.G.Dengupta, B.Manna, M.K.Bhattacharya, and S.K.Bhattacharya. Relationship of socioeconomic & Environmental parameters with childhood diarrhoea in a hospital based surveillance: application of Log-Linear Model. 9th Asian Conference on Diarrheal Diseases & Nutrition. Ashok hotel, New Delhi 28-30, September 2001.
 - 15 S.Chattopadhyay, S.Dutta, A.Chowdhari, S.Chowdhari, A.K.Mukhopadhyay, **K.Rajendran**, S.K.Bhattachaya, D.E.Berg, G.B.Nair. Different distribution of key virulence genes in *H.Pylori* Strains from West Bengal residents with overt *H.Pylori* associated disease versus healthy volunteers. 9th Asian Conference on Diarrheal Diseases & Nutrition. Ashok hotel, New Delhi 28-30, September 2001.

- 16 D. N.Gupta, S.K. Mondal, S.Gosh, A.Pandey, D. Sur, B.Manna, **K.Rajendran** and P.G. Sengupta. Impact of Zinc supplementation on diarrheal morbidity. 9th Asian Conference on Diarrheal Diseases & Nutrition. Ashok hotel, New Delhi 28-30, September 2001.
- 17 D.Sur, P.G. Sengupta, D. N.Gupta, S.K. Mondal, S.Gosh, B.manna, A.Pandey, **K.Rajendran**, S.K. Bhattacharya. Low birth weight babies: Effect of feeding practices on diarrhea and proportional weight gain. 9th Asian Conference on Diarrheal Diseases & Nutrition. Ashok hotel, New Delhi 28-30, September 2001.
- 18 S.Gosh, T.Rammamurthy, D.N.Gupta, S.K.Mondal, D.R.Saha, S.Dutta, B.Manna, D.Sur, T.N. Naik, A.Pandey, **K.Rajendran**, and P.G.Sengupta. A longitudinal study on diarrheagenic escherichia coli amongst rural under-five children: Some preliminary observations. 9th Asian Conference on Diarrheal Diseases & Nutrition. Ashok hotel, New Delhi 28-30, September 2001.
- 19 Aparna Pandey, D. N.Gupta, S.K. Mondal, S.Gosh, B.Manna, D. Sur, **K.Rajendran** and P.G. Sengupta. Health care seeking pattern for common acute childhood illnesses in a rural community All India Annual Conference Indian Public Health Association, New Delhi, 15 Apr. to 18 Apr.2001.
- 20 D.Sur, P.G. Sengupta, B. Manna, M.K. Bhattacharya, **K. Rajendran** and S.K. Bhattacharya. Importance of hospital based surveillance system for diarrhoeal diseases. All India Annual Conference Indian Public Health Association, New Delhi, 15 Apr. to 18 Apr.2001.
- 21 D.R.Saha, **K.Rajendran**, T.Ramamurthy and S.K.Bhattacharya. Intestinal parasitism and changing pattern of Vibrio Cholerae infection among diarrhoea cases in Kolkata population. In Abstract Book. 11th Asian Conference on Diarrhoeal Diseases and Nutrition held at Bangkok, Thailand during March 8-10, 2006 pp.116.
- 22 U.Mitra, **K.Rajendran**, S.K.Bhattacharya and P.Dutta. Impact of supplementation of zinc and zinc and vitamin A on acute watery diarrhoea in mild to moderately-malnourished children. In Abstract Book. 11th Asian Conference on Diarrhoeal Diseases and Nutrition held at Bangkok, Thailand during March 8-10, 2006 pp.101.
- 23 P.Dutta, U.Mitra, **K.Rajendran** and S.K.Bhattacharya. Impact of Lactobacillus (L.sporogens) in children with acute diarrhoea. 11th Asian Conference on Diarrhoeal Diseases and Nutrition held at Bangkok, Thailand during March 8-10, 2006 pp.127.
- 24 D.N. Gupta, S.K.Mondal, **K.Rajendran**, S.Ghosh and S.K.Bhattacharya. Impact of zinc supplementation on incidence of diarrhoea and its operational feasibility in rural community. 11th Asian Conference on Diarrhoeal Diseases and Nutrition held at Bangkok, Thailand during March 8-10, 2006 pp.93.
- 25 S.K.Mondal, D.N. Gupta, S.Ghosh, **K.Rajendran** and S.K.Bhattacharya. Observation on treatment pattern of childhood diarrhoea practiced in rural West Bengal. 11th Asian Conference on Diarrhoeal Diseases and Nutrition held at Bangkok, Thailand during March 8-10, 2006 pp.128-129.
- 26 S.Gosh, B.Manna, B.K.Sircar, P.G.Sengupta, S.K.Mondal, D.N.Gutpa, K.Sarkar, D.Sur, **K.Rajendran**, A.Pandey and S.K. Bhattacharya. Impact of Vitamin a Supplementation on occurrence of childhood diarrhoea: A multivariate analysis. 42nd All India Annual Conference Indian Public Health Association, 1998.

- 27 P.G.sengupta, S.K.Mondal, D.N.Guta, S.Gosh, K.Sarkar, D.Sur, B.Manna, **K. Rajendran** and S.K.Bhattacharya. An education intervention to reduce diarrhoeal morbidity in a rural community of West Bengal. XLIII All India Annual Conference Indian Public Health Association, Pune, 15 Apr. to 18 Apr.1999.
- 28 S.Gosh, S.K.Mondal, D.N.Guta, K.Sarkar, D.Sur, B.Manna, **K.Rajendran**, B.K.Sircar and P.G.Sengupta. Mother's education is a consistent determinant for diarrhoea: Results of three prospective community based study. XLIII All India Annual Conference Indian Public Health Association, pune, 15 Apr. to 18 Apr.1999.
- 29 P.G.Sengupta, B.Manna, D.Dutta, M.K.Bhattacharya, **K.Rajendran** and S.K. Bhattacharya. Hospital based surveillance system for diarrhoealdiseases: some preliminary observations. XLIII All India Annual Conference Indian Public Health Association, Pune,15 Apr. to 18 Apr.1999.
- 30 S.K. Mondal, P.G.Sengupta, D.N.Guta, S.Gosh, S.N.Sikder, **K.Rajendran** and B.K. Sircar. Role of mothers in infant feeding practices and its impact on diarrhoea: Observation from a community based study in rural West Bengal. 40th All India Conference of Indian Public Health Association, Jamia Hamdard, New Delhi 9-11 February 1996.

FELLOWSHIP AND FOREIGN TRAINING

- 1) **Awarded W.H.O.** fellowship in “Epidemiology and Bio-statistics from July, 2 – August, 10 2007 at Khon Kean University, Khon Kean, **Thailand**.
- 2) **WHO Workshop on** ”Clinical Data Management Workshop”, held during March 24-29 2003 in Faculty of Allied Health science, Thammasat University, **Bangkok Thailand**
- 3) **Training on GIS** titled “Introductory GIS, Disease Mapping, and Spatial Analysis,” held at The International Vaccine Institute, Seoul, **Korea** during 14-18, May 2007.
- 4) **Pre-Conference Workshop** on “Demographic Surveillance and GIS as Tools for Health Research”, held on 6th December, 2003 at ICDDR’B, **Dhaka, Bangladesh**.
- 5) **Invited as visiting researcher** for collaborative research and training on “Time series analysis of cholera outbreaks and climate changes” held at **Sapporo medical university, Sapporo, Japan** during 16th October – 15th November, 2008.
- 6) **Invited as visiting Scientist to deliver a talk** titled “Essential Statistics for Bio-Medical Research “ in **AMIST University, Malaysia** in October 04-06, 2010.

Training in India

- 1) Fifth Graduate summer program in Bio-Statistics held during 12.6.95 to 30.6.95 at Department of Biostatistics of Christian Medical College at Vellore, India. Subjects covered pertaining EPIDEMIOLOGIC AND ANALYSIS PC - BASED STATISTICAL SOFTWARE IN HEALTH CARE-ADVANCED.
- 2) Winter School Training Program in Spatial Statistics held during February 8-25, 2000 by The Applied Statistical Unit of INDIAN STATISTICAL INSTITUTE, India. Titled “Statistical Exploration of Patterns in Spatial and other Types of large data”.
- 3) Training Programme on Application of Behavioural Sciences in Health System Research held on 23rd March, 2001 at National Institute of Cholera & Enteric Diseases (ICMR), Calcutta.

- 4) ICMR-WHO Workshop on “Use of information Technology in Biomedical Research” held during September 5-7, 2001 at National institute of cholera & Enteric Diseases, Calcutta, India.
- 5) Winter School Training Program on “Geographical Information System” held during January 8-18, 2002 by The Applied Statistical Unit of INDIAN STATISTICAL INSTITUTE, India.
- 6) Workshop on “Genetic Epidemiological Methods for Dissection of Complex Human Traits” held during June 2-11, 2003 at hotel Hyatt Regency Kolkata:-Organized by TCG-ISI Centre for pulation Genomics,Kolkata, India and University of Pittsburgh, Pittsburgh, USA.
- 7) Short course in Bio-statistics titled on “Fundamentals of Bio-Statistics, Principles of Epidemiology &SPSS” held during February 5-9, 2007 by Bio-statistics Resource and Training Centre, Christian Medical College, Vellore, India
- 8) Short course in Bio-statistics titled on “statistical Analysis System(SAS)” held during February 12-16, 2007 by Bio-statistics Resource and Training Centre, Christian Medical College, Vellore, India.
- 9) NIMS, ICMR-DOB, SGPGIMS. Collaboration with NACO, WHO and CDC,ATLANTA. Workshop on “Capacity Building Workshop on Application of Multivariate Mixed Effects Models” held during December 10-12, 2007 at Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, India.
- 10) Workshop on “Data Mining & Data Warehousing” held during September 15-20, 2008 at center for soft computing research, INDIAN STATISTICAL INSTITUTE, India.
- 11) Workshop on” NIH/NIAID research resources” held on April 5, 2009 at NICED, Kolkata.
- 12) GIS training program on “Introduction to Arc View 9.3” held during 23-24 April, 2009 at ESRI, Kolkata India.
- 13) Advance training programme on “Cyber law, Information Security and Software Quality assurance for Scientists and Technologists” Sponsored by DST, Government of India, held during July 6-10,2009 at Indian Institute of Public Administration, New Delhi, India.
- 14) Short-Term training programme on “Soft Computing (Sofcom '09)” held during July 27-31, 2009 at center for soft computing research, INDIAN STATISTICAL INSTITUTE, India.
- 15) Workshop on “Video Analysis and Surveillance (“WVAS” 10)” held during July 06-10, 2010 at Center for soft computing research, INDIAN STATISTICAL INSTITUTE, India.
- 16) Workshop on “Clinical trial; Design, Analysis: interpretation and Reporting” held during August 08-12, 2011 by Bio-statistics Resource and Training Centre, Christian Medical College, Vellore, India.

- 17) Participated in the ICMR sponsored Workshop entitled “Intellectual Property Rights in Medical Research held during September 18-19, 2013 at National Institute of cholera and Enteric Diseases, Kolkata.
- 18) Participated in the ISI Kolkata sponsored Workshop entitled “Modern trend in Soft Computing & Security Issues” held during September 23-28, 2013 at National Institute of Science and Technology, Berhampur Odisha
- 19) Workshop on diagnostic and screening test evaluation imperfect gold standard, meta analyses and application of latent class models held during October 9-11,2017 by Bio-statistics Resource and Training Centre, Christian Medical College, Vellore, India.
- 20) Training on Concept and applications of Health Economics in Research with Emphasis to Tuberculosis during December 18-19, 2017at National Institute for Research in Tuberculosis, Chennai
- 21) Blended capacity building programme on climate smart governance during 28th January to 01st February, 2019 at Indian Institute of Public Administration, New Delhi.
- 22) Training on Systematic Review and Meta-Analysis” during January to 24th – 25th, 2019 at National Institute for Research in Tuberculosis, Chennai
- 23) Participated in workshop on “Microsoft PowerPoint” on 7th October, 2018 at National Institute for Research in Tuberculosis, Chennai
- 24) Participated in workshop on “Microsoft Excel” during 3rd to 4th October ,2018 at National Institute for Research in Tuberculosis, Chennai
- 25) Systematic Review Follow-up workshop on 8th May 2019 at ICMR-National Institute for Research in Tuberculosis, Chennai.
- 26) Introduction to Modelling in Economic Evaluation for Health Technology Assessment during 14th to 18th May 2019 at ICMR-National Institute for Research in Tuberculosis, Chennai.
- 27) Systematic Review Follow-up workshop on 18th June, 2019 at ICMR-National Institute for Research in Tuberculosis, Chennai.
- 28) Training for TreeAge Software during 10th -11th February, 2020 at ICMR-National Institute for Research in Tuberculosis, Chennai.
- 29) Systematic Review two days Follow-up workshop during 12th -13th March, 2020 at ICMR-National Institute for Research in Tuberculosis, Chennai.

Conference & Seminar presented

- 1) An international conference paper entitled “Time series components of climate factors determines real time of cholera infection in Kolkata, India: Methodical approach at 49th US-Japan Conference on Cholera and Other Bacterial Enteric Infections organized by US-Japan Cooperative Medical Sciences panel was held at “Touchdown Terrace in Bell Hill Griffin Stadium on University of Florida” **Gainesville, Florida, USA** during January 14-16, 2015.
- 2) An international conference paper entitled “Climate factors role in cholera prevalence in Kolkata, India: Time series models at the 48th Joint Meeting and Conference of the US-Japan Panel on Cholera and Other Bacterial Enteric Infections held at International Centre for Diarrhoeal Diseases Research, Bangladesh (ICDDR,B) during February 11-13, 2014 **at Dhaka, Bangladesh.**

- 3) An international conference paper entitled EL Niña and La Niña thirty years persuade cholera in Kolkata, India: Time series model: at 16th International conference on Emerging Infectious Diseases in the Pacific Rim held at International Centre for Diarrhoeal Diseases Research, Bangladesh (ICDDR,B) during February 09-11, 2014 **at Dhaka, Bangladesh.**
- 4) An international conference paper entitled “Influence of Relative Humidity on Persistence of Cholera in West Bengal: A three decade comparison with Time Series Model” at the 47th Joint Meeting and Conference of the US-Japan Panel on Cholera and Other Bacterial Enteric Infections at **Chiba, Japan** held During December 12-14, 2012.
- 5) An international conference on epidemiology with “ special focus to modelling infectious and chronic diseases data using Time series and Spatial data analysis” held during 16-18th august 2012 at St Thomas college palai, Mahatma Gandhi University, Kottayam, Kerala-74, India.

Invited as plenary Speaker topic” Dynamic focus on diarrhoeal diseases with influence of climate factors in Kolkata: time series and spatial data analysis ”

- 6) A National Conference on “Climate Change, Oil Spill and Radiation Risk; New Environmental Challenges” Yashwantrao Chavan Pratishtan, Mumbai- 21 during 15th - 16th November 2011.

Invited as plenary Speaker topic” Climate and cholera:A Changing Scenario in Kolkata, West Bengal”

- 7) The 14th International Conference on Emerging Infectious Diseases of the Pacific Rim: Next Generation Diagnostics for Infectious Diseases. October 4-6, 2010 **Penang, Malaysia**
- 8) International symposium on “fifty years of discovery of cholera Toxin: A tribute to SN De.October 25-27, 2009, Kolkata, India
(Awarded paper)
- 9) The 13th International Conference on Emerging Infectious Diseases of the Pacific Rim:Focus on Enteric Diseases. April 6-9, 2009, Kolkata, India
- 10) 9th Asian Conference on Diarrheal Diseases & Nutrition. India, Ashok hotel, New Delhi during 28-30, September 2001
- 11) 10th Asian Conference on Diarrheal Diseases & Nutrition. **Bangladesh, Dhaka** during 7-9, December 2003.

Note: Poster presentation had been recognized one among six best poster and final listed best scientist award

- 12) 11th Asian Conference on Diarrhoeal Diseases and Nutrition held at Bangkok, Thailand during March 8-10, 2006 pp.118-119.
- 13) A one day national seminar on May 18, 2001 entitled “Mathematical Biology : state of the Art” at Indian Statistical Institute, Calcutta

Awards

Dr K Rajendran, Scientist-E
ICMR-NIRT, Chennai – 31

- 1 Awarded W.H.O. fellowship during 2007.
- 2 Invited as Visiting Researcher to Sapporo medical university, Sapporo, Japan during 2008.
- 3 Acquired **Best Scientist Award** in climatic Research the Entitled paper “Influence of relative humidity in Vibrio cholerae infection: A Time series model” from an International symposium on “fifty years of discovery of cholera Toxin: A tribute to SN De at Kolkata during October 2009.

Journal reviewers:

Five National/international journals

My Research specialization (Major scientific fields of interest): Climate change (factors) and Health: cholera (previous), Tuberculosis (present). I have a 15 years experer in climate factors and health research

Project No: I (PI)

- 1) Title: Time series model study for prediction of cholera and diarrhoea using Atmospheric Temperature, Relative Humidity and Rainfall in Kolkata, India. (initiated 2008)

Project No: II (PI)

- 1) Title: Relation between diarrhoea and climatic factors in Kolkata: Twenty years retrospective study (initiated 2010)

Project No: III(PI)

- 1) Protocol title: Retrospective observational time series study for fifteen years Tuberculosis relational impact with climatic factors:

- 1) Novel concept data preparation for analysis.

In climatic factors, the difference of RH and temperature [i.e., morning (max)-evening (min)] were used in the analysis. This procedure was relevant to identify the actual causative factors instead of mean factors in the Generalized Linear Model (GLM). The mean factors purposefully have been averted to avoid the influence of high variation in the series.

2) Novel Methodological procedure have been developed for climate factors and health research data analysis

Core finding from this project

1. Analytical concept in case of climate and health data
2. Model development diarrhoea and climate factors
3. New finding is 30 years relation of Relative humidity of cholera infection by my analytical model.
4. The El Niño and La Niña has definite role in determining the prevalence of diarrhea in Kolkata.

VI. Outcome of the climate projects..

The project upshot **4 article** had been published and pretended **10 national and international** conferences; the appreciation was mounted as invited talk, plenary talk in two conferences.

V. Awards

Dr K Rajendran, Scientist-E
ICMR-NIRT, Chennai – 31

This projects outcome has received a best poster award in an international conference, Title of the paper is Influence of relative humidity in *Vibrio cholerae* infection: A Time series model.” an International symposium on “fifty years of discovery of cholera Toxin: A tribute to SN De at Kolkata during October 2009.

Outcome of research into Translation : It had been articulated to government of west Bengal in details to prevent burden of cholera in seasons.

END
