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NIE
NATIONAL INSTITUTE OF
EPIDEMIOLOGY

Annual Report - 2019

ICMR-National Institute of Epidemiology

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1. HIV Sentinel Surveillance among ANC

Principal Investigator	A. Elangovan
Co-Investigators	Dr. B. Ganesh
Collaborating Institute(s)	SACS and NACO
Funding agency	NACO
Initiation of the project	2006
Duration	Biennial
Budget	71.80 lakh

Background

HIV sentinel surveillance under taken by National AIDS Control Organization is an ongoing systematic collection, collation, analysis and interpretation of data periodically, which helps to calculate HIV disease burden in the country and to take appropriate action within stipulated time. Antenatal Clinic (ANC) attendees at the HIV sentinel surveillance centres are considered as the surrogate group for general population in the age group of 15-49 years. NIE is identified as Regional Institute to conduct HIV surveillance for 7 southern states (Tamil Nadu, Andhra Pradesh, Telangana, Karnataka, Kerala, Orissa and Pondicherry). The HIV sentinel surveillance is being implemented and supervised by NIE in South India since 2006.

Objectives

HIV sentinel surveillance carried out by NIE with the support of State AIDS Control Societies of 7 states. The primary objectives area) to improve tracking of HIV trends; b) to understand the epidemic's characteristics and its level of proliferation across the 7 states.

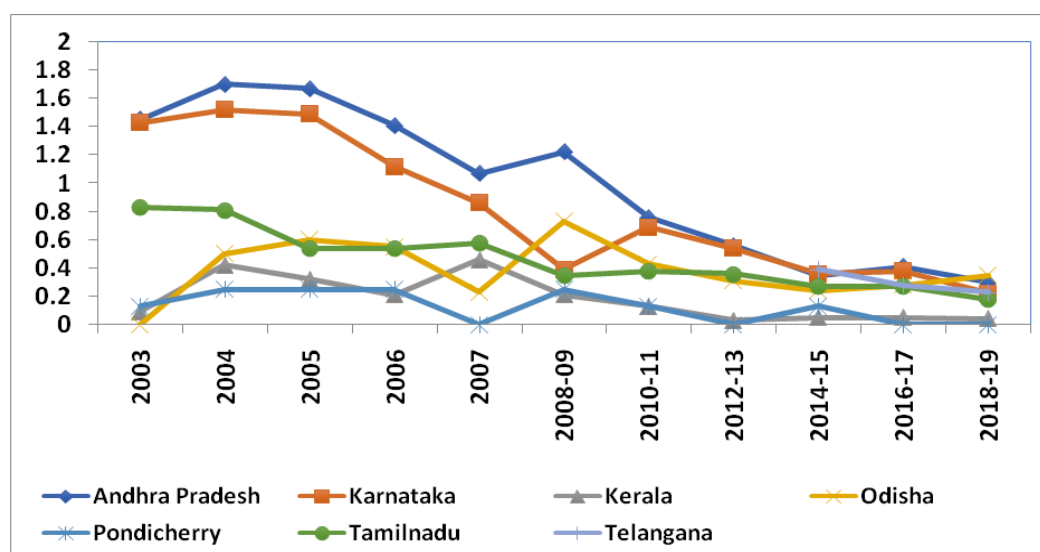
Results

In the current round (16-th) of surveillance, a total of 1,00,000 blood samples were collected from 250 sites across the 7 states and these data were entered into SIMS, an online data management package. The HIV prevalence are calculated and provided in Table-1 and Figure-1.

Table 1. Prevalence of HIV among ANC clinic attendees: 2018-19

S.No	State	Total no. of sites	Total No. of Tested	No of HIV Positive	HIV Prevalence (%)
1	Orissa	33	13200	46	0.35
2	Andhra Pradesh	39	15600	47	0.30
3	Telangana	29	11600	27	0.23
4	Karnataka	62	24800	54	0.22
5	Tamil Nadu	71	28400	50	0.18
6	Kerala	14	5600	2	0.04
7	Pondicherry	2	800	0	0
Total		250	100000	226	0.23

Figure 1. Prevalence of HIV among ANC clinic attendees: 2003 – 2019



2. Assessment of health impacts among the nearby residents of thermal power stations at Ennore, North-Chennai, Tamil Nadu

Name of Principal Investigator	A. Elangovan
Name of Co-Investigators	Dr. R. Prabu
Collaborating Institute(s)	PHFI and CCDC
Funding agency	CCDC
Initiation of the project	2017
Duration	2 year
Budget	14.30 lakhs

Background

North Chennai is a geographic term used to refer to the northern part of Chennai city. It is considered as home to various industries, thermal power plants and ports. Apart from these, the Buckingham canal (an engineered navigation canal) also passes through North Chennai region, which is now in a state of neglect. Industrial pollution, ash from thermal power plants, sewage and widespread encroachments has led to the degradation and contamination of the Buckingham Canal. Hence this study initiated to describe the health impact of the people residing near to the area of thermal power plants.

Objectives

a) To assess the respiratory health status of the adult population residing in a defined geographical area around all the thermal power plant and ash ponds at Ennore, North Chennai; b) To assess health related problems among the residents; c) To measure the PM 2.5 level at various points around the thermal power plants; d) To estimate the levels of selected heavy metals in fly ash, air, water (surface and ground) and soil within the study area.

Results

A total of 1584 (M-733; F-848; TG-3) participants were recruited. Spirometry test were done for a subset of 541 individuals. Self-reported morbidity indicates that diabetes followed by hypertension and respiratory diseases are found high in the study area (Figure-1 & 2).

Figure 1. Self-reported morbidities among those who had some ailments

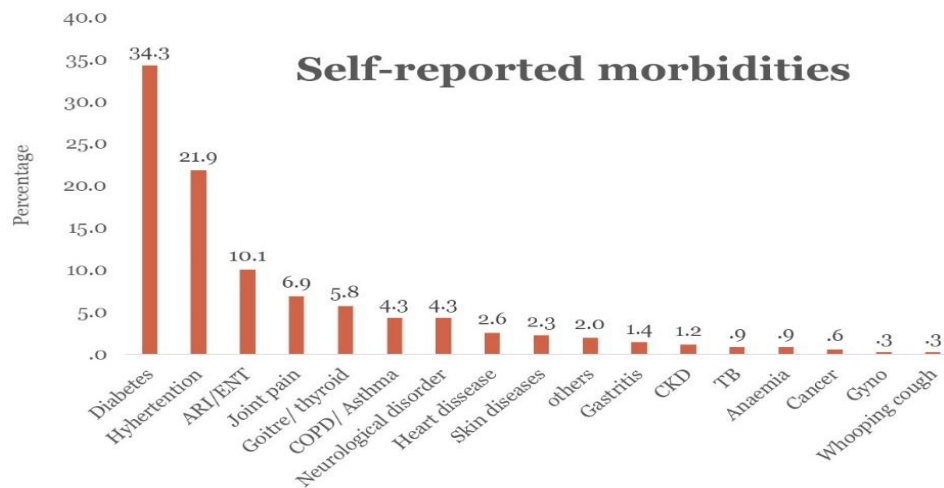


Figure 2. Duration of stay in the study area versus lung function abnormalities

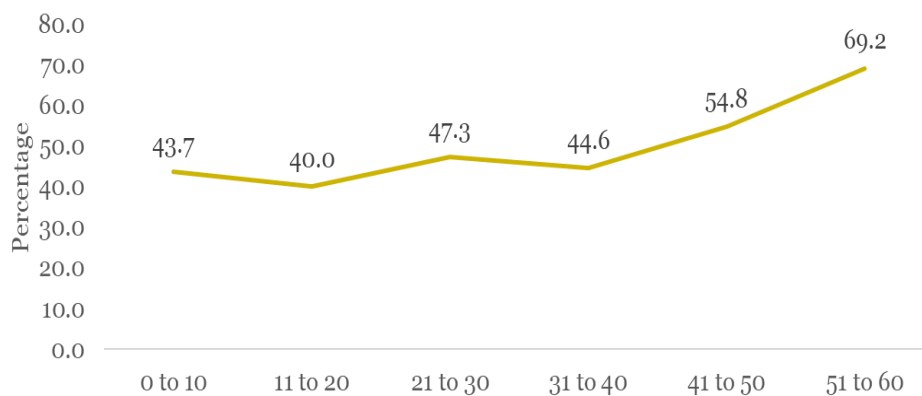


Figure 2 clearly shows that the lung function abnormalities are directly proportionate to the duration of stay of the participants in the study area (ie within 10 KM radius of the thermal power plants).

3. Virus Research & Diagnostic Laboratories Network (VRDLN)

Principal Investigator	Manoj Murhekar V
Co-Investigators	Vasna Joshua, K Kanagasabai, B K Kirubakaran, M Ravi, V Ramchandran
Funding Agency	DHR-ICMR
Initiation of the project	Dec 2013
Duration	
Budget	

Objective

To strengthen the laboratory capacity in the country for timely identification of viruses and other agents causing morbidity significant at public health level and specifically agents causing epidemics and/or potential agents for bioterrorism.

Method

The number of laboratories in the network increased from 20 in 2014, 34 in 2015, 37 in 2016, and 84 by Sept 2019 covering 24 Indian states (Fig. 1). Demographic, clinical, and laboratory details from the patients enrolled in the surveillance is collected using a case report form and are entered in a web-based data entry system. Data entered on the system is shared with respective authorities like state IDSP and NVBDCP on the timely basis. NIV Pune is nodal agency for ensuring quality of lab procedures while NIE Chennai is data mining centre for VRDLs.

Disease clusters diagnosed

During Dec 2018- Sept 2019, VRDLs provided diagnosis to 145 disease clusters. These included Varicella Zoster Virus (n=59), Influenza A H1N1 (n=17), JE (n=15), Dengue (n=14), HEV (n=9), Chikungunya (n=9), Measles (n=5) and HAV (n=5) etc. (Table-1). Information about the outbreaks diagnosed by VRDLs was communicated to the state IDSP and NVBDCP within 24 hrs of reporting.

Diagnosis provided to patients attending medical colleges

Besides providing the diagnosis to 145 outbreaks, VRDLs investigated patients attending the medical colleges that housed VRDLs. out of 172265 patients tested 34591 (20 %) were positive for viral disease (Table 2). The commonly tested virus included Dengue, Chikungunya, Influenza A H1N1, HAV, HEV, HSV, JE.

Conclusions

The virology laboratory network is established to strengthen the capacity for timely diagnosis of disease outbreaks in India.

Table 1. Common disease clusters diagnosed by VRDLs, 2018-19.

Clusters	Total diagnosed	Clusters
Varicella Zooster Virus (VZV)		59
Influenza A Pandemic H1N1		17
Japanese Encephalitis		15
Dengue		14
Hepatitis E virus (HEV)		9
Chikungunya		9
Measles		5
Hepatitis A virus (HAV)		5
Mumps		4
Herpes Simplex Virus (HSV)		1
Scrub Typhus		1
Others		6
Total		145

Figure 1. * DHR/ICMR Virology Laboratory network

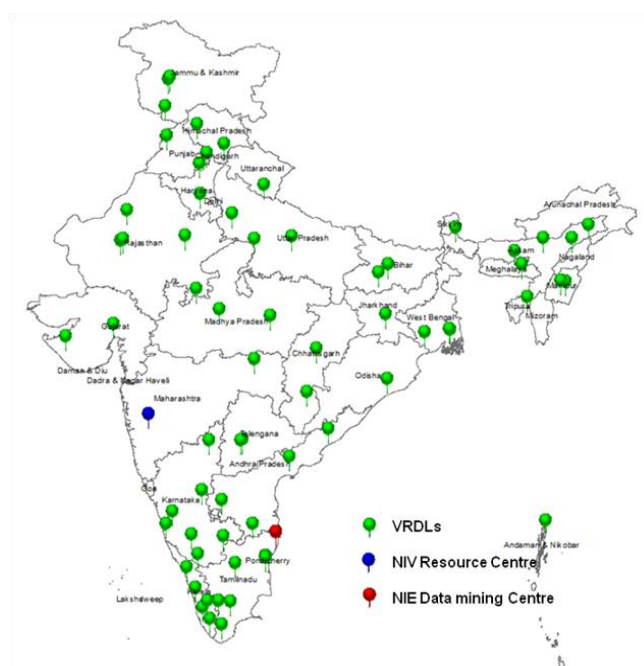


Table 2. VRDLN data for Dec 2018- Sept 19

	Medical college hospital	Outbreaks	Total
Total no. of patients investigated by VRDLs	172265	2244	174509
Total no. of samples tested	176596	2302	178898
Total no. of tests run	310080	3324	313404
Total cases positives (%)	34591 (20%)	1153 (51%)	35744 (20%)

4. Hospital Based Sentinel Surveillance of *S. pneumoniae* and other Invasive Bacterial Diseases

Principal Investigator	Dr.J.Yuvaraj
Co-PI	Dr.C.P.Girish Kumar
Co-Investigator(s)	Dr.V.Balaji and Investigators from 6 sites
Collaborating Institute(s)	1. GMC, Trivandrum; 2. AIIMS, Jodhpur; 3. NEIGRIHMS, Shillong; 4. LTMGH, Sion; 5. BHU, Varanasi & 6.IGMC, Shimla
Funding Agency	UNDP
Initiation of the project	December 2017
Duration	1.5 years
Budget	2.7crore

Background

Bacterial meningitis surveillance in India was initiated by the Ministry of Health and Family Welfare in December, 2011 with the key objective of establishment of 11 Hospital Based Sentinel Surveillance Sites which were earlier a part of IBIS study in India. The network of these sentinel surveillance sites generated data on disease burden of meningitis among children below 5 years of age attributable to *S. pneumoniae*, *N. meningitidis*, and *H. influenzae* type b [S pn, N me and Hib] and also their trends over a three year surveillance period. Preliminary data indicates that *S. pneumoniae* contributes to a 72% of the confirmed meningitis cases in children below 5 years of age in comparison with *H. influenzae* type b and *N. meningitidis* put together (28%). This data would be useful to assess the impact of Pentavalent vaccine with its phased roll out through the Universal Immunization Programme in India. The network study has built the capacity to carry out multi-site surveillance among young children and established standard operating procedures for similar surveillance activities. It has provided the required platform to set up pneumonia surveillance network across India with a view to generate data and information to assess the impact of initiation of pneumococcal conjugate vaccine in India. The added benefit will be that with the same infrastructure and minimum additional investment, surveillance for meningitis associated with *S. pn*, *N. me* and *Hib* can also be conducted. The proposed surveillance for invasive bacterial diseases in under five children in India will make tremendous value addition to the recent national initiative of introduction of pentavalent vaccine and proposed introduction of pneumococcal conjugate vaccine.

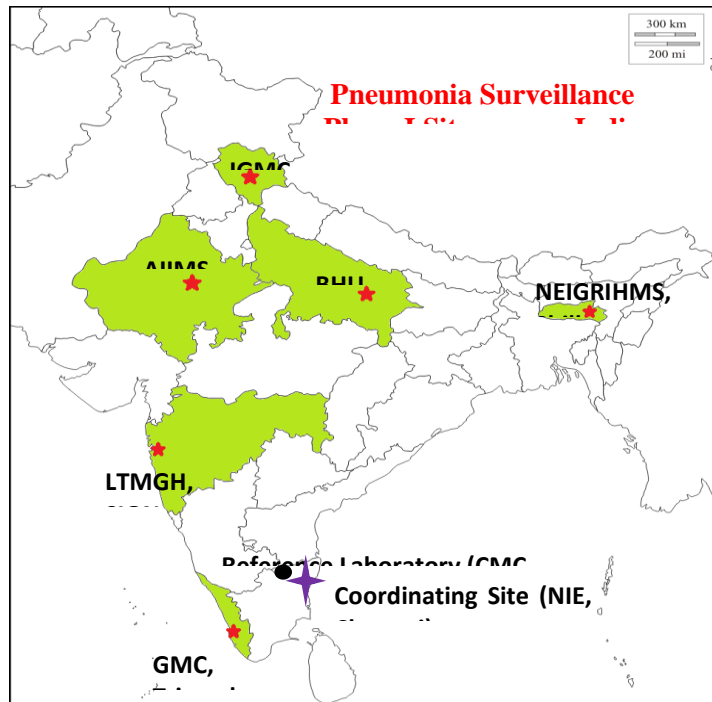
Primary Objectives

1. To assess the burden and distribution *Streptococcus pneumoniae* in children aged 1 month to 59 months presenting with symptoms of pneumonia and invasive bacterial disease attending select hospital -based sentinel sites after introduction of the Pneumococcal Conjugate Vaccine in the Universal Immunization Programme in India.
2. Determine the serotype profile and subsequent replacement of serotypes of *S. pneumoniae* in children with pneumonia and invasive bacterial diseases.

Secondary objective

To assess the burden and distribution *N. meningitidis* and *H influenzae* type b in children aged 1 month to 59 months presenting with symptoms of pneumonia and invasive bacterial disease.

Figure 1. Hospital based sentinel surveillance of *S.pneumoniae* and Other Invasive Bacterial Diseases (HBSSPIBD) network- Phase I



Methodology

This study was coordinated by ICMR-National Institute of Epidemiology (NIE), the Department of Microbiology, Christian Medical College, Vellore served as the reference laboratory for the network and administered external quality assurance (EQA) programme for the participated sentinel sites. The study populations are children above one year and below 59 months with suspected clinical conditions of pneumonia and other invasive bacterial infections including bacterial meningitis. All suspected cases are enrolled in the surveillance, clinically evaluated by the pediatrician from surveillance sites and information about demographic, epidemiologic and clinical details is collected. CSF, blood and other sterile body fluids were collected and tested for presence of *S.pneumoniae*, *H.influenzae* type b and *N.meningitidis* by bacterial culture, Latex Agglutination Test (LAT) and Real-time PCR. Positive Pneumococcal isolates and samples were further processed for sero-typing/grouping.

Results

- Between December 2016 to May 2018, 9487 cases were admitted in inpatient wards for fever, out of which 1216 were suspected for pneumonia, 671 were suspected for bacterial meningitis and 312 cases were suspected for sepsis (Table 1).
- All the suspected samples have been processed for culture and sensitivity test, LAT at the sentinel sites for detection of *S. pneumoniae*, *H. influenza type b* and *N. meningitidis*. A part of unused CSF and blood samples (in EDTA) were sent to reference laboratory for molecular detection (PCR). Sample collection and laboratory test results were presented in table 2.
- From sentinel sites 48 isolates were sent to reference laboratory, among them 24 were confirmed as *S. pneumoniae* and 12 different serotypes were identified which includes 14 (5 nos); 6B (2 nos); 1 (2 nos); 10A (2 nos); 2; 19 F (4 nos); 9V (2 nos); 33A; 5 (2 nos); 7B; 6A;15C (Table 3).
- Based on the various laboratory test, *S. pneumoniae* (n=51) was the commonest cause for pneumonia and other IBD cases in children aged between 1 to 59 months, followed by *H. influenzae type b* (n=8) and *N. meningitidis* (n=8) (Table 4).

Table 1. Case recruitment Dec 2016 to May 2018

Parameters	GMC Trivandrum	LTMGH, Sion, Mumbai	NEIGRI HMS Shillong	AIIMS Jodhpur	IGMC Shimla	BHU Varanasi	Total
Admitted for fever	5090	1766	452	293	327	1245	9487
Suspected Pneumonia	97	397	160	228	92	242	1216
X ray confirmed pneumonia	86	153	44	163	41	240	727
Lab confirmed pneumonia	1	9	1	10	1	0	22
Suspected meningitis	208	188	25	27	190	33	671
Probable meningitis	28	21	12	9	29	10	109
Lab Confirmed meningitis	3	9	0	0	8	0	20
Suspected sepsis	37	85	59	44	41	46	312
Lab confirmed sepsis	1	0	1	1	0	0	3

Table 2. Sample collection and Test results in sentinel sites

Suspected for	No. of suspected cases	Samples collected (n)	Probable cases	Confirmed cases n (test)		
				<i>S. pneu</i> +ves	<i>Hib</i> +ves	<i>N.men</i> +ves
Pneumonia	1216	Blood (1127)	-	Culture – 12	-	-
		Other specimens (74)		Culture – 9	1	-
Meningitis	671	CSF (670)	109	Culture – 7 LAT – 4	LAT -1	LAT - 8
Sepsis	312	Blood (297)	-	Culture - 3	-	-

Table 3. Serotype Distribution

S. No	Centre	Serotype
1.	GMC, Trivandrum, Kerala	14, 6B
2.	LTMGH, Sion, Mumbai	1 (2 nos), 14 (2 nos), 10 A (2 nos), 2, 19F (2 nos), 9V, 33A, 5
3.	NEIGRIHMS, Shillong	7B
4.	AIIMS, Jodhpur	6A, 19F, 6B, 15C, 5, 14 (2 nos), 9V,
5.	IGMC, Shimla	19 F

Table 4. Over all test results

Organism	Method	GMC, Trivandrum	LTMGH	NEIGRIHMS Shillong	AIIMS Jodhpur	IGMC Shimla	BHU, Varanasi	Total
<i>S. pneumoniae</i>	Blood culture	-	1	1	9	1	0	12
	Other specimen culture	1	7	0	1	0	0	9
	CSF culture	2	5	0	0	0	0	7
	LAT	1	3	0	0	0	0	4
	PCR	5	4	1	2	1	5	18
	Total	9	20	2	12	2	6	51
<i>H. influenzae</i>	Culture	-	1	-	-	-	-	1
	LAT	-	-	-	-	1	-	1
	PCR	1	-	-	2	3	-	6

	Total	1	1	-	2	4	-	8
<i>N. meningitidis</i>	LAT	0	1	0	0	7	0	8
	Total	0	1	0	0	7	0	8
Total positives		10	22	2	14	13	6	67

5. Hospital Based Sentinel Surveillance of *S. pneumoniae* and other Invasive Bacterial diseases – Phase II

Principal Investigator	Dr.J.Yuvaraj
Co-PI	Drs.C.P.Girish Kumar & R.Prabhu
Co-Investigator(s)	Dr.V.Balaji and Investigators from 14 sentinel sites
Collaborating Institute(s)	1. AIIMS, Jodhpur; 2. AIIMS, Bhopal; 3. MGMMC, Indore; 4. LTMGH, Sion; 5. GMC, Trivandrum; 6. DrRPGMC, Tanda; 7. IGICH, Bengaluru; 8. SMGS, Jammu; 9. KKCTH, Chennai; 10. ICH, Chennai; 11. RIMS, Ranchi; 12. GMC, Jagdalpur; 13. GMC, Warangal & 14. GMC, Jamnagar
Funding Agency	UNDP
Initiation of the project	January 2019
Duration	2.0 years
Budget	9.4 crore

Background

The Hospital-based sentinel surveillance of *S. pneumoniae* and other invasive bacterial diseases funded by the MOHFW/UNDP was initiated in December 2016 and phase I was completed in June 2018. This study coincided with the completion of Hib (*Haemophilus influenzae* type B) vaccine coverage throughout the country in early 2017 and the introduction of PCV in mid-2017 under the Universal Immunization Program in India. This study started with 6 sites spread across 6 states (including 3 states where PCV is launched). Initial data collected from the 6 sites in Phase I detected 51 *Streptococcus pneumoniae* (pneumococcus), 8 *H. influenzae* type B (Hib) and 8 *Neisseria meningitidis* (meningococcus) cases. Pneumococcus accounted for the majority of the cases suspected for pneumonia and other invasive bacterial diseases (76%). The Phase II of this study was started on January 1, 2019 by retaining 3 phase I sites namely, AIIMS, Jodhpur, GMC, Trivandrum and LTMGH, Sion and the expanded to additional 11 sites (Figure 1). Currently surveillance activity carried out in 10 sites, 4 more new sites (RIMS, Ranchi; MPSHAH GMC, Jamnagar; GMC, Jagdalpur, Kakatia MC, Warangal) added from October 2019 (Figure 1).

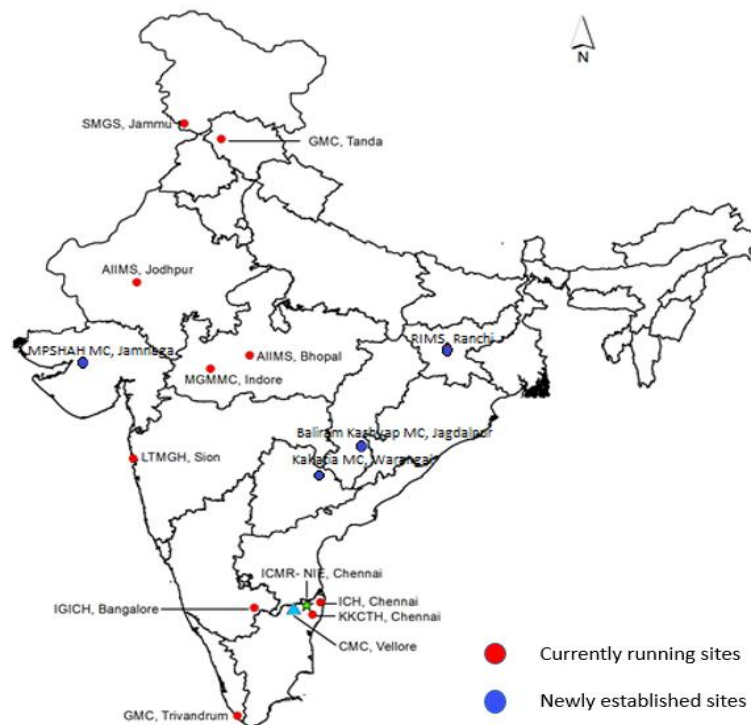
Primary Objectives

1. To assess the burden and distribution *Streptococcus pneumoniae* in children aged 1 month to 59 months presenting with symptoms of pneumonia and invasive bacterial disease attending select hospital -based sentinel sites after introduction of the Pneumococcal Conjugate Vaccine in the Universal Immunization Programme in India.
2. Determine the serotype profile and subsequent replacement of serotypes of *S. pneumoniae* in children with pneumonia and invasive bacterial diseases.

Secondary objective

To assess the burden and distribution *N. meningitidis* and *H influenzae* type b in children aged 1 month to 59 months presenting with symptoms of pneumonia and invasive bacterial disease.

Figure 1. Hospital based sentinel surveillance of *S. pneumoniae* and other invasive bacterial diseases (HBSSPIBD) network



Methodology

Pneumonia and IBD surveillance is focused on identifying suspected pneumonia, meningitis and sepsis cases among children aged 1–59 months attending inpatient wards of the sentinel hospitals. WHO recommended case definitions are used for surveillance. All suspected cases are enrolled in the surveillance, clinically evaluated by the pediatrician from surveillance sites and information about demographic, epidemiologic and clinical details is collected. CSF, blood and other sterile body fluids were collected and tested for presence of *S.pneumoniae*, *H.influenzae* type b and *N.meningitidis* by bacterial culture, Latex Agglutination Test (LAT) and Real-time PCR. Positive Pneumococcal isolates and samples were further processed for serotyping/grouping.

Results

a) Sentinel sites

- Between January 2019 and August 2019, a total of 21075 cases were admitted in inpatient wards with the age group of 1-59 months, out of which 1401 cases were enrolled for suspected pneumonia, 574 cases for suspected meningitis and 234 cases for suspected sepsis (Figure 2).
- From 1401 suspected pneumonia cases, 1333 blood and 53 other specimens (includes 3 NP swabs processed in Trivandrum) were collected and processed for bacterial culture. A total of 22 blood and 13 other samples showed positive for *S. pneumoniae* and 3 other specimens showed positive for *H. influenzae* type *b*.
- Of the 574 suspected bacterial meningitis cases, 540 CSF samples were collected and subjected to bacterial culture. Among them, 2 CSF samples were found to be culture positive for *S. pneumoniae*. Out of 540 CSF samples, 469 samples were processed for latex agglutination test among them 4 were positive for *H. influenzae* type *b* and another one sample was positive for *N.meningitidis*. Out of 574 suspected bacterial meningitis cases, blood samples were collected from 419 cases and processed for bacterial culture. Of which, 2 samples showed positive for *S. pneumoniae* and 1 for *H. influenzae* type *b*.
- Among 312 suspected sepsis cases, blood samples were collected from 234 cases, of which 3 samples were positive for *S. pneumoniae* by bacterial culture.

b) Reference Laboratory activity:

- From all the sentinel sites, a total of 328 CSF samples from meningitis suspected cases and 4 pleural fluids from pneumonia suspected cases were sent to Reference Laboratory for molecular diagnosis (Direct PCR) for detection of *S. pneumoniae* by targeting “*lyt A*” gene, *H influenzae* type *b* by targeting ‘*hpd*’ gene and *N. meningitidis* by targeting ‘*sod C*’. Out of which 236 CSF samples and all 4 pleural fluids have been processed for molecular diagnosis. Test results are presented in Table 2.
- From sentinel sites, 44 pneumococcal isolates and 4 Hib isolates were sent to reference laboratory, among them 37 isolates were confirmed as *S. pneumoniae* and all 3 Hib isolates were confirmed.
- Among 36 pneumococcal isolates tested, 17 different serotypes were identified and 14 (21.6%), 19F (16.2%), 3 (8.1%) and 9V (8.1%) are the commonest serotypes. Results were presented in Figure 3.

Figure 2. Pneumonia and IBD surveillance summary

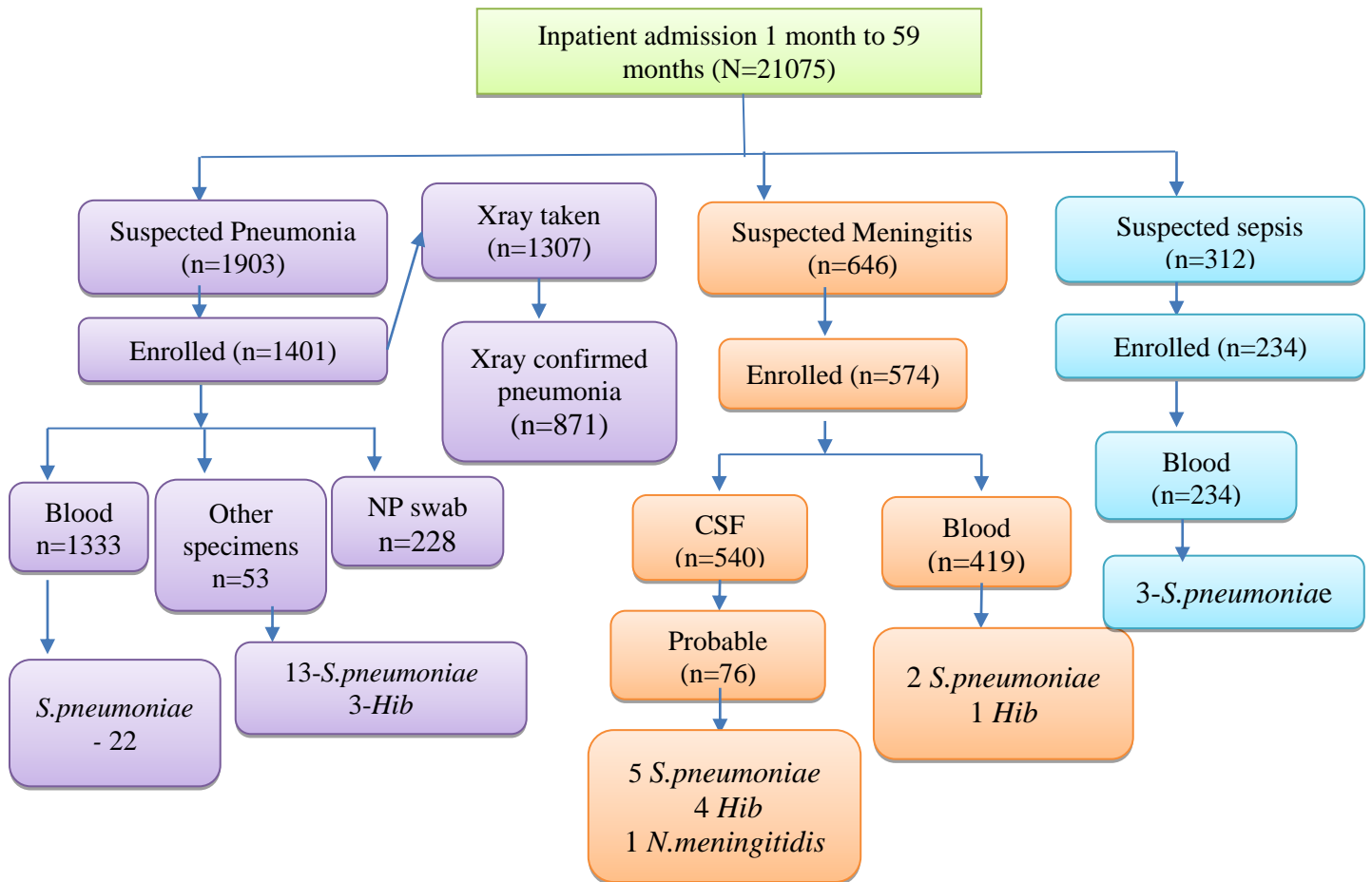


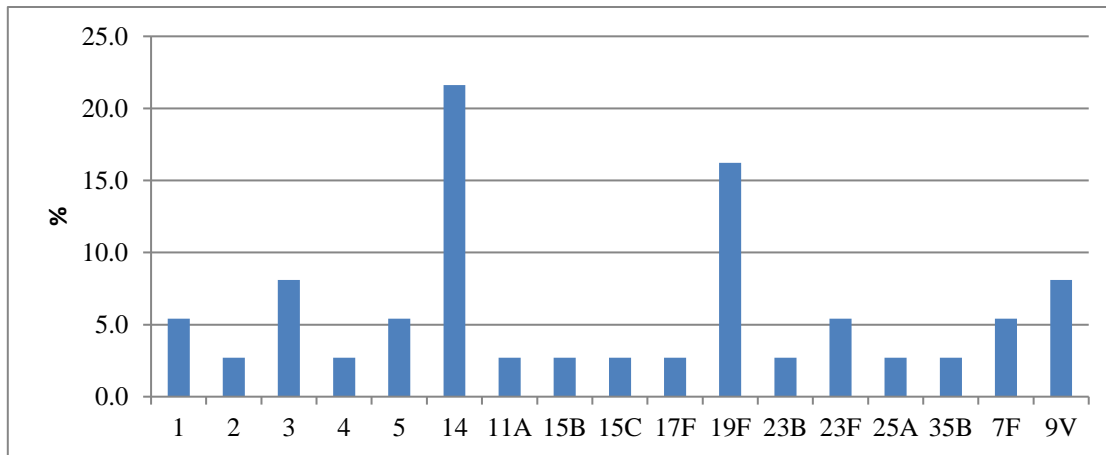
Table 1. Site wise case recruitment from January to August 2019

January- August 2019	AIIMS, Jodhpur	AIIMS, Bhopal	MGMHC Indore	LTMGH Sion	GMC, Trivandrum	GMC, Thandavur	IGICH Bengaluru	GMC, Jommu	KKCTH Chennai	ICH, Chennai	Total
Inpatient (1-59months)	1101	813	947	2282	2216	962	3937	1972	4787	2058	21075
No. of pneumonia case enrolled	117	83	22	162	282	65	92	30	278	270	1401
Lab confirmed pneumonia	7	0	0	2	2	0	5	0	20	2	38
No. of meningitis cases enrolled	32	16	20	89	115	37	44	50	31	140	574
Lab confirmed meningitis	3	2	2	3	0	0	1	0	1	1	13
No. of sepsis cases enrolled	49	18	9	9	29	28	8	7	30	53	240
Lab confirmed sepsis	0	0	0	1	0	0	1	0	0	1	3

Table 2. Molecular testing results (January – August 2019)

	AIIMS, Jodhpur	AIIMS, Bhopal	MGMHC Indore	LTMGH Sion	GMC, Trivandrum	GMC, Tanda	IGICH Bengaluru	GMC, Jammu	KKCTH, Chennai	ICH, Chennai	Total
Number of CSF samples sent to RL for PCR	24	15	0	39	60	14	10	27	2	137	328
Number of CSF samples tested at RL	24	0	0	30	35	14	0	27	2	104	236
<i>i. S. pneumoniae</i>	1	0	0	1	0	0	0	0	0	1	3
<i>ii. H. influenzae type b</i>	1	0	0	0	0	0	0	0	0	0	1
<i>iii. N. meningitidis</i>	0	0	0	0	0	0	0	0	0	0	0
Number of other specimen sent to RL for PCR	0	0	0	2	0	0	1	0	1	0	4
Number of other specimens tested at RL	0	0	0	2	0	0	1	0	1	0	4
<i>i. S. pneumoniae</i>	0	0	0	1	0	0	1	0	1	0	3
<i>ii. H. influenzae type b</i>	0	0	0	0	0	0	0	0	0	0	0
<i>iii. N. meningitidis</i>	0	0	0	0	0	0	0	0	0	0	0

Figure 3. *Streptococcus pneumoniae* serotypes distribution between January 2019 and August 2019 (n= 36)



6. Improving health and nutritional status of vulnerable segment of population by implementing multi-component health and nutrition education intervention as a sustainable model of intervention

Principal Investigator: Arocikasamy J

Objective

To improve health and nutritional status of vulnerable segment of population by implementing multi-component health and nutrition education intervention, focusing on dietary counseling and modification keeping in view the cultural and socio-economic status of population.

Study design

Pre and post intervention cross sectional study

Study population

The following 10 villages are selected by PPS sampling from Kalloor PHC block: 1.Melakallur (MK)2.Bharathiyarnagar, MG Nagar (BN)3.Ambethkarnagar, Anna Nagar (AN)4.Suthamali (SM)5.Narasinganallur (NN)6.Gramangalam (GM)7.Thirupanikarisalkulam (TK)8.Vettuvankulam (VK)9.Uganthanpatti (UP)10.Puthur (PR)

Methodology

Phase I (Formative research)

Demographic, Household Information and KAPP regarding Health issues and Anthropometric measurements and 24 hours Dietary Information will be collected. Clinical examination will be carried out to assess presence of nutritional deficiencies signs. Blood will be drawn for biochemical investigation. KAPP with respect to nutritional problems and programmes of Govt. of India will be collected from medical and paramedical staff of the study areas.

Phase II (Intervention - IEC)

Counseling of pregnant women about regular ante-natal check-ups and intake of IFA tablets during pregnancy and lactation. Counseling of mothers of children and adolescent girls on consumption of IFA tablets/ syrup as per Govt. of India guidelines 2007, Deworming tablets to be given periodically. Counseling of the pregnant and lactating mothers will be carried out on infant and young child feeding practices. Improve awareness of communities about National Nutritional Programs.

Phase III (Impact evaluation)

After 18 months of intervention, impact evaluation will be carried out and all the parameters which cover during baseline will be re-assessed with cross sectional study.

Phase I and II of the study has been successfully completed.

Phase-II (2018-19) included various interventional activities such as:

1. Targeted Door to Door Health Education: 22 volunteers from 10 villages were trained to do a house to house IEC.
2. School Health Campaign: Adolescent children were given IEC on nutrition, personal hygiene and OAD.
3. Mass Village IEC campaign: Mass campaign in 10 villages
4. Healthy Cooking: 9 cooking competitions to enhance public participation and awareness of healthy low cost locally available hygienic food preparation practices.
5. Drawing and elocution competitions for school students in the study area.
6. Focused group discussions among study populations.

Focus has been given to early diagnosis of anemia among adolescent girls and pregnant women by creating awareness among the population on common signs and symptoms of anemia.

Prevention of anemia in the form of health education regarding nutritious food, food fads and taboos, regular consumption of deworming tablets and hygienic cooking practices is also being done on regular basis across the different study populations.

School campaigns

Health education program focusing on hygiene practices, balanced diet and menstrual hygiene for adolescent girls are conducted routinely.

Mass campaigns

Mass Health campaigns for young women, new mothers and general public regarding dangers of anemia and methods to prevent nutritional anemia.

Summary of Phase I (2015-2016) Study:

1. 38.8% of the adolescent girls in the MRHRU field area were found to be anemic and 40% never took de-worming tablets.
2. 30.4% of the Under Five children were found to be Underweight.
3. 38% of the antenatal women were found to have Haemoglobin less than 10gm%.

7. Seroprevalence of Chikungunya virus infection, India, 2017: a nationally representative cross sectional serosurvey

Name of Principal Investigator	Dr Manoj V Murhekar
Name of Co-PI	Mr P Kamaraj
Name of Co-Investigators	Dr CP Girish Kumar & Dr M Santhosh Kumar
Funding agency	ICMR
Initiation of the project	June 2017
Duration	2 years
Budget	Rs.3,29,09,100

Background

Surveillance data from National Vector Borne Disease Control Programme and virology laboratory network suggest continued CHIKV transmission after its 2005 reemergence and highlight the impending risk of outbreaks in different parts of India. Periodic seroprevalence surveys could supplement surveillance information to provide insights on CHIKV circulation, population immunity and understand the risk of future outbreaks. There is a lack of nationwide data on the seroprevalence of CHIKV in India.

Objective

Estimate age-specific seroprevalence of CHIKV infection in India

Methods

We carried out a serosurvey to estimate the prevalence of dengue infection by randomly selecting individuals in three age groups (5-8, 9-17 and 18-45 years), covering 240 clusters (118 rural, 122 urban) from 60 selected districts of 15 Indian states spread across all five geographic regions of India. Residual sera collected from dengue serosurvey were tested for presence of IgG antibodies against CHIKV using CHIKjjDetectTM IgG ELISA (InBios International, Inc. Seattle, USA) following manufacturers instruction. We estimated weighted age-group-specific seroprevalence of CHIKV infection along with 95% CI for each geographical region using design weight and adjusting for non-response.

Results

In a nationwide survey among 12,300 individuals aged between 5-45 years, the overall prevalence of IgG antibodies against Chikungunya in India was 18.1% (95% confidence interval, 14.2–22.6). The seroprevalence was lowest in northeast (0.3%) and highest in southern (43.1%) region with significant difference between rural (11.5%) and urban (40.2%) areas. The overall seroprevalence of CHIKV among children aged 5–8 years was 9.2%, increasing to 14% among those aged 9–17 years and 21.6% among adults aged between 18–45 years ($p < 0.0001$). The difference in seroprevalence between men (18.8%) and women (17.6%) ($P = 0.50$) was not statistically significant.

8. Cohorts for Zika Epidemiology in India

Principal Investigator Tarun Bhatnagar,

Background

Recently, outbreaks of Zika virus infection have been reported from Jaipur and Bhopal in India. It is proposed to conduct cohort studies to understand the epidemiology of Zika virus infection in the country. This includes cohorts of pregnant women and newborns exposed to Zika virus during pregnancy.

Objectives

Primary objective – To estimate the risk of microcephaly among women infected with Zika virus compared to women not infected with Zika virus. Secondary objectives - 1. To measure the incidence of Zika virus infection in cohort of pregnant women; 2. To describe the clinical spectrum of Zika virus infection in cohort of infected pregnant women; 3. To measure the association between trimester of Zika virus infection in the mother & resulting frequency of abnormalities in fetus; 4. To determine risk factors for Zika virus infection among asymptomatic & symptomatic Zika virus infected women; 5. To identify, describe & quantify the spectrum of abnormalities in infants born to women included in this cohort; 6. To compare risk of congenital abnormalities between live newborns from symptomatic & asymptomatic Zika virus infected women during pregnancy; 7. To compare post-natal risk of developmental abnormalities between infants from symptomatic & asymptomatic Zika virus infected women during pregnancy; 8. To describe the natural history of congenital and developmental abnormalities during infancy in babies born to mothers with Zika virus infection during pregnancy.

Methods

The prospective cohort study will recruit pregnant women at risk of Zika virus infection during pregnancy at Jaipur, Bhopal and adjoining districts with reported Zika virus outbreaks. They will be followed-up from the time of enrolment until childbirth or termination of pregnancy with one follow-up visit per trimester, to estimate the risk of adverse pregnancy outcomes. Newborns of these mothers will be followed-up for two years of their life, with nine follow-up visits (1, 3, 6, 9, 12, 15, 18, 21, 24 months). Four follow-up visits will be conducted for the pregnant women from the time of enrolment until the termination of pregnancy with at least one visit per trimester. The Zika virus negative pregnant women would be tested once every trimester by IgM serology and PRNT₉₀ if required at NIV, Pune for the presence of Zika virus infection in past three months. During these visits the Zika virus positive and negative pregnant women would be tested for infections due to Flavivirus (Dengue and Japanese encephalitis), Chikungunya by IgM capture (MAC) ELISA and TORCHS group (toxoplasmosis, rubella, cytomegalovirus, herpes, syphilis) by specific IgM ELISA. The outcome of the pregnancy (live birth, miscarriage, stillbirth, induced abortion) will be recorded by the gynaecologist/paediatrician of the hospital where the pregnant women gets registered. Blood of the Zika negative pregnant woman will be tested for Zika virus at time of delivery as per algorithm. Recruitment of mother/ newborn pairs will take place as soon as possible after birth. The following parameters will be recorded for the newborns: Microcephaly by measuring head circumference (occipito-frontal) within 24 hours following birth; Facial disproportion; Dysphagia; Epilepsy and seizures; Low birth weight; Spasticity and tone; Neurological reflexes;

Cerebral palsy; Hospitalization. Hearing impairments will be screened by Otoacoustic Emissions (OAE); visual impairments by Ocular exam, including fundoscopy and ROP screening; calcifications by CNS imaging (Transcranial USG). Phenylketonuria, hypothyroidism and Congenital adrenal hyperplasia would be ruled out by laboratory evaluations in either the 1st or 3rd month, if not done earlier. Considering risk of microcephaly among Zika infected mothers as 3% and ratio of Zika positive and negative pregnant women of 1:4, the sample size is 1000 pregnant women with 200 Zika virus positive and 800 as Zika virus negative. Study end points include: Abnormal pregnancy outcome, Microcephaly, Miscarriage/ Abortion (Spontaneous or planned), Stillbirth, Preterm birth, Low birth weight (Intra-uterine growth retardation), Frequency of signs and symptoms of Zika virus infection in pregnant women, Guillain-Barré syndrome, Any feature of Congenital Zika Syndrome in newborns, and Neuro-developmental anomaly in newborns/ children (2 years).

Results

Data collection was initiated at Jaipur site in May 2019. Till date, 119 pregnant women and 25 babies have been enrolled in Cohort 1. Data collection is ongoing with simultaneous data entry in Redcap software.

9. Integrated Road Traffic Injuries Surveillance (IRIS), Chennai, Tamil Nadu

Principal Investigator	P.Manickam
Co-Investigator(s)	P. Ganeshkumar, T. Jeromie Wesley Vivian, K Kanagasabai, T Daniel Rajasekar, Saravanakumar V, Jasmine Sundar, Gitakrishnan Ramadurai, PV Jayasankar, K Jayanthi, Ajay Prasad, Rajesh V
Collaborating Institute(s)	A collaborative study of ICMR-National Institute of Epidemiology (NIE), Indian Institute of technology – IIT Madras, The Tamil nadu Dr.MGR Medical University, Rajiv Gandhi Government General Hospital (RGGGH) and Sundaram Medical Foundation (SMF)
Funding Agency	Indian Council of Medical Research (ICMR) Task Force
Initiation of the project	April 2017
Duration	2years
Budget	23.88lakhs

Background

Evidence suggests that hospital-based injury surveillance for Road traffic Accidents (RTAs) is useful in the international and in the Indian context. However, such surveillance has not been established in Chennai city.

Objectives

We established road traffic injuries (RTI) surveillance in two hospitals (private and public sector) in Chennai city with the objectives to characterize nature, types, distribution & pattern of RTIs, describe clinical management and outcomes of treatment of hospitalized RTIs

and describe factors associated with fatal RTIs. We did surveys to describe RTIs at the community level in a sub-urban locality.

Methods

We established hospital-based surveillance at Rajiv Gandhi Government General Hospital (public sector) and SMF hospital (private sector). Trained nurse investigators used tablet-based data collection tool (designed on the basis of WHO surveillance tool for RTIs) to collect data [Personal identifier, Socio-demographic, Accident identification (Site, weather, climate and light conditions), Road, Vehicle, Person related data, Pre-hospital admission, Ambulance, Clinical Treatment and Outcome details] through a combination of interview of patients or their respondents and abstraction of information from hospital records. The information at the community level was collected from key informants every two-weeks in Ayapakkam cohort.

Results

We developed tools for situational analysis, surveillance in public health facility, surveillance in private health facility and surveillance in community. We collected information on 2077 cases from public sector and 140 cases from private sector. The community based data was available for 255 cases.

Type	Study sites	Start date	End date	# cases
Public	Rajiv Gandhi Government General Hospital, Chennai	31 October 2018	30 April 2019	2077
Private	Sundaram Medical Foundation Dr.Rangarajan Memorial Hospital (SMFH), Chennai	12 February 2018	28 February 2019	140
Community	Ayapakkam locality, Chennai	1 February 2019	14 May 2019	255

10.Public health surveillance during mass gatherings, Tamil Nadu

Principal Investigator	P. Manickam
Co-Investigator(s)	Ganeshkumar P, MV Murhekar, T Jeromie; DHPHM, Tamil Nadu: K. Kolanda Swamy, GK Durairai, B Premkumar, B Viduthalai Virumbi.
Collaborating Institute(s)	A collaborative study of ICMR-NIE and Tamil Nadu Directorate of Public Health and Preventive Medicine (DHPHM)
Funding Agency:	Intramural
Initiation of the project	December 2015

Background

Mass gatherings involve major public health preparedness, alertness to plan and effectively manage the natural and manmade threats. Operational/implementation research such as establishment and assessment of effectiveness of enhanced surveillance during mass gatherings is an identified research priority. In India, National and State Governments use guidelines to prevent communicable diseases and other issues related to the nature of the gathering. Tamil Nadu Public Health Act, 1939 (updated, 1993) notifies 123 fairs and festivals. The Act mentions about detection and segregation of cases of infectious diseases and prevention of introduction and spread of such diseases. However, additional experience in a variety of challenging settings and situations would be useful in making the Act up-to-date.

Objectives

- (1) Document effectiveness of syndromic surveillance system for a limited number of conditions that could be facilitated by the mass gathering and/or of outbreak potential
- (2) Update the guidelines for mass gatherings

Methods

Based on our participation in notified fairs and festivals, we had (1) described public health preparedness plans through review of documents, records and reports, interviews of stakeholders and site inspection (2) monitored implementation through observation, review of records, survey of participants (3) facilitated syndromic surveillance through mobile/tablet tools for analysis and report generation for action and (3) documented effectiveness of surveillance through collecting data on surveillance attributes. We proposed updating Act/Guidelines based on the experience above.

Results

We participated in two festivals in Tamil Nadu (Karthigai Maha Deepam and Periyapalayam). ICMR-NIE and DHPHM working group was established. In October 2018, meeting of experts reviewed the draft for updating specific aspects of the guidelines.

11. India Hypertension Control Initiative

Principal Investigator Dr Prabhdeep Kaur,
Co-investigator Dr Ganeshkumar
Collaborators ICMR, WHO, State Governments, MoHFW, Resolve to Save lives

In India, it is estimated that at least one in four adults have hypertension but only about 10% of them have their blood pressure under control. To achieve the Government of India's target of a 25% relative reduction in the prevalence of raised blood pressure, approximately 4.5 crore additional people with hypertension need to be brought under blood pressure control. Under the National Program for Prevention and Control of Cancer, Diabetes, CVD, and Stroke (NPCDCS) population based screening for early detection of common non-communicable diseases (NCDs) in the community is being carried out. However, the continuum of care component needs to be further developed to improve patient follow up.

5 Crucial Components of Effective Hypertension Care



To achieve and support the GOI goal of 25% relative reduction in raised blood pressure the India Hypertension Control Initiative (erstwhile India Hypertension Management Initiative) was launched in November 2017. The program was developed to address the needs and facilitate achieving the target. In the first year, IHCI covered 26 districts across five states- Punjab, Kerala, Madhya Pradesh, Telangana and Maharashtra.

Overall, by 31 Dec 2018, 187,017 patients were registered under IHCI, with nearly 63% of the registrations from the State of Kerala alone. The other four states, Punjab, Telangana, Madhya Pradesh, and Maharashtra, contributed 14%, 9%, 8%, 5% to the total registrations, respectively. Nearly, one third of the enrolled patients achieved blood pressure control, and one third had uncontrolled blood pressure despite treatment, with high variation across states. The blood pressure control was higher in PHCs compared to higher-level facilities (43%, 30%, and 27% in PHC, CHC, and district/sub-district hospital, respectively).

The initiative has had notable successes in the first year, including effective coordination and commitment among multiple partners; selection of state-specific hypertension treatment protocols; improvement in drug logistics systems and thereby ensuring the availability of protocol drugs; recognition of the value of professional digital blood pressure devices; provision of effective training; ensuring distribution of 30-day supplies of medications to patients; and

measurement of blood pressure control each quarter by establishing robust information system allowing, for the first time, systematic and accurate information on hypertension control rates.

In addition, we are conducting community-based surveillance in ten districts for the comprehensive assessment of impact of IHCI. The IHCI has both required and facilitated strengthening of the primary care system, which is transitioning from one primarily addressing maternal and child health to the one that also can address non-communicable diseases, including hypertension.

The project demonstrated the feasibility of a large-scale hypertension intervention within the existing primary health care system of India. The strategies, tools and lessons learnt will be used for improving quality and for scaling the interventions to the other districts within first five states and rest of India.

Figure 1: Registrations of patients with hypertension in the five states by month, India, Jan-Dec 2018

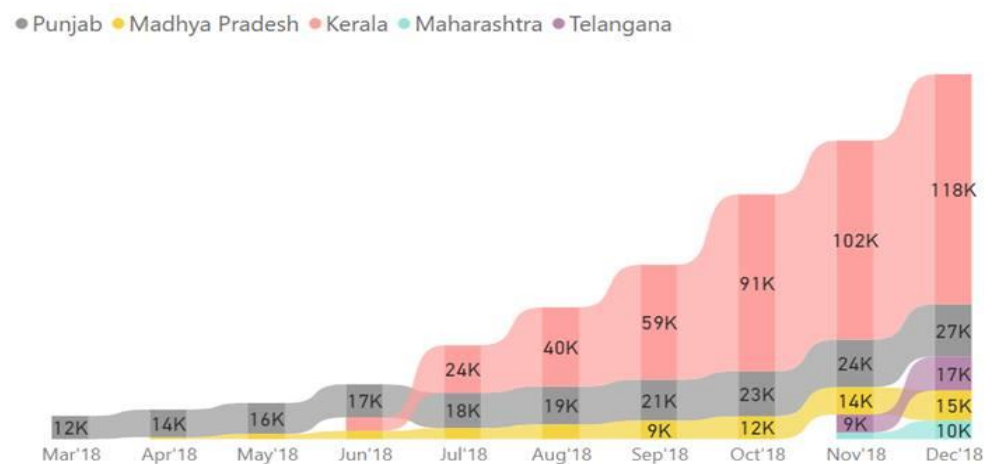
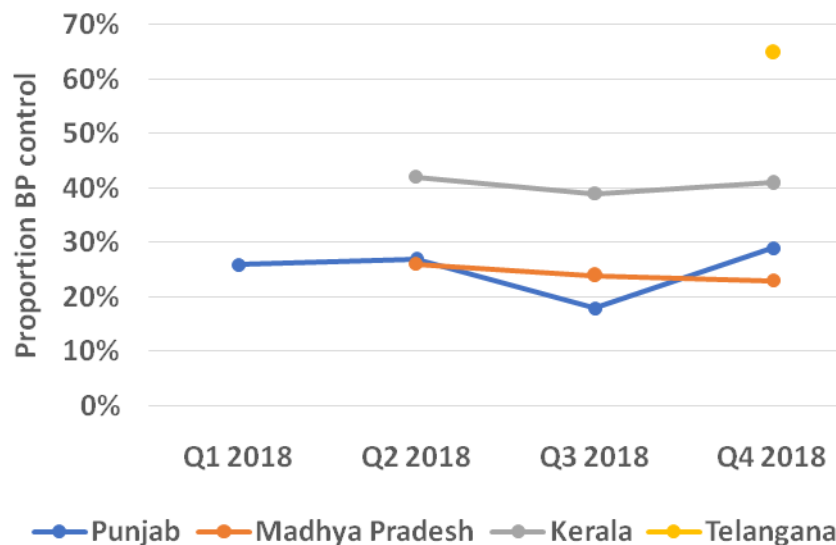


Figure 2: Figure 6: Blood pressure control among patient cohorts 3-6 months after the registration in four states, India, Jan-Dec, 2018



12.Socio-behavioral issues and structural factors regarding health of under-5 children in urban slum population of Chennai, Tamil Nadu 2018

Principal Investigator Ganeshkumar P,

Background

Under-5 mortality was found to be 2.5 times higher in the slums as compared to urban areas in the developing countries. Identification of health needs of urban poor and lack of convergence among wider determinants of health are some of the gaps and constraints in the service delivery of urban health. We intended to describe the socio-behavioral issues and structural factors related to the health of under-5 children in urban slum population of Chennai.

Objectives:

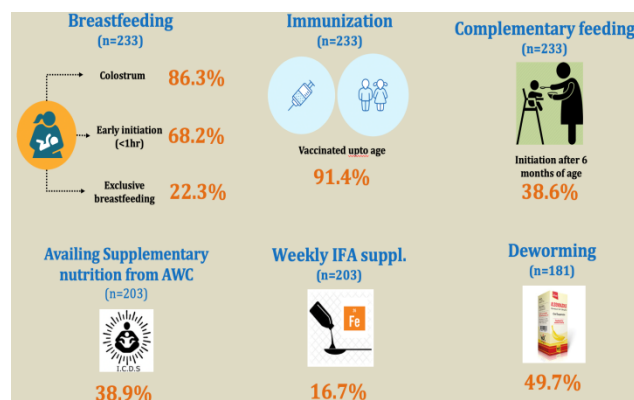
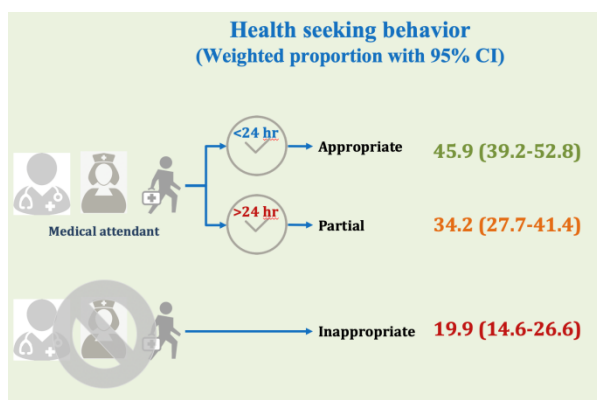
- a)To describe the socio- behavioral issues related to the health of under-5 children in urban slum population of Chennai.
- b)To describe the structural factors related to the health of under-5 children in urban slum population of Chennai

Methods

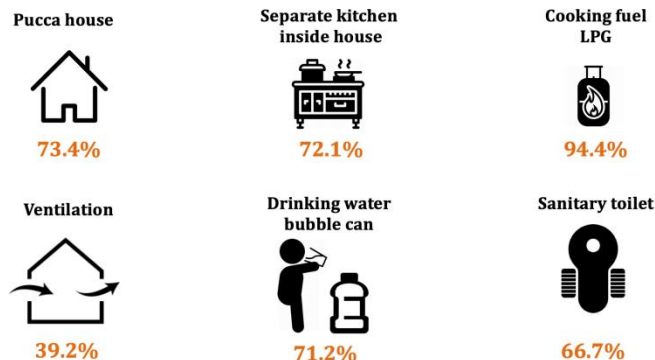
We adopted mixed method research to study among the Under-5 children in urban slums of Chennai city, Tamil Nadu, India, and the respondents are mothers of under-five children and Anganwadi workers at selected slums. We adopted a single-stage cluster sampling procedure for the selection of slums (clusters). Within the selected slum, we identified the random starting household by simple random sampling method from the total number of households in each slum. It was estimated to include 240 under-five children in the study from the 40 selected slums. In each selected slum six under-5 children were included in the study. Nine focus group discussions, 18 in-depth interviews with mothers and 6 in-depth interviews with Anganwadis are conducted in the study.

Results

There are 2332 areas identified as slums by Chennai Corporation within Greater Chennai area. Of this, forty slums were covered and obtained the data from 233 under-5 Children. Around 86.3 % of mothers have fed colostrum milk as first food to their children at birth. Nearly 68.2 % have initiated breastfeeding within one hour of birth and only 22.3% have exclusively breastfed the child for 6 months. About 91.4% of selected under-5 children are vaccinated upto age. In the last 14 days, around 33% of children had any illness and 35.1% have taken treatment within 24 hours to the appropriate medical attendant while 41.6% of under-5 children have never sought any kind of treatment for the illness



Selected Structural factors (n=233)



13. Assessment of multisectoral action plan for prevention of non-communicable diseases in India 2019

Principal Investigator Ganeshkumar P,

Background

NCDs can be prevented and controlled by addressing social determinants of health. All the social determinants of health are not in control of health sector. The NMAP provides directions for sectors in all the states. However, states in India are an oasis having their own context, physical and social environments and demonstrate mixed patterns of capacities, some of which can be scaled up; and those that will be scaled up can be adapted for intervention in other states with different contexts and physical and social environment.

Objectives

a)Measure the capacity of states under different strategic areas outlined in NMAP required to establish multi stakeholder engagement and effective NCDs response b)Assess the capacity and readiness of states to create enabling environment for NMAP based on the capacity assessment findings; c)Explore existing practices of multi-sectoral collaboration across health and non-health sectors at state level; d)Examine the existing platforms/structures/mechanisms available at state level to foster the operationalization of NMAP; and e)Provide recommendations for improving multi-stakeholder engagement

Methods

We adopted mixed method research to study in six states viz., Assam, Himachal Pradesh, Gujarat, Odisha, Uttar Pradesh and Tamil Nadu. The data for the assessment will be collected for all the sectors identified under NMAP. The identified sectors are Agriculture, Consumer affairs, Commerce and Industry, Environment, Food processing, Finance, tax & revenue, Health, Human resource development, Information & broadcasting, Labour, Law & justice, Road transport & highways, Social justice & empowerment, Urban & rural development, Women & child development and Youth affairs & sports. Senior state officials of 17 selected sectors/ministries – Secretary, Director and Deputy Directors and Representatives of selected professional association and civil registered societies were included in the study. In each state we did the following data collection procedure to address the objectives, a.Desk review on multi-sectoral action in the respective sectors using data abstraction form; b.Semi-structured interview on the tool based on WHO Global NCD Progress Monitoring on the strategic areas on alcohol consumption, tobacco use, cardiovascular disease, diabetes, chronic respiratory disease, nutrition & diet and physical activity; c.In-depth interviews using interview guides to identify the barrier of multisectoral coordination and strategies to overcome that.We did descriptive analysis on identifying the strengths, weaknesses, opportunities and threats for multi-sectoral collaboration. We will also identified the state preparedness for multi-sectoral collaboration.

Results

Data collection was completed and data analysis is being conducted on the following areas, governance, law policies, use of technology, use of financial instruments and scope of multisectoral coordination.

14. Scaling up interventions to improve the control of hypertension and diabetes in partnership with the governments of Kerala and Tamil Nadu: Leveraging India's national NCD program 2019 – 2024

Principal Investigator Ganeshkumar P,
Funding agency National Health and Medical Research Council, Australia under
Global Alliance of Chronic Diseases (GACD) Scale-up grant

Background

To date, NPCDCS implementation in Kerala and TN has primarily focused on opportunistic screening, case detection, referral and increasing NCD awareness among the general population. To improve hypertension and diabetes outcomes further in these two states, there is an urgent need for an implementation and scale up model that integrates strategies for screening, secondary prevention and disease management. The major challenge of scalability is to extend the reach of research beyond the findings demonstrated in RCTs and to extend and adapt these to other settings and populations, particularly to those living in LMICs. However, not only there is very limited evidence about what to scale up to improve chronic non-communicable disease (NCD) outcomes in LMICs, but these countries also face significant resource constraints, health workforce shortfalls, governance difficulties and other challenges in scaling up programs. This proposal will demonstrate, design and deliver scalable SLM (structured lifestyle modification) models to improve diabetes and hypertension outcomes in the two Indian states of Kerala and Tamil Nadu.

Objectives:

1. To evaluate the implementation outcomes of a peer support program and community mobilisation strategy to improve the prevention and control of diabetes and hypertension (using RE-AIM Framework & Theoretical Framework of Acceptability).
2. To identify and address contextual factors within the community and health systems that act as enablers and barriers to scale up (using Normalisation Process Theory).
3. To determine the value and return on investment of the program by assessing program cost and cost-effectiveness

Methods

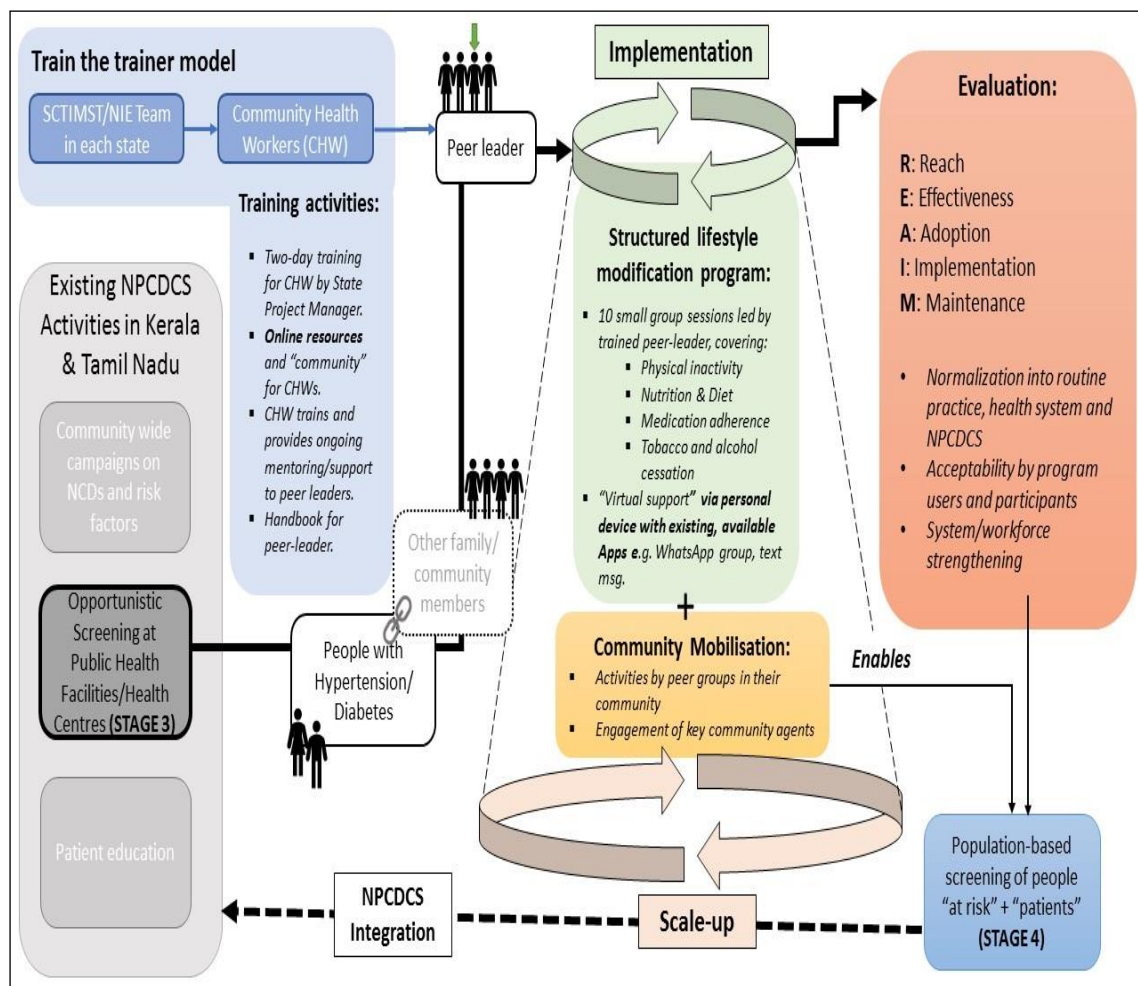
Our project will design and deliver a scalable structured lifestyle modification (SLM) program that is adapted from our previous trials to improve diabetes and hypertension outcomes. The intervention model consists of an integrated screening and lifestyle modification program, which includes peer-group and community mobilization components.

The intervention components will be targeted to provide adherence and lifestyle maintenance support for individuals with diabetes and/or hypertension. Based on the three project objectives as stated above, we shall evaluate the public health benefit and the potential of the program framework model for wider implementation and scalability in India

The project will be conducted in three stages, Stage 1: Stakeholder engagement & commitment; Stage 2: Intervention adaptation and implementation design for NPCDCS; Stage 3: Implementation – Feasibility of the scale-up model in Kerala and Tamil Nadu
Mixed-methods evaluation of the Implementation stage will cover Reach, Effectiveness, Adoption and Implementation

Results

Stage 1: Stakeholder engagement has been completed. Letter of support from both the state government was obtained. Two project stakeholder workshop was completed to design the intervention and steps to implement the program along with the stakeholders. We have applied for HMSC clearance to initiate the study.



Multi-level program delivery and iterative evaluation model for structured lifestyle modification to improve hypertension and diabetes outcomes in rural communities in Kerala and Tamil Nadu.

15. Congenital Rubella Syndrome Surveillance in India

Principal Investigator	Dr. Manoj Murhekar, Director, ICMR-NIE, Chennai
Co-Investigator(s)	Division of Epidemiology & Communicable Diseases, ICMR Hqrs - Dr. Nivedita Gupta, Scientist E National Institute of Epidemiology, Chennai- Mr R. Sabarinathan National Institute of Virology, Pune - Dr. Gajanan Sapkal, Scientist E & Dr. Rajlakshmi Viswanathan, Scientist C
Collaborating Institute(s)	All India Institute of Medical Sciences, Jodhpur Christian Medical College, Vellore Indira Gandhi Institute of Child Health, Bangalore Post Graduate Institute of Medical Education and Research, Chandigarh. KEM Hospital, Pune All India Institute of Medical Sciences, Bhubaneswar ICH, Kolkata Niloufer Hospital, Hyderabad All India Institute of Medical Sciences, Bhopal Mahatma Gandhi Institute of Medical Sciences, Sevagram King George's Medical University, Lucknow Government Medical College, Trivandrum
Funding Agency	MOHFW
Initiation of the project	Nov 2016
Duration	5 years

Background of the study

Rubella infection during pregnancy, especially during the first trimester, can result in miscarriage, fetal death, stillbirth, or a constellation of congenital malformations known as congenital rubella syndrome (CRS). The 11 member states in the WHO Southeast Asia Region committed to eliminate measles and control of rubella/CRS by 2020. Developing and sustaining a case-based surveillance for measles, rubella and CRS is one of the identified strategies towards measles elimination and rubella/CRS control. In view of the introduction of rubella vaccine in India, ICMR has established a facility based surveillance for CRS in the country. The main aim of this surveillance is to provide baseline estimate of disease burden and also help monitor the impact and progress made by rubella vaccination.

Rationale

Government of India has decided to introduce rubella vaccine in the national immunization program in 2016. In view of the proposed introduction of rubella vaccine in the country, it is proposed to establish surveillance for CRS, which will provide a baseline estimate of disease burden and help monitor the impact and progress made by rubella vaccination

Objectives:

Primary objective

- To establish a facility-based surveillance for CRS in selected medical colleges/hospitals in different parts of country to monitor the time trends of the disease.

Secondary objective

- Monitor the rubella sero-prevalence among the pregnant women over time.

Methods

Data collection

From every suspected CRS case, information about clinical and epidemiological details will be collected in a case-report form.

Collection of samples

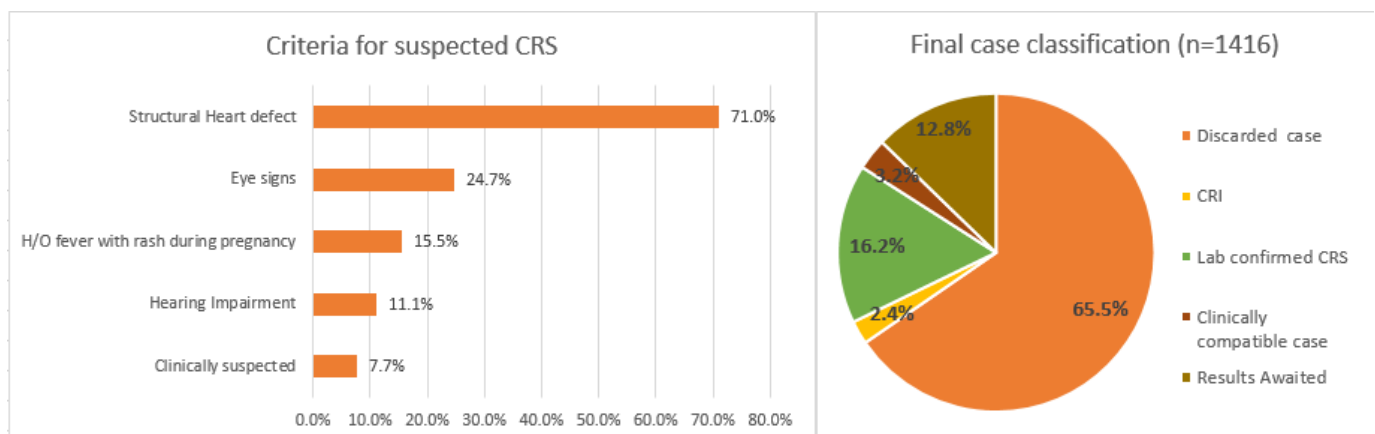
1-2 ml blood and one oro-pharyngeal swab will be collected from every suspected CRS patient. The sera samples will be tested for the presence of IgM/IgG antibodies against rubella. In sites where the testing laboratory is located away from the hospital site, the samples will be transported at 2-8°C in vaccine carrier. For all infants, OP swab will be collected from all suspected CRS cases and stored at -70°C for detection of rubella virus RNA in the throat swab. Laboratory confirmed CRS patients will be followed up periodically for viral excretion. The sera sample and OP swab will be stored 4-8°C until tested.

Data analysis

The data will be analyzed to study the percentage of suspected and confirmed CRS cases by age, sex, month, and geographic area. We will also find the trend of suspected and confirmed CRS cases over years for all the sentinel sites. We will also present the distribution of rubella genotypes.

Results

Twelve surveillance sites enrolled 1416 suspected CRS patients so far (till 15th Oct 2019) since November 2016. The suspected CRS patients met one or more criteria of suspected CRS as shown in below figure. Most (45.8%) of the suspected CRS patients were aged between 1-5 months. So far, Two hundred and nineteen (15.5%) suspected CRS case-patients were detected on newborn screening, while the remaining were recruited from pediatrics, ophthalmology, cardiology or ENT OPDs of the sentinel sites. The final classification of suspected CRS patients, based on IgM and IgG serology and clinical details is presented in below figure. 47 out of 610 samples (7.7%) tested for O-P swabs so far, were positive by RT PCR.



16.Prevalence and intensity of soil transmitted helminths among at-risk cohorts in states of Madhya Pradesh, Rajasthan, Bihar and Tirpura, 2019

Principal Investigator	. S. Devika
Collaborating Institutes	Evidence Action - Deworm the World Initiative, New Delhi; Model Resources, Mumbai; Postgraduate Institute of Medical Education and Research, Chandigarh, National Institute of Cholera and Enteric Disease, Kolkata, Rajendra Memorial Research Institute of Medical Sciences, Patna
Funding Agency	Deworm the World Initiative
Initiation of the project	June 2019
Duration	6 months

Background

Soil-transmitted helminths (STHs) are most common infections worldwide and commonly affect poor and most deprived communities. It is estimated that 220.6 million children in India need deworming to avert the negative consequences of STH infections. We conducted a study to estimate the prevalence and intensity of STH among at-risk groups (age from 1 to 19 years) to guide the school based deworming program in states of Madhya Pradesh, Rajasthan, Bihar and Tirpura.

Methods

We conducted a cross-sectional survey among primary school children studying in 56 primary schools in 48 blocks from 37 districts of 11 agro climatic zones in the state of Madhya Pradesh and in Rajasthan the survey was conducted in 55 primary schools in 50 blocks from 26 districts of 11 agro climatic zones. For the state of Tripura, we conducted a cross-sectional survey among all at-risk groups (Pre-School aged children, School aged children and adolescents) in 10 Villages/Wards in 9 blocks from 5 districts. Information about socio-demographic details, defecation and hand-hygiene practices and stool samples were collected from at-risk groups. Stool samples were examined using Kato-Katz method. The data were analyzed to estimate the prevalence and its 95% confidence intervals and to identify the risk factors for STH infection.

Results

During June-August 2019, a total of 3169 (Madhya Pradesh) and 3027 (Rajasthan) school children and in Tirpura a total of 2074 Pre-School aged children, School aged children and adolescents provided stool samples and completed the questionnaire. The overall prevalence of any STH was 3.25% (95% CI: 2.04-5.15) in Madhya Pradesh and 0.66% (95% CI: 0.26-1.67) in Rajasthan and in Tirpura was 1.88% (95% CI: 0.65-5.30) adjusted for clustering. Hookworm was the most prevalent STH in states of Madhya Pradesh and Rajasthan, with a prevalence of 2.59% (95% CI: 1.59-4.17) and 0.40% (95% CI: 0.17-0.92) respectively. And in Tirpura, Ascaris was the most prevalent STH with a prevalence of 1.30% (95% CI: 0.53-3.18). Majority of the STH infection were of low intensity in all the three States.

17.Indian Network of Population-Based Surveillance Platform for Influenza and Other Respiratory Viruses among Elderly (INSPIRE)

Principal Investigator	Dr. R. Prabu
Co-Investigator(s)	Dr. C. P. Girish Kumar, Dr. J. Yuvaraj
Collaborating Institute(s)	AIIMS, New Delhi, NIV, Pune, NICED, Kolkata
Funding Agency	US Centers for Disease Control and Prevention Atlanta, US
Initiation of the project	August 2018
Duration	2 years (for Phase II)
Budget	<u>106 Lakh for first year</u>

Background

Older adults (aged 60 years or above) account for 8% of total population in India (2011). This proportion is projected to reach 19% by the year 2050. Influenza associated ARI is an important cause for high mortality and morbidity among elderly. However there is paucity of literature related to this problem. The available reports are from facility based or limited to small population, which might underestimate the true burden. Hence, it is important to estimate the burden of infections with influenza and other respiratory viruses in this vulnerable age group through a population-based cohort study is necessary. ICMR-NIE is conducting a multi-centric study led by AIIMS, New Delhi with the following objectives.

Rationale

Influenza associated acute respiratory infection is a major cause for morbidity and mortality among elderly population. There is a paucity of data on burden of Influenza associated ARI among elderly in India, which is essential for providing necessary inputs for policy makers for implementing appropriate vaccination programmes. This study will provide data on incidence rate, seasonal variability, risk factors of influenza associated ARI and associated economic burden.

Objectives:

Phase II:

- i. To estimate the incidence of influenza- and RSV- associated acute respiratory infections (both upper and lower), outpatient clinic visits and hospitalizations among a community cohort of older adults (≥ 60 years)
- ii. To describe the risk factors for influenza- and RSV-associated ALRI, hospitalization, ICU admission and mortality among older adults
- iii. To estimate the annual cost of influenza associated acute respiratory infections among older adults in India from the societal perspective
- iv. To estimate the effect of influenza and RSV infection on frailty and cognition among a community dwelling cohort of older adults

Methods

The households in the study area were mapped by the field staff by house to house visit. The households with the elderly persons aged 60 years and above were identified. We obtained written informed consent from the potential participants before enrollment.

The staff nurses undertake weekly ARI surveillance using standardized tools and collect nasal/throat swabs from the persons suffering from ARI. We collect data using Tablet computers with pre-structured questionnaire designed and programmed in Open Data Kit 1 (ODK 1). In phase II, in addition to incidence of ARI and we collect data on economic burden due to ARI, burden of the illness due to hospitalizations, effect of ARI frailty index and risk factor, are also being collected.

The swab samples are being tested as per the CDC protocol in NIE Laboratory. For external QC we send 5% samples to AIIMS, New Delhi.

Results

Phase -II:

We recruited 1562 elderly population. We started ARI surveillance in August 2018. Till July 2019, 219 participants were lost to follow up due to various reasons. We enrolled 184 participants in August 2019 and currently 1527 participants are under surveillance. The incidence of ARI was 121.9 (115.5-128.7) per 100 person years and influenza associated ARI incidence was 5.3 (3.9-6.7) per 100 person years.

Figure 1: Seasonality of influenza transmission

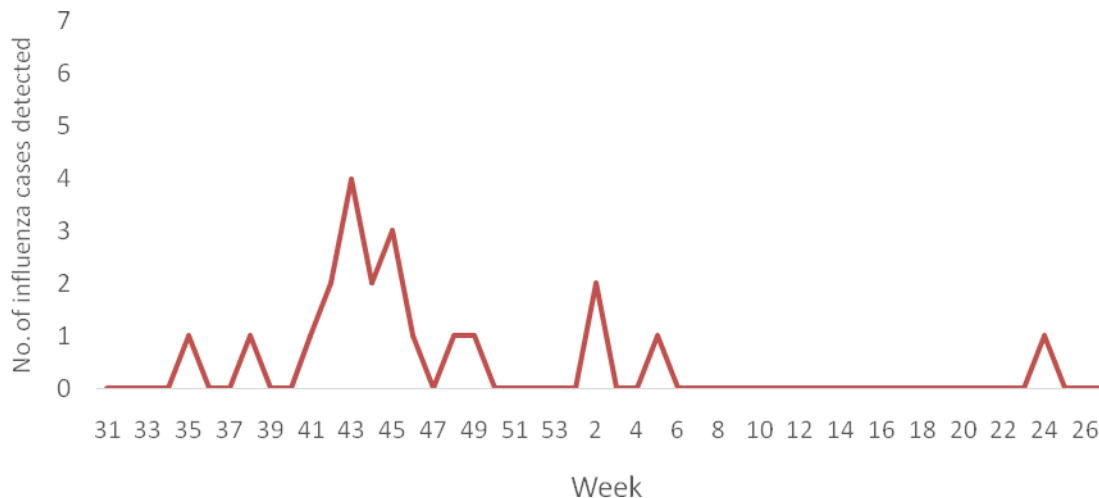
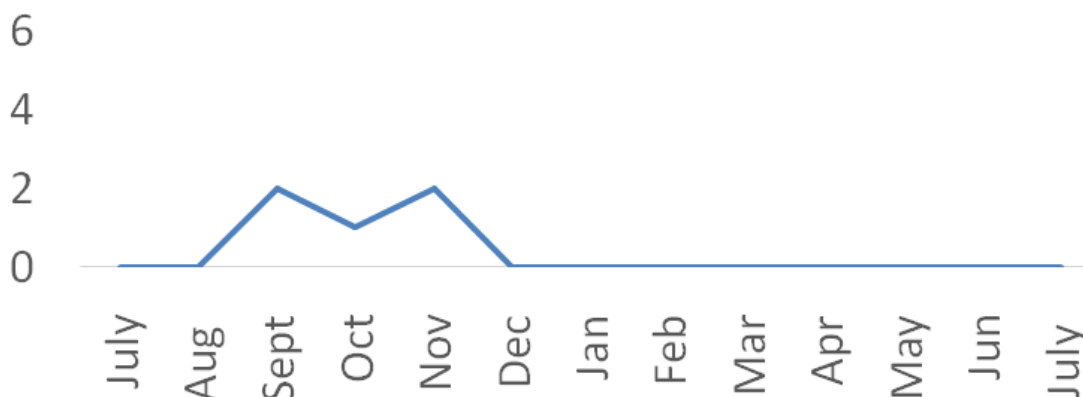


Figure 2: Seasonality of RSV transmission



18.A systematic assessment of acute viral hepatitis and chronic liver diseases in Northeast India with special reference to strengthening of laboratories in the region

Principal Investigator	Dr. Vineet Kumar Kamal (Data Mangment Unit, NIE, Chennai)
Co-Investigator	Mr. K. Kanagasabai
Collaborating Institute(s)	ICMR-National Institute of Epidemiology (NIE), ICMR Hqrs., New Delhi; NICED, Kolkata; RMRC, Dibrugarh; Gauhati University, Guwahati; AMCH, Dibrugarh; GMCH, Guwahati; JNIMS, Porompat, Imphal East; NEIGRIHMS, Shillong; AGMC, Agartlala; DH, Dimapur; CH, Aizawl; SMIMS, Gangtok; GH, Pasighat
Funding Agency	Indian Council of Medical Research (ICMR) Task Force
Initiation of the project	Sept 2018
Duration	3yrs
Budget	

Background

There is scanty and patchy data in the literature about the prevalence of viral hepatitis and their molecular characterization from northeast region and their potential risk factors like outpatient as well as hospital related risk factors and community-level exposures. Further, laboratory capacity for testing of viral hepatitis in Northeast is limited, and there is no designated reference laboratory for viral hepatitis in this region. In order to systematically study the prevalence, potential risk factors, virological profile and molecular characterization associated with these hepatitis viruses in the whole northeast states of India and for further strengthening the laboratory capacities (VRDLs/hospital sites) for diagnosing these hepatotropic viruses in the entire Northeast region, this study is proposed.

Objectives

- 1) (a) To study the contribution of Hepatitis viruses (HAV, HBV, HCV, HDV and HEV) in clinically suspected cases of acute viral hepatitis (AVH). (b) Spectrum of viral hepatitis in patients with fulminant hepatitis / acute liver failure (ALF). (c) Spectrum of hepatitis viruses in patients with chronic liver diseases (CLD). (d) Molecular characterization of HCV and correlation with the clinical presentation.
- 2) (a) To estimate the prevalence of HAV, HBV, HCV and HEV in pregnant women in any trimester, attending Antenatal Clinics of 4 hospitals, supported by VRDL facilities in these states. (b) Follow up of pregnant women found to be infected with HBV, HCV and HEV to look at vertical transmission.

Methods

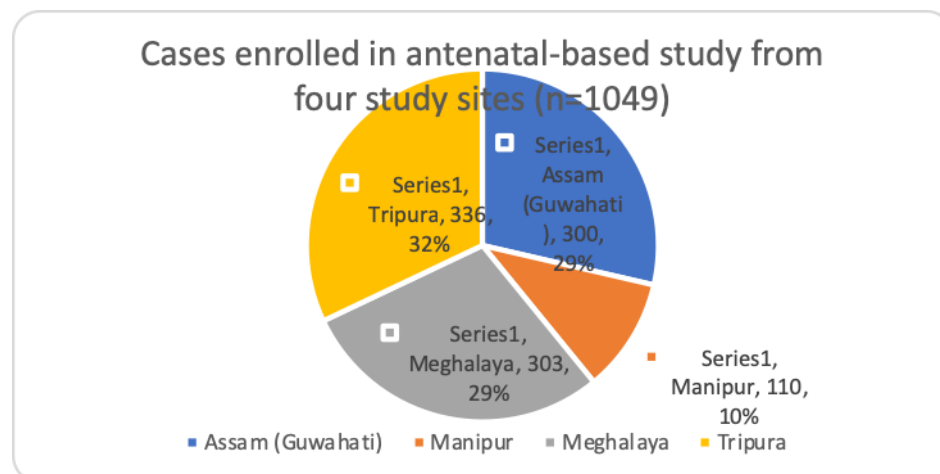
The study is a cross-sectional study divided into two parts ,1) which recruits all the eligible consecutive patients (filling the inclusion & exclusion criteria) attending either OPD or admitted cases across the selected tertiary & district hospitals of eight NE states over a period of three years under three main groups: Acute Viral Hepatitis, Acute Liver Failure, Chronic Liver Disease [sub-groups: Chronic Liver Disease, Cirrhosis (Liver Cirrhosis / Decompensated), Hepatocellular carcinoma (HCC)], 2) which recruits all consecutive pregnant women in any

trimester of their pregnancy & gestation attending the antenatal clinic for check-up, presenting with or without the history of jaundice which confer to the diagnosis of AVH in the antenatal clinics of four selected hospitals, supported for diagnosis by VRDL facilities in four NE states (GMCH, NEIGRIHMS, JNIMS, AGMC). National Institute of Epidemiology (NIE), Chennai is serving as the data management unit for this project. Data collection, storage, security and backup, analysis is being carried out at NIE.

Results

Work done from data management point of view: The questionnaire designed for the purpose of data collection was modified by NIE in consultation with PIs and other experts in user- friendly manner for both data collection and to design the database. An online data entry system was designed in REDCap software by NIE to cater the need of data management of the study. A workshop on ‘REDCap software & AQ/QC for ICMR Taskforce study of Vital Hepatitis – North East’ was conducted in data management for the PIs and RAs at RMRC Dibrugarh. We visited all sites to monitor the progress of the study in terms of data management and to train the center staff in the online data entry software designed in REDCap. A validation program was developed for both the forms (hospital-based information from nine study sites, and antenatal mother’s information from four study sites) to pick out the missing values of important variables in the entered data. In collaboration with RMRC, Dibrugarh and ICMR Hqrs, data analysis and reporting were done for submission of annual progress report. Figure 1 depicts the summary of data records of hospital-based information from all nine study sites entered till date. Figure 2 depicts the summary of data records of mother’s information from four study sites entered till date.

Figure 1



19.Validation of prognostic models for prediction of outcomes in traumatic brain injury patients for Indian subcontinent

Principal Investigator	Dr. Vineet Kumar Kamal
Co-PI	Prof. (Dr.) Deepak Agrawal, Jai Prakash Narayan Apex Trauma Centre, AIIMS, New Delhi
Co-Investigator	Dr. Manickam Ponnaiah, Dr. P. Ganeshkumar
Collaborating Institute(s)	ICMR-National Institute of Epidemiology (NIE), Chennai Jai Prakash Narayan Apex Trauma Centre, AIIMS, New Delhi
Funding Agency	Intramural
Initiation of the project	February 2019
Duration	2years

Background

Traumatic brain injury (TBI) is a leading cause of mortality, morbidity, disability and socioeconomic losses in India as well as in other developing countries. The early prediction of outcome after TBI is important for both clinician and patients for several purposes but till date, no prognostic models have been developed with assured generalizability across different settings. Titterington et al., 1981 demonstrated that it was the choice of variables and the setting in which models were applied which is more important rather than the formulae. Many of the models are based on western setting and population, but only a few prediction models have been developed using low- and middle-income countries, where most of the trauma occurs, and it may not be well suited to our settings. Prognostic models are frequently published but very few of these models are being used widely, as many of them were developed using small samples and poor modeling strategy, and they are rarely validated on external populations, which limit its generalization.

Objectives:

Primary: 1) To validate the CRASH model for patients with TBI in India (the Crash model, BMJ 2008), 2) To validate the Shanghai model for patients with TBI in India (J Trauma Acute Care Surg. 2012), 3) To identify the applicability of the above models for our settings.

Secondary objective: To describe admission characteristics and outcomes (at discharge and 6-months) in patients with traumatic brain injury at India's largest trauma care center.

Methods

Study Design: this study will be based on utilizing an existing neuro-trauma registry database of Jai Prakash Narayan Apex Trauma Centre (JPNATC) under AIIMS, New Delhi (India) during May 2010-December 2016. Patients, study site and inclusion criteria: for validating CRASH model, this study will consider adults with TBI, who had a score on the GCS of 14 or less, and who were within eight hours of injury. For Shanghai model, this study will consider adult patients (age ≥ 18 years) with admission GCS ≤ 12 at the time of admission at emergency department. We will exclude those patients who were dead on arrival. Predictors and outcome(s): for CRASH model, prognostic variables would be age, GCS, pupil reactivity, major extracranial injury, various CT findings. For Shanghai model, this study will include age, the motor GCS, pupillary reactivity, various CT findings [midline shift, subdural haematoma (SDH),

epidural haematoma (EDH), basal cistern effaced, presence of traumatic subarachnoid haemorrhage/intraventricular haematoma (tSAH/IVH)] and various blood results (levels of haemoglobin, glucose). In the present study, the outcome assessment will be based on Glasgow Outcome Scale (GOS). The Glasgow Outcome Scale is a 5-point score (Dead '1', Vegetative State '2', Severely Disabled '3', Moderately Disabled '4', Good Recovery '5') given to victims of TBI at some point of time in their recovery. The GOS score will be further dichotomized into favourable outcome (moderate disability, good recovery or GOS= 4, 5) and unfavourable outcome (death, persistent vegetative state and severe disability or GOS = 1, 2, 3). For CRASH model, outcomes will be mortality at 14 days and unfavourable outcome (death or severe disability) at 6-months. For Shanghai model, it would be mortality at 30 days, and unfavourable outcome at 6-months. Performance (validation) of the models: the performance of models will be evaluated in terms of discrimination and calibration, and overall performance measures (global measures).

Results

An ethical clearance for running this project was approved by Institutional Human Ethics Committee, ICMR - National Institute of Epidemiology, Chennai in the month of February, 2019. Telephonic discussion about nature of data and neuro-trauma registry at JPNATC, AIIMS were discussed with Dr Deepak Agrawal. Data is yet to be analyzed.

20. Molecular epidemiological study on drug resistance of diarrheagenic gram-negative bacteria in Chennai, India.

Principal Investigator	B. Ganesh (ICMR-NIE)
Principal Investigator (Japan)	Prof. Nobumichi Kobayashi, Head, Dept. of Hygiene, Sapporo Medical University School of Medicine, Sapporo, Japan.
Co-Investigator(s) (Japan)	Dr. Ayako Sumi, Associate Professor, Dr. Noriko Urushibara, Associate Professor, Sapporo, Japan
Funding agency	Department of Science and Technology, Government of India (DST-JSPS) Japan Society for Promotion of Science, Government of Japan [Indo-Japan Cooperative Science Program, DST-JSPS Bilateral Joint Research Project]
Budget	9 lakhs

Background:

More than one billion diarrhea episodes occur every year among children <5 years of age in developing countries causing 2 to 2.5 million deaths. More than twenty viral, bacterial, and parasitic enteropathogens are currently associated with ADD. The major therapeutic intervention for all individuals with diarrhea consists of fluid and electrolyte therapy. When antimicrobial therapy is appropriate, selection of a specific agent should be made based upon susceptibility patterns of the pathogen or information on local susceptibility patterns. Antibiotic resistance in bacterial infections is a major public health problem worldwide and the issue needs to be tackled with high priority. Here, we plan to study incidence of diarrheagenic gram negative bacteria

among hospitalized cases and to study the AMR in selective diarrheic pathogens viz. Enterobacteriaceae and Vibrionaceae.

This study will help to generate important information on the major etiologies of ADD from hospitalized cases in Chennai and the antimicrobial susceptibility data will provide judicious use of effective drug for the treatment of diarrheal diseases.

Objectives:

- (i). To determine the incidence of gram-negative bacteria (with special reference to *Vibrio* spp. *Salmonella* spp. *Shigella* spp. and *Escherichia coli*) among diarrheic cases and controls in Chennai
- (ii). Antibiotic susceptibility testing (AST) for the gram-negative bacteria isolated from stool samples of cases and controls as per CLSI guidelines
- (iii). To study and characterize the genetic basis of antimicrobial resistance (AMR) by molecular techniques

Expected Outcomes:

The expected results will be shared to the scientific community by way of joint research publications. The processes of conducting the detection assays of identification of antimicrobial resistance (AMR) genes of the major diarrheic pathogens will be made as a common protocol and we have a plan to develop a simple and rapid detection assay suitable for resource poor settings.

Current Status:

The Health Ministry Screening Committee (HMSC) has approved this project for exchange visit of Scientists from both the countries. From Japanese side, Prof. Nobumichi Kobayashi has visited our institute on 20th March 2019 and had a detailed discussion about the study progress.

21.Prevalence and severity of Hemoglobin disorders (Haemoglobinopathies and G6Pd deficiency) and the measures of multimorbidity burden of selected Haemoglobinopathies among Tribal populations of Tamil Nadu

Principal Investigator	B. Ganesh
Co-Investigator(s)	S Devika, SM Jeyakumar, J Yuvraj,
Co-Investigator(s)	Dr. Subhendu Kumar Acharya, ICMR-RMRC, Bhubaneswar, Dr. Anita Nadkarni, ICMR-NIIH, Mumbai, Dr. Raja Subramaniam, ICMR-NIRTH, Jabalpur
Funding Agency	ICMR Extramural research under Tribal Health Research Forum,
Budget:	182 Lakhs (3 years)

Background:

Haemoglobinopathies like Sickle-cell-anemia, thalassemia and abnormal haemoglobin variants (like D, E etc,)along with Glucose-6-phosphate-dehydrogenase-deficiency(0-18%) and nutritional anemia(>50%) are the common and major health problems among Indian indigenous populations. There are approximately 1 crore 80laksickle-cell gene carriers and 14 lakhs patients in India with 20%prevalence among Indian tribes. Similarly, 10%of the total world thalassemics are born in India every year with a 0-14%burden among the Indian tribes. G6PD deficiency is present in about 15 million Indian tribals. The attached social, economic and emotional burdens in case of haemoglobinopathies are also huge.

Objectives:

Primary objectives 1. To map the prevalence rate

Secondary objective:

- i) To describe the prevalence rate and carriers' frequencies of haemoglobinopathies such as sickle cell anemia, thalassemia and selected other abnormal haemoglobin variants (like E, D etc) and Glucose-6-phosphate dehydrogenase (G6PD) deficiency disorder among the tribes in Tamil Nadu

Primary objectives 2. To measuring the severity, multi-morbidity and morbidity burden of sickle cell anemia and thalassaemia patients

Secondary objectives:

- i).To measure the fetal haemoglobin concentration and its association with the severities related to sickle cell anemia and thalassemia patients among the tribes
- ii).To understand the measures of selected multimorbidities with respect to Sickle cell anemia and thalassemia patients
- iii).To study the morbidity burden among the sickle cell anemia and thalassemia patients

Expected Outcomes:

The present study has tremendous scope with respect to public health aspects as will indicate the actual burden necessary for appropriate control strategies by health administrators.

Furthermore, the present study will further help in formulating a functional policy for haemoglobinopathies in Tamil Nadu with pre-natal screening, carrier screening of pre-marital (adolescent, school children). It will further boost the awareness and education activities. In India, pre-natal diagnosis by genetic testing is available at chosen centres, which is cost intensive and not accessible to the rural masses. So, the study can help define the scope for TN govt. to consider a policy decision in providing such facilities to rural and tribal couples at free or affordable cost.

Current Status:

Project approved and received 1st and 2nd instalment of funding. Initial procurement of instrument and recruitment of manpower is initiated.

22. To develop a low-cost, rapid diagnostic prototype test kit based on Lateral Flow immunoassay for Dengue detection and serotype identification.

Principal Investigator Ganesh B

Background:

Diagnosis of a dengue infection can be determined through isolation of the virus, serological tests, or using molecular methods (PCR), however each test has different advantages and disadvantages. Virus isolation is the most specific method although it has the least sensitivity and is the slowest, often taking 7-21 days to obtain detectable virus. PCR is the most rapid of the three techniques but must be used during the relatively short viremic phase (5-7 days post infection) and the assay is prone to false –positive results. Serologic methods have proven to be the easiest to use, extremely reliable, and can distinguish between primary and secondary infections. Serologic tests require collection of two specimens at different times from the same individual to determine sero conversion.

Objectives:

- (i) Detecting multiple targets in a single test for rapid detection of dengue fever and serotype identification
- (ii). To develop point-of-care test for early detection of dengue infection

Expected outcomes:

We propose to develop a low-cost, more sensitive lateral flow-based on polyclonal antibodies to detect early dengue infection that is suitable both for bed-side as well as field use.

Current Status:

Project approved and awaiting for fund from ICMR Extramural research grants under Medical Innovation Fund (MIF).

23. Rotavirus Vaccine Impact Assessment Study

Principal Investigator Girish Kumar C.P.

Background of the study

Rotavirus is the most common cause of severe, dehydrating acute gastroenteritis (AGE) among children under-five years of age in India, causing an estimate 11.37 million illnesses, 3.27 million outpatient visits and 872,000 inpatient admissions each year and resulting in Rs 10.37 billion each year in direct costs. An indigenous Rotavirus Vaccine ROTAVAC, based on a neonatal rotavirus strain (116E), recently completed a successful Phase III clinical trial in which 3 vaccine doses given at 6, 10, 14 weeks of age were 56% effective against severe rotavirus AGE. ROTAVAC has been licensed in India and in 2014, the Government of India recommended inclusion of rotavirus vaccine into the Universal Immunization Programme (UIP) of India. Rollout of ROTAVAC, in a phased manner, from 2016. This project will generate data on effectiveness and impact of rotavirus vaccines through UIP in early introducing regions of India and will establish a sentinel site-based platform for assessment of safety of the vaccine with respect to intussusception.

Objectives

A. Acute gastroenteritis surveillance

1. To identify cases of rotavirus among children less than five years of age hospitalized for AGE and to determine the circulating rotavirus genotypes pre- and post-introduction of ROTAVAC using sentinel hospital surveillance sites
2. To measure changes in attendance rates of all-cause AGE and severity of presentations at the sentinel surveillance sites pre- and post-introduction of ROTAVAC
3. To determine the effectiveness of a completed series of ROTAVAC against laboratory confirmed severe, rotavirus AGE under conditions of routine use in India, using existing sentinel hospital surveillance sites and case-control methods. Additional secondary objectives of the case-control study include:
 - Determination of vaccine effectiveness against specific rotavirus genotypes
 - Determination of vaccine effectiveness of a partial series of ROTAVAC
 - Determination of potential waning of ROTAVAC effectiveness during the study period
4. To implement surveillance for intussusception in a network of pediatric hospitals in India

B. Intussusception surveillance

Primary

1. To describe the epidemiology (e.g., age distribution and seasonal patterns) of intussusception hospitalizations among children <2 years of age.

Secondary

2. To determine the proportion of intussusception-associated hospitalizations that requires surgical treatment.
3. To determine the proportion of intussusception-associated hospitalizations that result in death.

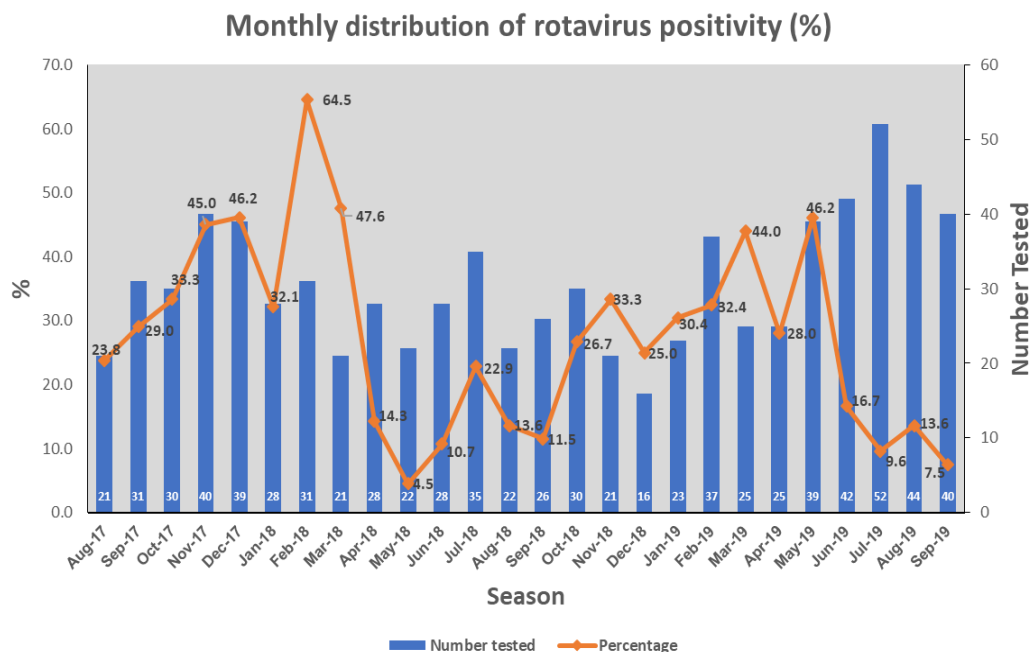
4. To describe potential infectious etiologies of intussusception by assessing for infectious pathogens in stool samples from intussusception cases and matched controls without intussusception.

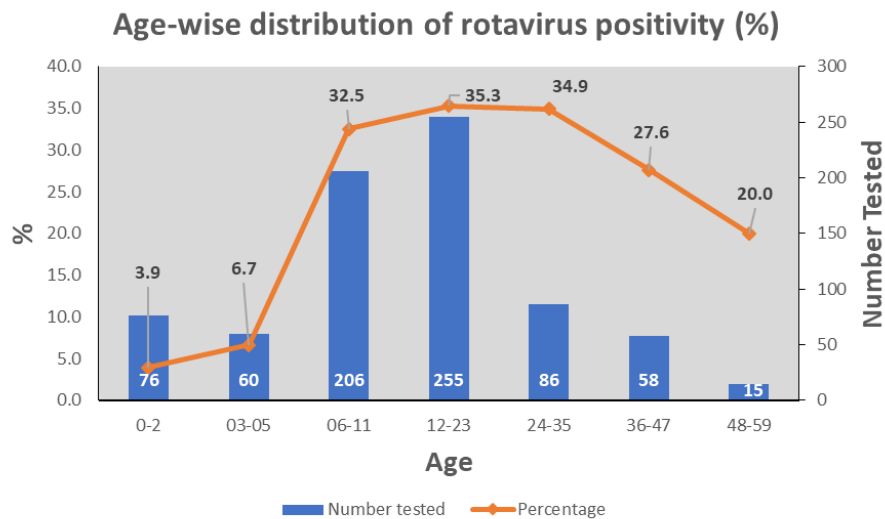
Methods

This is a multi-centric vaccine impact surveillance project involving sentinel sites which will each have in-patient facilities submitting clinical data and samples for rotavirus testing and characterization. All children less than 5 years of age admitted with acute diarrhoea will be enrolled after obtaining informed and written consent from parent/guardian. Clinical information and a stool specimen will be obtained. Stool samples will be tested for presence of rotavirus by ELISA and characterization by PCR. For intussusception surveillance, intussusception cases and controls (non-intussusception, non-infectious hospitalized patients) who age, gender and location matched will be enrolled. Surveillance staff will complete a control case report form, including limited information on demographics, diagnosis, and discharge date as well as collect a stool specimen. Data management will be carried out centrally by CMC, Vellore.

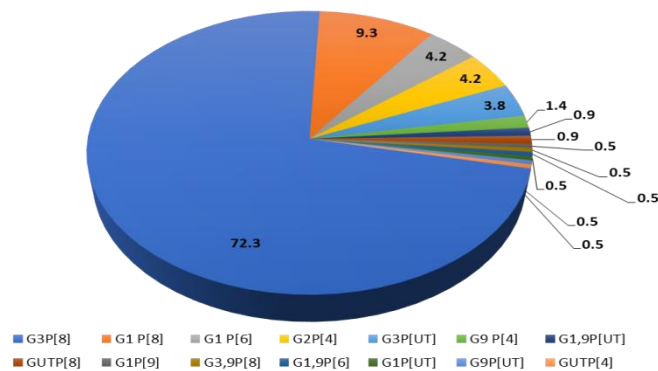
Results

During the period August 2017 - September 2019, 947 eligible cases of children under 5 years of age with AGE were enrolled. Stool samples from 796 cases were available for testing and 27.1% were positive for rotavirus. Highest positivity (35.6%) was observed among children between 12 to 23 months followed by 24-35 months (34.9%) and 06-11 months (32.5%). Rotavirus positivity was higher during cooler months and decreased positivity was seen during 2019 in comparison to the same period between 2017 and 2018. Analysis of distribution of various rotavirus genotypes showed the preponderance of G3P[8] strains (72.3%) followed by G1P[8] strains (9.3%). None of the positive cases had the vaccine strain type i.e. G9P[11]. One hundred and twelve intussusception cases and 57 controls were enrolled during the reporting period. Stool specimen from only one intussusception case was positive for rotavirus (G3P[8]).





Distribution of Rotavirus GP Strains (%)



24.Outbreak of Acute encephalopathy syndrome, Muzaffarpur, Bihar, 2019

Background

Outbreaks of acute neurologic illness affecting young children and associated with high case-fatality rates have been reported in the Muzaffarpur district of Bihar state in India since 1995 . Investigations conducted during outbreaks in 2013 and 2014 for infectious etiology, pesticides, toxic metals were negative. Metabolites of methylenecyclopropylglycine (MCPG), hypoglycin A or both were detected in urine specimens from case-patients and were absent in urine specimens of controls. A hospital based control study in which case-patients were compared with patients admitted within a week in the same hospital for non-neurological disease, identified consumption of litchi consumption, and absence of an evening meal in the 24 h preceding illness onset were associated with illness as risk factors for illness . Based on these findings, the government of Bihar initiated interventions focusing on (a) educating parents about not to let children go to sleep without cooked meal, (b) training medical officers to identify encephalopathy early, and (c) administer 10% dextrose to inhibit gluconeogenesis. During 2015-18, the number of acute encephalopathy cases and deaths reduced, suggesting that these interventions were effective. However, a large outbreak of acute encephalopathy occurred in

Muzaffarpur in 2019. We investigated the outbreak to identify risk factors associated with the illness

Methodology

We conducted an unmatched case control study. A child aged 2-14 years, hospitalized either at Sri Krishna Medical College Hospital (SKMCH) or KrishnadeviDeviprasadKejriwal Maternity Hospital (KDKMH), Muzaffarpur with new-onset seizures or altered sensorium during 15-25 June was considered as case. From each case village, we selected up to four controls – two household and two community controls. Using a standardized questionnaire, trained investigators interviewed cases and controls or their care takers (preferably mothers) to collect information about Socio-demographic-economic characteristics, illness profile, health seeking, risk factors, preventive and promotive factors. Case-patients were interviewed in hospital, while controls were interviewed in their households. Weight and height were measured for each case and control. We calculated crude odds ratio (OR) and their 95% confidence intervals (CI) for different risk factors, using all controls as well as separately for two types of controls. We calculated adjusted OR and their 95% CI using multiple logistic regression analysis.

Results

We included 61 case-patients and 239 (101 household, 138 community) controls in the study. The mean age of cases was lower than controls (5 versus 6.1 years, $p=0.010$); 59.7 % cases and 48.6 % controls were aged ≤ 5 years. On univariate analysis, case patients were more likely to be young female children aged less than 5 years. A higher proportion of cases were malnourished and consumed litchi in last one week before onset of illness. When compared with controls, children with AES were more likely to have missed their night meal and slept in empty stomach (Table 1). On multivariable analysis, young female children [adjusted OR (AOR): 2.3, 95% CI 1.2–4.5] aged less than five years [adjusted OR (AOR): 2.6, 95% CI: 1.1–5.8] and night meal (AOR: 4.9, 95% CI: 2.3 –10.6) had higher odds of developing AES.

Risk factors	Household controls OR (95% CI)	Community Controls OR (95% CI)	All controls OR (95% CI)
Age ≤ 5 y	2.6 (1.4 – 5.0)	1.4 (0.7 –2.5)	1.8 (1.0 –3.1)
Female sex	1.8 (0.9 – 3.5)	2.0 (1.1 –3.7)	1.9 (1.1 –3.4)
Ate litchi in 24 h	0.9 (0.5 –1.8)	1.1 (0.6–2.1)	1.1 (0.8 –1.4)
Ate litchi in previous 7 days	1.3 (0.6 –2.8)	3.3 (1.6 –6.7)	2.3 (1.2 –4.5)
Skipped evening meal	4.1 (2.0 –8.3)	4.3 (2.2 –8.3)	4.1 (2.2 –7.5)
BMI for Age	2.2 (0.9 –5.1)	2.7 (1.2 –6.0)	2.5 (1.1 –5.4)

Conclusions

In Muzaffarpur and adjoining districts, young female children with malnourishment, consuming litchi during the season and sleeping in empty stomach were associated with higher risk developing AES among children. Of these risk factors skipping night meal or sleeping in empty stomach was the commonest exposure.

25. Impact of measles rubella (MR) vaccination campaign on population immunity in India [IMRVI study]

Principal Investigator	Dr Manoj Murhekar
Co-Investigator(s)	Dr. M Santhosh Kumar Dr Jeromie and Dr Saravana Kumar
Collaborating Institute(s)	Johns Hopkins Bloomberg School of Public Health, WHO-India, Model Rural Health Research Units (MRHRUs)
Funding Agency	Indian Council of Medical Research and Johns Hopkins Bloomberg School of Public Health
Total Budget	
Start date	Feb 2018
Study period	2 years

Background

The Government of India (GoI) is committed to eliminate measles and control rubella by 2020. To achieve this goal, population immunity should be at least 90-95% for measles and 80% for rubella. The GoI is currently conducting the largest ever measles and rubella (MR) vaccination campaign to rapidly increase population immunity in children younger than 15 years of age and has begun to provide two doses of MR vaccine through the routine immunization program. Serological surveys are an important tool to directly measure population immunity, identify susceptible populations, and guide immunization strategies to achieve measles elimination and rubella control goals.

Primary Objective

Estimate age-specific population immunity to measles and rubella viruses within three age strata (children 9 months to <5 years and 5 to <15 years of age, and women 15 to <50 years of age) in India using serological surveys.

Sampling

One district in each of the 9 states will be selected for the serosurvey based on the geographical location of the MRHRUs. A two-stage cluster sample survey will be conducted in each district. A total of 30 clusters will be selected from each district by probability proportional to size linear systematic sampling method. From the selected villages or wards, one Census Enumeration Block (CEB) will be selected randomly. Selected CEBs having more than 140 households will be further segmented with each segment having at least 70 households. One segment will be randomly selected from the available segments. Within each segment we will randomly select 13 persons from each of the three age groups.

Serosurvey Progress status: The survey status is summarized in following table

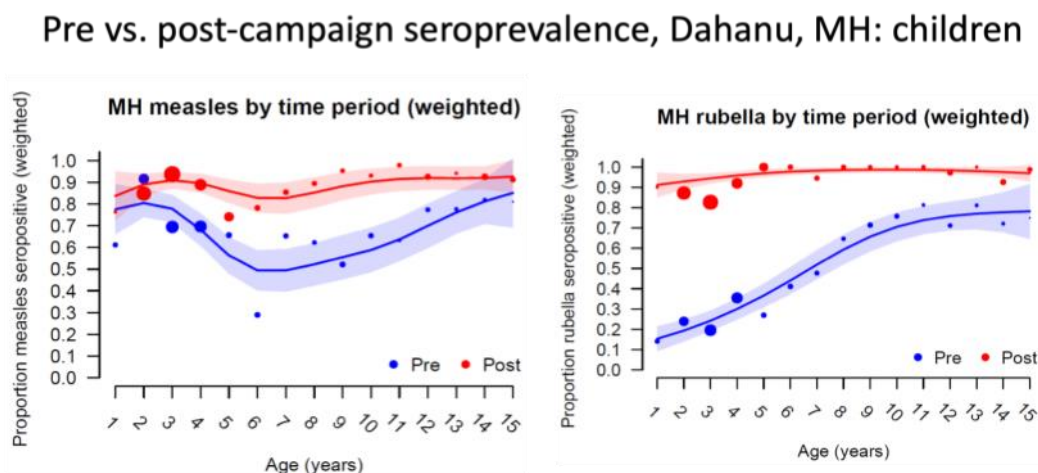
State	Dates of pre-campaign serosurvey	Dates of post-campaign serosurvey
Punjab	Completed	In progress
Assam	Completed	In progress
Uttar Pradesh	Completed	Completed
Maharashtra	Completed	Completed
Tripura	N/A	Planned
Tamil Nadu	N/A	Planned
Andhra Pradesh/ Telangana	N/A	Planned
Kerala	N/A	Completed

Results of Pre campaign Sero-Survey

- The population immunity to Rubella was low compared to measles. Population immunity to measles was 71% in UP, 68% in Maharashtra, 63% in Assam and 53% in Punjab. The population immunity to Rubella was 42% in Up, 46% in Maharashtra, 32% in Assam, 39% in Punjab.

Preliminary findings of Post Campaign Sero surveillance

- The analysis of Maharashtra shows that the Seroprevalence is high for Rubella in the age group between 9 months to 15 years, compared to measles (Rubella 94%, Measles 88%)
- Sero prevalence is similar among women between 15 to less than 50 years for Measles and Rubella (Measles 91%, Rubella 91%)
- Pre/post age-specific seroprevalence curve for Maharashtra is depicted below



Ongoing Activities and way forward

- The post campaign Survey is ongoing in Punjab (completed 16 clusters) and Assam (completed 2 clusters). One third of the post campaign samples of Uttar Pradesh is pending for laboratory testing.
- The post campaign survey in Andhra Pradesh and Hyderabad is planned in the month of November and the survey dates for Tamil Nadu and Tripura to be finalized.