

Public Private Partnerships in prevention of waterborne disease in urban slums (2004-06)

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Public-Private Partnership in Water Quality Monitoring in Urban Slums of Hyderabad: Summary Report (Feb 05- Feb 06)

I. Background

The quality of drinking water is a vital element of public health and well-being. Poor quality drinking water and inadequate sanitation are among the world's major preventable causes of early mortality. Contaminated water is an important cause of diarrhoeal diseases which is responsible for about 19% of death among 'children under five' in the developing countries¹. According to World Health Organization estimates, diarrhoeal diseases kill around 2.5 million people globally each year.² The provision of an adequate supply of safe water was one of the eight components of primary health care identified by the International Conference on Primary Health Care in Alma-Ata in 1978³. In most countries the principal risks to human health associated with consumption of polluted water are microbiological in nature. It is therefore imperative that quality of water supplied for drinking purposes be continuously monitored, at the minimum, for indicators of faecal pollution, turbidity, and residual chlorine (if water is disinfected with chlorine)⁴.

Epidemics of waterborne diseases are more common in slum areas. Poverty, poor sanitation, lack of sufficient and good quality drinking water, malnutrition, crowded living, lack of access to health care, poor hygienic practices etc., contribute to perpetuation of waterborne diseases in this area. Ensuring adequate and safe supply of water in slum areas, therefore plays a crucial role in interrupting this vicious cycle of waterborne disease epidemics. A key preventive measure is therefore to periodically check water quality and conduct sanitary surveys in slum areas.

In Hyderabad, The Hyderabad Metropolitan Water Supply and Sewerage Board (HMWSSB), provides water supply that caters to the drinking water needs of about 55.33 lakh persons, including those living in about 800 slums. The HMWSSB has in-house testing facilities. Other additional facilities in Hyderabad include the Institute of Preventive Medicine (IPM), Rural Water Supply (RWS) as well as a few private laboratories. However, existing mechanisms for

¹ Guidelines for drinking- water quality, Recommendations, Second edition, Vol.1, WHO1997

² Ibid

³ Guidelines for drinking- water quality, Health criteria and other supporting information, Second edition, Vol.2,WHO1997.

⁴ Guidelines for drinking- water quality, Surveillance and control of community supplies, Second edition, Vol.3, WHO1997.

drinking water quality testing may not be enough to meet the challenge of such a large city. Although laboratories in the public sector are open to people, they are not fully utilized due to various factors such as non-availability of well designed water sample collection kit, lack of awareness, accessibility etc. One alternative to improve water quality monitoring in the city, would be to expand the water testing facilities in the public sector. This is not likely to be cost effective considering past experience. The establishment cost per sample collected through these mechanisms is usually very high. Hence it would be desirable to explore the possibility of a Public Private Partnership (P3) model to monitor water quality in the city.

As a first step, feasibility public-private partnerships in monitoring water quality and associated risks in high priority areas such as urban slums, was explored. The HMWSSB entrusted the Institute of Health Systems, the responsibility of conducting a pilot study in Attagutta slum. Incorporating lessons learned from the pilot, a more systematic public-private partnership model is currently being implemented in urban slums of Hyderabad since February 2005. The Hyderabad Metropolitan Water Supply and Sewerage Board and the Institute of Health Systems are the key partners representing the public and private side of the partnership, respectively. This partnership is envisaged as a third party check, to augment the Board's quality control mechanisms.

II. Objectives of the Public-Private Partnership:

The main objectives of the study are:-

1. To expand water testing capacity in Hyderabad and to supplement testing done by the HMWSSB in high priority areas such as slums
2. To identify risks associated with spread of waterborne diseases in slum areas of Hyderabad
3. To systematize drinking water quality monitoring based on a Public Private Partnership model and to develop the required data and experience for planning and implementation of similar projects

III. Scope of Work

The following work was carried out in urban slums identified by the HMWSSB:

1. Monitoring of quality of water supplied to residents in urban slums
2. Monitoring sewerage overflows and its effect on pollution

3. Testing of quality of water used by hotels and street vendors in and around the slum areas
4. Surveillance of major water borne diseases in identified slum areas
5. Empowering residents for prevention of waterborne infections

IV. The PPP Model: Methodology

A total of 113 different slums were visited by IHS personnel, for field work in the reporting period. The slums were assigned by the Board on a daily or weekly basis. The following work was carried out in urban slums identified by the HMWSSB

1. Monitoring of quality of water supplied to residents in urban slums

The residents of slums receive water for drinking purpose, predominantly from HMWSSB sources. Some utilize water from private sources. Sources of drinking water in urban slums include:

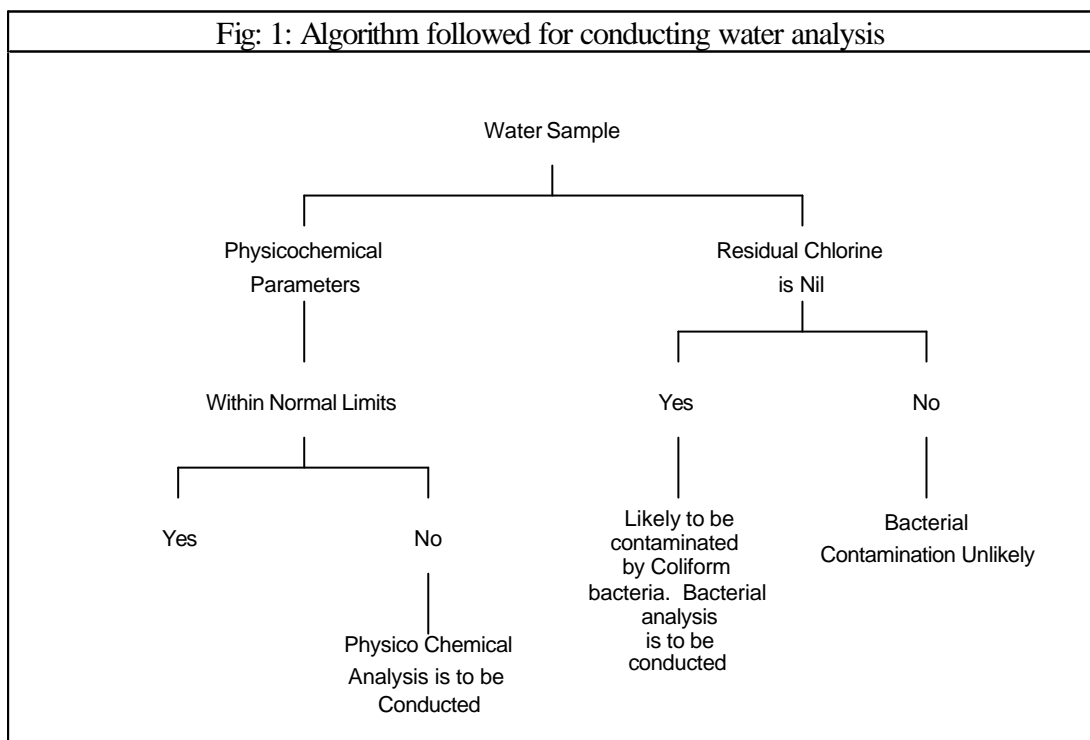
- i. House Taps or HTs
- ii. Public Stand Posts or PSPs
- iii. Pit Taps or PTs
- iv. Metro Water Tanker or MWT
- v. Metro Borewells or MB
- vi. Private Water Tankers or PWT
- vii. Private Borewells or PB

Residual chlorine of piped water supplied by the Board in identified slums are monitored in each slum. Water samples were collected as per the algorithm in Figure -1. Direct samples are collected from (a) All public stand posts (b) All pit taps (c) 5% of the house taps, which are randomly selected, and (d) if the selected public stand posts and pit taps did not have water supply on the day of survey, a stored water sample was collected.

Residual chlorine was tested, using DPD (*N,N-Diethyl paraphenylene diamine*), as recommended by the World Health Organization⁵, at the site itself. If the residual chlorine levels are within normal limits (0.2 - 0.5 PPM), the water sample is unlikely to be contaminated with bacteria and hence considered bacteriologically satisfactory for drinking purpose. If the residual chlorine levels are less than normal limits, the water sample is likely to be bacteriologically contaminated and hence a sample was collected for bacteriological analysis. If the general

⁵ 1. Orthotolidine will not be used for testing Residual Chlorine as it is carcinogenic

appearance, odour and turbidity of the water was found to be objectionable, a sample was collected for physicochemical analysis. In addition, water samples were collected from borewells and tankers for bacteriological analysis. Samples for laboratory testing were collected in IHS Water Sample Collection Bottles. All samples were analyzed by the IHS Water Quality Testing Laboratory (WQT Lab).



In addition to RC test results, the IHS personnel also record their observations pertaining to any circumstances at the slum site that could have an impact on water quality, such as: improper chlorination, leakage of the tap, damage of the sewerage pipelines, cross connections with sewerage pipes, cracked or eroded tap stand, presence of open defecation in the near vicinity, presence of farm animals or industrial pollution.

2. Monitoring sewerage overflows and its effect on pollution

An 'on-site inspection is done by IHS personnel to identify any sewerage overflows in the selected slums. The Board is notified of all such sewerage overflows, with exact address. When the overflows are from within houses, respective households are informed of their potential health hazards. The status these overflows is followed up during repeat visits.

3. Testing of quality of water used by hotels and street vendors in and around the slum areas

Water samples are collected from hotels, permanent eateries, street vendors, ice manufacturing units, etc., operating in and around the selected slums. All samples are tested for bacteriological quality and physiochemical parameters like color, odor, taste, turbidity, P^H, conductivity, TDS, total hardness, estimation of dissolved mineral contents like fluoride, calcium, magnesium, and natural pollutants like nitrites, nitrates, ammonia and sulphates. Results are communicated to the Board and the respective establishments.

4. Surveillance of major water borne diseases in identified slum areas

During the field visits IHS personnel enquire whether any of the residents have symptoms of waterborne diseases such as diarrhoea and jaundice. During outbreaks, survey of health care providers and case-finding was done. History of food and water consumption was elicited and water samples were taken from households for testing.

5. Empowering residents for prevention of waterborne infections

Whenever, IHS personnel comes across sewerage outflows, usage of pit taps, poor sanitary surroundings etc., they inform concerned residents about the potential health hazards and advice remedial action. During outbreaks, the residents were educated about good hygiene practices and measures to prevent water contamination.

6. Periodicity of Reporting

The test results are communicated to the Board daily. In addition consolidated weekly and monthly reports are also submitted to the Board. This summary report pertains to the test results and findings for the period between 1 February 05 to 25 February, 2006.

V. Results and Findings

A. Monitoring of quality of water supplied to residents in urban slums

1. Testing of Residual Chlorine

A total of 5666 metro water samples were tested for residual chlorine during the reporting period. Bulk of the samples were taken from house taps (83%). Samples from Pit Taps and Public Stand Posts constituted 9.5% and 7.5% of the total, respectively. 6.72% of the samples were found unsatisfactory. Slum wise and month wise details of RC Tests done is provided in Annex-1

Table-1: Distribution of Samples for RC Test by Source of Sample

Sources	Residual Chlorine Test Results			% Samples
	Satisfactory	Unsatisfactory	Total	Unsatisfactory
Public Stand Post	405	19	424	4.48
House Taps	4391	328	4719	6.95
Pit Taps	489	34	523	6.50
Total	5285	381	5666	6.72

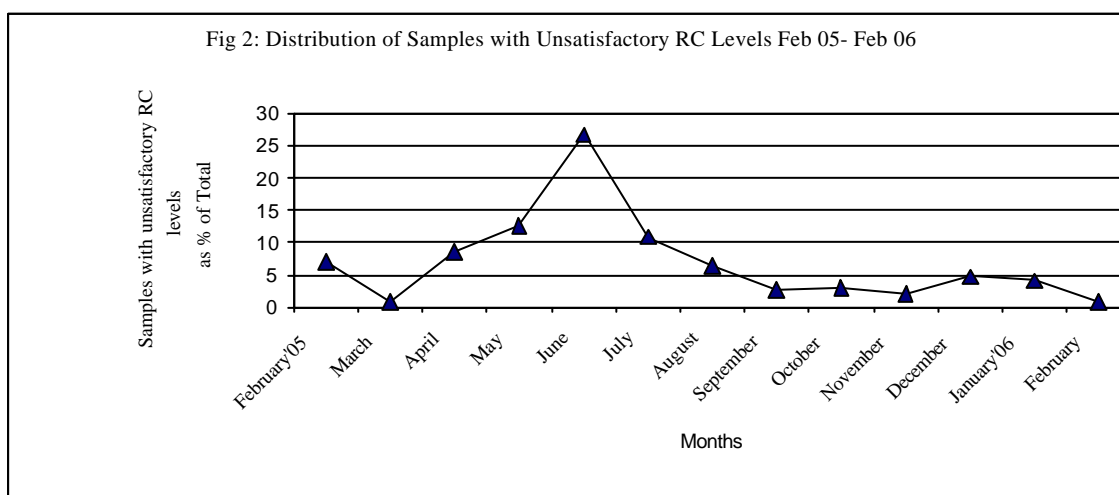
While certain slums received water supply with adequate chlorination consistently (See Annex-1), some slums fared poorly in terms of satisfactory levels of chlorination (Table-2).

Table 2. Poorly performing slums in terms of satisfactory levels of chlorination

Identified Slum	Residual Chlorine Test			% of Samples
	Total	# Satisfactory	#Unsatisfactory	Unsatisfactory
Chandrayanagutta	35	20	15	42.86
Misrigunj	34	20	14	41.18
Rajivnagar	37	22	15	40.54
Bibi Ka Chasma	36	23	13	36.11
Rajivnagar	36	24	12	33.33
Riyasatnagar	44	32	12	27.27
Sultanshahi	288	219	69	23.96
Yakutpura	354	292	72	20.34
Bramhanwadi	40	32	8	20.00
Babunagar	69	57	12	17.39
Aliyabad	146	128	18	12.33

Note: All 20 samples taken from Bagh-e-Jahara were found unsatisfactory

It was observed that on an average, about 11.4% of the samples were found unsatisfactorily chlorinated in the first six months of the reporting period. The corresponding figure for the subsequent six months was 3.2%, indicating a significant improvement in overall levels of chlorination of water supplied by the Board (See Annex-2).



3. Bacteriological Test Results

Slum wise details of Bacteriological Tests done for each month of the reporting period is provided in Annex-3. A total of 147 samples tested for bacterial contamination. These include 12 borewell samples, 5 tanker and 24 stored water samples.

Table-3: Source wise results of bacteriological testing of water samples

Source	Samples for Bacteriological Testing		
	Total	Unsatisfactory	% US
Direct Piped Water	106	32	30.19
Borewells	12	5	41.67
Tanker	5	3	60.00
Stored Water	24	15	62.50
Total	147	55	37.41

About 37.4 % of the total samples tested for bacteriological contamination were found to be contaminated with pathogenic bacteria. More than 60% of the stored water samples (water stored for drinking purpose by the household either in vessels, pots or plastic buckets) and samples collected from tankers were found to be contaminated. About 42% of the bore-well water samples were also found to be contaminated. E.Coli, Klebsiella, Citrobacter and Irregular bacteria were isolated in 45.5%, 27.2%, 7.2% and 14.5% of the contaminated samples respectively (Annex-4).

Certain slums had a higher prevalence of bacteriological contamination in water supplied for drinking purposes (Table-4).

Table 4: Slums with higher prevalence of bacteriological contamination

Slum	Bacteriological Testing			Samples US (%)	Organism Isolated			
	Total	Satisfactory	Unsatisfactory		E. Coli	Klebsiella	Citrobacter	Irregular
Hafeezbabanagar	9	4	5	55.5	4	1	-	-
Babunagar	11	5	6	54.5	5	1	1	0
Chachanehrunagar	3	1	2	66.6	1			1
Moinbagh	21	12	9	42.8	2	5		2
Sultanshahi	10	6	4	40.0	1	2	1	
Sitarampet	7	3	4	57.1	1	2		1
Sadatnagar	2	1	1	50.0	1			
Sarwarnagar	3	1	2	66.6	1	1		
Gowlipura	2	0	2	100	1	1		
Indirammanagar	4	4	0	0.00				
Shivganganagar	2	0	2	100	1			1
Riyasatnagar	3	1	2	66.6	1		1	

B. Monitoring sewerage overflows

Sewerage overflows from manholes, household drainage pipes, drainage pipes of the Metro Board, open sewerage drains, storm drains etc., were observed in slums. 241 instances of sewerage overflows were identified during the reporting period (Annex-5). Sewerage overflows were particularly high in Sultanshahi (66 instances of sewerage overflows), Gowlipura (57) and Jahanuma (28) slums. The Board was notified of all such sewerage overflows, with exact address. When the overflows were from within houses, respective households are informed of their potential health hazards. The status these overflows was followed up during repeat visits. In most instances, it was observed that sewerage overflows were rectified following communication to the Board. In some instances, where the sewerage overflow posed a significant public health risk, the matter was taken up directly with higher Board officials.

C. Testing of quality of water used by hotels and street vendors

128 water samples were collected for testing, from hotels, permanent eateries, street vendors, ice manufacturing units, etc., operating in and around the selected slums. About two thirds of the sample were physicochemically satisfactory and half the samples were bacteriologically satisfactory (See Annex-6).

36 samples were taken directly from the source of water supply used by these establishments, for retesting. About 83% of these samples were found to be bacteriologically satisfactory (Annex-7), indicating that the contamination could have mostly occurred due to storage and handling practices.

The bacteriological water quality testing included tests for detection of pathogenic Coliforms, Fecal streptococci, Salmonella, Shigella and general contaminants present in the water samples. E. Coli was the most common pathogenic organism isolated. Salmonella, was isolated from water used by two Mirchi vendors of Addagutta, a chat shop in Babunagar and a hotel in Fateshahnagar. Shigella was isolated from water used by two mirchi vendors in Moinbagh.

D. Surveillance of major water borne diseases in identified slum areas

During the field visits IHS personnel enquire whether any of the residents have symptoms of waterborne diseases such as diarrhoea and jaundice. They also interact with medical practitioners working in and around the slums to ascertain whether there has been any reported cases of gastroenteritis. The medical practitioners are requested to provide clients with information

regarding good hygiene practices and measures to prevent water borne diseases. Support of 22 health care practitioners was enlisted during the reporting period. (See Annex-8 for details).

A questionnaire was developed to elicit clinical and food and water consumption history, to investigate outbreaks (Annex-9). 82 patients or their bystanders were interviewed. Further follow up was not done as the funds required for such epidemiological investigation did not materialize.

E. Empowering residents for prevention of waterborne infections

A potential public health risk identified in many slums was the use of pit- taps for drinking water purposes. Either because they cannot afford legal connections or due to low pressure in pipes, residents establish pit-taps, which are connected to main pipe lines. Pit taps are more vulnerable to contamination than others as their base is not cemented and there is water stagnation around the tap. In most instances the surroundings are unsanitary. IHS personnel demonstrate how water gets stored in pipe, explain how such connections are a risk for water contamination and their role in water borne infections. The residents are also encouraged to approach the Board for proper connections. A total of 430 pit taps were identified during the reporting period (Annex-10). Reliance on pit taps were found to be more in certain slums such as: Sultanshahi, Gowlipura, Hashamabad, Chandrayangutta etc.

Whenever, IHS personnel comes across sewerage outflows and poor sanitary surroundings etc., they inform concerned residents about the potential health hazards and advice remedial action. During outbreaks, the residents were educated about good hygiene practices and measures to prevent water contamination. Support of the local health care providers are enlisted to provide necessary health information. Additionally, support of local leaders of the community was enlisted for the said purpose. Informal focus group discussions were held with women to learn about water usage, storage and handling practices, health status, difficulties encountered in accessing potable water and educate them on good hygiene practices and measures to prevent water-borne diseases. Residents were found to be generally receptive to such interactions. Report of a focus group discussion conducted in Moinbagh is enclosed as Annex-11.

VI. Analysis and Recommendations:

1. There has been improvement in levels of chlorination of water supplied to slums since the monitoring has started. In the first six months of the reporting period, on an average about

11.3% of the samples were unsatisfactorily chlorinated, whereas in the subsequent six months only 3.2 % of the samples were unsatisfactorily chlorinated. Measures taken by the Board for quality control and monitoring including third party checks, seems to have played a role in ensuring comparatively improved chlorination at reservoir level.

2. However, it needs to be noted that there is variance in level of chlorination at different supply points of a slum, during the same period of supply. Unsatisfactory chlorine levels at some of the supply points may be because they are the distant endpoints of the distribution system. In some instances, this may be because of concurrent online supply of water, which was generally observed to be improperly chlorinated. Therefore, in addition to ensuring chlorination at the reservoir level, necessary steps may be taken to ensure that adequate residual chlorine levels is maintained through out the entire distribution system.
3. Some slums fared more poorly than others in terms of satisfactory levels of chlorination. These have been identified and reported to the Board. Special attention may be required at the concerned reservoir level and distribution system at the slum level to address this issue.
4. More than 40% of bore-well and 60% of metro tanker samples were found to be bacteriologically contaminated, indicating the need for a more comprehensive monitoring of such alternate sources. The contaminated bore-wells have been identified and reported. Where feasible, the Board may take steps to decontaminate such borewells. In other cases, residents need to be informed of the potential health hazards of using water from such bore-wells and alternate water supply be provided.
5. More than 60% of the household stored water samples tested, were found to be contaminated with pathogenic bacteria. This may be due to improper collection, handling and storage practices at the household level. Thus even when the water supplied by the Board is potable, it may be contaminated at a later stage, due to lack of awareness regarding hygiene practices.
6. Similarly, about half of the samples collected from hotels and other eateries were found to be contaminated with pathogenic bacteria. During follow up survey, samples were taken directly from water source. Overall 83% of follow up samples and all follow up samples

directly taken from metro supply point were found to be bacteriologically satisfactory, indicating that the contamination could have mostly occurred due to storage and handling practices.

7. The utilization of pit taps is a potential public health risk. Pit taps are more vulnerable to contamination than others, as the taps are not surrounded by cement compound and water stagnates around the taps. In many instances these taps are near to open defecation and drainage lines. Direct tapping of water from the metro water pipe line presents risk of contamination of local distribution system, especially during monsoons and epidemics. Reliance on pit taps were found to be particularly high in certain slums. These have been identified and reported. Residents often resort to pit taps due to low water pressure in the distribution system. The Board needs to address this issue on a priority basis. The pit taps need to be phased out by providing reliable alternate water supply.
8. Another potential risk for contamination of water is the presence of sewerage overflows. The Board has been notified of all such sewerage overflows, with exact address. It was observed that in most cases, direct reporting to senior officials of the Board, ensured prompt response in rectifying the sewerage overflows. Sewerage overflows were particularly high in certain slums such as Sultanshahi, Gowlipura and Jahanuma. Maintenance and repair of drainage systems of these slums may be taken up on a priority basis.

VII. Conclusions and Suggested Future Steps

The above findings indicate that the public-private partnership has immense potential for:

1. **Augmenting HMWSSBs efforts to provide safe drinking water to urban slums.** The presence of external monitoring and direct reporting of findings to senior most level of Board management, has to a great extent ensured that lower level staff are more vigilant and prompt in carrying out their routine work. Data indicate that there has been an overall improvement in levels of chlorination of water supplied to the slums, during the reporting period. Further, communication of findings on a real time basis to the officers of Board, ensures prompt response in taking corrective measures.

2. **Empowerment of slum residents for prevention of water-borne diseases:** Data indicate that water used by residents may be contaminated even when potable water is supplied by the Board. This may be due to improper collection, storage and handling practices and unsanitary surroundings at the household level. Therefore, there is need to empower residents with the necessary knowledge about good hygiene practices and measures to prevent waterborne diseases. The monitoring provides opportunity for direct contact and interaction with the residents on these issues. It was found that the residents were generally very receptive towards such interactions and health related information.

3. **Further systematization and expansion:** As is evident, the public-private partnerships have a number of components. However, given resource constraints, the focus has been primarily on monitoring quality of water supplied by the Board. There is need for further expansion in terms of coverage and resources deployed for a more systematic implementation of all key components. Additional resources are to be deployed for more systematic (1) monitoring of other water sources such as tankers, bore-wells, hotels and eateries, which are potentially at risk for contamination, and (2) interaction with residents for improving awareness and disease surveillance. It is also suggested that the coverage be doubled from present levels. This would ensure repeat monitoring of water quality in slums at shorter intervals of time. Further, it would provide opportunity for more frequent interaction with residents, which is necessary for enlisting their active support in preventing waterborne diseases.

Annex-1: Slum wise details of RC Tests done

Month	Identified Slum	Residual Chlorine Tests			# RC samples	
		Satisfactory	Unsatisfactory	Total RC	%Satisfactory	%Unsatisfactory
February	Addagutta	223	2	225	99.1	0.88
	Hafeezbabanagar	47	13	60	78.3	21.6
	Babunagar	57	12	69	82.60	17.39
	Sanjaynagar	36	-	36	100	-
March	Sayednagar	114	-	114	100	-
	Madhuranagar	96	-	96	100	-
	SRT nagar	52	-	52	100	-
	Chachanehrunagar	36	3	39	100	-
	Sanjaynagar	38	-	38	100	-
	Habbebnagar	18	-	18	100	-
	Moinbagh	109	3	112	97.3	2.6
	Moinbagh	252	4	256	98.82	1.56
April	Jahanuma	68	9	77	88.3	11.6
	Aliyabad	15	10	25	53.5	52.1
	Sultan-Shahi	113	23	136	83.0	16.9
	Arundathi colony	8	1	9	88.8	11.1
	Misrigunj	23	-	23	100	0
	Yakutpura	109	24	133	81.9	18.0
May	Misrigunj	25	1	26	96.1	3.8
	Jahanuma	10	-	10	100	0
	Aliyabad	54	7	61	88.5	11.4
	Sultan-Shahi	67	6	73	91.7	8.2
	Gowlipura	66	2	68	97.00	2.90
	Doodhbowli	25	0	25	100	0
	Yakutpura	133	31	164	95.1	4.8
June	Kumarwadi	31	1	32	96.8	3.2
	Gowlipura	20	-	20	100	-
	Aliyabad	59	1	60	98.3	1.6
	Jahanuma	11	1	12	91.6	8.3
	Rajanarasimhanagar	3	18	21	14.2	85.7
	Misrigunj	14	20	34	41.1	58.8
	Sultanshahi	39	40	79	49.3	50.6
	Bela	20	-	20	100	-
	Kala Pather	-	5	5	100	-
	Fatesahnagar	81	2	83	98.7	2.4
July	Rajivnagar	24	12	36	66.6	33.3
	Rajanarasimhanagar	19	-	19	100	-
	Riyasathnagar	32	12	44	72.7	27.2
	Habeebnagar	7	1	8	87.5	12.5
	Badachandra	21	-	21	100	-
	Sitarampet	64	-	64	100	-
	Sadatnagar	46	5	51	90.1	9.8

Month	Identified Slum	Residual Chlorine Tests			# RC samples	
		Satisfactory	Unsatisfactory	Total RC	%Satisfactory	%Unsatisfactory
	Rakshapuram	19	-	19	100	-
	Moinbagh	35	9	44	79.5	20.4
	Bramhanwadi	27	2	29	93.1	6.89
	Jamalcolony	24	-	24	100	-
	Sadatnagar	46	5	51	90.1	9.8
	Chunnu ki Basti	15	2	17	88.2	11.7
	Narayanguda	18	-	18	100	-
	Ghode-Ki-Khaber	20	-	20	100	-
	Sanjaygandhinagar	14	-	14	100	-
August	Moinbagh	60	-	60	100	-
	Badabazar	18	-	18	100	-
	Haribowli	26	-	26	100	-
	Brahmanwadi	5	6	11	45.4	54.5
	Bela	15	-	15	100	-
	Laldarwaza	30	1	31	96.7	3.22
	Gowlipura	54	-	54	100	-
	Hanumanagar	16	-	16	100	-
	Yakutpura	32	-	32	100	-
	Bhag-e-jahara	-	20	20	-	100
	Keshavagiri	18	-	18	100	-
	Bhoiguda	52	2	54	96.2	3.7
	Haribowli	20	-	20	100	-
	Santoshnagar	25	-	25	100	-
	Bhavaninagar	15	-	15	100	-
	Hamabowli	43	-	43	100	-
	September	Bibi-ka-Chashma	23	13	36	63.8
Bela X Road		16	-	16	100	-
Aliyabad		3	2	5	60	40
Jahanuma		13	-	13	100	-
Shivajinagar		22	1	23	95.6	4.3
Yakutpura		50	7	57	87.7	12.2
Chandryangutta		45	-	45	100	-
Moinbagh		19	-	19	100	-
Nawabsabkunta		28	-	28	100	-
Indranagar		17	-	17	100	-
Sultanshahi		20	-	20	100	-
Misrigunj		34	-	34	100	-
Doodhbowli		20	-	20	100	-
Vattepally		9	-	9	100	-
Ghazimilla colony		15	-	15	100	-
Mustafanagar		17	-	17	100	-
Fatima nagar		20	-	20	100	-
Teegalkunta	20	-	20	100	-	

Month	Identified Slum	Residual Chlorine Tests			# RC samples		
		Satisfactory	Unsatisfactory	Total RC	%Satisfactory	%Unsatisfactory	
October	Shivganganagar	37	-	37	100	-	
	Ambedkarnagar	38	-	38	100	-	
	Tadbun	36	1	37	97.2	2.7	
	Mustafanagar	25	-	25	100	-	
	Jahanuma	15	-	15	100	-	
	Fateshahnagar	20	-	20	100	-	
	Yakutpura	28	-	28	100	-	
	Farooqnagar	16	-	16	100	-	
	Shivganganagar	7	-	7	100	-	
	Keshavagiri	20	-	20	100	-	
	Laldarwaza	16	-	16	100	-	
	Kalapather	25	-	25	100	-	
	Kumarwadi	20	-	20	100	-	
	Fatehdarwaza	15	-	15	100	-	
	Aliyabad	37	-	37	100	-	
	Hashamabad	25	-	25	100	-	
	Nawabsabkunta	36	-	36	100	-	
	Bansilalpet	15	3	18	83.8	16.6	
	November	Nawabsabkunta	35	-	35	100	-
		Shakkergunjkota	31	-	31	100	-
Cbligunj		57	-	57	100	100	
Fateshahnagar		15	-	15	100	100	
Kurmaguda		50	-	50	100	100	
Bannaka		10	-	10	100	100	
Misrigunj		10	-	10	100	-	
Kumarbasthi		10	-	10	100	-	
Sarwarnagar		25	6	31	80.6	19.3	
Chandrayanagutta		15	-	15	100	-	
Talabkatta		20	-	20	100	-	
Tadban		40	-	40	100	-	
Phisalbanda		18	2	20	95.0	5.00	
Falaknuma		20	-	20	100	-	
Rajnagar maqtha		32	-	32	100	-	
Keshavagiri		13	-	13	100	-	
Musheerabad		8	-	8	100	-	
Reinbagh		14	1	15	93.3	6.60	
Golnaka		16	-	16	100	-	
New Bhoiguda		14	-	14	100	-	
Addagutta	17	-	17	100	-		
Bansilalpet	15	3	18	83.3	16.6		
Amalbasthi	11	-	11	100	-		
Jangammet	15	-	15	100	-		
Dec	Nawabsabkunta	15	-	15	100	-	

Month	Identified Slum	Residual Chlorine Tests			# RC samples	
		Satisfactory	Unsatisfactory	Total RC	%Satisfactory	%Unsatisfactory
	Bannaka	31	-	31	100	-
	Misrigunj	10	-	10	100	-
	Jawaharnagar	11	-	11	100	-
	Shakkegunjkota	10	-	10	100	-
	Sainagar	16	-	16	100	-
	Krishnanagar	10	-	10	100	-
	Shamshirgunj	10	5	15	66.6	33.3
	Ayyapanagar	12	-	12	100	-
	Devarakondabasthi	14	-	14	100	-
	Fatehdarwaza	9	1	10	90.0	10.0
	Shalibanda	22	-	22	100	-
	Siddiqnagar	15	-	15	100	-
	Anjayyanagar					
	Nandinagar	11	-	11	100	-
	Mir-chowk	10	-	10	100	-
	Kishanbagh	10	-	10	100	-
	Talabkatta	10	-	10	100	-
	Mustafanagar	10	-	10	100	-
	Aliyabad	10	-	10	100	-
	Jahanuma	11	-	11	100	-
	Kalapather	10	-	10	100	-
	Fatesahnagar	10	-	10	100	-
	Mekalabanda	9	-	9	100	-
	Shokathnagar	26	-	26	100	-
	Doodbowli	26	-	26	100	-
	Gourishankernagar	10	-	10	100	-
	Kurmaguda	10	-	10	100	-
	Chandrayangutta	20	15	35	57.1	42.8
January	Zaheranagar	15	-	15	100	-
	Patanbasthi	12	-	12	100	-
	Devudi masjid	15	-	15	100	-
	Addagutta	11	-	11	100	-
	Fathima colony	10	-	10	100	-
	Omnagar	15	-	15	100	-
	Devarakondabasthi	26	-	26	100	-
	Sultanshahi	12	-	12	100	-
	Chintalbasthi	19	-	19	100	-
	Nandinagar	17	-	17	100	-
	Harizanbasthi	10	-	10	100	-
	Siddiqnagar	12	-	12	100	-
	Ranganagar	32	-	32	100	-
	Februa	Merban galli	22	-	22	100
VPcolony		18	-	18	100	-

Month	Identified Slum	Residual Chlorine Tests			# RC samples	
		Satisfactory	Unsatisfactory	Total RC	%Satisfactory	%Unsatisfactory
	Indiramma nagar	18	2	20	90.0	10.0
	Nawasabkunta	15	-	15	100	-
	Indirammanagar	11	-	11	100	-
	Jayaprakashnagar	11	-	11	100	-
	Ranganagar	14	-	14	100	-
	Bapujinagar	21	-	21	100	-
	Madhannapatekura	15	-	15	100	-
	mguda					
	Talabkatta	13	-	13	100	-
	Chandrayanagutta	15	-	15	100	-
	Premnagar	14	-	14	100	-
	Hamalbasthi	19	-	19	100	-
	Chintal basthi	17	-	17	100	-
	Tadbun	16	-	16	100	-
	Phoolbagh	14	-	14	100	-
	Dewarakonda basti	15	2	17	88.2	11.8
	Kurmaguda	16	-	16	100	-
	Talabkata	18	-	18	100	-
	Aliyabad	11	-	11	100	-
	Kishanbagh	13	-	13	100	-
	New Bhoiguda	9	-	9	100	-
	New ganga	15	-	15	100	-
	Uppuguda	19	-	19	100	-
	Harijanabasti	15	-	15	100	-
	Hafeezbaba nagar	16	1	17	94.1	5.8
	Musheerabad	17	-	17	100	-
	Chintal basti	19	-	19	100	-
	Total	5,285	381	5,666	93.27	6.724

Annex-2: Month wise results of Residual Chlorine Tests

Month	RC Tests		% of Samples Unsatisfactory
	# of samples	#Unsatisfactory	
February'05	390	27	6.92
March	378	3	0.79
April	525	45	8.57
May	407	51	12.53
June	447	119	26.62
July	509	56	11
August	458	29	6.33
September	398	10	2.51
October	552	17	3.08
November	572	12	2.1
December	233	11	4.72
January'06	357	15	4.2
February	440	3	0.78
Total	5666	381	6.72

Annex-3: Slum wise Bacteriological Tests done (Feb-05- Feb -06)

Month	Identified Slum	Bacteriological contamination tests (BCT)			# BCT samples	
		#Satisfactory	#Unsatisfactory	Total BCT	% Sat	% US
Feb	Addagutta	7	2	9	77.7	22.22
	Hafeezbabanagar	5	2	7	71.4	28.5
	Babunagar	6	4	10	60.0	40.0
March	Sayednagar	4	-	4	100	-
	Chachanehrunagar	4	-	4	100	-
April	Moinbagh	1	2	3	33.3	66.6
	Jahanuma	2	2	4	50.00	50.00
	Aliyabad	1	-	1	100	0
	Sultan-Shahi	1	-	1	100	0
	Arundathi colony	1	-	1	16.6	83.3
May	Yakutpura	2	2	4	50	50
	Misrigunj	1	-	1	100	-
	Jahanuma	2	2	4	50	50
	Sultan-Shahi	2	-	2	100	-
	Gowlipura	1	-	1	100	-
June	Yakutpura	5	3	8	62.5	37.5
	Kumarwadi	-	1	1	100	-
	Gowlipura	-	-	-	-	-
	Aliyabad	-	1	1	-	100
	Rajanarasimhanagar	1	1	2	50	50
	Misrigunj	-	2	2	-	100
	Sultanshahi	2	4	6	33.3	66.6
	Kala Pather	-	1	1	-	100
July	Fateshahnagar	-	2	2	-	100
	Rajivnagar	1	1	2	50.0	50.0
	Sitarampet	3	4	7	42.8	57.1
	Sadatnagar	1	1	2	50	50
	Sadatnagar	1	1	2	50	50
	Chunnu ki Basti	1	3	4	25.0	75.0
	Sanjaygandhinagar	2	-	2	100	-
	Moinbagh	1	-	1	100	-
August	Brahmanwadi	1	1	2	50.0	50.0
	Bela	1	1	2	50.0	50.0
	Laldarwaza	-	1	1	-	100
	Bhag-e-jahara	-	2	2	-	100
	Bhoiguda	1	-	1	100	-
	Bibi-ka-Chashma	-	2	2	-	100
September	Bela X Road	1	-	1	100	-
	Aliyabad	-	1	1	-	100
	Shivajinagar	-	1	1	-	100
	Yakutpura	1	-	1	100	-

Month	Identified Slum	Bacteriological contamination tests (BCT)			# BCT samples	
		#Satisfactory	#Unsatisfactory	Total BCT	% Sat	% US
Oct	Tadbun	-	1	1	-	100
	Bansilalpet	-	2	2	-	100
	Shakkergunjkota	1	-	1	100	-
	Cbligunj	3	-	3	100	-
	Kurmaguda	2	-	2	100	-
	Sarwarnagar	1	2	3	33.33	66.66
	Chandrayanagutta	1	-	1	100	-
	Talabkatta	1	-	1	100	-
	Tadban	1	-	1	100	-
	Phisalbanda	2	-	2	100	-
	Falaknuma	2	-	2	100	-
	Rajnagar maqtha	1	-	1	100	-
	Addagutta	2	-	2	100	-
	Bansilalpet	2	-	2	100	-
January	Sultanshahi	2	-	2	100	-
	Gowlipura	2	-	2	100	-
	Vallabhaipatelcolony	1	-	1	100	-
February	Indirammanagar	3	-	3	100	-
	Dewarakonda basti	1	-	1	100	-
	Hafeezbaba nagar	1	-	1	100	-
	Total	92	55	147	62.58	37.41

Annex-4: Pathogenic Organisms isolated in water samples (Feb 05-Feb 06)

Slum	% Samples		Organism Isolated			
	Unsatisfactory		E. Coli	Klebsiella	Citrobacter	Irregular
Hafeezbabanagar	55.5		4	1	-	-
Babunagar	54.5		5	1	1	-
Addagutta	25.0		1	-	-	1
Chachanehrunagar	66.6		1	-	-	1
Moinbagh surroundings	42.8		2	5	-	2
Sultanshahi	40.0		1	2	1	-
Kumarwadi	20.0		-	-	-	1
Alivabad	50.0		2	-	-	-
Sitarampet	57.1		1	2	-	1
Sadatnagar	50.0		1	-	-	-
Jahanuma	0.00		-	-	-	-
Brahmanwadi	50.0		-	-	1	-
Ghode-ki-Khaber	0.00		-	-	-	-
Bela	20.00		1	-	-	-
Sarwarnagar Jeea	66.6		1	1	-	-
Cbligunj	0.00		-	-	-	-
Gowlipura	100		1	1	-	-
Shakkergunjkota	0.00		-	-	-	-
Yakutpura	18.75		2	-	-	1
Indirammanagar	0.00		-	-	-	-
Rasulpura	50.00		-	1	-	-
Talabkatta	50.00		2	-	-	-
Bibikachashma	0.00		-	-	-	-
Uppuguda	0.00		-	-	-	-
Misrigunj	50.0		-	1	-	-
Rajanarsimhanagar	0.00		-	-	-	-
Shivganganagar	100		1	-	-	1
Laxminagar	50.00		1	-	-	-
Riyasatnagar	66.6		1	-	1	-
Kalapather	100		1	-	-	-
Total			28	15	4	8
% of the Total			45.5	27.2	7.2	14.5

Annex-5: Slum wise number of the sewerage over flows identified

Slum	Total No Sewerage over flows
Jahanuma	28
Kumarwadi	2
Sultanshahi	66
Misrigunj	6
Nawabsabkunta	9
Sitarampet	3
SanjayGandhi nagar	2
Mustafanagar	1
Brahmanwadi	1
Bela	1
Sarwarnagar Jeea	2
Cbligunj	3
Gowlipura	57
Shakkergunjkota	2
Yakutpura	9
Rasulpura	1
Talabkatta	2
Bibikachashma	1
Misrigunj	1
Shivganganagar	3
Laxminagar	3
Riyasatnagar	1
Kalapather	1
Vatepally	2
Teegalkunta	5
Tadbun	1
Golnaka	1
Newbhoiguda	1
Fateshahnagar	6
Chintalkunta	2
Shalibanda	1
Qazepura	3
Belalinagu	1
Asmangadh	1
Feb is sadhan	1
Nampally	1
Chalrinaka	3
Hafeezbabanagar	3
Malakpet	1
Indrammanagar	3
Total	241

Annex-6: Slum wise results of testing of Street Vendors/ Hotels Samples

Slum	# Total samples	Samples for Chemical Testing		Samples for Bacteriological Testing	
		Satisfactory	Unsatisfactory	Satisfactory	Unsatisfactory
Addagutta	13	13	-	7	6
Hafeezbabanagar	11	10	1	9	2
Sanjaynagar	2	2	-	1	1
Babunagar	5	2	3	1	4
Sayednagar	7	7	-	4	3
Fatheshahnagar	9	4	5	4	5
SRT Nagar	4	3	1	3	1
Moinbagh	15	5	10	3	11
Yakutpura	13	6	7	5	8
Sultanshahi	2	1	1	1	1
Laldarwaza	5	2	3	3	2
Kumarwadi	2	1	1	0	2
Gowlipura	2	1	1	1	1
Aliyabad	2	1	1	1	1
Rajanarsimhanagar	2	1	1	2	-
Riyasatnagar	3	2	1	2	1
Laxminagar	2	1	1	1	1
Bhavaninagar	2	-	2	-	2
Charminar	2	2	-	1	1
Kandikalgate	2	1	1	1	1
BelaXRoad	2	1	1	1	1
Mustafanagar	1	1	-	1	-
Teegalkunta	1	1	-	1	-
Fatimanagar	1	1	-	1	-
Brahmanwadi	1	1	-	1	-
Indranagar	1	1	-	-	1
Maqta	1	1	-	-	1
Falaknuma	1	1	-	-	1
SarwarnagarJira	1	1	-	1	-
Phisalbanda	1	1	-	1	-
Nawabsabkunta	6	4	2	3	3
Rasulpura	2	1	1	2	-
Chandryangutta	2	1	1	2	-
Shalibanda	1	1	-	1	-
Chintal basti	1	1	-	1	-
Total	128	83	45	67	61
% of the Total	100.0	64.8	32.2	52.5	47.5

Annex-7: Results of Testing of Repeat Samples from Hotels/Vendors

Slum	Source	Samples for Bacteriological Testing		
		# Total samples	Satisfactory	Unsatisfactory
Addagutta	Direct Metro	12	12	-
Hafeezbabanagar	Direct Metro	4	4	-
Sanjaynagar	Direct Metro	1	1	-
Babunagar	Direct Metro	3	3	-
Sayednagar	Direct Metro	1	1	-
Fatheshahnagar	Direct Metro	2	2	-
Laxminagar	Direct Metro	1	1	-
Bhavaninagar	Direct Metro	1	1	-
Kandikalgate	Direct Metro	1	1	-
BelaXRoad	Direct Metro	1	1	-
BelaXRoad	Metro Stored 1hr	1	-	1
Moinbagh	Direct Metro	1	1	-
Fatheshahnagar	Borewell	2	1	1
Moinbagh	Borewell	1	-	1
Yakutpura	Borewell	1	-	1
Laldarwaza	Borewell	2	-	2
Gowlipura	Borewell	1	1	
Total		36	30	6
% of the Total		100.0	83.33	16.66

Annex-8: List of Medical Practitioners Interacted

Sl.No.	Hospital Name	Name of Medical Practitioner	Address	Qualification
1	Haqani Clinic	Md. Hidayatullah	Babanagar. Ph.no.040-24532181	PMP
2	Mohammadia Clinic	Dr. Tahseeduddin	Near Mehraj Hotel, Babanagar	BUMS
3	Limra Nursing Home	Dr. Naseem Rizwana	Near Bismillah Hotel, Babanagar. Ph.No.040-24444093	BUMS
4	Aman Hospital	Dr. Khayam Khan	Near Omer Restaurant, Babanagar. Ph.No. 9849065510	MBBS
5	Dr. Omer Khan Clinic	Dr. Omer Khan	Near Omer Restaurant, Babanagar.	BUMS
6	Shifa Homeo Clinic	Dr. Mazher Inam	Near Tahseen Function Hall, Babanagar	RMP
7	Chakravarthy Clinic	Dr, Saleemuddin	Near Community Hall, Addagutta	PMP
8	Divya Clinic	Dr. C.H.S. Padma Rao	Loyanagar, Addagutta	RMP
9	Shree Shiridi Sai Ram Clinic	Dr. Rama Devi	16-4-A/460, Addagutta	BAMS
10	Shanti Clinic	Dr. CH. Aruna	Near Community Hall	PMP
11	Urban Health Post	Dr. P. Anuradha	Medical Officer, Near Police station, Addagutta	MBBS
12	First Aid Clinic	Dr. B. Ravi Kumar	East Marredpally, Addagutta	BSc, MLT
13	KG Poly Clinic	Dr. Pasumathi	Tukaram Gate, Addagutta	MBBS DGO
14	Medwin Clinic	Dr. Khaleelullah	Babunagar	BUMS
15	Annapurna Clinic	Dr.K.V.UmaMahesh awar Rao	Chenna Reddy Nagar, Babunagar	RMP
16	Haji Clinic	Dr. Haji Peran	Babunagar	BAMS

Sl.No.	Hospital Name	Name of Medical Practitioner	Address	Qualification
17	Shoeb Ahmed Clinic	Dr. Shoeb Ahmed	Sayednagar	MBBS
18	Shifa Clinic	Dr. Md. Qutubuddin	Sayednagar	DHMS
19	Sri Sai Clinic	Dr. P. Navin	Madhuranagar, Borabanda	MBBS DPM
20	Shilpa Clinic	Dr. Venu	NRP Puram Colony Madhura nagar	DAMS
22	Meraj Clinic	Dr. Meraj	Fatehshahnagar	BUMS
22	Huma Nursing Home	Dr. Huma	Near Community Hall Fateshahnagar	MBBS

IHS-Standard foodborne/waterborne disease outbreak case questionnaire

Part I. Demographics

Pt. Name: _____ DOB: ____ / ____ / ____

Age: _____ years

Address: _____

Home phone: _____

Parent's Name (if child) _____

Occupation: _____

Who was interviewed? Patient Other person

Part II. Clinical information

Which did you experience first: vomit diarrhea

Date of onset of vomit or diarrhea (whichever occurred first): ____ / ____ / ____

Onset time: *Circle closest hour. For onset times after midnight, double-check the onset day/date!*

1 am	7 am	13-1 pm	19-7 pm
2	8	14-2	20-8
3	9	15-3	21-9
4	10	16-4	22-10
5	11	17-5	23-11
6 am	12 noon	18-6 pm	24-12 midnight

Are you still experiencing vomit or diarrhea? Y N

Date of last day of illness with vomit or diarrhea: : ____ / ____ / ____

Time of last episode of vomit or diarrhea: ____:____ AM PM



Read questions exactly as written below. Circle Y for "yes," N for "no" and DK for "don't know, can't remember, not sure" etc.

Did you have:

Nausea	Y	N	DK
Vomiting	Y	N	DK
Diarrhea	Y	N	DK

If yes:

Maximum number of stools in a 24-hour period: _____

Bloody diarrhea	Y	N	DK
Abdominal cramps	Y	N	DK
Fever	Y	N	DK
Chills	Y	N	DK
Headache	Y	N	DK
Body aches	Y	N	DK
Fatigue	Y	N	DK
Constipation	Y	N	DK
Other:	Y	N	DK _____

Did you see a healthcare professional, such as a doctor or a nurse?

Y N When? ____ / ____ / ____

Were you hospitalized overnight? Y N
Where? _____

Was a stool culture done? Y N DK
Results: _____

Did you take any prescription medications for this illness? Y N DK
If yes, what medications? _____

Did anyone in your household have a similar illness? If yes, who? _____

Part III. General information

Did you attend a large gathering the week before your illness? (e.g., wedding reception, religious functions, clubs, school events, athletic events, office parties or banquets, parties, festivals, fairs)
Y N



If yes, what events?

Event 1: _____ location: _____ When? ____ / ____ / ____
 Event 2: _____ location: _____ When? ____ / ____ / ____
 Event 3: _____ location: _____ When? ____ / ____ / ____
 Event 4: _____ location: _____ When? ____ / ____ / ____

Do you know anyone else in your neighborhood/area of work etc. with the same illness? Y N

If yes: Where? _____
 How many people? _____ Name _____ Tel _____
 Name _____ Tel _____
 Name _____ Tel _____

Did you travel anywhere during the seven days before your illness? Y N

If yes, where? _____ When? ____ / ____ / ____ to ____ / ____ / ____

From what sources of water did you drink during the seven days before your illness?

Municipal tap water	Y	N	DK
Municipal hand pump	Y	N	DK
Open well water	Y	N	DK
Borewell	Y	N	DK
Tanker	Y	N	DK
Untreated surface water			
(river, pond, lake)	Y	N	DK
Bottled water	Y	N	DK
Other _____			

Did you drink any untreated/raw water during the seven days before your illness? Y N

If yes, where? _____

Did you swim during the seven days before your illness? Y N

If yes, where? Ocean/sea Y N If yes: Location _____
 Pool Y N If yes: Location _____
 Lake Y N If yes: Location _____
 Pond Y N If yes: Location _____
 River Y N If yes: Location _____
 Other Y N If yes: Location _____



Part IV. Commercial Food Exposures:

In the seven days before your illness, did you eat at any of the following types of commercial food establishment?

Restaurant	Y	N	DK			
Fast-food establishment	Y	N	DK			
Read-to-eat food served in a supermarket or department store?	Y	N	DK			
Street-vended food	Y	N	DK			
Others	_____					

Please list all such food establishments where you ate during the seven days before you became ill.

Name: _____ date: ____ / ____ / ____
Address: _____ time: _____
Foods eaten: _____

Name: _____ date: ____ / ____ / ____
Address: _____ time: _____
Foods eaten: _____

Name: _____ date: ____ / ____ / ____
Address: _____ time: _____
Foods eaten: _____

Name: _____ date: ____ / ____ / ____
Address: _____ time: _____
Foods eaten: _____

Name: _____ date: ____ / ____ / ____
Address: _____ time: _____
Foods eaten: _____



Name: _____ date: ____ / ____ / ____
 Address: _____ time: _____
 Foods eaten: _____

Part V. Open-ended food history:

List the location of the meal and foods eaten within ____ days before onset of symptoms. [Use the incubation period applicable to the agent/disease under investigation, e.g.,

Bacillus cereus: 1-24 hours *E. coli* O157:H7: 2-7 days *Staphylococcus*: 30 min - 8 hrs Viral agent: 0-3 days
Campylobacter: 1-10 days *Salmonella*: 0-5 days *Vibrio parahemolyticus*: 0-2 days
Cryptosporidium: 1-12 days *Shigella* 0-3 days

If a specific agent is not suspected at the time of interview, ask about the day of illness and the four days before illness.

Days before illness onset: 0
(Day of illness onset)

	<u>Meal</u>	Ate at <u>home</u>	Ate outside <u>of home</u>	<u>Outside</u> <u>location</u>	<u>Foods eaten</u>
Breakfast		9	9	_____	_____
Day of week: _____	Lunch	9	9	_____	_____
Date: ____/____/____	Dinner	9	9	_____	_____
	Other	9	9	_____	_____

Days before illness onset: 1
(Day before illness onset)

	<u>Meal</u>	Ate at <u>home</u>	Ate outside <u>of home</u>	<u>Outside</u> <u>location</u>	<u>Foods eaten</u>
Breakfast		9	9	_____	_____
Day of week: _____	Lunch	9	9	_____	_____
Date: ____/____/____	Dinner	9	9	_____	_____
	Other	9	9	_____	_____

Days before illness onset: 2

	<u>Meal</u>	Ate at <u>home</u>	Ate outside <u>of home</u>	<u>Outside</u> <u>location</u>	<u>Foods eaten</u>
Breakfast		9	9	_____	_____
Day of week: _____	Lunch	9	9	_____	_____
Date: ____/____/____	Dinner	9	9	_____	_____
	Other	9	9	_____	_____



Days before illness onset: 3

	<u>Meal</u>	Ate at <u>home</u>	Ate outside <u>of home</u>	Outside <u>location</u>	<u>Foods eaten</u>
	Breakfast	9	9	_____	_____
Day of week: _____	Lunch	9	9	_____	_____
Date: ___/___/___	Dinner	9	9	_____	_____
	Other	9	9	_____	_____

Days before illness onset: 4

	<u>Meal</u>	Ate at <u>home</u>	Ate outside <u>of home</u>	Outside <u>location</u>	<u>Foods eaten</u>
	Breakfast	9	9	_____	_____
Day of week: _____	Lunch	9	9	_____	_____
Date: ___/___/___	Dinner	9	9	_____	_____
	Other	9	9	_____	_____

Days before illness onset: 5

	<u>Meal</u>	Ate at <u>home</u>	Ate outside <u>of home</u>	Outside <u>location</u>	<u>Foods eaten</u>
	Breakfast	9	9	_____	_____
Day of week: _____	Lunch	9	9	_____	_____
Date: ___/___/___	Dinner	9	9	_____	_____
	Other	9	9	_____	_____

Days before illness onset: 6

	<u>Meal</u>	Ate at <u>home</u>	Ate outside <u>of home</u>	Outside <u>location</u>	<u>Foods eaten</u>
	Breakfast	9	9	_____	_____
Day of week: _____	Lunch	9	9	_____	_____
Date: ___/___/___	Dinner	9	9	_____	_____
	Other	9	9	_____	_____



Days before illness onset: 7

	<u>Meal</u>	<u>Ate at home</u>	<u>Ate outside of home</u>	<u>Outside location</u>	<u>Foods eaten</u>
	Breakfast	9	9	_____	_____
Day of week: _____	Lunch	9	9	_____	_____
Date: ___/___/___	Dinner	9	9	_____	_____
	Other	9	9	_____	_____

Interviewer name: _____

Date of interview: ___/___/___



Annex-10: Slum wise Number of Pit taps identified

<u>Slum</u>	<u>Pit Taps Identified</u>
Jahanuma	8
Madhuranagar	1
Sayednagar	2
Sultanshahi	59
Misrigunj	2
Hashamabad	52
Keshavgiri	20
Gowlipura	55
Nawabsabkunta	40
Brahmanwadi	5
Bela	1
Sarwarnagar Jeera	1
Borabanda	1
Moinbagh	2
Fateshahnagar	5
Fatimanagar	7
Aliyabad	5
Shakkegunjkota	10
Momchop Darga	6
New Ganga Nagar	3
Premnagar	1
Phool Bagh	2
Devarkondabasthi	4
Yakutpura	6
Indira nagar	1
Farooqnagar	5
Talabkatta	2
Bibikachashma	1
Uppuguda	6
Misrigunj	1
Shivaji nagar	1
Laxminagar	2
Riyasatnagar	1
Kalapather	9
Vallabhai Patel Colony	1
Teegalkunta	3
Tadbun	
Bholakpur	3
Chandryangutta	43
Shamshirgunj	6
Shokatnagar	6
Ranganagar	18
Badi Masjid	1
Merban Galli	1
Jai prakashnagar	5
Total	430

Annex-11: Focus Group Discussion with Women

Date: 14-04-05

Time: 12.30 to 1.45PM

Area: Moinbagh

Venue: Anganwadi Center No.1, Fatehshah nagar

Code words :

SK: Srikanthi

SR: Saritha

R: Respondents, designated as R1 to R6, based on their sitting arrangement

Facilitators:

Ms.B.Srikanthi, Research Associate ,IHS

Ms.K.Saritha, Research Assistant, IHS

Others present:

Mr.Lakshmi Narayana,Project Intern, IHS

Mr.Sumeeth, Project Intern, IHS

Mr.Krishna, Field Investigator, IHS

Participants:

Ms.Sara Begum

Ms.Sabiha Begum

Ms.Sultana Begum

Ms.Salima Begum

Ms.Salma Begum

Ms.Asia Sultana

Ms.Rabia Begum

SK: Namaste. My name is Srikanthi and her name is Saritha. We have come from the Institute of Health Systems, Hyderabad. Our office is in the HACA Bhavan opposite to the Public Gardens. We have come over here as Researchers to find out about your health status and factors affecting your health status. We have been doing the water testing from different sources from your area from the past few weeks and reporting the same to the Metro water board as this task has been assigned by the metro water board to IHS. We would be interested to learn more about your drinking water sources, supply, storage etc .Since this area has been affected by jaundice recently we would be interested to learn more about how it occurred , how many are affected and the reasons for this. We would like all of you to openly discuss everything. If you are all willing , we can start the discussion

All the respondents collectively agreed for the FGD

SK: What is meant by good health according to you? What are the factors affecting the health status ?

R3: There should be proper food, water, chemicals should not be more in water and water should be pure. Addition of chemicals should be done as per our bodies` requirement only. It is because of water the diseases are spreading

SK: What measures need to be taken for maintaining good health?

R4: Food should be adequate without any deficiencies, should have good water and food

SK: What do you mean by good water and good food?

R4: Means the water should be clean, we are getting dirty water, they are adding chemicals because of which diseases are occurring

R1: Water should be clean without chemicals so that Jaundice (called as “Irkhan”) does not come

R5: They are adding chemicals in rice also. People wash this rice only once before cooking and use it. Because of this diseases occur. Vitamins should be adequately present in food. If one child gets, others also gets contaminated

SK: What are the other reasons for the occurrence of diseases apart from water?

R4: Chemicals present in food, improper sanitation

R5: The drinking water which comes through pipes has smell and dirt sometimes

SK: What are the sources of drinking water in your area?

R3: We get drinking water through taps, bore also

R4: Sometimes we use bore water

R5: Bore water does not come always. Now even tap water we are not getting, from past 15 days we are not getting drinking water supply. Day before yesterday it has come but it was smelling of medicine very badly

SK: How do you get water supply in your area-daily or any other way?

R3: Earlier we were having supply every alternate day,

R4: Now we are getting water once a week or 10 days

SK: From how long are you having supply this way?

R4: From past 2 months

R5: There was an attack of jaundice from past 2 months

R3: Whatever water we got was dirty with smell

R6: We are getting mud sometimes

SK: How did you drink water before when it was coming alternately? Were you drinking them directly or boiling them?

R4: We used to fill that water in pots (kada). The dirt settles down and then we used to drink that water

SK: How were you giving drinking water to your children-were you giving it directly or boiling them?

R3: We were giving them directly, not boiling them

R4: Due to the occurrence of jaundice from the past 15 days they are giving small tablets we are adding them to the well water and drinking

SR: Do you have those tablets now with you?

R4: No. They got over. They asked us to use four tablets for four days.

R1: We now have medicine (Dawa-referring to liquid chlorine) to be added into water before consumption. For some of us they gave tablets and some they have given medicine (dawa)

R4: They asked us to add 2 drops of it in one pot of water

(They brought the liquid chlorine bottle and showed us)

R3: They asked us to add two drops of it per pot and then consume the water by evening

R5: Because of drinking that our health is becoming normal now

SK: For how long are you getting the water supply now?

R5: Half an hour

SK: How were you getting water before?

R3: Earlier we were getting it nicely for one to one and half hour

SK: How many taps are there in street?

R2, R3, R4, R5: There are many. We have in every house

R3: Taps are there but no water

R6: After filling 4 to 5 pots it is stopping

SK :Last when did you get the water supply?

R5: It has come day before (Tuesday, 12th April, 2005)

R4: After one week, they gave on Tuesday but they left it only for half an hour

R5: For eight days what do we drink? Sometimes we are drinking bore water. We are not feeling well. The water is not good, sometimes it is smelling of oil

R3: In Old city the water is good. Here only there is problem

SK: Was there any incidence of jaundice in this area before?

R3: Never it happened

R4: There were nearly 500 to 1000 people admitted into the hospital from this street

SK: Has it happened to you ? (referring to respondent 4 as she appeared weak)

R4: Yes, I left my small child at home and stayed in the hospital for 5 days in Koranti hospital (Quarantine hospital is addressed this way)

R6: Even her son has got (referring to R4)

SK: How many people have been infected with jaundice per house?

R3: 3-4 people from each house have been infected with jaundice

R4: They became very yellowish like turmeric, they were getting scratching on their bodies w

R3: Because of scratching they were getting rashes on their bodies

R4: They have discharged us after 5 days saying that we are normal

SK: Is there any one still suffering with jaundice in your homes?

R3: Now no body is having. It has reduced

R4: People are now having it lightly, not so much like before

SK : Which water have you been using for cooking food now?

R5: We use tap water or bore water

SK: For other domestic purposes?

R3: Now that we are not getting water we are using bore water only

SK: Other than jaundice was there any other health problem ?

R6: No, only jaundice

R4: There was fever with persistent shivering. It lasted for 2 months. Now we are having medicines and going to the hospital.

R5: Now we have these mosquitoes problem also

R3: We are not able to sit inside the house without fan due to mosquitoes

SK: Which age group was more affected with jaundice?

R4: Everyone, children, elders, old people, everyone

R5: One lady staying near by got affected. She must be around 25-30 years old. She has 3 children.

R3: Jaundice affected the entire family members

SK: When did it begin actually

R3: From past 2 months

R4: It occurred in less than 2 months

R6: When there was Tsunami rain in Krishna, from then on Jaundice started spreading. From the time they started bringing Krishna water here it began spreading

SK: You mean to say that jaundice has occurred merely due to drinking water. What about outside sources like lassi , ice etc

R4: We don't drink any thing outside

R3: What do we drink outside? Nothing

SK: How about children? Do they drink lassi?

R3: Nothing they eat

SK: Why do you feel drinking water has been contaminated like this?

R6: Water does not come clean. Sometimes there is dirt know

R3: For 5 to 10 min there is lot of dirt. Then it comes clean. It will be yellow in colour, with particles

SK: Why do you think there is dirt in water?

R4: There is leakage in the pipes

R3: They don't clean and monitor the tanks and pipe lines. They don't filter the water and supply them. They supply water as they like. We fill them into the vessels and drink them. Because of this we become infected

SK: You mean to say that it has occurred due to improper pipelines?

All: Yes

R4: They should open and clean pipelines and tanks at least once in 6 months. If they clean there will not be so much dirt. Otherwise there will not be mosquitoes, dirt and drainage water gets mixed up and we drink that water

SK: Now they are making new pipelines?

R3: Yes now because our health is spoilt and that people are admitted in Koranti hospital, they are making new pipelines

R5: Doctors have tested and declared that water is only spoilt

R3: They said that because of water this problem has occurred and that is the reason for changing the pipes. After those pipelines are changed, we get clean water

SK: What are the accompanying diseases with jaundice?

R5: Fever, itching sensation and rashes

R3: The way we get shivering fever due to mosquito bite, we are getting

SK: What are the other symptoms of jaundice?

R4: They become absolutely yellow in colour, loss of appetite, sluggishness, unable to eat any food,

SK: Which organ in the body is most affected due to jaundice?

R4: There is affect on the liver. When it enters the blood there will be itching sensation. Later it enters the urine and leaves. When it is circulating in the blood there will be lot of itching sensation

SK: What are the other symptoms of jaundice?

R3: It occurs due to water, food

R2: They feel sleepy, there is pain inside the body and stomach

R6: Eyes become yellow in colour and sleep

R4: Loss of appetite, nausea and vomiting

SK: Do you buy the ice or ice creams sold outside

R3: These days, company people are making the ice with dirty water

SK: Do you buy that ice?

R4: Children will eat them

SK: What about lassi and sugarcane juice?

R3: Because of Jaundice, doctors told us not to drink sugarcane juice

R4: No one will get them from the market and drink

R3: Only when we go for shopping etc we drink, otherwise no

SK: Ice which they add in them is not good

SR: Do you eat the coloured ice sold outside?

R3: The ice factory people are using well water for making the ice. They banned that company but they are doing business secretly. That's why children are getting jaundice

SK: What measures need to be taken to prevent from Jaundice, since you are getting dirty water?

R3: They have to put proper pipelines, they have to filter the water

SK: O.K.. The metro water board supplies water in bulk. They do those treatments in bulk and sometimes they might do some mistake, but what kind of household measures do you need to take in order to overcome this?

R5: We should store them in a clean and hygienic way. There should not be dirt

SK: Now that your area is affected with jaundice, Government has supplied this medicine (chlorine) to add in the water. But it is also upto you to carefully monitor the drinking water quality

R4: Yes we should filter the water and drink

SK: Yes. You should filter or boil the water at least for children. Boiling destroys the virus responsible for jaundice. Also you will not be knowing whether the water supplied to you is good or bad. No body tells you. If at all you want to know whether the water is pure and safe, whether there is excess chlorine or not, you need to test it. Such kind of testing is done by us. This madam (referring to Saritha) is testing the water and sending the reports to the Government everyday. 44 water samples from this area have been tested and reported as contaminated to the Metro water board. This madam will now explain about how water is tested and how to keep the water safe for consumption

Ms.Saritha took over and first explained about the Residual Chlorine test conducted and demonstrated the test by using the tap water from that area. She narrated to the participants that RC should not exceed 1ppm showing the colour change. She then tested the bore well water from

that area for RC which showed nil. She explained to them about the importance of chlorinating water. She then explained about the water samples collected from different areas of Moinbagh and their reports. She explained about the water quality testing being done at IHS and recommended that they should get their tap water monitored once in a month or two months in order to ensure their safety.

We then explained them that they can always approach their counselor for getting the water samples tested by the IHS. We gave them our Institute cards , thanked them and departed

Insights Learnt:

All the 6 women involved in the Discussion had jaundice infected family members. They said that atleast 3 members in each family have been infected with jaundice in the Moinbagh area. This included people from all the age groups i.e., children to old people. They attribute this to drinking contaminated water due to leakage of pipelines. Earlier they were getting water supply every alternate days for nearly 2 hrs duration. But due to this epidemic, they now don't have water supply for 7 to 10 days. The last supply they had was on Tuesday, 12th April 2005. They complained that water was supplied for only half an hour and had high amount of Chlorine in it and said that chlorine was literally floating on the water. This reason matched with the IHS water quality testing report of Moinbagh area for 12th April which showed a RC value above 8ppm. Even after storing the same water sample for 3 days, the RC level is showing as 1ppm on 14th April 2005 (Institute of Health Systems). All the jaundice cases have been referred to Fever Hospital (Quarantine Hospital) at Nallakunta and were hospitalised for 5 days treatment for 5 days. They have now come to the mild stages of infection and still under medication. Metro Water Board has supplied each of their families with one 100 ml bottle of liquid chlorine bottles and advised them to add 2 drops per pot of drinking water. As there is irregular and improper supply of drinking water, they are facing difficulties in fetching water from bore wells and wells. The women from Fatehshah nagar felt that pipelines and reservoirs should be thoroughly cleaned every six months and only required amounts of chlorine need to be added to water by the Metro water board. From their side they assured that they would fill and store the water hygienically and subject them for filtration before drinking.

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