WEEKLY EPIDEMIOLOGICAL REPORT

A publication of the Epidemiology Unit
Ministry of Health

231, de Saram Place, Colombo 01000, Sri Lanka
Tele: + 94 11 2695112, Fax: +94 11 2696583, E mail: epidunit@sltnet.lk
Epidemiologist: +94 11 2681548, E mail: chepid@sltnet.lk
Web: http://www.epid.gov.lk

Vol. 40 No.51 — 14th – 20th December 2013

WER SRI LANKA- 2013

Rotavirus Gastro-Enteritis (Part I)

This is the first in a series of two articles on Rota virus Gastro-Enteritis

Background

Rotaviruses infect nearly every child by the age of 3–5 years and are globally the leading cause of severe, dehydrating diarrhoea in children aged <5 years. WHO estimates that in 2008, approximately 453 000 rotavirus gastroenteritis (RVGE)-associated child deaths occurred worldwide. These fatalities accounted for about 5% of all child deaths and a cause-specific mortality rate of 86 deaths per 100 000 population aged <5 years. About 90% of all rotavirus-associated fatalities occur in low-income countries in Africa and Asia and are related to poor health care. National cause-specific mortality rates ranged from 474/100 000 (Afghanistan) to < 1/100 000 (63 countries); in 4 countries (Afghanistan, Burundi, Chad and Somalia) mortality rates of >300/100 000 were recorded.

Epidemiology

In low-income countries, the median age at the primary rotavirus infection ranges from 6 to 9 months (80% occur among infants <1 year old) whereas in high income countries, the first episode may occasionally be delayed until the age of 2–5 years, though the majority still occur in infancy (65% occur among infants <1 year old).

In most low income countries in Asia and Africa, rota virus epidemiology is characterized by one or more periods of relatively intense rotavirus circulation against a background of year-round transmission, whereas in high income countries with temperate climates a distinct winter seasonality is typically observed.

This difference, as well as differences in health care availability and childhood co-morbidity, drives the marked inequality in rotavirus disease burden between low and high income countries.

Each year during the pre-vaccination era 1986–2000, >2 million children worldwide were hospitalized for rotavirus infections.

In a recent report of sentinel hospital-based rotavirus surveillance from 35 nations representing each of the 6 WHO Regions and different economic levels, an average of 40% (range 34%–45%) of hospitalizations for diarrhoea among children aged <5 years were attributable to rotavirus infection.

The universal occurrence of rotavirus infections even in settings with high standards of hygiene testifies to the high transmissibility of this virus.

The pathogen

Rotaviruses are classified as a genus in the family of Reoviridae. The triple-layered viral particle encompasses a viral genome consisting of 11 segments of double-stranded RNA that encode 6 structural viral proteins (VPs) and 5 or 6 non-structural proteins(NSPs). Reassortment of the 11 gene segments may take place in co-infected host cells during the viral replication cycle. Formation of re-assortants is in part responsible for the wide variety of rotavirus strains found in nature; even re-assortants of animal-human strains have been identified. The outermost viral layer contains the viral proteins VP7 and VP4, which elicit the production of neutralizing antibodies in the host and hence are considered important for protective immunity. In human rotaviruses, at least 12 different VP7 antigens (G-types) and 15 different VP4 antigens (P-types) have been identified. As the combination of G- and P-types can vary independently, a binomial typing system is used to identify strains. Currently, 5 G-P combinations (G1P[8], G2P[4], G3P[8], G4P[8]) and G9P[8]) account for approximately 90% of all human rotavirus infections in many parts of the world; type G1P[8] is the most prevalent combination. However, data from countries in Asia and Africa show greater strain diversity with several rotavirus types circulating simultaneously. The prevalent types may vary from one season to the next, even within the same geographical area. The type of rotavirus does not usually correlate with the severity of the disease. There are currently no known laboratory markers for rotavirus virulence.

During the first episode of rotavirus infection, rota viruses are shed for several days in very high concentrations (>10^{12} particles/gram) in the

Contents	Page

stools and vomitus of infected individuals. Transmission occurs primarily by the faeco-oral route directly from person to person, or indirectly via contaminated fomites.

Disease

Rotavirus infections affect primarily the mature enterocytes on the tips of the small intestinal villi. Destruction of these cells reduces the absorptive capacity of the villi, resulting in diarrhoea. The clinical spectrum of rotavirus disease is wide, ranging from transient loose stools to severe diarrhoea and vomiting causing dehydration, electrolyte disturbances, shock and death. In typical cases, following an incubation period of 1–3 days, the onset of disease is abrupt, with fever and vomiting followed by explosive watery diarrhoea. Without adequate fluid replacement, dehydration may ensue. Detailed clinical scoring systems have been developed to facilitate comparison of disease severity, particularly in vaccine trials. Gastrointestinal symptoms normally disappear within 3–7 days, but may last for up to 2–3 weeks. Although in most cases, recovery is complete, fatalities due to RVGE may occur, mainly in children ≤1 year of age.

No specific therapy is currently available against rotaviruses. As with other childhood diarrhoeas, the cornerstones of treatment are fluid replacement to prevent dehydration and zinc treatment which decreases the severity and duration of diarrhoea. Solutions of low-osmolality oral rehydration salts (ORS) are more effective in replacing fluids than previous ORS formulations. Additional treatment measures during the diarrhoeal episode include continued feeding, including breast feeding, and if ORS is not available, use of appropriate fluids available at home

Laboratory Diagnosis

An aetiological diagnosis of rotavirus gastroenteritis requires laboratory confirmation. A range of diagnostic tests are commercially available: enzyme immunoassays for detection of rotavirus antigen directly in stool specimens are widely used, as are also the less sensitive, but rapid and simple-to-use test strips and latex agglutination assays. Reverse transcription polymerase chainreaction (RT-PCR), which is highly sensitive in detecting small concentrations of rotavirus in stool specimens, is also used for strain identification and further differentiation.

Protective immunity

Protection against rotavirus infection is mediated by both humoral and cellular components of the immune system. Following the first infection, the serological response is directed mainly against the specific viral serotype (i.e. a homotypic response), whereas a broader,heterotypic antibody response is elicited following ≥1 subsequent rotavirus infections.

A study that monitored 200 Mexican infants from birth to 2 years of age by weekly home visits and stool collections, detected on the basis of the faecal excretion of virus or a serologic response a total of 316 rotavirus infections, of which 52% were first and 48% repeated infections. Children with 1, 2 or 3 previous infections had progressively lower risk of subsequent rotavirus infection (adjusted relative risk, 0.62, 0.40, and 0.34 respectively) or of diarrhoea (adjusted relative risk, 0.23, 0.17, and 0.08) than children who had no previous infections. Subsequent infections were significantly less severe than first infections (p=0.02) and second infections were more likely to be caused by another G type (p=0.05). However, one study from India reported that the risk of severe disease continued after several re-infections.

In immunocompromised patients, natural rotavirus infection is not regularly associated with severe diarrhoea or systemic disease, although shedding of the virus may be prolonged. However, individuals with congenital immunodeficiency, bone marrow transplantation or solid organ transplantation sometimes experience severe, prolonged and even fatal RVGE.

The immune correlates of protection against rotavirus infection are incompletely defined, but the immune responses to the VP4 and VP7 proteins are generally believed to be important. Serum anti-rotavirus IgA antibody responses have been used as a measure of immunogenicity of all the live attenuated rotavirus vaccines evaluated.

Source-Rota Virus vaccine-available from *http://www.who.int/wer/2013/wer8805.pdf*

Compiled by Dr. Madhava Gunasekera of the Epidemiology Unit

Table 3 : **Water Quality Surveillance**
Number of microbiological water samples - Nove /2013

District	MOH areas	No: Expected *	No: Received
Colombo	12	72	55
Gampaha	15	90	67
Kalutara	12	72	NR
NHIS	2	12	22
Kandy	23	138	22
Matale	12	72	7
Nuwara Eliya	13	78	NR
Galle	19	114	81
Matara	17	102	30
Hambantota	12	72	NR
Jaffna	11	66	22
Kilinochchi	4	24	2
Manner	5	30	35
Vavuniya	4	24	23
Mullatvu	4	24	18
Batticaloa	14	84	16
Ampara	7	42	0
Trincomalee	11	66	8
Kurunegala	23	138	NR
Puttalam	9	54	6
Anuradhapura	19	114	50
Polonnaruwa	7	42	0
Badulla	15	90	54
Moneragala	11	66	79
Rathnapura	18	108	9
Kegalle	11	66	68
Kalmunai	13	78	NR

* No of samples expected (6 / MOH area / Month)
NR = Return not received

to be continued.

Table 4: Selected notifiable diseases reported by Medical Officers of Health 07th Dec– 13th Dec(50th Week)

RDHS Division	Dengue Fever		Dysentery		Encephalitis		E Fever		F Poisoning		Leptospirosis		T Fever		V Hepatitis		H Rabies		Chickenpox		Meningitis		Leishmaniasis		WRCD %	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	T*	C**
Colombo	256	10107	4	227	1	18	4	169	0	59	0	214	0	9	0	88	0	1	2	455	3	73	0	1	**92**	**8**
Gampaha	44	3633	3	215	0	23	0	52	0	40	1	472	1	25	4	194	0	0	0	173	0	96	0	5	**40**	**60**
Kalutara	32	1779	3	192	1	21	0	83	0	27	10	433	0	6	0	29	0	0	16	286	0	84	0	0	**46**	**54**
Kandy	28	1707	3	167	1	13	0	31	0	24	12	92	1	103	1	129	0	0	5	159	3	23	0	5	**78**	**22**
Matale	03	468	0	114	0	4	0	25	0	10	1	68	0	4	0	60	0	0	0	48	0	39	0	13	**77**	**23**
NuwaraEliya	05	259	6	172	0	4	0	17	0	217	0	33	0	65	0	25	0	0	12	164	1	15	0	0	**62**	**38**
Galle	13	850	4	131	0	19	0	7	0	89	9	239	1	67	0	17	0	2	8	334	0	47	1	3	**84**	**16**
Hambantota	07	329	1	67	0	3	0	16	0	38	7	179	2	66	1	94	0	0	0	101	0	55	2	349	**75**	**25**
Matara	10	470	4	98	1	17	1	30	0	30	4	172	0	95	1	153	0	2	1	263	3	90	2	103	**100**	**0**
Jaffna	26	728	13	457	2	13	5	334	0	114	0	9	10	375	0	17	0	2	4	153	0	58	0	0	**83**	**17**
Kilinochchi	0	63	3	53	0	0	0	16	0	5	0	9	0	17	0	0	0	2	0	2	0	7	0	13	**25**	**75**
Mannar	0	68	0	76	0	3	0	71	0	36	0	15	0	20	0	2	0	0	0	12	0	7	0	4	**40**	**60**
Vavuniya	0	81	0	76	0	14	0	14	0	20	0	51	0	3	0	4	0	2	0	23	0	36	0	16	**25**	**75**
Mullaitivu	0	121	0	30	0	3	0	10	0	47	0	38	0	7	0	2	0	2	0	8	0	7	0	15	**20**	**80**
Batticaloa	4	541	5	383	0	5	0	11	0	74	0	42	0	2	0	15	0	3	0	46	0	8	0	0	**71**	**29**
Ampara	1	207	0	199	0	1	0	5	0	12	0	40	0	1	0	11	0	0	0	102	0	20	0	3	**29**	**71**
Trincomalee	0	193	0	74	0	3	0	6	0	3	0	61	0	15	0	4	0	1	0	41	1	5	0	30	**25**	**75**
Kurunegala	24	2700	7	226	0	43	1	43	5	31	9	384	2	52	1	64	0	1	9	372	2	105	0	60	**67**	**33**
Puttalam	16	893	3	81	0	7	1	18	0	36	0	44	0	14	0	7	0	2	0	88	1	36	0	12	**62**	**38**
Anuradhapura	13	526	1	112	0	17	0	3	0	71	9	329	1	26	1	29	0	2	1	174	3	106	2	421	**58**	**42**
Polonnaruwa	6	478	5	98	0	3	0	14	0	73	3	179	0	3	0	36	0	2	2	145	0	23	2	170	**86**	**14**
Badulla	3	516	2	212	0	5	0	22	0	12	0	61	1	95	0	47	0	1	1	136	0	73	0	7	**71**	**29**
Monaragala	2	263	0	125	1	7	0	26	0	38	4	206	0	69	0	193	0	2	0	66	0	28	0	14	**45**	**55**
Ratnapura	4	1685	0	391	0	84	1	43	0	20	2	402	0	75	8	580	0	1	0	202	0	90	0	18	**28**	**72**
Kegalle	24	1183	4	143	0	17	3	36	0	11	8	303	0	74	8	252	0	0	10	352	0	112	0	2	**91**	**9**
Kalmune	1	503	9	194	0	3	0	6	0	130	0	11	0	3	0	5	0	0	5	106	0	13	0	1	**54**	**46**
SRI LANKA	**522**	**30351**	**80**	**4313**	**7**	**350**	**16**	**1108**	**5**	**1267**	**79**	**4086**	**19**	**1291**	**25**	**2057**	**0**	**28**	**76**	**4011**	**17**	**1256**	**9**	**1265**	**64**	**36**

Source: Weekly Returns of Communicable Diseases (WRCD).

*T=Timeliness refers to returns received on or before 07th December , 2013 Total number of reporting units 337. Number of reporting units data provided for the current week:214 C** -Completeness

A = Cases reported during the current week. B = Cumulative cases for the year.H Rabies*= Human Rabies, E Fever*=Enteric Fever, F Poison* =Food Poisoning, T Fever*=Typhus Fever, V Hepatitis*=Viral Hepatitis

Table 1: Vaccine-Preventable Diseases & AFP 07th Dec– 13th Dec 2013 (50th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2013	Number of cases during same week in 2012	Total number of cases to date in 2013	Total number of cases to date in 2012	Difference between the number of cases to date in 2013 & 2012
	W	C	S	N	E	NW	NC	U	Sab					
AFP*	00	01	00	00	00	00	00	00	00	01	01	101	73	+ 38.3%
Diphtheria	00	00	00	00	00	00	00	00	00	-	-	-	-	-
Mumps	01	00	03	03	00	01	01	00	04	13	25	1452	4231	- 65.7%
Measles	14	01	19	00	02	05	00	00	02	43	05	3883	71	+ 5369.0%
Rubella	00	00	00	00	00	01	00	00	00	00	-	27	-	-
CRS**	00	00	00	00	00	00	00	00	00	-	-	-	-	-
Tetanus	00	00	00	00	00	00	00	00	00	00	00	24	13	+ 84.6%
Neonatal Tetanus	00	00	00	00	00	00	00	00	00	-	-	-	-	-
Japanese Encephalitis	00	00	00	00	00	00	00	00	00	00	-	68	-	-
Whooping Cough	00	01	01	00	00	00	00	00	00	00	01	85	99	-14.1%
Tuberculosis	134	172	75	13	14	11	15	08	28	470	127	8366	8370	- 0.04%

Key to Table 1 & 2

Provinces: W: Western, C: Central, S: Southern, N: North, E: East, NC: North Central, NW: North Western, U: Uva, Sab: Sabaragamuwa.

RDHS Divisions: CB: Colombo, GM: Gampaha, KL: Kalutara, KD: Kandy, ML: Matale, NE: Nuwara Eliya, GL: Galle, HB: Hambantota, MT: Matara, JF: Jaffna, KN: Killinochchi, MN: Mannar, VA: Vavuniya, MU: Mullaitivu, BT: Batticaloa, AM: Ampara, TR: Trincomalee, KM: Kalmunai, KR: Kurunegala, PU: Puttalam, AP: Anuradhapura, PO: Polonnaruwa, BD: Badulla, MO: Moneragala, RP: Ratnapura, KG: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Neonatal Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps., Rubella, CRS,

Special Surveillance: AFP* (Acute Flaccid Paralysis), Japanese Encephalitis

CRS** =Congenital Rubella Syndrome

AFP and all clinically confirmed Vaccine Preventable Diseases except Tuberculosis and Mumps should be investigated by the MOH

Influenza Surveillance in Sentinel Hospitals - ILI & SARI (Oct /2013)								
Month	**Human**					**Animal**		
	No Received	Infl A untyped	Infl B	A(H1N1)pdm09	A(H3N2)	Pooled samples	Serum Samples	Positives
November	216	1	9	9	25	457	300	0

Source: Medical Research Institute & Veterinary Research Institute

PRINTING OF THIS PUBLICATION IS FUNDED BY THE WORLD HEALTH ORGANIZATION (WHO).

Comments and contributions for publication in the WER Sri Lanka are welcome. However, the editor reserves the right to accept or reject items for publication. All correspondence should be mailed to The Editor, WER Sri Lanka, Epidemiological Unit, P.O. Box 1567, Colombo or sent by E-mail to chepid@sltnet.lk. **Prior approval should be obtained from the Epidemiology Unit before publishing data in this publication**

ON STATE SERVICE

Dr. P. PALIHAWADANA
CHIEF EPIDEMIOLOGIST
EPIDEMIOLOGY UNIT
231, DE SARAM PLACE