

**A prospective hospital-based  
surveillance of Rotaviral Disease in  
children at the Port Moresby General  
Hospital, Papua New Guinea.**

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# Introduction

- **Acute Gastroenteritis – one of the leading cause of illness and death in infancy & childhood worldwide.<sup>1</sup>**
- **Viral pathogens - ~70% cases; Rotavirus is the most common.<sup>2</sup>**
- **A double-stranded RNA virus; in the family Reoviridae.<sup>2</sup>**
- **Group A Rotavirus- most common; >90% of acute diarrhoeal disease in children.<sup>2</sup>**

# Rotavirus Globally

- World wide ~40% of diarrhoeal hospitalizations in <5 yrs due to RV. (WHO Surveillance 2001-2008)<sup>3</sup>
- Estimated; > 2 million –hospitalized annually; >500 000 die from the disease.<sup>3</sup>
- **P[8]G1** strain most predominant worldwide –  
**52.2%** most countries<sup>4</sup>

# Rotavirus in PNG

- **Diarrhoeal disease accounts for 10% of admissions with case fatality rate 2.7%**  
(PNG Department of Health child morbidity & mortality -2011)<sup>5</sup>
- **Only limited studies (*Goroka*) have been conducted to determine the burden of Rotavirus in PNG**
- **RV detected 31.2% (n=254) with mortality rate of 2.4%**  
(Horwood. P et al. 2012)<sup>6</sup>
- **PMGH- Diarrhoeal disease 11.5% of OPD visits & hospitalizations.**  
(PMGH COPD records-2012)
- **Rotavirus is NOT diagnosed at PMGH & its burden UNKNOWN.**

- **Vaccination considered most effective public health strategy prevent infection & reduce burden.**
- **Rotavirus vaccine efficacy (74%; 95% CI 35-90%) against severe RV infection. (systemic review 2010)**
- **Data on disease burden will guide**

# **AIM:**

- **To estimate the burden of Rotavirus gastroenteritis at the Port Moresby General Hospital.**

# **OBJECTIVES:**

- 1. What proportion of acute diarrhoeal cases are due to rotavirus at PMGH?**
- 2. What are the genotypic patterns of Rotavirus at PMGH?**
- 3. What's the contribution of rotavirus to deaths in children at PMGH?**

# METHODOLOGY

## STUDY DESIGN:

- **Prospective hospital based surveillance from Sept 2011-Dec 2012**



# Study Participants

## **INCLUSION:**

- **Children (age > 7 days; <5 yrs) with acute diarrhoea**
- **Verbal consent given**
- **No blood in stool**

## **EXCLUSION:**

- **Age range not met**
- **No verbal Consent**
- **Bloody diarrhoea**

# Data Collection & Sampling Strategy

- **Following verbal consent- standard questionnaire used**
- **Hospitalized in-patients- additional information obtained from medical files.**
- **Specimens were collected at convenience**
- **2 Fecal samples (4-5mls) were collected using a feeding tube passed PR**

# Stool Sample Handling & Lab Analysis

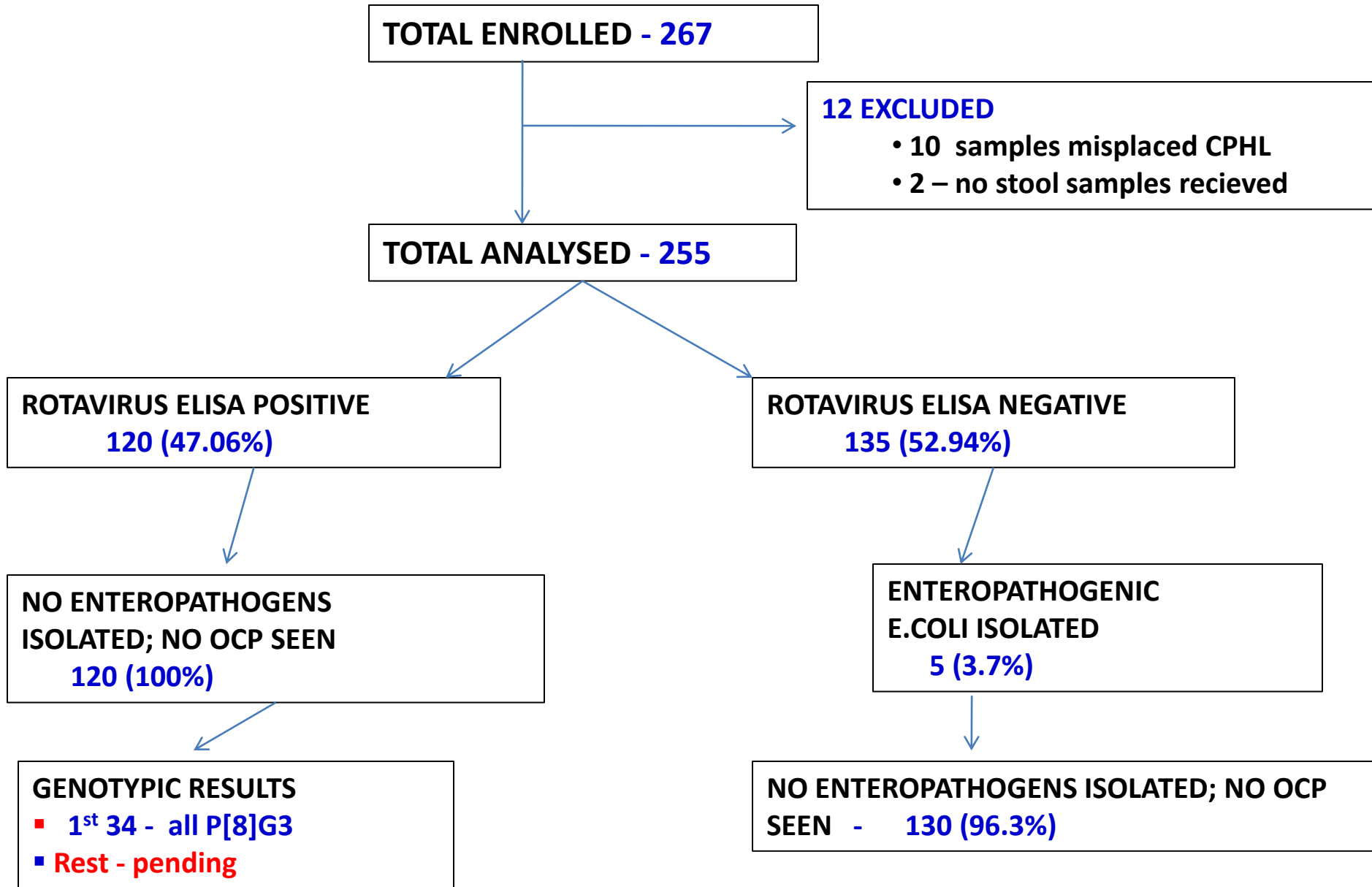
- Fecal samples collected within 48 hours
- Stored in an esky (4°C) prior to transfer to CPHL
- Analysis for Group A Rotavirus using ELISA test kit per manufacturers instruction.
- Stored at -20°C
- Genotyping RT-PCR - Melbourne

# **Statistical Analysis & Ethics**

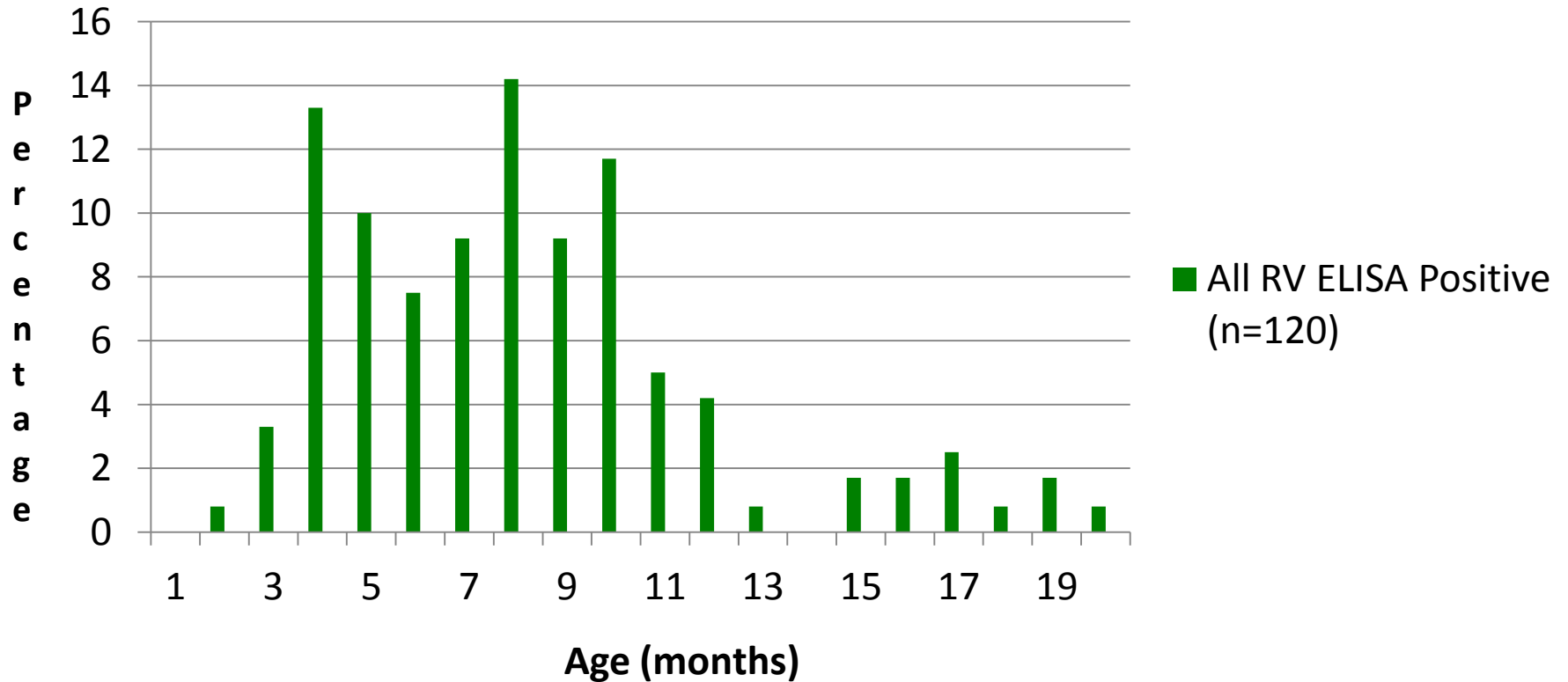
- **All data entered onto Excel Spreadsheet & analysed using SPSS (version 19; SPSS Inc Chicago,IL USA)**
- **Statistical analysis of categorical variables was performed using  $\chi^2$  tests (p value <0.05)**
- **Ethical approval obtained from both UPNG SMHS research & ethical committee and PMGH Management.**

# RESULTS

**Figure 1: Study Participants and Stool Sample Results.**



**Figure 2: Age distribution of Rotaviral ELISA positive patients**



**35% (42) RV detected - <6 months age**

**88.3%(106) RV detected - <1 year age**

# Table 1: Demographical parameters

Variables	RV Positive (n=120)	RV Negative (n=135)	P value
<b>Gender</b>			
F	48.3%	39.3%	0.92
M	51.7%	60.7%	0.72
<b>Water Source</b>			
Well/drum	3.2%	4.4%	0.39
Communal pipe	73%	66.7%	0.59
In-house	42%	28.9%	0.11
<b>Toilet type</b>			
Bush/sea	17.5%	20.7%	0.6
Pit	48.3%	50.4%	0.8
Flush	34.2%	28.9%	0.5
<b>Feeding Practice</b>			
Exclusive BF	20.8%	23%	0.73
Bottle	22.5%	21.5%	0.87
Mixed (Bot+BF)	5.8%	7.4%	0.65
Solids + BF	50.8%	48.1%	0.78

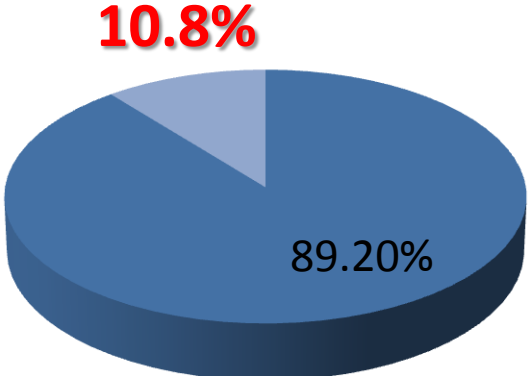


**Table 2: Clinical Findings & Mx on Initial OPD presentation**

	RV ELISA Positive (n=120)	RV ELISA Negative (n=135)	P value
<b>Nutritional Status</b>			
<i>Well nourished</i>	88.3%	73.3%	0.23
<i>Moderate Malnutrition</i>	11.7%	23%	0.055
<i>Severe Malnutrition</i>	0%	3.7%	0.054
<b>Hydration status</b>			
<i>Some dehydration</i>	55%	60.7%	0.59
<i>Severe; no shock</i>	45%	39.3%	0.53
<b>Initial Therapy given</b>			
<i>IV fluids (mainly HSD)</i>	100%	100%	1
<b><i>Ready- made ORS</i></b>	<b>0%</b>	<b>0%</b>	<b>1</b>
<b>Additional meds given</b>			
<i>None</i>	11.7%	16.3%	0.38
<b><i>Zinc</i></b>	<b>6.7%</b>	<b>3%</b>	<b>0.23</b>
<b><i>Antibiotics</i></b>	<b>30.8%</b>	<b>31.1%</b>	<b>0.97</b>

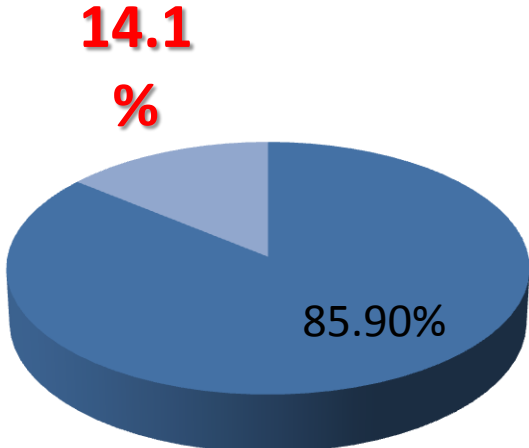
**Figure 3: Outcome of OPD Mx of Acute Gastroenteritis.**

**Rotavirus ELISA POSITIVE  
(n=120)**



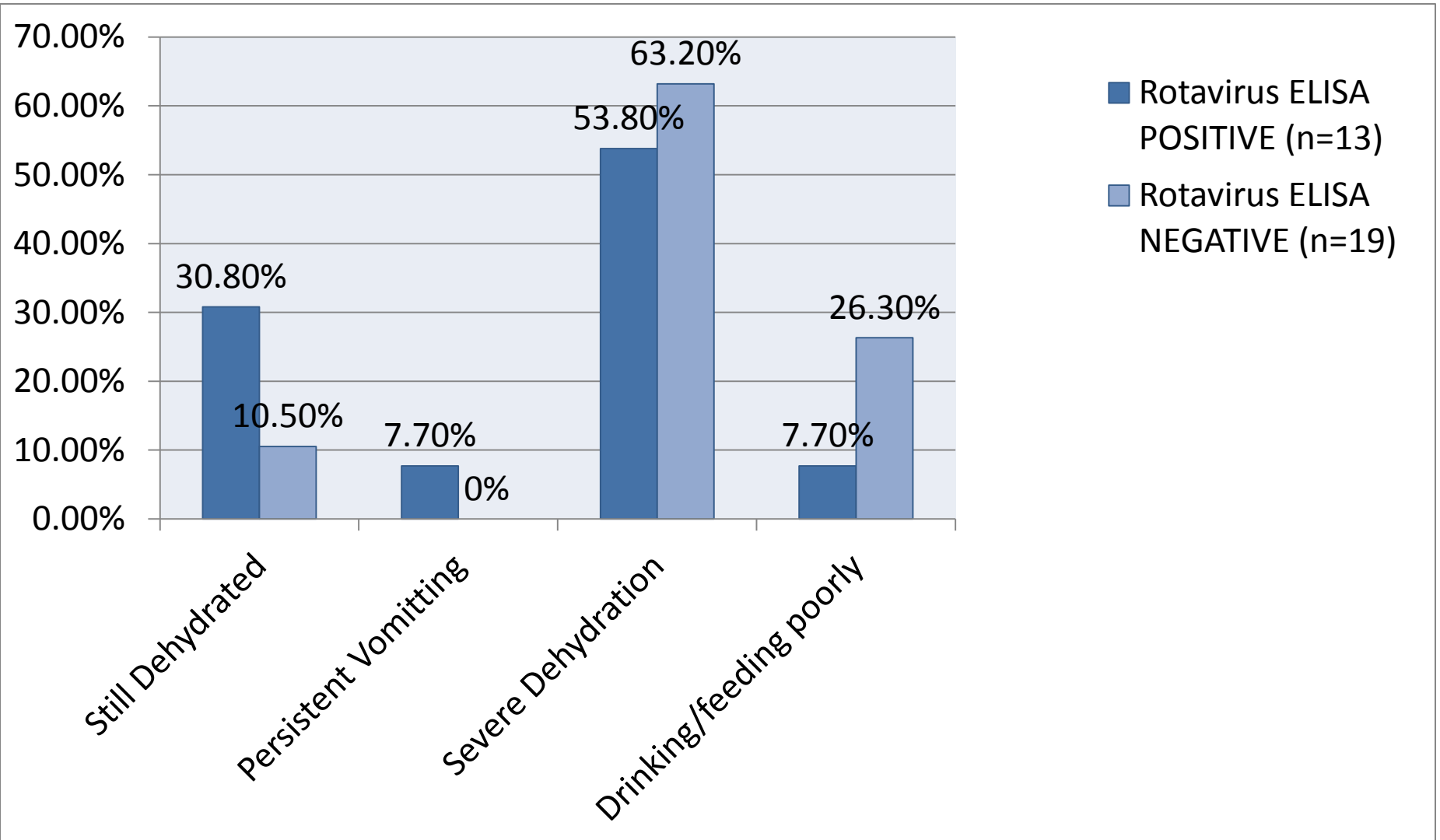
■ Discharged Home  
■ Admitted to wards

**Rotavirus ELISA NEGATIVE  
(n=135)**



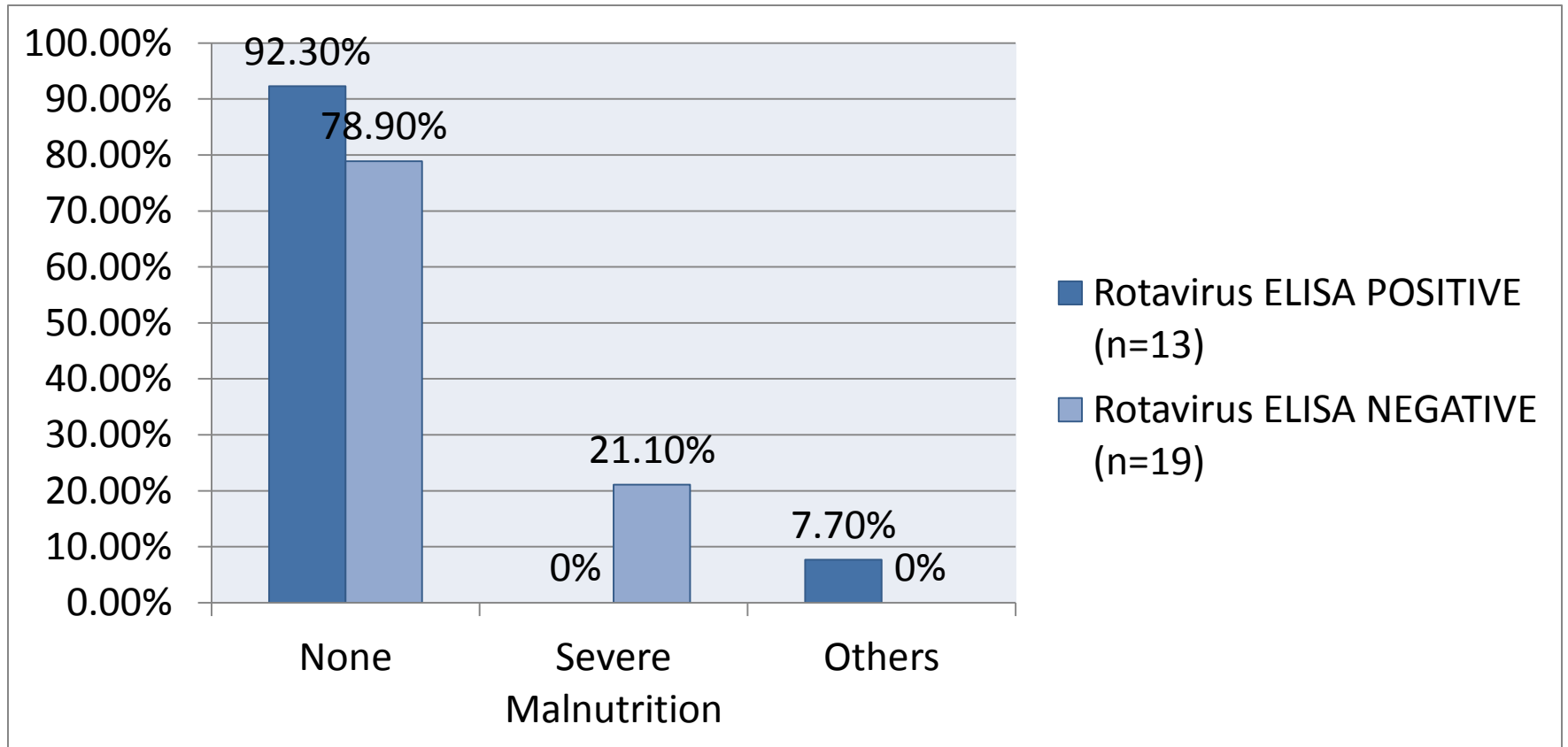
■ Discharged Home  
■ Admitted to wards

# Figure 4: Main reason for Admission to wards

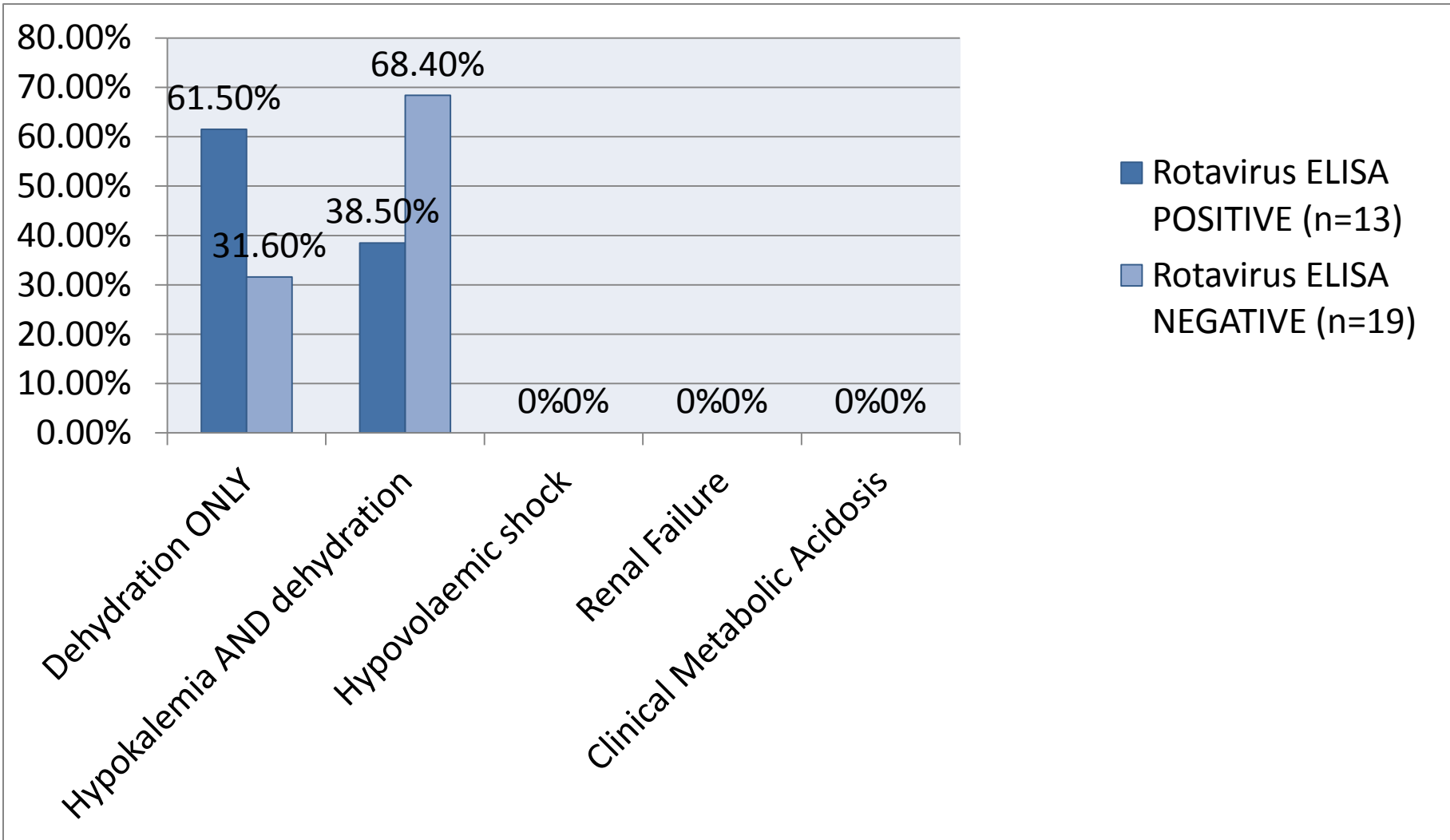


**Figure 5:**

# Associated Co-morbidities



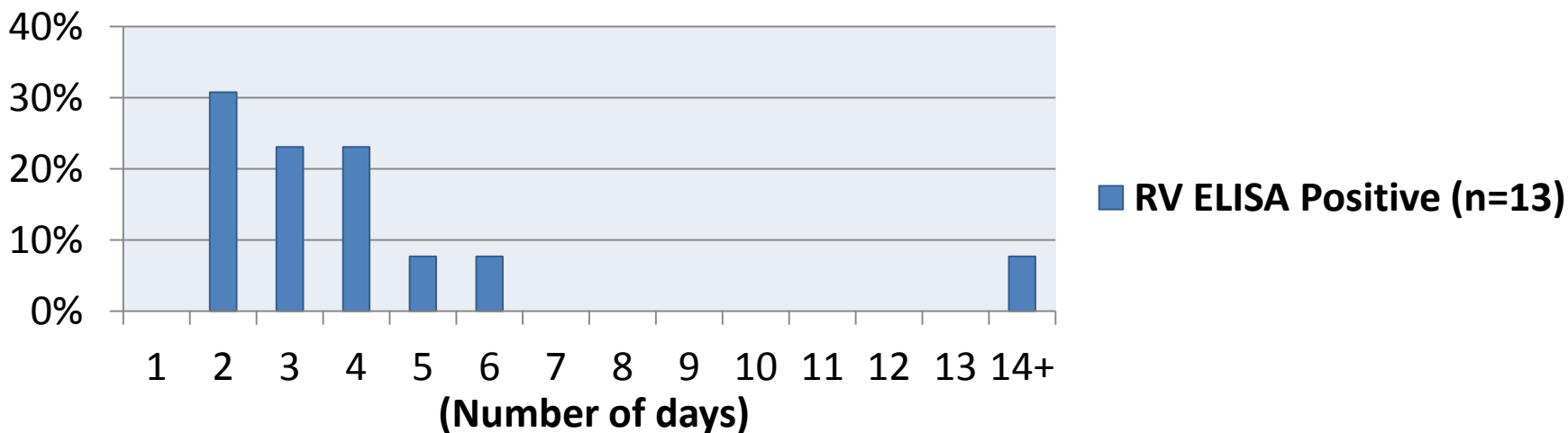
# Figure 6: Complications Observed



**Figure 7: Outcome of In-patient Admissions.**



**Figure 8: Length of Hospital Stay in RV ELISA Positive in-patients**



# DISCUSSIONS

- Rotavirus detected **47.06% (n=255)** & is similar to studies done in Goroka and within the Western Pacific Region.
  - Pratt et al 1992 – 68% (n=30)
  - Howard et al 2000 – 23% (n=1526)
  - Fiji , Malaysia and Thailand; 39%, 38% & 39% respectively
- High proportion **88.3%(n=120)** of RV hospitalization - first year of life (figure 2);
- Vaccine initiation in early infancy (**age 2, 4 & 6 months**) as shown in other countries will prevent RV infection prior to peak age group and hence reduce burden.

- **Preventative measures such as hygiene & sanitation have been shown to reduce the incidence of diarrhoea due to bacteria and parasites.**
- **This is not seen in Rotaviral diarrhoeal disease; global incidence in the developed and developing nations are still very much similar.**
- **In this study ([Table 1](#)) there was no statistical significance observed in the RV positive and negative groups – residence, water & sanitation and feeding practices.**



- **Main clinical management approach to diarrhoeal disease is addressing dehydration – ORS , IV fluids & Zinc.**
- **In this study (table 2)**
  - **<10% (n=255) were given Zinc**
  - **No one was given ready- made ORS**
  - **100% (n=255) were given IV fluids for rehydration**
  - **30% - received antibiotics**
- **Huge economic burden placed on our health system;**
  - **Inconsistent supply of Zinc,**
  - **ORS not made readily available in COPD**
  - **IV fluids only for rehydration & routine use of antibiotics**
- **Vaccination may be the optimal option to reduce burden.**

# CONCLUSION

- This study has established that Rotavirus is an important cause of Morbidity in children under age 5 years at the PMGH.
- Vaccination is the way forward if we are to reduce the disease burden of Rotavirus
- Further studies are required in different locations of PNG to characterize Rotavirus strains circulating within the country, prior to

# ACKNOWLEDGEMENT

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4. All patients who participated

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**Questions ?**