Inform'ACTION no 33
ISSN 1029-3396
Information for action / Information pour action

Diarrhoeal disease outbreak investigation in Guadalcanal and Honiara Provinces, September – November 2008

This article is an outcome of the field epidemiology or Data for Decision Making (DDM) training undertaken by the Secretariat of the Pacific Community in collaboration with other PPHSN partners in Solomon Islands. It is an update on the initial investigation of an outbreak of diarrhoeal disease that occurred in Guadalcanal Province during my acting Directorship of the Guadalcanal Provincial Health Services in Solomon Islands in 2008.

Introduction

On Saturday 11 October 2008, nursing staff at the Good Samaritan Hospital alerted Guadalcanal provincial medical officers to an increased number of patients admitted with diarrhoea, vomiting and signs of dehydration. Most of the cases at the time were children, aged five years and below. Stocks of intravenous fluids, intravenous canulas and paediatric burettes were running low and staff were overwhelmed with the workload of caring for these patients. They were contemplating being faced with a possible outbreak of diarrhoeal disease.

This article attempts to establish whether this was in fact an outbreak of diarrhoeal disease and to define its extent — the number of cases and details of the age group, gender, residence and clinic attended by each patient. It also lists the public health interventions, or measures undertaken to halt the outbreak, including aetiological investigations.

Methodology

The investigation commenced with outbreak surveillance. To rule out a seasonal trend, data from out-patient presentations with diarrhoea (WHO case definition) from all clinics around the Good Samaritan Hospital catchment area, in-patient log books and case notes of admissions to the Good Samaritan Hospital were collected for a period beginning several years prior to the event. In addition, the number of cases of diarrhoea among out-patients was also collected from all Honiara City Council clinics and from the National Referral Hospital (including data from adults' and children's wards for the same period). Teams were also dispatched to affected communities to identify and count cases.

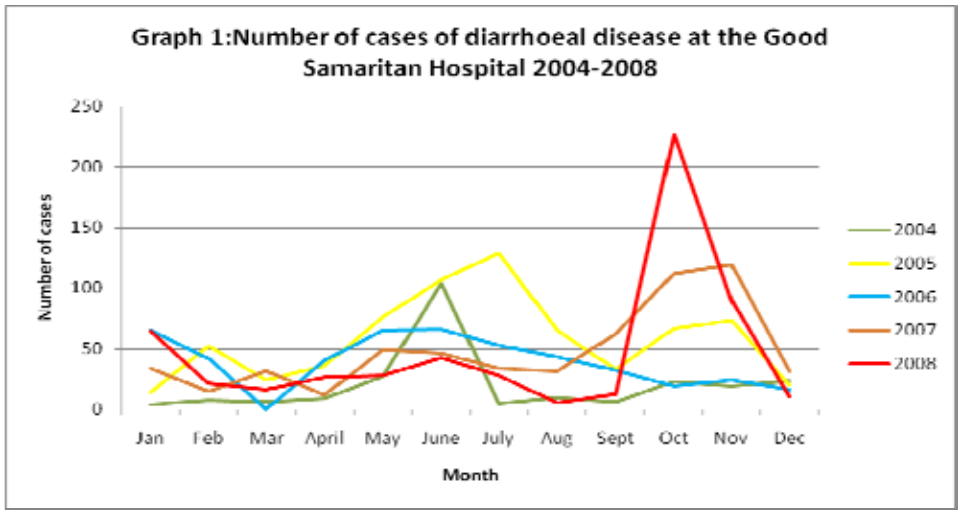
Data were analysed using Microsoft Excel and descriptive epidemiology was performed. Attack rates were estimated and a spot map was developed to show where the event was happening.

Laboratory testing of stools undertaken on cases at the National Referral Hospital failed to isolate specific enteric pathogens but samples sent to the Royal Brisbane Hospital for virology testing confirmed rotavirus infection.

Exact dates were noted for all public health interventions that were carried out by the various departments, namely the Ministry of Health and Medical Services, the Health Promotion and Health Environment Departments, Guadalcanal Provincial Health Services, and nursing staff.

Results

The investigations confirmed increased numbers of cases beyond what is usually expected. The findings from data collected are presented below as graphs and tables.



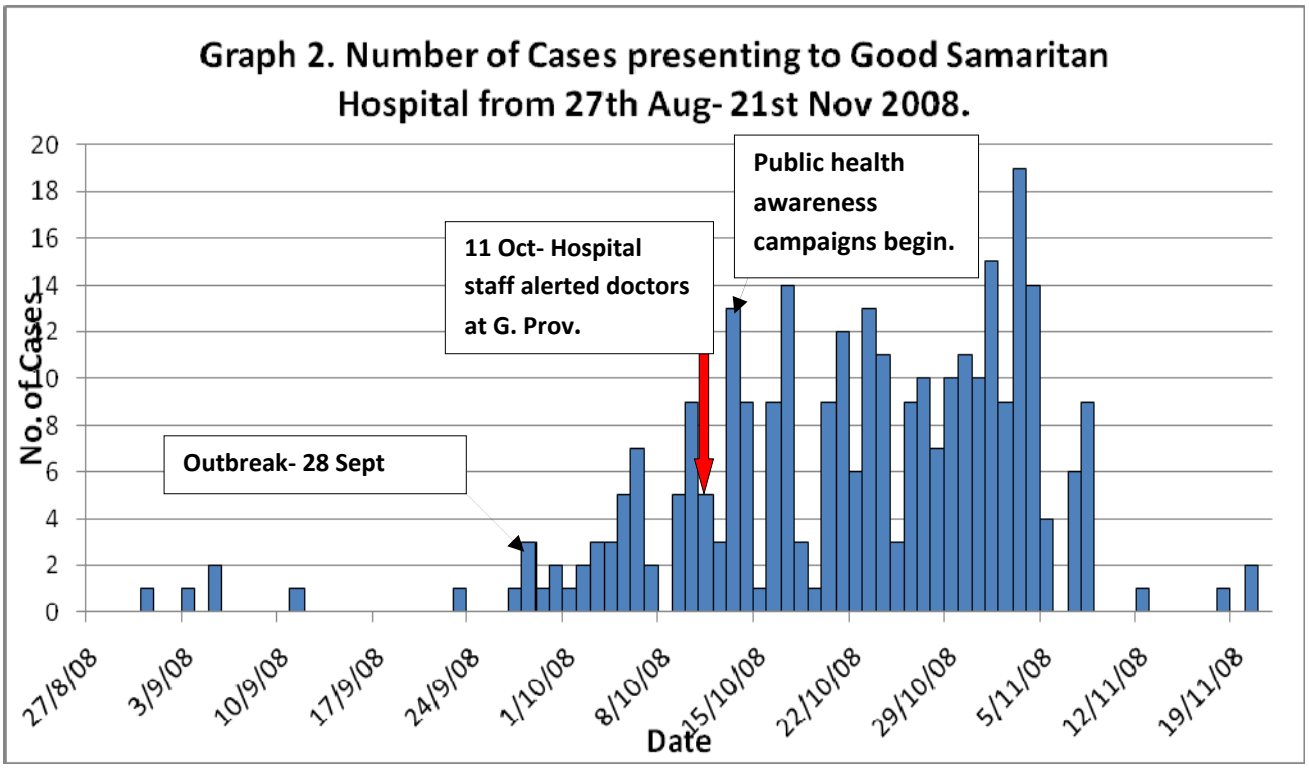
Graph 1 shows that in 2004, 2005 and 2006, an increase in diarrhoeal disease cases was seen during the middle of the year. However, in 2005, 2007 and 2008 there was an increase in cases of diarrhoea at the end of year. It appears to be a seasonal trend, where increases in cases are seen in the middle of the year and, more recently, at the end of the year.

In 2008, however, diarrhoeal diseases peaked to almost twice the number seen in 2007 (227 cases in October 2008 compared to 112 cases in 2007). This confirms that the Good Samaritan medical area was experiencing an outbreak of diarrhoeal disease, assuming there was no change in other parameters such as detection, reporting or surveillance.

The histogram (Graph 2) shows the chronology of events and the number of diarrhoea cases presenting on a daily basis to the Good Samaritan Hospital from 27 August to 21 November 2008 (301 cases in total).

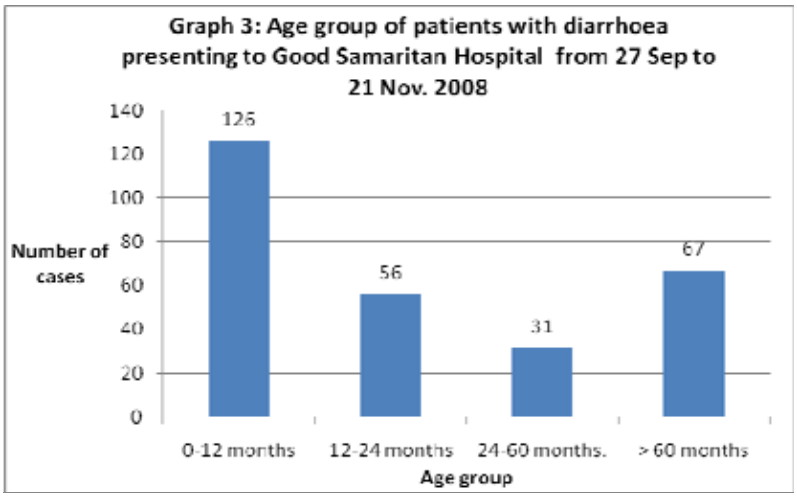
The epidemic curve clearly shows multiple peaks with increasing numbers of cases over 4–5 weeks, suggesting an ongoing outbreak in the area or a propagating epidemic curve. This suggested a possible infectious aetiology for the diarrhoea in this outbreak. Laboratory investigation results had not arrived from overseas at this stage.

On 11 October 2008, the out-patient staff of the Good Samaritan Hospital were overwhelmed by an influx of diarrhoeal disease cases and notified the Guadacanal provincial medical officers. This set a series of actions in motion, including investigations and management of the outbreak. The Ministry of Health was also notified of the event.

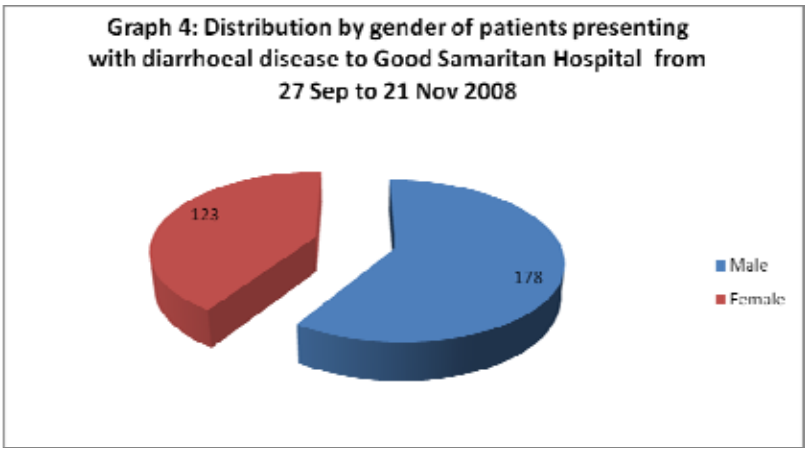


Public health interventions began on 13 October. They consisted of radio health programmes and awareness sessions at the Good Samaritan Hospital and its medical area on hygiene and sanitation practices. The Guadalcanal provincial environmental health officers were mobilised to conduct health assessment and educational awareness, in view of the large number of cases at the Good Samaritan hospital.

Children between the age of 0 and 12 months presenting diarrhoea cases at the Good Samaritan Hospital were the most frequent (Graph 3). Fewer cases were observed amongst older children and even fewer in adults. Thus these data confirmed that this was an aetiology largely affecting children.



More males (59%) were affected than females (41%) (Graph 4).



The areas around the hospital that had the highest number of cases were Sali village, followed by Komukama and Turarana (Table 1). Sali village had a diarrhoeal disease rate of 42 per 1000 followed by Komukama, 39 per 1000 and Turarana, 32 per 1000. These rates were estimated from Good Samaritan Hospital data, which meant that there were more cases in the village not counted in the data.

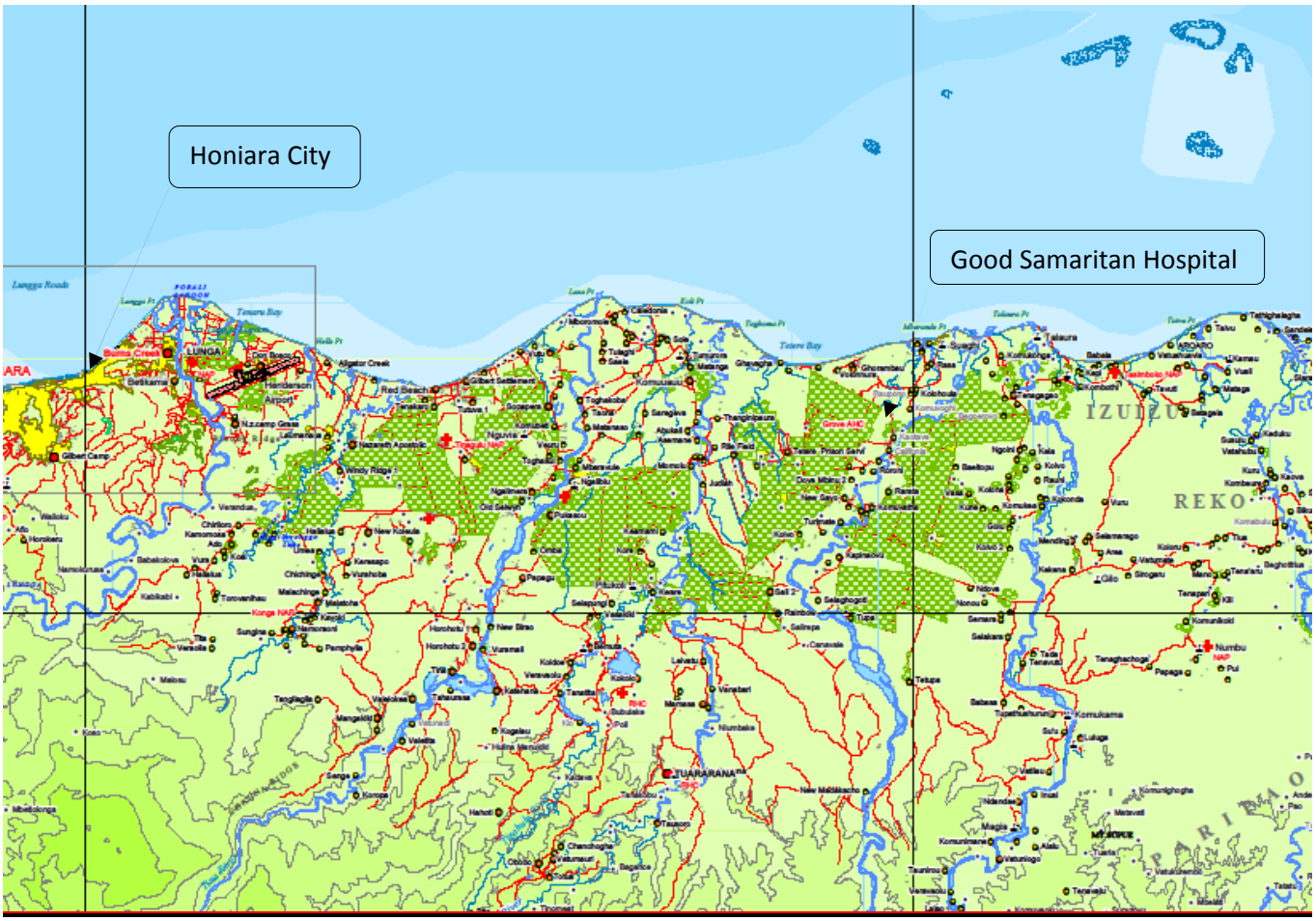
The rest of the villages and settlements affected are spread over a large area. Table 1 below shows the numbers of cases by village and the map shows their approximate location. The villages with the highest rate were targets for the interventions from provincial health teams.

Table 1: Residential areas of the cases presenting to the Good Samaritan Hospital

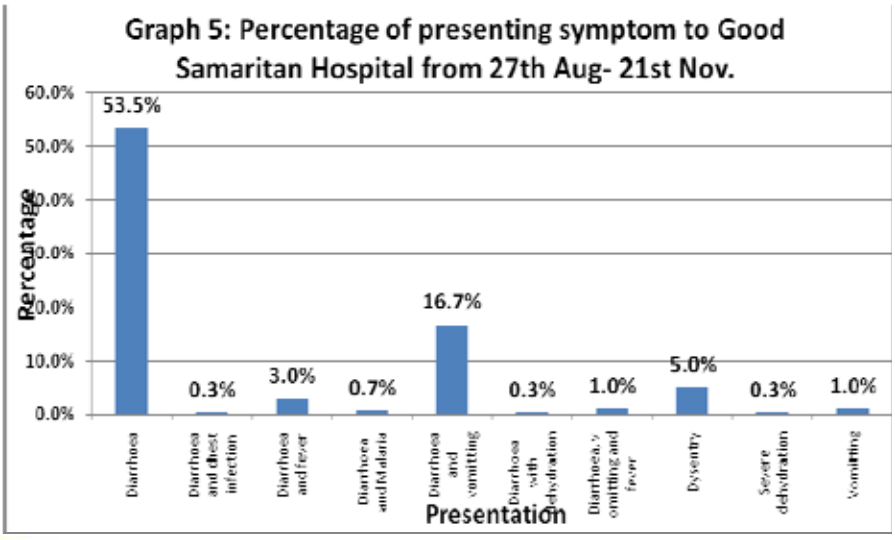
Location	No. of cases
Sali	13
Komukama	12
Turarana	10
Don Bosco, Reko, Soso, Numbu	9
Suaghi, Talaura, Metapona	7
Barande, Gold ridge, GPPOL, Ruavatu	6
Balasuna, Komuvatha, Unknown address	5
Others	10

Map 1 shows the location of the Good Samaritan hospital and some of the main affected villages.

Map 1: Guadalcanal province and expanded area of the residence of patients presenting to the Good Samaritan Hospital.

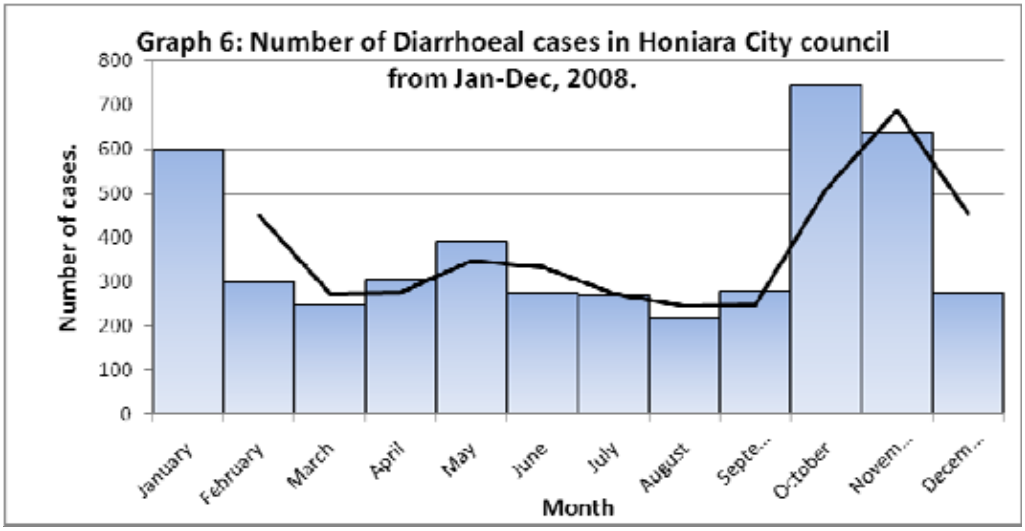


The clinical picture of the cases (Graph 5) was that most presented with diarrhoea only (53.5%), followed by diarrhoea and vomiting (16.7%), dysentery (5%) and fever (3%).

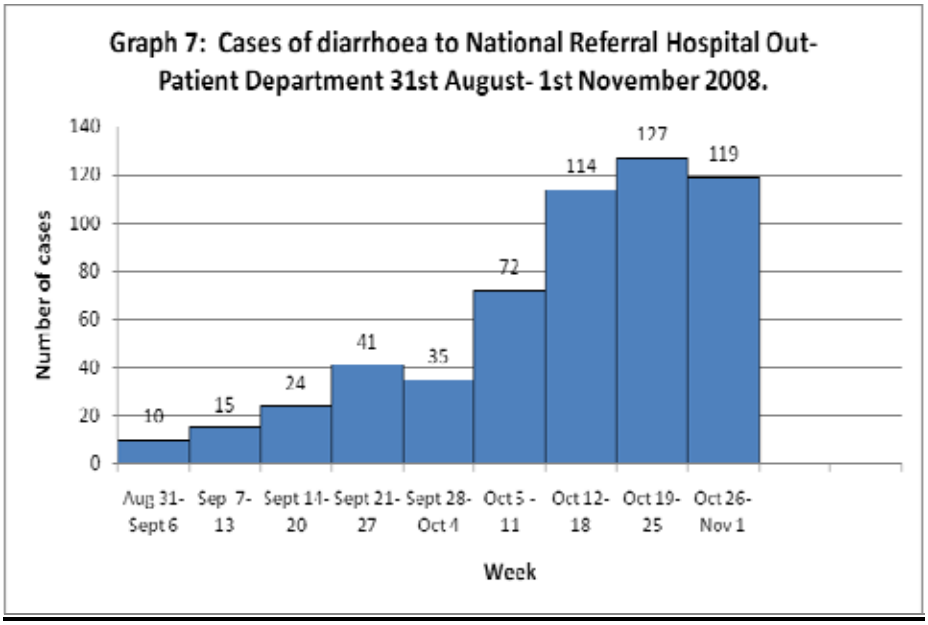


A more expanded review of data from nearby Honiara City Council clinics and the National Referral Hospital (Honiara Province) was also carried out to check whether there were outbreaks in catchment areas.

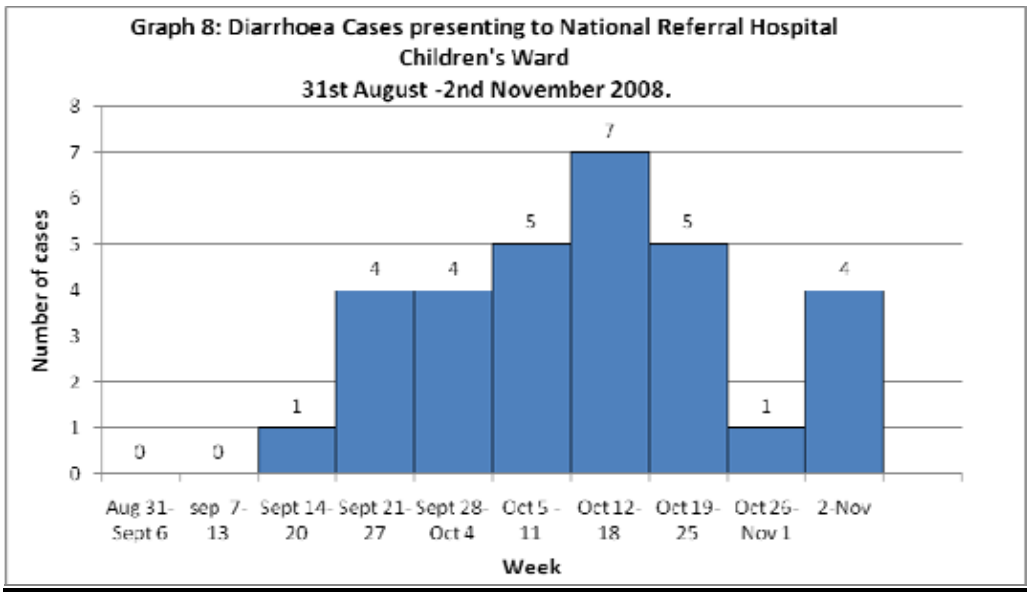
Aggregated data indicate that, on average, Honiara City Council clinics saw about 300 cases per month (Graph 6) during the period June to September. However, during the months of January, October and November there was an increase in the number of cases presenting to their clinics (601, 744 and 635 cases respectively). This confirmed the suspicion that clinics in Honiara city were experiencing an outbreak of diarrhoeal disease.



Data obtained from the National Referral Hospital out-patient department (Graph 7) showed that there was a gradual increase in the number of cases from the beginning of September with peaks in the last few weeks of October 2008. The patients were all from the earlier identified villages.



The in-patient data also showed an increase in diarrhoea admissions to the children's ward starting in the week beginning 21 September (Graph 8) and continuing for several weeks. This corresponded with the National Referral Hospital outpatient department figures.



Discussion

In the light of data from the Good Samaritan Hospital and its medical area, Honiara city clinics and the National Referral Hospital out-patients department and children's ward, we can confirm that an outbreak of diarrhoeal disease occurred which affected mainly children.

It seems that the outbreak started in Honiara with initial presentations to the National Referral Hospital out-patient department and children's ward at the beginning of September. Cases started to occur at the Good Samaritan Hospital towards the last week of September.

Samaritan Hospital staff recognised that something unusual was happening, but they did not know how to report it. They did not look at the data systematically prior to this outbreak and so they had difficulty recognising and alerting relevant authorities about the outbreak. Consequently, there was a delay in response.

There is a need for an effective surveillance system for monitoring communicable disease at clinic, provincial and national levels and for having baselines at each setting.

The increased number of cases presenting to the Good Samaritan Hospital posed case management difficulties in terms of resources to manage such a large number of cases. The fact that the outbreak predominantly affected children under the age of five years with the majority under the age of two years also caused difficulties. Case management resources for patients were depleted quickly as paediatric resources are always in short supply at provincial health facilities.

Other resources were mobilised at the National Referral Hospital out-patients department, the National Referral Hospital pharmacy department and the National Medical stores at

Ranandi. Staff were moved from the provincial health authorities to supply the extra manpower needed at the Good Samaritan hospital.

This experience could have been prevented if the outbreak had been identified at Honiara city clinics and the National Referral Hospital and appropriate public health interventions instituted.

On notification of the outbreak, provincial health authorities began public health interventions and activities on 13 October and these continued until the end of November.

The interventions consisted of:

- health awareness campaigns to affected villages and surrounding areas;
- interviews and education of families affected by the diarrhoeal outbreak;
- hygiene education, hand-washing campaigns via radio;
- inspections and water sampling done by the Health Environment Department of the Guadalcanal Provincial Health Authority and the Ministry of Health;
- campaigns through print media and radio conducted by the Ministry of Health.

It is debatable whether the interventions were timely and had a major impact. The outbreak may have continued until it infected the whole reservoir population of under five years and then subsided.

The demographic characteristics and picture of the disease indicated it was most likely rotavirus and this was confirmed when stool samples taken from seven children admitted to the Good Samaritan Hospital were analysed.

Conclusion

In summary the diarrhoeal outbreak occurred in September and lasted until mid November 2008 in Honiara and Guadacanal provinces. The initial outbreak started in the Honiara City Council clinics and National Referral Hospital but was not identified immediately. It affected mostly children under the age of five years. The causative agent was rotavirus, as confirmed by stool analysis at Brisbane Virology laboratory.

It is difficult to know if the public health interventions carried out by the Guadalcanal Provincial Health authorities and the Ministry of Health at that time were effective.

The burden that the outbreak put on other clinics within Honiara, at the Good Samaritan Hospital and surrounding health facilities could have been avoided had the initial surge in cases been recognised and investigated.

Recommendations

The following recommendations to improve the situation regarding surveillance and outbreak investigation are suggested.

1. Improved national, provincial, clinic-based communicable disease surveillance (perhaps syndromic) and response systems.
2. Setting up and strengthening of an outpatient database or system to monitor the

incidence of outbreak-prone diseases.
3. Improvement in the collection and quality of data for better analysis.
4. Better surveillance and outbreak communication among health services at provincial and national levels.
5. Proper and timely analysis of data at an outpatient level to monitor outbreak-prone diseases in all clinic settings.
6. Rapid intervention once an outbreak is suspected, including the mobilisation of manpower, financial, pharmaceutical and infrastructure resources.
7. Improved stocking and storage of supplies to cater for outbreaks.
8. Possible use of rotavirus vaccine for prevention of such an outbreak in future, in view of the impact this one had on the Guadalcanal Provincial Health Services and its population, especially if data establish that rotavirus outbreaks are recurrent.
9. Further training of health personnel to be alert in detecting outbreaks and directing interventions. This was the first outbreak that was investigated in Guadalcanal Province and the knowledge, skills and findings learned in the DDM training were used to direct intervention measures at community level.
10. Ongoing training in surveillance and outbreak investigation for health staff in the provinces and in clinics.

"Interestingly these skills assisted me to investigate another outbreak of diarrhoeal disease after floods in the western part of Guadalcanal Province. With my training and those officers in the provincial health department assisting with health intervention, we managed to abort the outbreak and prevented further spread."

Dr Nemia Bainivalu
HIV programme Coordinator,
former Health Director, Guadacanal Province
Solomon Islands