

SPECIAL REPORT

A REPORT ON OCEANIA UNIVERSITY OF MEDICINE'S EMERGENCY RESPONSE TEAM (OUMERT) ACTIVITIES FOLLOWING THE SAMOAN TSUNAMI ON THE 29TH SEPTEMBER 2009

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Introduction

This report outlines the work carried out by the Oceania University of Medicine Emergency Response Team (OUMERT) in the days following the Samoan tsunami of 29 September 2009. The work focused on providing immediate health care to the 3 villages of Lepa, Saleapaga and Satitua, which were amongst the most devastated villages affected by the tsunami.

Background

At 6.48am Samoa local time on Tuesday 29 September 2009, an earthquake measuring 8.0 on the Richter scale occurred 190 km south of Apia, the capital of Samoa (refer to Fig 1). Samoa is located in the South Pacific Ocean, about 2,200 miles south of Hawaii, with a population of 180,000¹. There are two main islands, the bigger island of Savaii and the smaller island of Upolu being home to three-quarters of Samoa's population. The earthquake triggered a tsunami that traveled north of the epicenter colliding with the south east coast of the island of Upolu within 10 minutes. The effects were also felt in American Samoa and Tonga. A total of 189 people died across the pacific region, with the greatest loss of life in Samoa with 149 deaths².

The Samoan National Health Care Service (NHCS) initially responded by dispatching emergency medical teams to the affected areas and commencing disaster response triage and treatment protocols in the emergency department of the Tupua Tamasese Meaole (TTM) National Hospital in Apia.

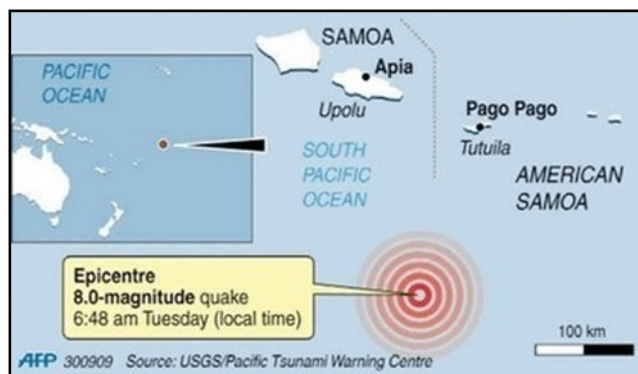


Figure 1. Location of quake epicenter in relation to the Samoan islands

However, there were many people directly affected by the tsunami that did not present to hospital, or did not attend follow up appointments of tsunami-related injuries. Moreover, many individuals were indirectly affected by the tsunami through loss of access to clean water, food, shelter, infrastructure and chronic medications. In the days following the tsunami, mobile medical teams were set up to provide care for these people. This report is a summary of the actions of one of these, the OUMERT.

Mandate of the OUMERT

Oceania University of Medicine (OUM), under the guidance of Vice Chancellor Prof. Surindar Cheema and Deputy Dean Dr Monalisa Punivalu, first sent a team of doctors and medical students to the areas affected on Thursday 1st October, two days after the tsunami. The team was led by Dr Viali Lameko and Dr Carmichael Patu.

Over the following days, a coordinated approach was mounted by the Samoan government through the Ministry of Health, TTM National Hospital and overseas aid organizations. The OUM team was one of four mobile medical teams working under the direction of the Samoan National Health Care Service, and was allocated the task of providing medical assistance to the villages of Lepa, Saleapaga, and Satitua. These villages were all located on the south coast of Upolu and were destroyed in the tsunami, with Saleapaga sustaining the most casualties. Local village residents who survived moved from low-lying beach villages to higher areas of remote rainforest and quickly began to build settlements. The OUM team visited these villages on weekdays (Mon-Fri) for two weeks post tsunami, with the exception of Thursday 8th October, when the team provided care for the village of Apai on Manono Island.

Records of patients seen and treatments provided were kept according to Ministry of Health protocol from Monday 5th October. Accurate records were not kept for the early response by OUM on



Figure 2. The Village of Lepa (A,B) and Saleapaga (C) post-tsunami. Images (B,C) courtesy of UK Times On-line and UK Guardian respectively.



Figure 3. Map of South-East Tsunami affected Coast of Upolu. Red arrows indicate villages assigned to OUMERT.

Thursday 1st and Friday 2nd October. Consequently this report includes data from the period including Monday 5th October to Friday 16th October.

Tsunami-related medical problems

Table 1 provides a summary of the consultations undertaken by the OUMERT. Note that individual patients may have had multiple diagnoses. OUMERT.

Initially the team was predominantly involved in the treatment of lacerations and infected wounds of patients, particularly to feet and legs, incurred during the tsunami. The team provided care by cleaning and dressing wounds, ensuring adequate antibiotic cover where appropriate, and in some cases providing dressing materials for patients to self-care. Pain relief for wounds and tsunami-related musculoskeletal injuries was also provided.

Respiratory infections were a major initial concern given the high prevalence of aspiration pneumonia in tsunami victims reported at the TTM hospital. Antibiotics were provided for suspected cases, although the numbers of these seen were small. The team also provided antibiotics for several cases of non-aspiration lower respiratory tract infections (LRTIs). Many upper respiratory tract infections (URTIs) were seen (see Table 1). Despite the likelihood that most URTIs were viral, antibiotics were often provided, particularly in the pediatric population, due to concerns that these cases could develop into more serious conditions such as rheumatic fever.

Post-tsunami chronic disease management

Replacement of long-term medication was a major part of the team's work initially as many patients with conditions such as diabetes and

hypertension lost their medication as a result of

Table 1. Total number of diagnoses for the period 5/10/09 - 16/10/09.

Diagnosis	0-12 years	>12 years
Wound +/- infection	19	45
Abscess	4	6
Respiratory tract infection		
Upper respiratory tract infection	32	21
Lower respiratory tract infection	10	19
Chronic disease		
Diabetes Mellitus Type II ¹		20
Suspected Impaired Glucose Tolerance ²		4
Hypertension ¹		13
Possible Hypertension requiring follow-up ³		6
Hypertension requiring intervention ⁴		2
Check-up (Nil medical illness identified)	4	5
Skin condition		
Scabies	13	2
Fungal infection	3	5
Impetigo	5	
Irritant dermatitis ("Nappy rash")	2	
Dermatitis (other)		4
Eczema		1
Psoriasis		1
Gastrointestinal disease		
Diarrhoeal disease	3	3
Vomiting		1
Abdominal pain (Nil vomiting or diarrhoea)		2
Musculoskeletal diagnosis		
Musculoskeletal pain (chronic)		19
Musculoskeletal pain (Acute)		6
Gout		3
Fracture (Radiologically diagnosed)		2
Dental disease	2	1
Otologic disease		
Otitis Media	2	2
Otitis Externa		1
Viral illness (non-specific)		3
UTI		2
Pregnancy		2
Other	1	10

¹ Previously diagnosed according to international criteria

² New diagnosis made by OUM MMR. (Random BSL >12.0 mmol/L)

³ Single reading; SBP=140-160 and/or DBP=90-100

⁴ At least two separate readings, within the one consultation; SBP>160 and/or DBP>100 plus at least one other CHD risk factor (obesity, DM, smoking, age >65).

damage caused by the tsunami wave. Moreover, it became evident that chronic disease was exacerbated by acute major stressors such as displacement, acute illness, and psychological distress. It was recognized that optimal glycemic control would be an important factor in successful wound healing, and minimizing the risk of diabetic complications which would further disadvantage those patients already in a difficult situation.

The team carried out check-ups on children, the elderly, and patients with chronic disease. Blood pressure and blood sugar measurements were performed as part of the check-ups and medication regimes were altered or uninitiated where appropriate.

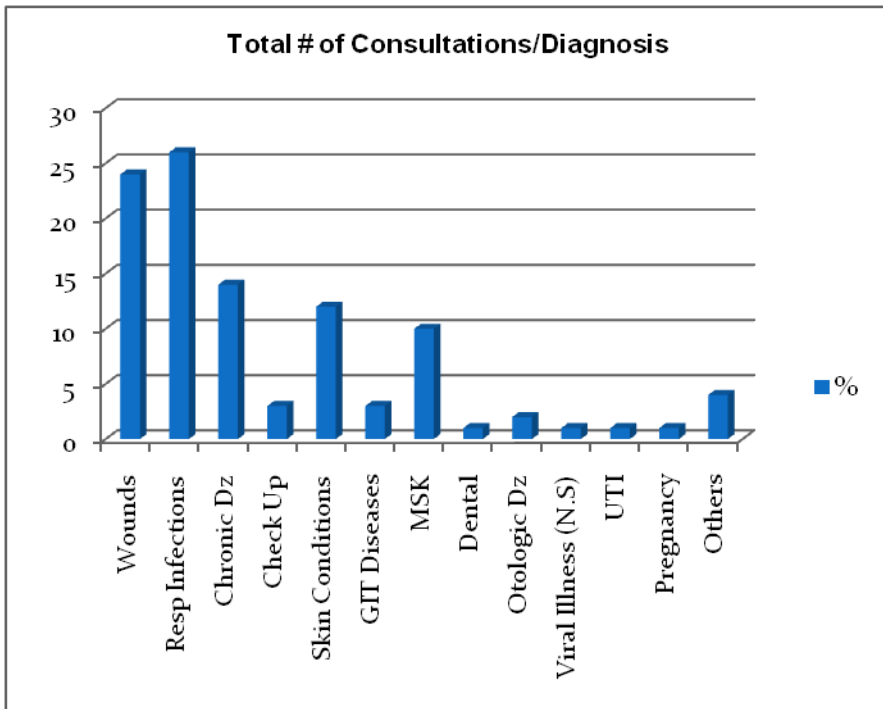
Post-tsunami public health issues

In the days following the tsunami, it became evident that poor living conditions, limitations of transport and infrastructure and reduced access to clean water were developing public health issues of major concern.

Living conditions were generally poor with the commonly observed overcrowding, limited shelter, and open sewage creating the potential for the spread of infection. Respiratory tract infections and scabies were common diagnoses, particularly in the pediatric population (under twelve years). Infections of wounds and insect bites were also a concern due to the unsanitary environment.

As rebuilding of villages began in the weeks post-tsunami, construction injuries provided a major source of wounds and subsequent

infection. In addition to male builders, many children sustained wounds from playing in the makeshift camps and from building debris. The prevention of tetanus and wound infection was a major priority for the team. Systemic antibiotics were given as appropriate, and the team ensured that patients were covered for tetanus by giving new vaccinations where necessary.



heightened awareness regarding the importance of drinking either bottled or boiled water. Similarly, safe food preparation, handling and storage practices which were promoted by various visiting medical teams along with awareness campaigns by the Ministry of Health helped minimize outbreaks of such illnesses.

The new settlements provided a significant potential for mosquito breeding sites, largely due to collections of stagnant water. Heavy rainfall during this period also exacerbated the situation. Combined with a lack of mosquito nets, this led to a significant number of children presenting with multiple mosquito bites, some of which

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Transport to and from the new villages was a major problem from the outset. Many families lost vehicles in the tsunami, leaving them unable to independently access food, water and other basic essentials. The absence of established roads leading to the new settlements, particularly Saleapaga, was also problematic for agencies supplying aid (such as the Red Cross), and access was made even more difficult after heavy rain. The displacement of families created problems for the team in providing continuity of care. It was sometimes difficult to locate patients requiring follow up consultation as there was considerable migration of individuals on a daily basis.

Other public health concerns included the potential for outbreaks of infectious disease including diarrheal diseases, measles, dengue fever, and typhoid. The prevention and treatment of diarrheal disease, particularly in the pediatric population, was a priority for all aid agencies and medical teams involved in the tsunami response. Fortunately, there were no major outbreaks of diarrheal disease or typhoid fever. A likely key determinant in this outcome was the rapid and successful delivery of potable water, as well as a

were infected. However, there was no outbreak of dengue fever.

Psychological impact of the tsunami

No OUM team members had specialist psychological training although the OUM doctors present were all experienced in general counseling of patients and family members as part of their responsibilities as physicians practicing in Samoa. A qualified psychologist with disaster management experience would have been invaluable during this period. Difficulties in providing psychological support for patients were compounded by the language barrier experienced by those members of the team who could not speak Samoan. However, despite these difficulties it was clear that many individuals were suffering from distress. The team witnessed several funerals taking place in the days following the tsunami and these included prayers, singing and food. Normal grief reactions are to be expected, and it was heartening to see families maintaining cultural norms regarding the burial of loved ones, despite their situation. Samoan traditions of hospitality were evident and the team was often offered food and water despite the families' circumstances.

The impact of the disaster on the affected population's immediate psychological health was apparent. One elderly woman spoke to the team about her experience of being caught in the tsunami and losing two grandchildren. She was lethargic, had lost her appetite, and continued to taste salty sea water in her mouth two weeks after the disaster. As head of the family, her only motivation for eating was to provide reassurance to her children and grandchildren. Several other

cases of self-neglect were seen; an elderly man suffering from severe pneumonia did not seek medical attention, insisted he was well, and was only diagnosed when offered a check-up. His primary concern was the progress of shelter construction for his family. Another patient refused hospital admission for a severe abscess as her priority was looking after her family.

There is a high prevalence of religious faith in the Samoan population, and it is likely that this, combined with strong family support and traditional customs, will contribute to Samoa's recovery. The team often observed people displaying a remarkable resilience in the face of adversity, and for this reason it is difficult to assess or quantify the long-term psychological impact that the tsunami will have. Appropriate psychological support needs to be made a priority in the coming months as immediate issues of aid and rebuilding are resolved.

OUM's role in post-tsunami healthcare provision

OUM's initial tsunami response consisted of daily visits to Lepa, Saleapaga and Satitua where acute medical problems were increasingly replaced by chronic disease management and other non-urgent presentations. These changing presentations, along with increasing access to health care at Lalomanu district hospital, led to a reduced requirement for mobile medical teams. OUM responded to this reduced demand by reducing the frequency of visits to the affected areas.

OUM is committed to providing long-term health care to the people of Samoa directly and indirectly affected by the tsunami. This is achieved through medical services provided by the Rotary 5000 program which is a monthly screening service targeting the areas affected by the tsunami³.

Challenges and recommendations

Immediate access to medical supplies and uncertainty regarding appropriate medication and equipment, limited the team's efficiency in the first few days post tsunami. This was in part due to limited stocks being available nationally, a situation which improved within days as overseas aid became available. The team became more effective as field experience was gained and medication and equipment requirements became apparent. The logistical coordination for the team improved over the first few days resulting in daily stocktaking and the initiation of accurate and consistent record keeping for medical supplies and drugs as well as patient records.

Table 2. Total number of treatments provided for the period 5/10/09-16/10/09.

Treatment	
<i>Wound management</i>	
Wound dressing	66
Tetanus vaccination	3
<i>Analgesic/Anti-inflammatory agents (systemic)</i>	
Paracetamol tablets	80
Ibuprofen capsules	10
Diclofenac	5
Naproxen	1
Aspirin	1
<i>Antimicrobials (systemic)</i>	
<i>Pediatric</i>	
Panadol suspension	23
Flucloxacillin suspension	12
Co-amoxiclav suspension	12
Amoxicillin suspension	19
Co-trimoxazole	2
<i>Adult</i>	
Flucloxacillin capsules	30
Amoxicillin capsules	19
Co-amoxiclav capsules	12
Roxithromycin capsules	3
Erythromycin capsules	3
Metronidazole capsules	3
Penicillin V capsules	2
Griseofluvin capsules	2
Ciprofloxacin capsules	1
Nitrofurantoin capsules	1
Co-Trimoxazole capsules	1
Chloramphenicol capsules	1
<i>Antimicrobials (topical)</i>	
Chloramphenicol eye drops	2
Betamethasone ear drops	1
<i>Topical skin preparations</i>	
Permethrin cream 5%	16
Hydrocortisone cream	7
Anti-fungal preparations	4
Betamethasone cream	1
<i>Oral hypoglycaemic agents</i>	
Metformin	11
Glicazide	8
<i>Anti-hypertensive agents</i>	
Captopril	9
Felodipine	1
Enalapril	1
Quinapril	2
<i>Nutritional Supplements</i>	
Oral Rehydration Solution	5
Iron Sulphate	1
Multivitamin capsules	1
<i>Gastrointestinal medications</i>	
Prochlorperazine capsules	1
Omeprazole capsules	1
Loperamide Hydrochloride	1
<i>Other</i>	3

Recommendations to improve the medical response in future natural disasters should include better anticipation of the conditions most likely to be encountered. This information would be invaluable in planning appropriate health care response. It would ideally be compiled in advance and available at the time of any future national disaster. A national protocol such as this, which recommends the most important supplies for an early phase response, would allow greater efficiency and ultimately result in optimal and timely patient care.

OUM should run practice mobilization drills each year so that the OUMERT protocols and logistical processes are followed to ensure a rapid and effective response in case there is another disaster. The OUMERT clearly established itself as an important and flexible rapid response team in times of national disaster and it is recommended that a clear role for the OUMERT be established in the national registry of health response teams. OUM faculty or consultants should provide training to OUM clinical students in disaster management consulting the national protocols.

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Notes

1. Number from the 2006 national census
2. Number provided by the Samoa Disaster Management Office
3. Rotary 5000 is a screening program targeting remote areas that are carried out on the last Friday of every month. It is an initiative by the Oceania University of Medicine and Rotary of Samoa.



Figure 4. Photo taken at a Saleapaga shelter depicting sub-standard living conditions.