Public health response to disasters

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The laboratory can often provide the essential link between environmental factors, disease and appropriate medical intervention. Laboratory processes have the capacity to identify causative organisms in samples which have been obtained from both humans (e.g. faeces) and the environment (e.g. water).

Following any disaster, the potential for occurrence of disease is increased at a time when medical facilities may be damaged and the demands for medical services increased. The identification of the causes of disease are essential in any circumstances; often simple public health measures are the most effective means of controlling a potentially disastrous situation such as a disease outbreak.

The recent tsunami in Banda Aceh was a typical example where public health interventions were essential to prevent and control the spread of disease. The disaster resulted in the destruction of infrastructure such as water supplies and sewerage systems. Along with the destruction of this essential infrastructure, the inundation of water, combined with the hot tropical climate, provided perfect environmental conditions for the outbreak of disease.

The Sphere standards are an international set of standards for the establishment of camps for internally displaced persons (IDPs) and refugees. These standards are designed to ensure that adequate conditions are provided in camps established for IDPs in order to reduce the likelihood of contracting or spreading disease in this vulnerable population.

The most important aspects of these standards include the provision of an adequate quantity of potable water, the provision of properly constructed and an adequate number of toilets, the prevention of overcrowded living conditions and the control of refuse, flies and mosquitos. The introduction of immunisation programs for diseases such as measles in vulnerable locations is also a simple but important public health intervention. Outbreaks of particular diseases were not apparent after the tsunami in Banda Aceh, although there was potential for outbreak to occur. This lack of outbreaks could be attributed to the facilities and the conditions provided in the many IDP camps.

In circumstances where a disaster has occurred, the provision of laboratory facilities to identify and isolate disease and to identify the source of infections enables a public health intervention which is an effective and humane way of controlling infectious diseases.

Supply of water in Banda Aceh following the tsunami. Provision of potable water is one of the highest priorities following a disaster.

Displaced persons camps were established among the areas destroyed by the tsunami in Banda Aceh.

The confirmation of a particular disease through analysis of blood, faeces or sputum provides the public health practitioner with the necessary knowledge to instigate preventative intervention strategies. An example of this is the confirmation that a patient is suffering from Dengue fever or malaria. An investigation can be based around the knowledge of the lifecycle of a mosquito and the particular breeding habits of the Aedes or Anopheles mosquito (mosquitoes which transmit Dengue fever and malaria). It can be as specific as identifying the breeding habits and likely biting times of each type of mosquito (e.g. Aedes mosquitoes are found close to human environments, often bite in sheltered areas near houses and usually bite during the day). Larvae of the mosquito are then targeted and an effective control of the disease can occur. Such investigation is essential, particularly where the two possible diseases cause similar initial symptoms that require quite specific interventions.

There are many examples of how an intervention can be undertaken once a disease has been confirmed. In some instances, boiling or chlorination of water can be an effective method of preventing water-borne diseases. However, in the case of some pathogens, chlorination alone may not be effective, which demonstrates the need to identify the cause of the disease. An example of this is shown in Table 1 in the comparison of Campylobacter and Giardia. This table also demonstrates how diseases with similar symptoms require specific treatments and interventions. Without the knowledge of the cause of a disease during a disaster, effective treatment and intervention may not occur.

In Banda Aceh, in most cases an effective response to the disaster involved the provision of appropriate conditions in the IDP camps. However, the ongoing supervision and maintenance of these conditions was not always provided within the camps.

Table 1. The comparison of Campylobacter and Giardia.

	Campylobacteriosis	**Giardiasis**
Symptoms	Diarrhoea, abdominal pain, fever, nausea, vomiting	Acute or chronic diarrhoea, malnutrition, fatigue, abdominal pains
Cause	Enteric bacteria	Protozoan infection
Reservoir	Animals such as cattle, sheep, birds, household pets	Humans
Transmission	Contaminated food (particularly undercooked chicken), water or by contact with infected animals	Person to person. Water-borne due to faecal contamination of public water supplies. Animals
Treatment	Antibiotics – Erythromycin	Metronidazole or Tinidazole
Prevention	Personal hygiene measures – hand washing. Pasteurise milk and chlorinate water	Education of personal hygiene measures, protection of public water supplies from faecal contamination. Boiling water more effective than chlorination.

Displaced persons camp in Banda Aceh.

The enthusiasm and efforts which exist in the early stages of a disaster have the potential to diminish overtime. Potential for outbreak of disease, however, remains the same and, in some cases, increases in the weeks following a disaster. For example, mosquito populations can increase due to extra breeding sites provided by inundation of water. During the prolonged period following a disaster, the combined efforts of medical teams with access to laboratory equipment supported by personnel to undertake investigations and implement intervention strategies is essential.

During the visit to Banda Aceh by the Australian medical team GOLF, the public health members of the team visited and reported on more than 60 IDP camps occupied by between 150 and 8,000 IDPs. An enormous amount of work had been undertaken to provide for the needs of the occupants in these camps. It was evident, however, that every condition necessary for the outbreak of disease was present; the worst conditions being the overcrowding in temporary shelters, the poorly maintained latrines (resulting in indiscriminate defecation), inadequate mosquito and fly control, and the uncertainty about the quality of water provided for drinking.

Overcrowding in displaced persons camp in Banda Aceh.

Having worked in most of the major disasters that have occurred worldwide in the past 20 years, it is interesting and somewhat disappointing to continue to see an imbalance in the response to disasters. The need to properly coordinate and balance a total health response, considering public health, laboratory capacity and medical needs, is an important lesson to learn from the response to the effects of the earthquake and tsunami in Banda Aceh.

ASM Annual Scientific Meeting – Adelaide 2007

The scientific program for the Adelaide ASM conference to be held in July 2007 is now being organised.

It is important that members provide information on potential topics and speakers for symposia to the appropriate Divisional Chairs. Symposia are organised by NSAC and are divided into four main divisions. Each division has a Chairman who oversees the organisation of 10 themed symposia, each with three speakers. Each division also represents a number of SIGs.

Please contact the following Chairs with any suggestions for topics and speakers.

LOC Chair

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Divisional Chairs

Division 1	David Ellis	dellis@adelaide.edu.au
Division 2	Tuck Weng Kok	tuckweng.kok@imvs.sa.gov.au
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Division 1 – Medical & Veterinary Microbiology

Antimicrobials, Mycobacteria, Mycology, Mycoplasmatales, Ocular Microbiology, Parasitology and Tropical Medicine, Public Health Microbiology, Serology, Veterinary Microbiology, Women's and Children's Microbiology

Division 2 – Virology

Virology

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