"Operation South East Asia Tsunami Assist": an Australian team in the Maldives

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Mention "the Maldives" and everyone immediately conjures up images of unspoiled coral islands, holiday resorts, spectacular diving sites and great surf. The Maldives (from the Sanskrit "mala-dvipa", meaning "garland of islands")[1] is all that and more, from the bustling capital city of Malé to the 200 serene inhabited islands where the traditional occupations of fishing and boat building continue as they have for centuries.

When the earthquake and subsequent tsunami struck Aceh on 26 December 2004, most Australians were contemplating the public holidays ahead of them. The tsunami, travelling at speeds of up to 800 kilometres per hour, struck countries around the Bay of Bengal and across the Indian Ocean. Tremors were felt in the Maldives at about 06:25 local time, and the tsunamis hit the Maldive atolls between 09:00 and 09:30. As the 1–4-metre waves struck the islands, 82 people died, 200 people were severely injured and a further 1100 required treatment. Twenty-six people remain missing. An estimated 2167 households (15 000 people or almost 5% of the population) were displaced from their homes,[2] as over half the inhabited islands sustained damage (Box 1).

1 Tsunami damage in Kandholhudoo on the Raa atoll

Photograph: Andrew Robertson.

The Australian response

Like many on Boxing Day, we had missed the early reports of the evolving disaster in Asia. However, we were soon thrust into its midst by the early morning news on 27 December 2004, and by an urgent teleconference of the Australian Health Disaster Management Policy Committee, as we considered what medical support might be needed. This Committee, chaired by the Commonwealth Department of Health and Ageing, and with State, Defence Force and Emergency Management Australia representation, played a key role in advising the Australian Government on what response could be mounted quickly.

By early on 28 December, it became obvious that we needed to send civilian medical teams into the tsunami-affected areas. While the Australian Defence Force had prime responsibility for deploying medical teams into areas affected by both the 1998 Aitape (Papua New Guinea) tsunami and 2002 Bali bombing,[3,4] Australia has not often deployed civilian medical teams into disaster areas. Most states and territories base their internal disaster relief medical teams around major hospitals; this is a practice which has been questioned since the 1997 Thredbo disaster.[5] However, as the Western Australian State Health Coordinator in times of disaster, I knew we could put a medical team together at short notice. For the first teams, we relied on advice from Chief Health Officers and Directors of Medical Services within Australia as to who might be appropriate, available within hours and experienced in providing health care in developing countries. While effective, personal preparations were *ad hoc*, the initial choice of team members has since been debated, and issues such as in-country operating funds, team expenditure and telephone costs are still being resolved.

Our key problems were time and distance, particularly as teams comprising members from different states were all leaving from Sydney (28 in two teams to Aceh and one team of 17 to the Maldives).[2] For once, the "red-eye" overnight flight for those travelling from Perth to Sydney was to our advantage, enabling us to get the team to Sydney rapidly. The logistics of assembling a team, equipping it (for medical work and to live in the field), reassembling it when its role changed from surgical care to public health, and deploying it in it the 24 hours after arrival, was challenging.

The team bound for the Maldives included a team leader (Andy Robertson), three general practitioners (Mark Adamski, Vince Duffy, and Grahaeme Hatfield), two public health physicians (Krishna Hort and Danny Csutoros), three emergency physicians (Colin Myers, Michael Novy and Peter Roberts), an infectious diseases physician (Dominic Dwyer), an anaesthetist (Gavin Coppinger), three nurses (Muriel Leclercq, Jeff Williams and William

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2 Destruction on Vilufushi in the Thaa atoll

Photograph: Gavin Coppinger.

3 Members of one of our small teams being conveyed in a small fishing boat (dhoni)

Photograph: Colin Myers.

Kerr), a paramedic (Greg Gibson), an environmental health officer (Paul Miller) and a logistics officer (Chris Sykes). With great assistance from the NSW Ambulance Counter Disaster Unit, Westmead Hospital, Queensland Health, the NSW Fire Brigade and Emergency Management Australia, this team, along with tonnes of cargo, deployed on a loaned QANTAS 747 early on 30 December 2004, and arrived in Malé that evening. During this flight, it became clear that a doctor was required to accompany 70 injured Australians from Colombo back to Sydney, and emergency physician Peter Roberts readily volunteered.

In the Maldives

The significant number of dead and injured had been well managed in the central Indira Gandhi Memorial Hospital in Malé and in regional hospitals and island medical centres.[6] Having survived the initial onslaught, the Maldivians were now concerned about subsequent epidemics and other public health issues (including food and water supply), as well as primary care; our team, with its public health and infectious diseases physicians, environmental health officer and GPs had been structured with that in mind.

The damage to the affected islands and the bravery of the people was noteworthy. Many reported the tsunami hitting from both sides of their island, leaving them with nowhere to run.

There was a strong sense of community among the Maldivians, who banded together in this time of devastation. Maldivians pride themselves on cleanliness, and many went to neighbouring islands to help clean up. On islands such as Vilufushi and Madifushi, where near total destruction reigned and rubble lay everywhere (Box 2), "Where do you start?" was the question in everybody's mind. The enthusiasm of the Maldivian people meant the teams were universally well received and the communities were keen to work with the teams to address local issues.

Health care delivery across 200 islands was never going to be easy (Box 3). Moving personnel, equipment and resources and patients was a challenge, as virtually all transport meant traversing water. The teams used everything from small fishing boats (dhonis), Coastguard landing craft, hospital boats and ocean-going ships to seaplanes and Indian Airforce transports.

It was critical to work closely with Maldivian Ministry of Health staff to "value add" to their efforts. This meant working in small teams with local staff throughout the Gaafu Alifu, Thaa and Raa atolls, south and north of Malé.[6] Several islands had not seen medical staff since the tsunami and many were running short of pharmaceuticals—we were able to provide both (Box 4). There was a range of public health issues that needed addressing, from discouraging the use of chlorine on dead fish and animals, with resultant shortages of chlorine for the wells (Box 5), to monitoring the populations for outbreaks of dengue, scrub typhus and diarrhoeal diseases. Public health team members worked closely with the Ministry of Health's Water and Sanitation division to implement strategies for accommodation, children's health, water and sanitation, solid waste management and asbestos disposal. Strategies included acquiring bedding for islanders evacuated to other islands and arranging the supply of fruit and vegetables, especially for children, where local crops had been destroyed.

4 Reviewing patients at a clinic in Madifushi, Thaa atoll

Photograph: Vince Duffy.

5 Damage to wells in Viligili, Gaafu Alifu atoll

Photograph: Michael Novy. Courtesy of WA Health Department.

There were also continuing problems with tsunami-related injuries. Many people on the worst affected islands had been swept out to sea, and presented with chest infections in resultant "near drowning" syndromes. Infected wounds, abrasions and crush injuries were also evident. Outbreaks of gastroenteritis and respiratory disease were fortunately uncommon, and exacerbation of locally endemic infectious diseases (including dengue and scrub typhus) had not occurred. Anxiety and depression, as the islanders struggled to come to terms with the destruction, were common.

In giving health support, it was important not to become a burden on the local government. There were unfortunate cases of well-intentioned, but misguided, attempts by other international medical teams to take over the local health system or provide services that weren't needed (eg, trauma surgery), and this placed further strain on Ministry of Health staff.

Conclusion

The health response by the Maldives government was one of the few success stories after the tsunami. This rested on a well-organised, pre-existing infrastructure encompassing effective inter-island transport and island-based health care centres. Many issues remained, however, including profound anxiety about further waves; loss of the breadfruit, guava and other fruit trees following salt water contamination; contamination of drinking water; future withdrawal of foreign health care personnel; and concern that the Maldives may be forgotten in its recovery phase by both tourists and charities.

Australia's health response was rapid, effective and appropriate, but we did learn some lessons (Box 6). In the future, our response could be improved with the establishment of pre-selected state-based Disaster Medical Assistance Teams.[7] Teams that later went to Aceh were state-based, and had the benefit of enough time to select, prepare and equip their personnel before deployment. The multi-jurisdictional nature of the earlier teams, however, captured the spirit of the Australian desire to assist all those affected by the tsunami.

Competing interests

None identified.

6 Lessons learnt for team deployment

Health intelligence

- Accurate health information needs to be provided to the teams before deployment.

Team selection

- Military, developing country and/or rural and remote medical experience and disaster medicine training is useful.
- Team member flexibility is critical, especially being able to improvise and adapt to constantly changing circumstances.
- Interpreters, or team members who speak the local language, are highly desirable.

Equipment

- National modular checklists of both self-sufficiency and medical stores need to be further developed, incorporating sections on primary care, paediatrics, chronic care and public health (including vaccines).
- There is a need for team-identifying clothing, principally vests and headwear.

Communications

- A clear command and control structure is essential.
- Satellite phones with international coverage, and international roaming mobile phones are critical.

Logistics

- Funding, insurance and indemnity issues should be resolved before deployment, including cash advances (US dollars were widely accepted) and credit cards.
- Guidelines on what will be funded on deployment (eg, mobile phone use, purchase of clothing) are necessary.

Transport

- Agreements with commercial airline companies to rapidly deploy team members should be explored further.

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